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IMPACT OF CO₂ IMPURITY ON CO₂ COMPRESSION, LIQUEFACTION AND TRANSPORTATION

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IMPACT OF CO₂ IMPURITY ON CO₂ COMPRESSION, LIQUEFACTION AND TRANSPORTATION

Key Messages

- The study identified twelve worst-case but plausible impurities scenarios that are representative of the main CO₂ capture processes.
- Impurities greatly affect the thermodynamic and transportation properties of CO₂ streams.
- Apart from pure CO₂, the CH₄-rich scenario exhibited the most desirable qualities for dense phase pipeline transport.
- Only one case (i.e. adsorption with high N₂ content) showed significantly higher compression energy requirement than the other scenarios, being 7% more than the base case.
- For dense phase transport, the worst-case scenarios (i.e. adsorption with high N₂ content and oxyfuel combustion with high O₂ content) would lead to an increase in pipeline sizes compared to the base case, which would raise their capital cost.
- Temperature has a more pronounced effect on density than pressure, meaning that in order to increase the pipeline's capacity the inlet temperature should be as low as possible.
- Saturation pressure of CO₂ is a critical variable for fracture control. Especially H₂ has a strong elevating effect on saturation pressure. High levels of O₂ and N₂ also lead to an increase.
- The water specification for some scenarios (i.e. adsorption with high N₂ content and oxyfuel combustion with high O₂ content) will require careful consideration, due to the influence of impurities on water solubility, which in turn can affect corrosion and stress corrosion cracking. CO and H₂S may also increase the risk of stress corrosion cracking.
- Ship transport under most investigated scenarios would be uneconomical, as it requires high pressures and very low, i.e. cryogenic, temperatures. Thus, it might only be economically viable in case of very high CO₂ purity. The general arrangement and design parameters would likely be similar to a Type C ship for liquefied natural gas (LNG) but need to consider the significant variation in density of different impurity scenarios.

Background to the Study

The impurities present in CO₂ streams are important for CO₂ pipeline and ship transportation affecting various aspects, such as the range of operation, safety considerations, fracture control, cracking, corrosion control, dispersion in the event of a release, fluid density, operating pressure, temperature and the quantity of CO₂ that can be transported. The range and levels of potential impurities emitted from CO₂ capture facilities will differ between different power plant and industrial sources and also between the capture technologies installed at the source. However, the potential CO₂ specifications that could enter the transport and storage systems, particularly from industrial sources, remain relatively under-researched. Therefore, it is essential to improve the understanding of the effect of these potential impurities on CO₂ compression, liquefaction and transportation under relevant conditions.



IEAGHG has identified the need to investigate these effects and commissioned a study to a consortium led by Newcastle University and including the University of Edinburgh.

Scope of Work

The main objectives of the report are to:

- Review the CO₂ impurities that could be present from different CO₂ capture technologies and develop twelve CO₂ impurity scenario compositions for further analysis;
- Evaluate these impurity scenarios for CO₂ physical and transport properties. The properties that are investigated are the dew point, bubble point, melting point, density, Joule-Thomson coefficients, speed of sound, viscosity and thermal conductivity.
- Evaluate the effects of the impurities on CO₂ compression and liquefaction in terms of performance and energy requirements;
- Identify the effects of the impurities on the operating conditions for both pipeline and ship based transportation;
- Evaluate the effect of the impurities on the selection of materials for pipeline and ship transportation.

Table 1 summarises the twelve CO₂ impurity scenarios developed at the beginning of this study.

Table 1 CO₂ impurity scenarios

Scenario number	Scenario name	Component (all values % by volume)							
		CO ₂	O ₂	N ₂	Ar	H ₂	CO	H ₂ S	CH ₄
1	REF	100							
2	CO ₂ MEM1	93		7					
3	CO ₂ MEM2	97	3						
4	ADS1	90	1	9					
5	ADS2	95		5					
6	Ca LOOP	95	1	2	2				
7	OXY1	90	6	3	1				
8	OXY2	96.5	0.5	2.5	0.5				
9	PRE	98				2			
10	H ₂ MEM	96		1		1	0.5	1.5	
11	CH ₄ -RICH	98							2
12	TGR-BF	96		0.5			3.5		

Acronyms: ADS - adsorption; Ca LOOP - Calcium looping; CO₂ MEM - CO₂ membrane; H₂ MEM - H₂ membrane; OXY - oxyfuel; PRE - pre-combustion; REF – reference; TGR-BF – Blast furnace with top gas recycling



Findings of the Study

Impact of impurities on CO₂ physical properties

This section investigates the effect of the addition of the components identified in the scenarios developed on the physical properties of CO₂, i.e. regarding location of the phase boundaries, density, speed of sound, Joule-Thomson coefficient, viscosity and thermal conductivity relative to pure CO₂. The twelve scenarios identified represent a plausible range of ‘worst case’ scenarios for steady-state operation. The pressures and temperature ranges to cover the physical properties were selected to be representative of dense phase pipeline operation, a pressure of 15MPa was chosen and a temperature range of 0 to 50°C.

Details regarding the reference equations and assumptions used are laid out in the main report. Since not all experimental work covers the regions of interest in this paper, the thermodynamic and physical properties of the mixtures are modelled. Furthermore, there is limited experimental data available for the properties of potential captured CO₂ streams. In addition, for some impurity combinations, due to the lack of experimental data, the equations of state are operating in regions where they are less robust.

The qualitative effect of an impurity can be inferred from the binary behaviour but its behaviour in more complicated mixtures cannot be quantified by looking at the binary behaviour. The physical properties of the scenarios are compared with pure CO₂ in order that the worst case scenarios can be selected.

Figure 1 to Figure 3 show exemplary physical and transportation properties for all scenarios, i.e. bubble point curves, densities and dew point curves. Optimum dense phase transport requires low bubble point curves and high densities, whereas optimum gas phase transport needs high dew point curves. The dense phase Scenarios 4 (ADS1), 7 (OXY1) and 2 (CO₂MEM) tend to produce the least desirable qualities for pipeline transportation. These CO₂ streams have the lowest proportions of CO₂ and have the highest bubble point curves, compressibility, Joule-Thomson coefficient and the lowest densities, speed of sound and thermal conductivities. However, it is worth noting that these scenarios have the lowest viscosities.

Apart from pure CO₂, Scenario 11 (CH₄-RICH) has the most desirable qualities for dense phase pipeline transportation with the lowest dew point curve, Joule-Thomson coefficients and compressibility and the greatest density and speed of sound. This is balanced with the fact that it has the lowest thermal conductivity and the highest viscosities. It should also be noted that, even though it has a high CO₂ purity (98%), Scenario 9 has shown relatively undesirable dense phase pipeline transportation characteristics because H₂ has large effects in small quantities. For these reasons, Scenarios 4, 7 and 2 are selected for the worst cases for dense phase pipeline transportation.

Due to their relatively high compressibility, Scenarios 4, 7 and 2 show the highest compression power requirements for compression to dense phase.

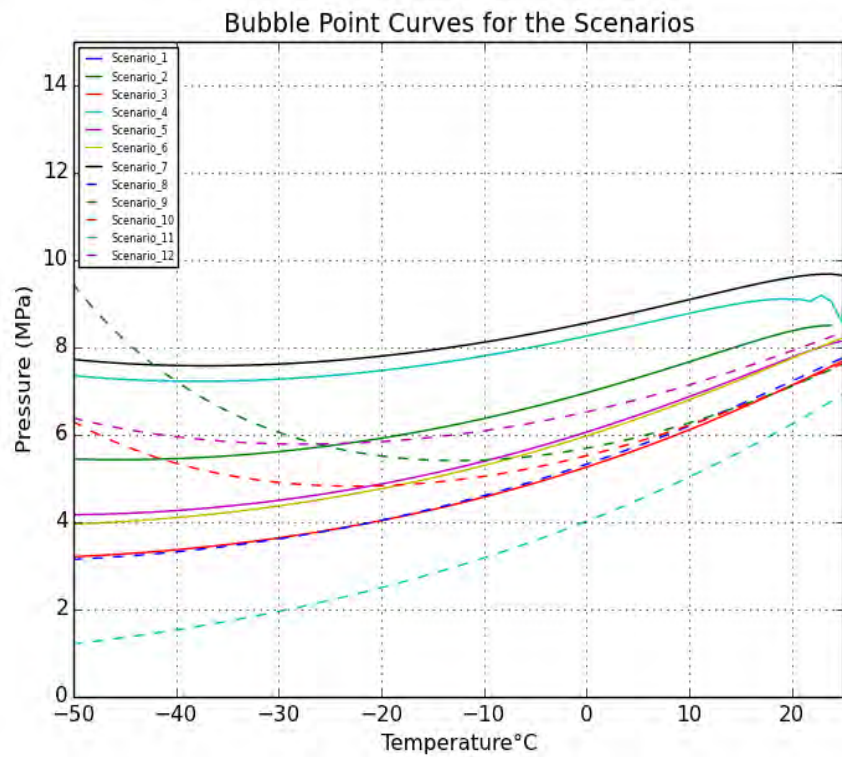


Figure 1 Bubble point curves for all scenarios

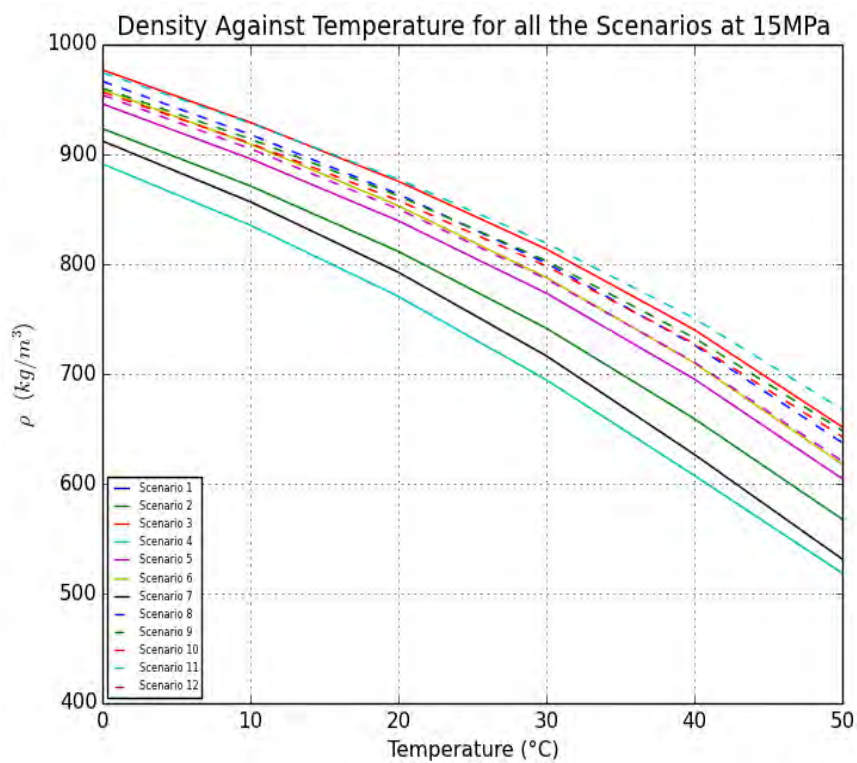


Figure 2 Densities for all scenarios

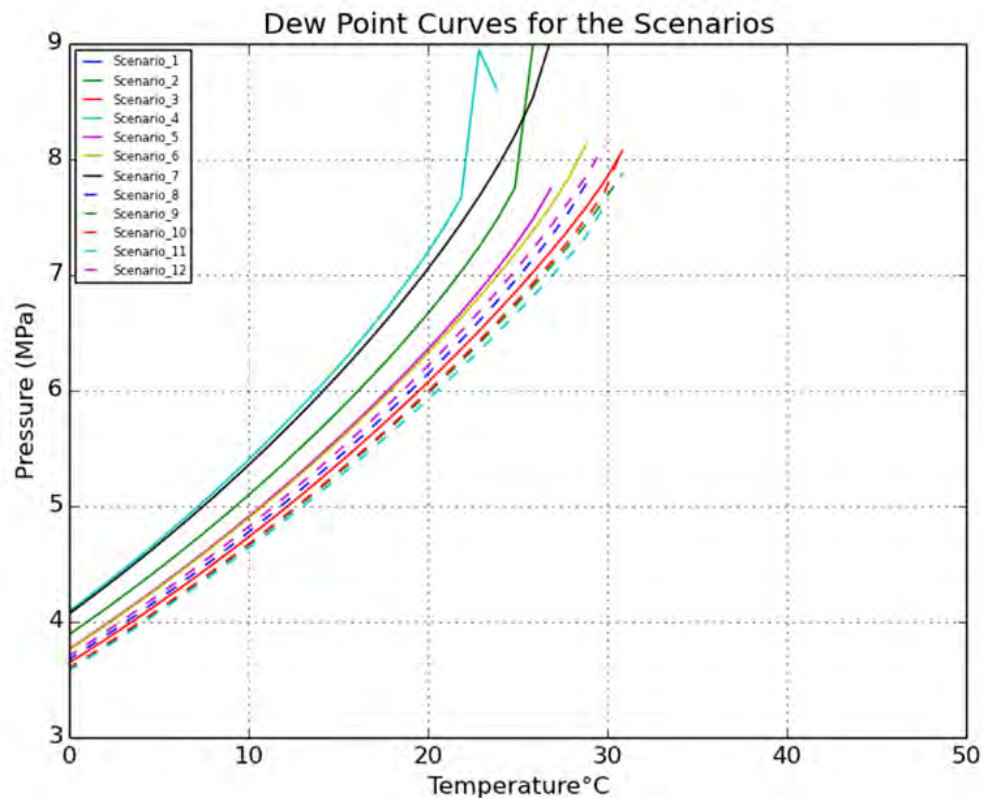


Figure 3 Dew point curves for all scenarios

Impact of impurities on CO₂ compression

Using commercially available pipeline simulation software, the energy requirement for a set of compressors for each scenario relative to a base case of pure CO₂ was evaluated and compared. The choice of base case sets the number of compression stages and the compression ratio at each stage. It should be noted, however, that the number of compression stages is process-specific and different project developers may adapt the number of compression stages used to better integrate the CO₂ capture and compression processes.

The inlet pressure and temperature were selected to be 1.6bar and 38°C respectively. These initial conditions are broadly representative of current recognized capture technologies and allow comparisons to be made between the scenarios. It should be noted that for specific CO₂ capture options actual compressor entry conditions should be used since these can have a noticeable impact on CO₂ compressor power requirements and costs.

A constant mass flow rate of 700,000 kg/h is assumed to entering the compressor. For the analysis of dense phase streams, it is assumed that the CO₂ flow delivered to the pipeline in the dense phase has a pressure of 110bar and temperature of 30°C. Table 2 in the next section summarises these and further assumptions for the analysis. For simplicity, this study has assumed a constant composition throughout the CO₂ compression process.

To draw clearer conclusions, the total power requirements of the anthropogenic CO₂ streams were normalized against the total power requirement of the REF case and the results are demonstrated in Figure 5. These are the data obtained with an efficiency of 85%.

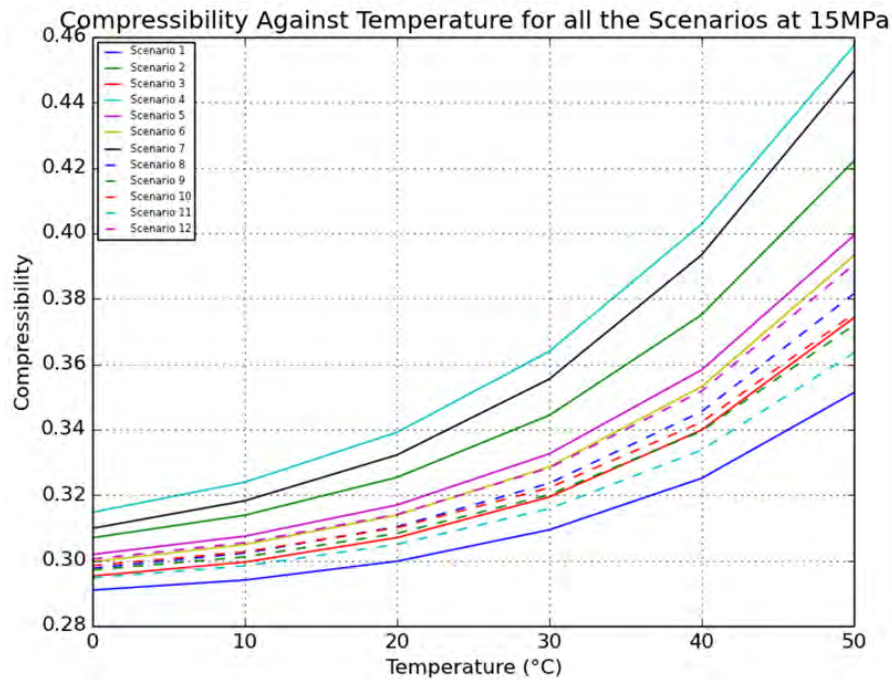


Figure 4 Compressibilities for all scenarios

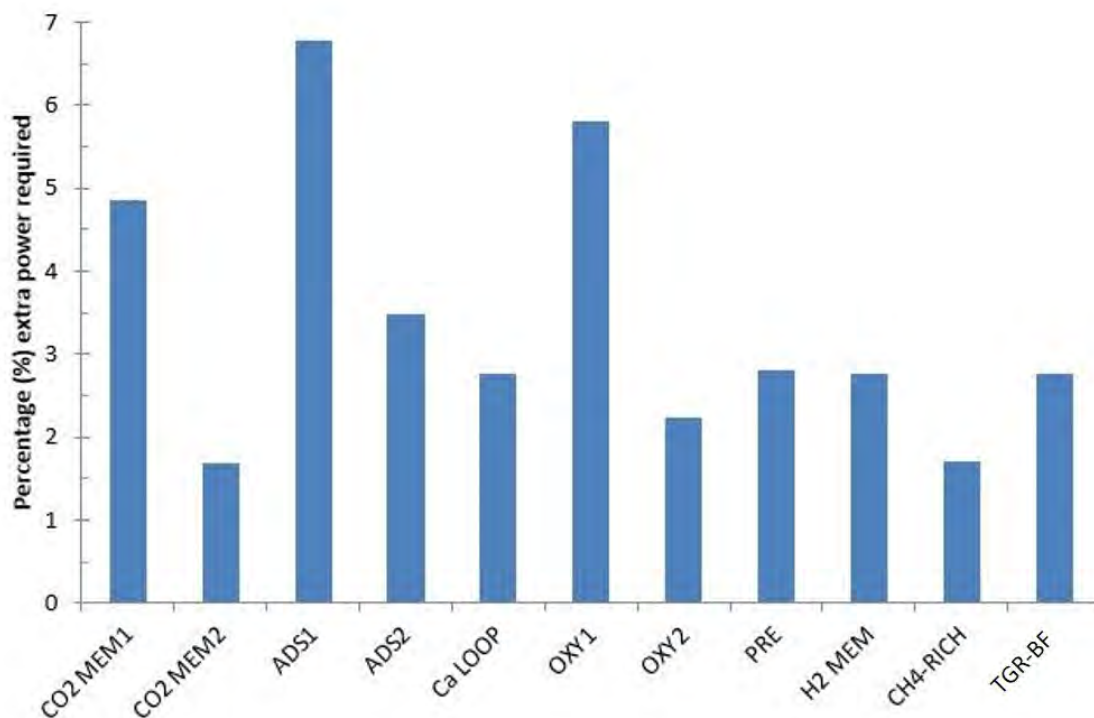


Figure 5 Extra power requirement of the impurity scenarios relative to the REF case

ADS1 is the worst-case scenario of all, with slightly below 7% extra energy requirements. Sorting the energy requirement of the anthropogenic scenarios, if only the composition varies (i.e. given that inlet conditions are assumed constant), then scenarios that also cause significant changes to compression power requirements are OXY1 and CO₂MEM1. This is in agreement with the compressibilities calculated and shown in Figure 4. Optimum compression processes require low compressibilities.



Impact of impurities on pipeline transport

Specifications

As demonstrated earlier, the impurities influence a wide range of thermodynamic properties, including the density of the stream, the specific pressure drop and the critical point. As a consequence, the pipeline design parameters such as diameter, wall thickness, inlet pressure, minimum allowable operational pressure (MAOP) and the distance between booster stations are potentially subject to change. This will also have a great impact on the cost of whole CCS chain. CO₂ is generally transported in the dense phase at temperature and pressure ranges between 12°C and 44°C and 85bara and 200bara. The lower pressure limit is set by the phase behaviour of CO₂ and should be sufficient to maintain single conditions while the upper pressure limit is mostly due to economic and material concerns. Regarding the temperatures, the upper temperature limit is determined by the compressor station discharge temperature and the temperature limits of the external pipeline coating material, while the lower limit is determined by the winter ground temperature of the surrounding soil.

To study the impact of the impurities on transportation, a set of assumptions have been assumed as listed in Table 3. The scope of this task is designing pipelines that transport the CO₂ stream from the capture site, where the CO₂ stream enters the pipeline at 110bar and 30°C and is transported to an onshore storage site or a terminal a distance of 150 km. This is a single point to point pipeline on a flat terrain.

Table 2 Initial condition considered for CO₂ transport

PARAMETER	VALUE	UNIT
Horizontal Distance	150	km
Elevation Difference	0	m
Roughness	0.0457	mm
Ambient Temperature	5	°C
Inlet Pressure dense phase	110	bara
Inlet Pressure gas phase	40	bara
Mass flow rate	700	ton/hr
Inlet Temperature	30	°C
Burial depth	1.1	m
Pipe steel yield stress	450	MPa
Steel Heat Transfer Coefficient	60.55	W/m ² /K
Soil Heat Transfer Coefficient	2.595	W/m ² /K

Hydraulics

Using the parameters in Table 2, the pipeline geometry requirements for dense phase transportation of the worst-case scenarios and of pure CO₂ case were calculated and are summarised in Table 3. Data for gas phase transport is available in Table 4.



Table 3 Comparison of pipeline dimensions, pressure and temperature losses for dense phase transportation

Dense phase	Calculated Pipe Parameters (mm)			P_{inlet}	T_{inlet}	P_{outlet}	T_{outlet}	Hoop Stress	%SMYS
	ID	wt	OD	bara	°C	bara	°C	MPa	
REF	490.4	8.8	508	110	30	84.87	15.39	317.5	71
ADS1	588	11	610	110	30	96.80	17.51	305.0	68
OXY1	588	11	610	110	30	97.20	17.53	305.0	68
PRE	490.4	8.8	508	110	30	83.3	15.78	317.5	71

Table 4 Comparison of pipeline dimensions, pressure and temperature losses for gas phase transportation

Gas phase	Calculated Pipe Parameters (mm)			P_{inlet}	T_{inlet}	P_{outlet}	T_{outlet}
	ID	wt	OD	bara	°C	bara	°C
REF	851.4	6.3	864	40	30	25.5	8.6
CH ₄ -RICH	851.4	6.3	864	40	30	25.0	8.7
OXY2	851.4	6.3	864	40	30	24.9	8.7
PRE	851.4	6.3	864	40	30	24.8	8.5

In order to transport 700Ton/hr (194.44kg/s) of pure CO₂ in dense phase, a pipeline of 508mm outside diameter would be required. The minimum thickness for this pipeline to comply with the maximum allowable tangential stress is 8.8mm. The maximum allowable tangential stress calculated as 324MPa and the designed stress limit is 317.5MPa. The choice of optimum wall thickness also keeps the pipeline weight to a minimum. This setup results in a 25.13bar pressure drop along the length of the pipeline which is equivalent to 16.75kpa/km and in agreement with allowable pressure drops limits in pipeline engineering. The delivery pressure is such that two phase flow in the pipeline is prevented. There is almost a 15°C drop in the temperature of the fluid, which makes the fluid slightly denser at the delivery point. This, in turn, causes a slight reduction in the erosional velocity. The erosional velocity ratio (flow mean velocity to erosional velocity) is around 0.3. The same design considerations as REF case have been applied in pipeline design for the worst case scenarios. The cases ADS1 and OXY1 require pipelines OD sizes of 610mm with wall thicknesses of 11mm. This keeps the hoop stress down to below 305MPa. Figure 6 shows the data for wall thickness and OD for the dense phase calculations of the worst case scenarios normalised to the REF case.

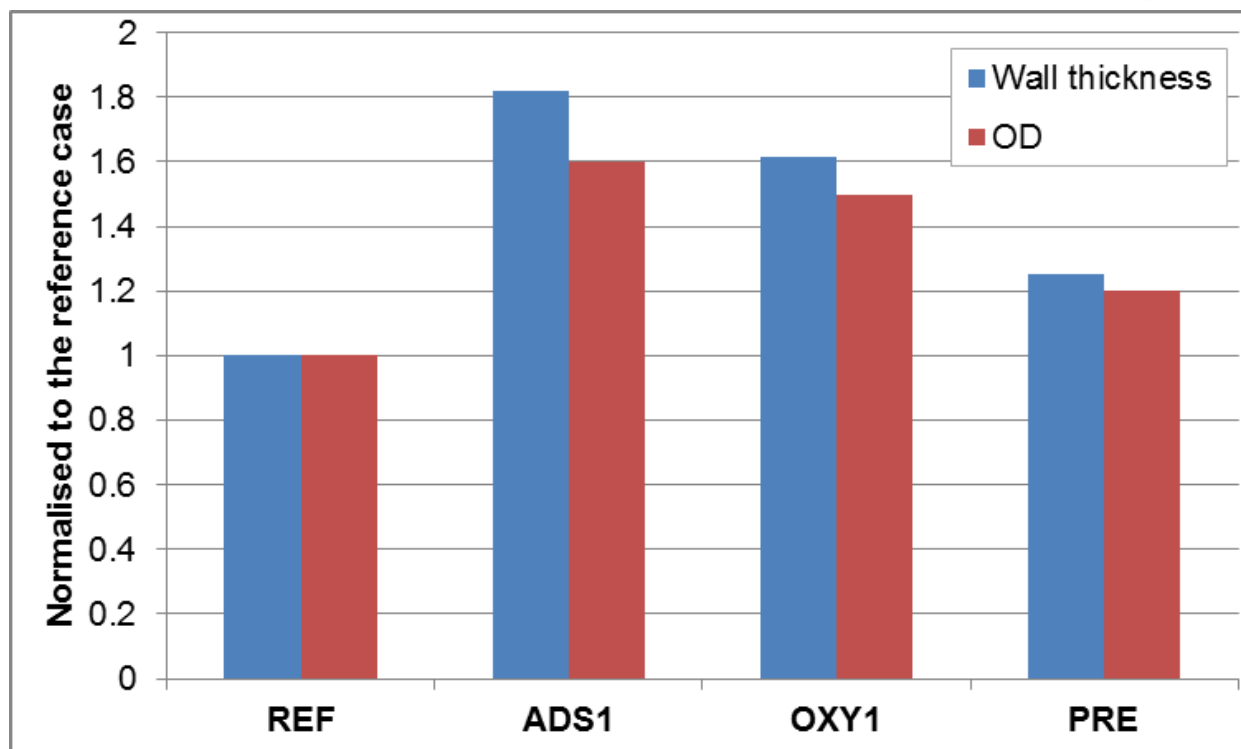


Figure 6 Effect of impurities on pipeline dimensions

Materials selection

It is highlighted that there is little published work on the types and levels of trace elements that could be present in the final captured CO₂. It could be considered that any components which could be present in the various waste streams of the plant could also be carried through to the exported CO₂ stream at very low levels. The types and levels of these trace elements therefore becomes very hard to quantify as coal and biomass can contain many different types of elements at low levels and some capture options might also add trace elements due to the nature of the process. Consequently, the approach in this work considers the effect that the trace elements could have on the various aspects of pipeline transportation and the levels required for these conditions to occur.

In order to identify a worst case composition from the developed scenarios, the saturation pressures have been calculated for each composition based on decompression from the pipeline operating conditions of 150bara and 30°C. The results are presented in Table 5. From this analysis, it can be seen that the OXY1 composition is the most troublesome composition to transport in terms of fracture control and will require careful consideration when designing the pipeline to ensure fracture arrest.



Table 5 Saturation pressure for all scenarios

Scenario number	Scenario name	Component (all values % by volume)								Saturation pressure
		CO ₂	O ₂	N ₂	Ar	H ₂	CO	H ₂ S	CH ₄	bar
1	REF	100								
2	CO ₂ MEM1	93		7						82.0
3	CO ₂ MEM2	97	3							69.5
4	ADS1	90	1	9						82.2
5	ADS2	95		5						75.5
6	Ca LOOP	95	1	2	2					79.8
7	OXY1	90	6	3	1					86.7
8	OXY2	96.5	0.5	2.5	0.5					77.2
9	PRE	98				2				62.3
10	H ₂ MEM	96		1		1	0.5	1.5		77.1
11	CH ₄ -RICH	98							2	59.0
12	TGR-BF	96		0.5			3.5			82.5

The specification of water in currently operating pipelines ranges between 640ppmv and 20ppmv to avoid the formation of free water in the pipeline at the operating conditions. However, whilst it is known that the presence of impurities will affect the solubility of water in CO₂, there has been little research into the absolute effects of these impurities and the published data is limited. The CO₂-H₂O-CH₄ system has been studied and the experimental results and thermodynamic models indicate that the addition of CH₄ requires a more stringent water content, as the solubility of water decreases with increasing CH₄ content. Similar results have been observed in the CO₂-H₂O-N₂ system where at a temperature of 40°C, an addition of 10% N₂ can lower the solubility of water in CO₂ by up to 26%. It is highlighted that this composition is similar to the ADS1 composition. Conversely, in the CO₂-H₂O-H₂S system, the solubility of water would increase with the addition of H₂S. Although these ternary systems provide useful information on the potential effects of individual components, the data on representative CO₂ streams as presented in the scenarios in this paper is extremely limited. In systems of CO₂ and 5.05% N₂ -3.07% O₂, 2.05% Ar at a pressure of 150bar, the addition of these impurities reduced the solubility of water by 20% compared to pure CO₂. This composition is similar to the OXY1 scenario considered in this paper and therefore water content for this scenario would have to be very carefully specified at the pipeline operating conditions to avoid associated degradation mechanisms.

Impact of impurities on ship transport

In order for the product to be kept in liquid phase, liquid carbon dioxide (LCD) will need to be transported in Type C tanks. Currently, Type C tanks have typical application for smaller liquefied natural gas (LNG) ships which are usually suitable for coastal trade for areas which lack



conventional gas pipelines. For example, 1000m³ capacity ships currently operate in remote coastal areas of Norway. However, larger vessels are currently being developed with Type C tanks. TGE Marine are currently constructing two 30,000m³ carriers, with class approval in principle, and already operate a 7,500m³ vessel. An advantage of Type C is the minimisation of the boil-off-gas (BOG). Some ships do not carry any BOG re-processing facility.

To enable containment of CO₂ mixtures in liquid form, the containment system must keep the product (above the triple point pressure) at pressures and temperatures that are above the bubble and melting point lines. This zone varies for different impurity scenarios. Some of the impurity scenarios can be transported in the liquid phase at around -57°C and 1 to 1.5MPa, with the others requiring higher pressures. The melting points are fairly invariant for the feasible containment pressures and range from -57°C to -73°C. Increasing the tank pressure further will move more scenarios further into the liquid phase. This improves the capabilities of the containment system for different impurity scenarios but some scenarios require unfeasible storage pressures.

Care must be taken to avoid formation of solids (dry ice) in the storage tank and when loading/unloading. This may indicate that higher tank pressures would be required. The suggested containment pressures/temperatures are similar to previously reported values.

It is feasible to transport certain impurities of CO₂ by ship. An equivalence to Type C LNG ships shows that the operating pressures and temperatures are within existing ship design scope. A suitable pressure/temperature combination for high purity CO₂ scenarios is 0.6MPa and -57°C. Increasing the tank pressure moves less pure scenarios into the liquid phase and improves the capabilities of the containment system for different impurity scenarios, although the majority of the worst case scenarios will require storage at unfeasible pressures. The general arrangement and fundamental design parameters of an LCD ship would likely be similar to a Type C LNG ship. The density of different impurity scenarios varies significantly. This would need to be considered for stability and sea-keeping during the ship design. It will also affect the payload capacity of the ship and would therefore impact on transportation costs.

Impact of impurities on buffer storage and liquefaction

Intermediate buffer storage could be placed in saline aquifers along the route of a pipeline or in a CO₂ terminal at the shore. However, these options could run into difficulties with health and safety bodies as well as public acceptance of onshore CO₂ storage. For CO₂ mixtures to be in the liquid state they must be stored at pressures and temperatures on the liquid side of the bubble point and melting point curves. Additional impurities in a pure CO₂ stream cause a two phase region to open up. Large quantities of these impurities tend to increase the size of the envelope, especially if they are very different to CO₂, and the envelope opens out away from critical point, i.e. at lower temperatures the bubble and dew point curves are further apart. Wider envelopes also have the dew and bubble point lines further apart and will require higher pressures to reach the liquid phase. There has been very little work done on low temperature CO₂ mixtures near the solid phase and impurities will affect the melting line, although there has been work done on the equation of state for solid CO₂ and the impurities in their pure form.

The lack of data on the melting point line for CO₂ mixtures leads to uncertainties in the liquid storage region. In order for mixtures with large amounts of impurities to be on the liquid side of the bubble point curve at low temperatures, large pressures are required. Therefore buffer storage of these types of mixtures is unlikely. For mixtures with a small amount of impurity, the properties



of the mixtures will be near identical to pure CO₂ and therefore the storage conditions and tank properties will be the same to those of pure CO₂.

The liquefaction states of CO₂ transport by ships that were investigated in this study are (i) 50°C, 7bara and (ii) -130°C and 7bara. A closer look at the condition (ii) reveals that all of the streams would be at their solid state for this condition; while in condition (i), many of the scenarios are either in the two phase region or in the gaseous phase (see Figure 1). Therefore it can be concluded that the decision on the conditions under which anthropogenic streams should be transported depends on the phase envelope of each stream.

Expert Review Comments

Nine reviewers were invited to provide feedback on the report, of which four submitted comments. In general, the majority of reviewers found that the report was well-written, provided a wealth of information underpinned by simulation data and presented a valuable contribution to the area. The contractors addressed several comments that asked for more clarification or references. However, there have also been some comments that were not addressed as they were considered out of the scope of this study and/or were not raised by a number of reviewers, e.g. regarding investigation of transient states, consideration of higher H₂S content, quantification of impurities' cost implications, impact on equipment, injection characteristics and leakage during transportation. Some of these topics might be a subject for further studies, as mentioned in the "Recommendations" section at the end. One reviewer did not agree with the chosen impurities levels for the scenarios. However, no changes were made here because other reviewers and IEAGHG regarded the numbers as appropriate.

Conclusions

It has been possible to identify twelve worst case but plausible scenarios in this work which are representative of the main capture processes. In the dense phase, the ADS1, OXY1 and CO₂MEM1 scenarios tend to produce the least desirable qualities for pipeline transportation. These CO₂ streams have the lowest proportions of CO₂ and have the highest bubble point curves, compressibility, Joule-Thomson coefficient and the lowest densities, speed of sound and thermal conductivities. However, it should be noted that these scenarios have the lowest viscosities. Apart from pure CO₂, the CH₄-RICH scenario has the most desirable qualities for dense phase pipeline transportation with the lowest dew point curve, Joule-Thomson coefficients and compressibility and the greatest density and speed of sound. That is balanced with the fact that it has the lowest thermal conductivity and the highest viscosities.

ADS1 show the highest compression energy requirements amongst all of the scenarios studied and this was 7% more than the base scenario. It is highlighted that this extra energy requirement is only at the compressor stages and does not represent the overall energy requirement for the whole process unit. In terms of dense phase transport, the worst case scenarios (ADS1 and OXY1) require increased pipeline sizes over the reference case of pure CO₂ for the design conditions considered. This will affect the capital cost of these pipelines. Temperature has a more significant effect on density than pressure for both pure CO₂ and CO₂ containing impurities. To increase the density and therefore capacity of the pipeline, the inlet temperature should be as low as possible.



For fracture control, the saturation pressure of the CO₂ stream is a critical variable that will determine the required pipeline dimensions and toughness to prevent a long-running ductile fracture. H₂ in particular has the most potent effect in raising the saturation pressure. The OXY1 scenario was the most difficult scenario composition to transport due to the high levels of oxygen and nitrogen which also raise the saturation pressure. Corrosion and stress corrosion cracking of plain carbon steel will not occur without the presence of water. The effect of impurities on water solubility is therefore critical. There is little information on water solubility available in the literature, but it has been shown that water specification for the ADS1 and OXY1 scenarios would require careful specification.

In order to liquefy the scenario compositions studied in this paper high pressure and low temperature conditions are required to maintain the fluid in its liquid phase. This renders these compositions uneconomical for transportation in the cryogenic liquid phase. It is feasible to transport high purity CO₂ streams by ship. The general arrangement and fundamental design parameters of an LCD ship would likely be similar to a Type C LNG ship but there are significant design and approval consequences if Type C vessels are applied for LCD in large volumes.

Recommendations

The authors of the study and the reviewers have identified the following areas for further work:

- Investigate more challenging CO₂ specifications for CO₂ transport systems in non-steady state conditions and particularly in upset conditions.
- A more detailed analysis with variations in CO₂ composition during compression, as composition is likely to have a significant impact on CO₂ compression requirements. A tailored, optimized compression route could be designed for each scenario based on the impurities existing in the CO₂ stream.
- Identify the best approach to setting pressure and temperature at the exit of the CO₂ capture plant, given the implications this will have for CO₂ transport, compression and/or liquefaction.
- Determine the cost implications of impurities on CO₂ transport and storage and recommend technically and economically reasonable ranges of impurities for CCS chain operation.
- For CO₂ capture from industrial sources, it may be valuable to review plant permits (rather than more generic best available technology documents) to improve understanding of the flows entering CO₂ capture, transport and storage systems.
- Consider a broader range of scenarios with different intercooling temperatures (e.g. depending on available cooling source) and a variety of heat exchanger options.

IEAGHG recommends investigating at least some of the points above in a future follow-up study.

**REPORT PREPARED FOR IEAGHG
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EXECUTIVE SUMMARY

INTRODUCTION AND SCOPE OF REPORT

The impurities present in CO₂ streams are extremely important for CO₂ pipeline and ship transportation affecting, various aspects such as, the range of operation, safety considerations, fracture control, cracking, corrosion control, dispersion in the event of a release, fluid density, operating pressure, temperature and the quantity of CO₂ that can be transported. The range and levels of potential impurities emitted from CO₂ Capture facilities will differ between different power plant and industrial sources and also between the capture technologies installed at the source. However, the potential CO₂ specifications that could enter the transport and storage systems, particularly from industrial sources, remain relatively under-researched. Therefore, it is of critical importance to improve the understanding of the effect of these potential impurities, which have not been widely studied, on CO₂ compression, liquefaction and transportation in relevant conditions.

IEAGHG has identified the need to study the effects of impurities in CO₂ streams on CO₂ compression, pipeline and shipping transportation. This study has been performed by a consortium led by Newcastle University and including the University of Edinburgh to address this need. The report:

- Reviews the CO₂ impurities that could be present from different CO₂ capture technologies and develops twelve CO₂ impurity scenario compositions for further analysis¹.
- Evaluates these impurity scenarios for CO₂ physical and transport properties. The properties that are investigated are the dew point, bubble point, melting point, density, Joule-Thomson coefficients, speed of sound, viscosity and thermal conductivity. Comprehensive tables and figures are provided for all of the scenarios investigated and for binary combinations of CO₂ with impurity².
- Evaluates the effects of the impurities on CO₂ compression and liquefaction in terms of performance and energy requirements.
- Identifies the effects of the impurities on the operating conditions for both pipeline and ship based transportation.
- Evaluates the effect of the impurities on the selection of materials for pipeline and ship transportation.

KEY FINDINGS AND CONCLUSIONS

Based on the work conducted the following conclusions can be drawn:

- It has been possible to identify eleven worst case, but plausible, scenarios in this work which are representative of the main capture processes and are compared to a reference case with 100% CO₂ (which is similar to that obtained by, for example, post-combustion capture using amines). These scenarios are summarised in Table E1. Descriptions of the scenarios are given in Section 2.
- Impurities greatly affect the thermodynamic and transportation properties of CO₂. For density, speed of sound, the Joule-Thomson coefficient and thermal conductivity an increase in impurity leads to worse dense phase pipeline transportation behaviour compared with pure CO₂. For viscosity, an increase in impurity levels tends to decrease viscosity which is a beneficial effect.

¹ For the purposes of this study the impurity scenarios are considered dry.

² The phase behaviour of CO₂ mixtures is crucial in determining the transportation pressure and temperature operating windows. The properties were chosen as they affect flow assurance and the safety of operation. Full details are given in Section 3.2.

- In the dense phase the ADS1, OXY1 and CO2MEM1 scenarios (see Table E1) tend to produce the least desirable qualities for pipeline transportation. These CO₂ streams have the lowest proportions of CO₂ and have the highest bubble point curves, compressibility, Joule-Thomson coefficient and the lowest densities, speed of sound and thermal conductivities. However, it should be noted that these scenarios have the lowest viscosities.

Table E1: CO₂ purity scenarios for developed in this study

Component (all values % by volume)	REF	CO2MEM1	CO2MEM2	ADS1	ADS2	Ca LOOP (also OXY-like)
Scenario number	1	2	3	4	5	6
CO ₂	100	93	97	90	95	95
O ₂			3	1		1
N ₂		7		9	5	2
Ar						2

Component (all values % by volume)	OXY1	OXY2	PRE	H2 MEM	CH ₄ -rich	TGR-BF
Scenario number	7	8	9	10	11	12
CO ₂	90	96.5	98	96	98	96
O ₂	6	0.5				
N ₂	3	2.5		1		0.5
Ar	1	0.5				
H ₂			2	1		
CO				0.5		3.5
H ₂ S				1.5		
CH ₄					2	

Acronyms: ADS-adsorption; CaLOOP-Calcium looping; CO2 MEM-CO2 membrane; H2 MEM-H2 membrane; OXY-oxyfuel; PRE-pre-combustion; REF-reference³

- Apart from pure carbon dioxide, the CH₄-rich scenario has the most desirable qualities for dense phase pipeline transportation with the lowest dew point curve, Joule-Thomson coefficients and compressibility and the greatest density and speed of sound. That is balanced with the fact that it has the lowest thermal conductivity and the highest viscosities.
- ADS1 show the highest compression energy requirements amongst all of the scenarios studied and this was 7% more than the base scenario. It is highlighted that this extra energy requirement is only at the compressor stages and does not represent the overall energy requirement for the whole process unit.
- In terms of dense phase transport, the worst case scenarios (ADS1 and OXY1) require increased pipeline sizes over the reference case of pure CO₂ for the design conditions considered. This will affect the capital cost of these pipelines. For transportation in the gaseous phase, the impurities did not result in a required increase in pipeline size for the pipeline design considered.
- Temperature has a more significant effect on density than pressure for both CO₂ and CO₂ containing impurities. To increase the density and therefore capacity of the pipeline, the inlet temperature should be as low as possible.

³ The REF case closely resembles post-combustion capture with amines.

- For fracture control, the saturation pressure of the CO₂ stream is a critical variable that will determine the required pipeline dimensions and toughness to prevent a long-running ductile fracture. Hydrogen in particular has the most potent effect in raising the saturation pressure. The OXY1 scenario was the most onerous scenario composition to transport due to the high levels of oxygen and nitrogen which also raise the saturation pressure.
- Corrosion and stress corrosion cracking of plain carbon steel will not occur without the presence of water. The effect of impurities on water solubility is therefore critical. There is little information on water solubility available in the literature, but it has been shown that the water specification for the ADS1 and OXY1 scenarios would require careful specification.
- Scenario compositions containing CO and H₂S (H2MEM, TGR-BF) are at risk from forms of stress corrosion cracking in the presence of water and therefore material specification would have to be carefully considered for these scenarios.
- In order to transport the scenario compositions studied in this report by ship, high pressure and low temperature conditions are required to maintain the fluid in its liquid phase. This renders these compositions uneconomical for transportation in the cryogenic liquid phase.
- It is feasible to transport high purity CO₂ streams by ship where the bubble point line remains sufficiently close to that of pure CO₂. An equivalence to Type C LNG ships shows that the operating pressures and temperatures are within existing ship design scope. A suitable pressure and temperature combination for CO₂ streams with a very high purity is 0.6MPa and -57°C. Increasing the tank pressure moves the scenarios into the liquid phase. However, most of the scenarios require an unfeasibly large pressure for ship transportation in the liquid phase.
- The general arrangement and fundamental design parameters of an LCD ship would likely be similar to a Type C LNG ship.
- Type C vessels have, thus far, only been carried on relatively small LNG ships. Therefore, there are significant design and approval consequences if Type C vessels are applied for LCD in large volumes.
- The density of different impurity scenarios varies significantly. This would need to be considered for stability and sea-keeping during the ship design. It will also affect the payload capacity of the ship and would therefore impact on transportation costs.

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LIST OF ABBREVIATIONS

BOG	Boil Off Gas
BTCM	Battelle Two Curve Model
CCS	Carbon Capture and Storage
CPU	CO ₂ Processing Unit
CTL	Coal to Liquid
EOR	Enhanced Oil Recovery
EOS	Equation of State
EVR	Erosional Velocity Ratio
GTL	Gas to Liquid
IDLH	Immediately Dangerous to Life and Health
IGCC	Integrated Gasification Combined Cycle
IMO	International Maritime Organisation
LCD	Liquefied Carbon Dioxide
LNG	Liquefied Natural Gas
MAOP	Maximum Allowable Operating Pressure
NETL	National Energy Technology Laboratory
NIOSH	National Institute for Occupational Safety and Health
P-R	Peng-Robinson
SCC	Stress Corrosion Cracking
STELs	Short Term Exposure Limits
VLE	Vapour Liquid Equilibrium line

1 INTRODUCTION AND SCOPE OF STUDY

The impurities present in CO₂ streams are extremely important for CO₂ pipeline and ship transportation affecting, amongst other things, the range of operation, safety considerations, fracture, cracking, corrosion control, dispersion in the event of a release, fluid density, operating pressure and temperature and the quantity of CO₂ that can be transported. The range and levels of potential impurities emitted from Carbon Capture and Storage (CCS) facilities will differ between power plant and industrial sources and also between the capture technologies installed at the source. However, the potential CO₂ specifications that could enter the transport and storage systems, particularly from industrial sources, remain relatively under-researched. Each potential impurity has its own unique properties and in turn will have a unique effect on each process of CCS. Not only does each impurity cause different effects, these effects, for any individual component, can vary with conditions and can, for example, alter gaseous and dense phase pipeline operation in different ways. Additionally, the mixture of impurities in CO₂ streams leaving different capture processes could vary substantially, leading to dramatically different effects on compression, transport and storage operations. Therefore, it is of critical importance to improve the understanding of the effect of these potential impurities, which have not been widely studied, on CO₂ compression, liquefaction and transportation in relevant conditions.

IEAGHG have identified the need to study the effects of impurities in CO₂ streams on CO₂ compression, pipeline and shipping transportation. This document has been prepared by a consortium led by Newcastle University and including the University of Edinburgh to address this need.

The report has been compiled in the following sections:

- Section 2 reviews the possible impurities present in captured CO₂ and develops a series of eleven ‘worst case’ scenarios plus a reference case that are used in the remainder of the study. It combines insights from a state-of-the-art review of the literature with a survey to elicit information from relevant practitioners and the expert judgement of the project team.
- Section 3 investigates the effect of the addition of the components identified in the scenarios developed in Section 2 on the physical properties of CO₂. The properties that are investigated are the dew point, bubble point, melting point, density, Joule-Thomson coefficients, speed of sound, viscosity and thermal conductivity. Comprehensive tables and figures are provided for all of the scenarios investigated.
- Section 4 reports on the effects of the impact of impurities on compression for reference base cases in terms of the energy requirements required to compress the twelve CO₂ streams for dense and gaseous phase transportation.
- Section 5 considers the impact of the impurities on the design of the pipeline system and in particular the hydraulic performance, whilst Section 6 investigates the effect that the impurities might have on the materials selection for the system. It is highlighted that the hydraulic analysis only considers steady state operation of the pipeline system. Although it is recognised that transient behaviour is an important consideration in pipeline design, it falls beyond the scope of this report.
- Ship based transportation is considered in Section 7, which considers the requirements for the liquefaction of the identified scenarios, and Section 8, which specifically addresses ship transportation requirements.
- Section 9 concludes the study and makes recommendations for future work.

2 REVIEW OF POSSIBLE IMPURITIES PRESENT IN CAPTURED CO₂

2.1 Introduction

Although there is some public domain information in the literature on impurities that are likely to enter CO₂ transport systems (e.g. NETL, 2013a), it is also widely acknowledged that state-of-the-art understanding in industry and from pilot plant operations is not fully reflected in public domain literature. The project team have, therefore, combined a critical review of the literature with a questionnaire used to elicit feedback from relevant experts that is not readily available in the public domain to explore possible impurities that may be present in captured CO₂. This section presents the results from this activity and the scenarios developed for use in this study based on this work.

Two general types of impurities can be considered. These are (1) those that may be present at %vol levels and, hence, have an impact on thermodynamic properties etc and (2) those that are likely to be present only at much lower (e.g. ppm) levels, but that may have important impacts on material performance, safety etc. The primary purpose of this Section is to identify a realistic set of potential impurities present at the %vol level in CO₂ produced by a range of CO₂ capture processes. Within this text, references to CO₂ impurities can be assumed to be on a volume basis, except where stated otherwise.

Although the scope of work is not exhaustive, it does aim to be sufficiently comprehensive to allow a range of plausible ‘worst case’ scenarios that could be faced by future CO₂ transport systems operating within CCS projects to be identified. It should be noted that this section does not take into account downstream constraints that may limit pipeline specifications. For example, at the time of writing, there is an emerging body of work on acceptable O₂ levels in the sub-surface that may lead to substantially tighter CO₂ transport specifications that would not be met by some of the scenarios considered in this study. The remainder of this report will explore the implications of potential impurities being present in CO₂ entering CO₂ transport systems, so that better informed judgements can be made on which impurities, if any, need to be removed before CO₂ transport.

IEAGHG asked the project team to consider a broad range of CO₂ sources, including major industrial emitters, as well as power plants. Section 2.2 provides an overview of likely compositions of gases entering CO₂ capture systems. Considerations for gas compositions relevant to pre-combustion capture are also introduced, but are addressed in more detail in Section 2.4. The majority of the remainder of this Section then outlines potential CO₂ composition when different CO₂ capture technologies are used, including when CO₂ is captured at selected large industrial sites (Section 2.3 – 2.6). The Section then concludes with an overview of the scenarios developed for the rest of this study based on this work (Section 2.7).

This Section draws on questionnaire responses, information available in public domain literature and the expert judgement of the project team. In general, it should be noted that most, if not all, participants in integrated CCS projects will have a view on CO₂ purity. For example, a project delivering CO₂ for enhanced oil recovery (EOR) may have CO₂ purity requirements that are substantially more stringent than for CO₂ that is stored in a saline formation. This study does not attempt to take all perspectives into account. Instead, it focusses on looking at impurities that could be present in captured CO₂ if this is considered acceptable to other participants in the CCS chain.

It should also be noted that there can be differences between what systems actually achieve and what they are guaranteed to achieve – and this may be particularly the case in the early stages of CCS implementation. Additionally, the focus of this study is on steady-state performance at design

conditions. Further work could consider the potential for more challenging CO₂ specifications to be supplied to CO₂ transport systems in non-steady state conditions and particularly in upset conditions. There is, however, very limited data available in this area even for the CO₂ capture technologies that are most developed.

Finally, the compositions reported and discussed in this Section are typically provided on a dry basis and in the remainder of this report it is assumed that CO₂ is dry when it enters the CO₂ transport system. Water content is, however, an important consideration in determining CO₂ pipeline specifications. For example, technical guidance issued by the Energy Institute on hazard analysis for onshore carbon capture installations and onshore pipelines (EI, 2010) noted that:

“A key cause for failure within carbon dioxide pipelines can be corrosion. It is recommended that operators of carbon dioxide pipelines define moisture contents for product entry into their pipeline systems, and rigorously monitor moisture content, specifying what corrective action needs to be taken if exceeded.” (EI, 2010)

Previous work commissioned by IEAGHG (2013) has concluded that:

“The technology required for CO₂ drying is commonplace. No significant improvements are expected for this process. However, research into water-carrying capacity of CO₂ streams with small amounts of various impurities has the potential to allow further optimization of these systems.”

Several R&D programmes are currently producing data that will improve knowledge of the impact of impurities on the water-carrying capacity of CO₂ streams (UKCCSRC, 2014) and the outcomes of this work should be integrated with the findings from this study as they become available.

2.2 Produced gas composition before CO₂ capture

The likely flue gas composition from conventional fossil-fired power generation is well-established (e.g. see below from Drage et al, 2012). In addition to these components there is potential for a substantial number of trace elements to be found in solid fuels and a wide range of trace components may, therefore, also be present in gases produced by combustion or gasification of solid fuels. The public domain CCS literature typically does not attempt to quantify the levels of these substances. It is, however, important to identify whether any substances that may be present in captured CO₂ at low levels (e.g. ppm or ppb) need to be given special consideration to ensure, for example, adequate materials life and CO₂ transport system safety. This is addressed further in later sections of this report, including Section 6.

In the future, it is likely that a broader range of fuels will be used in power plants and work is ongoing to understand likely flue gas compositions associated with this expansion in fuel source (e.g. Williams et al (2012) review). For example, it seems likely that biomass-derived flue gas will typically have lower contents of SO_x and NO_x than flue gases produced by pulverised coal combustion, but there is concern that the presence of relatively high levels of alkali metals and chloride in some fuels may be problematic. It seems unlikely, however, that there will be substantial increases in the %vol impurities present in CO₂ captured from biomass-derived flue gases when compared with flue gases produced by pulverised coal combustion.

For pre-combustion capture for power generation, fuel is typically gasified or reformed to produce synthesis gas (CO + H₂), which is then shifted to produce additional H₂ and CO₂. The impurities contained in this H₂ and CO₂ mixture will depend on process design decisions such as gasification temperature and whether a ‘sweet’ or ‘sour’ shift is used. Such decisions are typically closely linked

to the design of the process which will separate CO₂ from H₂, so discussion of pre-combustion capture gas compositions can be found in Section 2.4.

Table 2-1: Typical flue gas composition from conventional fossil-fired power generation (Drage et al, 2012)

Component	Coal ^a (no FGD/DeNO _x)	Coal (after FGD/DeNO _x)	Natural Gas
N ₂	75-80%	75-80%	74-80%
CO ₂	12-15%	12-15%	3-5%
SO ₂	1800 ppm	10-70 ppm	<10 ppm
NO _x	500 ppm	50-100 ppm	50 ppm
H ₂ O	5-7%	5-14% ^b	7-10%
O ₂	3-4%	3-4%	12-15%
CO	< 100ppm – occasionally 5000ppm	< 100ppm – occasionally 5000ppm	< 5ppm
Hg/As	Ppb	ppb	0
Particulates	10-20 mg Nm ⁻³	10-20 mg Nm ⁻³	not present
Pressure (MPa)	0.1	0.1	0.1
CO ₂ partial pressure (MPa)	0.012-0.015	0.012-0.015	0.005-0.01

^a Based on medium to high sulphur coal

^b The moisture content of post FGD (flue gas desulphurisation) flue gas will depend on whether a wet or dry technology is used. Wet FGDs (such as the common limestone/gypsum technology) typically produce a flue gas at outlet with between 10-14% vol H₂O.

Composition of CO₂ derived from industry sources is an important topic, which has so far received limited attention. Documents used to define Best Available Technology in Europe give an indication of components that may be present in CO₂-rich gases that feed CO₂ capture processes (e.g. EC, 2010; EC, 2012). One survey respondent suggested, however, that a more accurate picture would be obtained by reviewing operating permits for relevant installations. A review of this nature is beyond the scope of this study but could be considered for future work.

Although industry sources are very diverse, it seems likely that CO₂ entering CCS transport systems will ultimately often have similar composition to power plant derived CO₂ since technologies for capture from large-scale industrial sources often have somewhat similar characteristics to CO₂ capture options that are being considered for power generation. It can also be argued that likely regulatory and commercial arrangements for shared infrastructure that may be used by many industry sources will tend to lead to CO₂ pipeline entry specifications that will require CO₂ produced from all sources to meet common purity standards.

The project team determined, however, that two ‘special cases’ should be considered further in this study. These are (i) the potential for relatively large amounts of CO to enter transport systems that are receiving CO₂ arising from the iron and steel sector and (ii) CO₂ arising from natural gas production that contains CH₄. These are discussed further in Section 2.6. Although it may be possible to identify options for separating these impurities from the CO₂ stream, the focus of this study is to explore whether a CO₂ stream could be accepted into the CO₂ transport system without the need to introduce additional treatment steps for CO₂ ‘polishing’.

2.3 Post combustion capture

2.3.1 Liquid solvents

Pilot plant data, including information provided by survey respondents, suggests that CO₂ produced by post-combustion capture processes using amine-based solvents are likely to have very low levels of impurities present. This is also consistent with the literature in this area. For example, IEAGHG (2013) reported 99.97% CO₂, 0.02% N₂ and 0.01% O₂ (on a molar basis) for a natural gas combined cycle power plant using an MEA-based post-combustion capture process. It is also expected that post-combustion capture with amines where CO₂ is removed from the flue gas produced by pulverised fuel (e.g. coal or biomass) combustion will produce CO₂ that has a purity that is well above 99%. For example, IEAGHG (2013) reported 99.98% CO₂ and 0.02% N₂ (also on a molar basis) delivered to the CO₂ transport system for a supercritical pulverised coal plant using MEA-based post-combustion capture. Although this Section is generally not considering trace components in detail, it should also be noted that there is ongoing work to establish whether trace levels of solvent may be carried over into the CO₂ transport system.

Kuramochi et al (2012) suggested that for industrial processes, “*although considered less economical, feasibility of chemical absorption CO₂ capture has been continually investigated because it is the only available technology for most emission sources if CCS is to be deployed in the near future*”. If amine-based post-combustion capture is chosen for these processes then very high CO₂ purities can be expected, as with power plant applications (e.g. see IEAGHG (2008) study on CO₂ capture from cement plants).

Since pilot plant data and the literature is suggesting CO₂ compositions containing 99.9% CO₂ exiting the CO₂ capture system, the base case CO₂ composition used within this study is 100% CO₂. It should be noted, however, that a broad range of novel solvents are currently under development. These include phase change and demixing solvents. In many cases produced CO₂ compositions are not yet published for these solvents (and may not be known for real flue gases), but there may be potential for these to be somewhat different to the CO₂ produced by a typical amine-based benchmark post-combustion capture plant.

2.3.2 Calcium looping

One promising option for CO₂ capture that has progressed substantially in recent years is high temperature solid looping (e.g. see IEAGHG, 2014a). Different options are at different stages of development, but one well developed example is calcium looping, which is being demonstrated at pilot scale. Several studies in the literature focus on power plant applications, where calcium looping is applied as a post-combustion capture technology. For example, Berstad et al (2012) reported composition for two process simulations using natural gas as a fuel, both assuming drying to 500ppm for water, as shown in

Table 2-2. It should be noted, however, that this technology is potentially also very well suited to some industrial applications (e.g. cement production where the spent CaO from the calcium looping process can be used for cement production lowering the cost associated with sorbent replacement).

Table 2-2: Produced CO₂ composition entering CO₂ transport system for calcium looping with a natural gas fuel (data from Berstad et al, 2012)

Gas Source: Entering CO₂ transport system	
Major components (e.g. N₂, O₂, CO₂ etc)	
Component	% vol
CO ₂	94.84% / 95.58%
O ₂	0.94% / 0.84%
N ₂	2.29% / 1.94%
Ar	1.88% / 1.59%

Arias et al (2013) presented results from a pilot scale plant operating as a power plant with coal, but provided limited detail about produced CO₂ composition. This work suggests that sulphur containing compounds may be produced in the CO₂ stream. Informal discussions with relevant experts suggest that at the exit of the calciner of a post-combustion capture process (i.e. entering the CO₂ conditioning/compression process) there is likely to be no more than 2% O₂ and up to 0.5% N₂, with the most significant trace components expected to be SO₂ at levels no higher than 50ppm and NO at levels no higher than 500ppm and likely to be substantially lower for some systems. Particulate removal is also expected to be particularly important for calcium looping systems with ash and potentially also fines from attrition of CaO in the process needing to be removed to low levels before the CO₂ enters the compression and transport system.

Based on the data provided in Table 2-2, the ‘Ca LOOP’ scenario considered further in this study assumes 95% CO₂, 1% O₂, 2% N₂ and 2% Ar. Illustrative values of 95% CO₂ and 2% N₂ lie between the values reported in Table 2-2. 1% O₂ provides a case that is slightly worse than suggested in Table 2-2, but consistent with the limits suggested by relevant experts. Compositions in this study are typically defined to one significant figure given the uncertainty associated with differences between different design and implementation of CO₂ capture systems and associated fuel choices. The balance of the produced stream is assumed to be Ar since no other major components are reported, leading to an illustrative 2% Ar in the produced CO₂ stream.

2.3.3 Low temperature adsorbents for post-combustion capture

In addition to work on high temperature solid looping cycles there is ongoing work to develop adsorbents for low temperature operation in post-combustion capture applications. Much of the literature on new adsorbents is now concerned not only with the CO₂ adsorption capacity but also with the stability of the material in the presence of impurities in particular SO_x, NO_x and water (e.g. Zhang et al, 2009; Ruiz et al, 2013). Impurities could adsorb on the solid and therefore reduce the working capacity for CO₂, leading to reduced CO₂ capture rates if the multistage adsorption process is not designed and operated correctly taking into consideration this penalty. The interaction of the impurities with the solid can be irreversible, poisoning the solid and therefore reducing progressively the performance of the material, or it can be reversible; in this latter case the impurity would be released during the desorption step together with the CO₂ and therefore would appear in the concentrated CO₂ stream sent to compression.

Currently, the adsorption processes that are proposed in the literature include steps for the purification and the dehydration of the inlet stream to avoid poisoning the material (NETL, 2012a). For example, Table 2-3 reports the results of a simulation a supercritical coal fired power plant run for the DOE by TDA using inputs from the experimental characterisation of adsorbent at the National Carbon Capture Center in Alabama, USA. The configuration contains a sulphur polish step to reach very low values of

SO₂ in the inlet to the capture unit. The outlet stream contains a substantial volume of water that is then knocked out in the compression train.

Table 2-3: Produced CO₂ composition entering CO₂ compression system for adsorption-based capture at a coal-fired power plant (data from NETL, 2012a)

Gas Source: CO₂ exiting capture plant (before compression)		
Major components (e.g. N₂, O₂, CO₂ etc)		
Component	% by vol (wet)	%by vol (dry – approx.)
CO ₂	50	94.7
N ₂	2.8	5.3
O ₂	0.1	0.2
H ₂ O	47.2	0.0
Ar	0.1	0.2

Table 2-3 is broadly consistent with the highest purity obtained in pilot plant data for illustrative adsorbent technologies treating coal-fired power plant flue gas that was provided by one survey respondent, as shown in Table 2-4. It is interesting to note, however, that this data suggests the potential for a substantial volume of N₂ to be present in produced CO₂ exiting the capture plant. This variation is likely to be due to the number of adsorption stages/columns that the pilot plant operators chose to use in these cases. It seems likely that the N₂ levels reaching CO₂ transport systems would be substantially less than 20% to avoid two phases in CO₂ compression or liquefaction process. Further work to explore trade-offs associated with reducing (or not) the level of N₂ entering the CO₂ transport system could be a useful future activity.

Table 2-4: Produced CO₂ composition entering CO₂ compression system for adsorption-based capture at a coal-fired power plant (pilot plant data from survey respondent)

Gas Source: CO₂ exiting pilot capture plant (before compression)			
Major components (e.g. N₂, O₂, CO₂ etc)		Trace components (e.g. HCl, HF, Hg etc)	
Component	% by vol	Component	ppm (by vol)
CO ₂	75-95	NO ₂ (dry basis)	25-28
N ₂	4-20	SO ₂ (dry basis)	0-120
O ₂	0.2-1.1		
H ₂ O	0-3.2		
Ar	0.1-0.3		

Due to the uncertainty in N₂ levels in produced CO₂, two illustrative scenarios are defined for adsorption technologies. The ‘worst case’ (ADS1) is assumed to have 90% CO₂, 1% O₂ (based on the worst case in Table 2-4) and balance N₂. As in other cases, it is assumed that negligible amounts of H₂O are present in the produced CO₂ stream and the relatively small volume of Ar reported in Table 2-4 is also neglected given the focus of this study on illustrative ‘worst case’ scenarios. The second, more optimistic, case (ADS2) is based on the dry composition reported in Table 2-3 with the relatively small volumes of O₂ and Ar reported here assumed to be less important than the relatively large volume of N₂ present in the produced CO₂.

2.3.4 CO₂-selective membranes

CO₂-selective membranes are also under development for post-combustion capture. One survey respondent provided data for a CO₂-selective membrane operating on coal-fired power plant flue gas at pilot scale, as shown in Table 2-5. For commercial application, other purification steps would be needed to increase the purity of the CO₂ stream before sending it to compression.

Table 2-5: Produced CO₂ composition before purification for membrane-based capture at a coal-fired power plant (pilot plant data from survey respondent)

Gas Source: CO₂ exiting capture plant (before compression)	
Major components (e.g. N₂, O₂, CO₂ etc)	
Component	% by vol
CO ₂	34
N ₂	46
O ₂	12
H ₂ O	7
Ar	1

For membrane capture processes, the actual configuration is expected to include several stages and modules; at least two stages with various options for recycles are required with the materials currently available (e.g. Merkel et al, 2010; Zhao et al, 2010). The experimental data available are for a single stage and therefore the purity of CO₂ in the output is quite low, as in the pilot plant data shown in Table 2-5. Based on these data, attempts have been made at simulating the complete configuration including the major impurities (typically water and SO₂), including the examples shown in Table 2-6 and Table 2-7.

The very wide range of potential produced CO₂ compositions reported in literature is related to the constraints imposed in the simulation and what is optimised in the study. The three examples shown in Table 2-6 are reported in the literature for CO₂-selective membranes treating coal-fired supercritical power plant flue gas. NETL (2012a) is based on data collected on polymeric membranes that are already commercial and have been tested at the National Carbon Capture Center in Alabama, USA. It should also be noted that due to the high permeability of water in most materials, for membrane separations it is generally expected that part of the purification would be performed during the compression to reduce the membrane area required and therefore the cost. A lower CO₂ purity in the stream exiting the last membrane stage is allowed and the water would be separated out in the compression train achieving 95% plus CO₂ purity in the high pressure stream going to transport, as shown in Table 2-7 which refers to the 83.6% CO₂ case from NETL (2012a) in Table 2-6.

Table 2-6: Produced CO₂ composition before purification for membrane-based capture at a coal-fired power plant (data from references cited)

Gas Source: CO₂ exiting capture plant (before compression)			
Component	% by vol or ppm (NETL, 2013b)	% by vol or ppm (NETL, 2012b)	% by vol or ppm (NETL, 2012a)
CO ₂	67.1%	89%	83.6%
N ₂	21.3%		6.6%
O ₂	12%	3%	0.2%
H ₂ O		7%	9.4%
Ar			0.08%
SO _x	32 ppm	276 ppm	<10ppmv
NO _x	73 ppm		

Table 2-7: Produced CO₂ composition entering the CO₂ transport system for membrane-based capture at a coal-fired power plant (data from NETL, 2012a)

Gas Source: CO₂ exiting CO₂ compression at pipeline delivery pressure	
Component	% by vol or ppm (NETL, 2012a)

CO ₂	99.6%
SO _x	508 ppmw
NO _x	3024 ppmw
Hg	0.05 ppmw
Particulate	561 ppmw

As already noted, differences in likely performance of membrane CO₂ capture systems that might ultimately be used commercially are relatively large, so this study again uses two illustrative cases to explore possible CO₂ stream impurities for CO₂ that has been produced by CO₂-selective membranes. As a ‘worst case’, these cases reflect the dry composition of the product streams reported by NETL (2012a) and NETL (2012b) in Table 2-6. It is important to note, however, that at least some O₂ and N₂ could be separated out from the produced CO₂ before entering the CO₂ transport system if this was considered to be the economically preferable approach to integrated CCS project design.

2.4 Pre-combustion capture

In pre-combustion capture systems, physical solvents are most typically used in situations where a relatively high partial pressure of CO₂ exists. The technologies that are currently dominant in the market (and typically suggested for CCS applications) are Rectisol (chilled methanol) and Selexol. If CO₂ is produced at relatively low partial pressure then a chemical solvent (often MDEA) will be used. For example, ELCOGAS experience at Puertollano with a chemical separation process is reported in Casero et al (2014). In this case, a 1/50th scale capture plant was integrated with a commercial-scale IGCC power plant. Characterisation tests were carried out using both sweet gas (after desulphurisation) and sour gas (before desulphurisation) as illustrated in Figure 2-1.

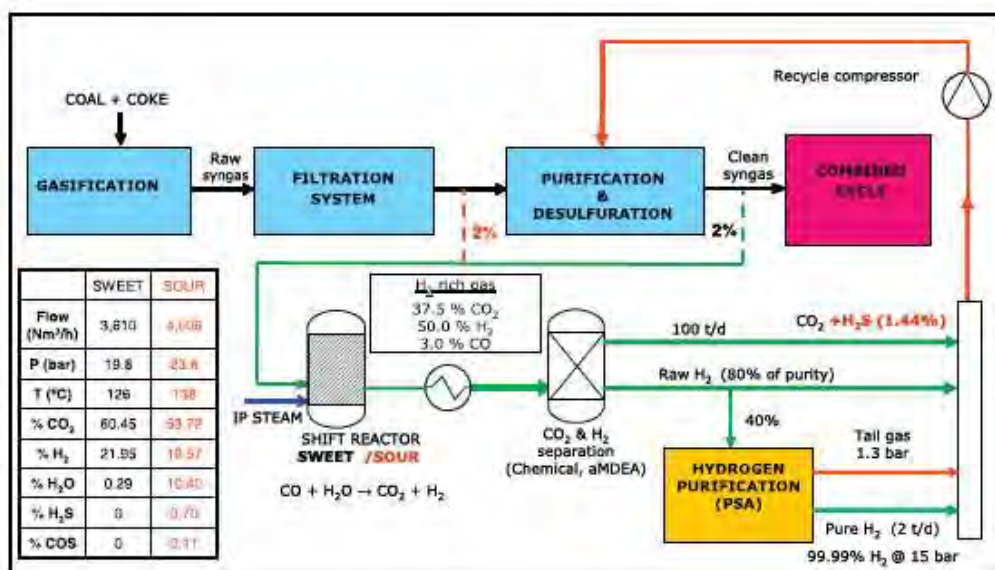


Figure 2-1: Block diagram of the ELCOGAS Puertollano CO₂ capture unit (source: ELCOGAS in Casero et al, 2014)

For this study, the ‘worst case’ is sour mode since more substantial levels of sulphur containing compounds could be found entering the shift reactor. Casero et al (2014) reported that “the CO₂ stream has a concentration of sulphide [H₂S] around 1% and 3% and a COS concentration around 5–22 ppm”. At Puertollano CO₂ was not transported to storage. It seems unlikely though, that these concentrations will be seen in CO₂ once it has been further prepared for CO₂ transport. For example, two questionnaire respondents provided data on IGCC plants with CO₂ capture (Tables 2-8 and 2-9). It should be noted that these compositions may be partly determined by expected safety regulations

related to H₂S content in streams to be transported in pipelines in many jurisdictions, although there are some locations where such regulations have not been introduced.

Table 2-8: CO₂ composition entering and exiting CO₂ capture for IGCC with using an amine-based pre-combustion capture system (operating data from survey respondent)

Gas Source: Entering CO₂ capture/clean-up system	
Major components (e.g. N₂, O₂, CO₂ etc)	
Component	% vol
N ₂	6.06%
H ₂	53.53%
CO ₂	38.86%
CH ₄	0.56%
CO	0.52%
Ar	0.07%
H ₂ S	0.09%

Gas Source: Exiting CO₂ capture/clean-up system (before compression)	
Major components (e.g. N₂, O₂, CO₂ etc)	
Component	% vol
CO ₂	98.84%
N ₂	0.09%
H ₂ O	0.26%
H ₂	0.76%

Table 2-9: CO₂ composition entering and exiting CO₂ capture for IGCC with using a physical solvent-based pre-combustion capture system (FEED study data from survey respondent)

Gas Source: IGCC, after Sour Shift			
Major components (e.g. N₂, O₂, CO₂ etc)		Trace components (e.g. HCl, HF, Hg etc)	
Component	% vol	Component	ppm (vol)
CO	1.9%	COS/H ₂ S	2000
H ₂	51.4%		
CO ₂	40.2%		
Ar/N ₂	Balance		

Gas Source: After Rectisol unit			
Major components (e.g. N₂, O₂, CO₂ etc)		Trace components (e.g. HCl, HF, Hg etc)	
Component	% vol	Component	ppm (vol)
CO ₂	99.56%	CO	600
		H ₂	2300
		Ar/N ₂	1150
		H ₂ S	20
		CH ₃ OH	240

Gas Source: After CO₂ Compression/drying			
Major components (e.g. N₂, O₂, CO₂ etc)		Trace components (e.g. HCl, HF, Hg etc)	
Component	% vol	Component	ppm (vol)
CO ₂	99.58%	CO	600
		H ₂	2300
		Ar/N ₂	1150
		H ₂ S	20
		CH ₃ OH	75

Table 2-8 provides data for an IGCC power plant using an amine-based pre-combustion capture system, although trace components are not reported, and Table 2-9 provides estimates of CO₂ composition at different points in an IGCC plant using a physical solvent based on a pre-FEED study.

The data provided in Table 2-8 is likely to be for a gasifier operating at a relatively low temperature. Substantial CH₄ contents are not typically expected with gasifiers that are mostly likely to be used for new-build IGCC plants in Europe and North America due to the gasifier designs and operating conditions that are expected to dominate in these markets (e.g. see Tables 2-10 and 2-11 later in this Section). Even in the case reported in Table 2-8, it is not expected that CH₄ will remain in produced CO₂ at %vol levels.

Table 2-9 suggests that low levels of CO and H₂S could be present in produced CO₂ and also that there is potential for some solvent carryover. It should be noted that the very low levels of H₂S reported here indicate a deliberate decision to remove this acid gas. In cases where this is not required it may be advantageous to allow H₂S to enter the CO₂ transport system. Removing H₂S is, however, a common approach to maintain operating lifetimes of engineering components used for preparing captured CO₂ for transport to storage (e.g. compressors) and also sometimes required by safety regulations, as noted above. This technology is well-established and further detail on the topic of gas treating and sulphur removal for gasification can be found in a comprehensive study undertaken by SFA Pacific for NETL in 2002 (Korens et al, 2002).

In both Table 2-8 and Table 2-9, the most substantial components expected to be observed in produced CO₂ are H₂ and N₂/Ar although these are reported to be present at levels below 1% vol. Some early studies suggested potential for somewhat higher levels of these impurities (Kather, 2009). By contrast, more recent work in the public domain has also suggested that pre-combustion capture at IGCC plants can achieve CO₂ purity levels of around 99.5% as illustrated in Table 2-10 (data from NETL, 2013b).

Table 2-10: CO₂ product to transport system for three gasifier options (NETL, 2013b)

Gas Source: CO₂ product to transport system (NETL, 2013b)			
Component	% vol (GEE)	%vol (E-Gas)	%vol (Shell)
CO ₂	99.48%	99.45%	99.44%
H ₂	0.48%	0.44%	0.50%
N ₂	---	0.01%	0.02%
Ar	0.02%	0.02%	0.02%
CO	0.02%	0.01%	0.02%
CH ₄	---	0.08%	---

It should be noted, however, that the NETL (2013b) study results reflect the decision to use a pipeline specification that requires <300ppmv N₂, <40ppmv O₂, <10ppmv Ar and <150ppmv H₂O. It is important that it has been demonstrated that IGCC plants with CO₂ capture can meet this specification. The primary purpose of this study is, however, to explore whether any or all of the ‘polishing’ steps that may have been used to meet this specification could be removed by allowing and/or designing CO₂ transport (and storage) systems to handle CO₂ that is somewhat less pure than this specification would allow. As shown in Table 2-11, recent work on pre-combustion CO₂ capture commissioned by IEAGHG (2014b) has suggested that somewhat higher levels of H₂ may be present in produced CO₂ although it is currently unclear whether these levels will be seen in practice given the calorific value of H₂.

The ‘PRE’ case considered in this work assumes 98% CO₂ and balance H₂ to reflect the ‘worst case’ values reported in Table 2-11. As in other cases, the presence of relatively small volumes of other components is neglected for clarity in comparisons between scenarios and since it is unlikely that the additional components will have a significant impact on relevant properties of the produced CO₂ stream. These additional components are considered in analysis of materials requirements etc, where relevant.

Table 2-11: CO₂ product to transport system for three gasifier options (IEAGHG, 2014b)

Gas Source: CO₂ product to transport system (IEAGHG)		
Component	%vol (GE)	%vol (Shell)
CO ₂	98.30	97.90
H ₂	1.61	1.88
N ₂	0.05	0.12
Ar	---	0.04
CO	0.04	0.06
CH ₄	---	---

Finally, adsorbents and membranes are also being developed and evaluated for pre-combustion schemes. Some of the same considerations valid for post-combustion applications can be applied in this case too. It should be noted that, as for post-combustion capture with CO₂-selective membranes, most of the studies are parametric simulations that build on experimental data for a single column or membrane module. In commercial operation, the final configuration of the separation process will consist of several stages for which pilot scale data are not available at the time of writing, especially regarding impurities.

The most relevant case for this study is represented by membranes. H₂ or CO₂ selective membranes can both be considered for pre-combustion capture applications. As noted above and as with CO₂ selective membranes for post-combustion (Section 2.5), most of the experimental data reported in the literature refers just to one membrane stage and not to the complete separation scheme. For H₂ selective membranes the species going through the membrane is H₂ and most of the research is devoted to maximising the purity and flux of hydrogen. It is, therefore, more difficult to find data on the impurities in the CO₂ stream. Based on this experimental data, some simulation studies have reported the expected results for the complete configuration.

It is worth noting that most schemes presented in the literature to reach the purity suitable for compression and transport involve a combination of both H₂ and CO₂ selective membrane with cryogenic steps since this is expected to lower cost and energy demand. Both metallic (e.g. Pd and Pd alloys) and polymeric membranes are evaluated for these schemes with different levels of purification of the syngas before the membrane stage. The availability of such different scenarios makes it hard to pin point one set of conditions in terms of pressure and temperature for the stream entering the compression stage. For example, a simulation study including one promising polymeric membrane reported in the literature based on data collected at National Carbon Capture Centre in Alabama, USA is as shown in Table 2-12, with an unusually high H₂S concentration reported after compression (Merkel et al, 2012). In the case of Pd, the metal is poisoned by H₂S and CO and therefore more control would be exerted before the separation and therefore very low levels are expected in the final CO₂ stream.

Table 2-12: Worst case CO₂ product for CO₂ capture with membranes in a pre-combustion capture application (Merkel et al, 2012)

Gas Source: Produced CO₂ exiting (140bar, 10°C)	
Major components (e.g. N₂, O₂, CO₂ etc)	
Component	% by vol
CO ₂	96.0%
N ₂	1.1%
H ₂	0.8%
H ₂ S	1.3%
CO	0.7%

The 'H₂ MEM' case considered in further work is based on Table 2-12. Consistent with other scenarios, values are typically given to one significant figure in the illustrative scenario (e.g. 96% CO₂, 1% N₂, 1% H₂). The balance between CO and H₂S is adjusted to 0.5% CO and 1.5% H₂S for consistency with this general approach without having a significant impact on the study findings.

2.5 'Conventional' oxyfuel processes

In many studies, the CO₂ capture processes that have included the most substantial levels of impurities in produced CO₂ have been oxyfuel processes. A broad range of processes are under development, but the majority of the literature and associated discussion in the CCS community has been focussed on close to commercial processes where fuel is burned in a mixture of O₂ and recycled CO₂-rich flue gas. A key feature of these processes is that they tend to produce a flue gas which contains a relatively large proportion of CO₂. The whole flue gas stream (apart from that portion recycled to moderate combustion temperatures) is then cleaned and compressed in a CO₂ processing unit (CPU) for transport to geological storage, rather than the CO₂ being separated from other gases as in post- and pre-combustion capture.

There have been substantial developments in understanding of achievable purity levels in oxyfuel-derived CO₂ in recent years. In general, oxyfuel vendors currently suggest that it will be possible to produce CO₂ with very limited impurities (e.g. to meet specifications set for CO₂ use in an EOR project). For example, >99% purity CO₂ was delivered at the Vattenfall Schwarze Pumpe due to CO₂ storage requirements associated with that project (Burchhardt and Griebe, 2013) and FutureGen 2.0 is predicting 99.8% CO₂ purity, with NO_x (1600ppmw) and O₂ (110ppmw) making up much of the balance (McDonald et al, 2013).

It is likely, however, that there will be some scope for cost-saving in situations where somewhat less pure CO₂ can be accepted by the CO₂ transport and storage system. For example, the Lacq demonstration project in France appears to have successfully transported rather less pure CO₂ to storage, although only in a 27km pipeline, as shown in Table 2-13 (Copin, 2013).

Table 2-13: Oxyfuel-derived CO₂ exiting the CPU at the Lacq demonstration project (Copin, 2013)

Gas Source: CO₂ exiting CPU		
Component	% by vol or ppm (range - 2013)	% by vol or ppm (typical - 2011)
CO ₂	90-93%	92.6%
N ₂	1-3%	<0.1%
O ₂	5-7%	6.3%
Ar	1%	0.9%
NO _x	<0.1% vol	150ppmv
H ₂ O, CO	<10 ppm vol	CO <0.03%, H ₂ O <10ppm

Although examples with lower purity CO₂ can be found, the majority of studies in recent years have reported oxyfuel-derived CO₂ capture processes delivering streams containing at least around 95% CO₂ to the CO₂ transport and storage system. For example, Oljatrev Group (2011) reports data from a CO₂ transport FEED study for a commercial-scale demonstration project that was considered for Janschwalde power plant, including CO₂ compositions for pipeline entry, as shown in Table 2-14. It is also interesting to note that this study indicates that no substantial changes in composition are expected when full and part load (50%) conditions are compared.

Table 2-14: Oxy-fuel derived CO₂ exiting the CPU in Janschwalde FEED study (Oljatrev Group, 2011)

Gas Source: CO₂ exiting CPU	
Component	% by vol or ppm
CO ₂	95.0%
N ₂	2.1%
O ₂	0.8%
Ar	2.1%
Other	ppm levels

This FEED study data is reasonably consistent with pilot plant data provided by a survey respondent for a coal-fired oxyfuel process, shown in Table 2-15. The respondent indicated that the stream exiting the CPU contained 94% CO₂, with remaining impurities including 2% O₂ and 2% N₂. The major components reported in Table 2-15 are consistent with EPRI work in this area (Thimsen, 2011) and also Vattenfall/Air Liquide design data (Simonsson et al, 2011). It should be noted, however, that somewhat substantial variations in NO can be found in these studies. Additionally, both Thimsen (2011) and Simonsson et al (2011) report CO as significant trace component (350ppmv and ~190Mg/Nm³ respectively).

Table 2-15: CO₂ entering the CPU for a coal-fired oxyfuel process (pilot plant data from survey respondent)

Gas Source: Entering CPU			
Major components (e.g. N₂, O₂, CO₂ etc)		Trace components (e.g. HCl, HF, Hg etc)	
Component	% by vol	Component	ppm(by vol)
CO ₂	82	SO ₂	32
O ₂	3	NO	664
H ₂ O	13	Hg	0.03(mg/Nm ³)
N ₂	2		

Finally, oxyfuel processes has also received some attention for some industrial applications. For example, a study commissioned by IEAGHG (2008) included an oxyfuel process for a cement production case where the calcination and fuel combustion are undertaken in an oxygen-rich atmosphere to produce a flue gas that contains mostly CO₂ and water vapour. The full process flow diagram and associated heat and mass balances are available in the study report and Table 2-16 shows the composition of the CO₂ exiting the CPU, which is the stream that is of most relevance to this study.

Table 2-16: CO₂ exiting the CPU for an oxyfuel capture process deployed in a cement industry application (IEAGHG, 2008)

Gas Source: CO₂ exiting CPU	
Component	kg/s (% by vol)
N ₂	0.43 (2.5%)
O ₂	0.09 (0.5%)
CO ₂	16.31 (96.6%)
Ar	0.04 (0.24%)
NO ₂	0.02 (0.11%)
SO ₂	0.00 (0.00%)
Total dry flow	16.89

In order to maintain focus on ‘worst case’ scenarios, the oxyfuel scenarios defined for further work are 90% CO₂ stream consistent with Table 2-13 (OXY1) and a 96.5% CO₂ stream consistent with Table 2-16 (OXY2). A slightly simplified version of the components that contribute less than 0.5% vol to the final CO₂ stream is used for OXY2 to aid comparison between scenarios. It should also be noted that the ‘Ca LOOP’ scenario composition is very similar to that reported in Table 2-14.

2.6 CO₂ capture from industrial sources

As noted in Section 2.2, the assessment of the project team is that in many cases CO₂ composition from industrial sources will be very similar to CO₂ captured from power plants due to shared capture technology characteristics. There are, however, some cases where the combination of gas to be treated and likely CO₂ capture process could lead to CO₂ specifications that are quite different to CO₂ captured in the power sector. Two cases that warrant particular attention due to their relative maturity are high-CO content gas in the iron and steel sector and high-CH₄ content gas arising from natural gas production.

In the iron and steel sector, an option that would make changes to conventional blast furnace design to use an oxy-fuel based process known as top-gas recycling (e.g. as in the ULCOS (Ultra Low CO₂ Steel) process). In this approach around 98% O₂ is injected into the blast furnace (rather than air) eliminating most of the N₂ in the system. Most of the CO₂ in the blast furnace gas is then removed using pressure-swing vacuum adsorption. Mass balances for a pilot facility lead to the CO₂ composition given in Table 2-17 and it has been reported that the validity of these compositions was demonstrated at the pilot facility (Danloy et al., 2008).

Table 2-17: Output CO₂ stream composition after initial CO₂ capture process for TGR-BF Top-Gas Recycling process heat and mass balance modelling (Danloy et al, 2008)

Gas Source: CO ₂ exiting initial CO ₂ capture process	
Component	Component
N ₂	1.2-1.4%
CO ₂	86.5-86.6%
CO	11.3-11.7%
H ₂	0.6-0.7%

It can be seen that an important feature of the CO₂ captured from top-gas recycling is the high concentration of CO if pressure swing adsorption is used to capture CO₂ and no further purification of the produced gas occurs. Birat (2010) identifies a number of “mature” options that could be used to substantially increase the mole fraction of CO₂ entering the CCS transport and storage system, including the use of a cryogenic flash, as illustrated in Table 2-18. Further work is needed to assess whether a pressure swing process combined with an additional cryogenic process is likely to be more or less cost effective than an amine-based process (which produce CO₂ that is very close to 100% purity – see Section 2.3.1), including improving understanding of the implications for the CO₂ transport and storage system which are addressed within this study.

Table 2-18: Output CO₂ stream composition delivered to the CO₂ transport system from the ULCOS Top-Gas Recycling process heat and mass balance modelling (Birat et al, 2010)

Gas Source: CO ₂ entering transport system	
Component	% vol
N ₂	0.3%
CO ₂	96.3%
CO	3.3%
H ₂	0.1%

The ‘TGR-BF’ scenario defined for this study is based on Table 2-18. As in other scenarios, a simplified representation of components is used, particularly for those contributing less than 0.5% vol to the final CO₂ stream composition. This leads to an illustrative composition of 96% CO₂, 3.5% CO and 0.5% N₂.

Finally, particularly in the USA, separating CO₂ from CH₄-rich gas is well established as one of the sources of gas feeding CO₂ EOR floods. There is potential for sources of this type to use CCS infrastructure in the future, so it is relevant to explore whether the composition of CO₂ produced in this way will cause any unique problems in the CO₂ transport and storage system.

Watson (2009) suggests that 98% pure CO₂ with the balance being provided by CH₄ is typical and this is reflected in the ‘CH₄-rich’ scenario defined for this study. For example, Table 2-19 shows the composition for the Beaver Creek pipeline (BLM, no date) reported in the IEAGHG pipeline database. Further work could also explore cases where H₂S is present with CH₄. Although trace elements are generally not considered in detail in this Section it is also important to note that there may be trace elements (e.g. Hg) present in produced natural gas that should be considered when determining what steps are appropriate to produce CO₂ that is suitable for compression and transport.

Table 2-19: CO₂ composition in Beaver Creek pipeline (extracted from IEAGHG 2013c)

Gas Source: CO₂ in pipeline	
Component	% vol
CO ₂	97.8%
CH ₄	1.95%
H ₂	0.17%
Other (mostly H ₂ O)	0.07%

2.7 Summary of scenarios for further work

Table 2-20 presents a summary of the scenarios used in the remainder of this study, building on the work outlined above. As noted previously, the intention of this work is to provide scenarios that are ‘worst case’ but also plausible given current understanding of likely constraints on CO₂ transport and storage systems.

Only %vol impurities are considered in these scenarios and it is assumed that CO₂ entering the transport system is dry. The REF case closely resembles post-combustion capture with amines. Only one scenario includes a significant level of H₂S in the CO₂, although other scenarios (PRE, CH₄-rich) could be adapted to also include this impurity in further work targeted to the interests of jurisdictions where there is potential for this to be allowed by regulators.

In most cases, values are similar to those reported in one of the tables presented in the work above, but indicative values have been selected since these scenarios are intended to indicate illustrative CO₂ compositions entering CCS transport and storage systems. This approach also increases potential for comparison between scenarios (e.g. where identical CO₂ purity is obtained, but the impurities are different).

In many cases, there is expected to be a cost trade-off between improving purity of CO₂ entering CO₂ transport systems rather than designing a CO₂ transport (and storage) system that is able to handle some impurity in the CO₂. Overall, this study should make a substantial contribution to the evidence base that can be used by CCS project developers to determine which approaches are best to manage CO₂ impurities within CCS systems. For example, as mentioned previously, for novel technologies, several configurations are proposed in order to be competitive with closer to commercial CO₂ capture options. It should also be noted that this leads to a level of uncertainty regarding pressure and temperature levels of the stream entering the compression train that are heavily dependent on the chosen option, but a more detailed analysis is beyond the scope of this study.

Table 2-20: CO₂ purity scenarios for use in the remainder of this study

Component (all values % by volume)	REF	CO2MEM1	CO2MEM2	ADS1	ADS2	Ca LOOP (also OXY-like)
Scenario number	1	2	3	4	5	6
CO ₂	100	93	97	90	95	95
O ₂			3	1		1
N ₂		7		9	5	2
Ar						2

Component (all values % by volume)	OXY1	OXY2	PRE	H2 MEM	CH₄-rich	TGR-BF
Scenario number	7	8	9	10	11	12
CO ₂	90	96.5	98	96	98	96
O ₂	6	0.5				
N ₂	3	2.5		1		0.5
Ar	1	0.5				
H ₂			2	1		
CO				0.5		3.5
H ₂ S				1.5		
CH ₄					2	

Acronyms: ADS-adsorption; CaLOOP-Calcium looping; CO2 MEM-CO2 membrane; H2 MEM-H2 membrane; OXY-oxyfuel; PRE-pre-combustion; REF-reference

3 THE IMPACT OF IMPURITIES ON CO₂ PHYSICAL PROPERTIES

3.1 Introduction

This section investigates the effect of the addition of the components identified in the scenarios developed in Section 2.7 on the physical properties of CO₂. The effects on the location of the phase boundaries, density, speed of sound, Joule-Thomson coefficient, viscosity and thermal conductivity relative to pure CO₂, for the combination of impurities in each scenario, as well as the effects of each binary combination of the identified impurities with CO₂ (e.g. CO₂-N₂, CO₂-H₂ etc.) are considered. For the binary mixtures levels of 1-5% of the impurity are used to give insight into their qualitative effect on physical properties in mixtures with CO₂. For some of the impurities this represents unrealistic levels. For example, levels of water will be at the level of ppm as free water leads to corrosion and cracking problems. However, the twelve scenarios identified in Section 2.7 represent a plausible range of ‘worst case’ scenarios for steady-state operation.

The pressures and temperature ranges to cover the physical properties were selected to be representative of gaseous phase pipeline operation, dense phase pipeline operation and ship based transportation. For gaseous phase transportation a pressure of 3MPa was chosen and a temperature range of 0 to 50°C. For dense phase transportation two pressures of 10MPa and 15MPa were chosen and a temperature range of 0 to 50°C. Three pressures were selected for possible ship based transportation: 1MPa, 4MPa and 7MPa and a temperature range of -50 to -100°C.

Based on the effects of the impurities, worst case scenarios are developed for dense, gaseous and ship based transportation taking into account the effect of the impurities on the thermodynamic and transport properties. Particular attention is paid in selecting the worst cases for each type of CO₂ transportation, taking into account that the expected outcome that the effects of the impurities will vary depending on the phase of operation.

Equations of state can be used to model the thermodynamic properties of fluids to a very high precision. They are used in the pipeline industry for natural gas and oil transportation and are applicable to mixtures of CO₂ also. The Span-Wagner equation of state (Span and Wagner, 1996) is fitted to experimental data and models the thermodynamic properties of pure CO₂ to extremely high accuracy.

There is still research work being undertaken on the physical properties of CO₂ mixtures relevant to CO₂ transportation for CCS schemes including both experimental work and model development on equations of state. Experimental work is a key component in the accuracy of the equations of state with the inclusion of many tuning parameters in the equations. There is a relative lack of experimental data which represents CCS CO₂ streams—some gaps are identified in (Diamantonis et al, 2013) — and there is still quite a large uncertainty in the accuracy of the equations of state in some regions. Publications relevant to CO₂ transport are given in Li et al. (2011), although the authors recommend discounting data recorded before the 1980s due to the accuracy of experimental techniques at that time. More recent work has been conducted on CO₂ mixtures with methane and carbon monoxide (Rivas et al., 2013), with hydrogen (Drage et al., 2013) and with O₂, Ar, N₂ and water (Chapoy et al., 2013).

This report uses the reference equations of state for each component (Span and Wagner (1996), Tegeler et al. (1999), Lemmon and Span (2006) Leachman et al. (2009), Span et al. (2000), Setzmann and Wagner (1991), Lemmon and Jacobsen (2004), Wagner and Pruss (2002) and solving routines

identical to REFPROP (Lemmon et al., 2013). Mixing rules for compositions with more than one component are taken from GERG2008 (Kunz et al., 2007).

Mixtures are complicated by mixing rules but mixtures with very small levels of impurities can be expected to have similar properties to CO₂ while mixtures with a large amount of impurities will differ further from the properties of CO₂ and could, for instance, have large 2-phase regions. Binary combinations of impurities with CO₂ only give an indication of the impurity's effect in a more complicated mixture since it is difficult to quantify the combined effect of several components in more complicated mixtures because of the complication of the mixing rules.

Transport properties cannot be calculated from equations of state and are not defined in the two-phase region. To calculate viscosity the models of Fenghour et al. (1998), Lemmon and Jacobsen (2004), NIST (2014), Muzny et al. (2013), Quinones-Cisneros et al. (2011) and Huber et al. (2009) are used. The approaches due to Vesovic et al. (1990), Lemmon and Jacobsen (2004), NIST (2014), Assael et al. (2011), Friend et al. (1989) and Assael et al. (2012) are used to calculate thermal conductivity.

Since not all experimental work covers the regions of interest in this report, the thermodynamic and physical properties of the mixtures are modelled. Furthermore, there is extremely limited experimental data available for the properties of potential captured CO₂ streams. In addition, for some impurity combinations, due to the lack of experimental data, the equations of state are operating in regions where they are less reliable or fail to converge.

3.2 Effect of binary combinations of impurities on the properties of CO₂

The location of the (impurity's) pure component phase line determines which way the CO₂-binary component phase diagram opens up. If it lies above that of CO₂ the CO₂-binary component phase diagram will be raised to higher pressures and temperatures relative to pure CO₂. The more different the pure component phase diagram is compared with CO₂, the more dramatic the effect is. As a binary mixture becomes more pure the phase boundary approaches that of the pure component. A simple way to see this effect is by examining the critical point of the impurity components relative to pure CO₂ (Race et al., 2012).

A pure substance has a region of 2-phase along its Vapour Liquid Equilibrium Line (VLE) line. In mixtures 2-phase regions open up due to differences in boiling points - some components boil off before others. 2-phase pipeline operation is possible (and is currently being investigated as a research topic) but will cause operational issues e.g. cavitation, slugging, difficulties in pigging and re-pressurisation, and is uncommon.

CO₂ pipelines can be operated in the supercritical, dense liquid⁴ and gaseous phases. Typically, for supercritical or dense phase conditions internal pressures will be 8-20MPa and temperatures 0-50°C. Operation is constrained by the bubble point line⁵, where higher bubble point curves mean a decrease in potential operating area. Crossing the bubble point line would lead to 2-phase operation. Gaseous phase CO₂ pipelines operate with fluids at similar temperature but with lower pressures of 0.4MPa. Gaseous phase operation is constrained by the dew point curve. A lower dew point curve reduces the MAOP (maximum allowable operating pressure).

⁴ Not a well-defined term in the literature but taken here to mean above the critical pressure but below the critical temperature whereas the supercritical phase is taken to be above the critical temperature and pressure.

⁵ Where bubbles of gas are first observed.

Most impurities tend to raise the bubble point curve of CO₂. Some substances lower the bubble point curve (NO_x, SO_x, H₂O) however, these are generally seen in very small quantities in captured CO₂ streams and the other substances dominate. This leads to bubble point being raised in captured CO₂ streams. Looking at the figures showing the bubble points of CO₂ in binary combination with CO₂ (Figure A-1 to Figure A-8)⁶, the effect of the impurity is amplified by an increase in quantity of the impurity. From the figures, it is seen that hydrogen has the largest effect on raising the bubble point curve followed by CO.

The impurities that raise or lower the bubble point curves show the same effects on the dew point curves, *i.e.* if an impurity lowers the bubble point curve, it lowers the dew point curve. Looking at the dew point curves for the CO₂ mixtures in binary combination with CO₂ (Figure A-9 to Figure A-16), as in the case of the bubble point curves, an increase in the amount of impurity causes a greater effect on the dew point curve. Again H₂ and CO have the greatest effect on raising the dew point curve.

The melting point, dew point and bubble point curves, as well as the location of the triple point, influences the choice of pressure and temperature of liquefied CO₂ mixtures used in ship transportation. The presence of impurities move the phase boundaries and it needs to be confirmed that the fluid does not enter the solid phase and whether it is in the two-phase region.

The melting point curves are shown in Figure A-17 to Figure A-23. The sublimation point curves (Figure A-24 to Figure A-31) also need to be referred to in this regard. In binary combination with CO₂, all the impurities raise the melting point curve of CO₂ and the effect increases with decreasing quantity of CO₂, apart from with water which decreases in effect. The impurities that raise the melting curve the most are O₂ and N₂. Water lowers the sublimation point curve of CO₂ and the other impurities raise the sublimation point with hydrogen and argon having the greatest effect. The effect of the impurities increases with quantity.

Density is extremely important for all modes of CO₂ stream transportation. Higher densities lead to more efficient transport. Quality effects the amount of CO₂ being transported, density also effects flow rate, pressure drop and temperature drop in pipelines. Densities of CO₂ in binary combinations with the impurities are shown in Figure A-32 to Figure A-55.

In dense phase all the impurities decrease the density relative to that of CO₂ with hydrogen, methane and carbon monoxide decreasing the density the most. The effect increases with increasing impurity. In gaseous phase water increases the density of pure CO₂ while the other impurities decrease density with hydrogen and carbon monoxide causing the greatest decrease. The higher the quantity of impurity present, the greater the effect on the density. In dense phase as temperature is increasing density is decreasing at a higher rate, while in the gaseous phase the opposite is true and density decreases at a lower rate for increasing temperature. Hydrogen has the largest effect on density since it is the smallest molecule and is the least compressible.

The Joule-Thomson coefficient determines whether a fluid will cool or heat up during free expansion and the extent of the temperature change. Since CO₂ and mixtures containing a high proportion of CO₂ have positive Joule-Thomson coefficients, they experience a cooling effect on free expansion. High Joule-Thomson coefficients could cause operational issues for dense phase pipelines if, during a leak or rupture, the associated cooling takes the pipeline material below the ductile-brittle transition temperature. They can also lead to severe ground cooling (Cosham et al., 2013).

⁶ All figures for this chapter are located in Appendix A.

Referring to Figure A-57, Figure A-58, Figure A-60, Figure A-61, Figure A-63, Figure A-64, Figure A-66, Figure A-67, Figure A-69, Figure A-70, Figure A-72, Figure A-73 Figure A-75, Figure A-76, Figure A-78 and Figure A-79, showing the Joule-Thomson coefficients of CO₂ in binary combination with the impurities in the supercritical and dense phase, it is seen that an increase in temperature increases the Joule Thomson coefficients, with the rate of increase rising with temperature. In binary combination with CO₂ water lowers the Joule-Thomson coefficient relative to CO₂, while argon, methane, oxygen, nitrogen, hydrogen and carbon monoxide raise it. These effects increase with increasing volumes of the impurities.

The speed of sound in a fluid is used in calculating fracture control requirements. In the event of a fracture, if the fluid is escaping faster than the fracture is travelling, then the pressure in the pipeline dissipates and therefore the driving force behind the fracture decreases until the fracture arrests. When decompressing from the liquid phase there is a discontinuity in the escape velocity of the fluid (referred to as the saturation pressure) caused by the fluid undergoing a phase change from liquid to gas and the fact that gases have lower speed of sound in a vacuum compared with liquids. Consequently, a higher speed of sound is more desirable for fracture control. When considering fracture control for pipelines carrying CO₂ mixtures in the liquid phase it is also important to consider the speed of sound in the gaseous phase as, during decompression the fluid will change from liquid to gas. The operating pressures are much higher in the dense phase and dense phase pipeline will require much thicker (or higher grade) pipelines.

In the gaseous phase the speeds increase with temperature and impurity level (see Figure A-80, Figure A-83, Figure A-86, Figure A-89, Figure A-94, Figure A-97 and Figure A-100⁷). The rate that at which the speed of sound increases with temperature reduces as the temperature increases. All the impurities slightly raise the speed of sound with hydrogen and carbon monoxide raising the values the most.

Referring to Figure A-81, Figure A-82, Figure A-84, Figure A-85, Figure A-87, Figure A-88, Figure A-90, Figure A-91, Figure A-92, Figure A-93, Figure A-95, Figure A-98, Figure A-99, Figure A-101 and Figure A-102, it is seen that the speed of sound increases with pressure and decreases with temperature in the dense and supercritical phases. Binary mixtures with H₂O increase the speed of sound relative to pure CO₂, the other impurities lower the speed of sound with the effects increasing with impurity level. N₂ and H₂ decrease the speed of sound the most and CH₄ remains the highest.

Thermal conductivity governs how quickly the fluid loses heat to its surroundings. Quicker heat loss is a positive effect in pipeline transportation as CO₂ increases in density as it cools and there is a benefit in that the fluid has less of a temperature effect on its surroundings. The gaseous phase has much lower thermal conductivities compared to the dense phase since heat is transferred much quicker through a liquid (Figure A-103, Figure A-106, Figure A-109, Figure A-112, Figure A-115, Figure A-118, Figure A-121 and Figure A-124).

Figure A-104, Figure A-105, Figure A-107, Figure A-108, Figure A-110, Figure A-111, Figure A-113, Figure A-114, Figure A-116, Figure A-117, Figure A-119, Figure A-120, Figure A-122, Figure A-123, Figure A-125 and Figure A-126 show that, in the dense phase, thermal conductivity increases with pressure and decreases with temperature. Binary combinations of CO₂ with the impurities all lower the thermal conductivity relative to pure CO₂ except for water, which increases it. Thermal

⁷ It is highlighted that the speed of sound in water at 3MPa failed to converge.

conductivities rise with increasing quantities of water but tend to reduce with increasing quantities of the other binaries. N₂ and O₂ lower the thermal conductivity the most and H₂ lowers it the least.

Impurities also affect the viscosity of the mixture relative to that of pure CO₂. Increased viscosity results in less efficient pipeline transportation. Viscosity considerations are far less relevant in the gaseous and supercritical phases where viscous effects are very small.

Figure A-127, Figure A-130, Figure A-133, Figure A-136, Figure A-139, Figure A-145 and Figure A-148 show that levels of impurity have little effect on viscosities in the gaseous phase. However, Figure A-128, Figure A-129, Figure A-131, Figure A-132, Figure A-134, Figure A-135, Figure A-137, Figure A-138, Figure A-140, Figure A-141, Figure A-143, Figure A-144, Figure A-146, Figure A-147, Figure A-149 and Figure A-150 show that, in the dense phase, viscosity tends to decrease for increasing quantities of binary impurity. In the dense phase, the fluids behave as a liquid and the viscosity increases with pressure and decreases with temperature. The rate of decrease with temperature increases as the temperature drops. At low levels, the addition of binary impurities decreases the viscosity relative to that of pure CO₂ and the viscosities drop further with the addition of more impurity. Hydrogen causes the largest drop in viscosity while the addition of oxygen and water cause the smallest drops in viscosity.

3.3 The effect of the scenario compositions on the physical properties of CO₂

The qualitative effect of an impurity can be inferred from the binary behaviour but its behaviour in more complicated mixtures cannot be quantified by looking at the binary behaviour. This section examines the effects on the thermodynamic and transportation properties of CO₂ using the CO₂ streams identified in Section 2.7.

In this section, the physical properties of the scenarios are compared with pure CO₂ in order that the worst case scenarios to be used in Section 4 can be selected. In the plots, the scenarios are labelled as Scenarios 1 to 12 as described in Table 2-20.

3.3.1 The effect on the bubble point curves

Referring to Figure A-151 to Figure A-163, the streams with the lowest CO₂ purity (Scenarios 4 (ADS1) and 7 (OXY1)) have the highest bubble point curves and will require higher pressure to avoid two-phase flow. They require operation around 10MPa. The large effect of hydrogen on the phase boundaries is illustrated by the fact that Scenario 9 (PRE) has the next highest bubble point curve. The methane-rich scenario has the highest CO₂ purity and the lowest bubble point curve. The bubble point curves of the remaining scenarios are bunched together.

Larger operating pressures require more work for compression and thicker pipeline to control the stress in the pipeline within design requirements.

3.3.2 The effect on the dew point curves

The dew point curves for the scenarios are shown in Figure A-165 to Figure A-176. From the curves it is observed that the least pure scenarios (4 (ADS1) and 7 (OXY1)), as in the bubble point curves, have the highest dew point curves. The following next highest is from Scenario 2 (CO₂MEM1) which is also the next least pure scenario. As in the case of the bubble point curves, Scenario 11 (CH₄RICH) shows the lowest dew point curve.

3.3.3 The effect on the sublimation point curves

Looking at Figure A-177 to Figure A-189 all the scenarios show improved behaviour compared with pure CO₂ with Scenarios 4 (ADS1) and 2 (CO₂MEM1) showing the most favourable behaviour.

3.3.4 The effect on the melting point curves

The melting points curves, Figure A-190 to Figure A-202, show that the liquid conditions for CO₂ are sufficient for all the scenarios with regard to the melting point line.

3.3.5 The effect on the compressibility

The compressibility curves for the scenarios are shown in Figure A-203 to Figure A-205. Compressibility is related to density but putting it in this form gives a more convenient representation for identifying the scenarios that will require the most work to compress.

The dense and gaseous phase compressibilities show the same trends: pure CO₂ has the lowest compressibility, and the least pure scenarios (4 (ADS1), 7 (OXY1) and 2 (CO₂MEM1)) have the highest. Scenario 11 (CH₄RICH) is the closest to pure CO₂.

3.3.6 The effect on the density

The behaviour of the density curves in the dense and gaseous phases, Figure A-206 to Figure A-208 show the inverse of the behaviour of the compressibility curves. That is, Scenarios 4 (ADS1), 7 (OXY1) and 2 (CO₂MEM1) have the lowest densities.

Looking at the curves relevant to ship based transportation, Figure A-209 to Figure A-211, Scenarios 4 (ADS1) and 7 (OXY1) have lower density than CO₂, while the remaining scenarios have higher density. The difference in density is greater between scenarios at lower pressures. At 7MPa it is around 100kg/m³ while for 1MPa and 4MPa there are differences of around 300 to 400kg/m³.

3.3.7 The effect on the Joule-Thomson coefficient

Figure A-212 shows the Joule-Thomson coefficient for the gaseous phase CO₂ streams. All the scenarios have lower Joule-Thomson coefficients compared with pure CO₂. Scenarios 4 (ADS1) and 7 (OXY1) are the lowest, while Scenario 11 (CH₄RICH) is closest to pure CO₂.

In the dense phase (see Figure A-213 and Figure A-214), all the scenarios have higher Joule-Thomson coefficients when compared with pure CO₂. This would result in greater cooling upon expansion but could potentially make any leaks easier to detect. As in the gaseous phase, Scenarios 4 (ADS1) and 7 (OXY1) have the highest Joule-Thomson coefficients, then 2. Scenario 11 (CH₄RICH) is closest to that of pure CO₂.

The Joule-Thomson coefficient is seen to increase with decreasing pressure and increase into the gaseous phase when coming from the dense phase.

3.3.8 The effect on the speed of sound

When decompressing from the dense phase, the fluid will pass into the gaseous phase. Thus to give a complete picture of the dense phase speed of sound, the gaseous phase must also be included.

In the gaseous phase, the speeds of sound (shown in Figure A-215) of the scenarios are all above that of pure CO₂. Scenarios 4 (ADS1) and 7 (OXY1) show the largest values of the speed of sound,

followed by Scenario 2 with the remaining scenarios bunched together. Scenario 11 (CH₄RICH) has the closest values of the speed of sound to those of pure CO₂.

There is contrasting behaviour in the dense phase (see Figure A-216 and Figure A-217, with all the scenarios having lower speed of sound compared with pure CO₂ (which is worse for ductile fracture control). Scenarios 4 (ADS1) and 7 (OXY1) have the lowest values, then Scenario 2. Scenario 11 (CH₄RICH) has the closest values to those of pure CO₂.

3.3.9 The effect on the thermal conductivity

In the gaseous phase (Figure A-218) pure CO₂ shows the lowest thermal conductivities. Scenarios 6 and 9 have the largest values, followed by 10 (H₂MEM), 7 (OXY1) and 8 (OXY2). Scenario 3 (CO₂MEM2) has the closest thermal conductivity values to CO₂.

The dense phase thermal conductivities are illustrated in Figure A-219 and Figure A-220. The values of the thermal conductivities are much higher than in the gaseous phase. All the scenarios have lower thermal conductivities than CO₂ with Scenarios 7 (OXY1) and 4 (ADS1) the lowest, followed by 2 (CO₂MEM1). Scenario 9 (PRE) displays the most similar behaviour to CO₂.

A lower thermal conductivity means the fluid does not transfer heat as easily. CO₂ streams increase in density as the temperature drops. It follows that, if the fluid has less of a temperature drop, then there is less density gained. The fluid staying above ambient temperature for longer also leads to operational issues.

3.3.10 The effect on the viscosity

The plot of the scenarios' viscosities in the gaseous phase, Figure A-221, shows that Scenarios 9 (PRE) and 11 (CH₄RICH) have lower viscosity compared to CO₂, while the remaining scenarios have higher viscosities with Scenarios 4 (ADS1) and 7 (OXY1) being the greatest.

In the dense phase, Figure A-222 and Figure A-223, show that all the scenarios have lower viscosities than pure CO₂. The scenarios with the lowest values of viscosity are Scenarios 4 (ADS1) and 7 (OXY1), the next lowest being 2. Scenario 11 (CH₄RICH) is the closest to pure CO₂.

3.4 Conclusions

Impurities greatly affect the thermodynamic and transportation properties of CO₂. It is seen that the addition of greater quantities of impurities causes these effects to be exaggerated. For density, speed of sound, the Joule-Thomson coefficient and thermal conductivity an increase in Ar, CH₄, O₂, N₂, H₂ or CO proportion leads to poorer dense phase pipeline transportation behaviour compared with pure CO₂, requiring more stringent fracture control measures and a higher operating pressure. For viscosity, an increase in impurity levels tends to decrease viscosity which is a beneficial effect but, in general, will not compensate for the increase in operating pressure required due to the presence of the impurity.

Hydrogen tends to have the greatest effect on the thermodynamic and transportation properties of CO₂ raising the bubble point curve the most, decreasing density the most and decreasing the speed of sound by a large proportion. However, hydrogen also has the strongest beneficial effect on viscosity and thermal conductivity. Although every CO₂ pipeline transportation system is different, for the majority of cases the factor most influencing the economics of transportation will be the movement of

the phase boundaries⁸, which dictate the operating pressures of the pipeline and thus the compression requirements and wall thickness of the pipeline.

3.5 Worst case scenario selections

In the dense phase Scenarios 4 (ADS1), 7(OXY1) and 2 (CO₂MEM1) tend to produce the least desirable qualities for pipeline transportation. These CO₂ streams have the lowest proportions of CO₂ and have the highest bubble point curves, compressibility, Joule-Thomson coefficient and the lowest densities, speed of sound and thermal conductivities. However, these scenarios have the lowest viscosities. Apart from pure carbon dioxide, Scenario 11 (CH₄RICH) has the most desirable qualities for dense phase pipeline transportation with the lowest dew point curve, Joule-Thomson coefficients and compressibility and the greatest density and speed of sound. That is balanced with the fact that it has the lowest thermal conductivity and the highest viscosities.

It should also be noted that, even though it has a high carbon dioxide purity (98%), Scenario 9 (PRE) has shown relatively undesirable dense phase pipeline transportation characteristics because hydrogen has large effects in small quantities.

For these reasons, Scenarios 4 (ADS1) and 7 (OXY1) are selected for the worst cases for dense phase pipeline transportation. Scenarios 4 (ADS1) and 7 (OXY1) fall into the post-combustion and oxyfuel categories used in Sections 4 (ADS1) and 5 (ADS2); in addition Scenario 9 (PRE) has also been selected as the worst case in the pre-combustion category.

Due to their relatively high compressibility, Scenarios 4 (ADS1), 7 (OXY1) and 2 (CO₂MEM1) should show the highest compression power requirements in Section 4.4.2.2 for compression to dense and gaseous phase. For this task, the worse cases from the scenarios for the dense phase pipeline based on compressibility have been selected.

In the gaseous phase the dew point curves of Scenarios 4 (ADS1) and 7 (OXY1) are shifted (from those of CO₂) to the highest pressures resulting in a larger potential operating pressure window. Scenario 11 (CH₄RICH) has the lowest dew point curve and the smallest potential operating pressure window. Scenario 11 (CH₄RICH) also has the largest values of the Joule-Thomson coefficients (after pure CO₂) and Scenarios 4 (ADS1) and 7 (OXY1) the lowest. The speeds of sound are much lower in the gaseous phase but the operating pressures are much lower than in the dense phase and consequently there is a lower ductile fracture risk. Consequently, Scenario 11 (CH₄RICH) is selected for the worst case scenario for gaseous phase pipeline operation. Scenario 11 (CH₄RICH) falls into the post-combustion category, Scenarios 9 (PRE) and 8 (OXY2) are selected for the worst case pre-combustion and oxyfuel categories respectively. These scenarios show the lowest dew points for their category.

⁸Although this is not the case in two-phase pipeline operation. However, this mode of operation would be unusual for CO₂ stream transportation.

4 IMPACT OF IMPURITIES ON CO₂ COMPRESSION

4.1 Introduction

Reference cases for CO₂ compression (IEAGHG, 2011) were used for various conditions, which are considered to be typical of the requirements for transporting CO₂ by pipeline in the dense and gaseous phase. A commercially available pipeline simulation software was used to conduct the calculations (PIPESIM steady state multiphase flow simulator software (Schlumberger, 2013)).

Using the same simulation package, the energy requirement for each set of conditions was evaluated and the required compression power calculated using the approach outlined in (IEAGHG, 2009). The effects of impurities on compression relative to a base case of pure CO₂ were evaluated and the power requirement compared.

It should be highlighted that the approach described for this task utilises a commercial software package which is originally designed for the oil and gas industry and is not specific to CO₂. Therefore, validation calculations have been conducted, where possible, to determine any potential errors in the application of this proposed methodology.

Additionally, a limited range of pressure and temperature conditions were considered within this study. This approach is useful to provide initial, indicative insights into the impact of impurities on CO₂ compression. It should be noted, however, that in some cases this approach limits the ability of the insights provided by this study to be used directly for comparison of CO₂ compression requirements for specific CO₂ capture options (where pressure and temperature delivered to the CO₂ compressor may vary quite significantly and can have a noticeable impact on CO₂ compressor power).

4.2 Background to compression

Compression involves raising the pressure of a fluid to a specified pressure. In order to raise the pressure up to the desired value work needs to be done. The amount of work that needs to be done depends on the pressure ratio (the ratio of suction to the delivery pressure) to be used. If the compression ratio to be achieved is very high, say from 1bara to 110bara, the following limitations hinder achieving this in one compression step:

- The mechanical design may not be able to withstand such a large pressure increase.
- The material may not be able to withstand the sudden increase in temperature associated with such a high compression ratio.
- In some cases the lubricant may not be designed to operate in such high temperature situations or the fluid which is to be compressed may itself be subject to certain chemical changes at elevated temperatures.
- Any formation of multiphase flow will damage the structure of the blades (rotors and stator).

The solution to these problems is to employ multi-stage compression. Multi-stage compression has the added advantage of increased energy efficiency and consequently saves on power requirements.

4.2.1 Compressors

Compressors can be broadly classified as reciprocating and centrifugal compressors. High speed reciprocating compressors were used in the past to compress CO₂, especially for Enhanced Oil Recovery and carbon sequestration projects (Seevam, 2010). However, centrifugal compressors are also being considered in the current investigation because of higher CO₂ loads today and

comparatively lower operating and capital costs. In addition to this, centrifugal compressors offer higher efficiency and require less maintenance in contrast to reciprocating compressors.

Centrifugal compressors can be categorised into inline compressors and integral gear compressors. Among the two, integral gear compressors offer the better performance and have a higher efficiency owing to effective intercooling of the compressed fluid after each successive compression stage. Both options are not very different in terms of their reliability and maintenance intervals. However, the inline compressors would need about twice the number of stages required if, for the same pressure ratio, the inline design were to be used (Seevam, 2010; Mohitpour et al., 2011).

4.2.2 Compression efficiency

The specification of efficiency can be polytropic or adiabatic depending on the compressor manufacturer. In general, centrifugal compressors are specified using polytropic efficiencies in Europe and adiabatic efficiencies in North America (Mohitpour, 2007). According to Seevam (2010) the percentage efficiencies used for CO₂ compression are somewhat lower than that used for natural gas which is usually greater than 80%. This discrepancy is due to the physical properties of CO₂. In the current modelling investigation an efficiency of 85% has been used on most occasions. The reason for this is to tune the developed reference model to the result obtained in the literature. Further explanation will be provided in the next sections.

Generally lower discharge temperatures are desirable for transporting CO₂, particularly for supercritical CO₂, since this can greatly increase the density and reduce the size of transmission pipelines. Cooling the CO₂ at the compressor discharge to near or below ambient temperatures, using ambient air or cooling water to cool the suction temperature, results in large power savings in CO₂ the compression train. Ambient cooling, whenever it is available, is always preferable and more efficient than mechanical refrigeration. In the current study heat exchangers are employed where required to cool down the high temperature streams coming out of compression stages.

4.3 Validation of simulation package (Part I)

A validation study was performed using the simulation package to study the compression energy requirement of pure CO₂. The scenario is a standard case suggested by Mohitpour et al. (2011) for investigating compression power requirements.

In this scenario the CO₂ is assumed to be compressed from 1bara and 20°C to 200bara and 20°C as in Mohitpour et al. (2011). The compression strategy contains 6 isentropic stages, as shown in Figure 4-1. The power requirement for a CO₂ mass flow of 5Mt/year (158.5kg/s) is given in Table 4-1 as 44.41MW. This is in accordance with findings of Mohitpour et al. (2011). Applying inter-stage cooling between compression stages makes the process approach an iso-thermal process, which can decrease the power consumption of the compressors train.

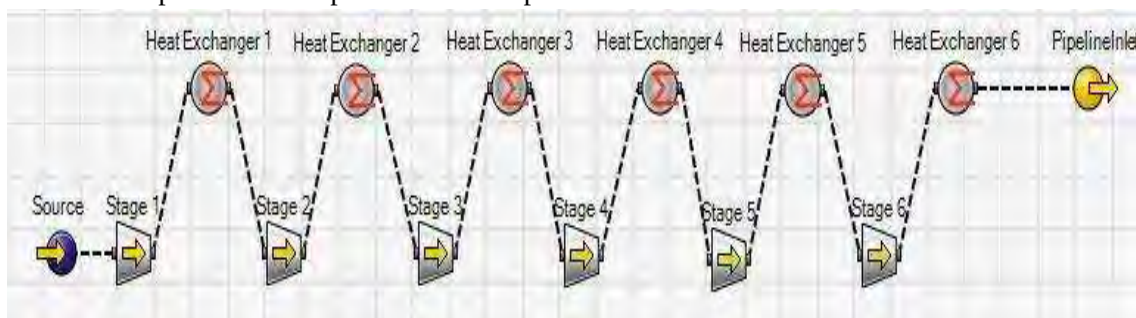


Figure 4-1: A six stage compressor setup with the compression strategy as outlined in Table 4-1.

This is achieved by calculating the CO₂ physical and phase properties using the Peng-Robinson (P-R) Equation of State (EOS) (Peng and Robinson, 1976) implemented in MultiFlash (Infochem, 2011). This EOS was selected as it has been shown to be sufficiently accurate for the mixture compositions (anthropogenic streams) within the pressure and temperature ranges explored in this report (Li and Yan, 2009; Wetenhall et al, 2014) whilst being computationally much faster than the equations of state used in Section 3. The compressors are assumed to be centrifugal and the compression process is isentropic and 100% efficient. The compression path for this scenario of the pure CO₂ is given in Figure 4-2.

The existing discrepancy of ~0.7% between the calculated compression power (44.41MW) and the reference compression power (44.09MW) is from choices of EOS and the CO₂ physical and phase properties by the software package. Mohitpour et al. (2011) utilized GERG-2008 (Kunz and Wagner, 2012) and REFPROP (NIST, 2010), respectively. It should be noted that the compression path of Mohitpour et al. (2011) approaches the phase boundary closely during the last compression stage which may prove not to be practical.

Table 4-1: Compression stage power requirements along the base compression strategy of Mohitpour et al. (2011)

State	Temperature (°C)	Pressure (bara)	Isentropic Power to compress 5 Mt/year CO ₂ (MW) (Mohitpour et al., 2011)	Isentropic Power to compress 5 Mt/year CO ₂ (MW) [Modelling from simulation software]
1	20	1		
2	76.87	2.25	7.74	7.74
3	20	2.25		
4	77.24	5.05	7.69	7.68
5	20	5.05		
6	77.99	11.35	7.56	7.55
7	20	11.35		
8	79.68	25.49	7.28	7.25
9	20	25.49		
10	82.96	57.28	6.59	6.56
11	20	57.28		
12	112.47	200	7.23	7.64
13	20	200		
SUM			44.09	44.41

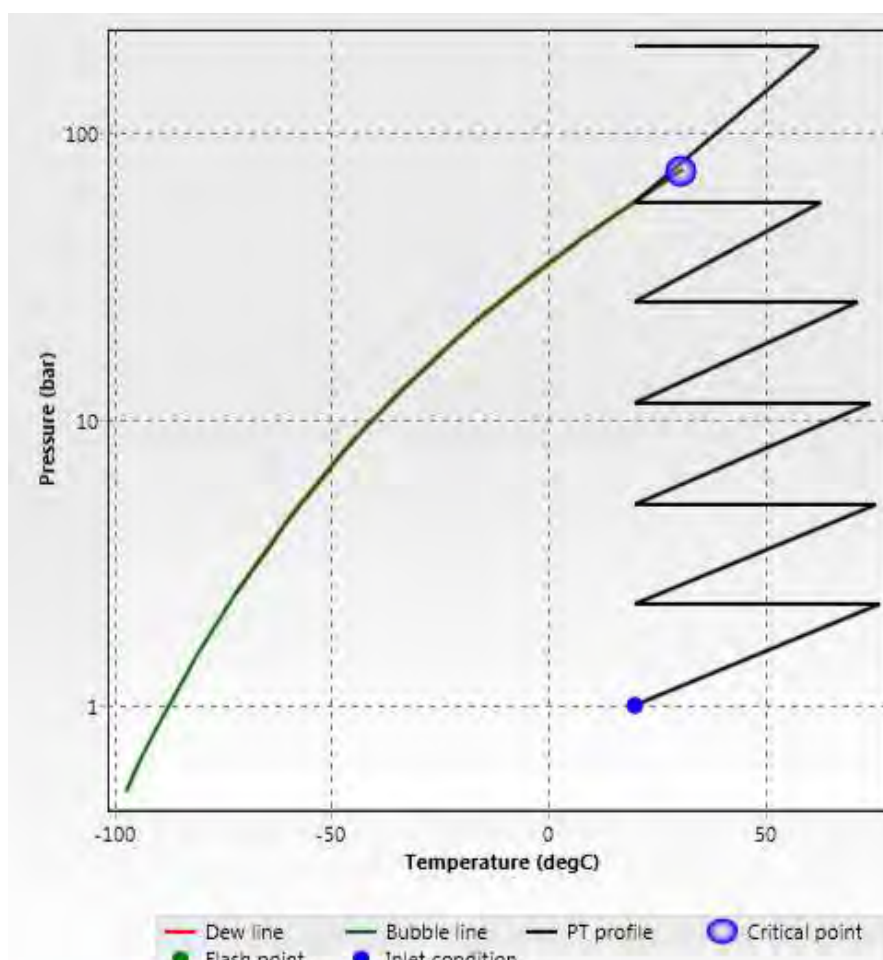


Figure 4-2: A compression path for pure CO₂ based on the strategy outlined in Table 4-1 and the phase envelope of pure CO₂.

4.4 Evaluating impact of impurities on CO₂ compression in dense phase

4.4.1 Selection of the base case

Three distinctive reference cases are outlined in the IEAGHG (2011/07) report for the Pre-combustion (A₀), Post-combustion (B₀) and Oxy-combustion (C₀) capture technologies. To study the effect of compression on the anthropogenic CO₂ streams given in Table 4-2, one base compression scenario was first chosen. The choice of the base case sets the number of compression stages (varies between 4-6 stages in the literature) and the compression ratio at each stage. It should be noted, however, that different project developers may adapt the number of compression stages used to better integrate the CO₂ capture and compression processes (e.g. by reducing the number of stages in cases where a relatively high inlet pressure is delivered by the capture process) on a process-specific basis.

The post combustion base case, B₀, (IEAGHG 2011/07) was chosen as the basis for the reference case (REF in Table 4-2) to study/evaluate the compression power requirements of anthropogenic CO₂ streams. The main reason for choosing case B₀ over the case A₀ (Pre-combustion) and the case C₀ (Oxy-combustion) is that this case exhibits the most pure CO₂ stream (99.99 %) throughout the compression process, as shown in Table 4-3. In addition to this, most of the cases outlined in Table 4-2 are related to Post-combustion inlet conditions. Furthermore, this provides an opportunity to further verify the accuracy of the software package as outlined in the next section. As already noted, it is likely that there will be non-trivial differences in pressure/temperature of streams entering the CO₂

compression train that are categorised as having the same technology in Table 4-2 when CO₂ capture processes are modelled in detail. These differences should be considered in more detail in any further work intended to provide a robust inter-comparison between specific capture technologies.

Table 4-2: The scenarios developed in previous sections

Scenario	CO ₂	O ₂	N ₂	AR	H ₂	CO	H ₂ S	CH ₄	Technology
REF	100								
CO ₂ MEM1	93		7						Post-Combustion
CO ₂ MEM2	97	3							Post-Combustion
ADS1	90	1	9						Post-Combustion
ADS2	95		5						Post Combustion
Ca LOOP	95	1	2	2					Post-Combustion
OXY1	90	6	3	1					Oxy-Combustion
OXY2	96.5	0.5	2.5	0.5					Oxy-Combustion
PRE	98				2				Pre-Combustion
H ₂ MEM	96		1		1	0.5	1.5		Pre-Combustion
CH ₄ -RICH	98							2	Post-Combustion
TGR-BF	96		0.5			3.5			Post-Combustion Oxy-Combustion

Table 4-3: The variation in mass flow and composition throughout the process unit of the post combustion case B₀ (IEAGHG 2011/07)

Compression	Mass flow (kg/h)	Composition (vol %)		
		CO ₂	N ₂	H ₂ O
Stage-1	556451	95.88	0.01	4.11
Stage-2	608630	99.62	0.01	0.37
Stage-3	546855	99.99	0.01	ppm
Stage-4	546855	99.99	0.01	ppm

From the information provided in Table 4-3, it could be understood that:

- The composition of the stream slightly changes throughout the dehydration unit and compression stages.
- The mass flow rate varies with a range of 546855kg/h to 608630kg/h.
- The compression strategy has four compression stages.

The presently developed scenarios for CO₂ streams with impurities are listed in Table 4-2, where eleven anthropogenic scenarios are identified. For the purpose of this study, ADS1, ADS2, CO₂ MEM1, CO₂ MEM2, Ca LOOP, and CH₄-RICH, are considered related to Post-combustion inlet conditions, the OXY1 and OXY2 are the scenarios considered for Oxy-combustion inlet conditions and the H₂MEM and PRE are in general relevant from Pre-combustion inlet conditions.

It should be noted that in some cases, (e.g. H₂MEM, OXY1 and OXY2) the data reported in Table 4-1 are for the outlet conditions of a CO₂ processing unit that undertakes combined CO₂ compression and clean-up. For simplicity, this study has assumed a constant composition throughout the CO₂ compression process but further work could usefully undertake a more detailed analysis that takes variations in CO₂ composition during CO₂ compression into account for cases where this initial works

suggests that changes in composition are likely to have a significant impact on CO₂ compression requirements.

Additionally, the TGR-BF scenario could not be assigned to the above classic inlet conditions with certainty. It is noteworthy that even the current categorization is not exact and has been conducted solely for initial, illustrative comparison purposes. In TGR-BF technology, O₂ is used for the blast furnace and then separating CO₂ from the top gas by either amine based solvent absorption process or by solid sorbents adsorption process. From IEAGHG study on iron and steel (IEAGHG, 2013) it was preferred to use solid based adsorption process to separate CO₂. So, based on this the main inlet condition is close to Oxy-combustion together with post combustion inlet condition. Hence, TGR-BF has been analysed in the context of both Post-combustion and Oxy-combustion. As reflected in Table 4-2, the type and the level of impurities depend on the capture technology a great deal.

The compression power requirement of the anthropogenic CO₂ scenarios is evaluated in two steps.

In the first step, the same sets of initial conditions are considered for all the cases present in Table 4-2. This investigates the compression power requirement irrespective of the processes associated with the carbon capture process. It is, therefore, important to note that some of the results reported here are not suitable for inter-technology comparison since changes in compressor entry conditions (e.g. pressure and temperature) that will occur in reality due to capture process-specific factors are not considered. For example, the number of compression stages and the mass flow rate through the compressors as well as the initial pressure and temperature of the stream are assumed to be constant for the all the scenarios.

The evaluation of the compression power requirement in the next step (shown in Section 4.4.3) adopts features from the relevant capture processes. Therefore the number of compression stages changes from one technology to another. In addition to this, the mass flow rate varies at each compression stage. The initial pressures and temperatures of the anthropogenic CO₂ streams also changes with capture technology. Although this step incorporates some important features associated with capture process-specific concerns, there is scope for further work in this area to provide more reliable comparisons for cases where different CO₂ capture processes have been used. For example, the implications of the full range of temperature and pressure variations that might occur for different CO₂ capture processes that are classified as the same technology type in Table 4-2 could be explored further and it is also likely that mass flow rate differences between stages will vary somewhat depending on CO₂ capture technology and CO₂ composition.

4.4.2 Constant flow rate assumption

4.4.2.1 Validation of the simulation package (Part II)

A simulation was carried out with the following assumptions to further validate the software against IEAGHG Benchmarks (case B₀ in Appendix 1 of the IEAGHG 2011/07). The simulation was performed with an isentropic compressor efficiency of 85%. The sequence of the compression path is similar to the one presented in Figure 4-1, only with four compressors and heat exchangers.

The flow rate is assumed to be a constant value of 546,855kg/h based on the range given in Table 4-3 and pure CO₂ was used. An estimation of the power requirements were compared with that given by IEAGHG (2011/07), and the results are given in Table 4-4. The predicted power is in good agreement with the IEAGHG report, and the available discrepancies, < 5%, are from the uncertainty inherent in

the flow rate and the presence of variable traces of impurity in the process studied by IEAGHG. The assumed compressor efficiency may also contribute to the existing discrepancy.

Table 4-4: A comparison of the compressor electrical consumption at different stages for the post combustion case B₀ of (IEAGHG 2011/07)

Stage	State	Temperature (°C)	Pressure (bara)	Power to compress (MW) IEAGHG 2011/07)	Evaluated Isentropic Power to compress 546855kg/h CO ₂ flow stream (MW)
1	1	38	1.6	21.7	21.24
	2	184	7		
2	3	19	6.6	24.1	21.89
	4	176	34		
3	5	24	32.7	8.0	7.83
	6	97	70		
4	7	40	69.6	3.7	3.71
	8	81	111.2		
	9	73	111		
SUM				57.5	54.68

4.4.2.2 Compression power requirement with the presence of impurity

Once the simulation setup was verified, the next step was to define a set of initial values for temperature and pressure, and compare the power requirements of all 12 scenarios against the same initial conditions. The inlet pressure was selected to be 1.6bara and the inlet temperature 38°C. These initial conditions could be seen among current recognised capture technologies.

A constant mass flow rate of 700,000kg/h (6.132Mt/yr) is assumed to entering the compressor. For the analysis of dense phase streams undertaken in this Section, it is assumed that the CO₂ flow delivered to the pipeline in the dense phase has a pressure of 110bara and temperature of 30°C. This information is summarised in Table 4-5:

Table 4-5: The initial conditions for the compression studies in dense phase

Inlet pressure	Inlet temperature	Mass flow rate	Final Pressure	Final Temperature
p_i [bara]	T_i [°C]	$\dot{m}$ [kg/h]	p_f [bara]	T_f [°C]
1.6	38	700,000	110	30

Simulation results for the compressor investigation of the anthropogenic CO₂ streams are given in Table 4-6. The compression strategy comprises of four compression stages, C₁, C₂, C₃ and C₄, similar to the four stages devised in Table 4-4 and with the same pressure ratio and intercooling setup.

The total power requirements and individual compressor power requirements for each case are shown in Figure 4-3. These are the data obtained with $\eta_{comp} = 0.85$. To draw clearer conclusions, the total power requirements of the anthropogenic CO₂ streams were normalised against the total power requirement of the REF case and the results are demonstrated in Figure 4-4.

The ADS1 showed to be the worst case scenario of all, with slightly below 7% extra power requirements. This is a case most likely to happen in Post-combustion inlet combustion category.

Sorting the power requirements of the anthropogenic scenarios, if only composition variations are considered (i.e. given that inlet conditions are assumed constant) then in descending order the scenarios that cause the most significant changes to compression power requirements are as follows.

- 1- ADS1
- 2- OXY1
- 3- CO2MEM1
- 4- ADS2
- 5- PRE
- 6- Ca LOOP and TGR-BF
- 7- H2MEM
- 8- OXY2
- 9- CH4RICH
- 10- CO2MEM2

In the Oxy-combustion technology category, OXY1 and in the Post-combustion category, ADS1 have the highest compression power requirement. The cases Ca LOOP, TGR-BF and H2MEM require a comparable amount of energy.

Table 4-6: A comparison of the compressor electrical power consumption at different stages for the anthropogenic CO₂ streams

Scenario	CALCULATED COMPRESSION POWER (MW)				
	C1	C2	C3	C4	Total
REF	5.30	28.02	10.03	4.65	48.00
CO2 MEM1	5.46	28.98	10.60	5.29	50.33
CO2 MEM2	5.35	28.34	10.23	4.89	48.81
ADS1	5.52	29.38	10.83	5.52	51.25
ADS2	5.41	28.70	10.44	5.12	49.67
Ca LOOP	5.38	28.54	10.36	5.06	49.33
OXY1	5.48	29.15	10.72	5.42	50.78
OXY2	5.37	28.45	10.29	4.97	49.07
PRE	5.41	28.64	10.34	4.95	49.34
H2 MEM	5.41	28.64	10.34	4.95	49.33
CH4-RICH	5.37	28.41	10.21	4.83	48.82
TGR-BF	5.39	28.56	10.35	5.03	49.33

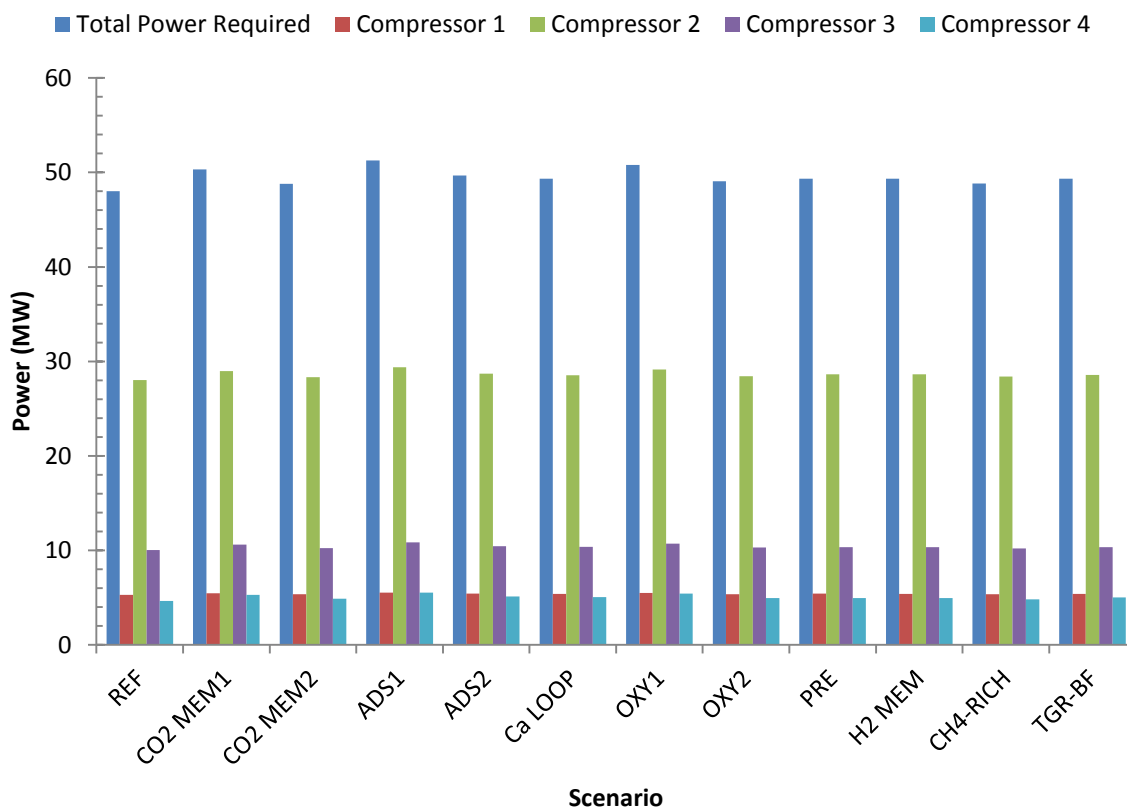


Figure 4-3: A comparison of the compression systems' electrical power consumption for the anthropogenic CO₂ streams

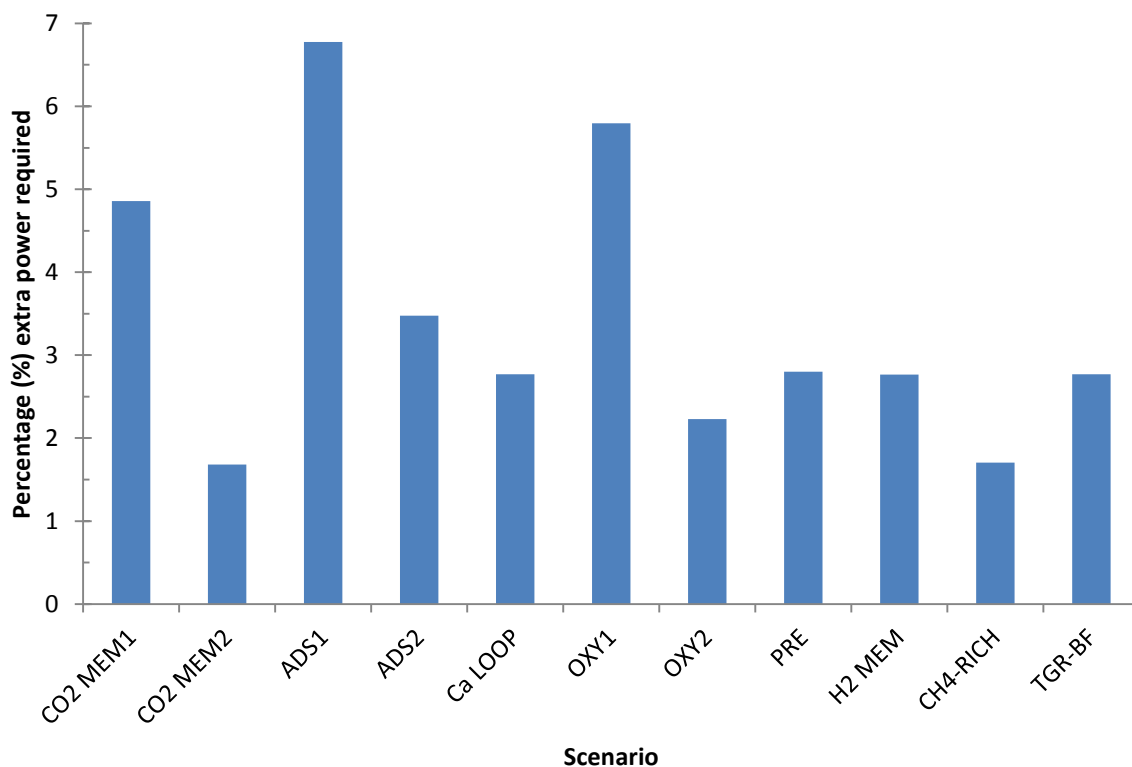


Figure 4-4: The extra power requirement of the anthropogenic CO₂ streams compared to the reference case.

4.4.3 Variable flow rate assumption

A second approach being considered in this report is the adoption of some additional features from the relevant capture processes to evaluate the electrical compression required by compressors. In this respect the number of compression stages is dependent on the type of technology under analysis. In addition to this, the mass flow rate varies at each compression stage. The initial pressures and temperatures of the anthropogenic CO₂ streams fed to the compression units also changes with capture technology. In the next three subsections the analysis for Post-combustion (Section 4.4.3.1), Oxy-combustion Section (4.4.3.2), and Pre-combustion Section (4.4.3.3) inlet conditions will be presented. It should be re-emphasised that the authors believe this categorisation matches roughly to the assigned inlet conditions and is not exact and also that there may be differences in mass flow rate variations between stages for different CO₂ compositions (e.g. due to difference in water carrying capacity or heat transfer properties and associated thermal management strategies) that are not reflected in this analysis.

4.4.3.1 Analysis of the compression power required by Post-combustion scenarios

The power requirements for the possible anthropogenic scenarios resulting from Post-combustion inlet conditions CO₂MEM1, CO₂MEM2, ADS1, ADS2, Ca LOOP, CH₄-RICH and TGR-BF (in common with Oxy-combustion) are summarised in Table 4-7. The initial conditions for the current set up are the same as reference case B₀ (IEAGHG, 2011). The inlet temperature is taken to be 38°C and the initial pressure at 1.6bara. The efficiency of the compressors has been considered to be 85%.

The compression strategy comprises of five stages and variant mass flow rates. The mass flow rates are 556,451kg/h, 608,630kg/h, 546,855kg/h, and 546,855kg/h through stages one to four, accordingly (IEAGHG, 2011). The flow variation is due to the design of compression unit, shown in Figure 4-5, for effective thermal management and the existence of CO₂ dehydration system. Part of the dehydrated flow is fed to the outlet flow after the first compressor hence an increase in the flow rate to the second compressor is present. Based on the current settings, the total power required for the cases CO₂MEM1, CO₂MEM2, ADS1, ADS2, Ca LOOP, CH₄-RICH and TGR-BF are 59.97MW, 58.35MW, 60.95MW, 59.27MW, 58.35MW, 58.42MW and 58.91MW respectively. These values will obviously change with a change in efficiency of compressors, as investigated in Table 4-8. The authors acknowledge that the use of the same mass flow rates for the study of anthropogenic scenarios may not be appropriate. This could affect the calculated power requirement. Further work could usefully consider an assessment of potential variations in CO₂ compression train design and operation in response to plausible variations in CO₂ composition.

Table 4-9 compares the results from the current approach with the results of the approach undertaken in Section 4.4.2. It can be seen in Figure 4-6 that the extra power requirements are fairly close together and slightly less than the constant mass flow rate through compression stages. The extra power requirement of the anthropogenic Post-combustion scenarios with respect to the reference case is broken down for each compression stage, and is given in Figure 4-7 for more clarity. The highest power requirement is for the final stage, as it has the highest compression ratio, in the undertaken compression strategy. The case ADS1 shows the highest power requirement. This scenario has a fairly high percentage of the Nitrogen (9%) and hence requires the maximum power amongst others in this category. The extra power requirement is about 6%. The evaluated power requirement for the reference case (REF) (shown in Table 4-7, 57.51MW, should be compared with the relevant value reported by IEAGHG (shown in Table 4-4, 57.5MW. Adopting the flow rates improved the

predictions of the software, despite the differences in the components of the streams: pure CO₂ and close to pure CO₂, as outlined in Table 4-3.

Table 4-7: Power requirements for the scenarios with from Post-combustion inlet conditions

	STAGE	Mass flow	Inlet		Outlet		Outlet (IEAGHG)		Cal. Comp. power
		kg/h	T[°C]	P[bara]	T [°C]	P[bara]	T[°C]	P[bara]	MW
REF	1	556451	38	1.6	169.6	7	184	7	21.62
	2	608630	19	6.6	165.1	34	176	34	24.35
	3	546855	24	32.7	95.4	70	97	70	7.82
	4	546855	40	69.6	79.1	111.2	81	111.2	3.72
	SUM								57.51
	STAGE	Mass flow	Inlet		Outlet		Cal. Comp. power at each stage		Total power requirement
		kg/h	T[°C]	P[bara]	T[°C]	P[bara]	MW		MW
CO2 MEM1	1	556451	38	1.6	172.3	7	22.26	59.97	
	2	608630	19	6.6	167.6	34	25.19		
	3	546855	24	32.7	92.8	70	8.27		
	4	546855	40	69.6	80.9	111.2	4.24		
CO2 MEM2	1	556451	38	1.6	170.7	7	21.83	58.35	
	2	608630	19	6.6	166.1	34	24.63		
	3	546855	24	32.7	92.6	70	7.98		
	4	546855	40	69.6	79.9	111.2	3.92		
ADS1	1	556451	38	1.6	173.5	7	22.53	60.95	
	2	608630	19	6.6	168.6	34	25.54		
	3	546855	24	32.7	93.1	70	8.46		
	4	546855	40	69.6	81.4	111.2	4.43		
ADS2	1	556451	38	1.6	171.5	7	22.07	59.27	
	2	608630	19	6.6	166.9	34	24.95		
	3	546855	24	32.7	92.7	70	8.14		
	4	546855	40	69.6	80.5	111.2	4.11		
Ca Loop	1	556451	38	1.6	172.1	7	21.95	58.89	
	2	608630	19	6.6	167.5	34	24.80		
	3	546855	24	32.7	93.0	70	8.08		
	4	546855	40	69.6	80.5	111.2	4.05		
CH4 RICH	1	556451	38	1.6	169.7	7	21.90	58.42	
	2	608630	19	6.6	165.1	34	24.69		
	3	546855	24	32.7	92.3	70	7.966		
	4	546855	40	69.6	79.5	111.2	3.87		
TGR-BF	1	556451	38	1.6	171.2	7	21.98	58.91	
	2	608630	19	6.6	166.5	34	24.83		
	3	546855	24	32.7	92.62	70	8.08		
	4	546855	40	69.6	80.21	111.2	4.03		

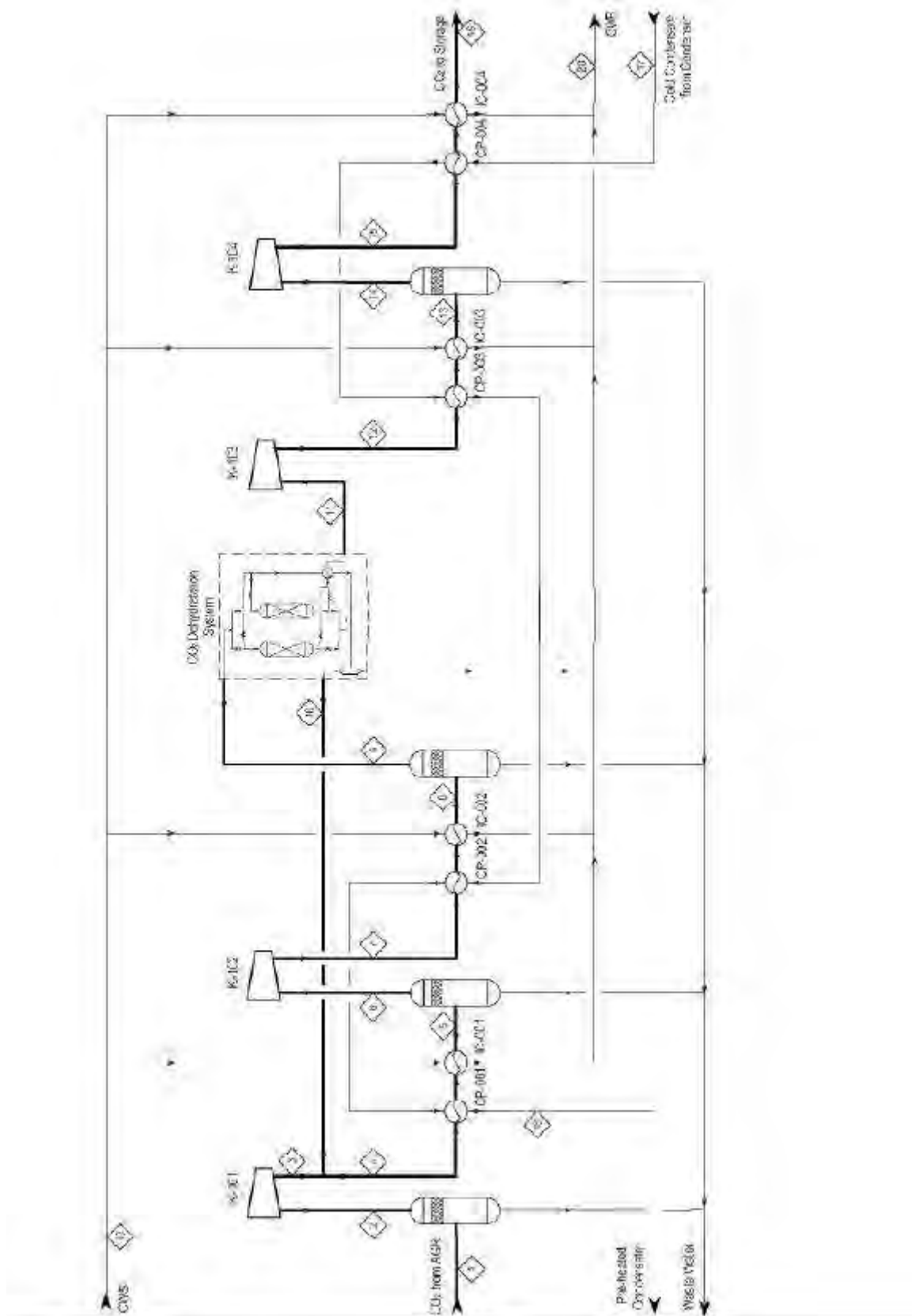


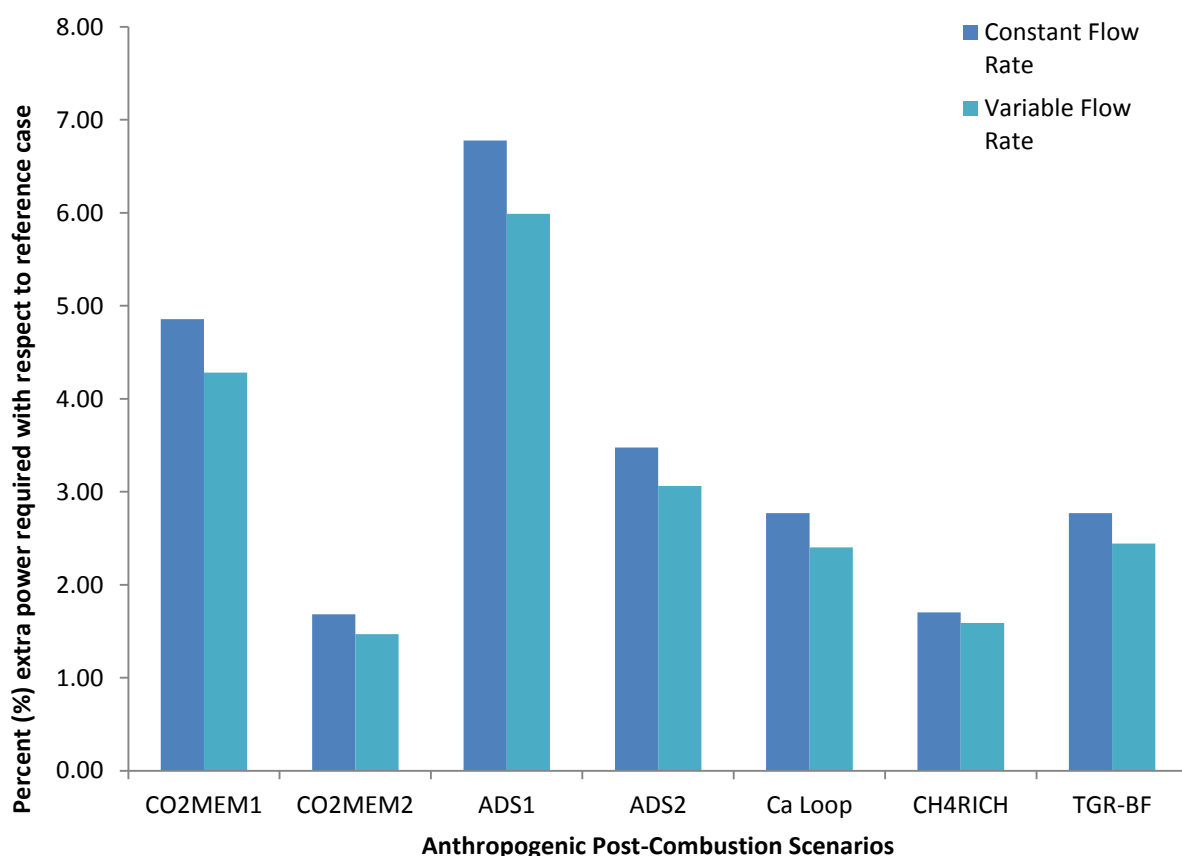
Figure 4-5: Post-combustion-Base case B0: CO₂ Compression Unit Scheme (IEAGHG, 2011)

Table 4-8: The total power requirement (MW) for the post-combustion type scenarios and the change in efficiency of the compressors

Efficiency	CO ₂ MEM1	CO ₂ MEM2	ADS1	ADS2	Ca LOOP	CH ₄ RICH	TGR-BF
0.85	59.97	58.35	60.95	59.27	58.89	58.42	58.91
0.80	67.70	65.88	68.81	66.91	66.48	65.95	66.50
0.75	77.03	74.95	78.29	76.13	75.64	74.77	75.67

Table 4-9: A comparison of the extra (%) power requirements of the scenarios with Post-combustion inlet conditions

Scenarios	Variable Flow Rate	Constant Flow Rate
CO ₂ MEM1	4.28	4.86
CO ₂ MEM2	1.47	1.68
ADS1	5.99	6.78
ADS2	3.06	3.48
Ca LOOP	2.40	2.77
CH ₄ RICH	1.59	1.70
TGR-BF	2.44	2.77

**Figure 4-6: A comparison of the total extra power requirements of the scenarios with Post-combustion inlet conditions**

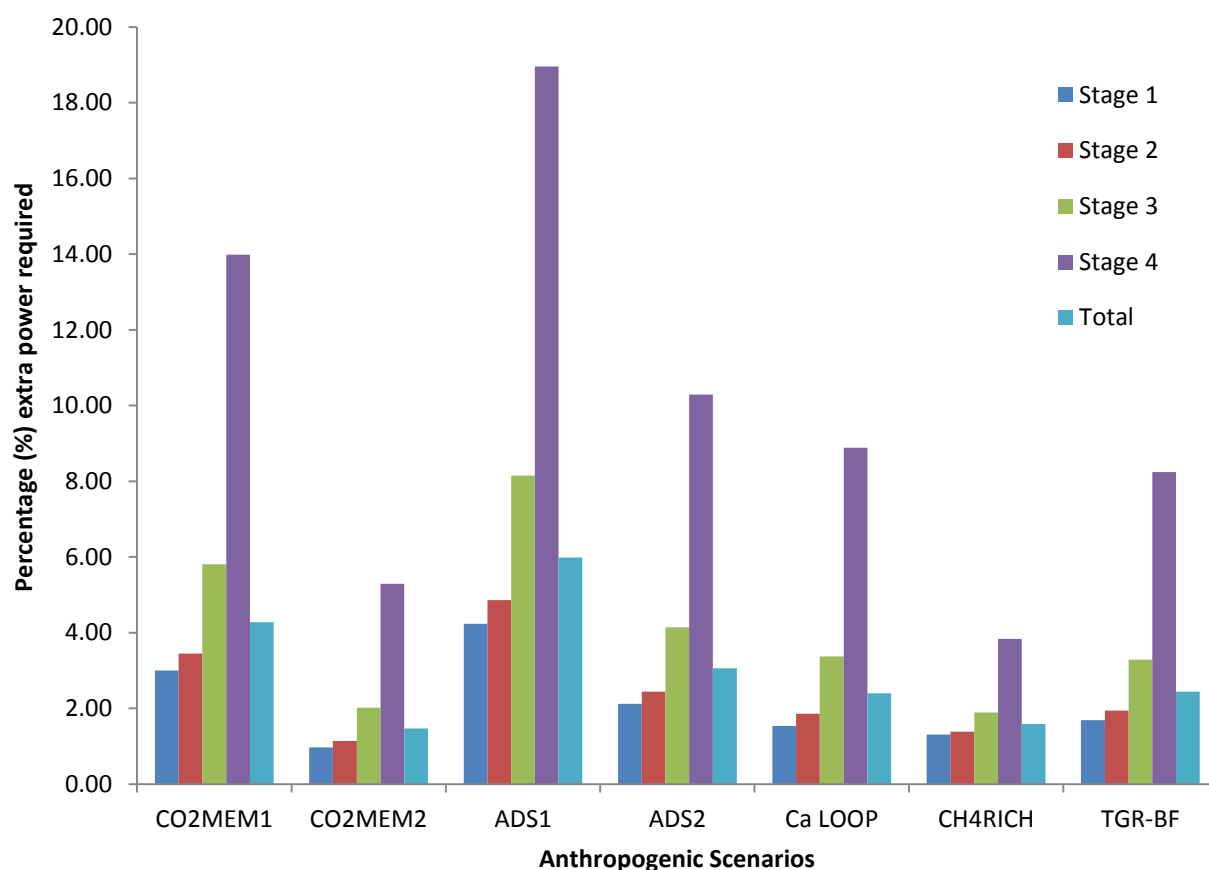


Figure 4-7: A comparison of the extra power requirement per compressor for the scenarios with Post-combustion inlet conditions

4.4.3.2 Analysis of the compression power required by Oxy-combustion scenarios

The power requirements for the possible anthropogenic scenarios resulting from Oxy-combustion inlet conditions, OXY1, OXY2 and TGR-BF (in common with Post-combustion category) are summarized in Table 4-10. As noted previously, it should be remembered that OXY1 and OXY2 are based on expected output CO₂ purity from a CPU that has the dual purposes of removing impurities from CO₂, as well as CO₂ compression. This change in purity during compression has not been considered in this study, but should be considered further in future work. For the first compression stage, the initial conditions for the current set up are the same as reference case C₀ (IEAGHG, 2011). The inlet temperature is taken to be 12°C and the initial pressure at 1bara. The efficiency of the compressors has been considered to be 85%.

According to reference case C₀ (IEAGHG, 2011), the compression strategy comprises of four stages and variant mass flow rates. The mass flow rates, as given in Table 4-10, are 602,055kg/h, 664,617kg/h, 231,838kg/h and 460,402kg/h through stages one to four, accordingly. The flow variation is due to the design of compression unit, shown in Figure 4-8, for effective thermal management and the existence of CO₂ dehydration system.

The power requirement for the reference case, REF is also calculated with suggested compression strategy of

Table 4-11. The power requirement for compression stages is calculated to be 10.768MW, 3.344MW and 18.5MW. This could be compared against the given power requirement for the base case, case C₀ (IEAGHG, 2011), 14.7MW, 3.1MW, and 17.6MW, accordingly. The composition of the base case scenario for Oxy-combustion, as outlined in Table 10, is not a pure CO₂ and varies through the compression process, and this explains the existing discrepancy. In particular, since the outlet specification has been assumed to be present for the entire CO₂ compression process, the presence of additional N₂ and O₂ (particularly in the first stage) increased the compression power requirements.

Table 4-10: The variation of mass flow and composition throughout the process unit of the along the Oxy-combustion case C₀ from IEAGHG (2011/07)

Compression	Mass flow (kg/h)	Composition (vol %)						
		CO ₂	N ₂	O ₂	Ar	SO ₂	NO+NO ₂	H ₂ O
Stage-1	602055	74.66	14.98	6.15	2.41	0.3	0.04	1.45
Stage-2	664617	75.62	15.18	6.23	2.44	0.3	0.04	0.19
Stage-3	231838	94.95	2.62	1.51	0.83	0.07	0.02	0.00
Stage-4	460402	95.73	2.05	1.16	0.63	0.42	0.02	0.00

The total power required for the anthropogenic cases OXY1, OXY2, and TGR-BF have been evaluated as 81.284MW, 79.155MW, and 79.489MW respectively. These values are obtained with an assumption of compression efficiency to be 85%. The variation of the power requirement with the efficiency of compressors has been investigated in Table 4-12.

In the process of capturing CO₂ in Oxy-combustion technology, as appeared in IEAGHG report (IEAGHG, 2011), an “auto-refrigerated cycle” is devised which uses some of the separated cold CO₂ at the early stages of process plant as working fluid of a refrigerating cycle that provides flue gas cooling.

The flue gas entering the unit is initially cooled and compressed into an inter-cooled two stages compressor to about 30bar. Compressed carbon dioxide flows through the swing dual bed desiccant dryer, to remove the last traces of water before entering the cold box. The electrical power feedback of this to the system was evaluated to be 9.8MW, for their Oxy-combustion reference case (IEAGHG, 2011). A conservative 5% could be deducted from the 9.8MW to take into account the electrical consumption of the Flue Gas Expander, i.e. 9.3MW. This value could be deducted from the total power required for the cases OXY1, OXY2, and TGR-BF, which reduces the total power required for the Oxy-combustion anthropogenic scenarios to 71.984MW, 69.855MW, and 70.189MW.

Table 4-13 compares the results from the current approach with the results of the approach undertaken in Section 4.4.2. It can be seen in Figure 4-9 that the extra power requirements are fairly close together and slightly less than the constant mass flow rate through compression stages. The extra power requirement of the anthropogenic Oxy-combustion scenarios with respect to the reference case is broken down for each compression stage, and is shown in Figure 4-10. The highest power requirement is for the final stage, as it has the highest compression ratio in the undertaken compression strategy.

The anthropogenic scenario OXY1 is shows the highest power requirement. This scenario is the least pure stream (90% CO₂) among this group and has relatively high oxygen (6%) and nitrogen (3%) concentration, hence required the maximum energy in the category. The extra power requirement is about 5.79%.

Table 4-11: The power requirements of the scenarios with Oxy-combustion inlet conditions

	COMP. STAGE	Eff.	Mass Flow	Inlet		Outlet (Pipesim)		Outlet (IEAGHG)		Cal. Comp. power
		Isen.	kg/h	T[°C]	P[bara]	T[°C]	P[bara]	T[°C]	P[bara]	MW
REF	1	0.85	602055	12	1	260.2	12	281	15	45.26
	2	0.85	664617	19	14.4	85.1	19	Not stated	31.1	10.77
	3	0.85	231838	7	9.3	64.5	7	66	18.7	3.34
	4	0.85	460402	13	18.6	180.4	13	188	111.4	18.50
	SUM									77.87

	COMP. STAGE	Eff.	Mass Flow	Inlet		Outlet (Pipesim)		Cal. power	Comp.	Total Power
		Isen.	kg/h	T[°C]	P[bara]	T[°C]	P[bara]	MW		MW
OXY1	1	0.85	602055	12	1	268.7	12	47.01		81.28
	2	0.85	664617	19	14.4	86.3	19	11.25		
	3	0.85	231838	7	9.3	65.7	7	3.48		
	4	0.85	460402	13	18.6	183.5	13	19.55		
OXY2	1	0.85	602055	12	1	263.3	12	45.92		79.16
	2	0.85	664617	19	14.4	85.5	19	10.95		
	3	0.85	231838	7	9.3	64.9	7	3.39		
	4	0.85	460402	13	18.6	151.5	13	18.90		
TGR-BF	1	0.85	602055	12	1	263.4	12	46.09		79.49
	2	0.85	664617	19	14.4	85.5	19	11.00		
	3	0.85	231838	7	9.3	64.9	7	3.41		
	4	0.85	460402	13	18.6	181.4	13	18.99		

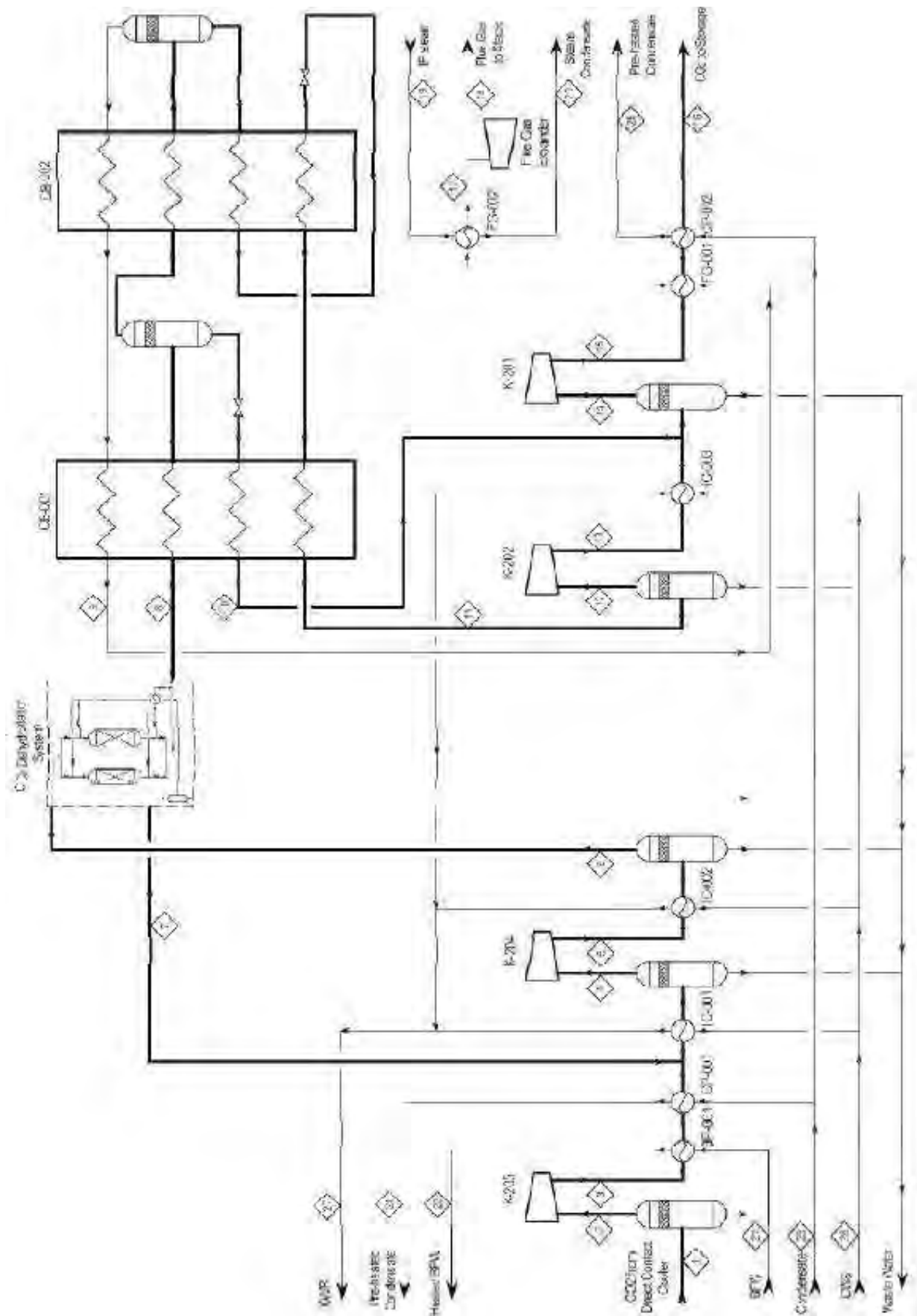


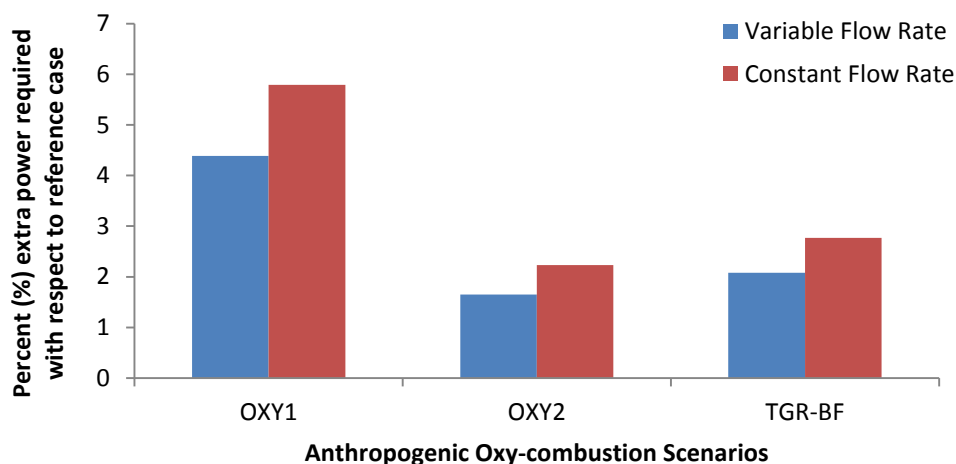
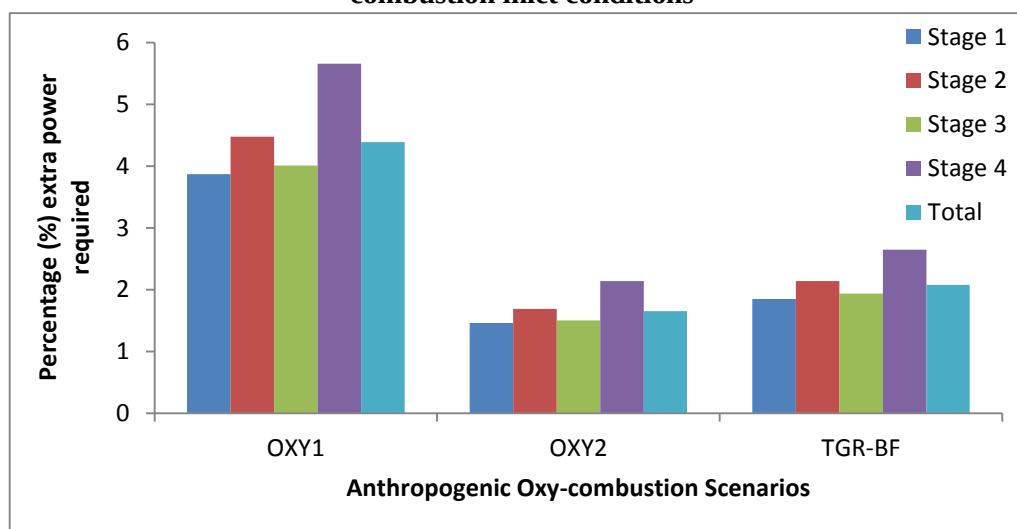
Figure 4-8: Oxy-combustion-Base case C₀: CO₂ Compression Unit Scheme (IEAGHG, 2011)

Table 4-12: The change in total power requirement (MW) for the scenarios with Oxy-combustion inlet conditions and the change in the efficiency of the compressors

		REF	OXY1	OXY2	TGR-BF
Efficiency	0.85	77.87	81.28	79.16	79.49
	0.80	87.91	91.76	89.36	89.74
	0.75	100.02	104.41	101.67	102.10

Table 4-13: A comparison of the extra power requirements of the scenarios with Oxy-combustion inlet conditions

Scenarios	Variable Flow Rate	Constant Flow Rate
OXY1	4.39	5.79
OXY2	1.65	2.23
TGR-BF	2.08	2.77

**Figure 4-9: A comparison of the total extra power requirement for the scenarios with Oxy-combustion inlet conditions****Figure 4-10: A comparison of the extra power requirement per compressor of the scenarios with Oxy-combustion inlet conditions**

4.4.3.3 Analysis of the compression power required by Pre-combustion analysis scenarios

The power requirements of the possible anthropogenic scenarios resulting from Pre-combustion inlet conditions, PRE and H2MEM are summarised in Table 4-14. For the first compression stage, the initial conditions for the current set up are the same as reference case A₀ (IEAGHG, 2011) for the sake of simplicity. The inlet temperature is taken to be -5°C and the initial pressure at 1.2bara. As previously mentioned it is, however, difficult to select just one set of pressure and temperature to be representative of all the separation schemes proposed in the literature. The efficiency of the compressors has been considered to be 85%.

According to reference Pre-combustion case A₀ (IEAGHG, 2011), the compression strategy comprises of five stages and variant mass flow rates. The mass flow rates, as given in Table 4-14, are 208,775kg/h, 619,951kg/h, 689,122kg/h, 619,775kg/h and 619,775kg/h through stages one to five, accordingly. The flow variation is due to the design of compression unit, shown in Figure 4-11, for effective thermal management and the existence of CO₂ dehydration system.

The power requirement for the reference case, REF is also calculated with suggested compression strategy of Table 14. The power requirement for compression stages is calculated to be 6.78MW, 12.4MW, 16.16MW, 8.77MW and 4.2MW. This could be compared against the given power requirement for the base case, case A₀ (IEAGHG, 2011), 6.6MW, 12.2MW, 16.0MW, 8.5MW and 4.1MW, accordingly. The composition of the base case scenario for Pre-combustion, as outlined in Table 4-15, is not a pure CO₂ and varies through the compression process, and this explains the existing discrepancy.

The total power required for the anthropogenic cases PRE and H2MEM have been evaluated as 49.621MW and 49.606MW, respectively. These values are obtained with an assumption of compression efficiency to be 85%. The variation of the power requirement with the efficiency of compressors has been investigated in Figure 4-16.

Table 4-17 compares the results from the current approach with the results of the approach undertaken in Section 4.4.2. It can be seen in this table that the extra power requirements are fairly close together and slightly less than the constant mass flow rate through compression stages. The extra power requirement of the anthropogenic Pre-combustion scenarios with respect to the reference case is broken down for each compression stage, and is given in Figure 4-12 for more clarity. The highest power requirement is at the final stage, as it has the highest compression ratio, in the undertaken compression strategy.

Similar to the conclusion of Section 4.4.2, the anthropogenic scenario PRE is showing the highest power requirement. The anthropogenic scenario PRE contains 2% of the hydrogen which has a large effect on the density (and thus compressibility) of CO₂.

Table 4-14: The power requirements of the scenarios resulting from Pre-combustion capture technologies

	STAGE	mass flow	Inlet		Outlet		Outlet (IEAGHG)		Cal. Comp. power
		kg/h	T[°C]	P[bara]	T[°C]	P[bara]	T[°C]	P[bara]	MW
REF	1	208775	-5	1.2	111.3	5	121	5	6.78
	2	619951	7	4.8	82.14	12	88	12	12.40
	3	689122	19	11.8	11.24	34	118	34	16.16
	4	619775	24	32.9	91.8	70	94	70	8.77
	5	619775	40	69.8	78.84	111.2	80	111.2	4.20
	SUM								48.31

	STAGE	mass flow	Inlet		Outlet		Cal. Comp. power	Total power
		kg/h	T[°C]	P[bara]	T[°C]	P[bara]	MW	MW
PRE	1	208775	-5	1.2	112	5	6.92	49.62
	2	619951	7	4.8	82.5	12	12.66	
	3	689122	19	11.8	1128	34	16.54	
	4	619775	24	32.9	92	70	9.05	
	5	619775	40	69.8	80	111.2	4.46	
H2 MEM	1	208775	-5	1.2	112.2	5	6.92	49.61
	2	619951	7	4.8	82.64	12	12.66	
	3	689122	19	11.8	111.8	34	16.53	
	4	619775	24	32.9	92.06	70	9.05	
	5	619775	40	69.8	79.71	111.2	4.46	

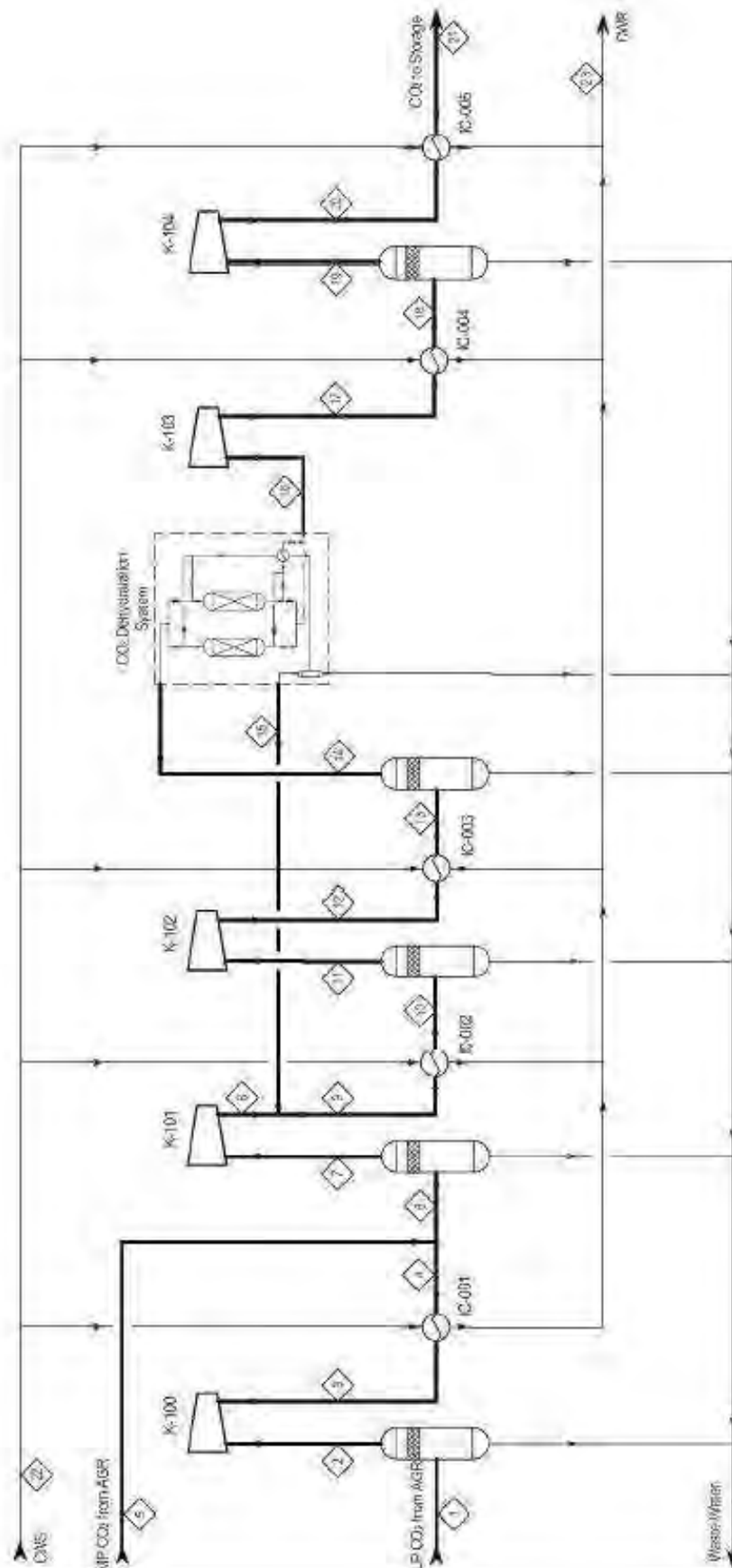


Figure 4-11: Pre-combustion-Base case A₀: CO₂ Compression Unit Scheme (IEAGHG, 2011)

Table 4-15: The variation of mass flow and composition throughout the process unit of the along the Pre-combustion case A₀ of IEAGHG (2011/07)

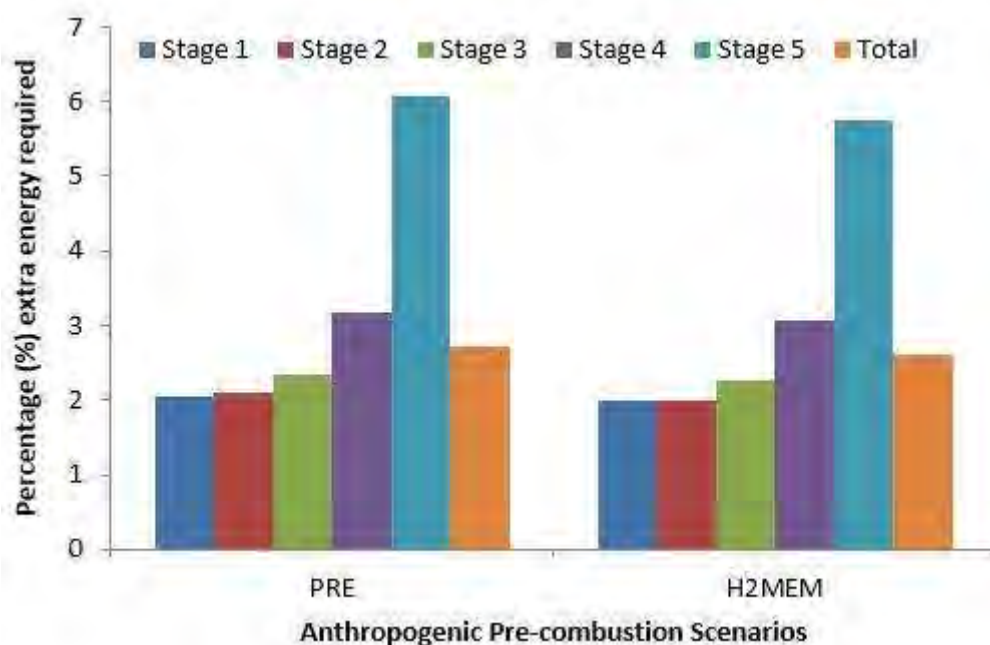
Compression	Mass flow (kg/h)	Composition (vol %)						
		CO ₂	CO	H ₂ S+COS	H ₂	N ₂	Ar	H ₂ O
Stage-1	208775	99.77	0.01	0.02	0.04	0.00	0.00	0.17
Stage-2	619951	98.12	0.14	0.01	1.57	0.02	0.04	0.11
Stage-3	689122	98.09	0.14	0.01	1.57	0.02	0.04	0.13
Stage-4	619775	98.22	0.14	0.01	1.58	0.02	0.04	0.00
Stage-5	619775	98.22	0.14	0.01	1.58	0.02	0.04	0.00

Table 4-16: The change in total power requirement (MW) of the Pre-combustion inlet condition scenarios and the change in the efficiency of compressors

		REF	PRE	H2MEM
Efficiency	0.85	48.31	49.62	49.61
	0.80	54.52	56.02	56.00
	0.75	61.57	63.74	63.72

Table 4-17: A comparison of the extra power requirements of the scenarios with Pre-combustion inlet conditions

Scenarios	Variable Flow Rate	Constant Flow Rate
PRE	2.71	2.80
H2MEM	2.61	2.76

**Figure 4-12: A comparison of the extra power requirement per compressor for the scenarios with Pre-combustion inlet conditions**

4.5 Evaluating impact of impurities on CO₂ gaseous phase compression

The choice of thermodynamic path in increasing the pressure of a fluid plays a large role in determining the discharge temperature and the work required. If a lower discharge pressure is required the number of compression stages may be reduced, although the increased risk of operating close to the two-phase area and critical point must be taken into consideration

For this analysis a two stage compression scenario has been considered to evaluate the extra power requirement in the compression of anthropogenic CO₂ streams. In the first stage of this compression strategy, the stream is compressed from an inlet pressure, P_1 of 4.8bara and a temperature of 1°C to an outlet pressure, P_2 , of 15bara. The initial conditions for entering the second compressor have been considered to be at 14.8bara and 30°C. There is a 0.2bara pressure drop in the heat exchangers as the fluid is cooled to 30°C. The final pressure of the compressed gas is 40.2bara. This pressure will allow for the 0.2bara pressure drop in last heat exchanger and cooling of the stream to the favourable temperature of 30°C, which will provide a compressed gas stream of 40bara at pipeline system inlet. These conditions for compression strategy are summarized in Table 4-18 and the phase behaviour for pure CO₂ is demonstrated in Figure 4-13. The outlet flow from the second compressor is also cooled to 30°C.

The worst case scenario from each technology has been chosen based on the relevant dew line behaviour outlined in Section 3.4. It has been concluded that ADS1, OXY1, and PRE are the worst case representative of the Post-combustion, Oxy-combustion and Pre-combustion inlet conditions, respectively, as they required the highest compression power within their categories. The power requirements of these cases are compared against pure CO₂ in Table 4-19.

The power requirement for the cases REF, ADS1, OXY1, and PRE are 33.23MW, 34.86MW, 33.75MW and 33.98MW respectively. This means that the last three anthropogenic scenarios require 4.9%, 1.6% and 2.3% more power compared to the reference case for a compression from 4.8bara to 40.2bara. This is mainly due to presence of gases such as nitrogen, oxygen and hydrogen in the composition of these scenarios. Figure 4-14 to Figure 4-16 demonstrate the two stage gaseous compression path on the phase diagram of the worst case scenario, ADS1, Figure 4-14, OXY1, Figure 4-15, and PRE, Figure 4-16.

Table 4-18: Initial conditions considered in the gaseous phase compression strategy

	P_1 [bara]	T_1 [°C]	P_2 [bara]
Stage-1	4.8	1	15
Stage-2	14.8	30	40.2

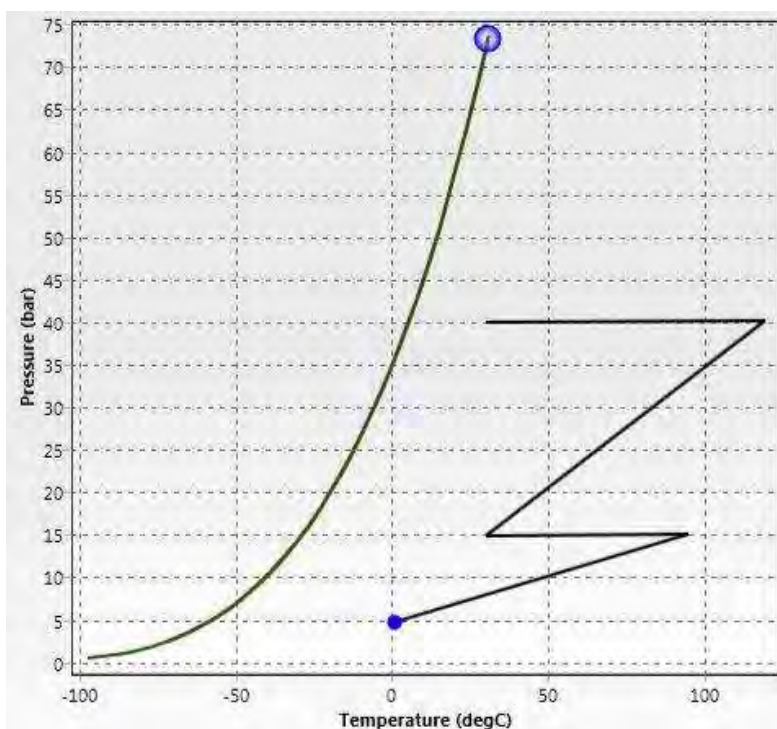


Figure 4-13: A Two-step compression path for gaseous phase compression of the REF case. VLE curve [solid green], Pressure-Temperature profile [solid black], Inlet condition [small blue dot]

Table 4-19: A comparison of the power requirements of the identified worst case scenarios for gaseous phase compression

Scenario	Compression stage (MW)		Required compression power (MW)	Extra power required
	1	2		
REF	17.45	15.78	33.23	
ADS1	18.23	16.63	34.86	4.92%
OXY1	17.70	16.05	33.75	1.55%
PRE	17.83	16.16	33.98	2.26%

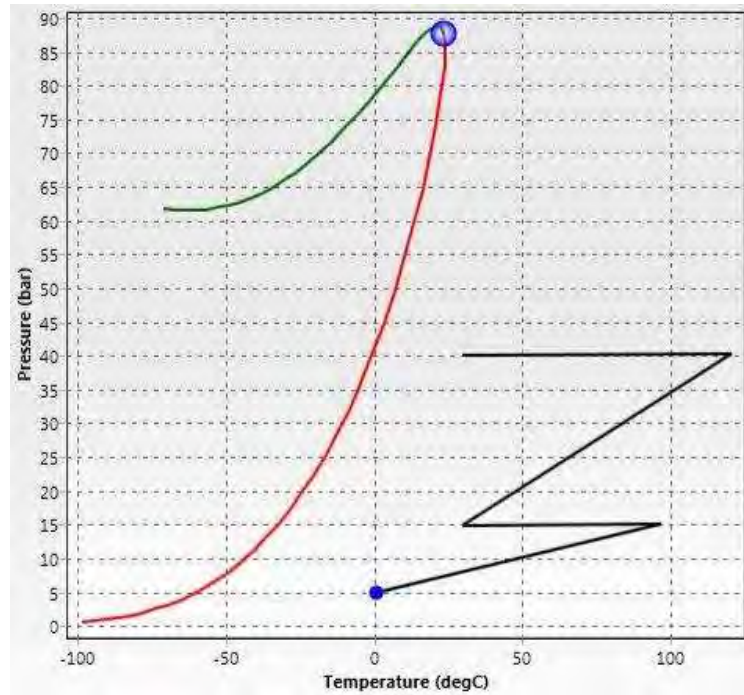


Figure 4-14: A two-step compression path for gaseous phase compression of the ADS1 scenario. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [small solid blue dot]

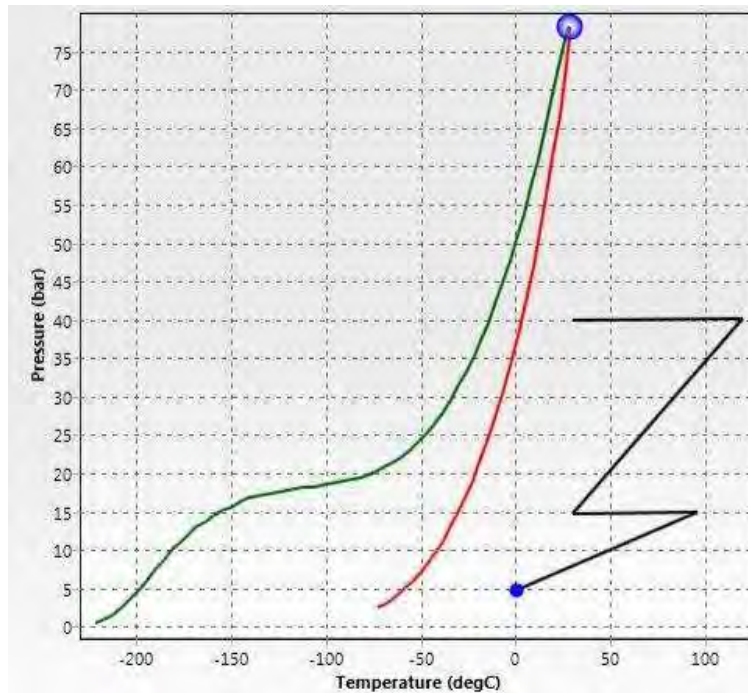


Figure 4-15: A two-step compression path for gaseous phase compression of the OXY1 scenario. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [small solid blue dot]

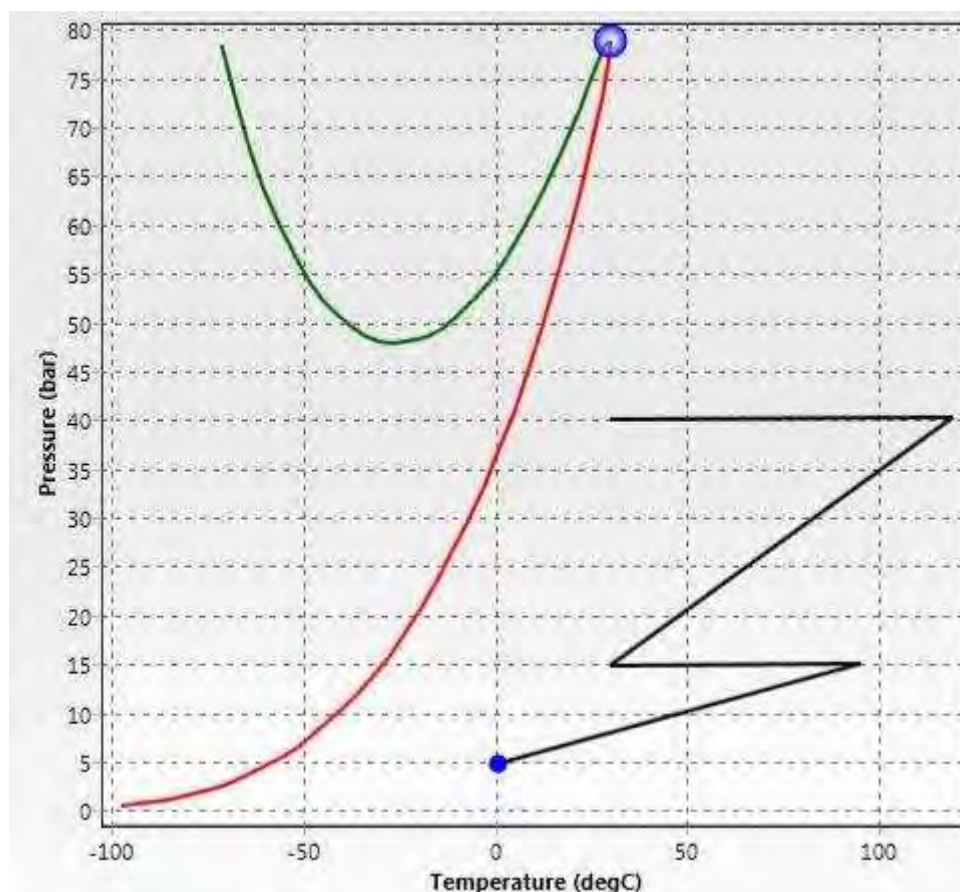


Figure 4-16: A two-step compression path for gaseous phase compression of the PRE scenario. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [small solid blue dot]

4.6 Conclusions

The section has presented an initial explanation of the extra power requirements during compression that might be observed with varying CO₂ composition. Two approaches have been used. In the first approach all scenarios are modelled with the same set of inlet conditions and equal number of compression stages taken from the Post-combustion scenario of the IEAGHG 07/2011 and with the assumption that the mass flow rate is constant throughout the compression stages. In the second approach, the scenarios were grouped in to conventional capture technology categories (Post-combustion, Oxy-combustion and Pre-combustion), and the calculation process adopted features, such as (i) the mass flow rate at each, (ii) number of compression steps and compression ratio of each compressor, and (iii) inlet operational conditions from the assigned conventional capture technology. The evaluated extra power requirements were very close to each other, although there is scope for further work to explore potential differences between CO₂ streams produced by different capture technologies that were not fully characterised in this study.

The presence of impurities in the CO₂ stream increased the compression power requirements. For the worst case scenario, ADS1, a 7% increase in compression power requirement calculated seen. This is a case which has 9% nitrogen as impurity.

For the oxyfuel combustion technologies, the OXY1 is the worst scenario and for the pre-combustion technologies, PRE is the worst scenario in terms of compressor power requirements.

5 IMPACT OF IMPURITIES ON PIPELINE SPECIFICATION AND HYDRAULICS

5.1 Introduction

The importance of the effect of impurities on CO₂ transportation was previously discussed by many scholars (e.g. Yan et al., 2009; Wang et al., 2011 and Race et al., 2012). As demonstrated in Section 3 the impurities would influence a wide range of thermo-dynamical properties, including the density of the stream, the specific pressure drop and the critical point. As a consequence, the pipeline design parameters such as diameter, wall thickness, inlet pressure, Maximum Allowable Operational Pressure and the distance between booster stations are potentially subject to change. These all will also have a significant impact on the cost of the whole CCS chain.

Experience in the U.S. has shown that CO₂ can be efficiently transported onshore in the dense phase at temperatures and pressures ranging between 12°C and 44°C and 85bara and 150bara. The lower pressure limit is set by the phase behaviour of CO₂ and should be sufficient to maintain single phase conditions while the upper pressure limit is mostly due to economic concerns and material. Regarding the temperatures, the upper temperature limit is determined by the compressor station discharge temperature and the temperature limits of the external pipeline coating material, while the lower limit is determined by the winter ground temperature of the surrounding soil. (Mohitpour et al., 2011)

To study the impact of the impurities on the cost of transportation, a set of assumptions has been made as listed in Table 5-1. The scope of this task is designing pipelines that transport the (anthropogenic) CO₂ stream from the capture site, where the dense phase stream is at 110bara and 30°C for a distance of 150km. This is a single point to point onshore pipeline on a flat terrain starting after the compression stage and delivering to an onshore terminal as shown in the Figure 5-1. The centre of the pipeline is buried 1.1 m below the ground level. The surrounding soil temperature is 5°C. The conductivity of the steel pipeline and the soil are taken to be 60.55 and 2.595 W/m²/K accordingly.

Table 5-1: Initial conditions considered for transport of CO₂ in the dense phase

PARAMETER	VALUE	UNIT
Rate of Undulations	0	/1000
Horizontal Distance	150	km
Elevation Difference	0	m
Roughness	0.0457	mm
Ambient Temperature	5	°C
Inlet Pressure	110	bara
Mass flow rate	700	ton/hr
Inlet Temperature	30	°C
Burial depth	1.1	m
Steel Heat Transfer Coefficient	60.55	W/m ² /K
Soil Heat Transfer Coefficient	2.595	W/m ² /K

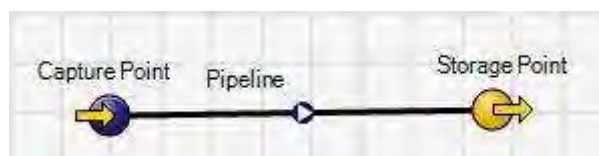


Figure 5-1: Schematic of a point-to-point pipeline on a flat terrain

5.2 Pipeline design considerations

The following are studied to aid the design of safe and durable transport infrastructure for CO₂ streams: i) Hoop stress, ii) Erosion, iii) Pressure drop and iv) Fluid Temperature.

5.2.1 Tangential/hoop stress

The material of the pipeline is assumed to be the EN10208 L450 carbon steel. The allowable tangential or hoop stress in the pipe wall is calculated from (Mohitpour et al., 2007):

$$\sigma_h = \frac{pD_0}{20t} \leq e \times a \times \sigma_{SYMS} \quad (1)$$

where

- σ_h is the hoop stress in MPa,
- p is the internal pressure (bara),
- D_0 is the external diameter (mm),
- t is the wall thickness (mm),
- e is the weld factor (assumed to be 1),
- a is the design factor suggested by codes of practice, and
- σ_{SYMS} is the specified minimum yield stress in MPa.

For the pipeline scenarios in the current study the design factor is considered to be 0.72 in accordance with PD8010-1 (2004), hence the hoop stress should be less than $450 \times 0.72 = 324$ MPa.

5.2.2 Erosion

Erosion is caused in pipelines when a fluid passes through a pipeline with a high velocity inducing both vibration and erosion in the pipeline which will erode the pipe wall over time. In addition to this type of erosion, further erosion is also caused by entrained solids. If the fluid velocity exceeds the erosional velocity calculated for the pipeline, the rate of erosion of the pipe wall is increased to rates that can significantly reduce the lifespan of pipeline. Therefore, it is always necessary to control the fluid velocity in fluid transmission lines to prevent it from rising above this limit. The API 14 E (2000) model is used in this study for modelling the erosional velocity.

The API 14 E model comes from the American Petroleum Institute, Recommended Practice, number 14 E. This is a solids-free model which will calculate an erosion velocity only (and not the erosion rate). The erosional velocity u_e can be calculated with the formula

$$u_e = \frac{C}{\rho_{mix}^{0.5}} \quad (2)$$

Where, in SI units,

- u_e is erosional velocity, m/s
- ρ_{mix} is the fluid mean density, kg/m³, and
- C is a constant defined as $91.5 < C < 183$.

C has dimensions of $\left(\frac{\text{mass}}{\text{length} \times \text{time}^2}\right)^{0.5}$. The recommended value for C in gas transmission pipelines is $C = 122$. (Mohitpour et al, 2007)

The recommended value for the gas velocity in gas transmission mainline is normally between 40% and 50% of the erosional velocity (i.e. a value of 10-13m/s is an acceptable value for design purposes) (BSEN10208, 2009). This value could be increased to 15-17m/s for non-major mainlines or laterals.

5.2.3 Pressure drop

The optimum pressure drop per unit length of pipe is an important factor used to design the most cost-effective system. Maintaining the optimal pressure drop along each section of the pipeline system is necessary to minimise the required facilities and operating expenses (including pipeline, compressor, and fuel-consumption costs).

The pressure drop of 15-25kPa/km is proven to be optimum in the studies performed by the Pipeline System Design department of TransCanada Pipelines (Mohitpour et al, 2007). This means that, when the final system design is complete, the pressure drop in all sections of the pipeline system should be within this range.

5.2.4 Temperature

Temperature has considerable influence on the economic and technical evaluations involved in the design of pipelines and related facilities. For gaseous phase CO₂ transportation the minimum temperature is considered to be greater than ground (soil) temperature, 5°C, here. For the case of dense phase CO₂ transport, temperature loss in the fluid has less of an effect, because the temperature of the fluid does not have a large bearing on the density. The density increases slightly as the temperature drops which results in a minor increase in erosional velocity.

5.3 Transportation in gaseous phase

The pipeline geometry requirement for the reference case and the worst case scenarios (based on the dew point curves) from each capture technology were calculated and are summarised in Table 5-2. The pipeline length and the mass flow rate are identical to those in Table 5-1.

Table 5-2: A comparison of the pipeline dimensions and pressure and temperature losses for gaseous phase transportation of the reference and worst anthropogenic cases

	Calculated Pipe Parameters (mm)			P _i	T _i	P _f	T _f
	ID	W	OD	bara	°C	bara	°C
REF	851.4	6.3	864	40	30	25.5	8.6
CH ₄ RICH	851.4	6.3	864	40	30	25.0	8.7
OXY2	851.4	6.3	864	40	30	24.9	8.7
PRE	851.4	6.3	864	40	30	24.8	8.5

Where ID is inside diameter, W is Pipeline thickness, OD is outside diameter, P_i is inlet pressure, T_i is the inlet temperature, P_f is the final pressure, and T_f is the final temperature.

In order to transport 700ton/hr (194.44kg/s) of pure CO₂ in the gaseous phase, a pipe size of 864mm outside diameter (OD) would be required. The minimum thickness (W) for this pipeline would be 6.3mm. For an initial pressure of 40bara, there would be 14.5bara pressure drop after 150km which is equivalent to 10kPa/km. These conditions also comply with the requirement that the temperature should always be greater than the ground temperature.

The same design considerations as the reference case were applied in the pipeline design for the worst case anthropogenic scenarios. It is found that the presence of impurities (to the level considered in this study) did not affect the optimum pipeline specifications in the gaseous phase (risk management has

not been considered). The impurities only had an insignificant effect on the final pressure and temperature.

The phase behaviour and pressure and temperature variation along the pipeline for the cases in Table 5-2 are shown in Figure 5-2, Figure 5-3, Figure 5-4 and Figure 5-5. Figure 5-6, Figure 5-7 and Figure 5-8 display the change in erosion velocity (solid blue/ Left Y axis) and the mean flow velocity (solid red/Right Y-axis) along the pipeline length. The erosional velocity ratio (EVR), the ratio of the mean flow velocity to the erosional velocity, is in the range of 0.3 to 0.38. The range of the mean flow velocity is 3.8m/s to 6.1m/s and is 12.9m/s to 16.4m/s for the erosional velocity. As previously mentioned, the recommended value for the fluid transportation velocity in gaseous transmission (coming from oil and gas experience) is normally 40% to 50% of the erosional velocity. The maximum EVR in the current calculations, 0.38, is a conservative design which is just below the 0.4 limit coming from oil and gas industry experience.

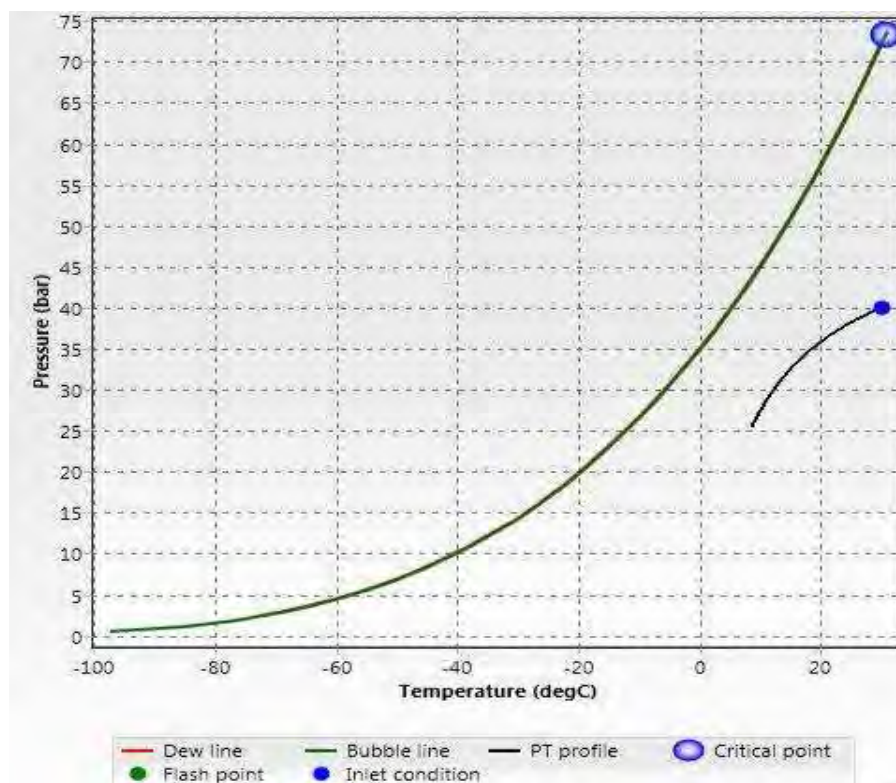


Figure 5-2: The phase behaviour of the REF case transported from 40bara and 30°C along 150km.

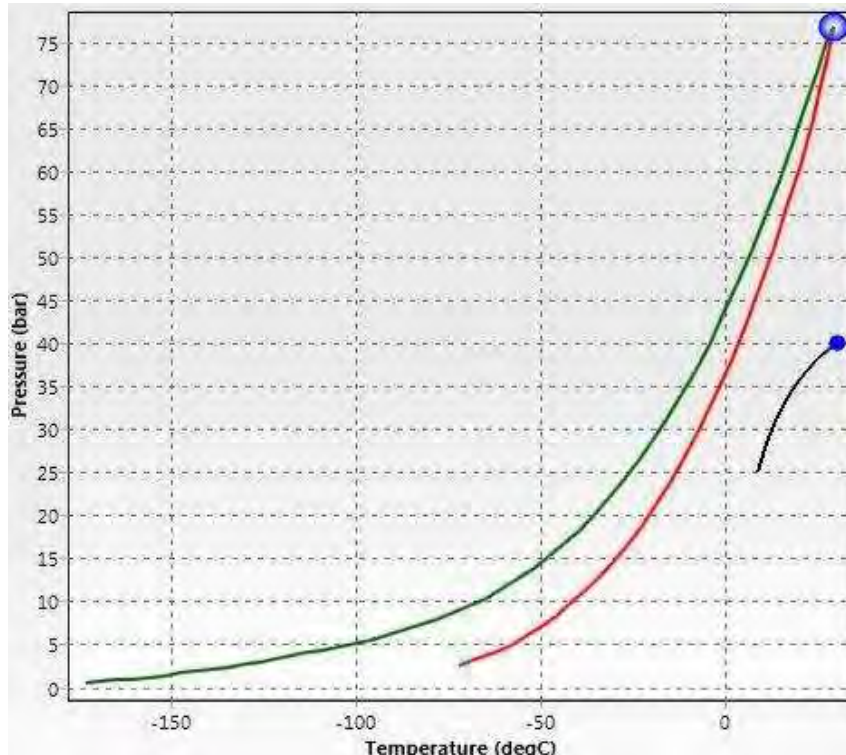


Figure 5-3: The phase behaviour of the CH₄RICH case transported from 40bar and 30°C along 150km. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [blue dot]

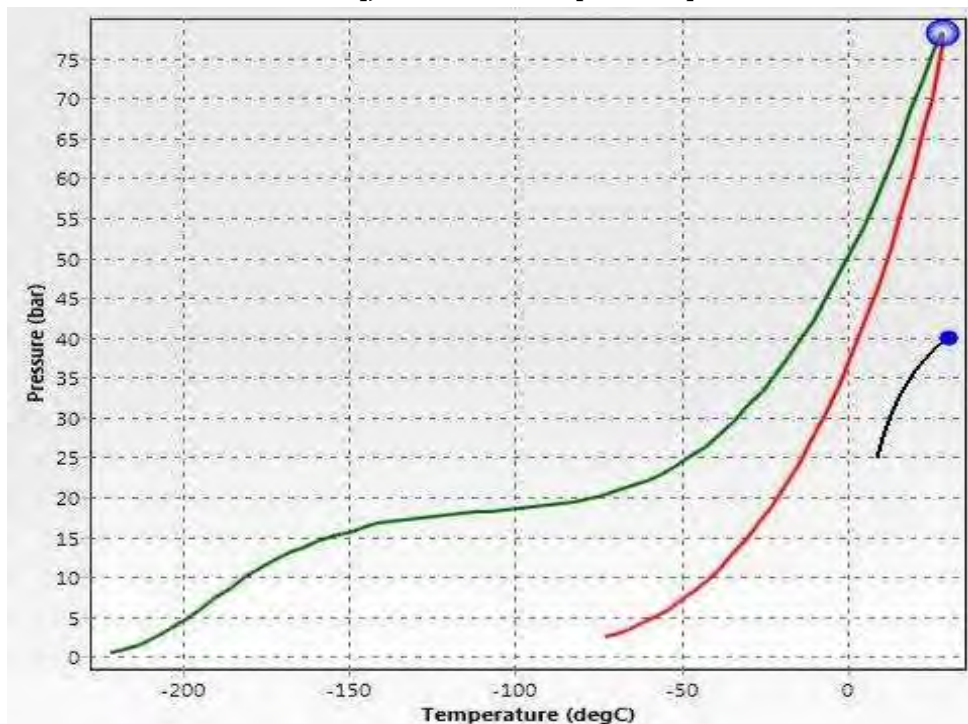


Figure 5-4: The phase behaviour of the OXY2 case transported from 40bar and 30°C over 150km. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [blue dot]

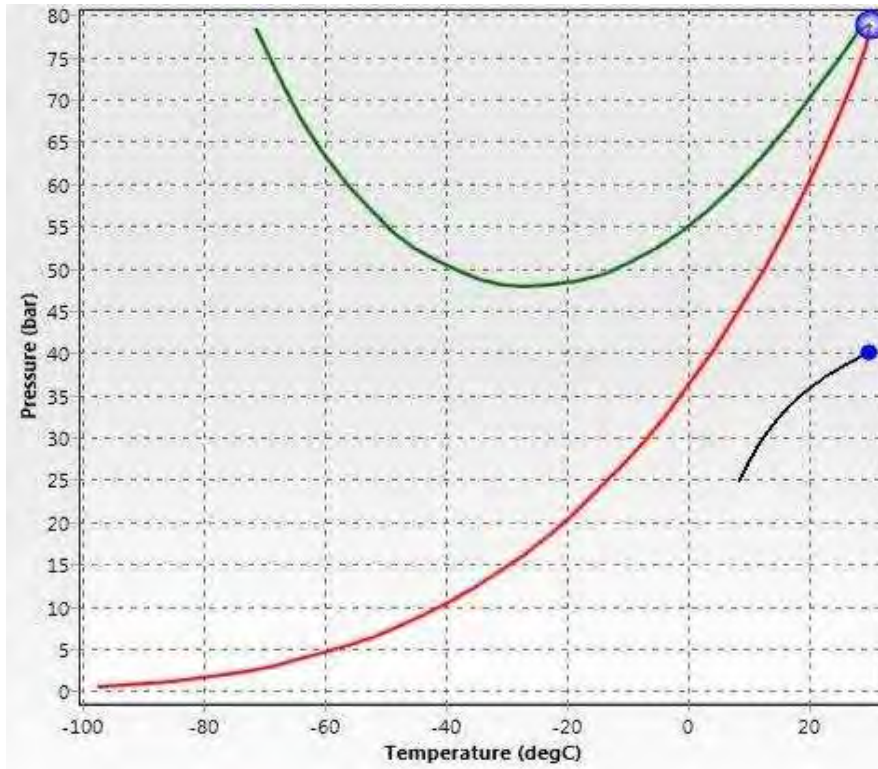


Figure 5-5: The phase behaviour of the PRE case transported from 40bara and 30°C over 150km. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [blue dot]

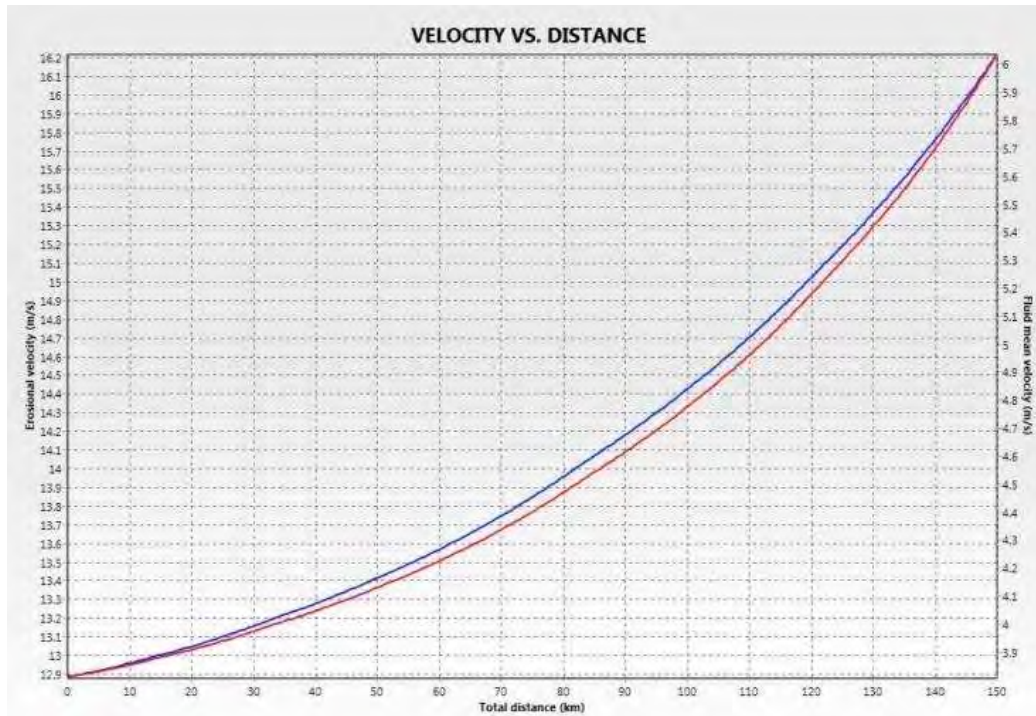


Figure 5-6: A comparison of the erosional velocity (solid blue/ Left Y axis) to the fluid mean velocity (solid red/Right Y-axis) for the CH₄RICH scenario during gaseous phase transportation.

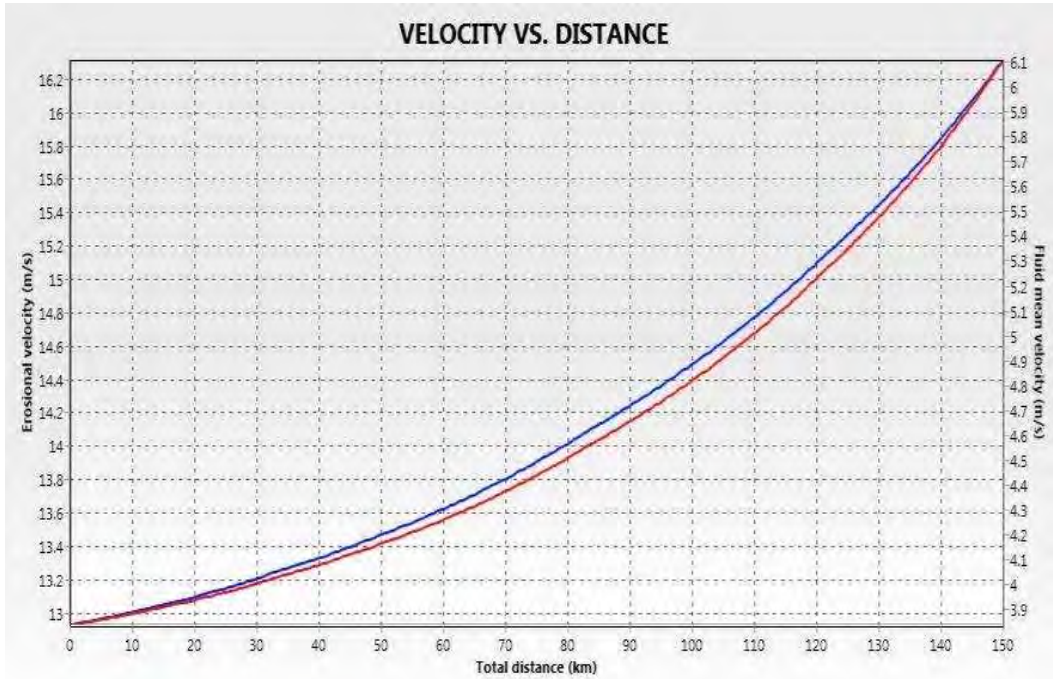


Figure 5-7: A comparison of the erosional velocity (solid blue/ Left Y axis) to the fluid mean velocity (solid red/Right Y-axis) for the OXY2 scenario during gaseous phase transportation

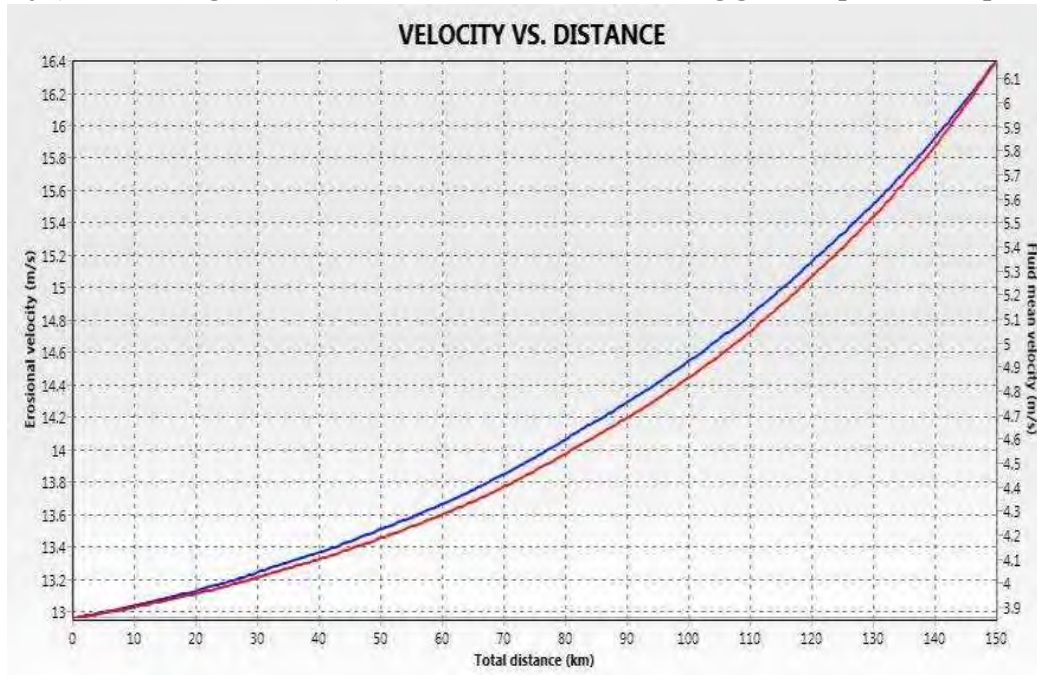


Figure 5-8: A comparison of the erosional velocity (solid blue/ Left Y axis) to the fluid mean velocity (solid red/Right Y-axis) for the PRE scenario during gaseous phase transportation

5.4 Transportation in the dense phase

Pipeline geometry requirements for dense phase transportation of the reference case and the worst case scenarios from each capture technology have been calculated and are summarised in Table 5-3. The pipeline length and the mass flow rate are identical to those in Table 5-1 and are similar to the gaseous phase transportation parameters.

Table 5-3: A comparison of the pipeline dimensions, pressure and temperature losses for dense phase transportation of the reference and worst anthropogenic cases

	Calculated Parameters (mm)			P _i bara	T _i °C	P _f bara	T _f °C	Hoop Stress (MPa)
	ID	W	Pipe OD					
REF	490.4	8.8	508	110	30	84.87	15.39	317.5
ADS1	588	11	610	110	30	96.80	17.51	305.0
OXY1	588	11	610	110	30	97.20	17.53	305.0
PRE	490.4	8.8	508	110	30	83.3	15.78	317.5

In order to transport 700ton/hr (194.44kg/s) of pure CO₂ in dense phase, a pipeline of 508mm outside diameter would be required. The minimum thickness for this pipeline to comply with the maximum allowable tangential stress is 8.8mm. The maximum allowable tangential stress calculated as 324MPa and the designed stress limit is 317.5MPa. The choice of optimum wall thickness also keeps the pipeline weight (hence the material cost) to its minimum. This results in a 25.13bara pressure drop along the length of the pipeline which is equivalent to 16.75kPa/km and in agreement with allowable pressure drops limits in pipeline engineering (Mohitpour et al, 2007). The delivery pressure is such that two phase flow in the pipeline is prevented. There is almost a 15°C drop in the temperature of the fluid, which makes the fluid slightly denser at the delivery point. This, in turn, causes a slight reduction in the erosional velocity. The erosional velocity ratio (flow mean velocity to erosional velocity) is around 0.3.

The same design considerations as in the reference case have been applied in the pipeline design for the worst case anthropogenic scenarios. The cases ADS1 and OXY1 require pipelines OD sizes of 610mm with wall thicknesses of 11mm. This keeps the hoop stress down to below 305MPa.

The phase behaviour for the cases outlined in Table 5-3 and the behaviour along the pipeline are presented in Figure 5-9, Figure 5-10, Figure 5-11 and Figure 5-12. Figure 5-5, Figure 5-6, Figure 5-7 and Figure 5-8; and Figure 5-13, Figure 5-14, Figure 5-15 and Figure 5-16 display the change in erosion velocity (solid blue/ Left Y axis) and the mean flow velocity (solid red/Right Y-axis) along the pipeline length for gaseous and dense phase transportation respectively. The EVR, the ratio of the mean flow velocity to the erosional velocity, is in the range 0.22 to 0.3. The range of the mean flow velocity is 1m/s to 1.4m/s and 4.4m/s to 5.4m/s for the erosional velocity. As previously mentioned, it is recommended that the fluid transportation velocity in gaseous phase transmission is 40% to 50% of the erosional velocity (this comes from oil and gas experience). A conservative value of 0.3 for the maximum EVR is used here for the dense phase.

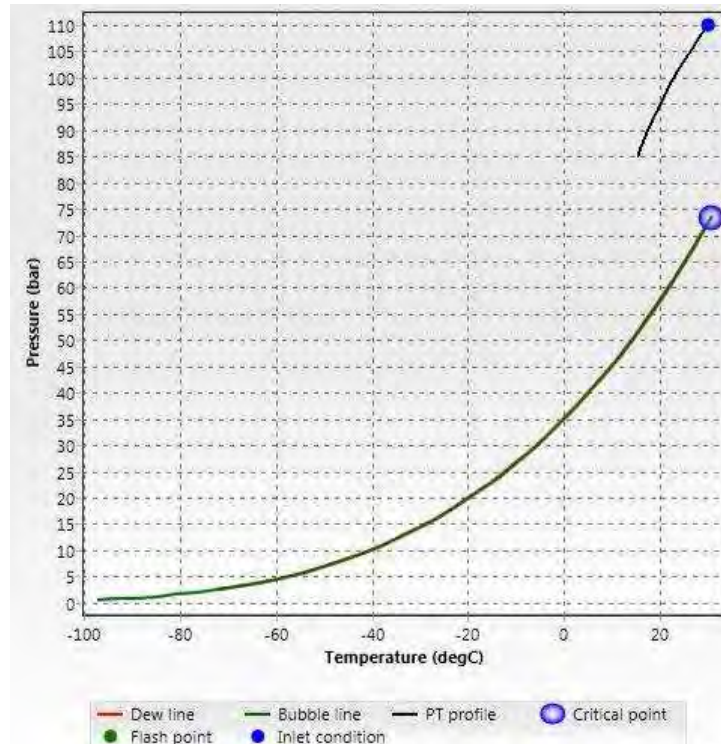


Figure 5-9: The phase behaviour of the REF case during dense phase transportation from 110bara and 30°C along 150km.

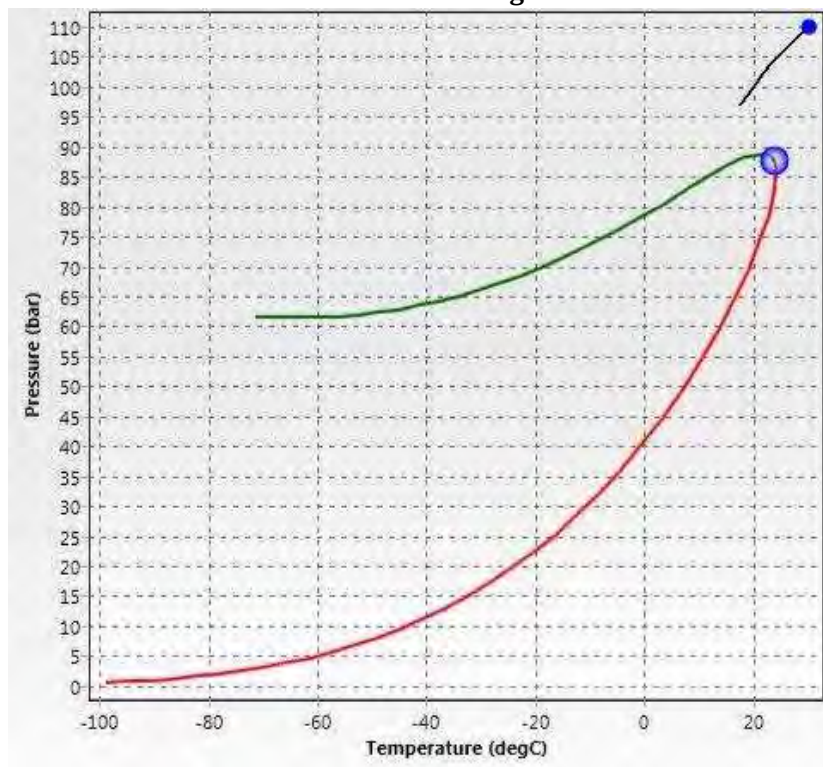


Figure 5-10: The phase behaviour of the ADS1 case during dense phase transportation from 110bara and 30°C along 150km. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [blue dot]

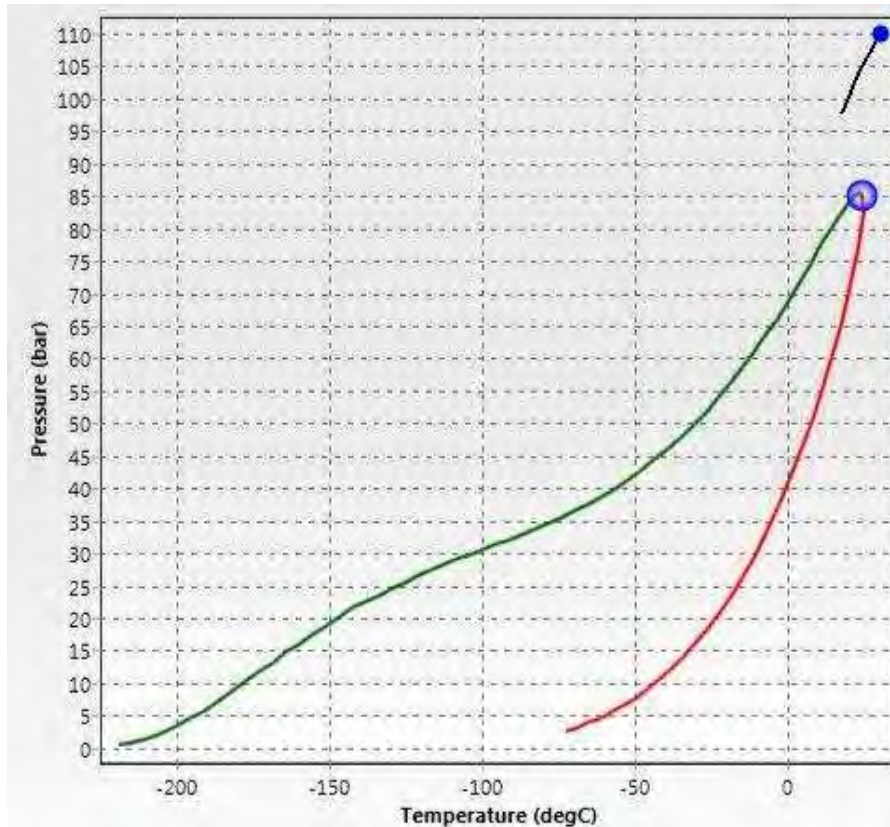


Figure 5-11: The phase behaviour of the OXY1 case during dense phase transportation from 110bar and 30°C along 150km. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [blue dot]

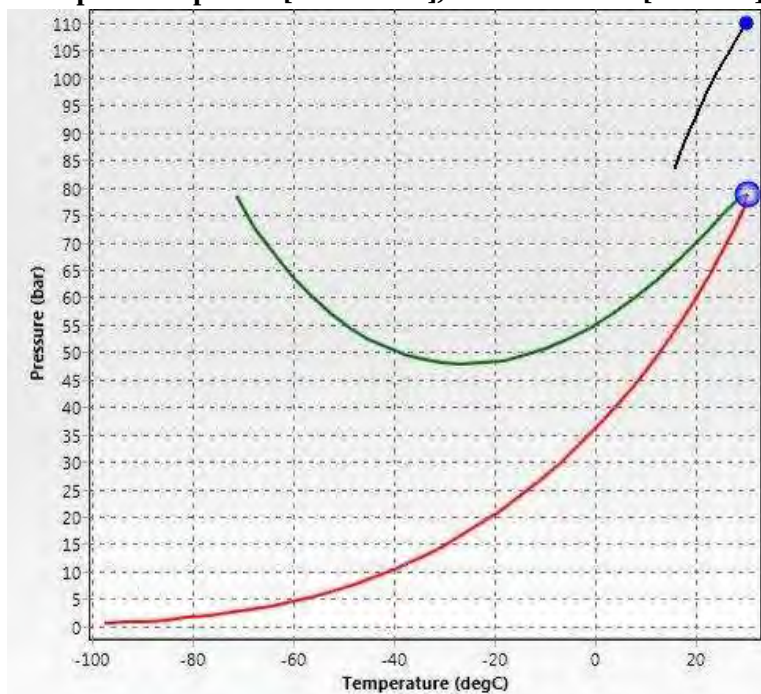


Figure 5-12: The phase behaviour of the PRE case during transportation in the dense phase from 110bara and 30°C along 150km. Dew line [solid red], Bubble line [solid green], Pressure-Temperature profile [solid black], Inlet condition [blue dot]

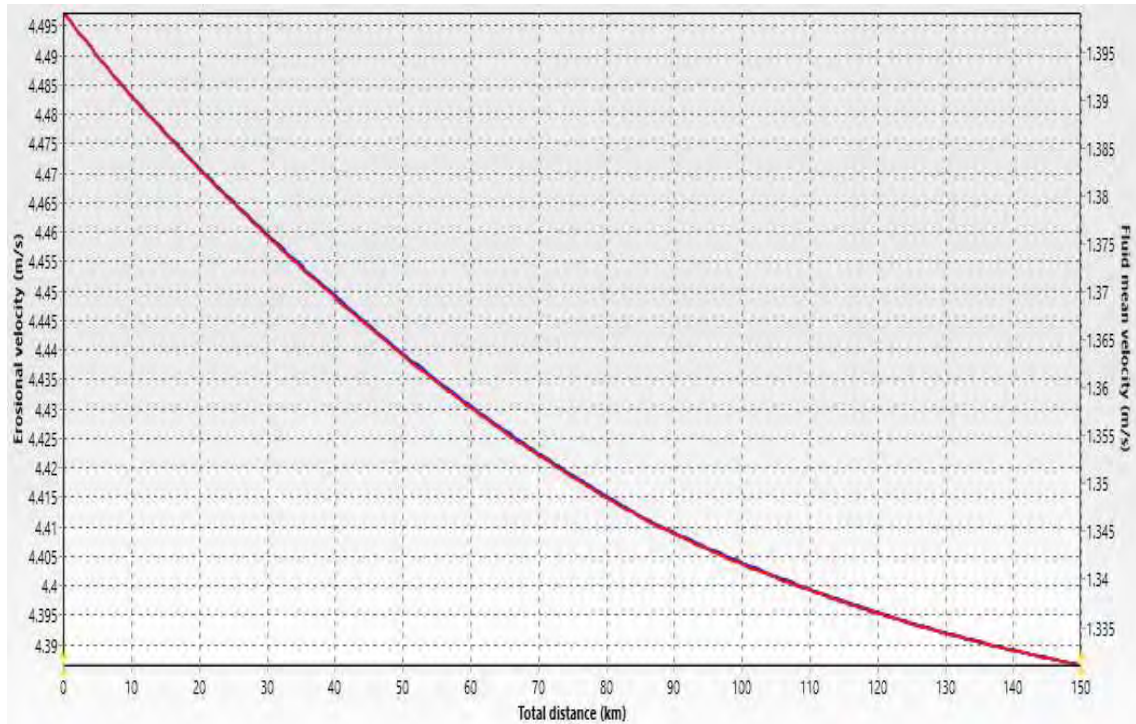


Figure 5-13: A comparison of the erosional velocity (solid blue/ Left Y axis) and the fluid mean velocity (solid red/Right Y-axis) for the REF scenario during dense phase operation.

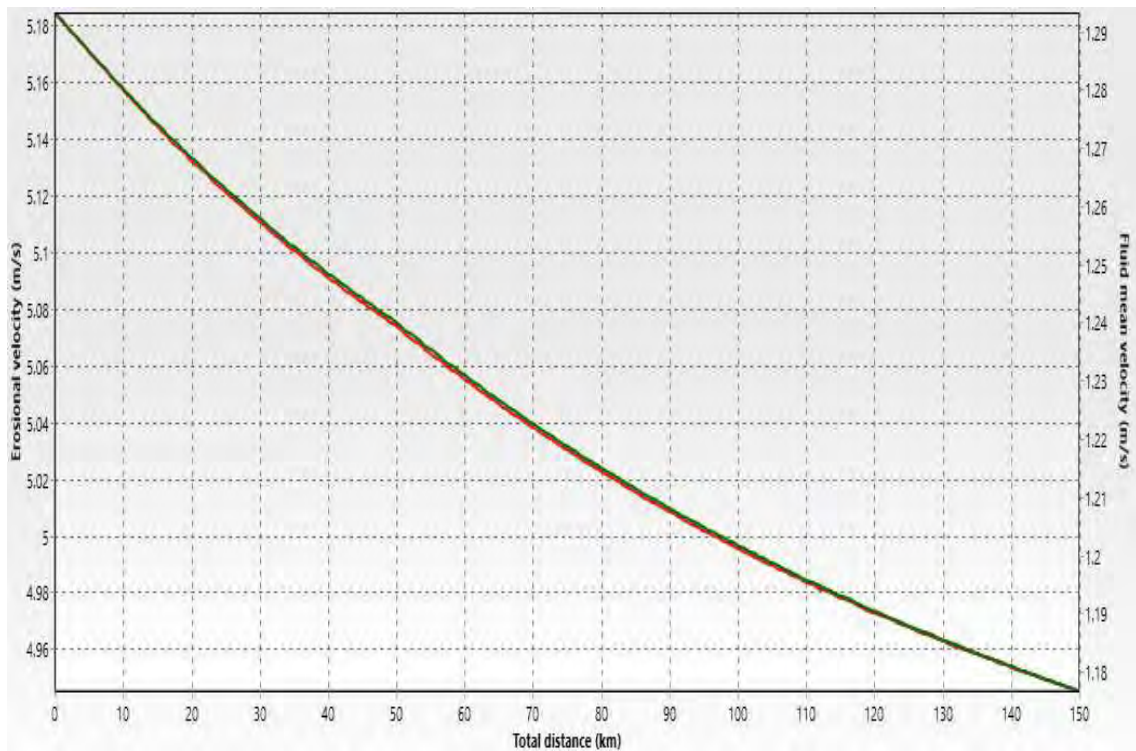


Figure 5-14: A comparison of the erosional velocity (solid green/ Left Y axis) and the fluid mean velocity (solid red/Right Y-axis) for the OXY1 scenario during dense phase operation.

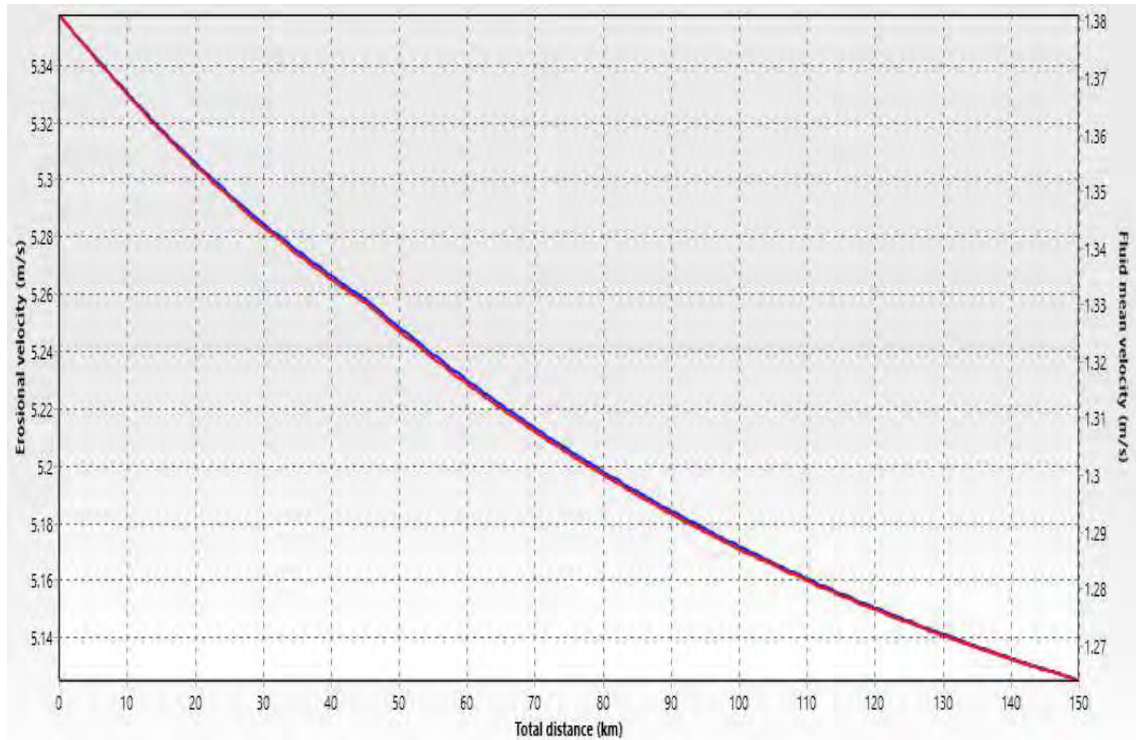


Figure 5-15: A comparison of the erosional velocity (solid blue/ Left Y axis) and the fluid mean velocity (solid red/Right Y-axis) for the ADS1 scenario during dense phase operation.

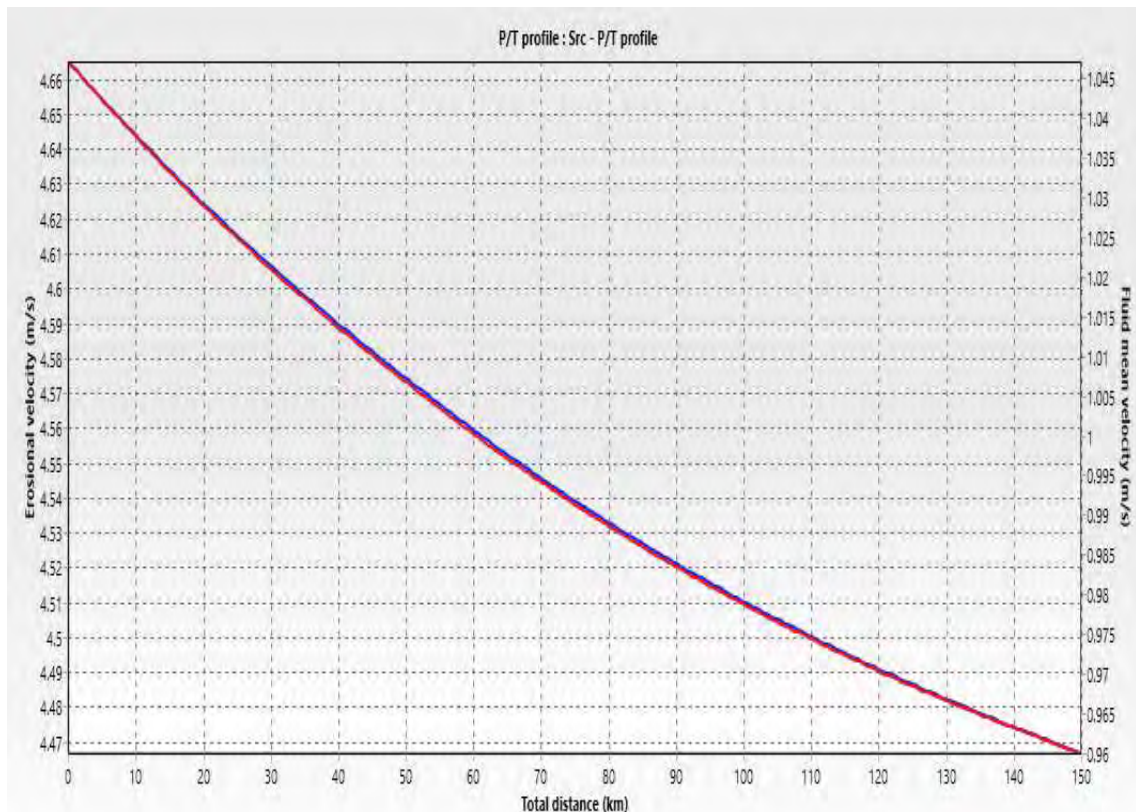


Figure 5-16: A comparison of the erosional velocity (solid blue/ Left Y axis) and the fluid mean velocity (solid red/Right Y-axis) for the PRE scenario during dense phase operation.

5.5 Sensitivity analysis

This section evaluates the effects of inlet pressure, ambient temperature and mass flow rate on the hydraulic characteristics of a dense phase CO₂ pipeline and seeks an optimum pipe size which handles each scenario effectively. The flow rates applied in this analysis are 500ton/hr (138.89kg/s) and 700ton/hr (194.44kg/s), the former accounts for a 30% drop in the nominal mass flow rate (700ton/hr) at the capture plant. It has been assumed that the type of soil (hence, constant heat transfer coefficient) and the burial depth do not change along pipeline route and only the ground temperature affects the temperature profile in the present study, hence 0°C, 5°C and 15°C have been considered. The inlet pressures for the sensitivity analysis are taken to be 100bara and 110bara. This is summarised in Table 5-4.

Table 5-4: Operating parameters to study the sensitivity of the design

Parameter	Value
Flow Rate	500ton/hr (138.89kg/s)
	700ton/hr (194.44kg/s)
Soil Temperature	0°C
	5°C
	15°C
Inlet pressure	100bara
	110bara

The temperature range represents the seasonal variation of the soil temperature in the United Kingdom throughout the year. The minimum, 0°C, occurs in February and the maximum temperature, 15°C, is expected to occur in August. The pressure of 100bara accounts for a 10% drop in the steady state operation of a pipeline.

Twelve operational combinations of the sensitivity parameters were created from combinations of these parameters. These 12 combinations were investigated in the framework of reference scenario, REF, and the previously identified anthropogenic worst case scenarios, ADS1, OXY1 and PRE. These combinations and the relevant pipeline specification (ID, W & OD) and the hydraulic specifications (final pressure and final temperature) are shown in Table 5-5, Table 5-6, Table 5-7 and Table 5-8 for the cases REF, ADS1, OXY1 and PRE respectively. Conditions 1 to 6 are operated at an initial pressure of 100bara and conditions 7 to 12 are operated at an initial pressure of 110bara.

In the previous section the pipeline specifications for the design conditions (110bara, 5°C and 700 ton/hr) were presented. Figure 5-17 compares the outer diameters calculated in Table 5-5, Table 5-6, Table 5-7 and Table 5-8 for the cases REF, ADS1, OXY1 and PRE. For the case of the pure CO₂ there is no need to alter the optimum pipeline size across the 12 operating conditions. The data related to this case is marked in Figure 5-17 with a red ■.

Figure 5-17 also reveals that the optimum pipeline specifications do not change for the conditions 7-12 for the ADS1, OXY1 and PRE scenarios. This is where the operating pressure is 110bara, and the effect of a change in the mass flow rate (to 500 ton/hr) and the potential changes in soil temperature (0°C and 15°C) were sought. However, as the inlet pressures drops to 100bara, the density of the stream decreases (conditions 1-6) and causes an increase in pipeline size. The minimum pipeline diameter for the cases ADS1 and OXY1 increases from 610mm to 660mm as the pressure is decreased to 100bara.

As shown in Figure 5-18, the pressure drop along the pipeline increases as the flow rate is increased from 500ton/hr to 700ton/hr. However, for the inlet pressure of 100bara, the maximum pressure drop predicted along the pipeline is between 24.46bara to 25.9bara for the maximum flow rate (700ton/hr) and between 12.21bara to 13.04bara for the minimum flow rate (500ton/hr). At the inlet pressure of 100bara, the maximum pressure drop predicted along the pipeline is between 25.30bara to 26.96bara for the maximum flow rate (700ton/hr) and between 12.57bara to 13.51bara for the minimum flow rate (500ton/hr).

The effect of the ground temperature on the pressure drop for fixed flow rates of 500ton/hr and 700ton/hr and initial stream pressures of 100bara and 110bara is shown in Figure 5-18, however the impact is not significant..

Condition 6 in Table 5-5 to Table 5-8 is the most critical condition considered where the inlet pressure is 100bara, the soil temperature is 15°C and the mass flow rate is 700ton/hr. Figure 5-19 shows the profiles of the pressure (blue solid line) and temperature (red solid line) along the length of the pipeline for the reference scenario, REF. The ADS1 scenario required the maximum pipeline size in the current investigation (813mm) at the worst conditions (6).

Table 5-5: Pipeline and hydraulic specifications for the case REF

	Inlet Pressure bara	Ground Temp °C	Flow Rate ton/hr	ID mm	W mm	OD mm	P_f bara	T_f °C
1	100	0	500	490.4	8.8	508	87.43	10.16
2	100	0	700	490.4	8.8	508	74.70	13.31
3	100	5	500	490.4	8.8	508	87.14	13.93
4	100	5	700	490.4	8.8	508	74.17	15.94
5	100	15	500	490.4	8.8	508	86.49	20.69
6	100	15	700	490.4	8.8	508	73.04	20.77
7	110	0	500	490.4	8.8	508	97.79	9.40
8	110	0	700	490.4	8.8	508	85.54	12.56
9	110	5	500	490.4	8.8	508	97.53	13.28
10	110	5	700	490.4	8.8	508	85.08	15.45
11	110	15	500	490.4	8.8	508	96.96	20.33
12	110	15	700	490.4	8.8	508	84.10	20.77

Table 5-6: Pipeline and hydraulic specifications for the case ADS1

	Inlet Pressure bara	Ground Temp °C	Flow Rate ton/hr	ID mm	W mm	OD mm	P_f bara	T_f °C
1	100	0	500	635	12.5	660	95.28	14.21
2	100	0	700	733.6	14.2	762	95.45	17.03
3	100	5	500	635	12.5	660	95.08	17.33
4	100	5	700	733.6	14.2	762	95.29	19.75
5	100	15	500	733.6	14.2	762	97.56	22.67
6	100	15	700	781	16	813	96.35	23.71
7	110	0	500	588	11	610	103.74	12.05
8	110	0	700	588	11	610	97.20	15.08
9	110	5	500	588	11	610	103.52	15.45
10	110	5	700	588	11	610	96.80	17.46
11	110	15	500	588	11	610	103.04	21.40
12	110	15	700	588	11	610	95.97	21.50

Table 5-7: Pipeline and hydraulic specifications for the case OXY1

	Inlet Pressure bara	Ground Temp °C	Flow Rate ton/hr	ID mm	W mm	OD mm	P_f bara	T_f °C
1	100	0	500	635	12.5	660	95.59	13.79
2	100	0	700	733.6	14.2	762	95.70	16.77
3	100	5	500	635	12.5	660	95.42	17.10
4	100	5	700	733.6	14.2	762	95.66	18.10
5	100	15	500	635	12.5	660	95.01	22.72
6	100	15	700	733.6	14.2	762	95.40	21.66
7	110	0	500	588	11	610	104.09	11.60
8	110	0	700	588	11	610	97.96	14.92
9	110	5	500	588	11	610	103.90	15.18
10	110	5	700	588	11	610	97.63	17.48
11	110	15	500	588	11	610	103.46	21.45
12	110	15	700	588	11	610	96.88	21.80

Table 5-8: Pipeline and hydraulic specifications for the case PRE

	Inlet Pressure bara	Ground Temp °C	Flow Rate ton/hr	ID mm	W mm	OD mm	Pf bara	Tf °C
1	100	0	500	490.4	8.8	508	86.49	11.28
2	100	0	700	539	10	559	83.35	14.32
3	100	5	500	490.4	8.8	508	86.25	12.89
4	100	5	700	539	10	559	82.96	17.03
5	100	15	500	490.4	8.8	508	85.61	17.63
6	100	15	700	588	11	610	88.67	22.31
7	110	0	500	490.4	8.8	508	97.05	10.18
8	110	0	700	490.4	8.8	508	83.90	13.16
9	110	5	500	490.4	8.8	508	96.85	11.76
10	110	5	700	490.4	8.8	508	83.53	14.33
11	110	15	500	490.4	8.8	508	96.32	16.78
12	110	15	700	490.4	8.8	508	82.58	17.97

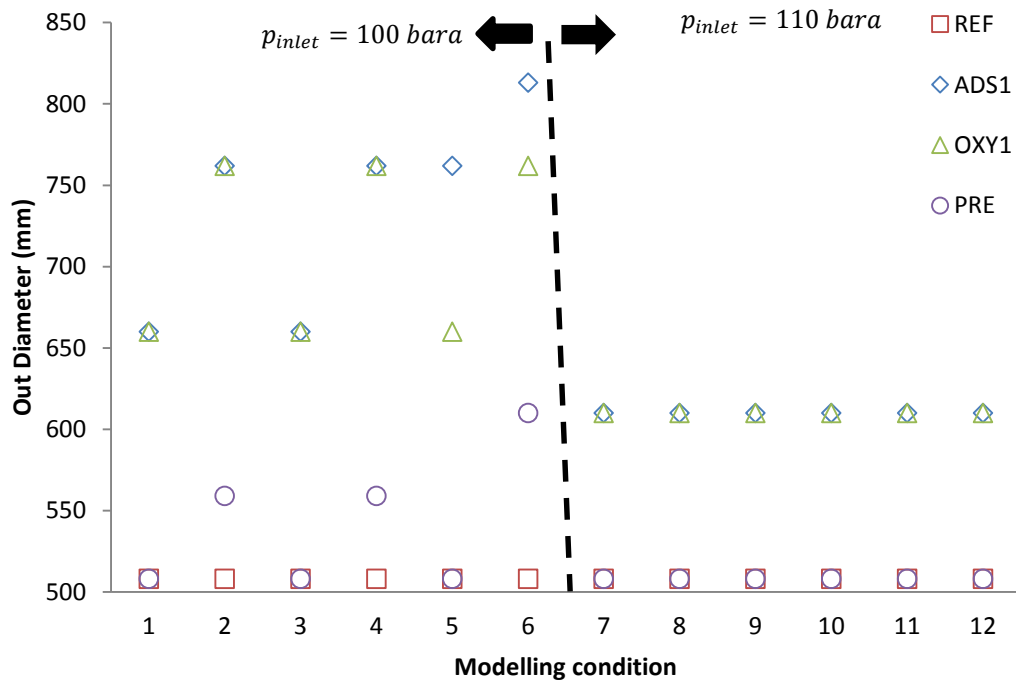


Figure 5-17: A comparison of the required pipeline sizes with a change in the modelling conditions of the scenarios REF (■), ADS1 (◆), OXY1 (▲) and PRE (×).

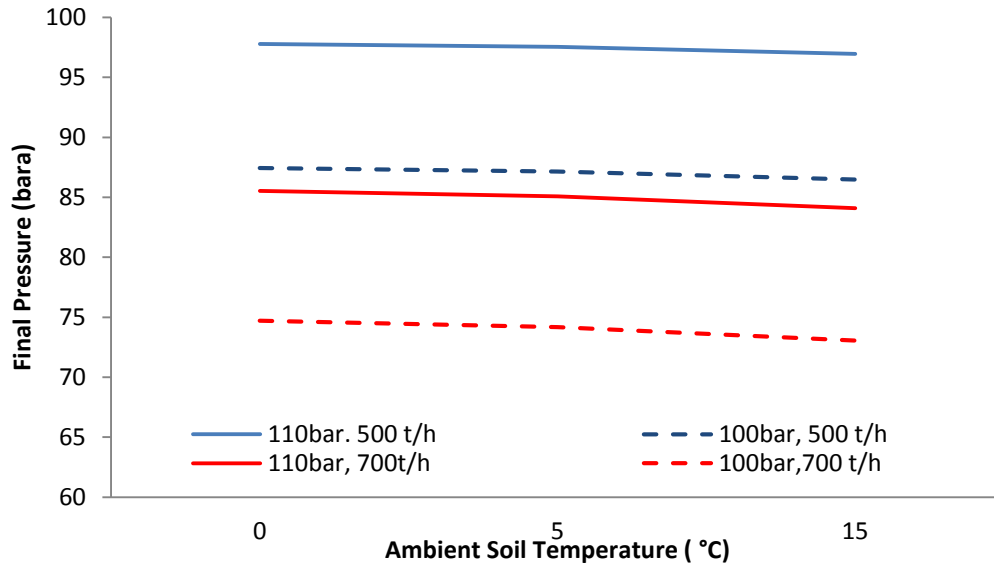


Figure 5-18: Analysis of the pressure drop as a function of mass flow rate, inlet pressure and ground temperature for the reference case, REF, along a horizontal pipeline of 150km.

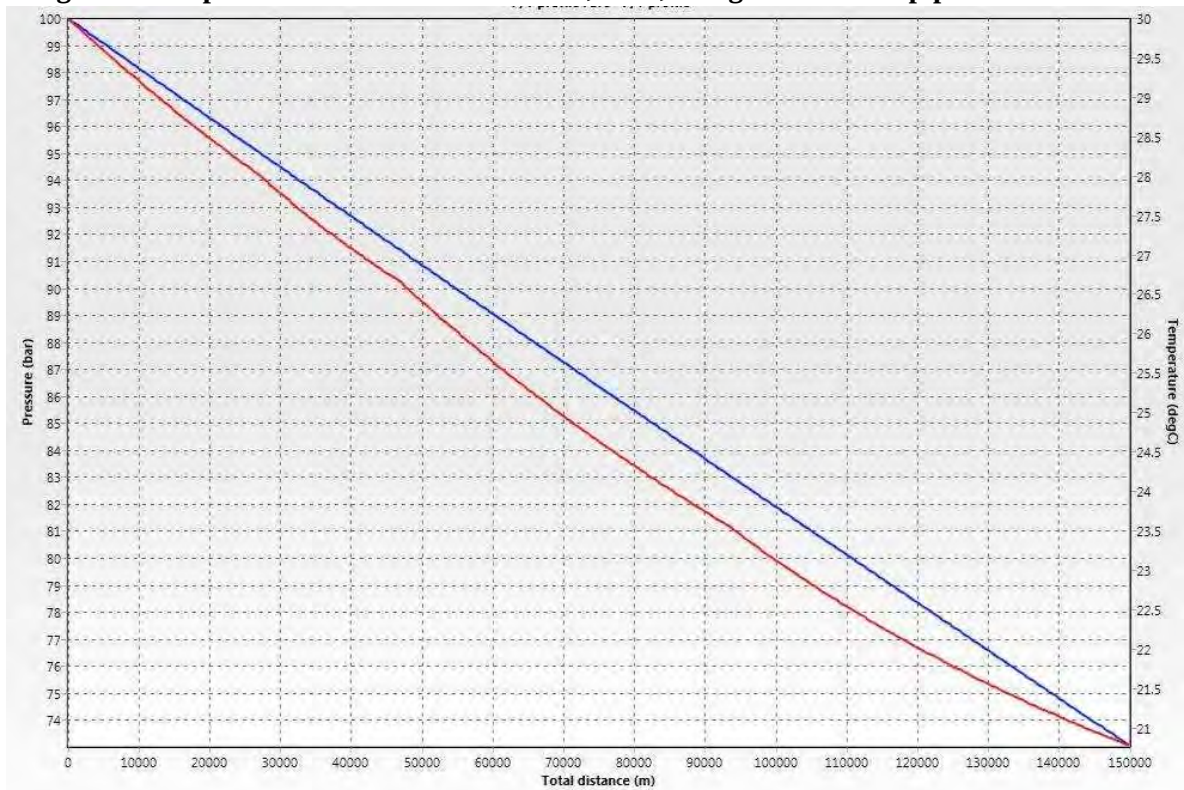


Figure 5-19: The profiles of the pressure (blue solid line) and temperature (red solid line) along the length of the pipeline for the REF case at Condition 6.

5.6 Conclusions

A study on the pipeline sizing requirement for the transport of anthropogenic CO₂ stream in the gaseous phase and dense phase has been performed. A pipeline of 150km from source to sink on flat terrain has been assumed. Other topographical conditions such as offshore, or mountains, would significantly change the design consideration.

This study on the impact of impurities on the anthropogenic CO₂ transportation showed a considerable increase in pipeline sizing, where the stream is transported in dense phase. The transportation in the gaseous phase was less affected by the presence of the impurities.

In terms of dense phase transport, the worst case scenarios (ADS1 and OXY1) require a pipeline size of OD 610mm and wall thickness 11mm compared to pure CO₂ which requires a pipeline size of 508mm OD and 8.8mm wall thickness for the design conditions considered. This will affect the capital cost of these pipelines. For transportation in the gaseous phase, all of the compositions could be transported with a pipeline size of 864mm OD and 6.3mm wall thickness for the inlet conditions studied here.

Temperature has a more significant effect on density than pressure for both pure CO₂ and CO₂ containing impurities. To increase the density and therefore capacity of the pipeline, the inlet temperature should be as low as possible.

6 EFFECT OF IMPURITIES ON MATERIALS SELECTION

6.1 Introduction

The previous sections of this report have reviewed the impacts of various impurities and stream compositions on the hydraulic behaviour of the CO₂ stream. However, the impurities present in the captured CO₂ will also impact other aspects of the pipeline transportation and this needs to be considered when defining the required limits on both major impurities and also trace elements for pipeline transportation. In this section the effects of the impurities identified in Section 2 will be considered with respect to fracture control, corrosion, cracking, hydrate formation and health, safety and environmental aspects in the event of a release.

It is highlighted that there is little published work on the types and levels of trace elements that could be present in the final captured CO₂. It could be considered that any components which could be present in the various waste streams of the plant could also be carried through to the exported CO₂ stream at very low levels. The types and levels of these trace elements therefore becomes very hard to quantify as coal and biomass can contain many different types of elements at low levels and some capture options might also add trace elements due to the nature of the process. Consequently, the approach that has been taken for this report has been to consider the effect that the trace elements could have on the various aspects of pipeline transportation and comment on the levels required for these conditions to occur.

6.2 Fracture control

The phenomenon of ductile fracture propagation has been a recognised issue in pipelines carrying natural and rich gas since the 1960s (Maxey, 1974). Propagation of a fracture in a pipeline in the fully ductile mode arises because, when a pipeline carrying a compressible fluid is ruptured, the pressure at the rupture site does not reach atmospheric pressure immediately and therefore the pressure required to drive the fracture can be maintained at the crack tip. Whether the fracture will propagate once initiated is dependent on whether there is sufficient driving force for propagation *i.e.* whether the initial pressure is high enough to sustain fracture. If fracture can be sustained then the crack will propagate along the pipeline at a velocity that is dependent on the strength and toughness of the pipe steel and also on the geometry of the pipeline (*i.e.* the diameter and wall thickness). If the crack propagation velocity is slower than the decompression velocity then there is no driving force for propagation and the crack will arrest. Ductile fracture propagation or arrest is therefore controlled by the relative velocities of the fluid decompression wave and the propagating crack; the former dependent on fluid properties and the latter dependent on material properties and pipe geometry.

The decompression behaviour of the fluid is dependent on the speed of sound in the fluid, the density and the entropy. These properties are, in turn, dependent on the fluid composition. Consider the example illustrated in Figure 6-1 for a 99%CO₂-1%N₂ mixture. For isentropic decompression, it is assumed that the fluid can be considered to be a one-dimensional, homogenous fluid in thermal equilibrium everywhere. When decompression begins in the liquid phase the pressure and temperature follows a line of constant entropy until it reaches the phase boundary at the saturation pressure and saturation temperature. At the phase boundary the gaseous phase starts to form resulting in a discontinuity in the gradient of the decompression curve. In a plot of the decompression velocity against pressure, a plateau is formed at the saturation pressure with the result that the decompression velocity is lower than would be the case without the phase change. From a fracture control point of view, the slow speed of decompression for fluids exhibiting a phase change means that the velocity of

the propagating crack must also be reduced by increasing the wall thickness or toughness of the pipe material for a particular diameter and grade.

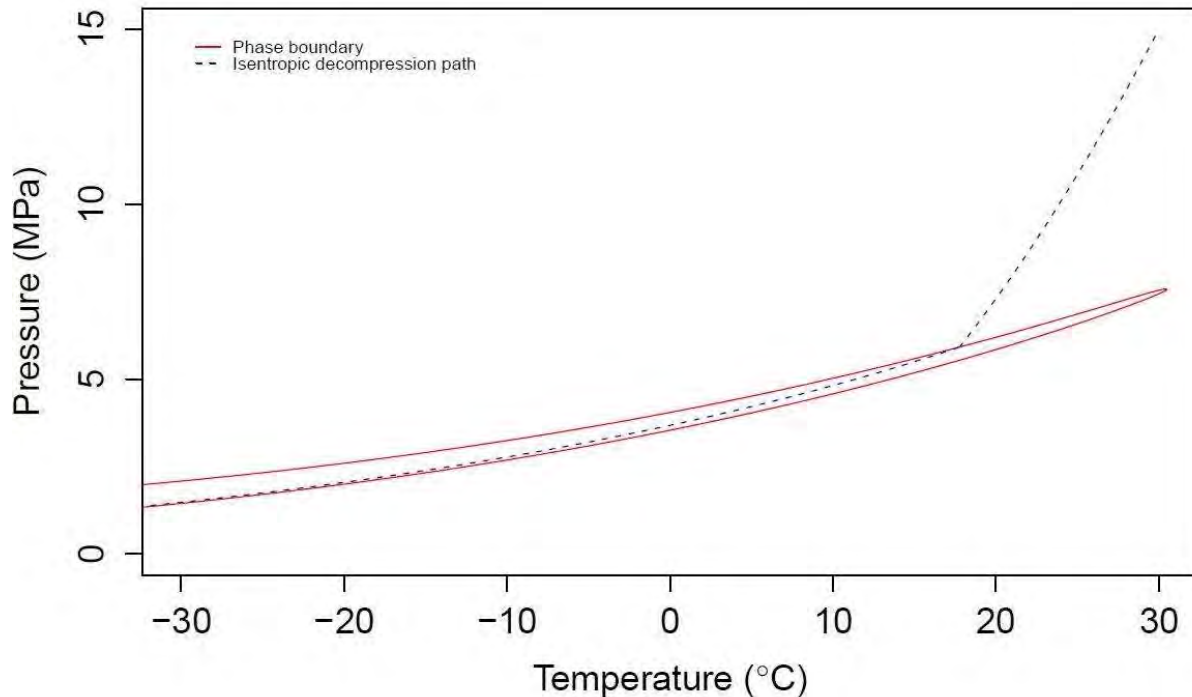


Figure 6-1: Example decompression path for a 99% CO₂-1% N₂ mixture decompressing from initial conditions of 15MPa and 30°C

The phase behaviour analysis conducted as part of Section 3.2 of this report indicates that the CO₂ compositions considered would all pass through a two phase region on decompression.

Extensive world-wide research has led to the establishment of a number of models which describe the ductile fracture propagation behaviour of natural gas and rich-gas systems. These models have been very successful in defining toughness requirements for pipe material to ensure fracture arrest. The most widely used model in the industry is the Battelle Two Curve Model (BTCM) (Maxey, 1974). The two curves in this model are the fluid decompression curve and the fracture velocity curve as illustrated in Figure 6-2. If the fracture velocity curve and the fluid decompression curve intersect or are tangent then there exists a pressure at which the decompression wave and the crack are travelling at the same speed and the crack will propagate. Consequently, for a pipeline of given diameter and material strength, in order to arrest the crack, the fracture velocity curve has to be raised so that it lies above the decompression curve. This can be achieved either by increasing the toughness of the steel or by increasing the pipeline wall thickness. Alternatively the decompression curve has to be lowered below the fracture velocity curve by changing the decompression properties of the fluid.

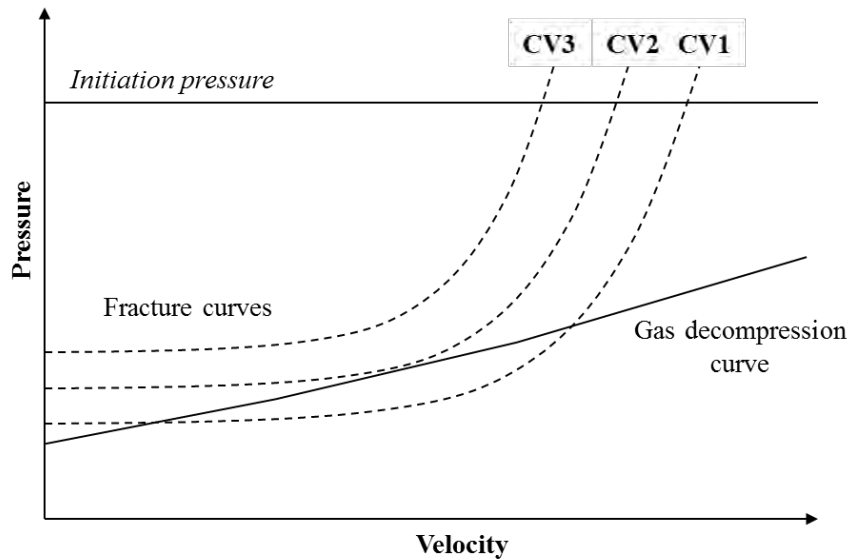


Figure 6-2: Schematic representation of the Battelle Two Curve Model

Although the BTCM has been applied successfully for many years to define toughness requirements for natural and rich gas pipelines, it is highlighted that it is a semi-empirical model that has not yet been fully validated for ductile fracture propagation in CO₂ pipelines. Indeed, there is emerging research work, based on full-scale fracture propagation tests for CO₂, to suggest that the BTCM model is non-conservative when applied to dense phase CO₂ pipelines (Barnett, 2013; Jones et al., 2013) and therefore its use is not recommended for determining the toughness requirements for large diameter, high toughness pipelines transporting dense phase CO₂.

While it is not currently possible to use the semi-empirical methods to define the toughness and wall thickness requirements for CO₂ pipelines, it is possible to comment on the severity of different CO₂ compositions on fracture arrest based on the decompression characteristics of the CO₂ fluid and in particular the saturation pressure (King, 1982; Maxey, 1986; Cosham, 2012). Figure 6-2 indicates that the higher the saturation pressure, the harder it is to arrest a long running ductile fracture as the saturation pressure must be higher than the arrest pressure, which is controlled by increasing the wall thickness of the pipe or the toughness of the material. The saturation pressure is dependent on the composition of the CO₂ mixture and also on the operating conditions of the pipeline. The effect that different impurities have on the saturation pressure, when in binary combination with CO₂, for a pipeline decompressing from 100bara and 5°C is illustrated in Figure 6-3. In general, impurities with lower critical temperatures than CO₂ will raise the saturation pressure and those with higher critical temperatures than CO₂ will lower the saturation pressure (Maxey, 1986) (Table 6-1). It has been shown that H₂ in particular has the most potent effect, in terms of %mol addition, in raising the saturation pressure and therefore has the most detrimental effect on fracture control for CO₂ pipelines (King, 1982; Cosham, 2012; Race et al., 2012).

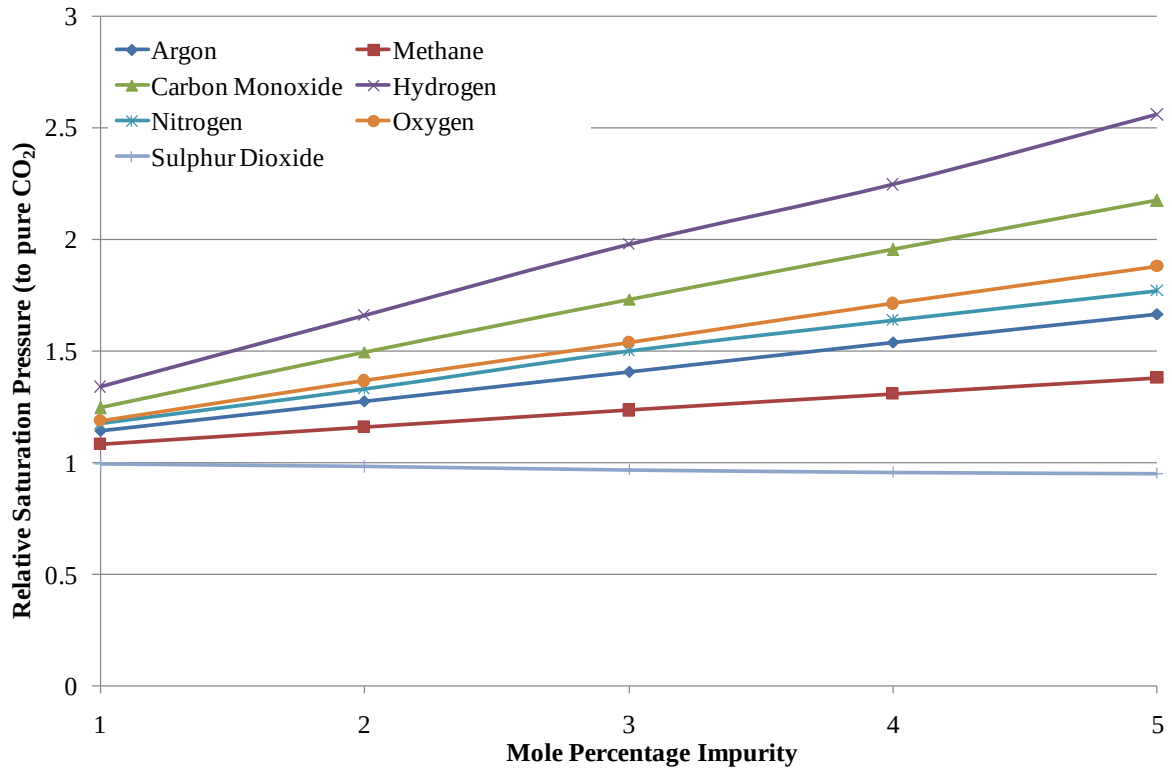


Figure 6-3: Relative saturation pressures compared with pure CO₂ for binary CO₂-%X mixtures when decompressed from 100bar, 5°C (Race et al., 2012)

Table 6-1: Relative critical pressures of key impurities and their effect on saturation pressure

	Molecular Weight	Critical temperature (°C)	Critical pressure (bara)	Effect on saturation pressure
Hydrogen	2	-240.0	13.0	Raises the saturation pressure
Nitrogen	28	-147.0	33.9	
Carbon monoxide	28	-140.35	35.0	
Argon	40	-122.4	48.7	
Oxygen	32	-118.6	50.4	
Methane	16	-82.8	46.0	
Carbon dioxide	44	31.0	74.1	Lowers the saturation pressure
Hydrogen sulphide	34	100.1	89.4	
Sulphur dioxide	64	157.7	78.8	
Nitrogen dioxide	46	157.9	101.0	

In order to identify a worst case composition from the scenarios identified in this current work, the saturation pressures have been calculated for each composition based on decompression from the pipeline operating conditions of 150bar and 30°C. The results are presented in Table 6-2. From this analysis, it can be seen that the OXY1 composition is the most onerous composition to transport in terms of fracture control and will require careful consideration when designing the pipeline to ensure fracture arrest.

Table 6-2: Saturation pressures for scenario compositions for a pipeline decompressing from 150bara and 30°C.

Scenario	CO ₂	O ₂	N ₂	Ar	H ₂	CO	H ₂ S	CH ₄	Saturation Pressure (bara)
REF	100								
CO2 MEM1	93		7						82.0
CO2 MEM2	97	3							69.5
ADS1	90	1	9						82.2
ADS2	95		5						75.5
Ca LOOP	95	1	2	2					79.8
OXY1	90	6	3	1					86.7
OXY2	96.5	0.5	2.5	0.5					77.2
PRE	98				2				62.3
H2 MEM	96		1		1	0.5	1.5		77.1
CH4-RICH	98							2	59.0
TGR-BF	96		0.5			3.5			82.5

6.3 Material degradation

Pure, dry CO₂ does not corrode or crack plain carbon pipeline steels. It is only in the presence of water that the conditions exist to promote corrosion or cracking mechanisms. One of the critical components of the CO₂ specification therefore, in terms of the susceptibility of the pipeline material to corrosion, is the water specification. It is critical that there is no free water in the pipeline and therefore that the operating temperature and pressure of the must remain above the saturation level. Consequently, prior to a discussion on potential corrosion and cracking mechanisms that could be prevalent in CO₂ pipelines, it is important to understand the role of impurities in the solubility of water in CO₂.

6.3.1 Water solubility

The solubility of water in pure CO₂ has been studied extensively as a function of temperature and pressure. The specification of water in currently operating pipelines ranges between 640ppmv and 20ppmv (Seevam *et al.*, 2010) to avoid the formation of free water in the pipeline at the operating conditions. However, whilst it is known that the presence of impurities will affect the solubility of water in CO₂, there has been little research into the absolute effects of these impurities and the published data is limited. The CO₂-H₂O-CH₄ system has been studied by a number of researchers (Heggum *et al.*, 2005; Seiersten and Kongshaug, 2005; Austegard *et al.*, 2006) and the experimental results and thermodynamic models indicate that the addition of CH₄ requires a more stringent water content to be specified as the solubility of water decreases with increasing CH₄ content. Similar results have been seen in the CO₂-H₂O-N₂ system where it has been shown that at a temperature of 40°C, an addition of 10%N₂ can lower the solubility of water in CO₂ by up to 26% (Foltran *et al.*, 2014). It is highlighted that this composition is similar to the ADS1 composition. Conversely, in the CO₂-H₂O-H₂S system, de Visser and Hendriks showed that, on the basis of thermodynamic calculation, the solubility of water would increase with the addition of H₂S.

Although these ternary systems provide useful information on the potential effects of individual components, the data on representative CO₂ streams as presented in the scenarios in this report is extremely limited. Pereira *et al* have studied a system of CO₂-5.05%N₂-3.07O₂-2.05Ar at a pressure of 150bar and have shown that the addition of these impurities reduced the solubility of water by 20%

compared to pure CO₂ (Pereira *et al.*, 2014). This composition is similar to the OXY1 scenario considered in this report and therefore water content for this scenario would have to be very carefully specified at the pipeline operating conditions to avoid associated degradation mechanisms.

6.3.2 Corrosion of pipeline steels

6.3.2.1 Corrosion in pure CO₂

Pure, dry CO₂ is not corrosive to either carbon steel or stainless steel. However, in the presence of water, CO₂ will dissolve to produce carbonic acid which is corrosive to carbon steel. This type of corrosion is well understood in the oil and gas industry and is termed “sweet corrosion” or “CO₂ corrosion”. All of the experience with sweet corrosion is at relatively low partial pressures of CO₂, relevant to the oil and gas industry, and the majority of the experimental data and the predictive corrosion rate models cannot be extended to the higher partial pressures of CO₂ experienced in CO₂ pipelines.

Schremp and Roberson (Schremp and Roberson, 1975) conducted initial experiments in which pipeline material (X60) was exposed to an environment of CO₂ containing 1000ppm water and 800ppm H₂S at 138bar and 22°C for up to six weeks. These conditions did not result in free water in the test environment and no significant corrosion was observed. In fact corrosion rates of less than 0.5µm were measured, confirming that dry CO₂ is not corrosive to pipeline steels. However, short-term experiments conducted by Russick *et al* (Russick *et al.*, 1996) in pure supercritical CO₂ and water-saturated supercritical CO₂ at 50°C and 240bar confirmed that, although no corrosion was observed in the pure environment, visual indications of corrosion could be seen on the mild steel sample exposed to the water saturated environment for 24 hours. Therefore, it can be concluded that, as long as free water is not allowed to form in the pipeline, corrosion of the internal surface of CO₂ pipelines will not occur. In addition, experience indicates that corrosion is not observed in currently operating pipelines. For example, Gill (Gill, 1985) reports corrosion rates between 0.25-2.5 µm/year in the Canyon Reef Carriers (CRC) pipeline.

Recognising that it might not always be possible to dry the CO₂ below the dew point, a number of experiments have been conducted to establish potential corrosion rates for pipeline steels in high pressure, pure CO₂ under a range of temperature and pressure conditions (Kongshaug and Seiersten, 2004; McGrail *et al.*, 2009; Choi *et al.*, 2010). These studies have reported corrosion rate up to 20mm/year (Choi *et al.*, 2010). However, the published data contains a large amount of scatter, reported corrosion trends are confusing and the corrosion mechanism in high pressure CO₂ environments has not been confirmed. For example there is conflicting experimental evidence regarding the effect of pressure on corrosion rates, with some authors reporting no effect (Choi and Nesić, 2009), whilst others report a decrease in corrosion rate with increasing pressure (Seiersten, 2001). Sweet corrosion theory in low pressure CO₂ systems would indicate that the corrosion rate would increase with temperature until a protective iron carbonate film is precipitated on the surface of the steel, at temperatures between 60-80°C, which serves to reduce the corrosion rate. This phenomenon has also been observed in high pressure corrosion testing in water saturated with supercritical CO₂ for a range of temperatures from 60°C to 150°C. The results indicated that the corrosion rates decreased with increasing temperature, a result that was attributed to the formation of an iron/calcium carbonate film on the surface (Cui *et al.*, 2006). However, tests conducted by Dugstad *et al* in water saturated CO₂ at 100bar and temperatures between 13-50°C showed an increase in corrosion rate with temperature (Dugstad *et al.*, 2011).

6.3.2.2 Corrosion in CO₂ containing impurities

There has been little experimental work conducted on the effect of impurities in the CO₂ stream on corrosion rates. Reviewing the impurities that could be present in percentage levels in the CO₂, the major components that will affect corrosion are considered to be H₂S and O₂. However, there are also smaller amounts of flue gas impurities such as NO_x and SO_x which will also affect the corrosion behaviour of the fluid and these are also discussed in this section.

Effect of Hydrogen Sulphide (H₂S)

From work conducted for the hydrocarbons industry, the influence of small amounts of H₂S (*i.e.* <0.0035bar partial pressure H₂S) on CO₂ corrosion is dependent on the concentration of H₂S and whether iron sulphide can precipitate as a protective surface scale. At low concentrations of H₂S and low values of pH, when iron sulphide precipitation does not occur, the experimental evidence is confusing and the mechanism by which H₂S affects the corrosion rate is not well understood. For example, some studies indicate that the corrosion rate is increased compared with an equivalent H₂S-free CO₂ corrosion environment (Ikeda *et al.*, 1985), whilst others suggest that small amounts of H₂S could reduce the corrosion rate (Brown *et al.*, 2003). As the H₂S concentration increases, the formation of the iron sulphide surface film becomes more favourable and can reduce the rate of corrosion.

In applications applicable to CO₂, McGrail reports that one of the effects of H₂S in the mixture is to promote corrosion in the CO₂-rich phase at lower water levels than seen with pure CO₂ (McGrail *et al.*, 2009). Another potential issue with H₂S and the formation of iron sulphide films is reported by Wong (Wong, 2005) in compression equipment. If the iron sulphide film becomes dislodged it can coat the stainless steel aerial coolers resulting in a decrease in compressor efficiency.

Effect of Oxygen (O₂)

There is very little experimental data relating to the effect of oxygen on corrosion rates. However, the limited data available indicates that there is an increase in corrosion rates in systems containing CO₂ and O₂ when compared to rates measured under similar conditions without O₂ (Choi and Nesić, 2009; Choi *et al.*, 2010; Dugstad *et al.*, 2011). Dugstad *et al.* (Dugstad *et al.*, 2011) postulate that the oxygen attacks the steel directly as well as reacting with the corrosion products to produce iron oxides.

Effect of SO_x and NO_x

It has been shown that the presence of SO_x or NO_x in the CO₂ stream can cause corrosion occur at lower water levels and at higher rates than those observed with pure CO₂ under the same experimental conditions (Ayello, 2009; Ayello *et al.*, 2010; Choi *et al.*, 2010; Xiang *et al.*, 2011; Dugstad *et al.*, 2013). This phenomenon has been attributed to the condensation of acids.

When SO₂ and O₂ are present in the stream, sulphurous or sulphuric acid can form on the surface, resulting in corrosion being observed even at low levels of water (Dugstad *et al.*, 2011).

Experimental research seems to indicate that the presence of NO₂ increases the corrosivity of the mixture even further above that of pure CO₂ and is more potent in this regard than SO₂ (Ayello, 2009; Ayello *et al.*, 2010; Dugstad *et al.*, 2013).

However, caution should be exercised when interpreting the results of these experiments. Authors have questioned whether, due to the differences in experimental protocol, the corrosion measurements taken in the laboratory with SO_x and NO_x are representative of worst case pipeline conditions (Dugstad, 2012; Sandana *et al.*, 2013a). However, there is agreement that the presence of SO_x and

NO_x will affect the specification of water in the CO_2 stream but, as yet, it is not possible to define a water specification in the presence of SO_x , NO_x and O_2 and further work is required in this area (Dugstad, 2012; Sandana *et al.*, 2013a).

Effect of Trace Elements

There has been little published work on the effects of other trace elements on the corrosion behaviour of pipeline steels in high pressure CO_2 . However, elements which would be of concern if they were present in a free water environment would be HCl, HF, CO, amines and NH_3 . Ayello *et al.* (Ayello *et al.*, 2010) have studied the effects of amine, HCl, and NaOH on both water solubility and corrosion rates. Due to the limited number of experiments conducted, it is not possible to draw conclusions regarding the levels of these contaminants required to cause problems with corrosion. However, it was confirmed that NaOH and HCl did not affect the water solubility but did have an effect on corrosion, even at very low levels. The addition of the amine MDEA did affect the water solubility and may have had an inhibiting effect on the corrosion rate although the data is hard to interpret.

One of the effects that alkaline trace impurities will have is to raise the pH of the free water phase into which they dissolve. Raising the pH will potentially reduce the corrosion rate, a phenomenon that was observed by Dugstad (Dugstad, 2012), although other researchers have reported no effect (Hesjevik *et al.*, 2003).

6.3.3 Corrosion of stainless steels and corrosion resistant alloys

Corrosion resistant alloys utilised in the oil and gas industry include stainless steels, duplex stainless steels and high nickel or chromium alloys. They are principally employed in locations where the environmental conditions are too corrosive for carbon steel and no treatment of the product can be performed. In order to minimise costs, corrosion resistant alloys can be applied as cladding or liners to carbon steel pipe.

There is limited corrosion data available for stainless steel in high concentrations of high pressure CO_2 . The work of Russick *et al.* (Russick *et al.*, 1996) exposed 304 and 316 grade austenitic stainless steels at 50°C and 240bar for 24 hours with no evidence of corrosive attack. Additionally austenitic stainless steel (304 and 316 grades) and duplex stainless steels are routinely utilised in high pressure wet CO_2 environments with no problems (Decker, 1985; Recht, 1987).

Some stainless steels are susceptible to pitting corrosion or stress corrosion cracking, particularly in chloride containing environments, therefore, it is recommended that the composition of the water be analysed to ensure that the correct stainless steel is selected (Recht, 1987; Seiersten and Kongshaug, 2005).

6.3.4 Stress Corrosion Cracking (SCC)

As well as impurities influencing the corrosion behaviour of the pipeline steel, there is also the possibility that certain impurities, in the presence of water, could promote stress corrosion cracking mechanisms. In order for stress corrosion cracking to occur, a susceptible material must be held under a tensile stress, above a threshold level, in an environment that will induce cracking. In this next section, the susceptible environments, which could result from the impurities in the CO_2 stream outlined in this report, are considered.

CO₂ Cracking

It has been established that in the presence of water and CO₂, mild steel will corrode. The potential for a cracking mechanism has also been investigated by researchers (Hudgins *et al.*, 1966; Kowaka and Nagata, 1976). Whilst it is generally considered that the CO₂-H₂O environment will not promote cracking (Kowaka and Nagata, 1976; Sandana *et al.*, 2013b), cracking has been generated in high strength steels during extended exposure at high stress (Hudgins *et al.*, 1966). The cracking was however associated with the presence of sulphur and it is not evident whether the conditions that led to cracking could be sustained under pipeline operating conditions.

H₂S (Sour) Cracking

In CO₂ environments containing partial pressures of H₂S greater than 0.003bar, as found in the oil and gas industry, the mechanism of corrosion changes to a cracking type mechanism. In the oil and gas industry, the product is then termed “sour”. This limit has been defined in the standard BS EN ISO 15156-2 to prevent sour cracking in H₂S environments for oil and gas production (BS EN ISO 15156-2, 2009). The methodology outlined in that standard has been applied in the current study to CO₂ pipelines and the effect on the specification of H₂S levels at different pipeline pressures is illustrated in Figure 6-4. This figure indicates that the specification of H₂S is dependent on system pressure and that raising the pressure reduces the allowable levels of H₂S. However, for the pipelines operating in the dense and supercritical phases, considered in this report, the H₂MEM specification would be at risk from H₂S cracking if the pipeline were not kept dry.

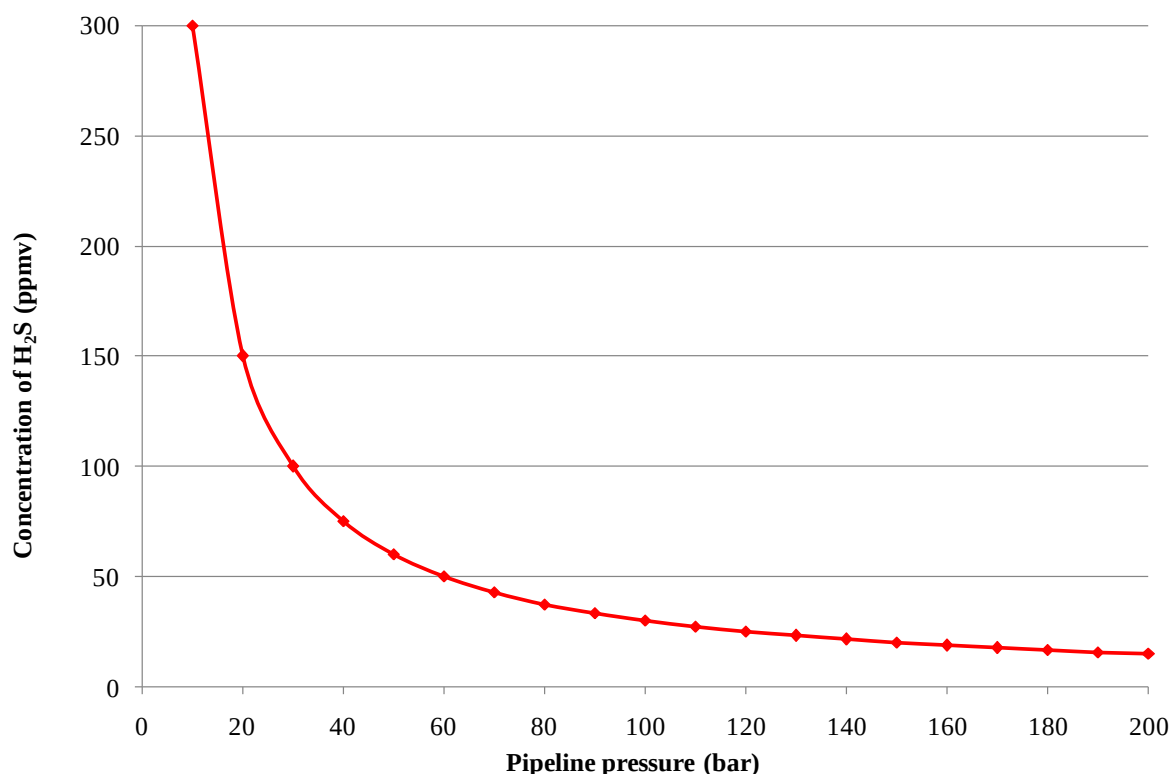


Figure 6-4: Concentration of H₂S required to prevent sour cracking (Race *et al.*, 2012)

If a pipeline is going to be operated in sour service (*i.e.* above the levels in Figure 6-4), sour-resistant steel has to be selected to prevent rapid failure, as failure times as short as days or hours have been observed for sour corrosion mechanisms under test conditions in oil and gas environments. High strength steels are more susceptible to cracking in a sour environment, and consequently steels have to be selected to comply with maximum hardness levels to avoid cracking in both the parent and the

weld material. As well as the additional costs associated with specifying sour resistant steel, there are additional requirements on welding and inspection when operating a sour pipeline which will increase pipeline construction and maintenance costs and need to be taken into consideration in the cost-benefit analysis associated with reducing levels of H₂S and/or ensuring that the CO₂ stream is completely dry.

CO Cracking

Another contaminant that may pose a threat to pipeline steels is CO in terms of cracking. This type of cracking has been identified as a potential risk in CO-CO₂ environments in carbon steels (Brown *et al.*, 1973; Kowaka and Nagata, 1976; Berry and Payer, 1979). There is very little published research in this area and therefore the level of impurity required to cause CO₂-CO cracking under pipeline operating conditions is not yet known. However, it has been confirmed that in order for cracking to occur, water must be present (Kowaka and Nagata, 1976) and that the presence of oxygen enhanced the susceptibility to cracking (Sandana *et al.*, 2013b). It is highlighted that no SCC was found in stainless steel (Kowaka and Nagata, 1976).

Effect of Trace Elements

Mild steel is also susceptible to SCC mechanisms due to the presence of carbonates/bicarbonates and nitrates, which could be present as trace elements in the CO₂ stream. Although the risk of bicarbonate/carbonate cracking occurring in isolation in the pipeline is considered to be low, Sandana *et al.* (Sandana *et al.*, 2013b) have considered effects of combinations of bicarbonate/carbonates SCC in the presence sulphites and nitrates. It was shown the presence of nitrate did not significantly affect the cracking susceptibility compared with the pure carbonate/bicarbonate system. The addition of sulphite was shown to decrease the susceptibility for cracking.

6.4 Health and safety

In addition to the hydraulic and materials concerns raised in the previous sections with respect to the specification of impurities in the CO₂ stream, another area that has to be considered is the impact on health and safety in the event of a release of CO₂ from the pipeline.

The DNV Recommended Practice (DNV, 2010) indicates that there are six potential components within the CO₂ stream which should be considered in terms of their effect on health and safety; CO₂, H₂S, SO₂, CO, amines and glycol. In addition, other publications have indicated that the levels of NO_x should also be considered in terms of the toxic effects (de Visser and Hendriks, 2007; de Visser *et al.*, 2008; EC, 2009).

In 2008, the Dynamis specification was published. The specification recommended the maximum allowable concentrations of impurities based on safety and toxicity levels, infrastructure durability and transport efficiency. This specification has received a lot of traction in the industry since its publication and, although it is recognised that some of the recommendations now need review in the light of subsequent research (Race *et al.*, 2012), however, the limits on health and safety are still considered to be relevant. The Dynamis specification sets the levels of H₂S, CO, NO_x and SO_x using an approach based on the Short Term Exposure Limits (STELs), which defines the maximum concentrations for H₂S, CO, NO_x and SO_x in the CO₂ stream based on the maximum amount of these components to which a person can be exposed for a period of 15 minutes without adverse effects. The Dynamis specification limits for the toxic components is presented in Table 6-3. The approach outlined by de Visser and Hendriks (de Visser and Hendriks, 2007; de Visser *et al.*, 2008) assumes that there is no additional toxic effect on people due to the combination of the components, which could increase the toxicity of the resultant stream and may require further investigation.

National Energy Technology Laboratory (NETL) have also considered toxicity in their quality guidelines. This approach uses a concentration set by as being “Immediately Dangerous to Life and Health (IDLH)” (NETL, 2013). This approach differs from the STEL limits as it defines a concentration “from which escape may be made within 30 minutes without injury or irreversible health effects and without deleterious/severe impediment to escape”. The recommended levels for toxic components for these guidelines are also presented in Table 6-3.

It is recognised that other toxins may also be present in the CO₂ stream in trace amounts including NH₃, COS, HCN, HCl, HF, Hg and MEA. These would not be a concern to health during normal operation, but NETL do consider the IDLH limits in the event of a venting release (NETL, 2013).

Table 6-3: Specification limits for toxic components

	Dynamis specification limits ^(de Visser and Hendriks, 2007; de Visser <i>et al.</i>, 2008)	IDLH limits ^(NETL, 2013)
Carbon monoxide	<2000ppm	1200ppm
Hydrogen sulphide	<200ppm	100ppm
Sulphur dioxide	<100ppm	100ppm
Nitrogen dioxide	<100ppm	200ppm
Nitrogen monoxide	--	100ppm

6.5 Conclusions

The following main conclusions can be drawn regarding the effect of impurities on the materials specification:

- For fracture control, the saturation pressure of the CO₂ stream is a critical variable that will determine the required pipeline dimensions and toughness to prevent a long-running ductile fracture. Hydrogen in particular has the most potent effect in raising the saturation pressure. The OXY1 scenario was the most onerous scenario composition to transport due to the high levels of oxygen and nitrogen which also raise the saturation pressure.
- Corrosion and stress corrosion cracking of plain carbon steel will not occur without the presence of water. The effect of impurities on water solubility is therefore critical. There is little information on water solubility available in the literature, but it has been shown that water specification for the ADS1 and OXY1 scenarios would require careful specification.
- Scenario compositions containing CO and H₂S (H2MEM, TGR-BF) are at risk from forms of stress corrosion cracking in the presence of water and therefore material specification would have to be carefully considered for these scenarios.

7 CO₂ LIQUEFACTION

Liquefaction of CO₂ is not a novel technology. Supplied CO₂ would be liquefied via dehydration and refrigeration processes. Two liquefaction processes are discussed in the IEAGHG report (IEAGHG 2011/07). One is at atmospheric pressure assuming CO₂ gas is liquefied just after the capture process. The other process is a pre-pressurized condition at 100bara assuming the effective utilisation of pressure for land transportation from the capture site to the liquefaction plant near the port.

A CO₂ liquefaction system has been proposed in the IEAGHG 2011/07 report for CO₂ gas of atmospheric pressure supply. That system has been considered as a benchmark to the present investigation. The compression stages have been extracted from the report and considered as the standard compression strategy to evaluate energy requirements of the worst case scenario. Four compression stages existed in that liquefaction process and the mass flow rate was variable, as presented in Table 7-1. The total compressor consumption for the scenarios REF, ADS1, OXY1 and PRE have been evaluated as 154.08MW, 160.69MW, 159.51MW and 157.29MW. The ADS1 composition can be seen to require the highest compression power.

Table 7-1: Comparison of the energy requirement across each stage of the compression

	Compression stage	Mass flow rate (ton/hr)	Inlet pressure [atm]	Initial Temp [°C]	Final pressure [atm]	Final temp [°C]	Compressor electrical consumption [MW]
REF	Stage -1	764.1	1.33	40	5.0	161.0	26.42
	Stage -2	831.8	4.80	40	15.5	147.0	24.58
	Stage -3	1567.3	1.03	-40.5	4.2	32.5	43.57
	Stage -4	2069.5	4.20	22	14.0	93.0	59.51
	SUM						154.08
ADS1	Stage -1	764.1	1.33	40	5.0	161.0	27.52
	Stage -2	831.8	4.80	40	15.5	147.0	25.66
	Stage -3	1567.3	1.03	-40.5	4.2	32.5	45.38
	Stage -4	2069.5	4.20	22	14.0	93.0	62.13
	SUM						160.694
OXY1	Stage -1	764.1	1.33	40	5.0	161.0	27.32
	Stage -2	831.8	4.80	40	15.5	147.0	25.47
	Stage -3	1567.3	1.03	-40.5	4.2	32.5	45.06
	Stage -4	2069.5	4.20	22	14.0	93.0	61.67
	SUM						159.51
PRE	Stage -1	764.1	1.33	40	5.0	161.0	26.96
	Stage -2	831.8	4.80	40	15.5	147.0	25.10
	Stage -3	1567.3	1.03	-40.5	4.2	32.5	44.47
	Stage -4	2069.5	4.20	22	14.0	93.0	60.77
	SUM						157.30

The final liquefaction states of CO₂ transport by ships that were requested by IEAGHG for investigation in this study were suggested to be (i) -50°C, 7bara and (ii) -130°C and 7bara. A closer look at the condition (ii) reveals that all of the streams would be at their solid state at -130°C and 7bar. Therefore it can be concluded that the decision on the conditions under which anthropogenic streams

should be transported depends on the phase envelope of each stream. Phase envelopes of these scenarios are demonstrated in Figure 7-1 to Figure 7-11, the green line, red line and blue dot represent the bubble and dew point curves and critical point respectively. At condition (i) as labelled on the Figures, all the scenarios would be either in the gaseous phase or in two phase conditions. This is not desirable from a transportation point of view and should be avoided.

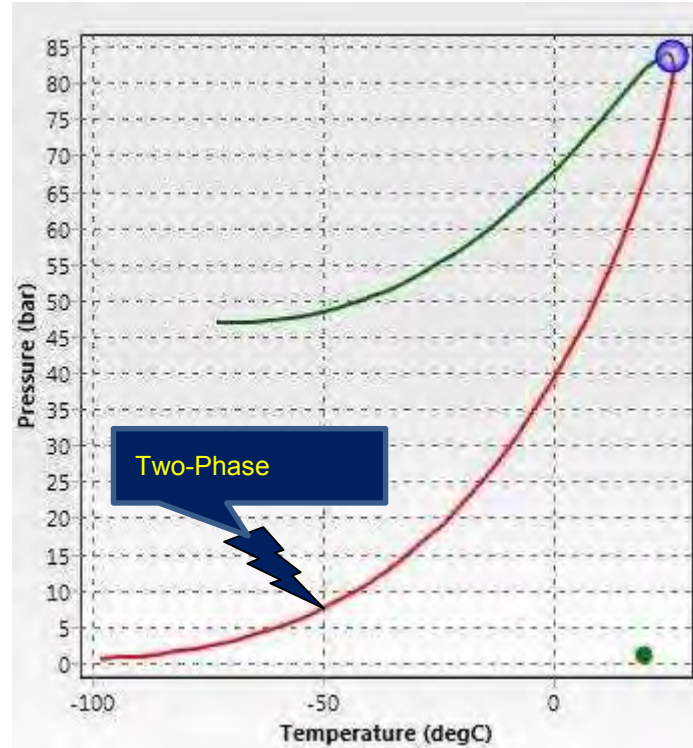


Figure 7-1: Phase envelope of the anthropogenic scenario CO2MEM1

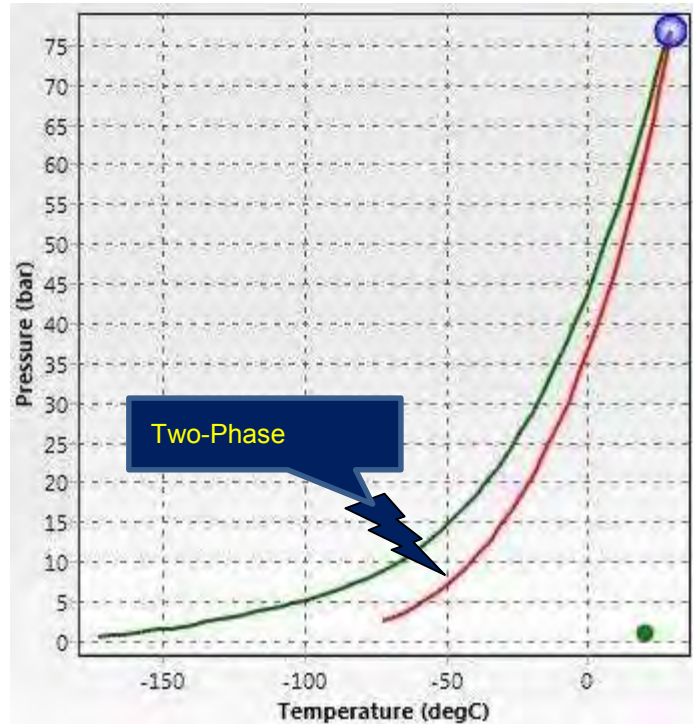


Figure 7-2: Phase envelope of the anthropogenic scenario CO2 MEM2

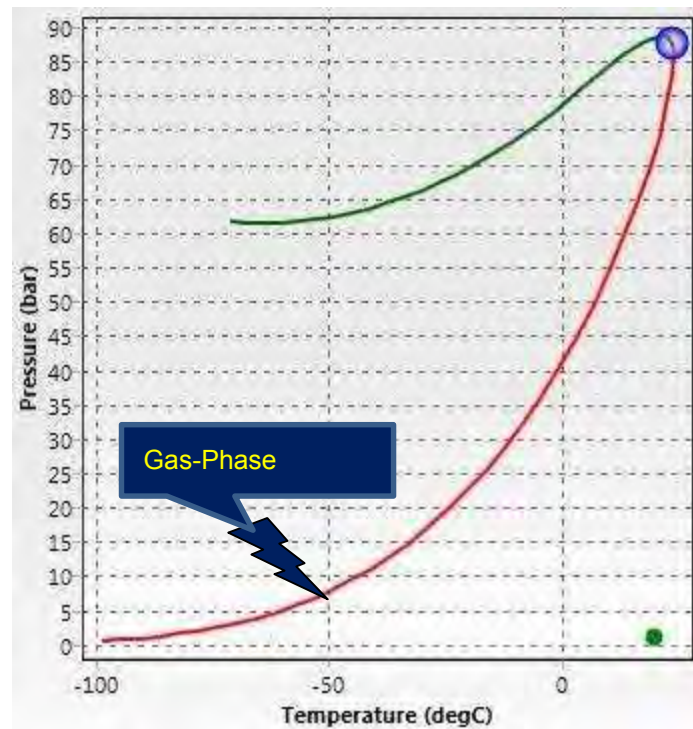


Figure 7-3: Phase envelope of the anthropogenic scenario ADS1



Figure 7-4: Phase envelope of the anthropogenic scenario ADS2

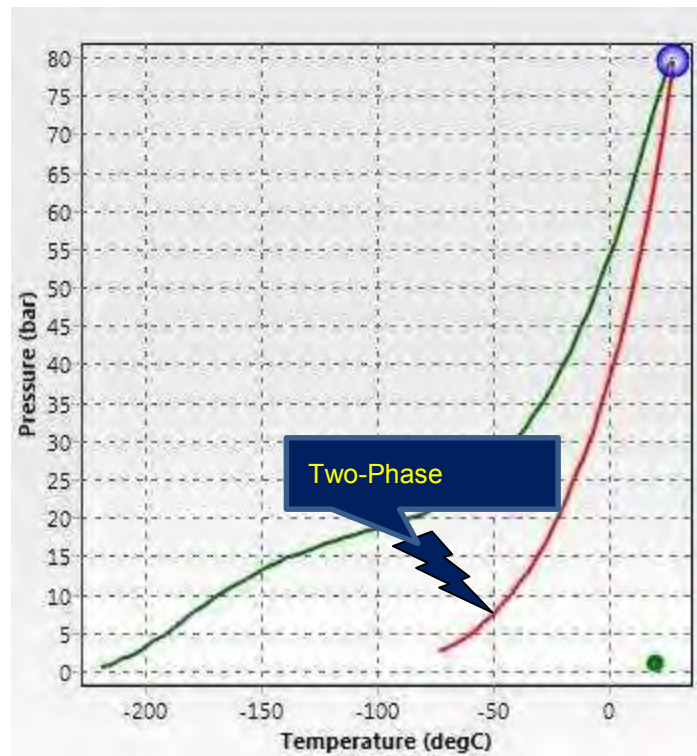


Figure 7-5: Phase envelope of the anthropogenic scenario Ca LOOP

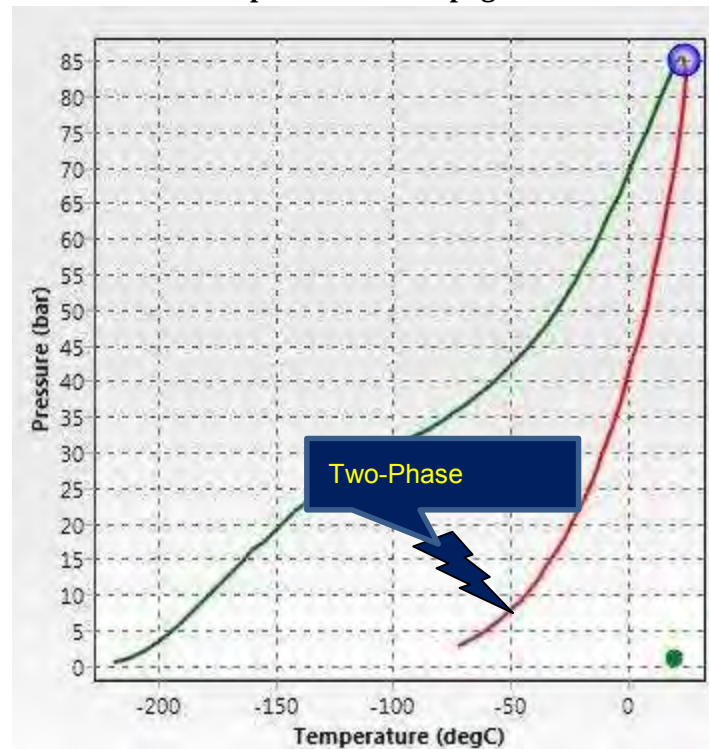


Figure 7-6: Phase envelope of the anthropogenic scenario OXY1

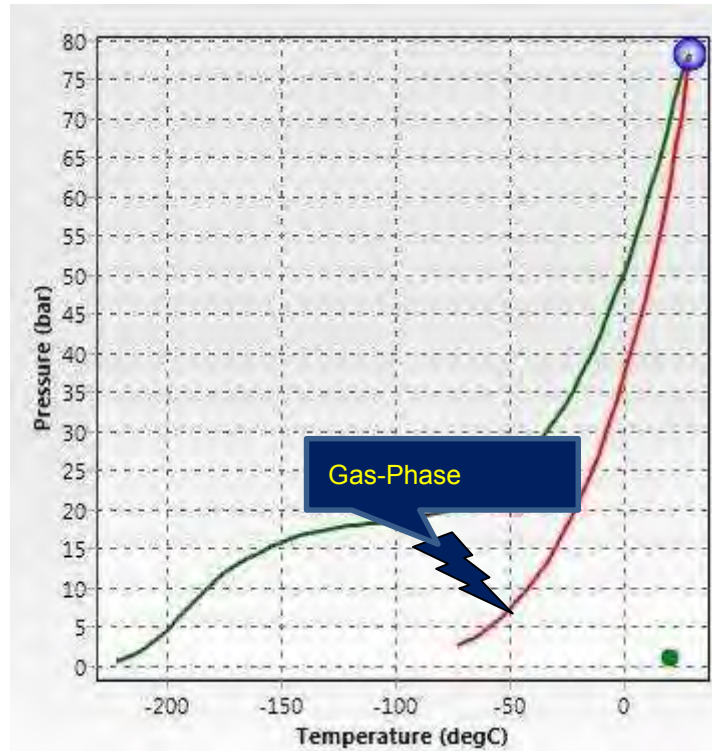


Figure 7-7: Phase envelope of the anthropogenic scenario OXY2

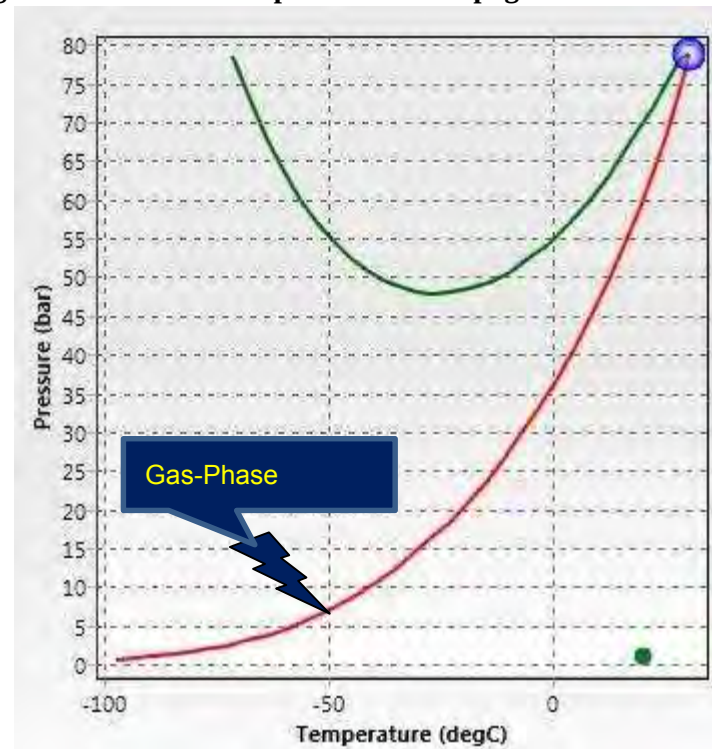


Figure 7-8: Phase envelope of the anthropogenic scenario PRE

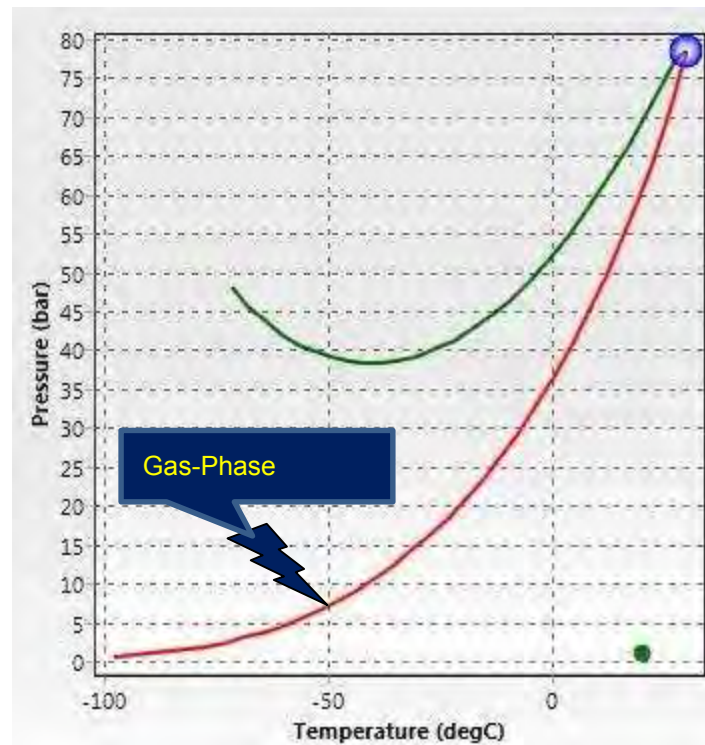


Figure 7-9: Phase envelope of the anthropogenic scenario H2 MEM

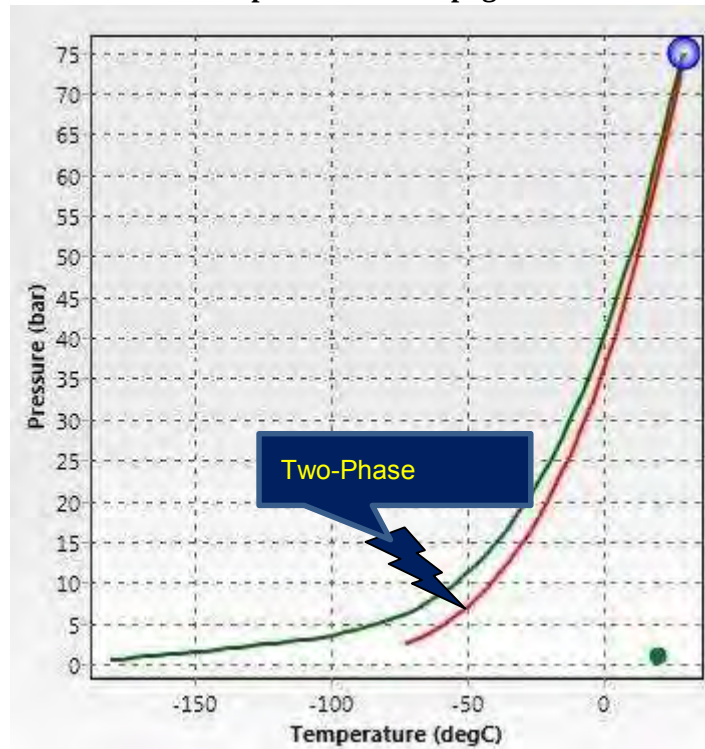


Figure 7-10: Phase envelope of the anthropogenic scenario CH4RICH

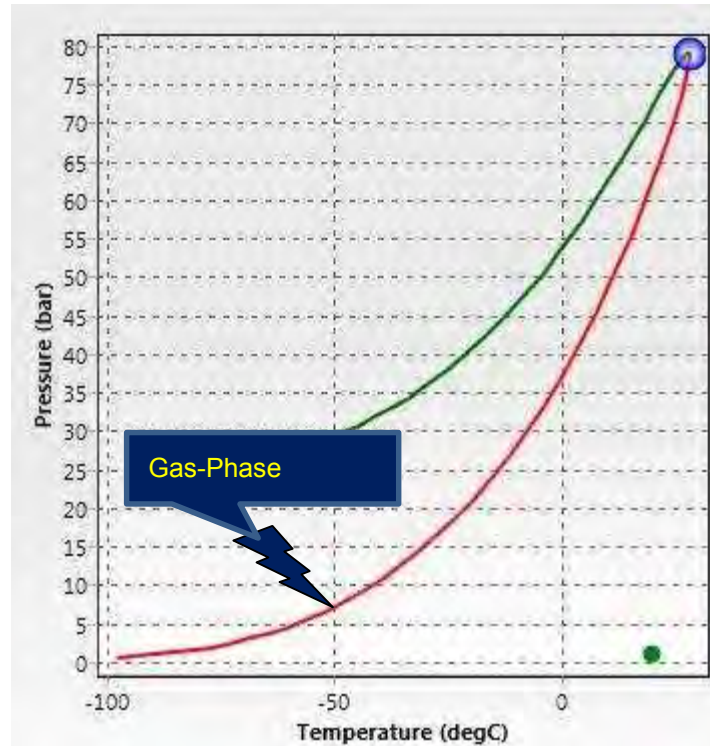


Figure 7-11: Phase envelope of the anthropogenic scenario TGR-BF

7.1 Conclusions

In order to liquefy the scenario compositions studied in this report high pressure and low temperature conditions are required to maintain the fluid in its liquid phase. To be in the liquid phase the fluid has to be kept at pressures and temperatures above the bubble point curve. This is strongly dependent on the level and type of impurity present in the CO₂ stream (see Section 3.3.1). At -50°C, the pressures required for liquid conditions of the scenarios range from 13bara to 62bara rendering these compositions uneconomical for transportation in the cryogenic liquid phase using existing storage tanks.

8 SHIP TRANSPORTATION

8.1 Ship Transportation Scenarios

An efficient transport mode for CO₂ over relatively long distances is by sea. At atmospheric pressure, impure CO₂ will be in either the gas or solid phase. For transportation by ship it is desirable to keep the product in liquid form. A specialised ship is therefore required with a suitable product containment system to keep the CO₂ in the liquid phase. A liquid state maximises the payload capability (the amount of cargo that can be carried) of the ship. A liquid state is achieved through a combination of raised pressure and low temperature applied to the containment system.

Some small scale CO₂ carriers have already been constructed including the ‘Coral Carbonic’ operated by Anthony Veder (Coral Carbonic, 2014) which has a length of 74 m and a capacity of 1250 m³. Previous IEAGHG studies have investigated the transportation of pure CO₂ by ship (IEAGHG, 2004).

8.2 Equivalence to LNG ships

In some respects the transport of Liquefied Carbon Dioxide (LCD) by sea is equivalent to Liquefied Natural Gas (LNG) ship transportation, although there are important differences which change some of the key design requirements for an LCD ship. LNG vessels are an established ship type and have been operating for over 50 years. The fleet of LNG ships is currently expanding rapidly to meet the demands of the natural gas market. The largest LNG ships currently operating are the Q-Max class, which have a capacity of approximately 270,000 m³.

LNG is normally transported slightly above atmospheric pressure at a cryogenic temperature of -169°C. Storage tanks typically operate at 1.3bar absolute. Some small LNG carriers operate at pressures up to 8bara to reduce boil off gas (BOG) rate.

BOG of LNG during ship transportation is typically 0.1-0.15% volume per day and is used to fuel engines (in dual fuel ships), burn in boilers (steam turbine powered ships) or re-liquefied.

LNG vaporisation is not homogenous. Nitrogen and methane have lower boiling points and tend to evaporate more easily (a phenomenon known as weathering). The consequences of this are that the LNG composition becomes heavier, the heating value increases and Wobbe index increases. The density change will have a small effect on the centre of gravity and thus an effect on stability and performance of the ship. However, the effect is minimal in most scenarios. Impurities in liquefied CO₂ may have a similar effect and may need to be accounted for in the ship design.

LNG ships are classified according to their containment and handling system. Chapter 4 of the IMO IGC code (IMO, 1993) specifies the following containment types:

- integral tanks
- membrane tanks
- semi-membrane tanks
- independent (freestanding) tanks – Spherical (Moss) or Prismatic (Conch)
- internal insulation tanks

Choice of containment system is based largely on the tank design vapour pressure and the manner in which the tanks are integrated into the hull. Some containment systems (such as the spherical Moss tanks) are proprietary designs and may only be built at certain shipyards under licence.

Tanks are constructed to standard oil tank design (Type A), pressure vessel design (Type C) or defined as neither of the first two (Type B). Most systems operate just above atmospheric pressure. Pressure is used to control the rate of BOG and may be set according to the relative price of oil and LNG for burning in the dual fuel steam turbines. Descriptions of the different systems are found from many sources such as Mokhatab et al. (2014). Only Type C tanks are summarised here due to their applicability to the current study. Type C tanks are required for LCD ship transportation because of the pressure requirements to keep the product in the liquid phase, Type A and B tanks are unpressurised tanks and therefore unsuitable for LCD ship transportation.

Type C tanks are either spherical or cylindrical and are regarded as pressure vessels, which is important for design specifications and safety regulations. The tanks are normally made of aluminium alloy, 9% Ni alloy steel or AISI 304L stainless steel. These tanks are designed and built to conventional pressure vessel codes and do not need a secondary barrier. Normally polyurethane or polystyrene is utilised as insulation. The insulation is either sprayed directly or placed on in blocks which are glued onto the cargo tank and covered with steel sheets.

Currently Type C tanks have typical application for smaller LNG ships which are usually suitable for coastal trade for areas which lack conventional gas pipelines. For example, 1000m³ capacity ships currently operate in remoter coastal areas of Norway. However, larger vessels are currently being developed with Type C tanks. TGE Marine are currently constructing two 30,000 m³ carriers, with class approval in principle, and already operate a 7,500 m³ vessel, the Coral Methane (TGE, 2013). An advantage of Type C is the minimisation of BOG. Some ships do not carry any BOG re-processing facility.

8.3 Containment pressure and temperature requirements for LCD

The properties of pure CO₂ at relatively low containment pressures show differences when compared to LNG (Table 8-1) which have consequences for containment. Whereas LNG can be liquefied at atmospheric pressure, the pressure of CO₂ must be raised above 0.5MPa to enable liquefaction from gas to liquid (Figure 8-1). However, the cooling requirements for liquefying CO₂ (approximately -57°C) are significantly less than for LNG (-169°C).

Table 8-1: Properties of LNG and CO₂

	LNG (typical composition)	Pure CO ₂
Boiling Point at atmospheric	-169°C	-55 to -70°C
Density (liquid)	410-500kg/m ³	100-400kg/m ³
Triple Point Temperature	-182°C	-57°C
Triple Point Pressure	11.7 kPa	518 kPa

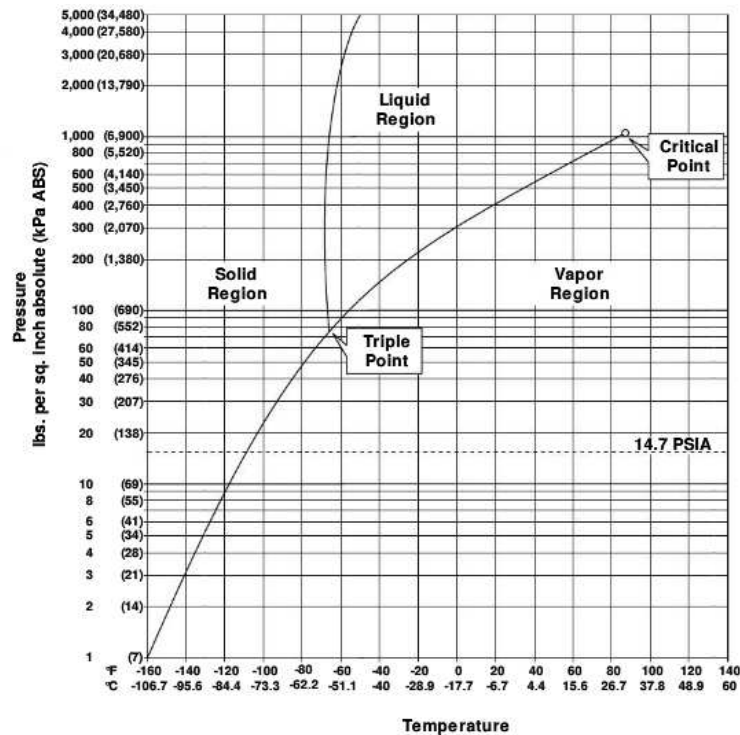


Figure 8-1: Pure CO₂ Phase Diagram (Praxair, 2009)

This indicates that an LCD ship would ideally contain the product at approximately 5bara or above whilst keeping the temperature above roughly -55°C. Too much cooling will cause unwanted solids formation and therefore must be avoided. Impurities added to CO₂ change the phase boundaries and consequently the temperature and pressure storage conditions.

The impurity scenarios for CO₂ presented in this study are used to develop design scenarios for a nominal LCD ship. To enable containment of CO₂ mixtures in liquid form, the containment system must keep the product (above the triple point pressure) at pressures and temperatures that are above the bubble and melting point lines. This zone varies for different impurity scenarios.

As seen in Section 7, some of the impurity scenarios can be transported in the liquid phase around -57°C and 1 to 1.5MPa, with the others requiring high pressures. The bubble points of the impure CO₂ scenarios are shown in Figure 7-1 to Figure 7-11. The melting points are fairly invariant for the feasible containment pressures and range from -57°C to -73°C (Figure A-190). Increasing the tank pressure further will move more scenarios further into the liquid phase. This improves the capabilities of the containment system for different impurity scenarios but some scenarios require unfeasible storage pressures (see Section 7). Care must be taken to avoid formation of solids (dry ice) in the storage tank and when loading/unloading. This may indicate that higher tank pressures would be required. The suggested containment pressures/temperatures are similar to previously reported values (WorleyParsons, 2013; Yoo et al., 2013): 0.683MPa and -50°C and 0.686MPa and -52°C respectively.

8.4 Effect of product density on ship design

Impurities have a significant effect on product density; the ability to carry cargo with a wide range of densities could be a significant challenge for the ship design. The range of density of CO₂ at transport conditions is similar to that of LNG. It could therefore be assumed that a design with similar arrangement to an LNG vessel is feasible for carrying LCD.

The addition of impurities can lower or raise the density for the same conditions which will have an effect on the ship design. As seen in Section 3.3.6, all the scenarios lower the density compared with pure carbon dioxide. Carrying products with lower densities will impact as follows:

- Lower cargo capacity in terms of mass.
- Changing draft depending on impurities carried (distance from the bottom of the ship to the waterline). Ships are usually designed to operate optimally at a specific draft. The draft change may be minimised by ballasting the ship. Sufficient ballast tanks (separate segregated tanks usually in the outer part of the hull and double bottom) would be required.
- Operating at reduced draft and/or with more ballast will usually lower the centre of gravity. This has effects on ship stability (the ship's ability to remain upright) and sea-keeping (the motion performance of the ship in waves). However, this scenario is similar to a normal cargo ship operating with reduced cargo or in ballast condition. Different loading scenarios would be accounted for during the design.

8.5 Effect of pressure requirements on ship design

The principal effect for requiring containment pressure to carry LCD is the use of Type C containment tanks. This has so far only been used for relatively small LNG ships and therefore would have significant design/approval consequences if applied for LCD in larger volumes. Otherwise, the required pressures for LCD are similar to equivalent LNG ships. A general arrangement similar to current Type C carrier designs can be envisaged (e.g. see (IMO, 1993)).

8.6 Effect of Temperature Requirements on Ship Design

LCD requires relatively less cooling than LNG and therefore the refrigeration power requirements are correspondingly less. However, whilst the refrigeration plant for a LCD ship may be smaller, it is not envisaged that this will have much effect on the general arrangement of the ship when compared to an equivalent LNG ship.

8.7 Loading and Offloading

Yoo et al. (2013) describe four CO₂ transport chains between clusters. Two cases involve the transfer of liquefied compressed CO₂ to and from a shore side terminal to a ship. The process depends on the distance of the CO₂ source to the shore side terminal. If nearby, the CO₂ should be immediately liquefied, transported to temporary storage tanks and then loaded into the ship. If the CO₂ source is further from the terminal then the CO₂ is compressed for transportation by pipeline and then decompressed for the liquefaction process. Recompression to the requirements of the ship tanks is then required before loading. Liquefaction is best achieved using an open-cycle process (WorleyParsons, 2013).

As pointed out by WorleyParsons (2013), the avoidance of dry-ice formation in the process plant, tank storage and loading system is highly important. Sufficient thermal insulation must be installed throughout the storage and loading system. Loading of CO₂ would follow equivalent LNG loading systems and is recommended by (IEAGHG, 2004) to use a loading arm with pumps located in the port. Unloading at the receiving port is likely achieved using pumps located on the ship. Any intermediate storage tanks at both the export and receiving port must be able to contain the cargo at the same or higher pressures as the LCD ship.

As shown in Section 7, the presence of CO₂ impurities need to be considered with regard to the pressure and thermal requirements to enable low temperature liquid phase operation. Section 7 showed that scenarios CO2MEM2 and CH4RICH could be liquefied at an elevated pressure but that it

was unfeasible for the remaining scenarios. Other physical properties altered by CO₂ impurities, such as density, should not significantly affect the loading/unloading system.

8.8 Intermediate Buffer Storage

This section looks at any potential issues due to the use of the worst case CO₂ specification scenarios on buffer storage vessels, compared with existing CO₂ storage vessels,. The analysis is informed by the physical properties of the worst case scenarios evaluated in Section 3.

Intermediate buffer storage could be placed in saline aquifers along the route of a pipeline or in a CO₂ terminal at the shore. However, these options could run into difficulties with health and safety bodies such as the HSE as well difficulties in public acceptance of onshore CO₂ storage, as seen in the Dutch CCS case in Barendrecht (Brunsting et al., 2011).

For CO₂ mixtures to be in the liquid state they must be stored at pressures and temperatures on the liquid side of the bubble point and melting point curves. Additional impurities to a pure CO₂ stream cause a 2-phase region to open up (the effect of the scenarios on the bubble and melting point curves was demonstrated in Sections **Error! Reference source not found.** and **Error! Reference source not found.** respectively). Large quantities of these impurities tend to increase the size of the envelope, especially if they are very different to CO₂, and the envelope opens out away from critical point, i.e. at lower temperatures the bubble and dew point curves are further apart. Wider envelopes also have the dew and bubble point lines further apart and will require higher pressures to reach the liquid phase.

There has been very little work done on low temperature CO₂ mixtures near the solid phase and impurities will affect the melting line, although there has been work done on the equation of state for solid carbon dioxide (Span and Wagner (1996), Trusler (2011), Jäger and Span, 2012) and the impurities in their pure form. The lack of data on the melting point line for CO₂ mixtures leads to uncertainties in the liquid storage region.

In order for mixtures with large amount of impurities to be on the liquid side of the bubble point curve at low temperatures, large pressures are required. Indeed, as shown in Section 7, the CO₂MEM2 and CH₄RICH could be liquefied at a temperature of -55°C and pressure over 15bara, while the remaining scenarios would require high impractical pressures. Therefore buffer storage of these types of mixtures is unlikely. For mixtures with a small amount of impurity, the properties of the mixtures will be near identical to pure CO₂ and therefore the storage conditions and tank properties will be the same to those of pure CO₂. However, as seen in Section 3.2, even small amounts of hydrogen can have a large effect on the bubble point curve.

8.9 Conclusions

It is feasible to transport certain impurities of CO₂ by ship. An equivalence to Type C LNG ships shows that the operating pressures and temperatures are within existing ship design scope. A suitable pressure/temperature combination for high purity CO₂ scenarios is 0.6MPa and -57°C. Increasing the tank pressure moves less pure scenarios into the liquid phase and improves the capabilities of the containment system for different impurity scenarios, although the majority of the worst case scenarios will require storage at unfeasible pressures (see Section 7). The general arrangement and fundamental design parameters of an LCD ship would likely be similar to a Type C LNG ship. The density of different impurity scenarios varies significantly. This would need to be considered for stability and sea-keeping during the ship design. It will also affect the payload capacity of the ship and would therefore impact on transportation costs.

9 CONCLUSIONS AND FUTURE RECOMMENDATIONS

9.1 Conclusions

This report represents a comprehensive review of the types of impurities that could be present in the CO₂ stream and makes substantial contribution to the evidence base that can be used by CCS project developers to determine which approaches are best to manage CO₂ impurities within CCS systems. Based on the work conducted the following conclusions can be drawn:

- It has been possible to identify eleven worst case, but plausible, scenarios in this work (plus one reference case) which are representative of the main current and future capture processes. These scenarios could be used by system designers as initial cases for a range of capture technologies to investigate the effects of impurities on different aspects of the transportation system. However, it is recommended that, for any scenario selected, the pressure and temperature levels of the stream entering the compression train needs to be confirmed as a detailed analysis of these constraints was beyond the scope of this study.
- Impurities greatly affect the thermodynamic and transportation properties of CO₂. For density, speed of sound, the Joule-Thomson coefficient and thermal conductivity an increase in impurity leads to worse dense phase pipeline transportation behaviour compared with pure CO₂. For viscosity, an increase in impurity levels tends to decrease viscosity which is a beneficial effect.
- Hydrogen tends to have the greatest effect on the thermodynamic and transportation properties of CO₂ raising the bubble point curve the most, decreasing density the most and decreasing the speed of sound by a large proportion. However, hydrogen also has the strongest beneficial effect on viscosity and thermal conductivity.
- The qualitative effect of an impurity can be inferred from the binary behaviour but its behaviour in more complicated mixtures cannot be quantified by looking at the binary behaviour
- In the dense phase the ADS1, OXY1 and CO2MEM1 scenarios tend to produce the least desirable qualities for pipeline transportation. These CO₂ streams have the lowest proportions of CO₂ and have the highest bubble point curves, compressibility, Joule-Thomson coefficient and the lowest densities, speed of sound and thermal conductivities. However, these scenarios have the lowest viscosities.
- Apart from pure carbon dioxide, the CH₄-rich scenario has the most desirable qualities for dense phase pipeline transportation with the lowest dew point curve, Joule-Thomson coefficients and compressibility and the greatest density and speed of sound. That is balanced with the fact that it has the lowest thermal conductivity and the highest viscosities.
- ADS1 show the highest compression energy requirements amongst all of the scenarios studied and this was 7% more than the base scenario. It is highlighted that this extra energy requirement is only at the compressor stages and does not represent the overall energy requirement for the whole process unit. Other projects, such as IMPACTS, are focusing on the effect of composition on costs of the CCS chain including compression and pipeline (Eickhoff et al, 2014).
- In terms of dense phase transport, the worst case scenarios (ADS1 and OXY1) require increased pipeline sizes over the reference case of pure CO₂ for the design conditions considered. This will affect the capital cost of these pipelines. For transportation in the gaseous phase, the impurities did not result in a required increase in pipeline size for the pipeline design considered.

- Temperature has a more significant effect on density than pressure for both CO₂ and CO₂ containing impurities. To increase the density and therefore capacity of the pipeline, the inlet temperature should be as low as possible.
- For fracture control, the saturation pressure of the CO₂ stream is a critical variable that will determine the required pipeline dimensions and toughness to prevent a long-running ductile fracture. Hydrogen in particular has the most potent effect in raising the saturation pressure. The OXY1 scenario was the most onerous scenario composition to transport due to the high levels of oxygen and nitrogen which also raise the saturation pressure.
- Corrosion and stress corrosion cracking of plain carbon steel will not occur without the presence of water. The effect of impurities on water solubility is therefore critical. There is little information on water solubility available in the literature, but it has been shown that water specification for the ADS1 and OXY1 scenarios would require careful specification.
- Scenario compositions containing CO and H₂S (H2MEM, TGR-BF) are at risk from forms of stress corrosion cracking in the presence of water and therefore material specification would have to be carefully considered for these scenarios.
- In order to transport the scenario compositions studied in this report by ship, high pressure and low temperature conditions are required to maintain the fluid in its liquid phase. This renders these compositions uneconomical for transportation in the cryogenic liquid phase.
- It is feasible to transport high purity CO₂ mixtures by ship where the bubble point line remains sufficiently close to that of pure CO₂. An equivalence to Type C LNG ships shows that the operating pressures and temperatures are within existing ship design scope. A suitable pressure/temperature combination for very high purity CO₂ streams is 0.6MPa and -57°C. Increasing the tank pressure moves the scenarios into the liquid phase. However, the majority of the scenarios require unfeasible pressures to be able to transport them by ship in the liquid phase.
- Type C vessels have, thus far, only been carried on relatively small LNG ships. Therefore, there are significant design and approval consequences if Type C vessels are applied for LCD in large volumes. Otherwise, the required pressures for LCD are similar to equivalent LNG ships.
- As the density of the impurity scenarios varies significantly, this would need to be considered for stability and sea-keeping during the ship design. It will also affect the payload capacity of the ship and would therefore impact on transportation costs.

9.2 Future recommendations

The project team have identified several areas during this project where further work could be usefully focussed. It is acknowledged that there are a number of research projects worldwide that are working to fill these knowledge gaps (e.g. the IMPACTS and CO₂QUEST projects co-funded by the European Commission under the 7th Framework Programme). However, in order to ensure that the identified research challenges are met as rapidly and cost effectively as possible, it is considered essential that these projects work collaboratively and as much data as possible is made available in the public domain.

9.2.1 CO₂ entering the CO₂ transportation system

Particularly for CO₂ capture from industrial sources, it may be valuable to review plant permits (rather than more generic Best Available Technology documents) to improve understanding of the flows

entering CO₂ capture (and, hence, potentially also CO₂ transport and storage) systems. Additionally, the CO₂ specifications considered in this study are intended to be broadly representative of steady-state operation and there is, therefore, scope for further work to explore whether any changes in CO₂ purity during start-up, shutdown and upset conditions should lead to changes in the design or operating strategy used for CCS transport systems. There is, however, currently very limited public domain data available in this area even for the CO₂ capture technologies that are most developed.

There is also scope for somewhat more significant variations in pressure and temperature of the CO₂ stream exiting the CO₂ capture plant than the quantitative analysis in this study considered, with several configurations under development for several CO₂ capture technology options. Further work could, therefore, usefully explore what the best approach to setting pressure and temperature at the exit of the CO₂ capture plant might be given the implications this will have for CO₂ transport (and also compression or liquefaction).

9.2.2 Definition of physical properties

In recent years, there has been increasing interest in developing Equations of State that are fit for purpose for CCS system modelling (Demetriades et al 2013). This effort is continuing and insights from improved models should be combined with work carried out in this study in the future, wherever possible. The implications of changes in factors such as water-carrying capacity and heat transfer properties of varying compositions of CO₂ could also be considered further to provide a deeper understanding of the compressor power required for different CO₂ compositions.

9.2.3 CO₂ compression requirements

Further work could consider a broader range of scenarios with, for example, different intercooling temperatures assumed (e.g. depending on cooling source assumed to be available) and a broader variety of heat exchanger options included in the analysis.

A tailored, optimised compression route could also be designed for each scenario based on the impurities existing in the CO₂ stream.

9.2.4 Material requirements

The work conducted in this report has highlighted the requirement for a ductile fracture propagation model that can be used for the specification of the toughness requirements for pipelines transporting CO₂ streams containing multiple impurities.

Further work is required to allow the water specification for mixtures of impure CO₂ to be determined or calculated in order to avoid corrosion and cracking in the transportation system.

Although there is an increasing database of corrosion data for binary and ternary mixtures of impurities with CO₂, further experimental data is still required to fully quantify the effects of different impurities in combination with CO₂ and water at temperatures and pressures relevant to the transportation system. Having a reliable set of experimental data would allow corrosion models, similar to those used for sweet corrosion in the oil and gas industry, to be developed.

Although CO and H₂S cracking has been highlighted as an issue for certain impurity streams, there is little experimental data available in relevant environments to confirm or otherwise whether this is going to be an issue for CCS transportation systems. Further work is required in this area.

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APPENDIX A

Figures from Chapter 3

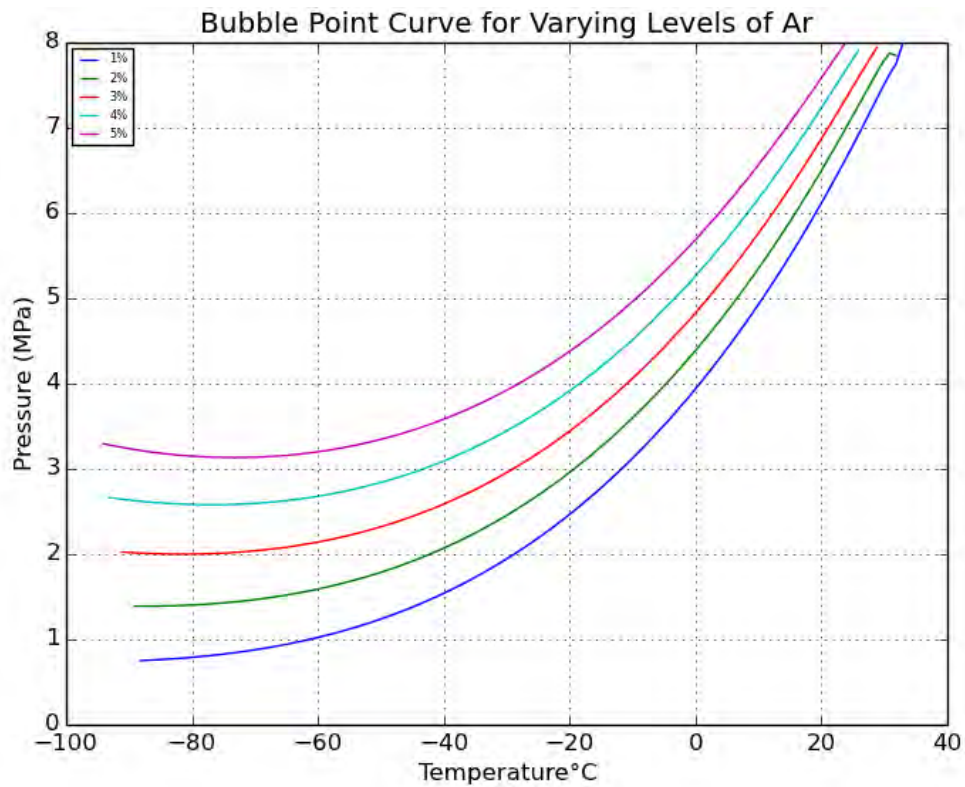


Figure A-1: Bubble point curves of CO₂ with varying levels of Ar

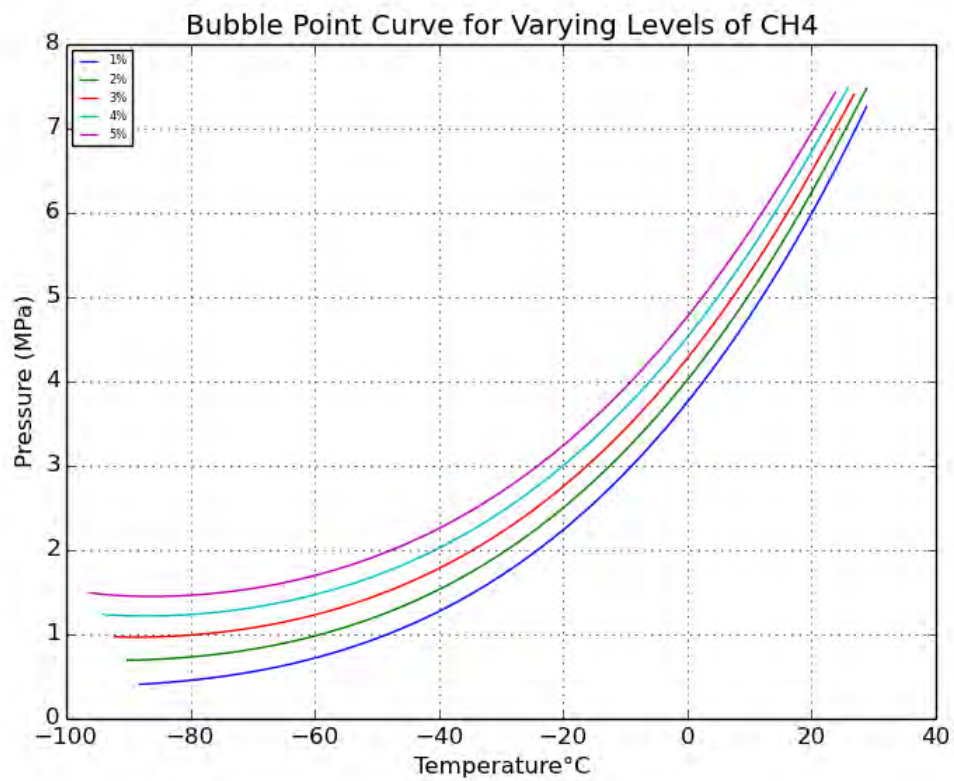


Figure A-2: Bubble point curves of CO₂ with varying levels of CH₄

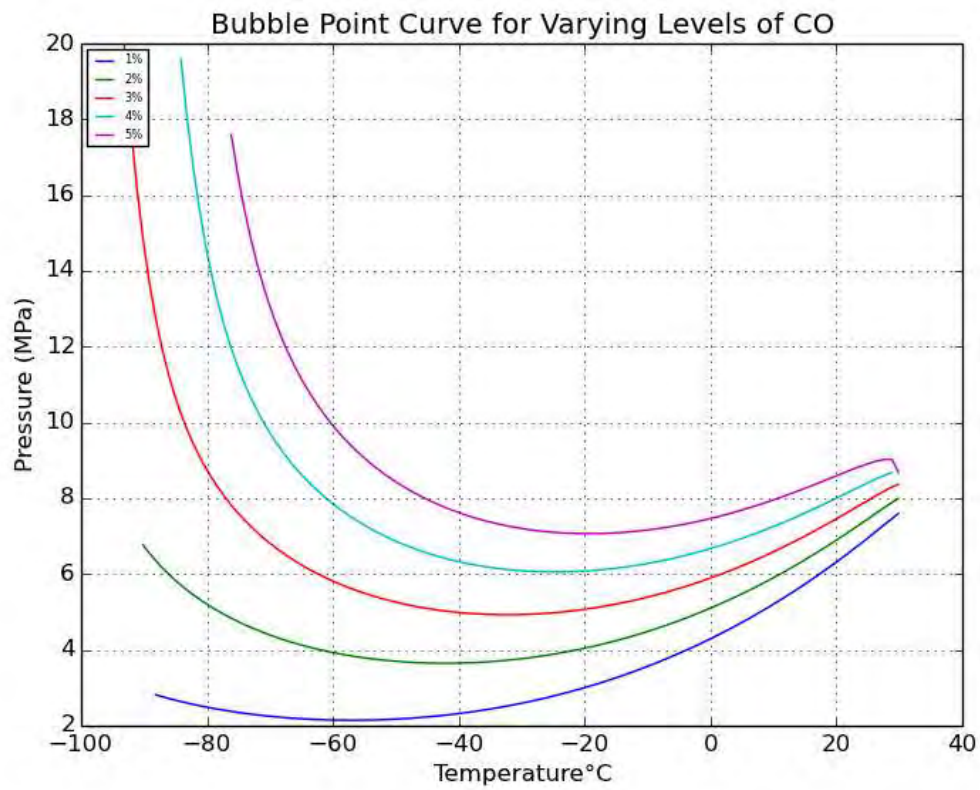


Figure A-3: Bubble point curves of CO₂ with varying levels of CO

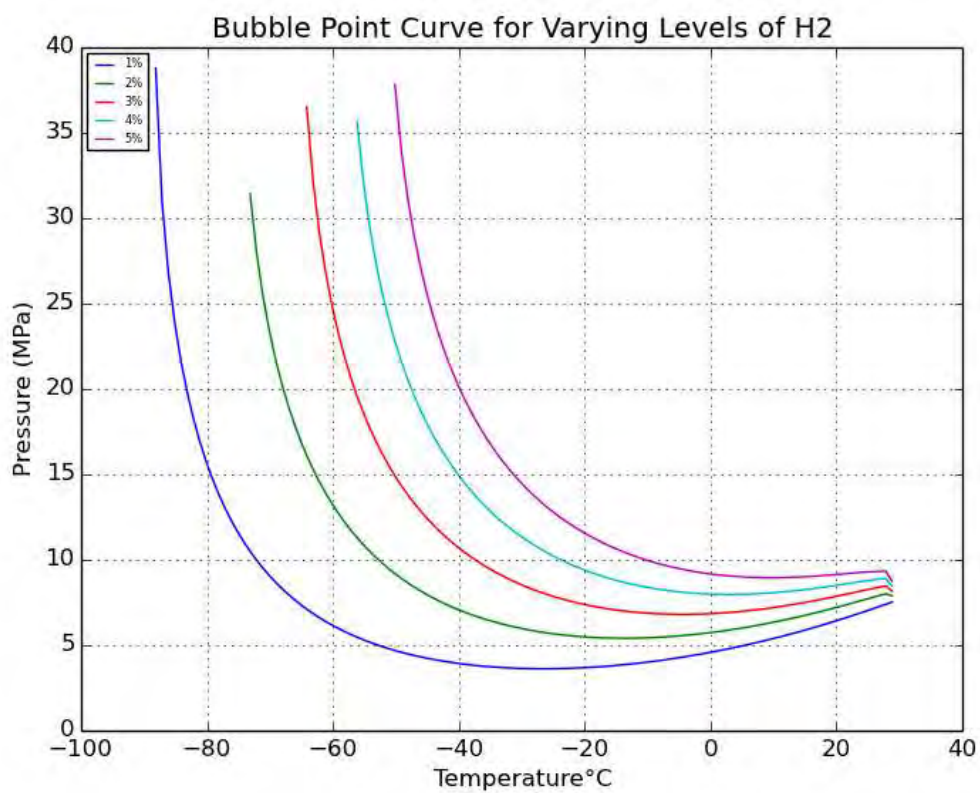


Figure A-4: Bubble point curves of CO₂ with varying levels of H₂

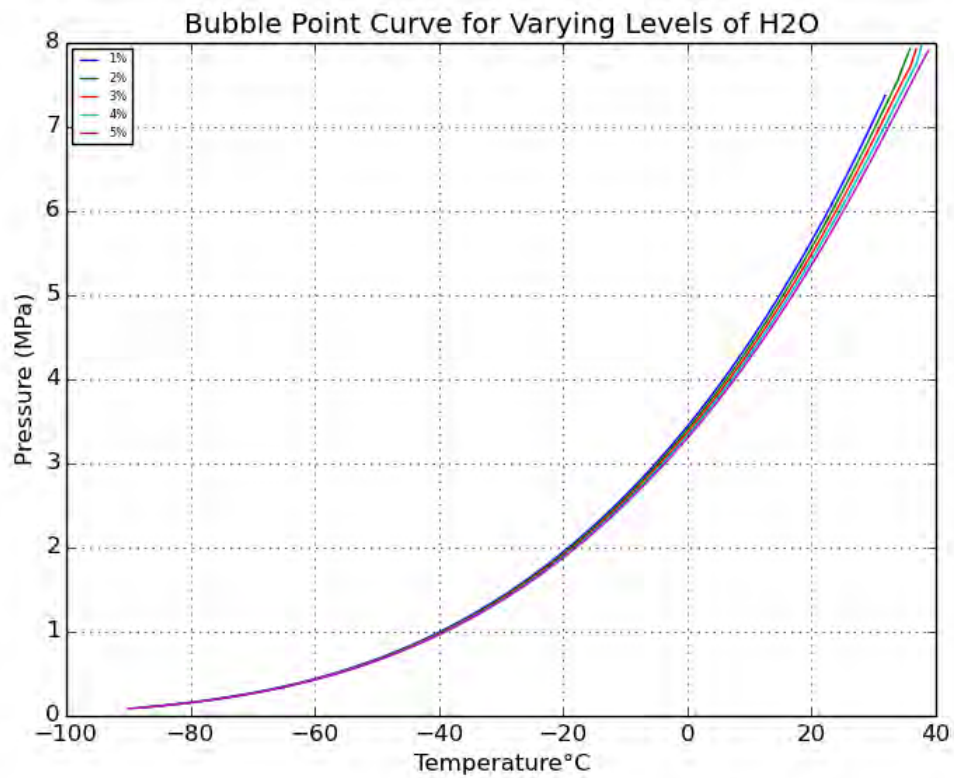


Figure A-5: Bubble point curves of CO₂ with varying levels of H₂O

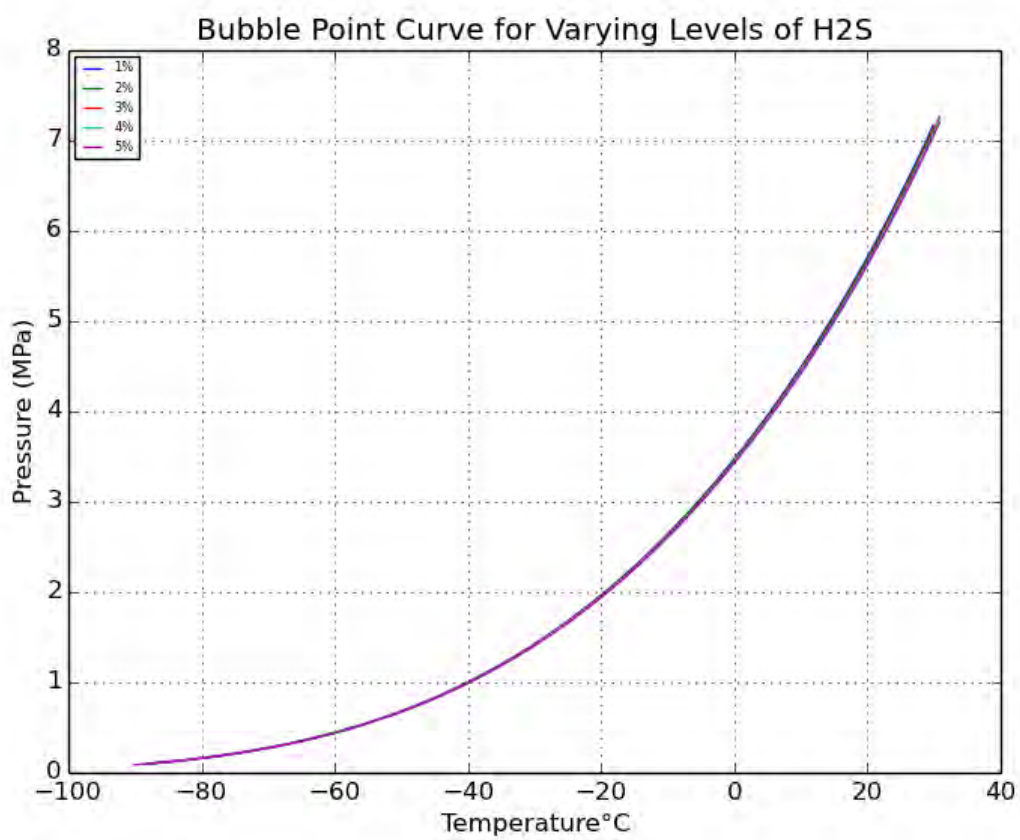


Figure A-6: Bubble point curves of CO₂ with varying levels of H₂S

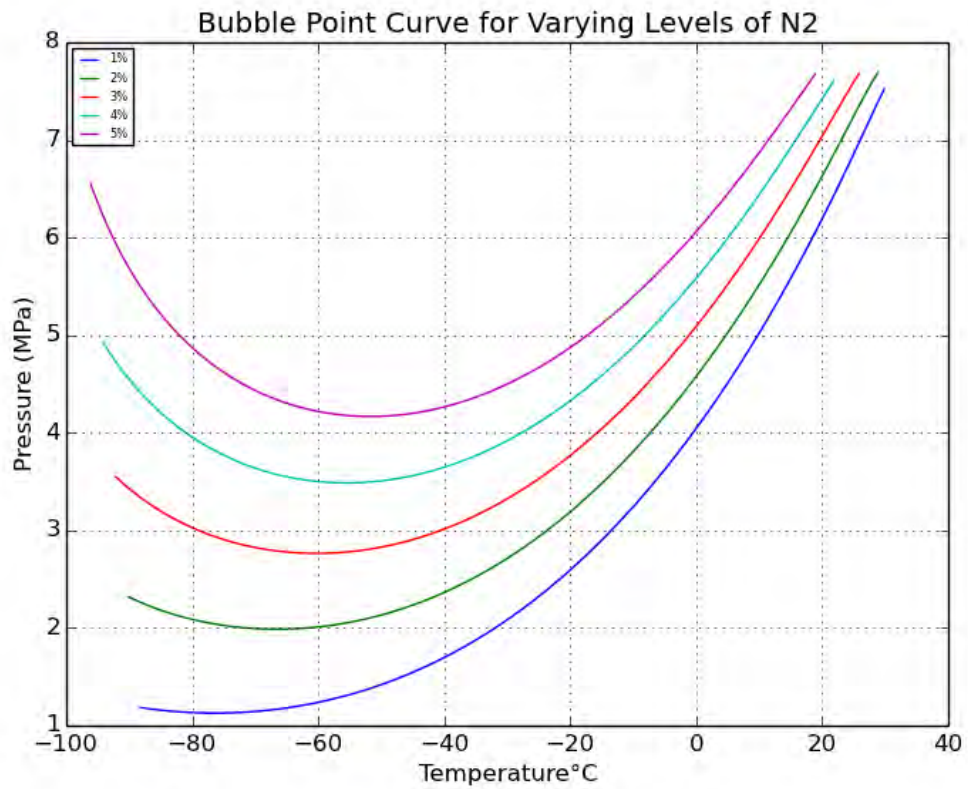


Figure A-7: Bubble point curves of CO₂ with varying levels of N₂

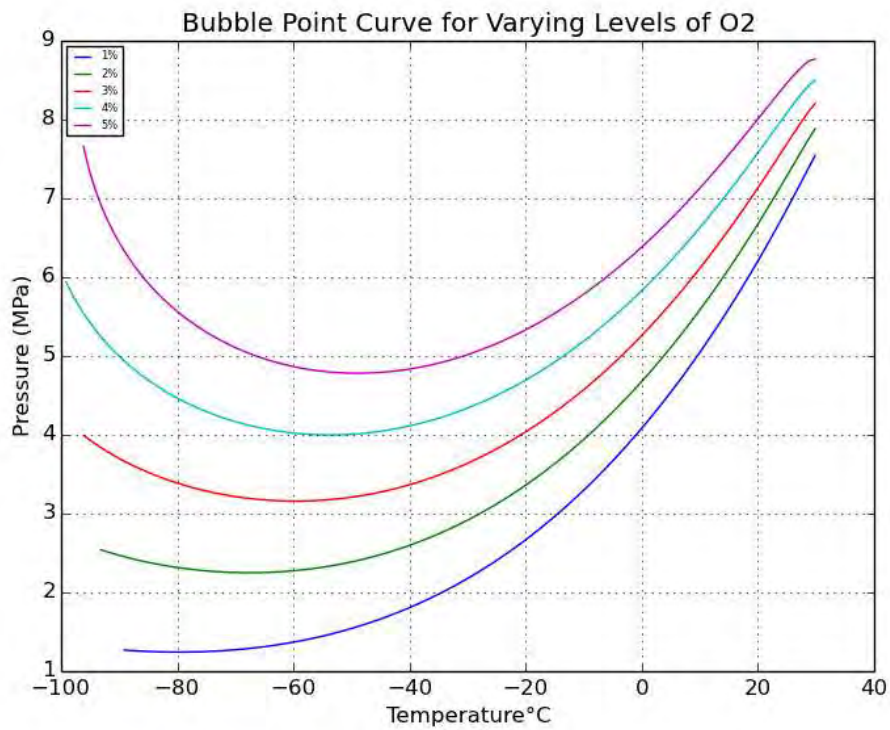


Figure A-8: Bubble point curves of CO₂ with varying levels of O₂

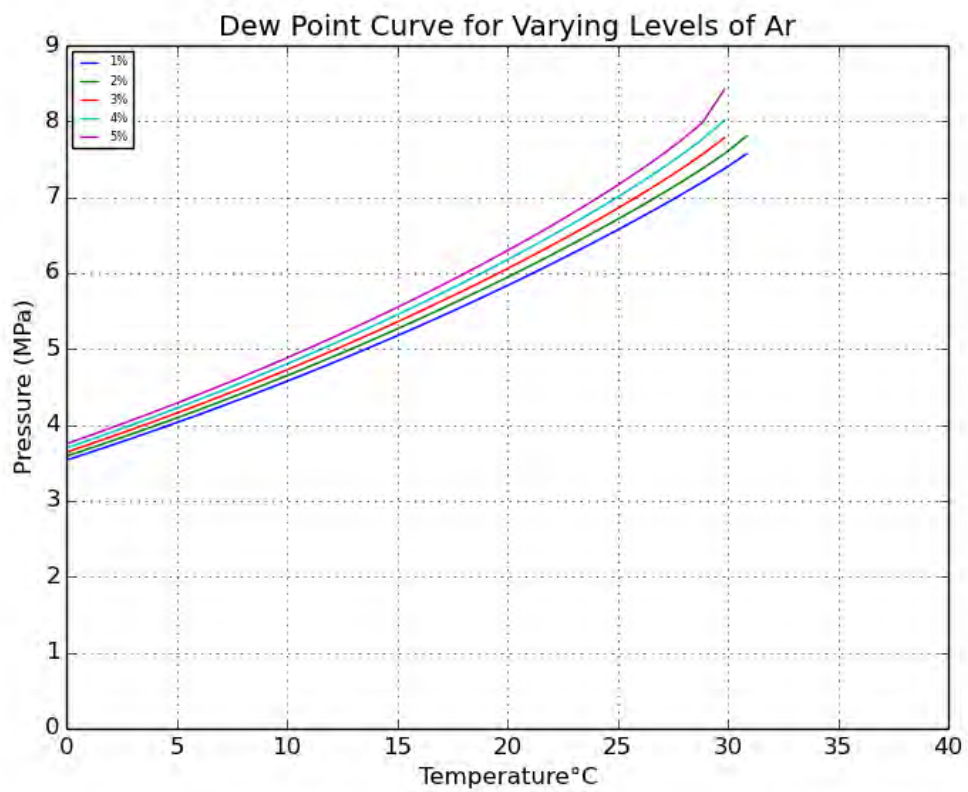


Figure A-9: Dew point curves of CO₂ with varying levels of Ar

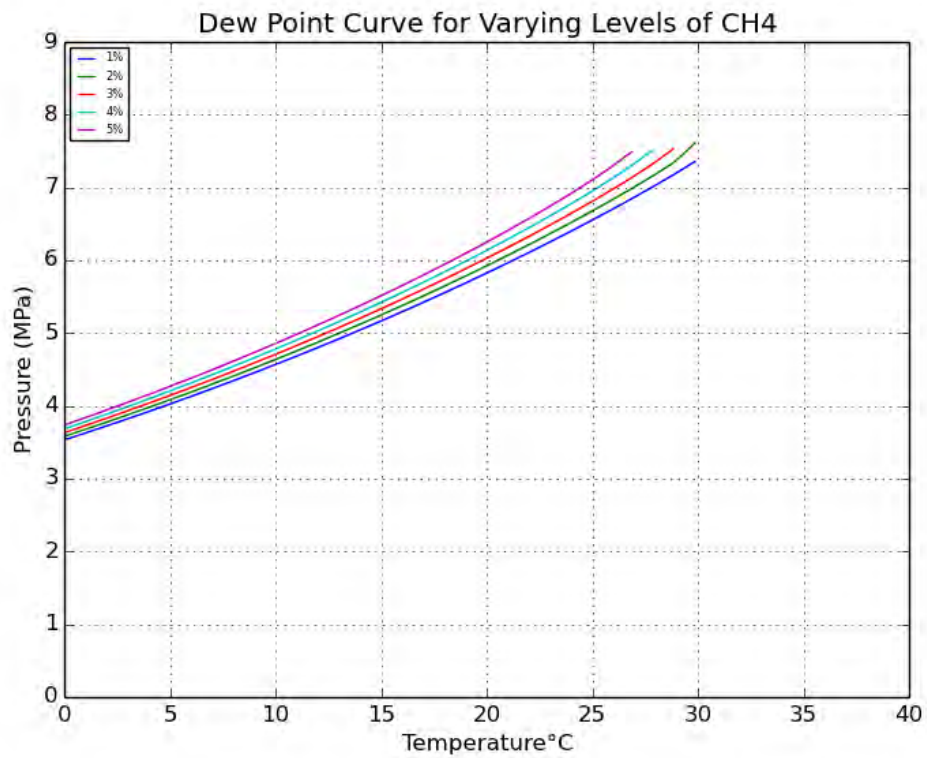


Figure A-10: Dew point curves of CO₂ with varying levels of CH₄

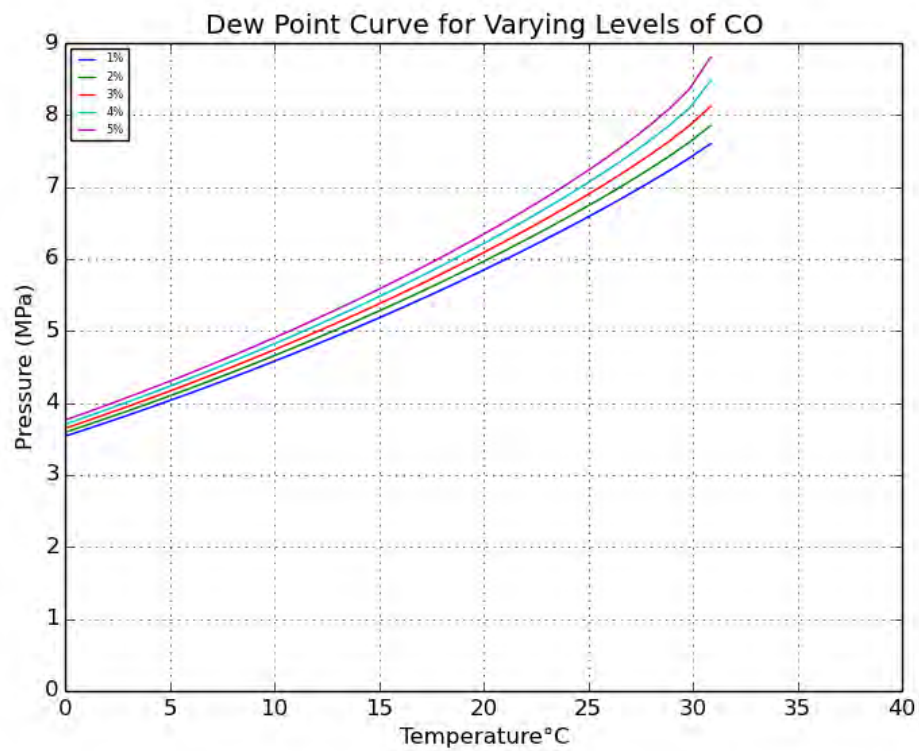


Figure A-11: Dew point curves of CO₂ with varying levels of CO

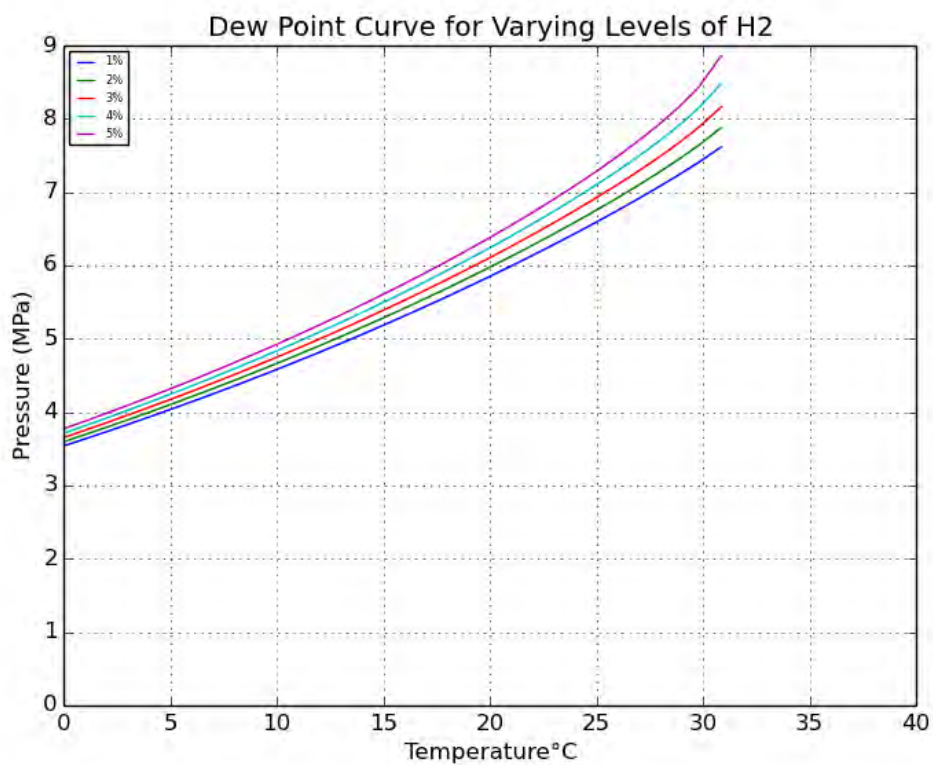


Figure A-12: Dew point curves of CO₂ with varying levels of H₂

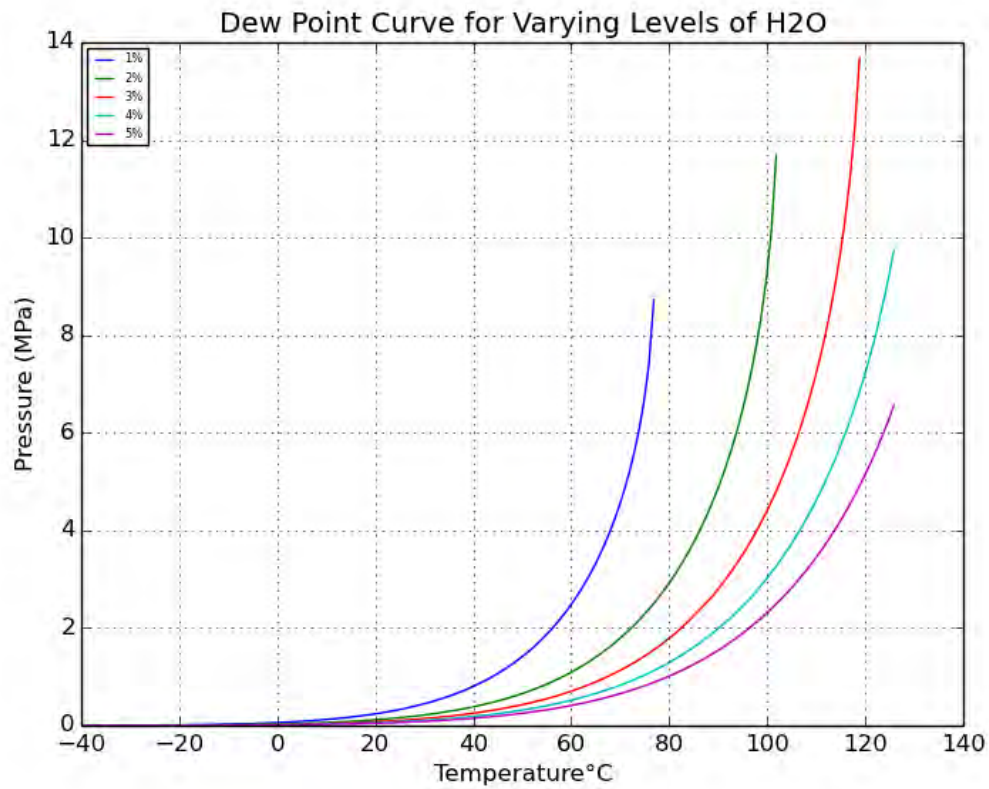


Figure A-13: Dew point curves of CO₂ with varying levels of H₂O

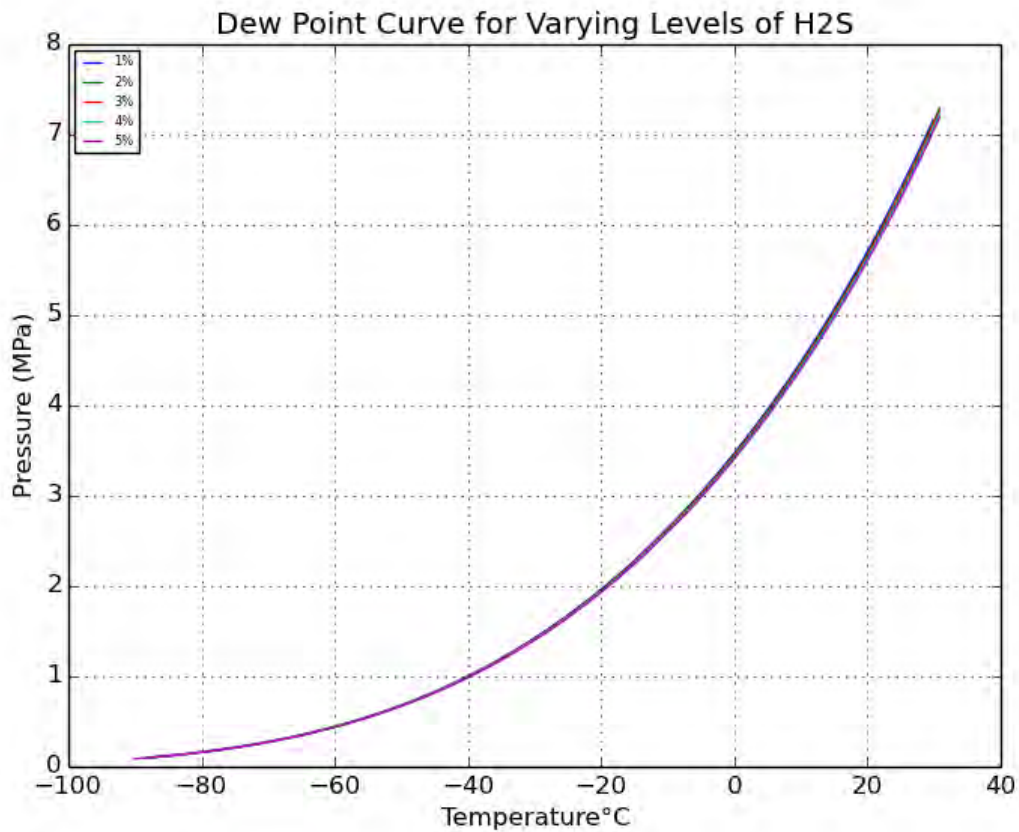


Figure A-14: Dew point curves of CO₂ with varying levels of H₂S

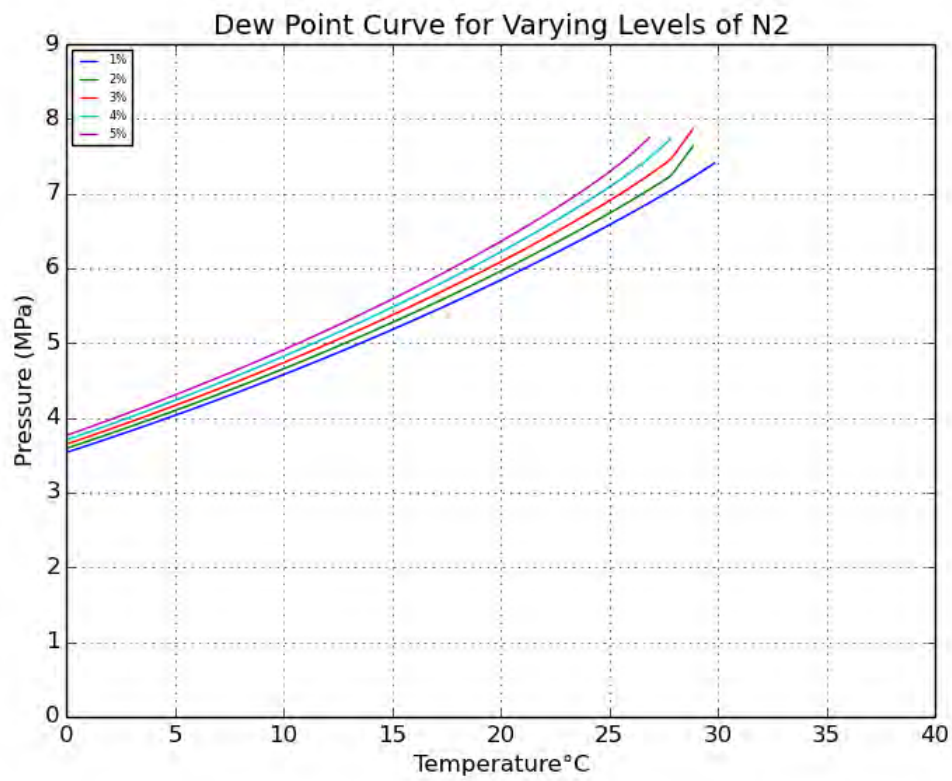


Figure A-15: Dew point curves of CO₂ with varying levels of N₂

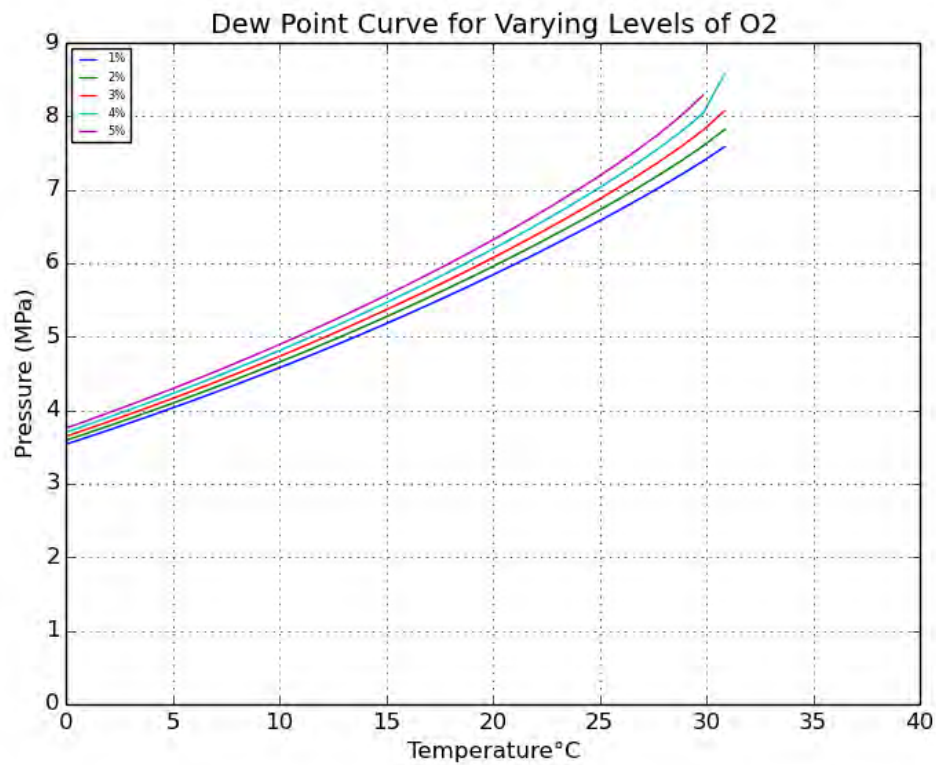


Figure A-16: Dew point curves of CO₂ with varying levels of O₂

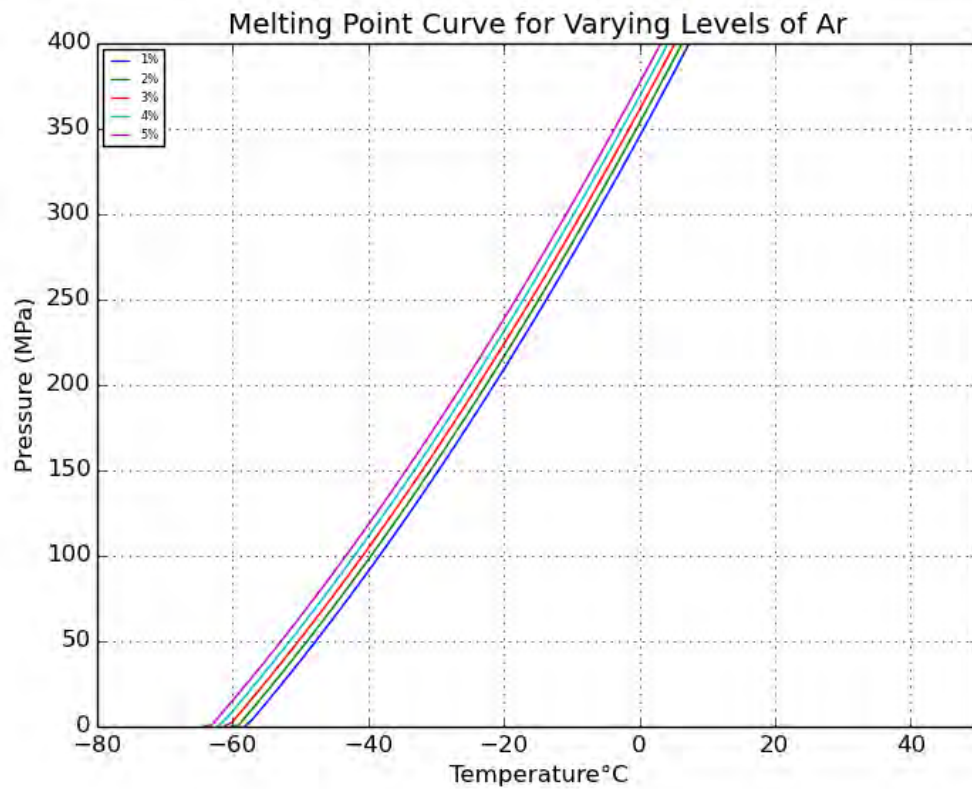


Figure A-17: Melting point curves of CO₂ with varying levels of Ar

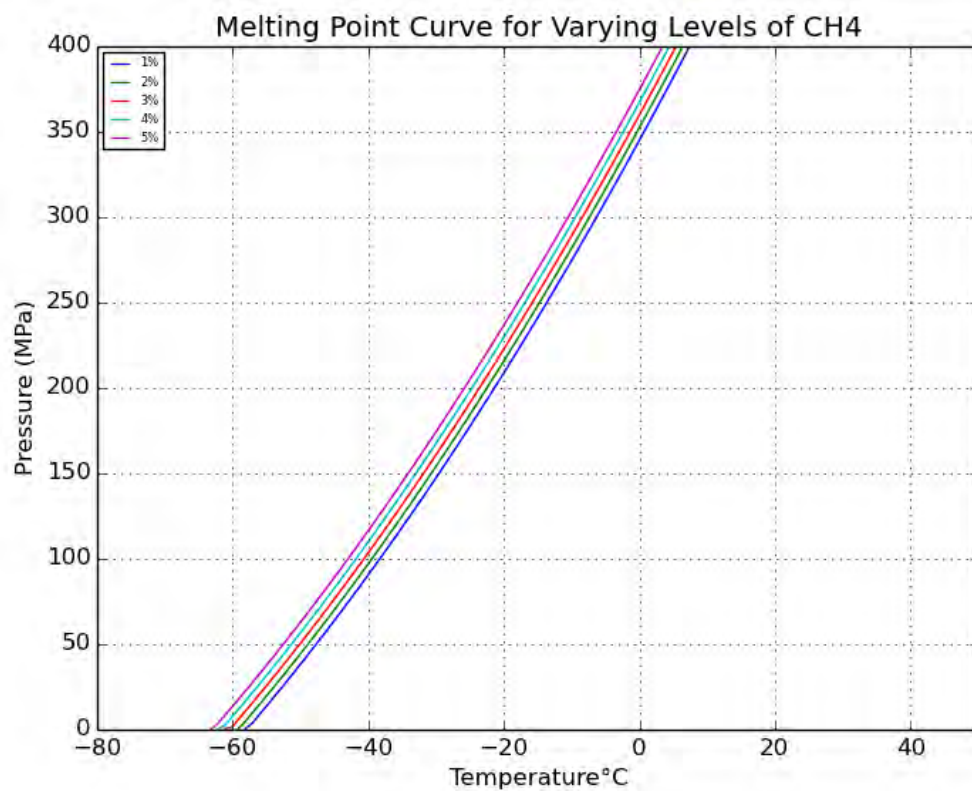


Figure A-18: Melting point curves of CO₂ with varying levels of CH₄

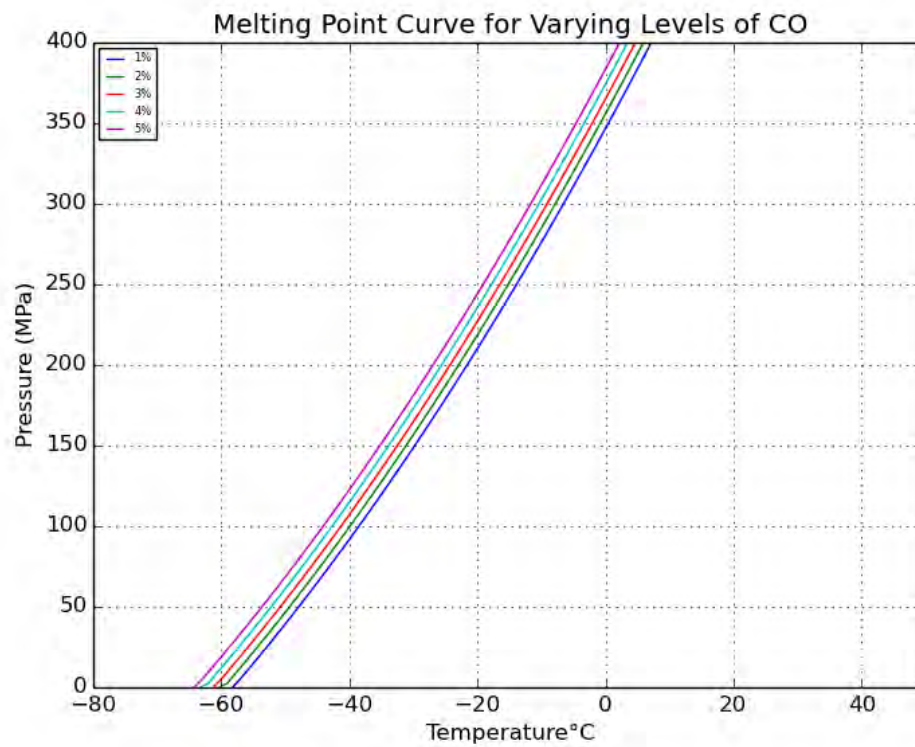


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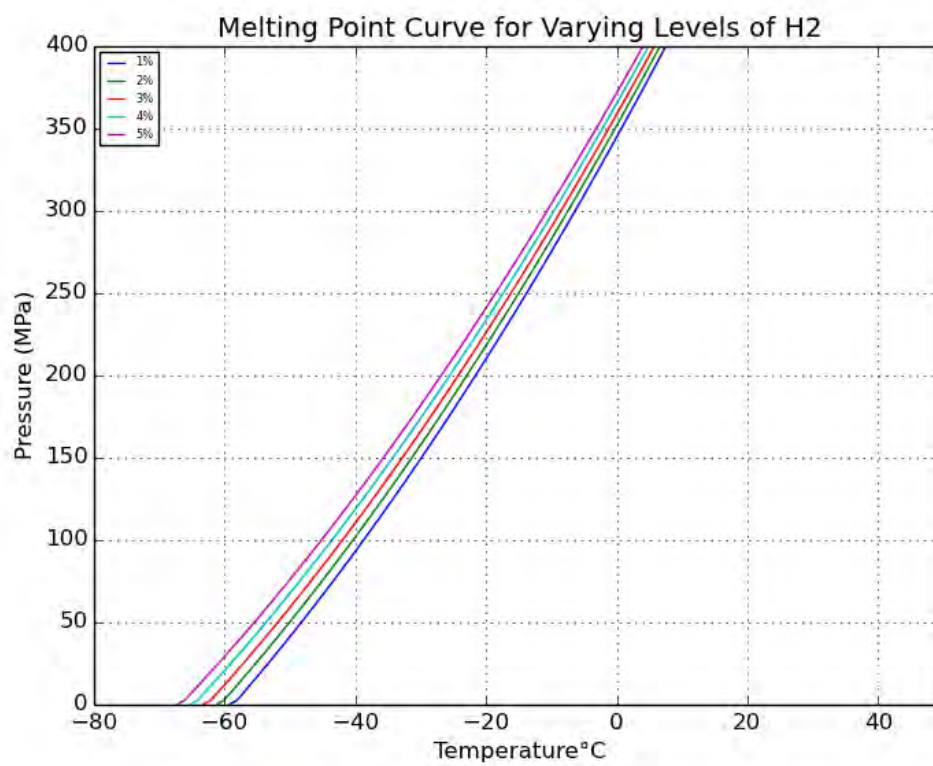


Figure A-20: Melting point curves of CO₂ with varying levels of H₂

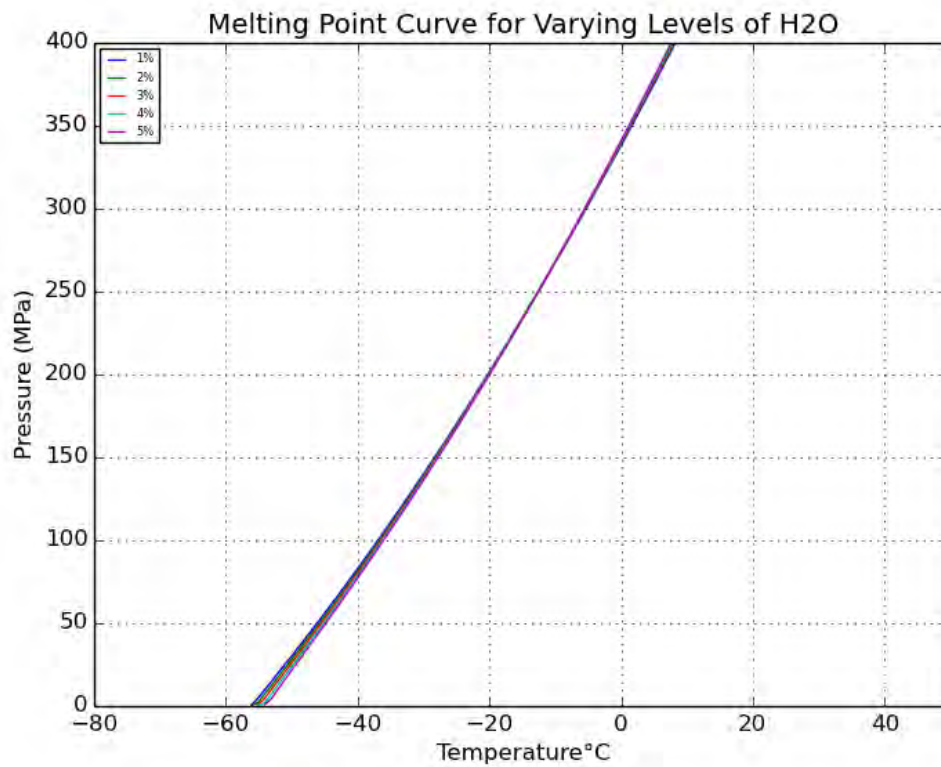


Figure A-21: Melting point curves of CO₂ with varying levels of H₂O

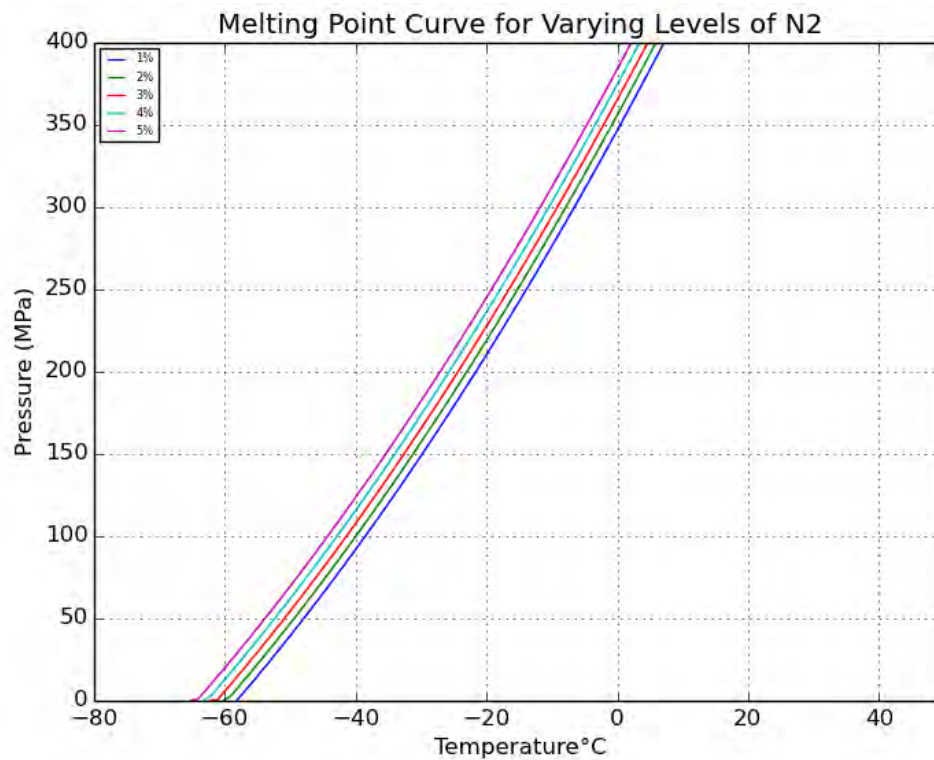


Figure A-22: Melting point curves of CO₂ with varying levels of N₂

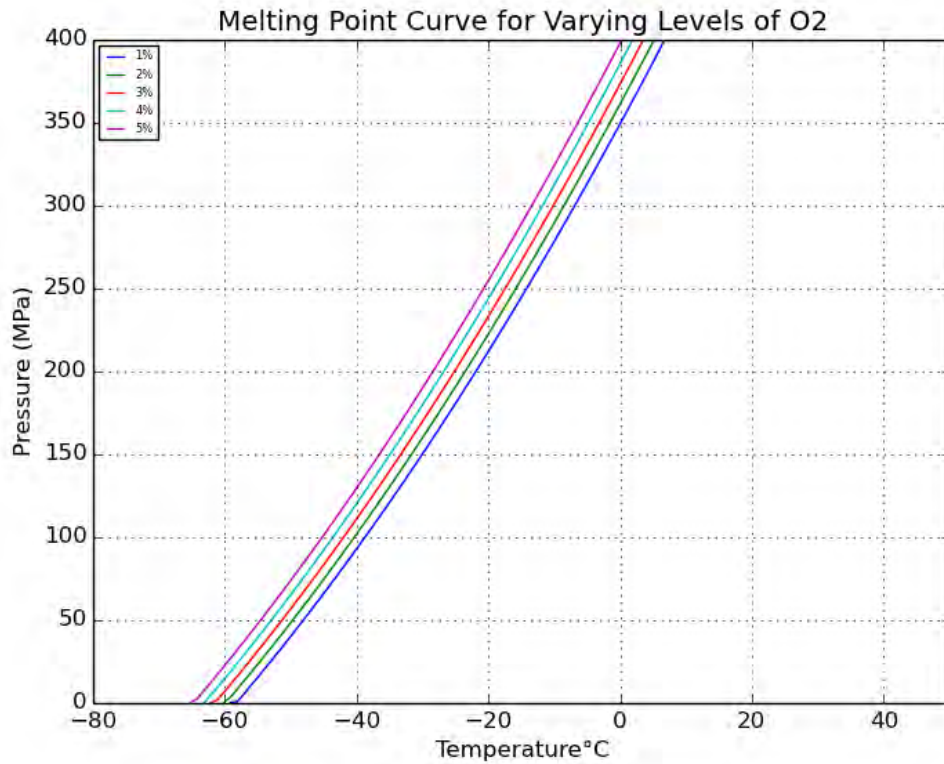


Figure A-23: Melting point curves of CO₂ with varying levels of O₂

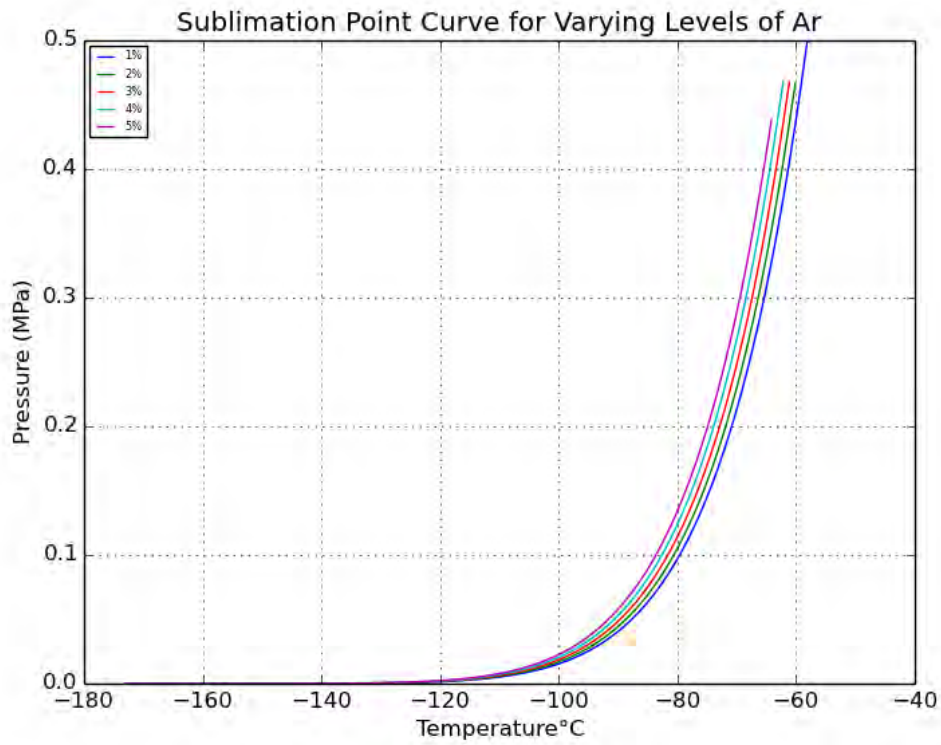


Figure A-24: Sublimation point curves of CO₂ with varying levels of Ar

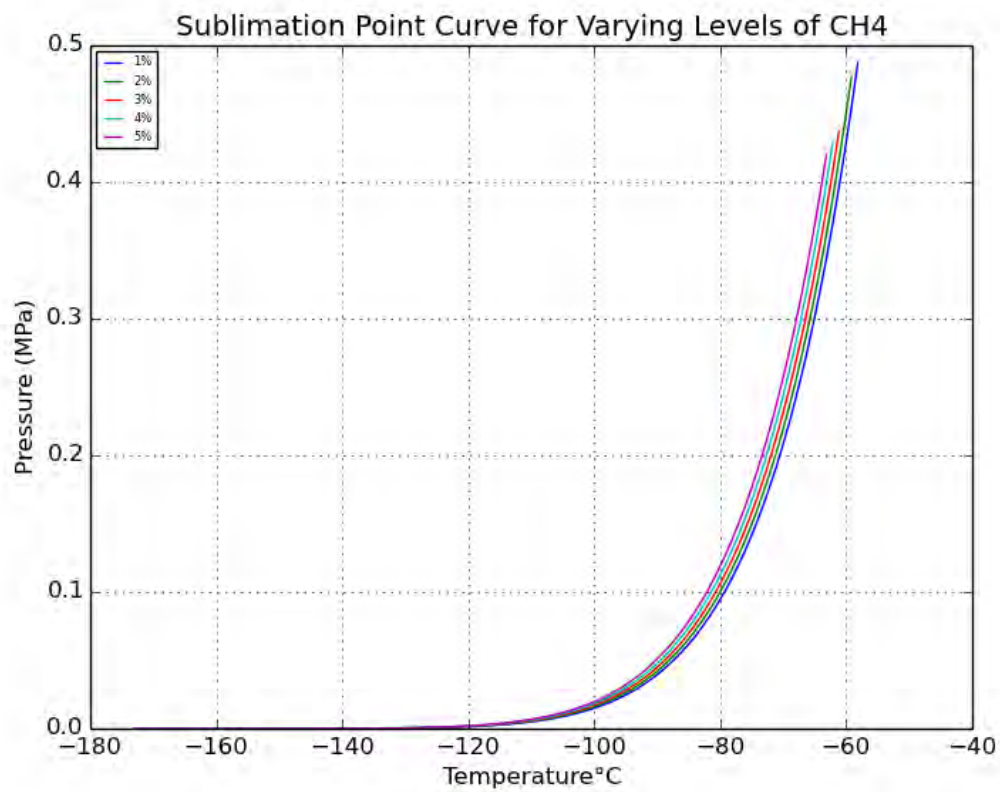


Figure A-25: Sublimation point curves of CO₂ with varying levels of CH₄

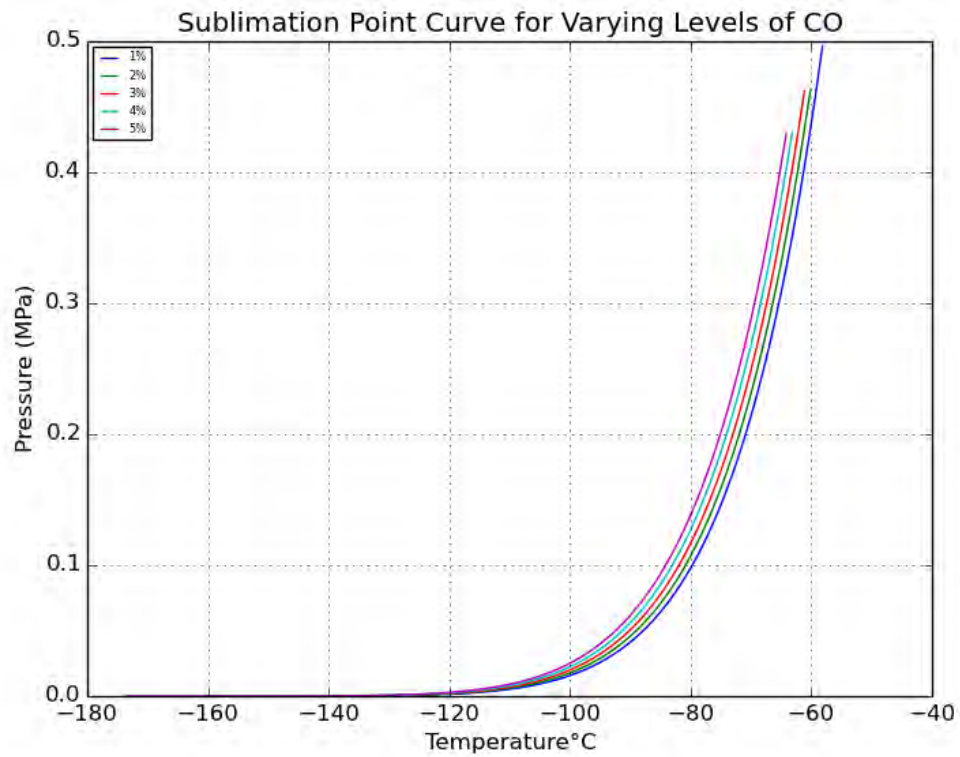


Figure A-26: Sublimation point curves of CO₂ with varying levels of CO

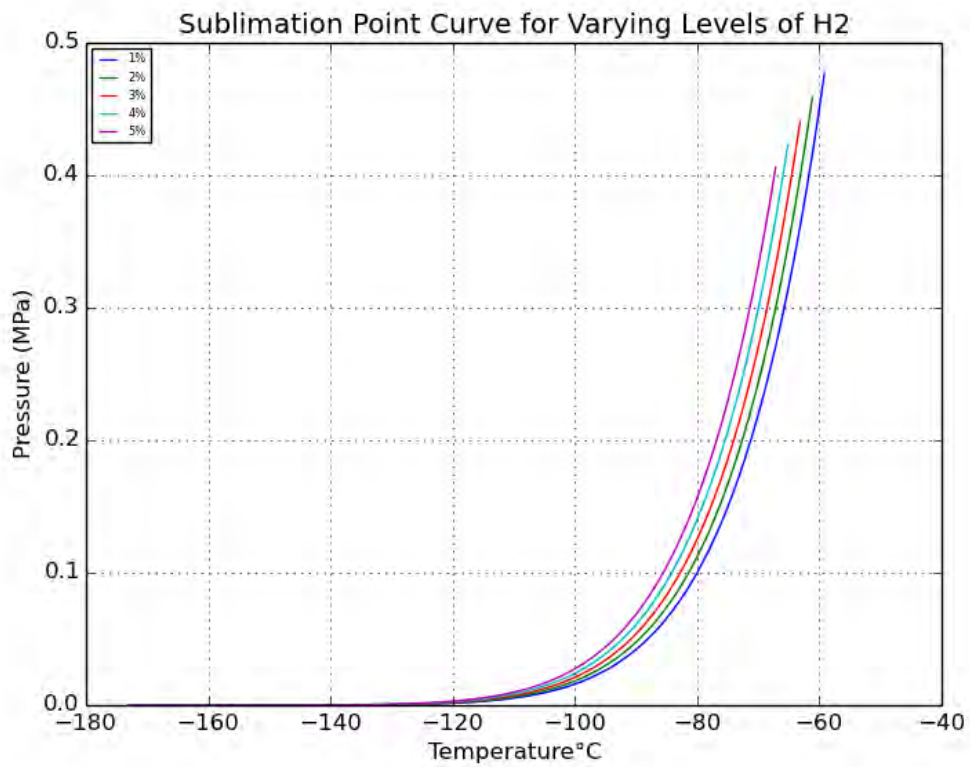


Figure A-27: Sublimation point curves of CO₂ with varying levels of H₂

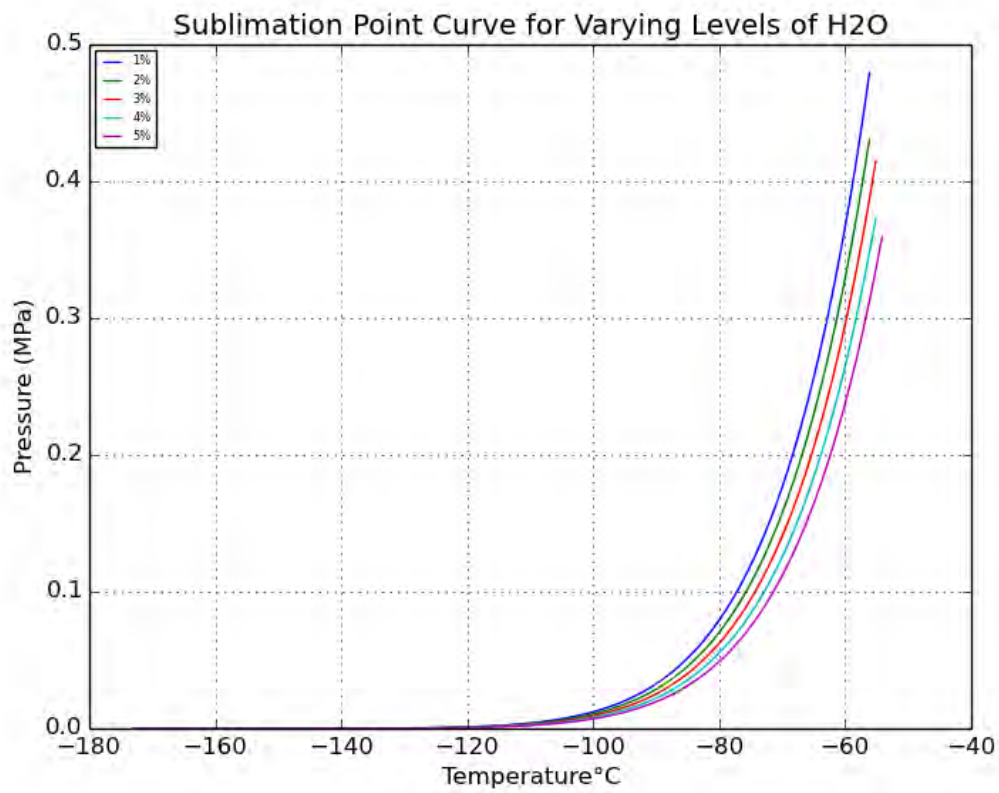


Figure A-28: Sublimation point curves of CO₂ with varying levels of H₂O

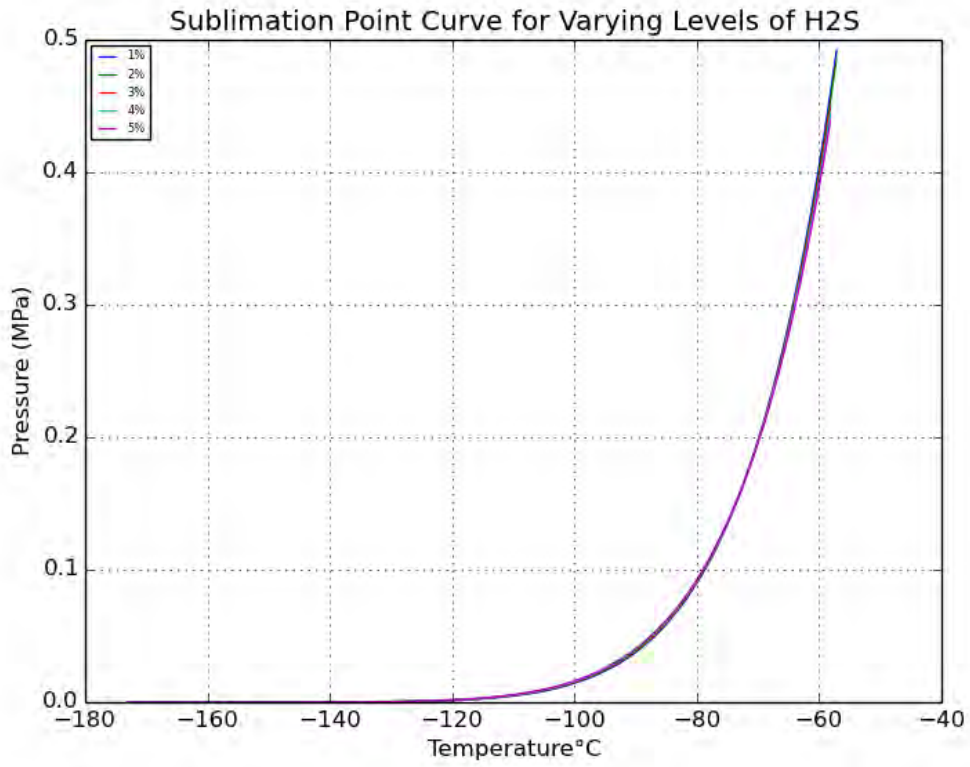


Figure A-29: Sublimation point curves of CO₂ with varying levels of H₂S

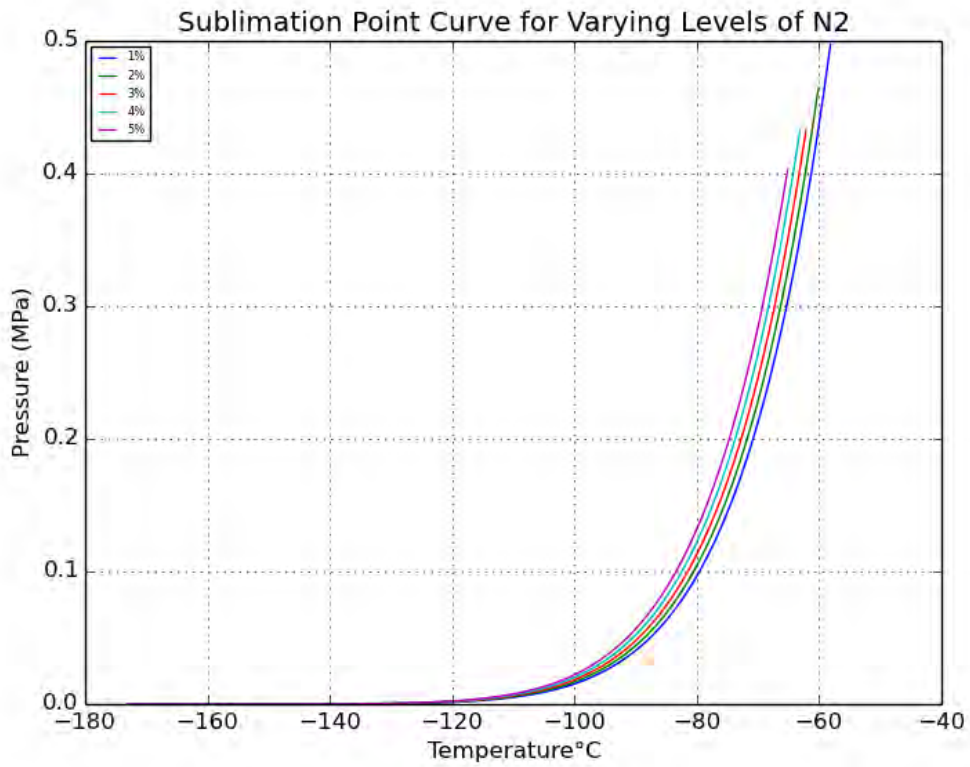


Figure A-30: Sublimation point curves of CO₂ with varying levels of N₂

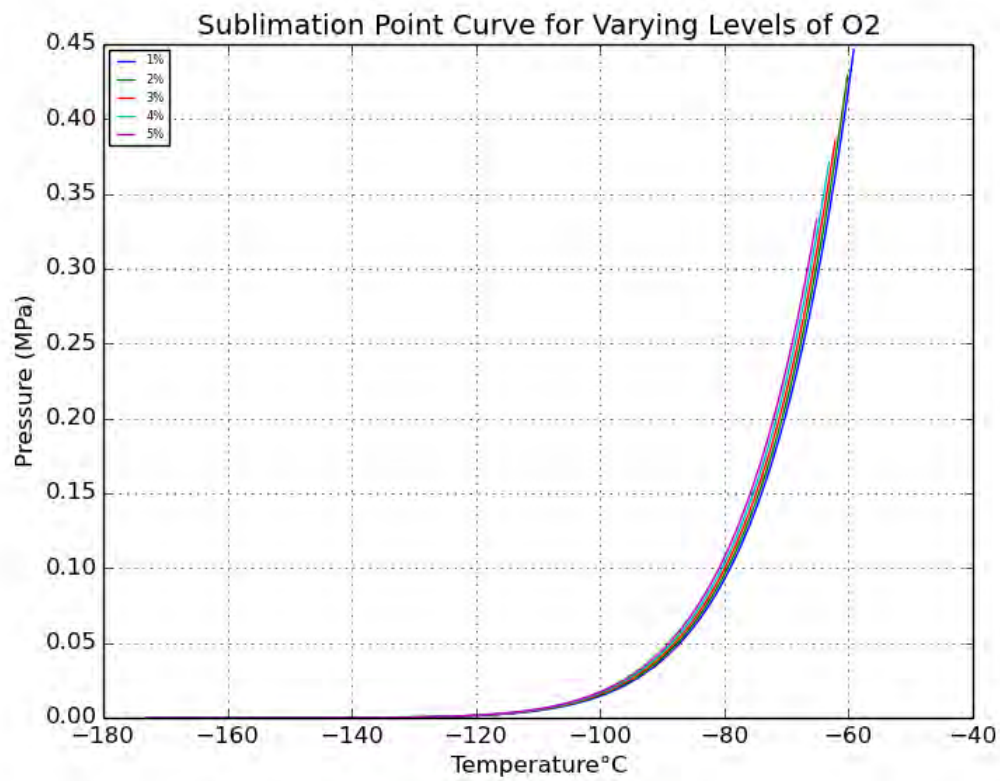


Figure A-31: Sublimation point curves of CO₂ with varying levels of O₂

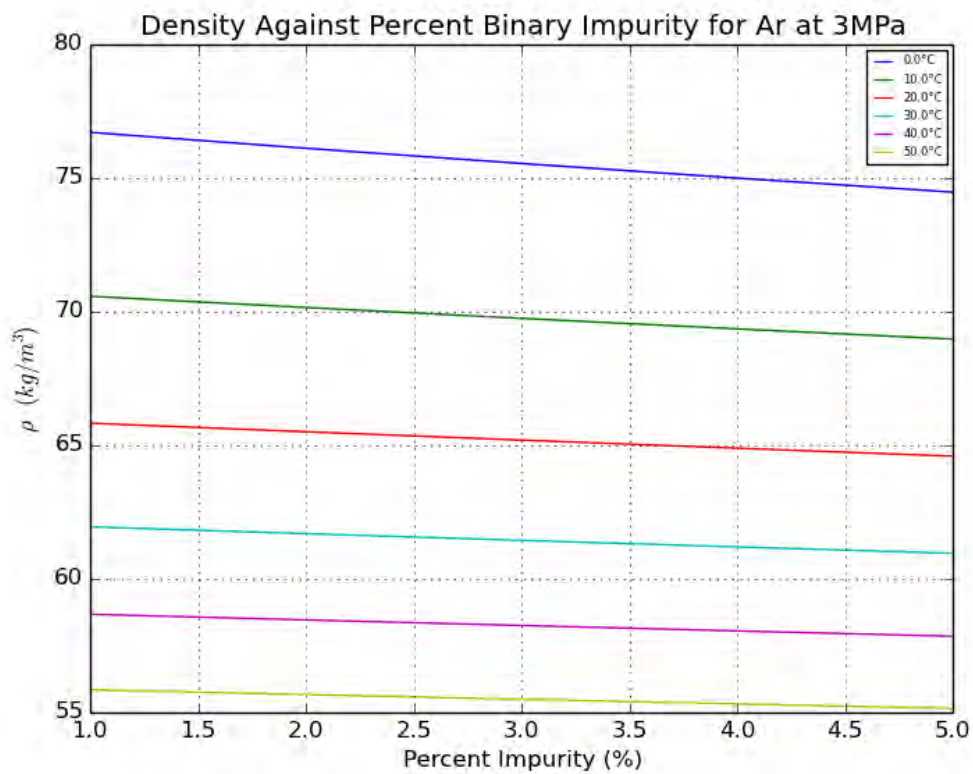


Figure A-32: Density of CO₂ with varying levels of Ar at 3MPa

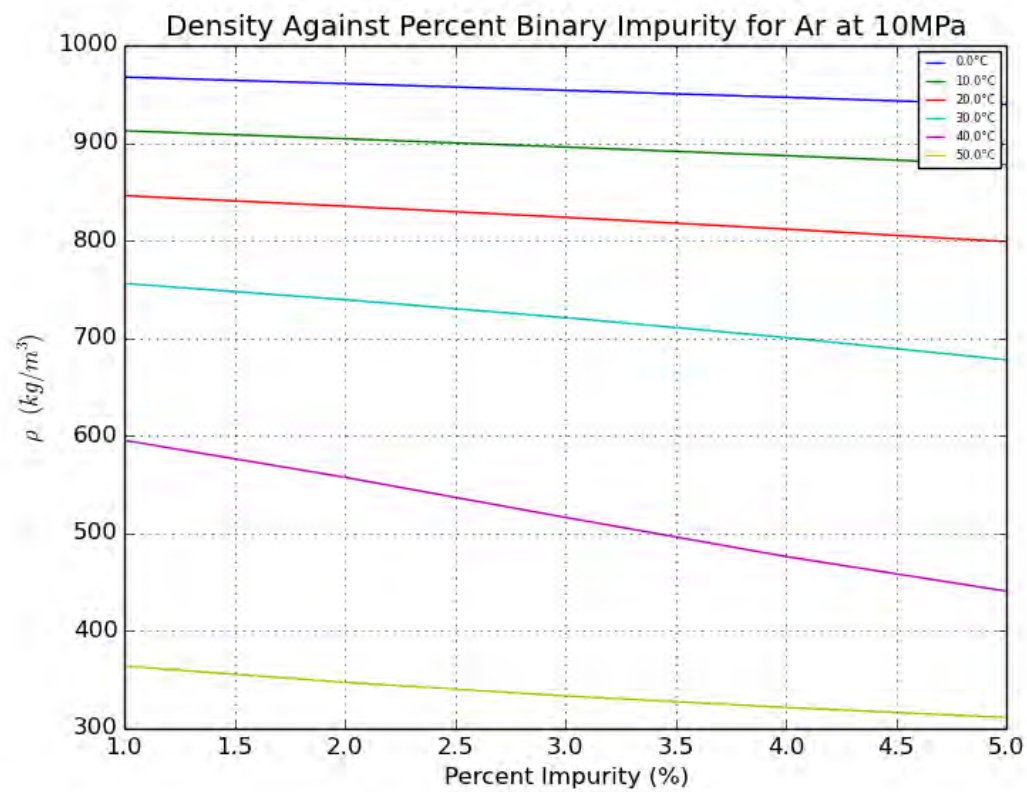


Figure A-33: Density of CO₂ with varying levels of Ar at 10MPa

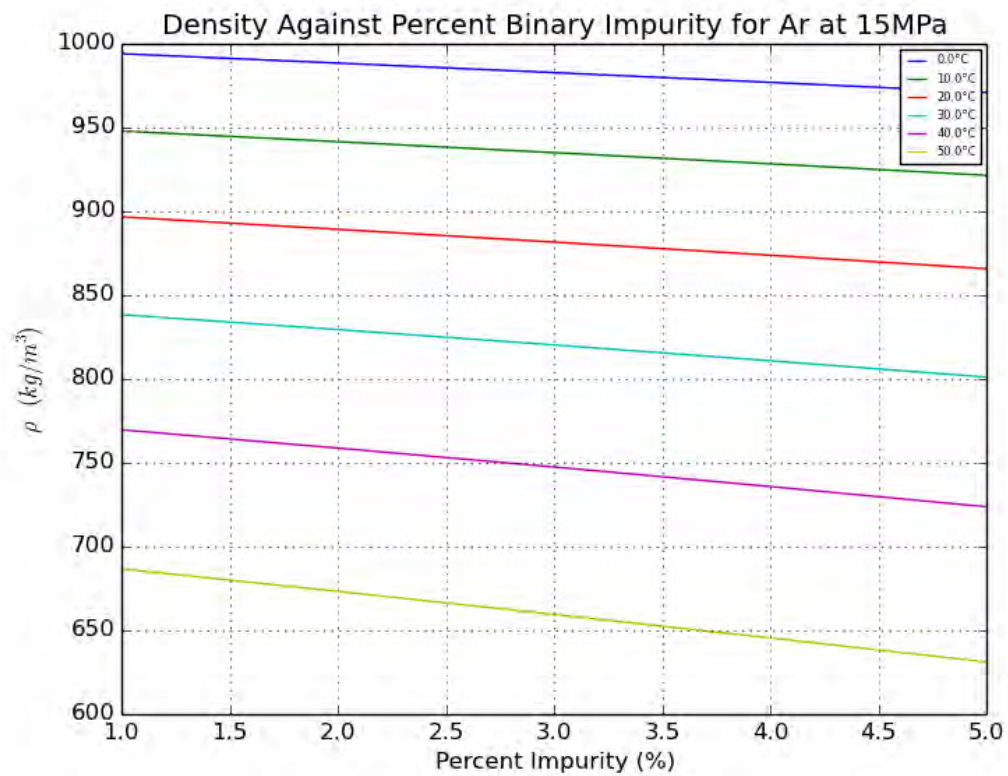


Figure A-34: Density of CO₂ with varying levels of Ar at 15MPa

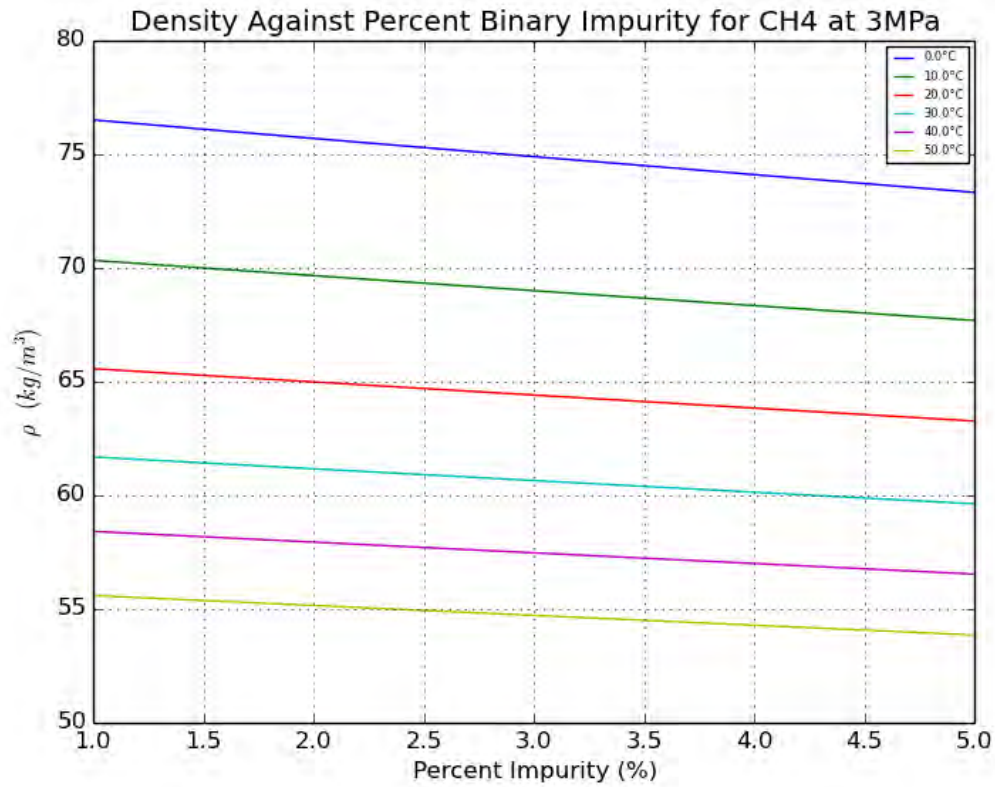


Figure A-35: Density of CO₂ with varying levels of CH₄ at 3MPa

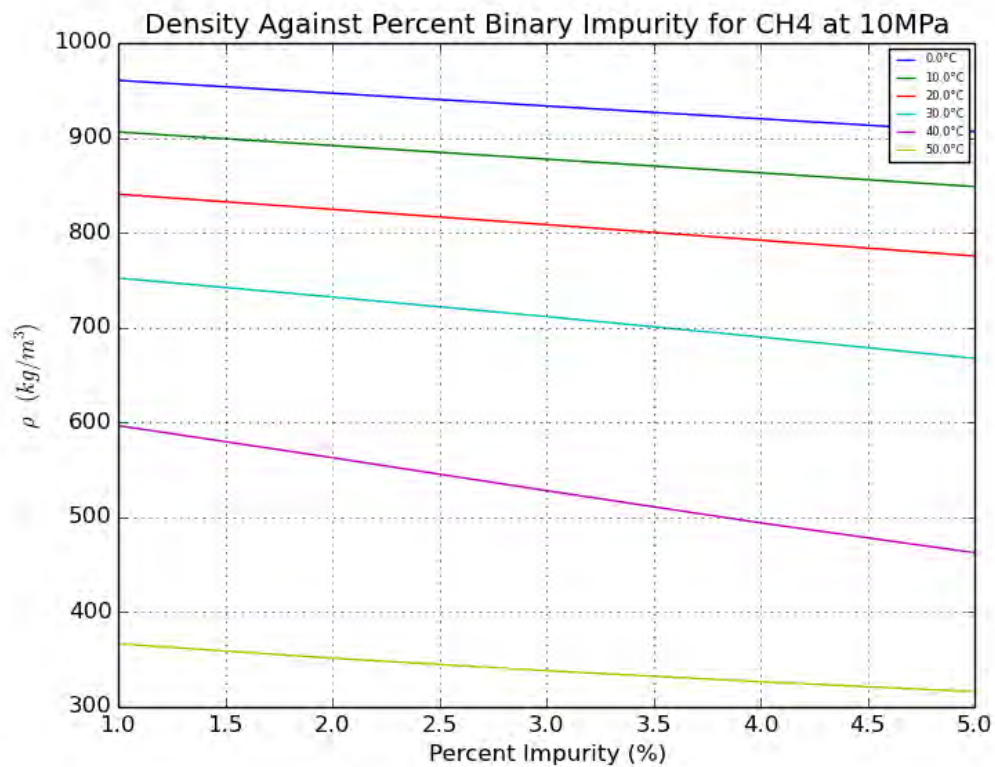


Figure A-36: Density of CO₂ with varying levels of CH₄ at 10MPa

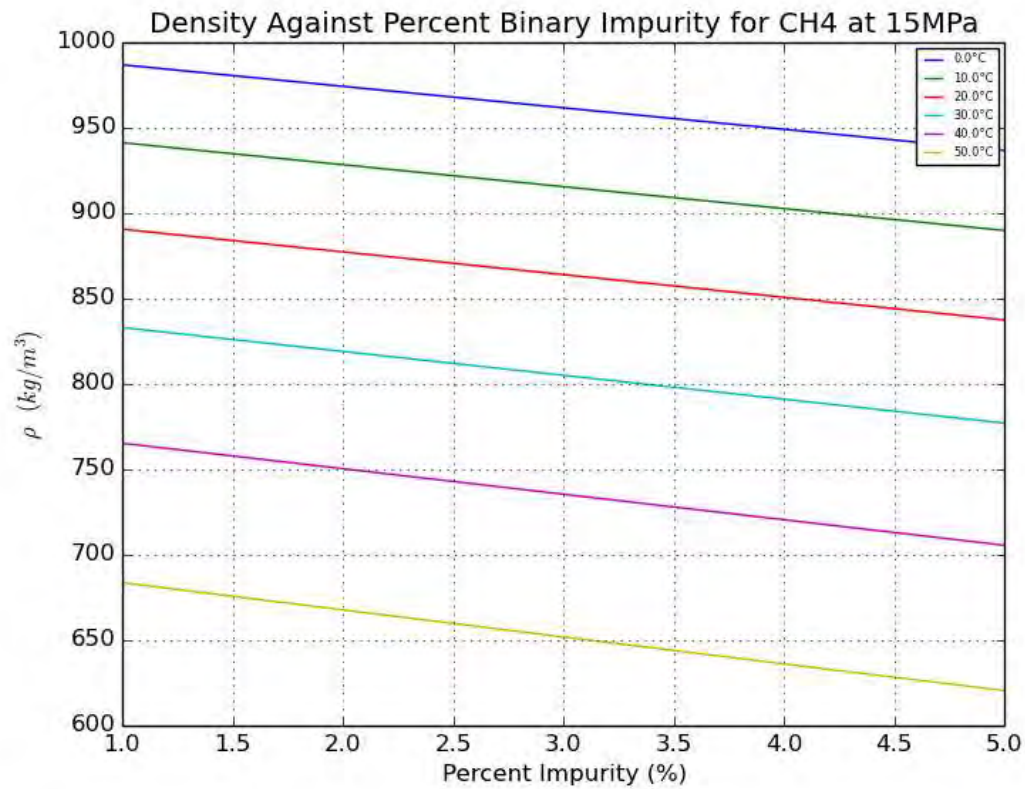


Figure A-37: Density of CO₂ with varying levels of CH₄ at 15MPa

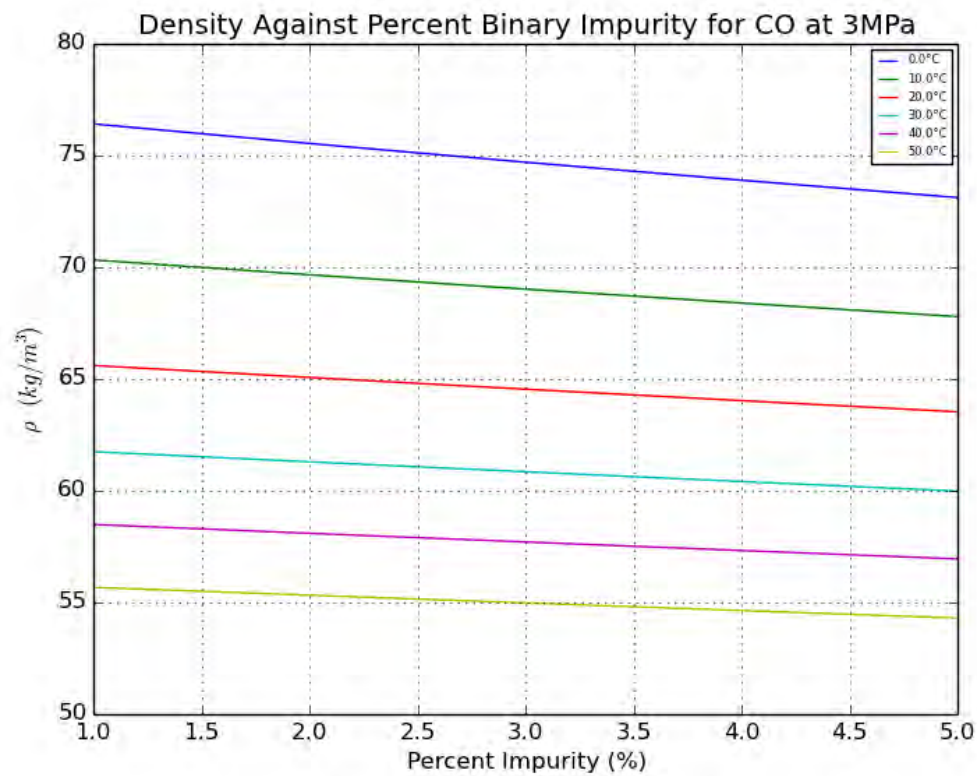


Figure A-38: Density of CO₂ with varying levels of CO at 3MPa

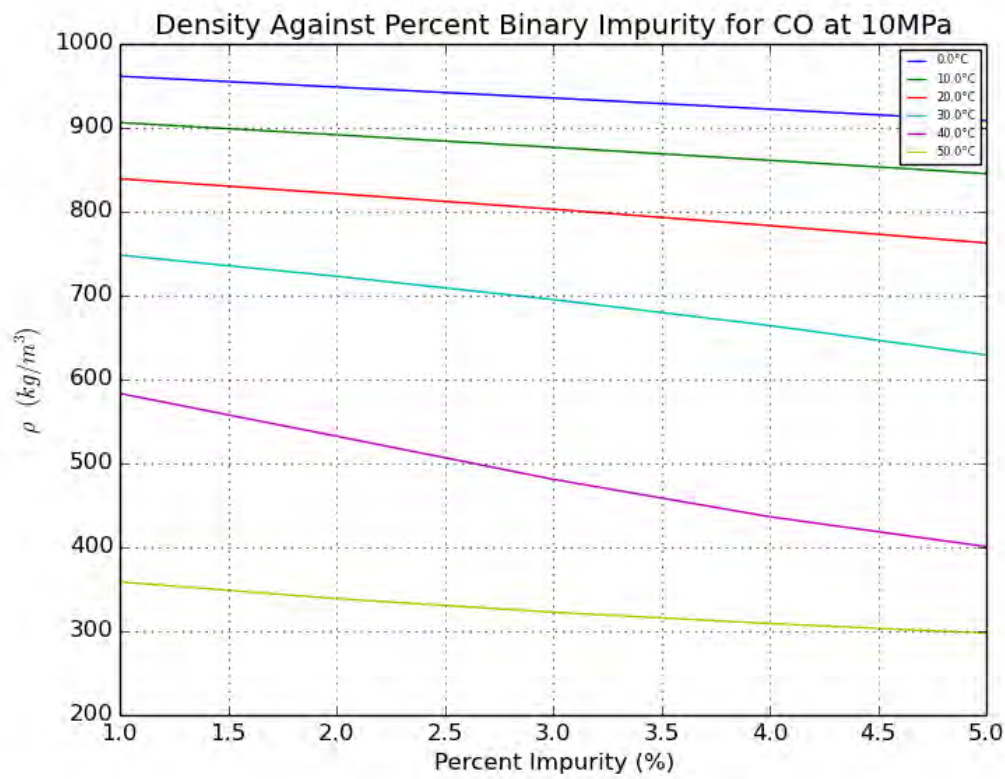


Figure A-39: Density of CO₂ with varying levels of CO at 10MPa

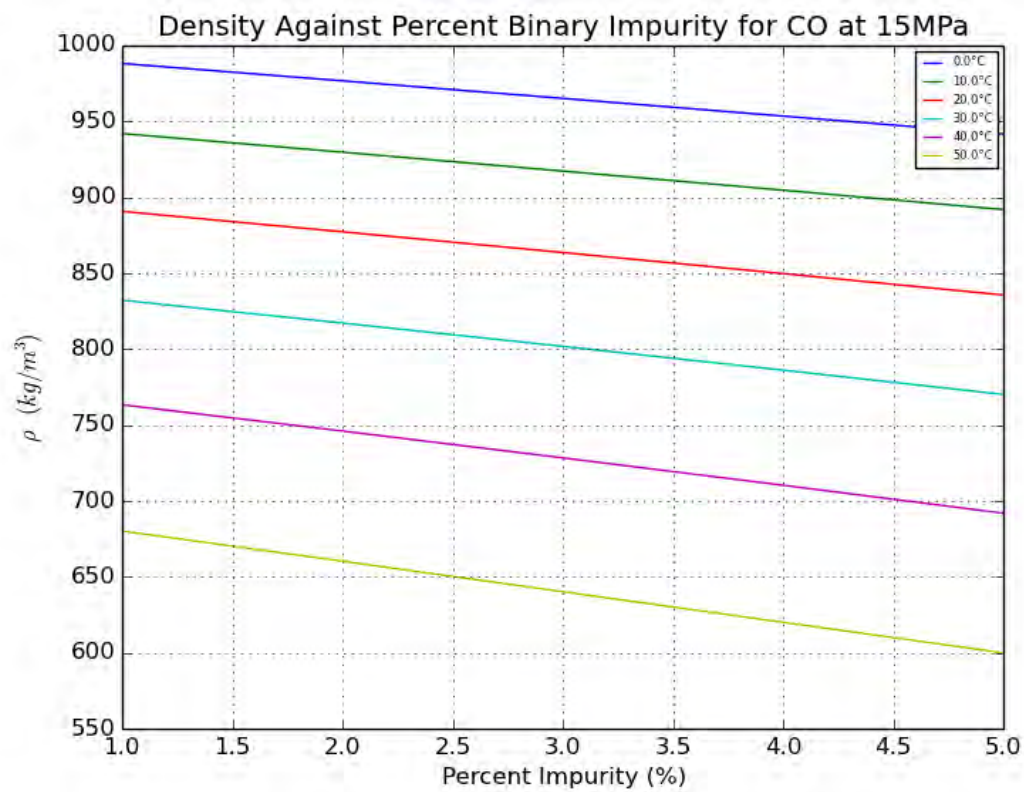


Figure A-40: Density of CO₂ with varying levels of CO at 15MPa

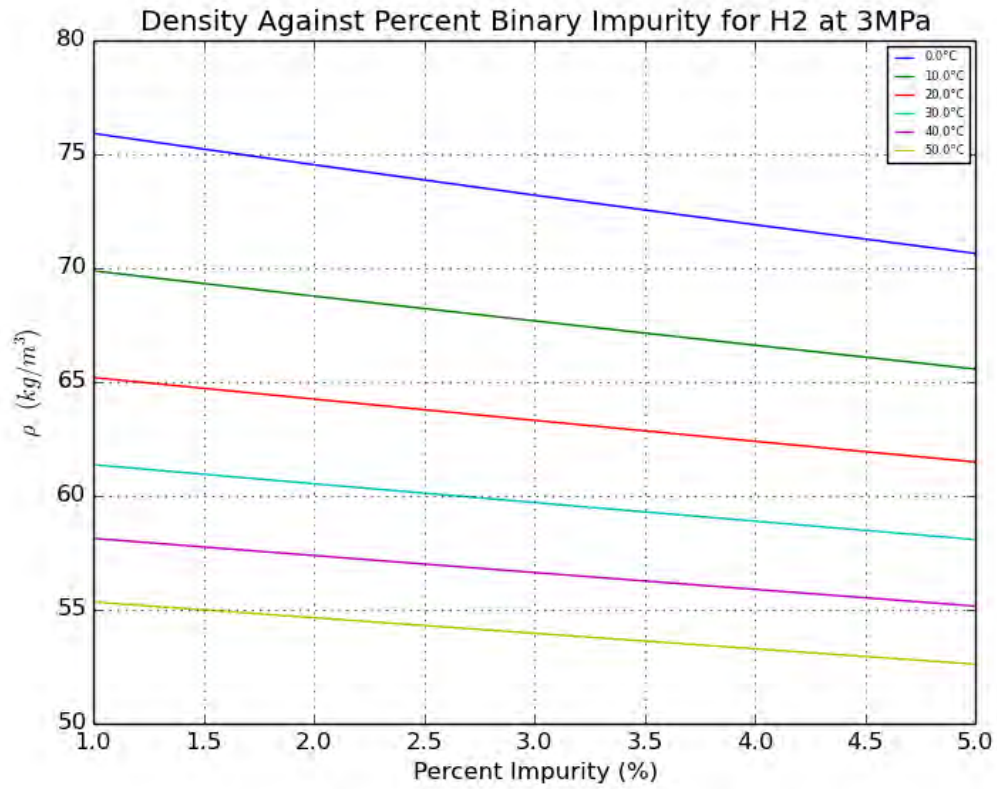


Figure A-41: Density of CO₂ with varying levels of H₂ at 3MPa

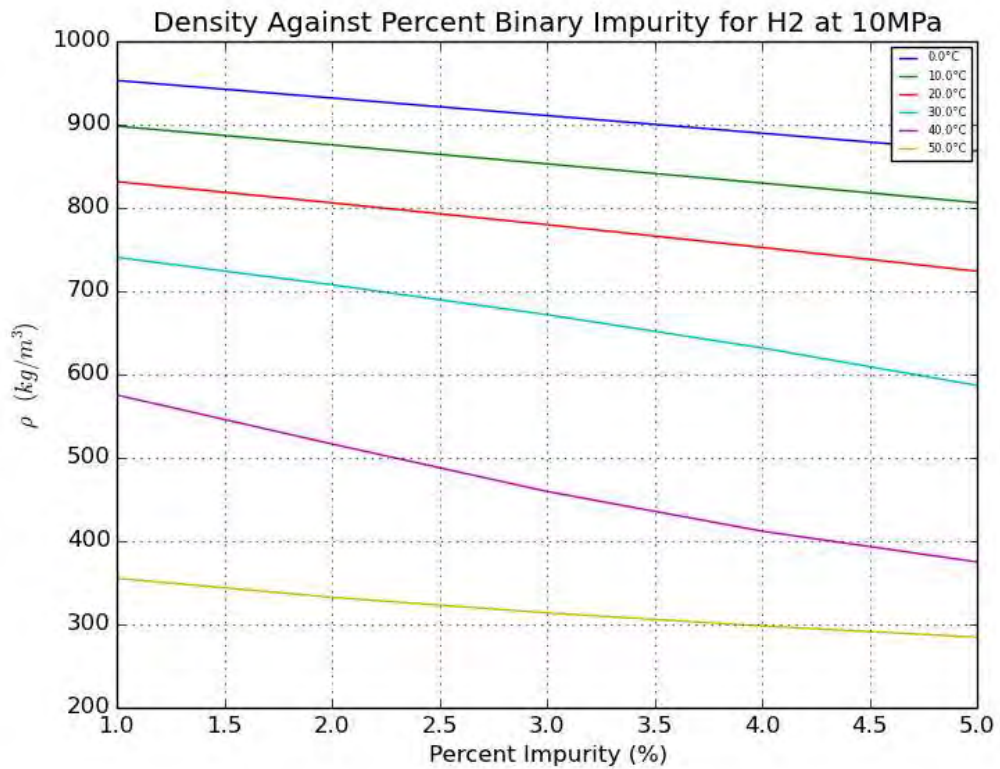


Figure A-42: Density of CO₂ with varying levels of H₂ at 10MPa

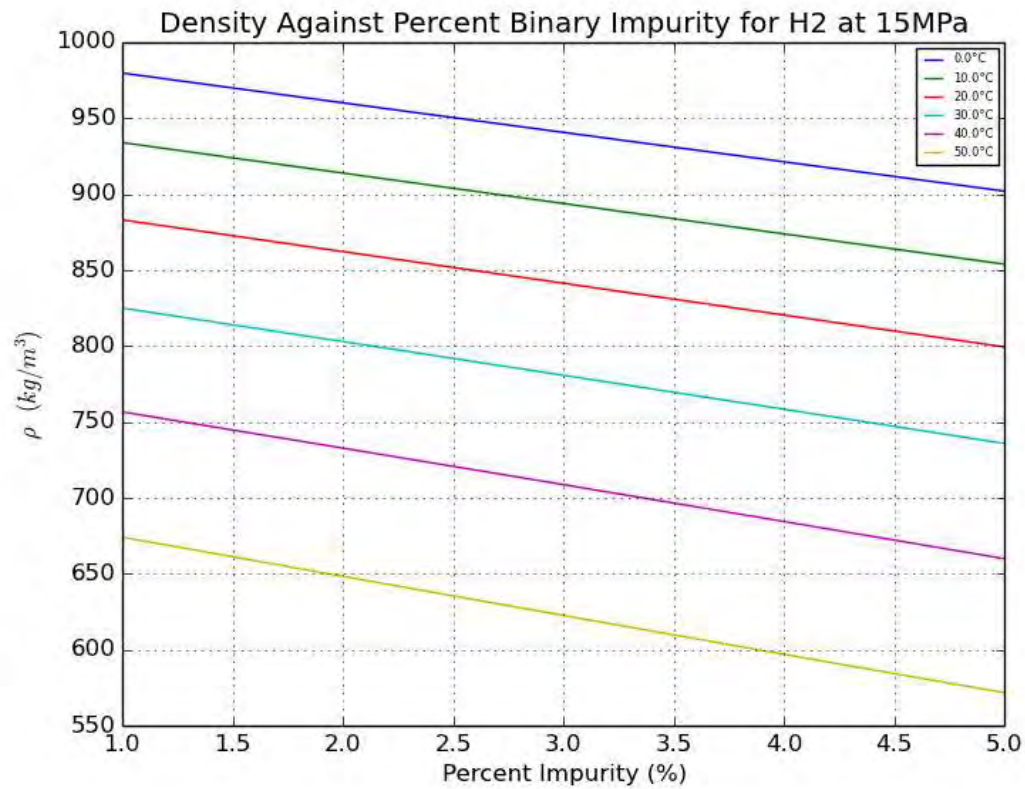


Figure A-43: Density of CO₂ with varying levels of H₂ at 15MPa

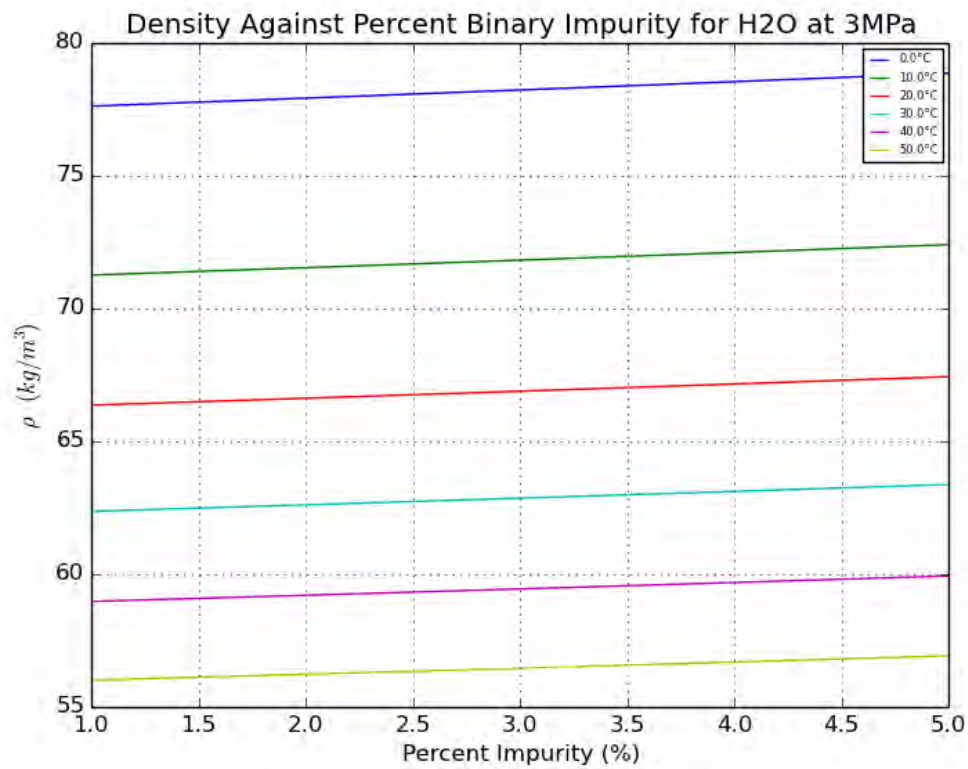


Figure A-44: Density of CO₂ with varying levels of H₂O at 3MPa

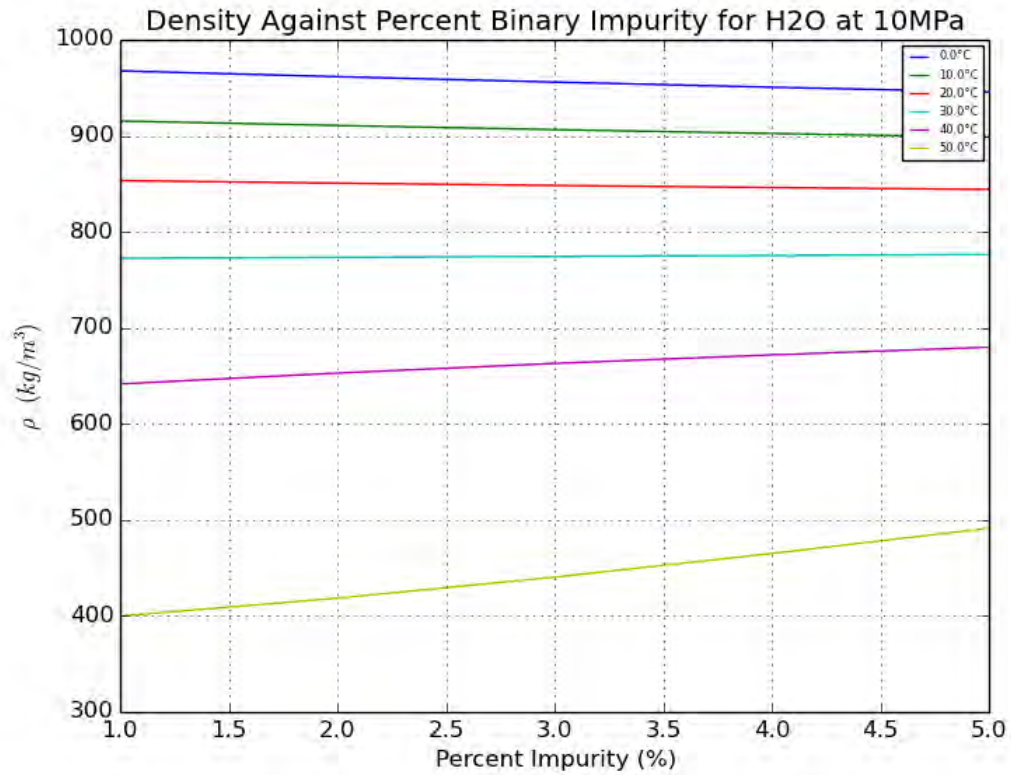


Figure A-45: Density of CO₂ with varying levels of H₂O at 10MPa

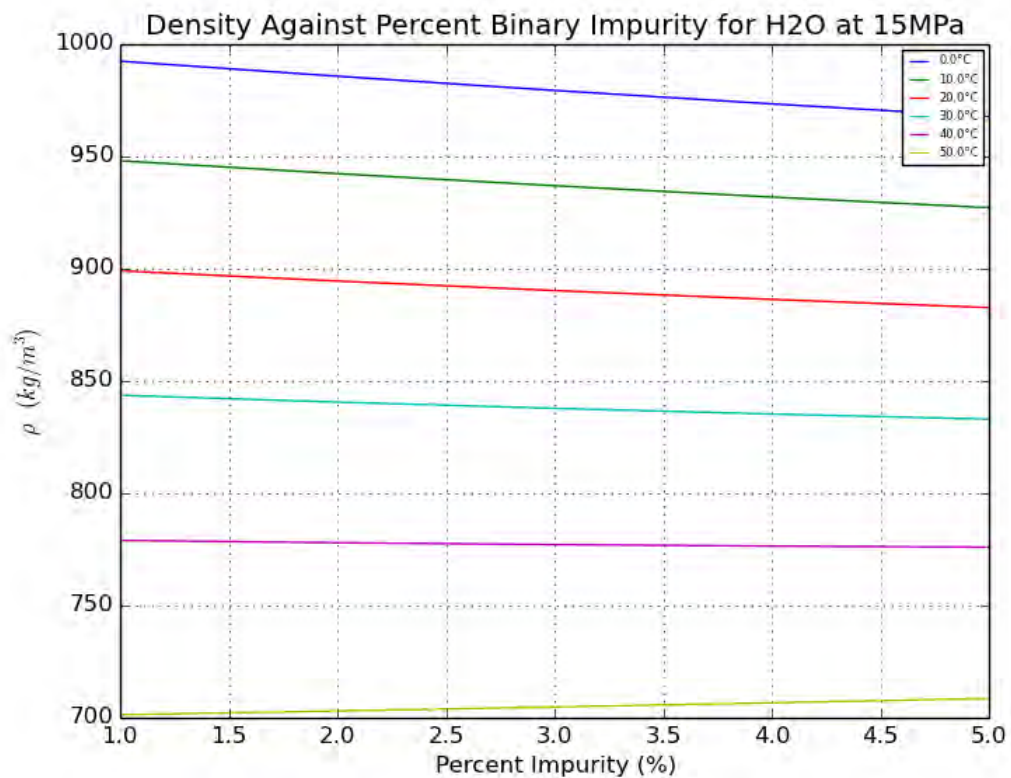


Figure A-46: Density of CO₂ with varying levels of H₂O at 15MPa

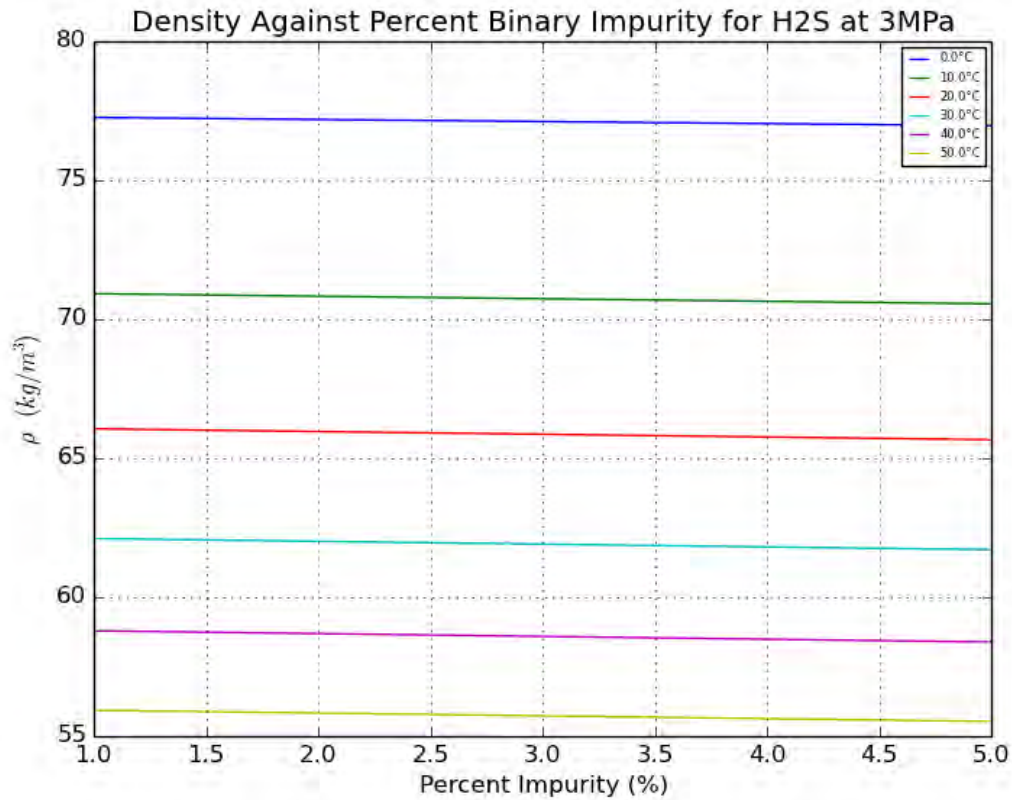


Figure A-47: Density of CO₂ with varying levels of H₂S at 3MPa

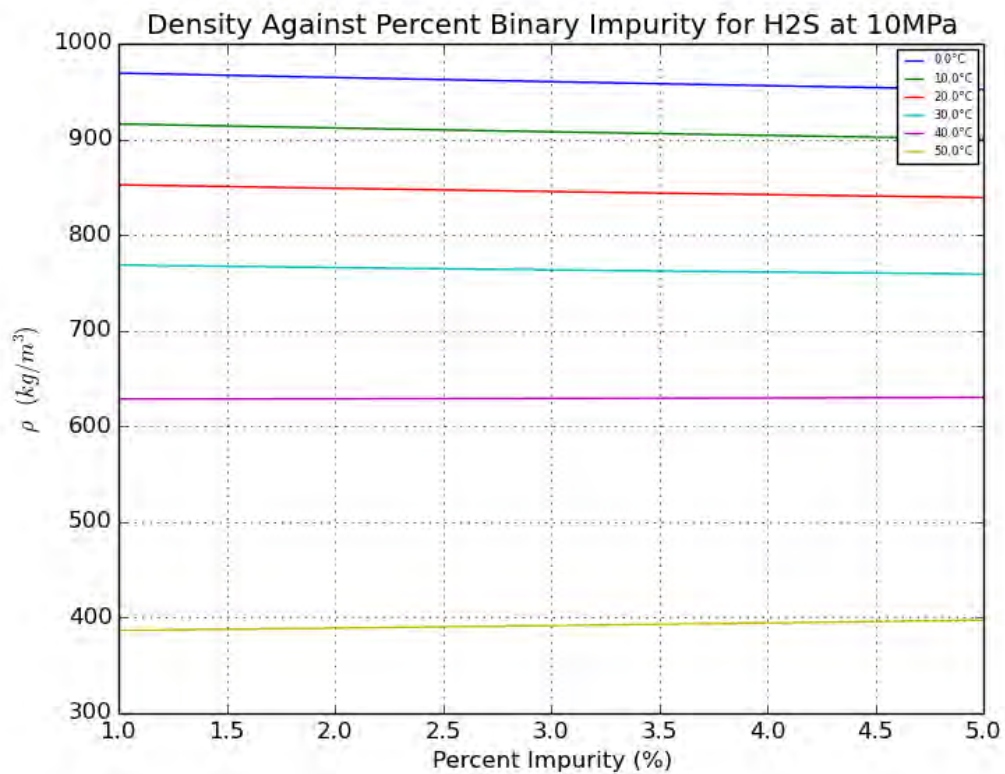


Figure A-48: Density of CO₂ with varying levels of H₂S at 10MPa

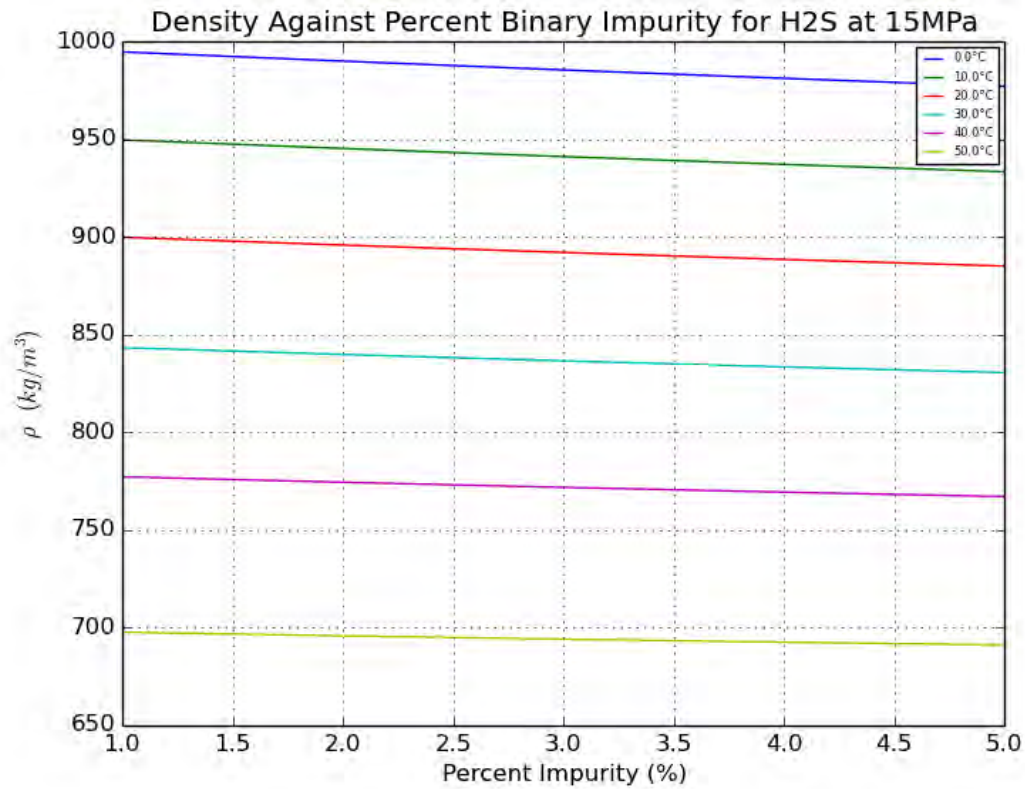


Figure A-49: Density of CO₂ with varying levels of H₂S at 15MPa

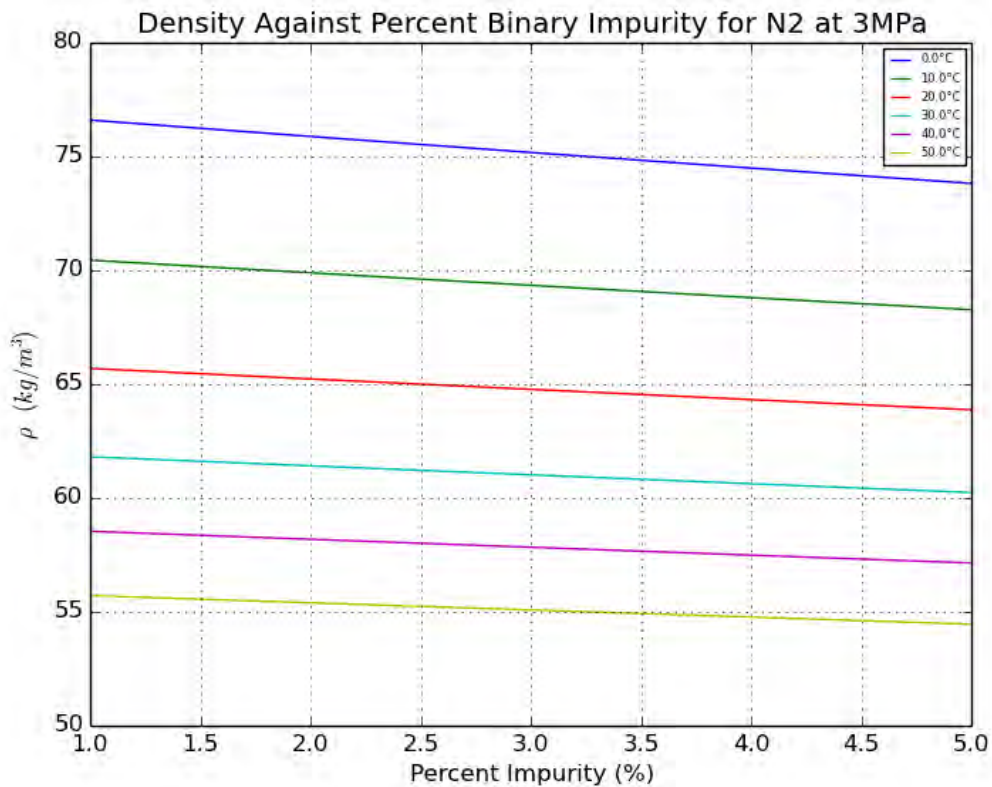


Figure A-50: Density of CO₂ with varying levels of N₂ at 3MPa

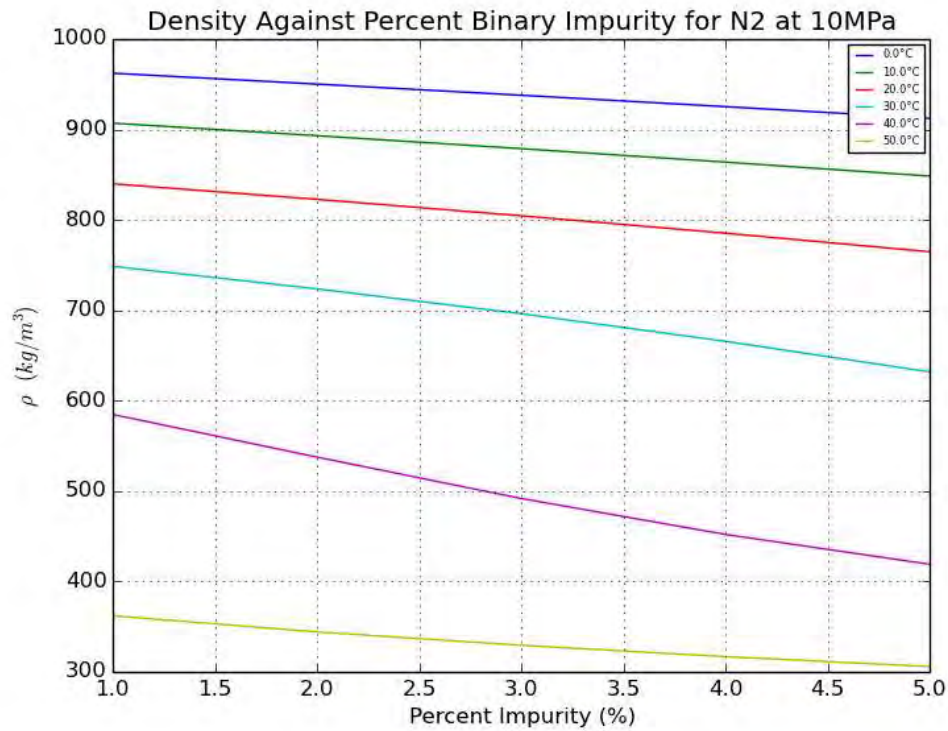


Figure A-51: Density of CO₂ with varying levels of N₂ at 10MPa

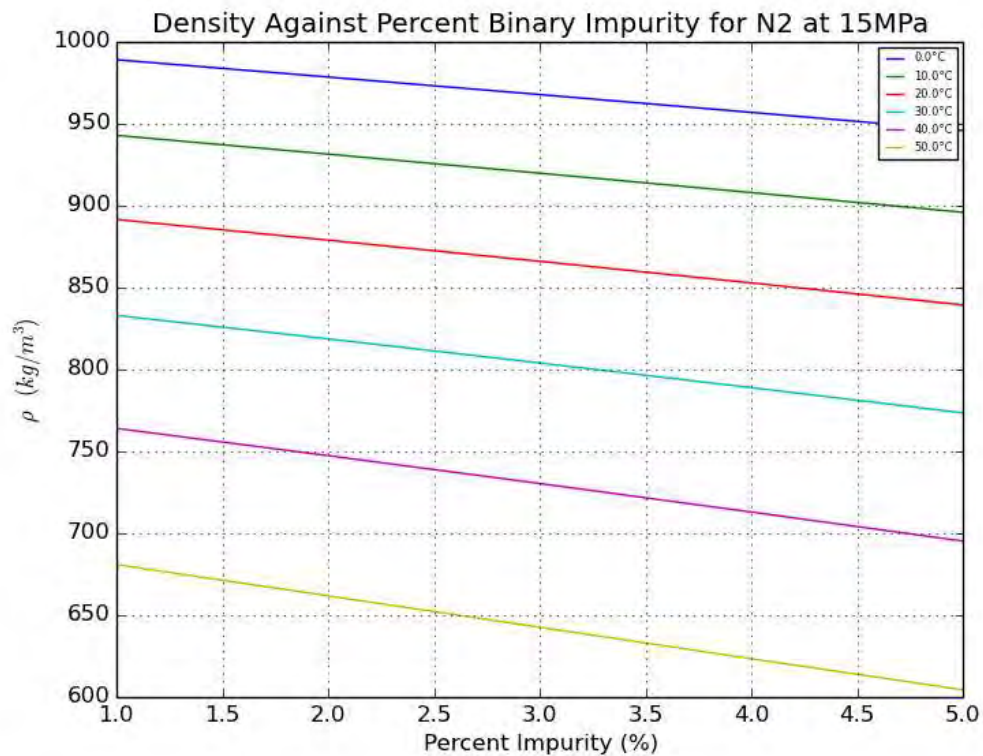


Figure A-52: Density of CO₂ with varying levels of N₂ at 15MPa

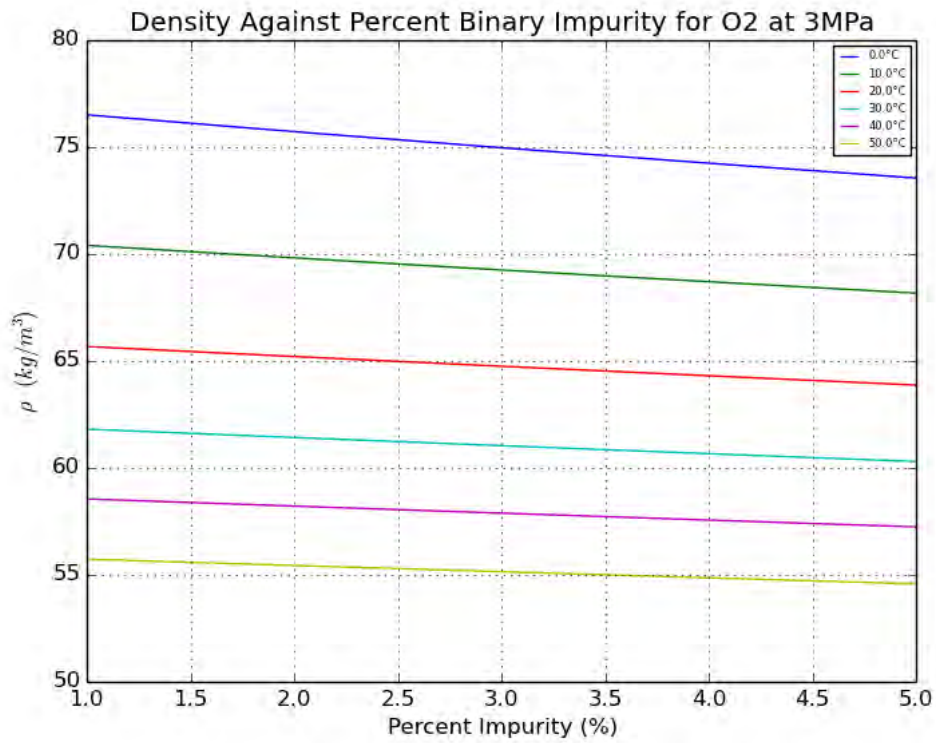


Figure A-53: Density of CO₂ with varying levels of O₂ at 3MPa

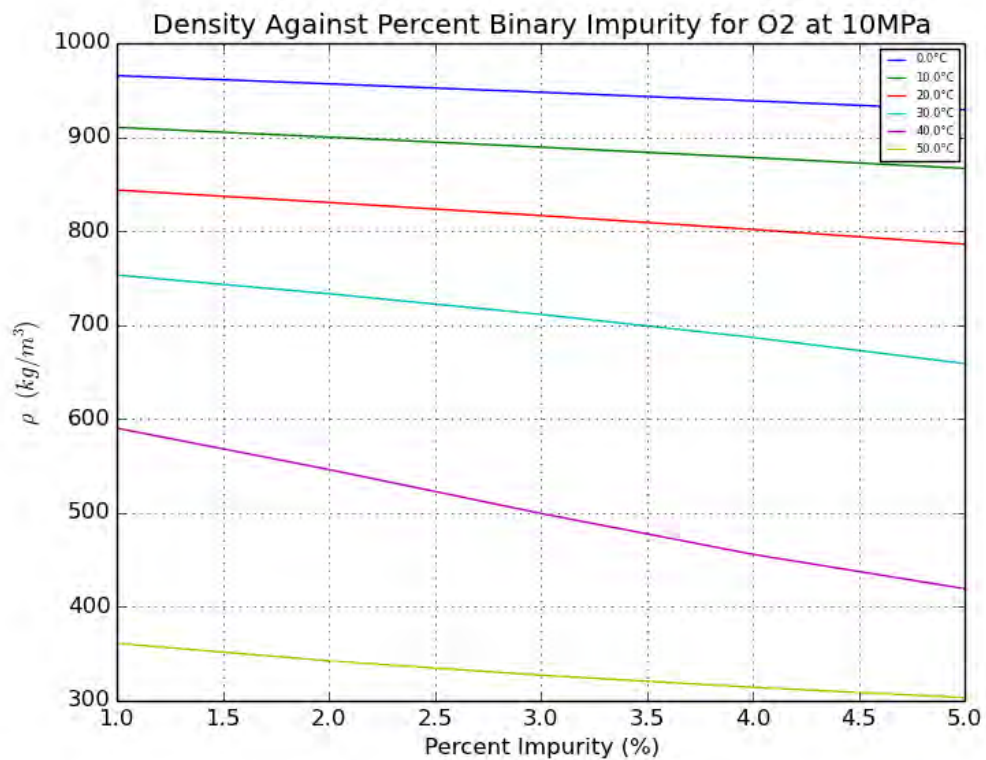


Figure A-54: Density of CO₂ with varying levels of O₂ at 10MPa

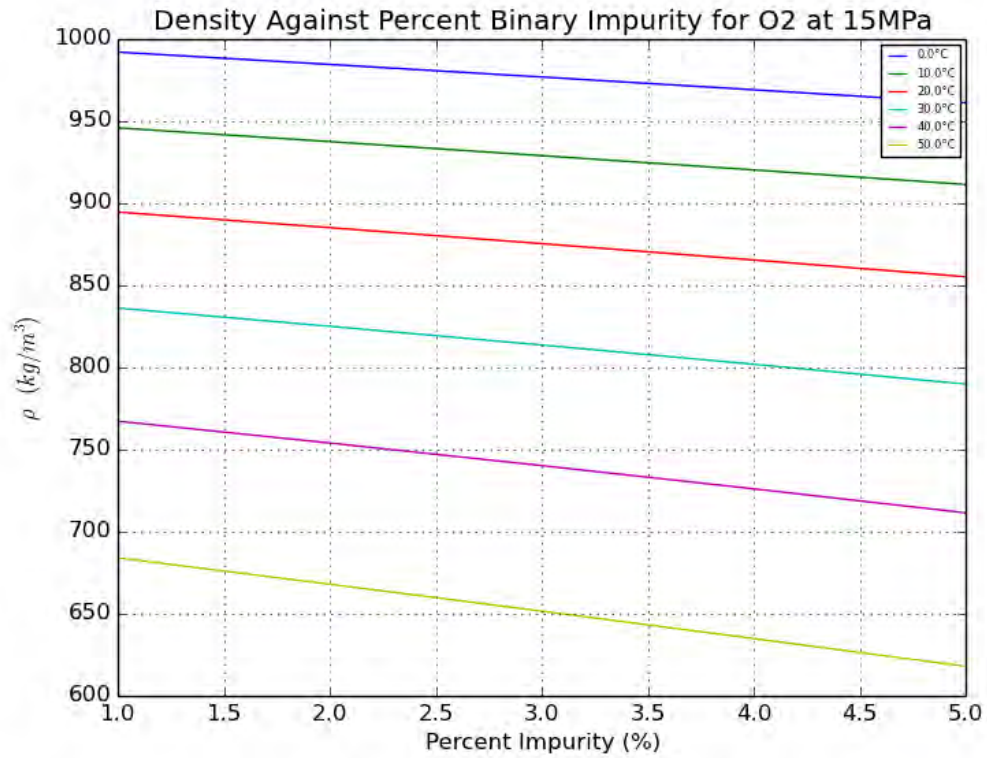


Figure A-55: Density of CO₂ with varying levels of O₂ at 15MPa

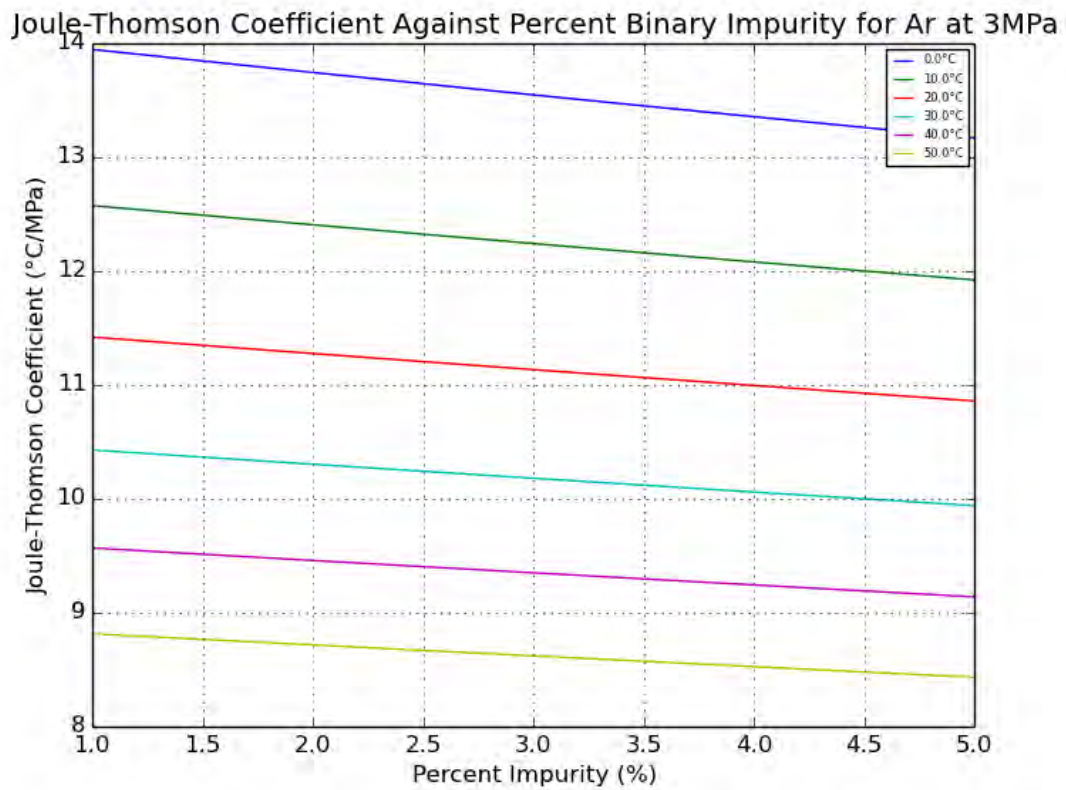


Figure A-56: Joule Thomson coefficient of CO₂ with varying levels of Ar at 3MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for Ar at 10MPa

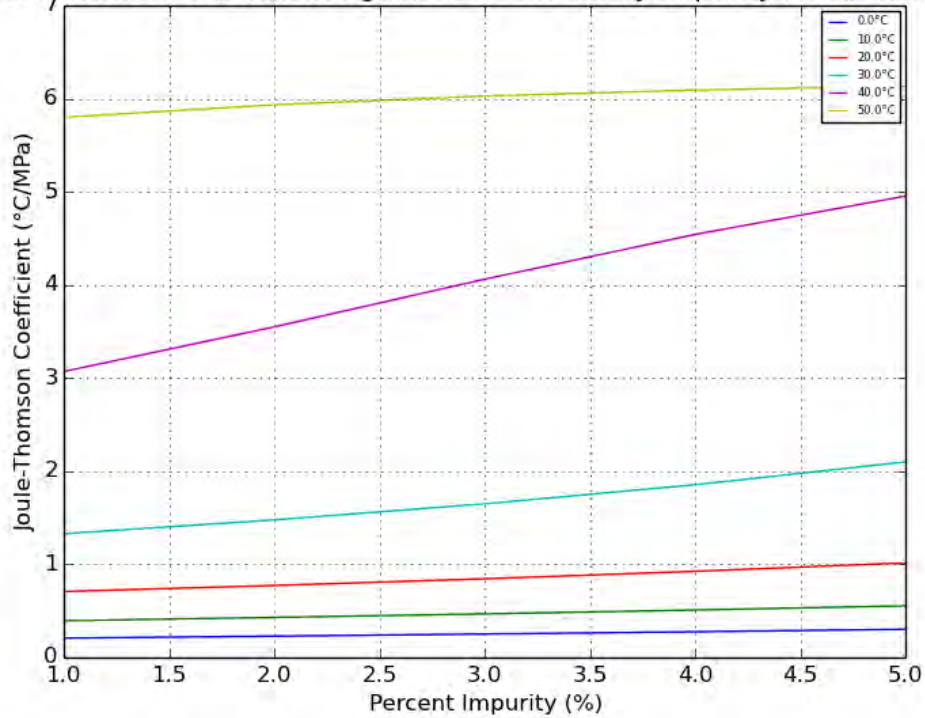


Figure A-57: Joule Thomson coefficient of CO₂ with varying levels of Ar at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for Ar at 15MPa

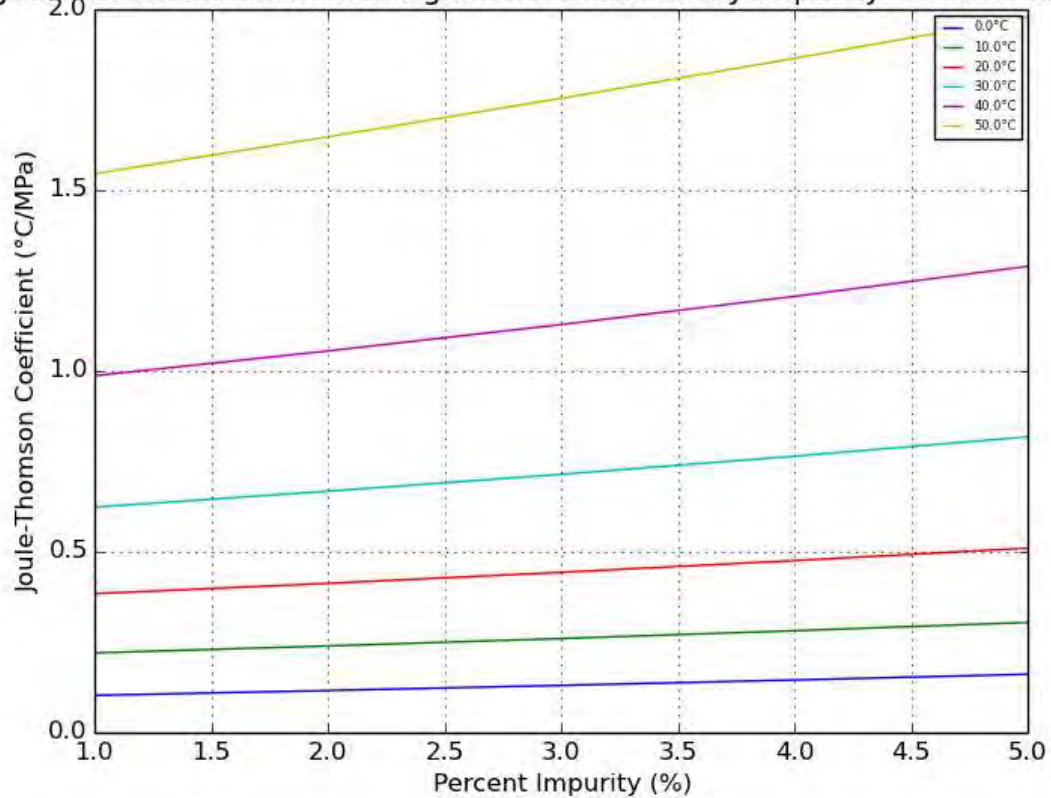


Figure A-58: Joule Thomson coefficient of CO₂ with varying levels of Ar at 15MPa

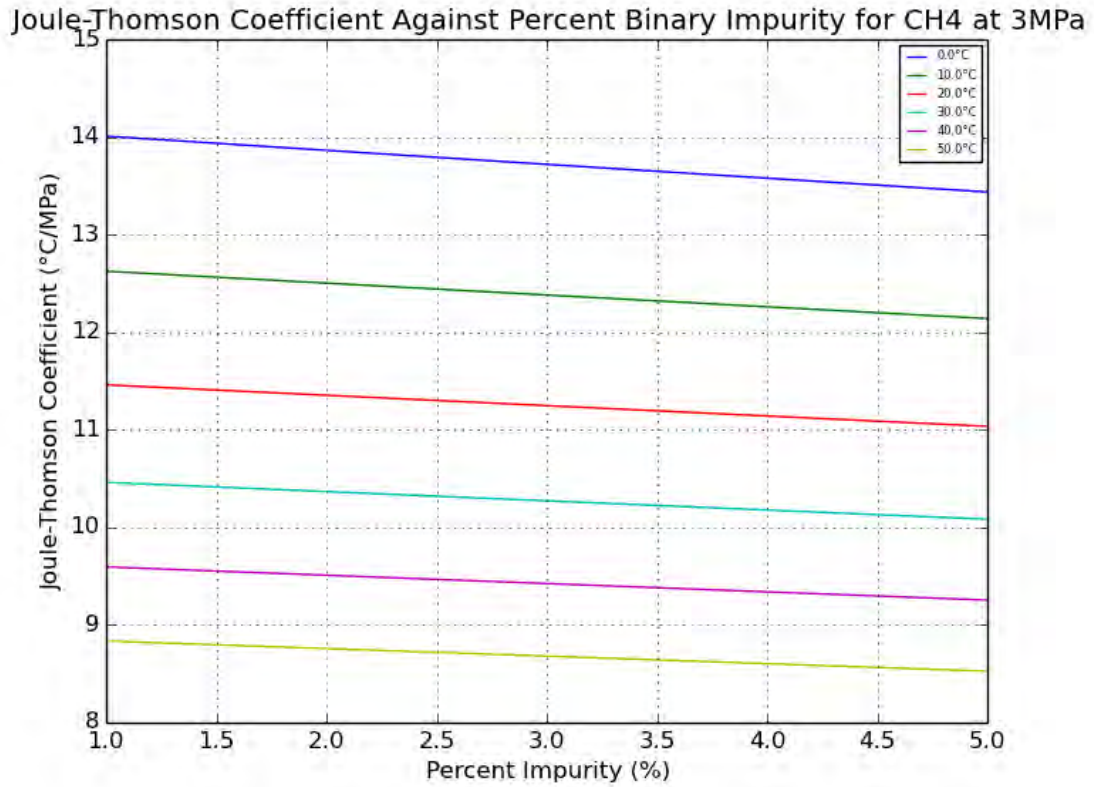


Figure A-59: Joule Thomson coefficient of CO₂ with varying levels of CH₄ at 3MPa

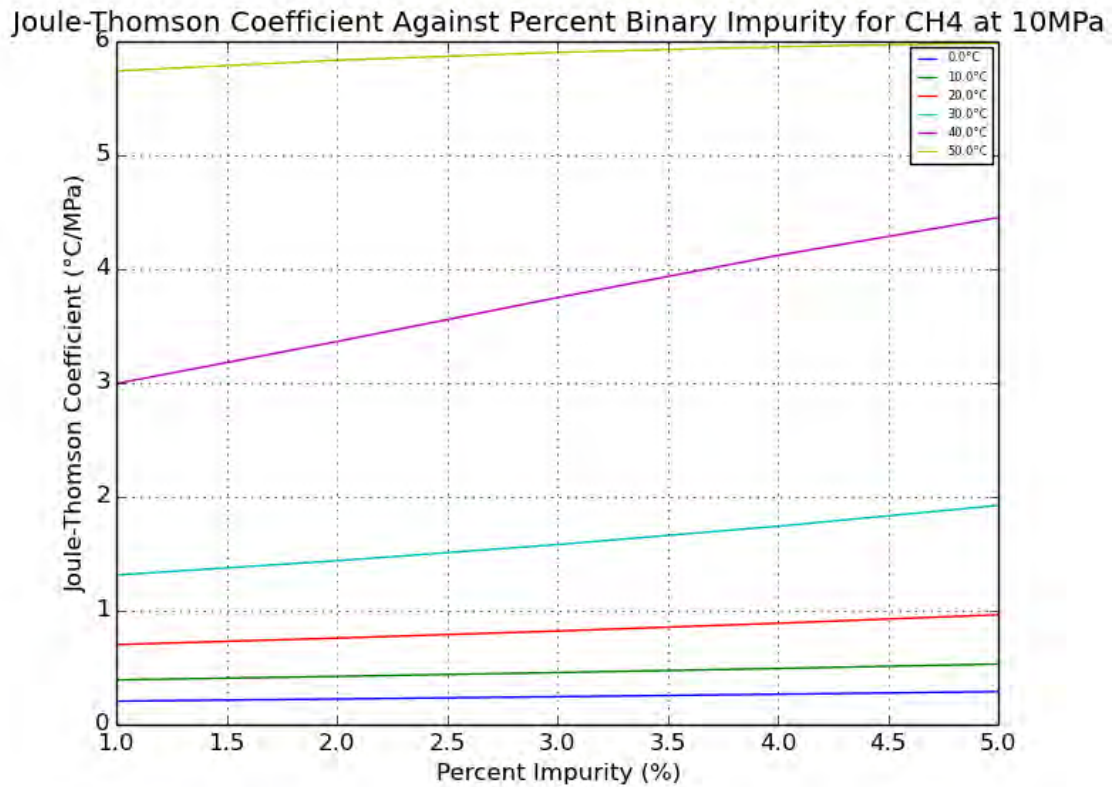


Figure A-60: Joule Thomson coefficient of CO₂ with varying levels of CH₄ at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for CH₄ at 15MPa

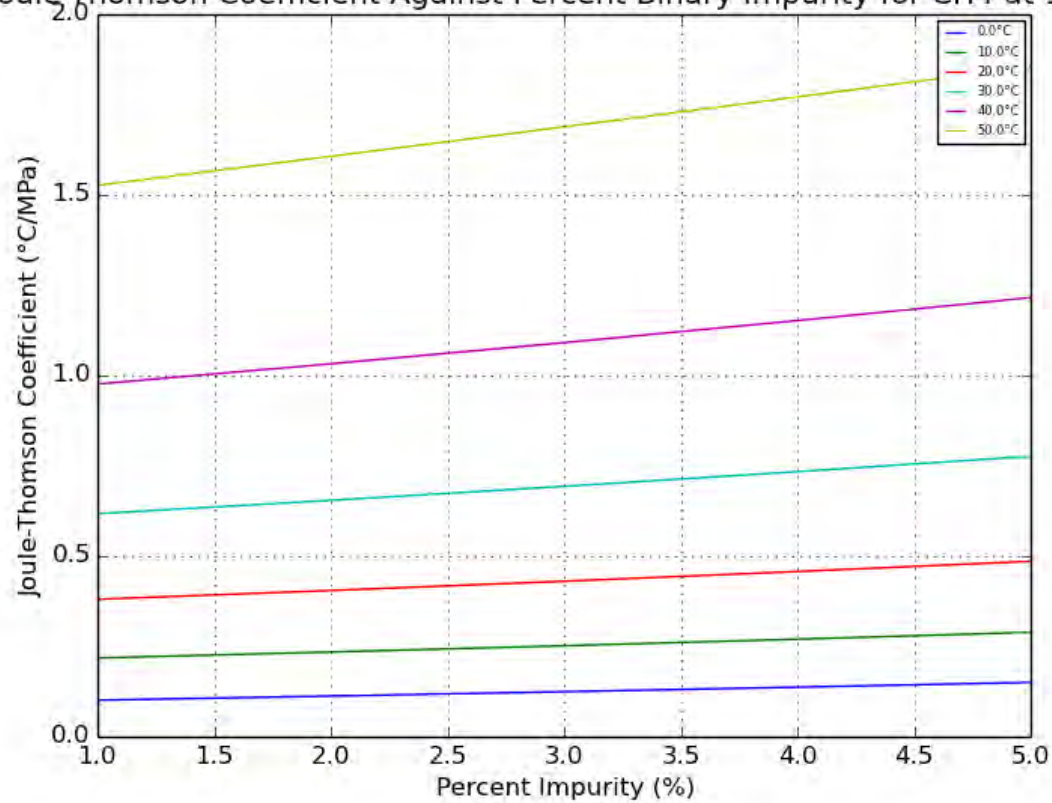


Figure A-61: Joule Thomson coefficient of CO₂ with varying levels of CH₄ at 15MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for CO at 3MPa

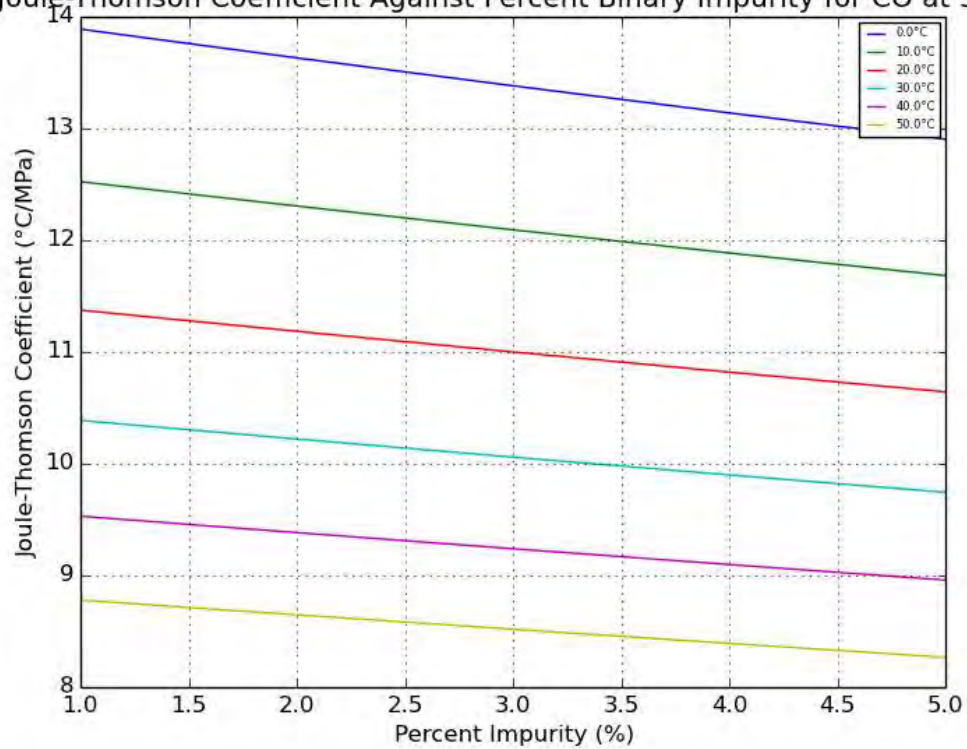


Figure A-62: Joule Thomson coefficient of CO₂ with varying levels of CO at 3MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for CO at 10MPa

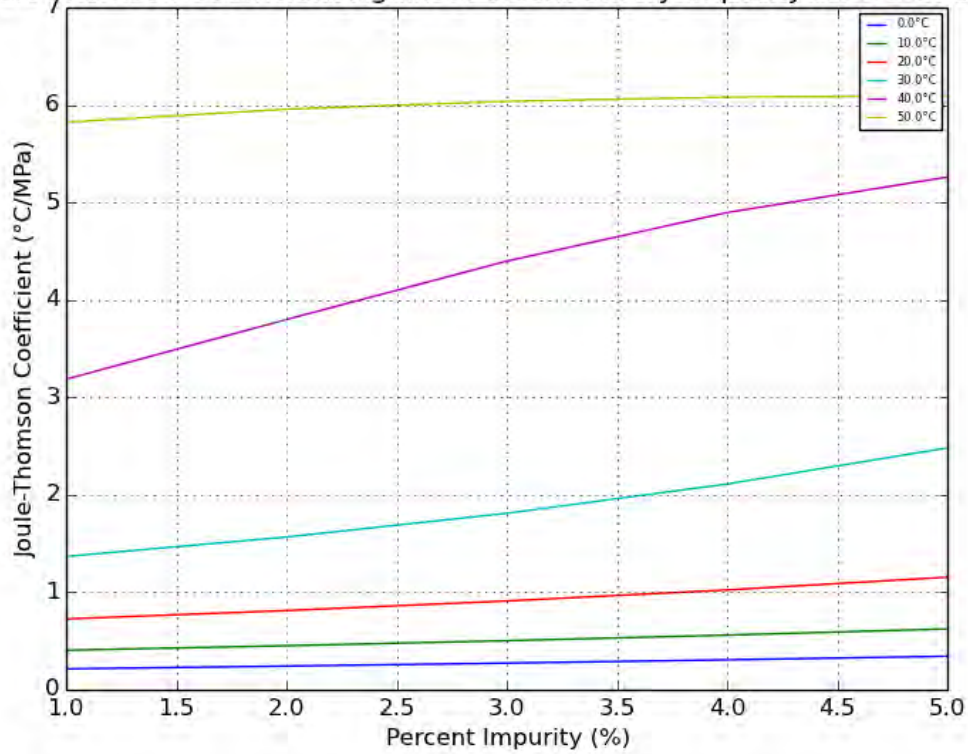


Figure A-63: Joule Thomson coefficient of CO₂ with varying levels of CO at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for CO at 15MPa

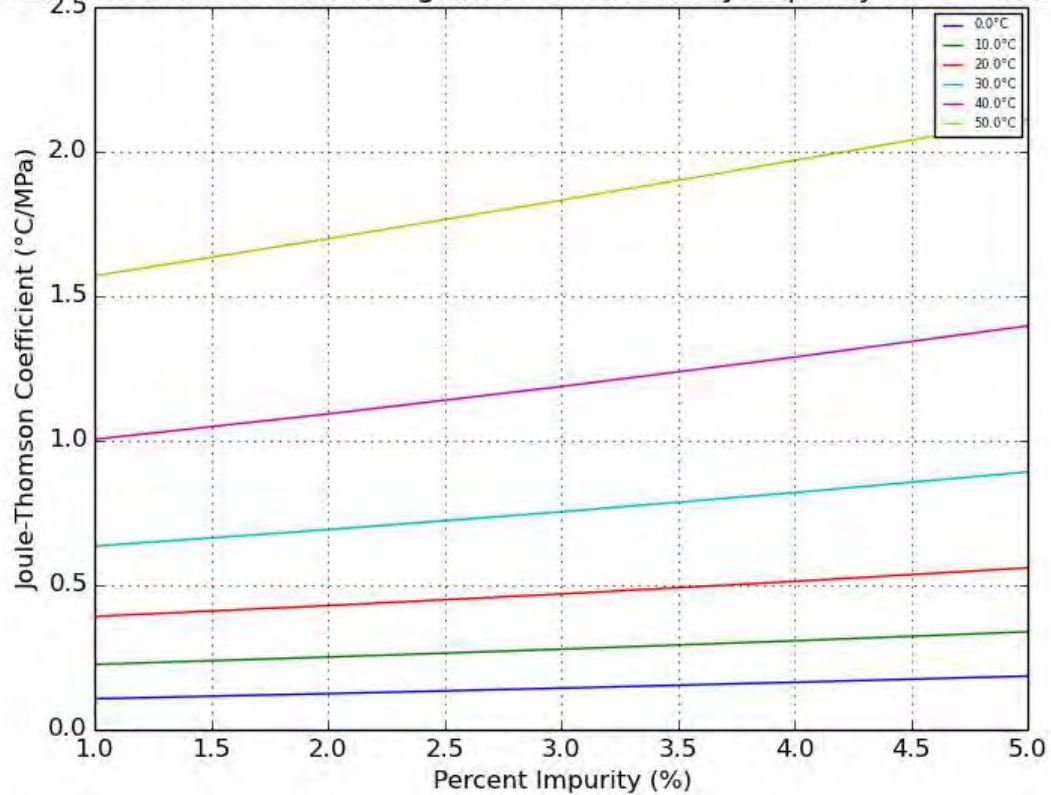


Figure A-64: Joule Thomson coefficient of CO₂ with varying levels of CO at 15MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂ at 3MPa

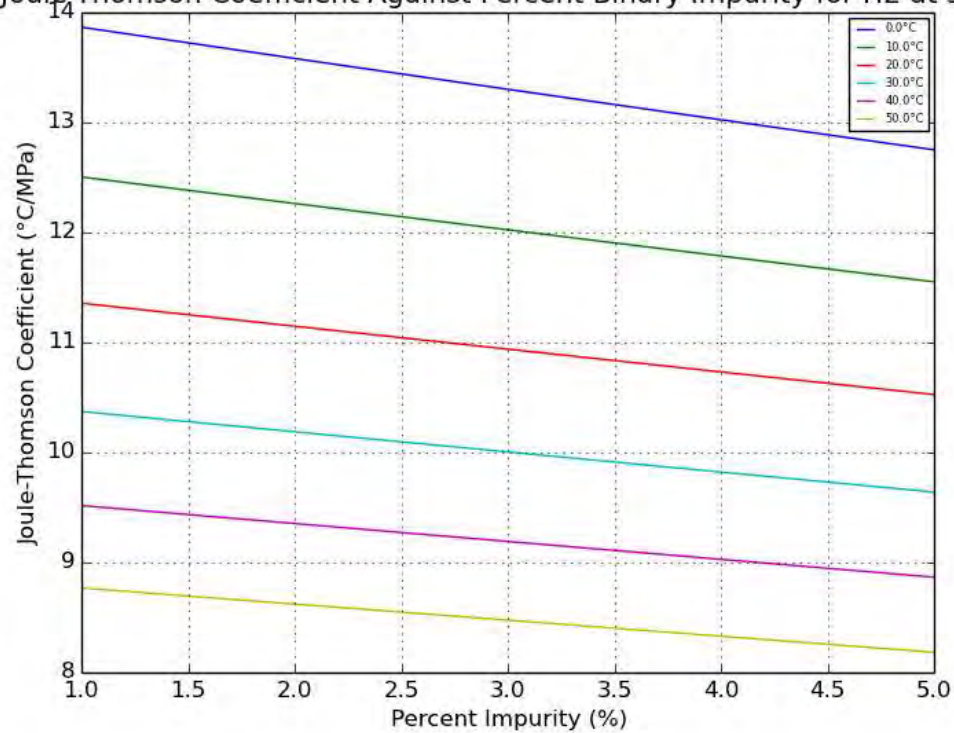


Figure A-65: Joule Thomson coefficient of CO₂ with varying levels of H₂ at 3MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂ at 10MPa

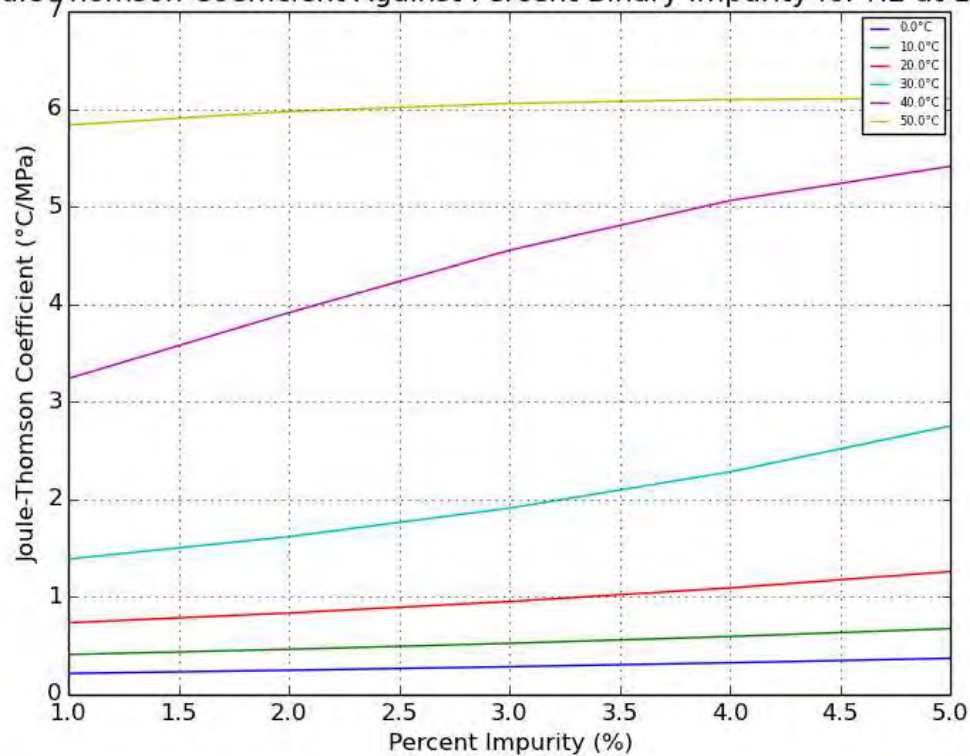


Figure A-66: Joule Thomson coefficient of CO₂ with varying levels of H₂ at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂ at 15MPa

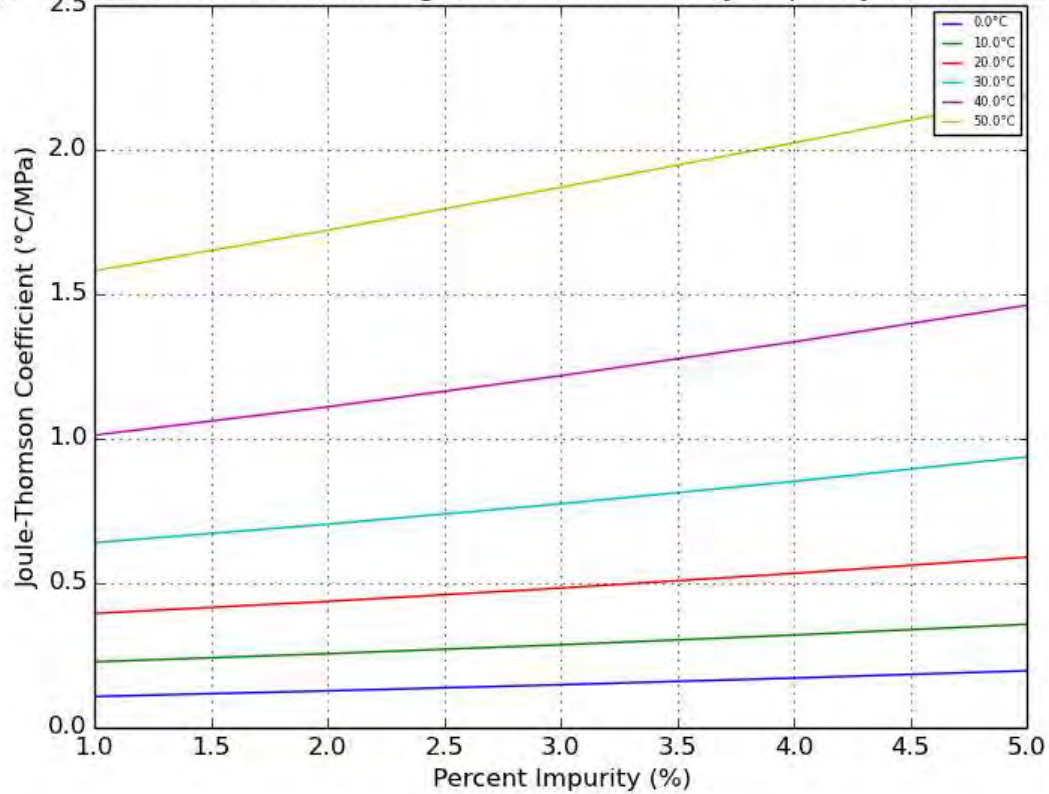


Figure A-67: Joule Thomson coefficient of CO₂ with varying levels of H₂ at 15MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂O at 3MPa

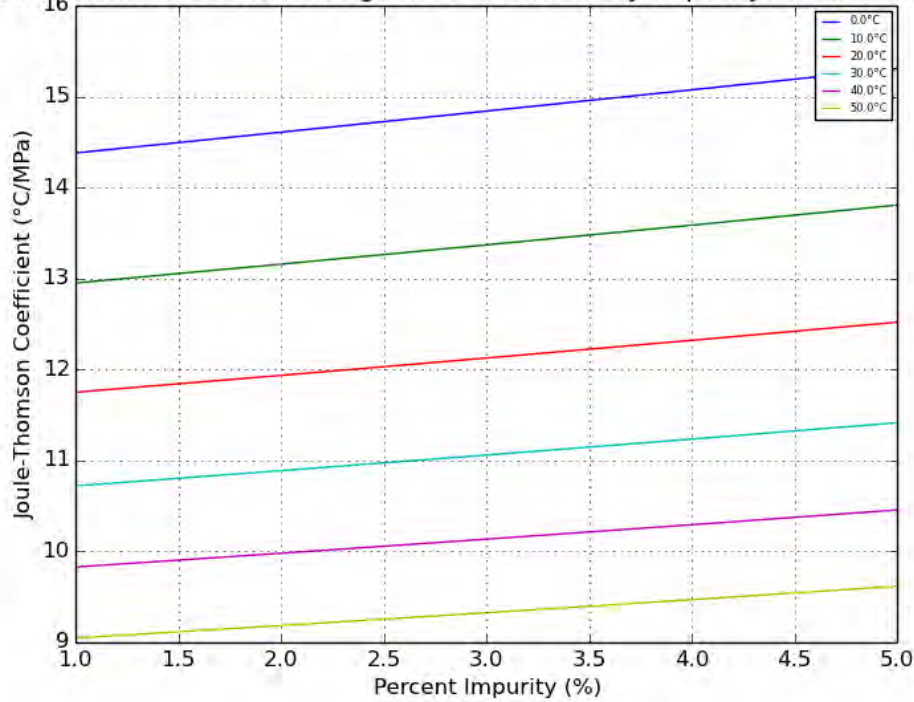


Figure A-68: Joule Thomson coefficient of CO₂ with varying levels of H₂O at 3MPa

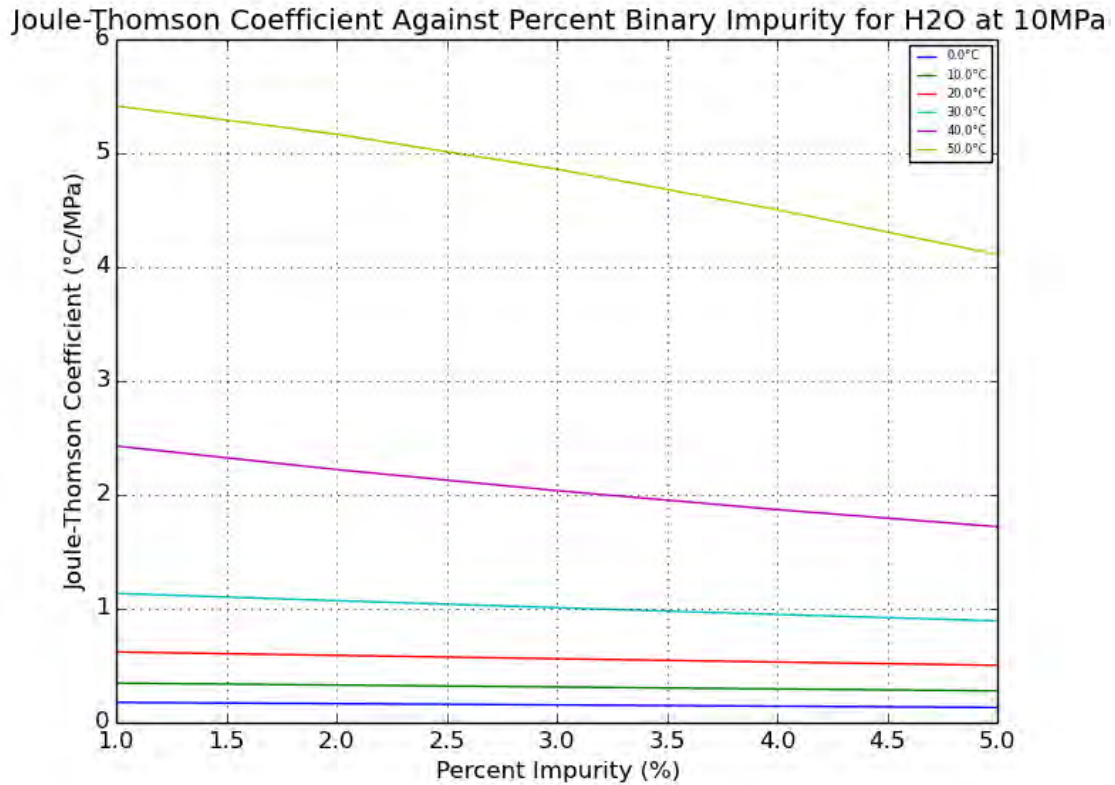


Figure A-69: Joule Thomson coefficient of CO₂ with varying levels of H₂O at 10MPa

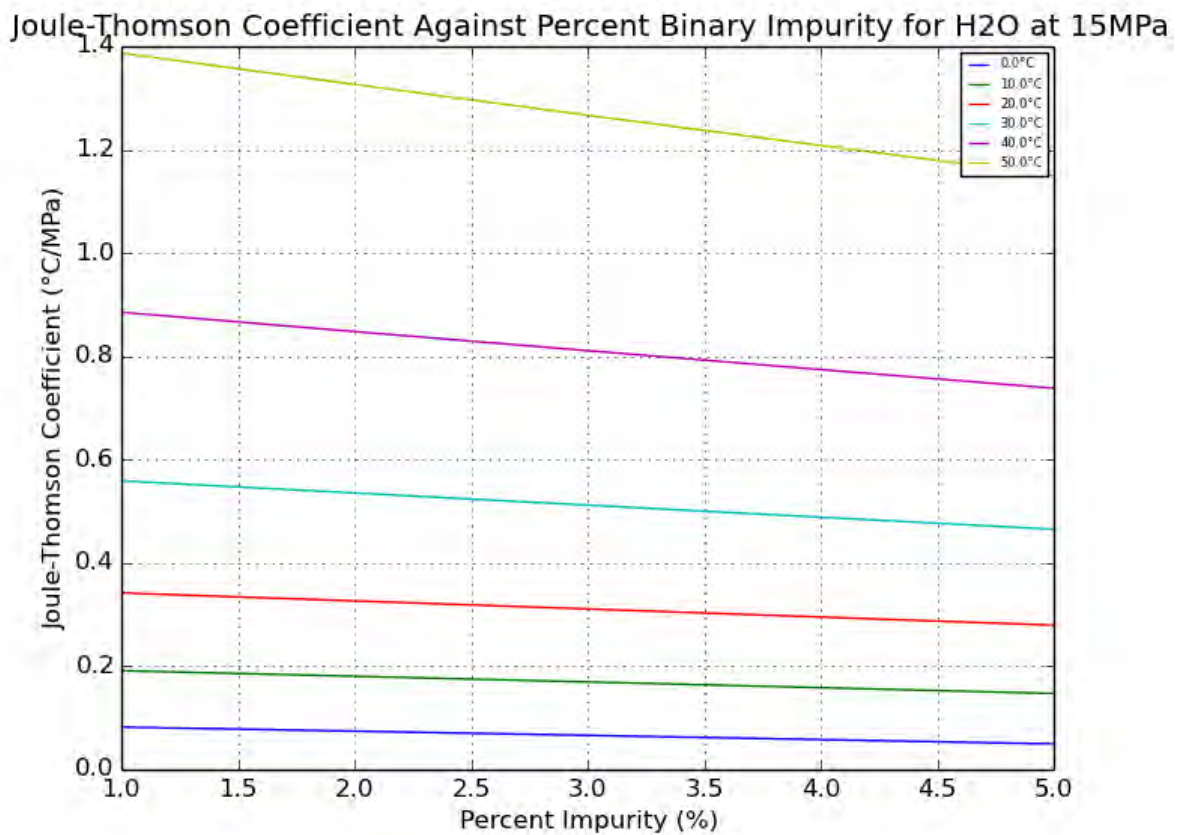


Figure A-70: Joule Thomson coefficient of CO₂ with varying levels of H₂O at 15MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂S at 3MPa

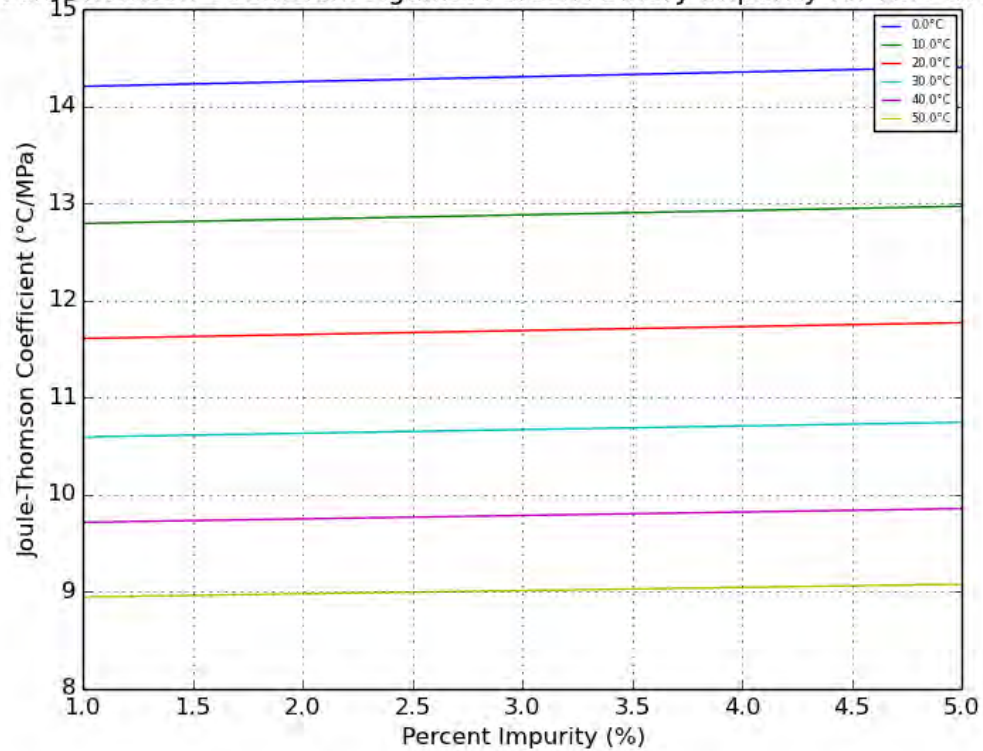


Figure A-71: Joule Thomson coefficient of CO₂ with varying levels of H₂S at 3MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂S at 10MPa

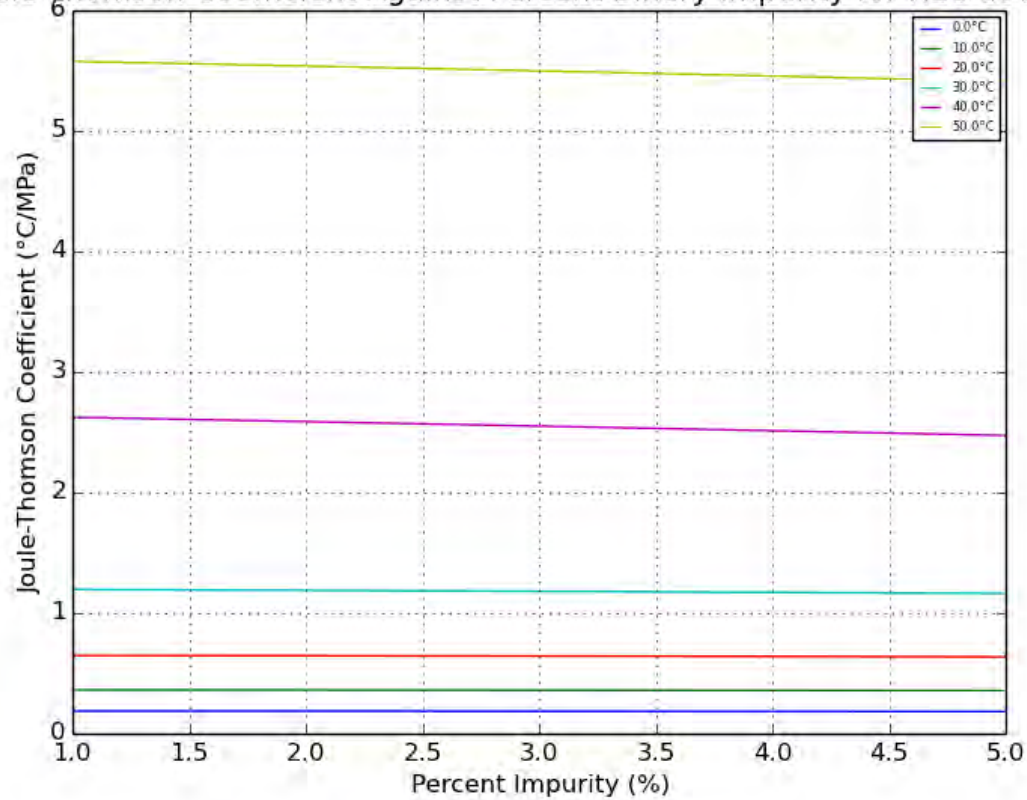


Figure A-72: Joule Thomson coefficient of CO₂ with varying levels of H₂S at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for H₂S at 15MPa

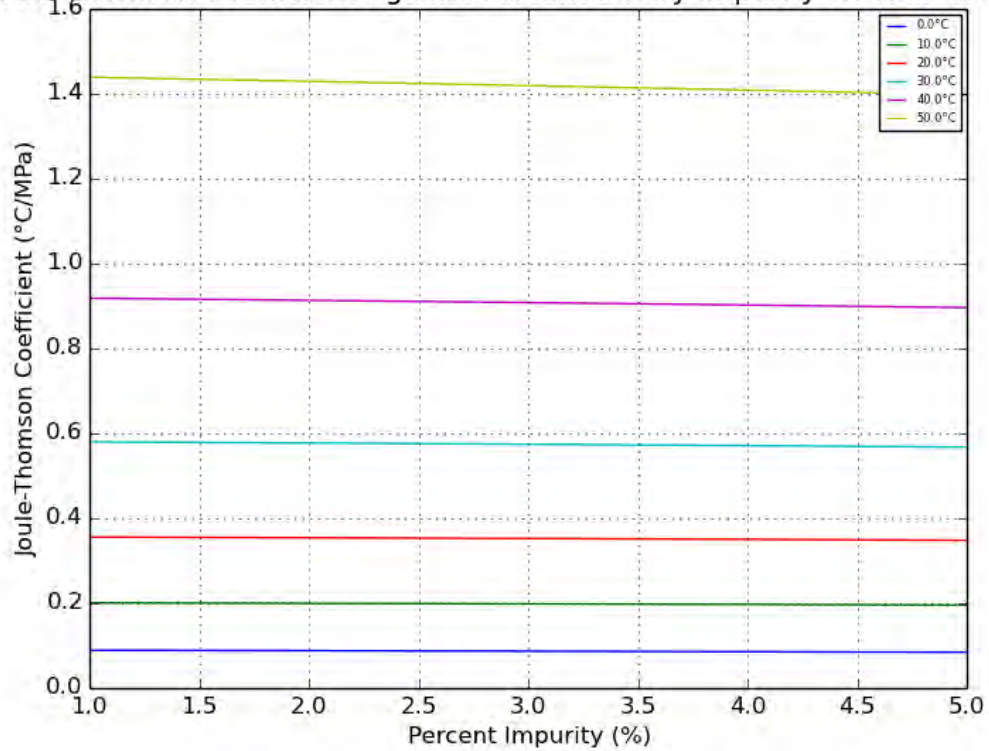


Figure A-73: Joule Thomson coefficient of CO₂ with varying levels of H₂S at 15MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for N₂ at 3MPa

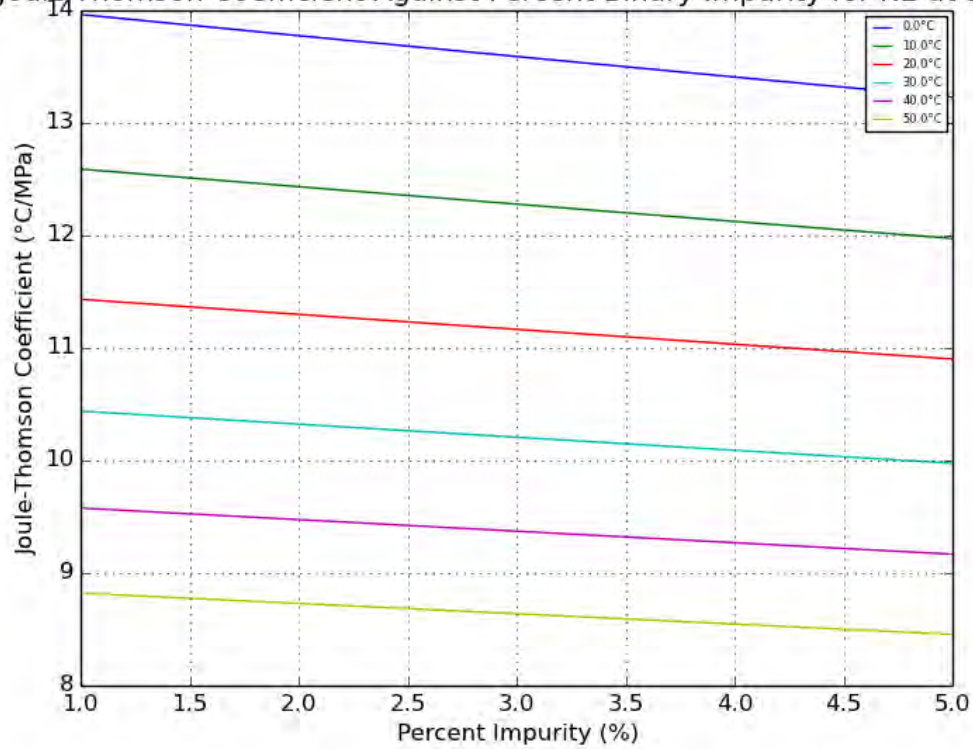


Figure A-74: Joule Thomson coefficient of CO₂ with varying levels of N₂ at 3MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for N₂ at 10MPa

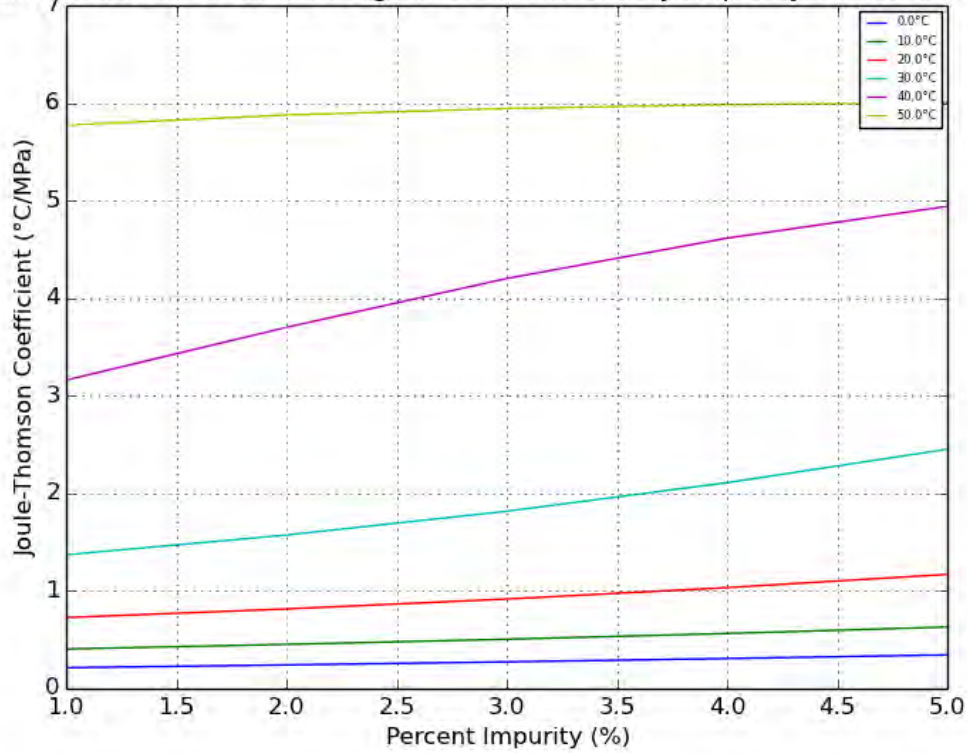


Figure A-75: Joule Thomson coefficient of CO₂ with varying levels of N₂ at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for N₂ at 15MPa

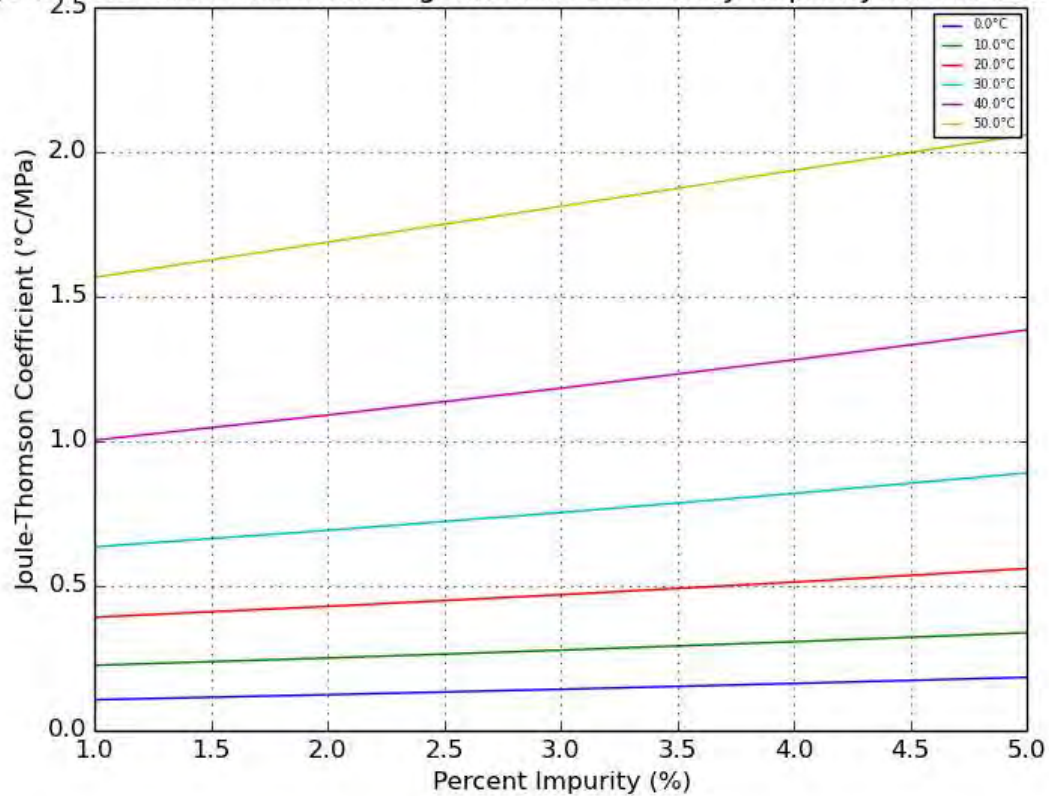


Figure A-76: Joule Thomson coefficient of CO₂ with varying levels of N₂ at 15MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for O₂ at 3MPa

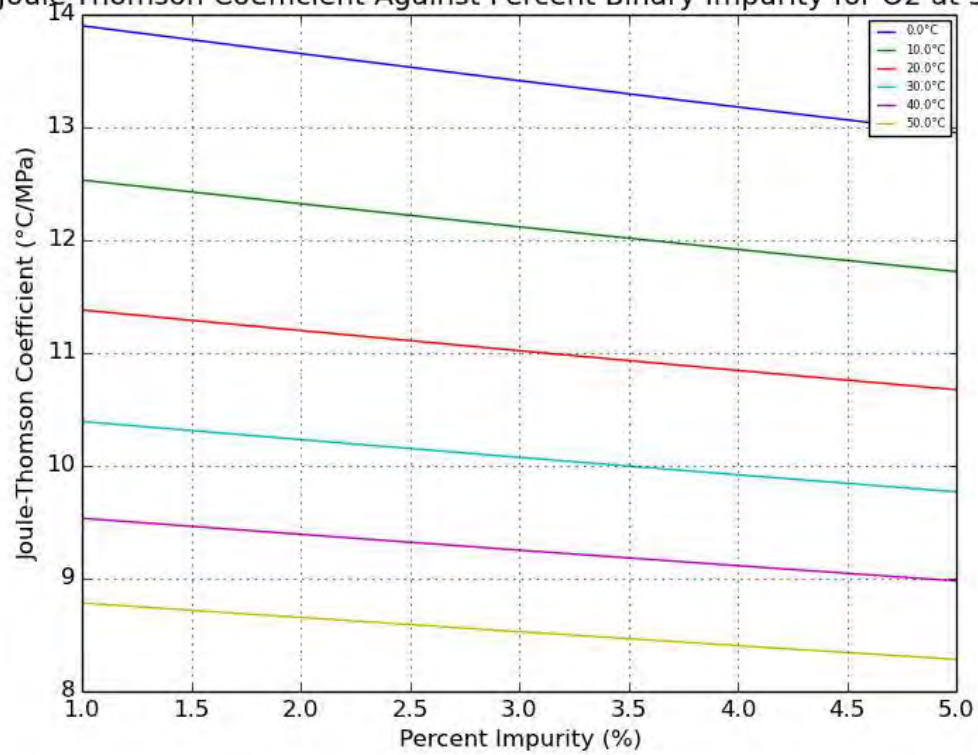


Figure A-77: Joule Thomson coefficient of CO₂ with varying levels of O₂ at 3MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for O₂ at 10MPa

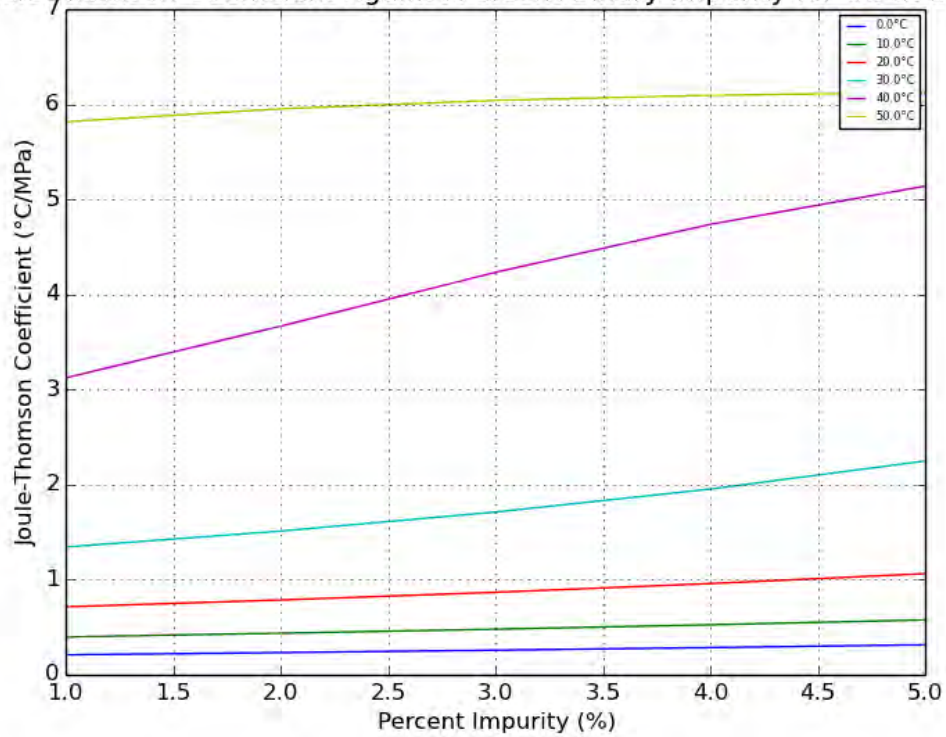


Figure A-78: Joule Thomson coefficient of CO₂ with varying levels of O₂ at 10MPa

Joule-Thomson Coefficient Against Percent Binary Impurity for O₂ at 15MPa

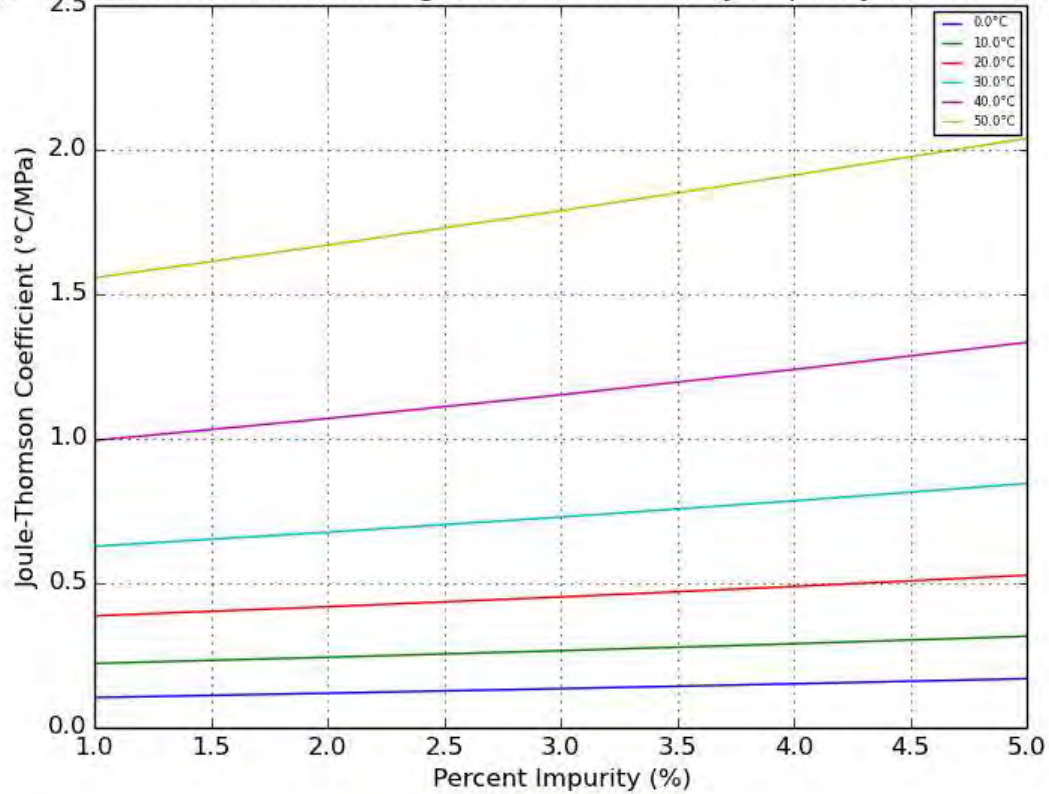


Figure A-79: Joule Thomson coefficient of CO₂ with varying levels of O₂ at 15MPa

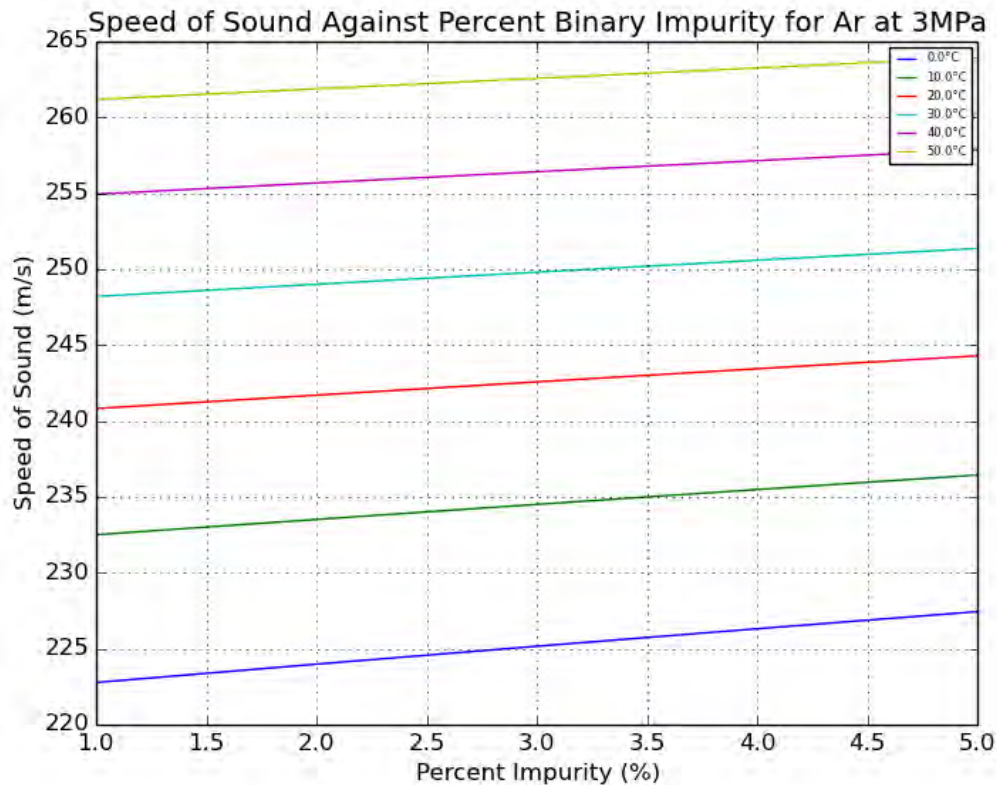


Figure A-80: Speed of sound of CO₂ with varying levels of Ar at 3MPa

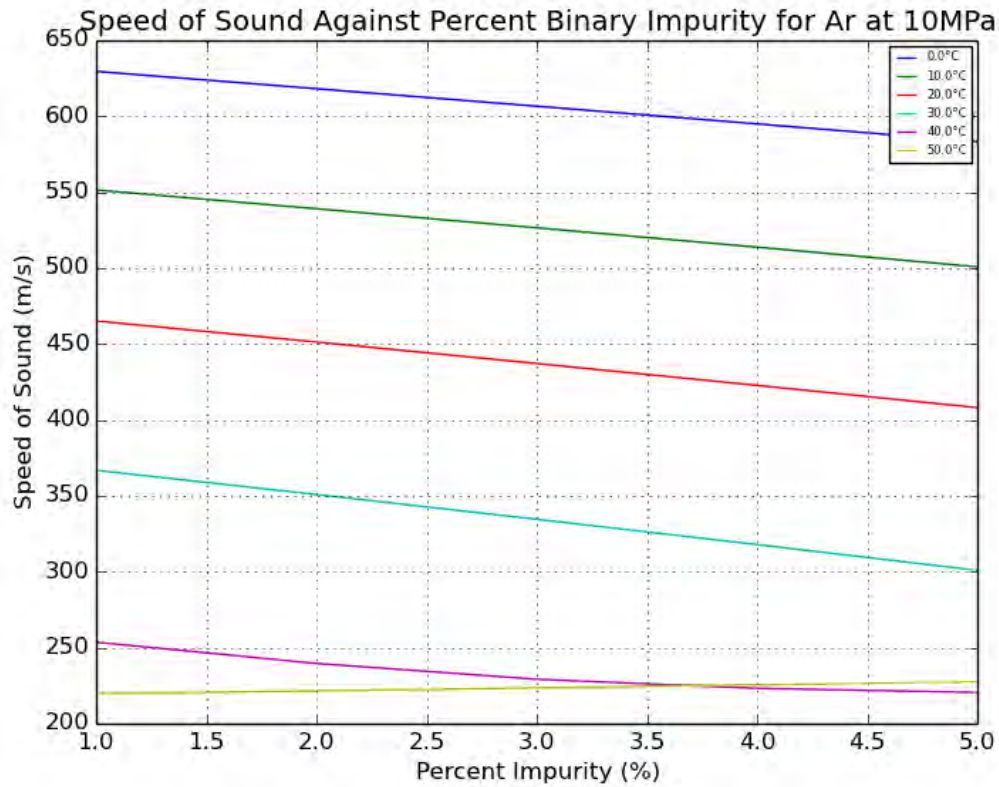


Figure A-81: Speed of sound of CO₂ with varying levels of Ar at 10MPa

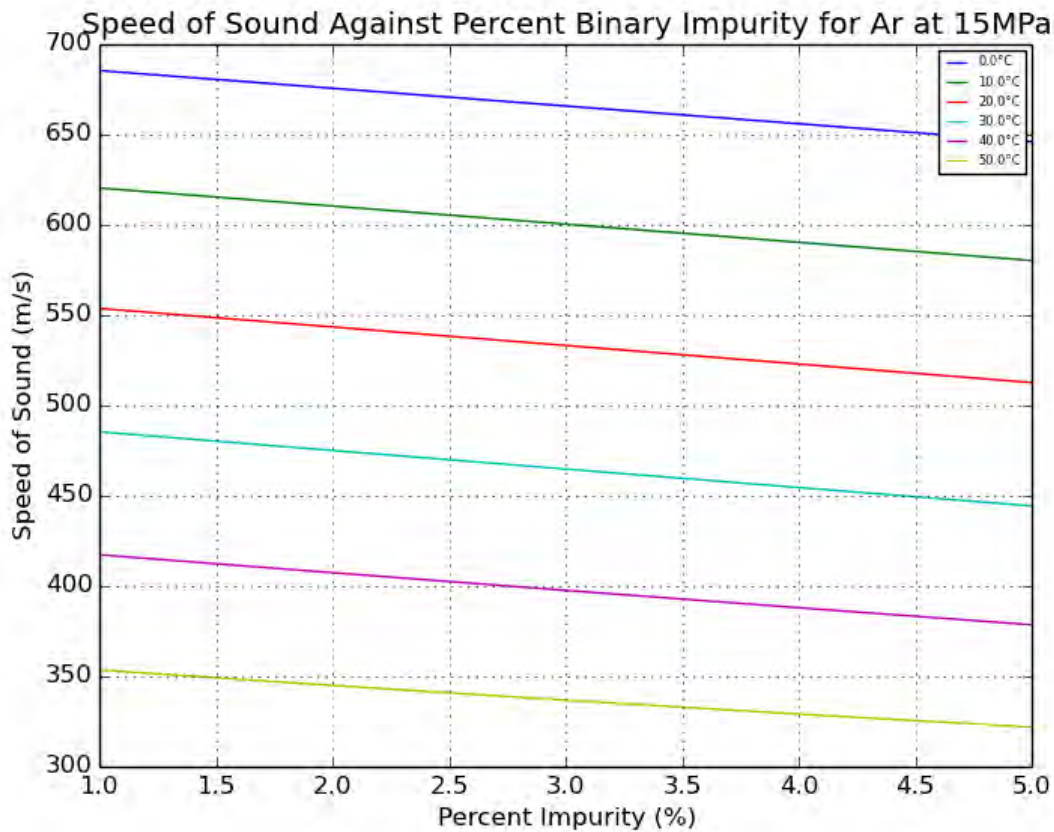


Figure A-82: Speed of sound of CO₂ with varying levels of Ar at 15MPa

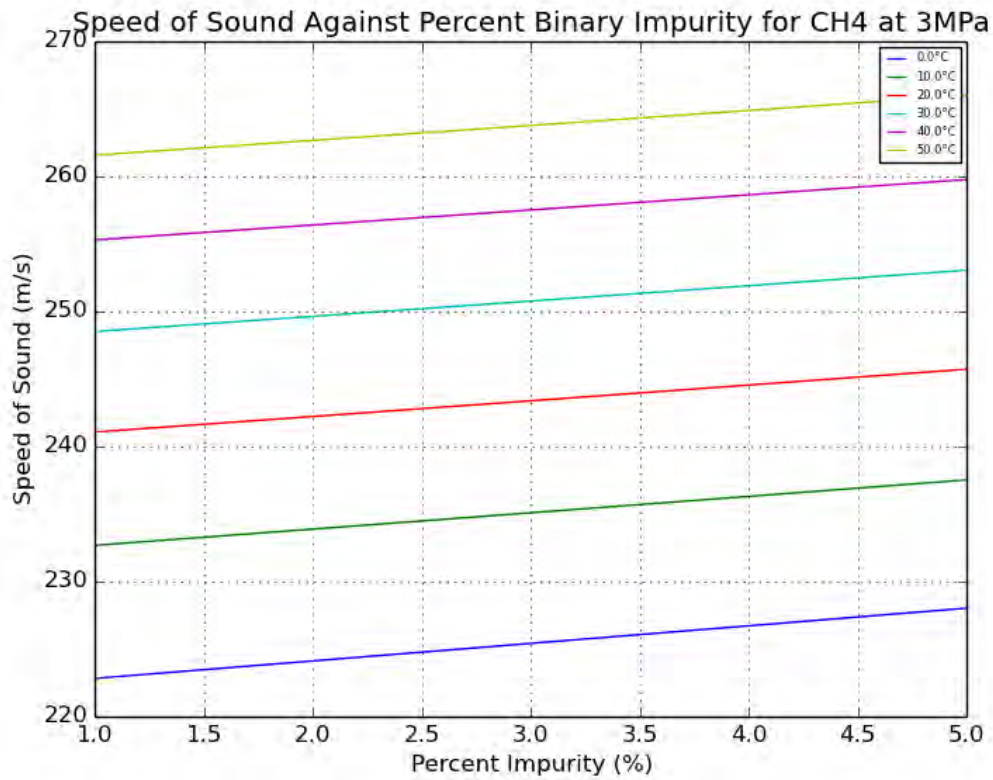


Figure A-83: Speed of sound of CO₂ with varying levels of CH₄ at 3MPa

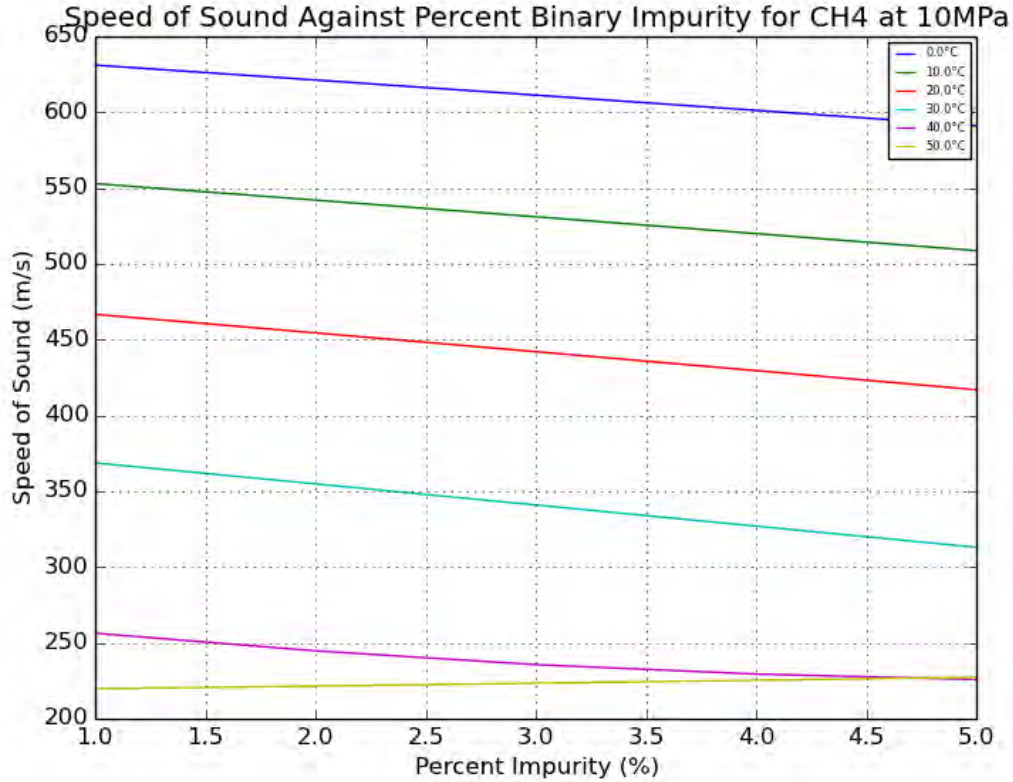


Figure A-84: Speed of sound of CO₂ with varying levels of CH₄ at 10MPa

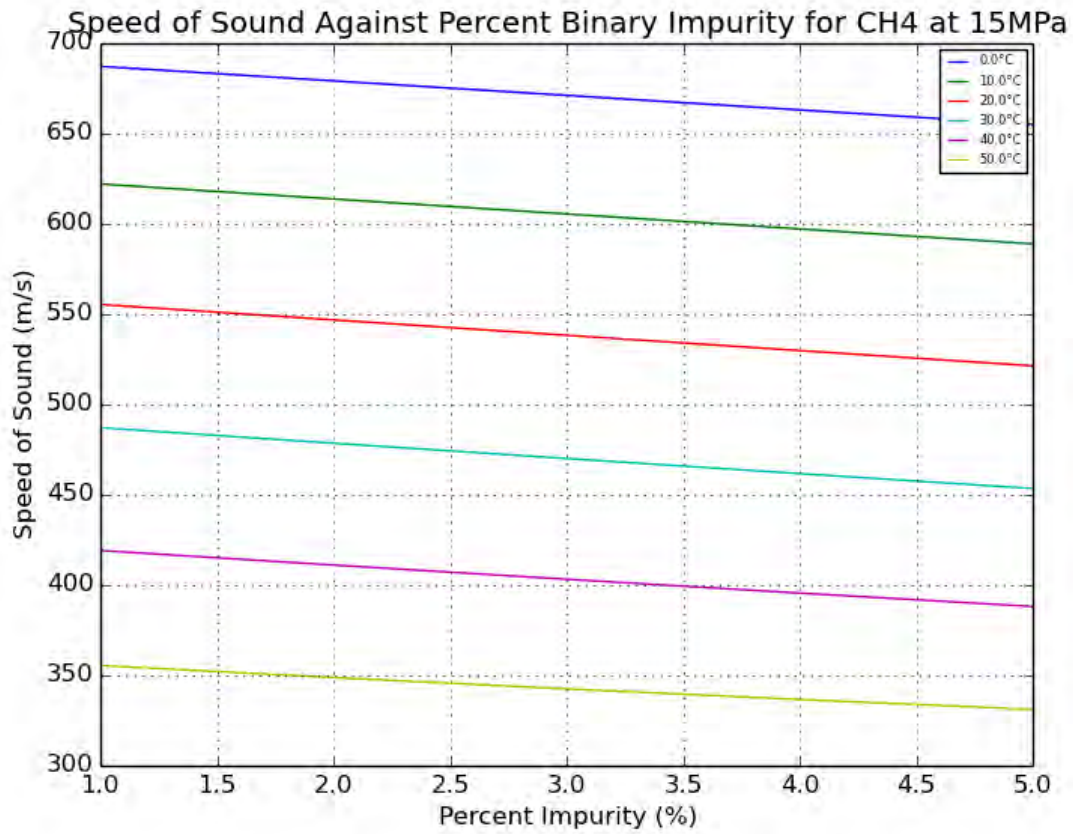


Figure A-85: Speed of sound of CO₂ with varying levels of CH₄ at 15MPa

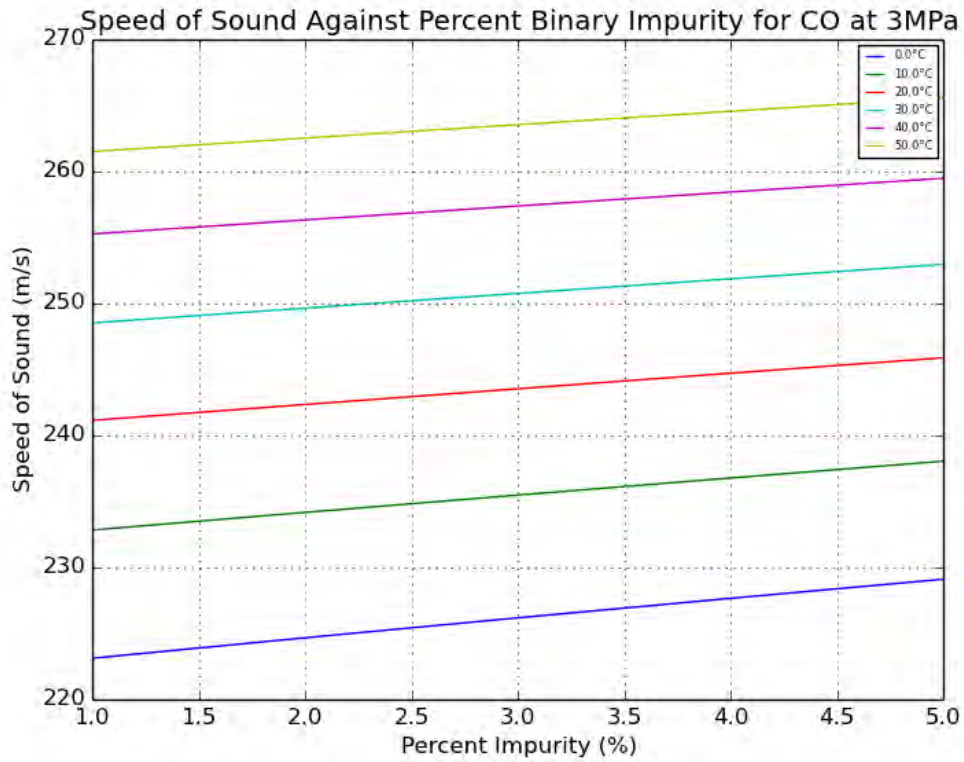


Figure A-86: Speed of sound of CO₂ with varying levels of CO at 3MPa

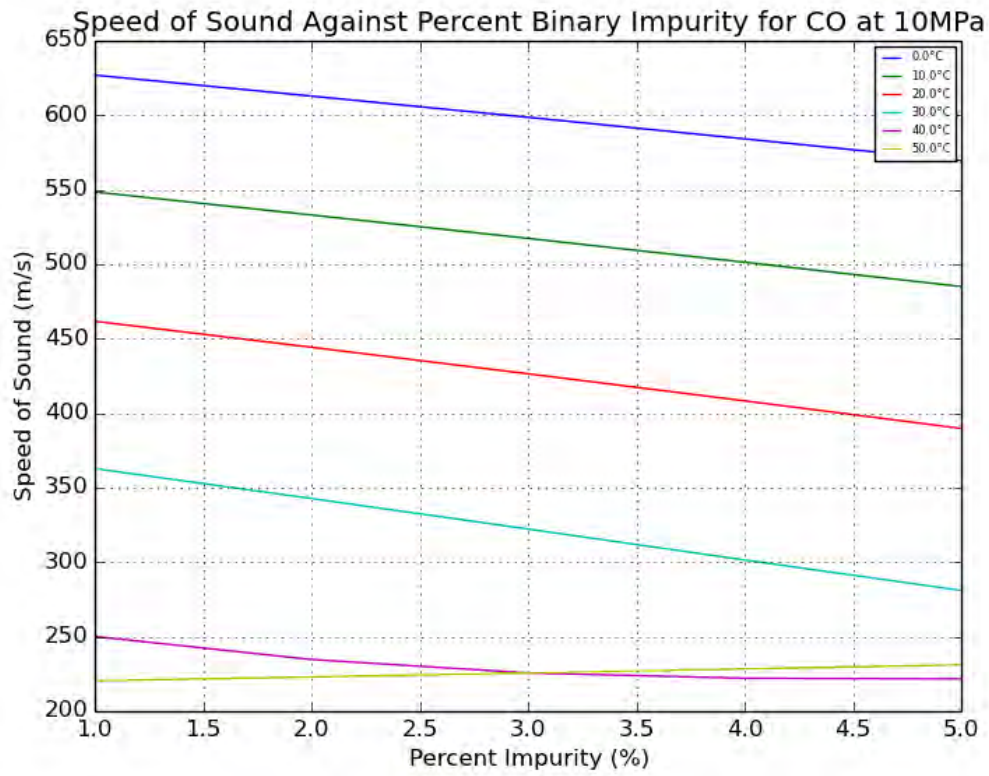


Figure A-87: Speed of sound of CO₂ with varying levels of CO at 10MPa

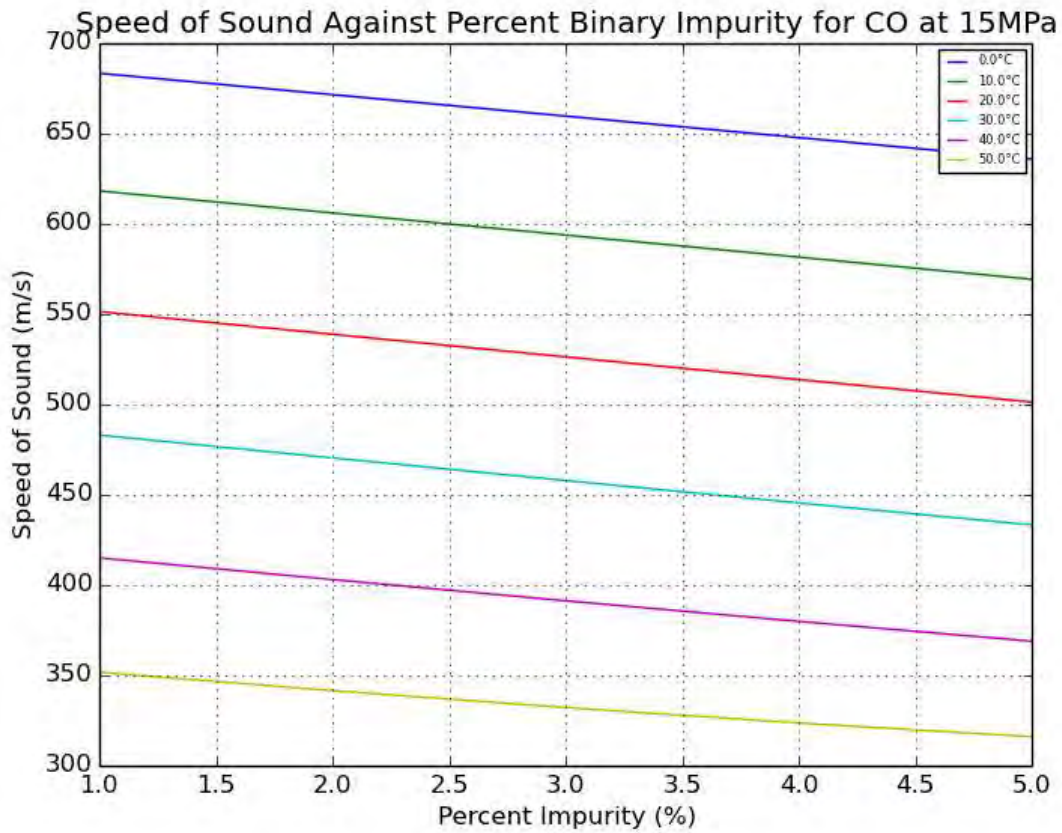


Figure A-88: Speed of sound of CO₂ with varying levels of CO at 15MPa

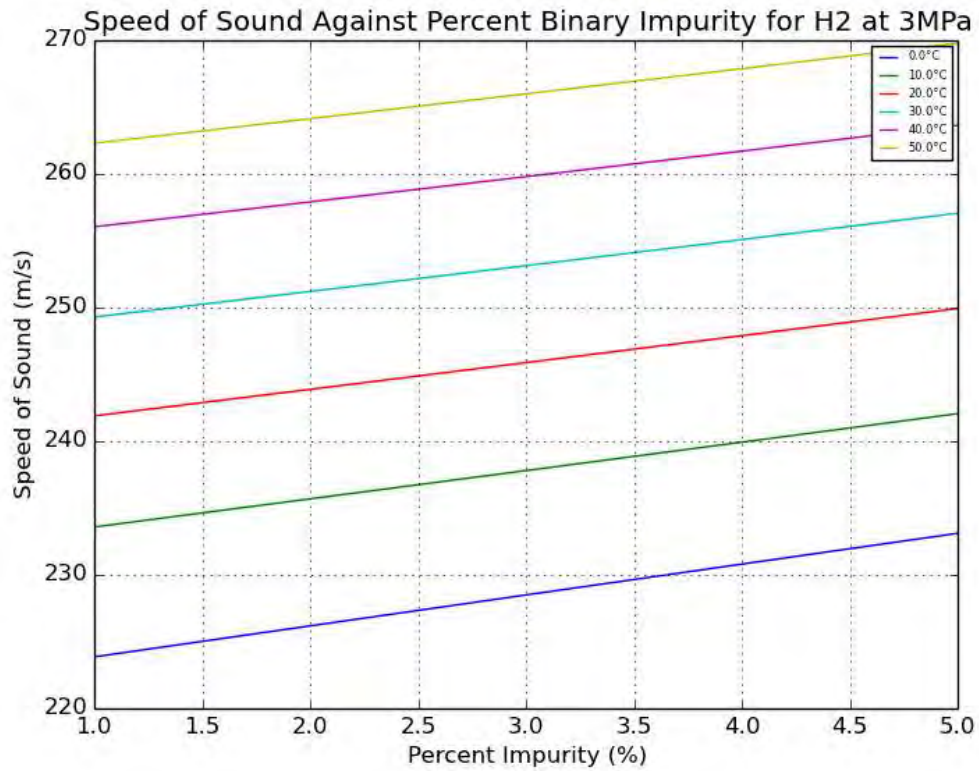


Figure A-89: Speed of sound of CO₂ with varying levels of H₂ at 3MPa

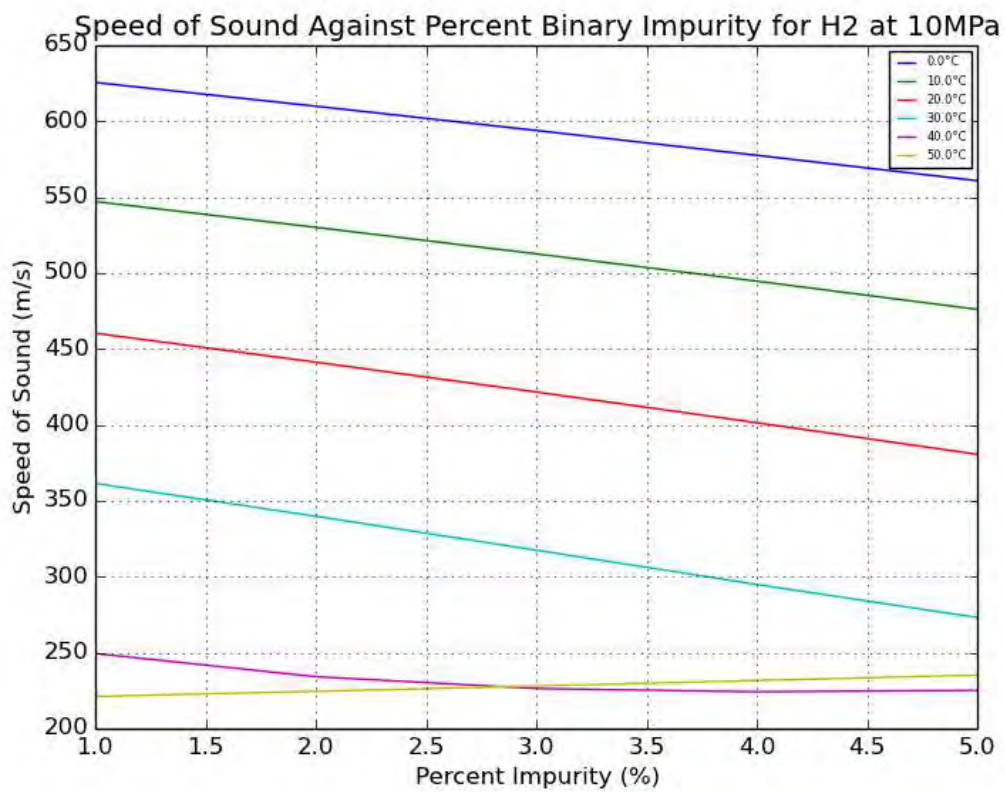


Figure A-90: Speed of sound of CO₂ with varying levels of H₂ at 10MPa

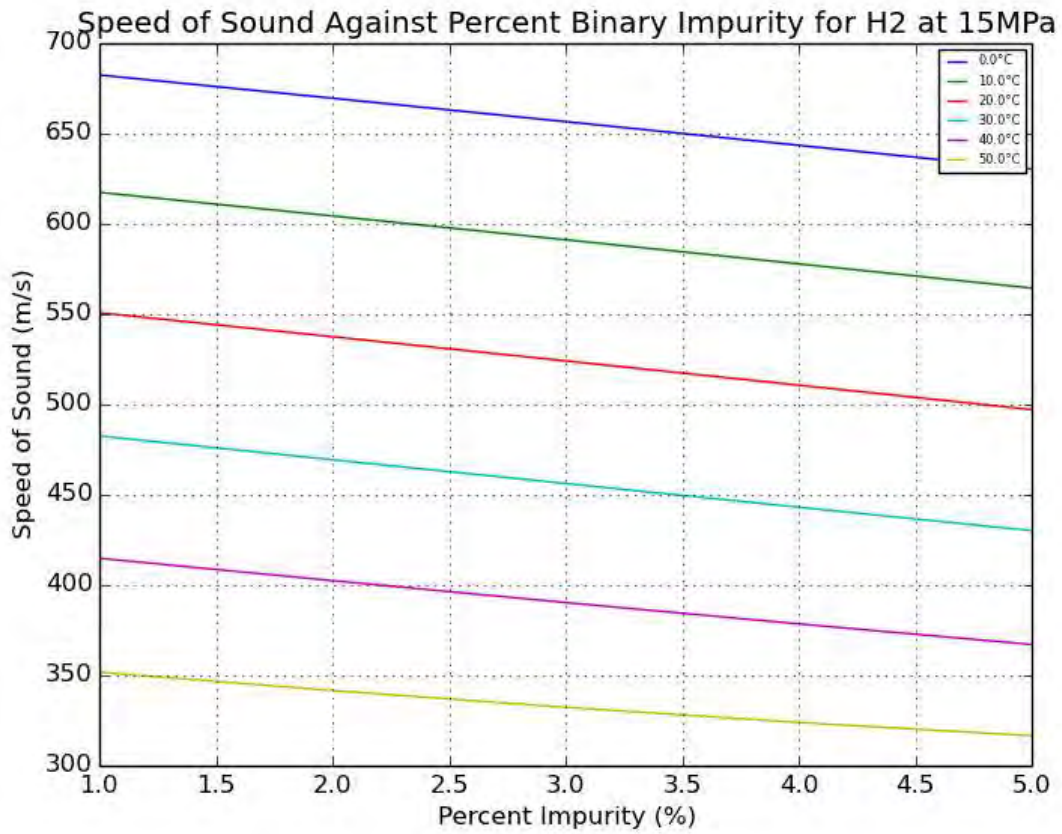


Figure A-91: Speed of sound of CO₂ with varying levels of H₂ at 15MPa

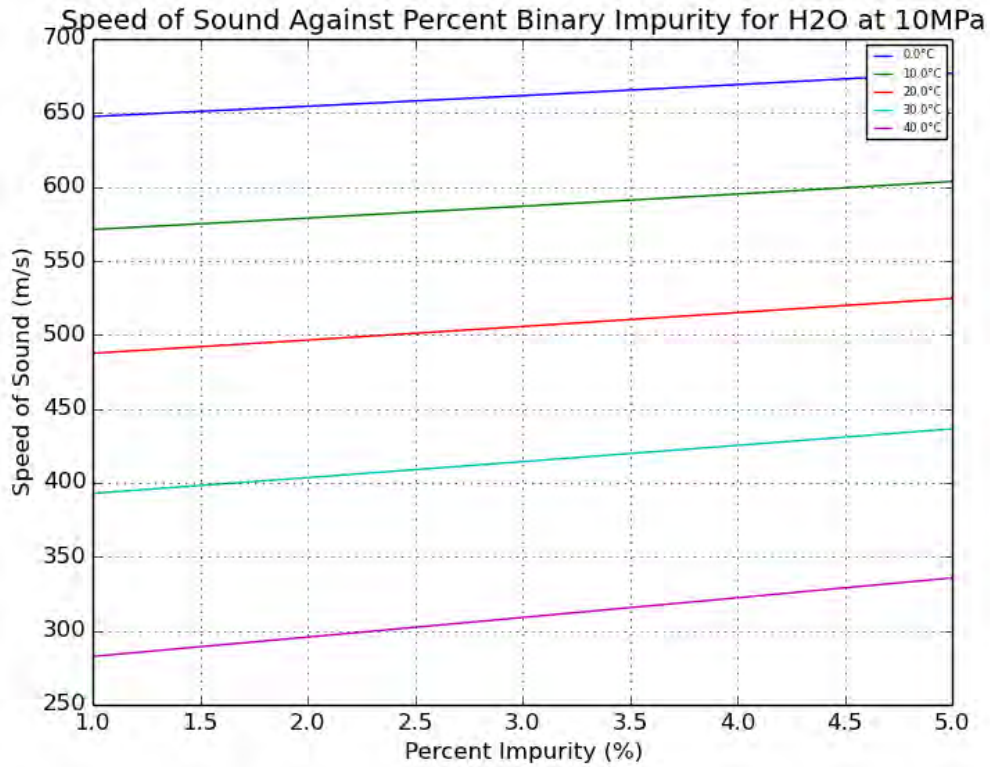


Figure A-92: Speed of sound of CO₂ with varying levels of H₂O at 10MPa

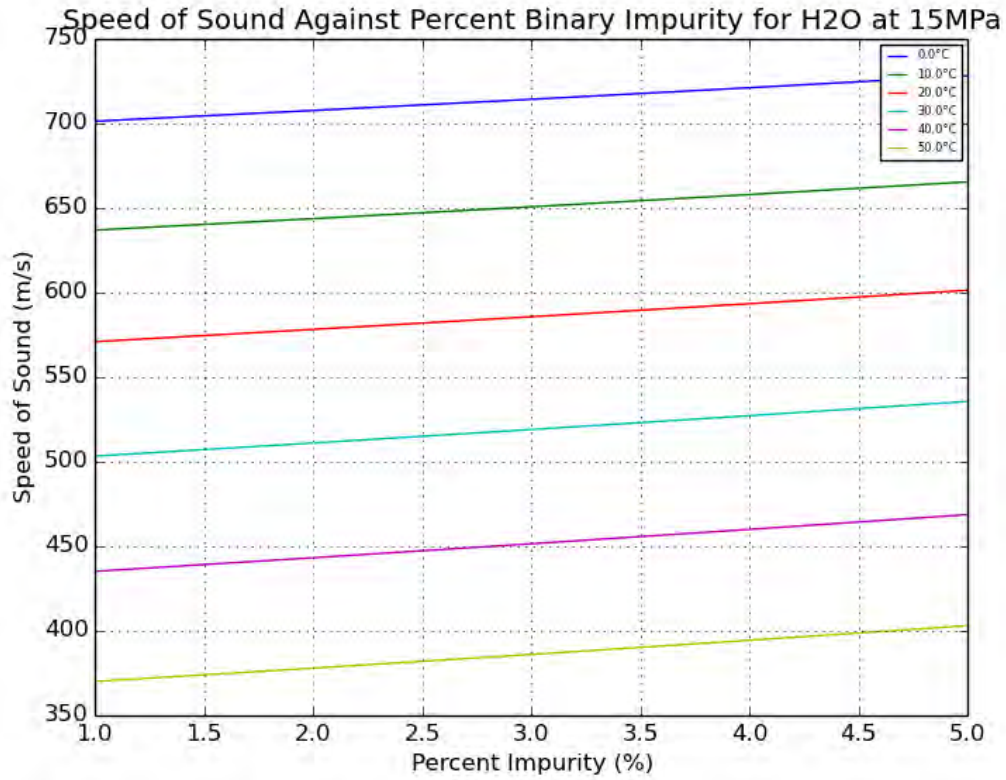


Figure A-93: Speed of sound of CO₂ with varying levels of H₂O at 15MPa

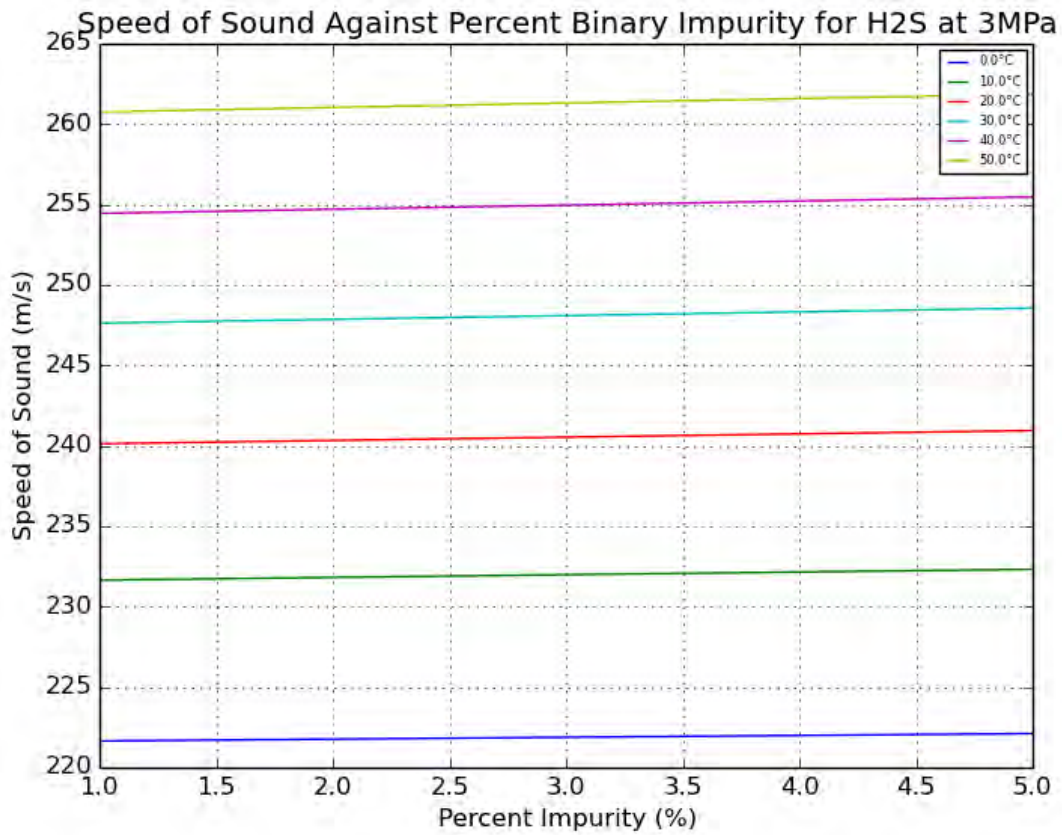


Figure A-94: Speed of sound of CO₂ with varying levels of H₂S at 3MPa

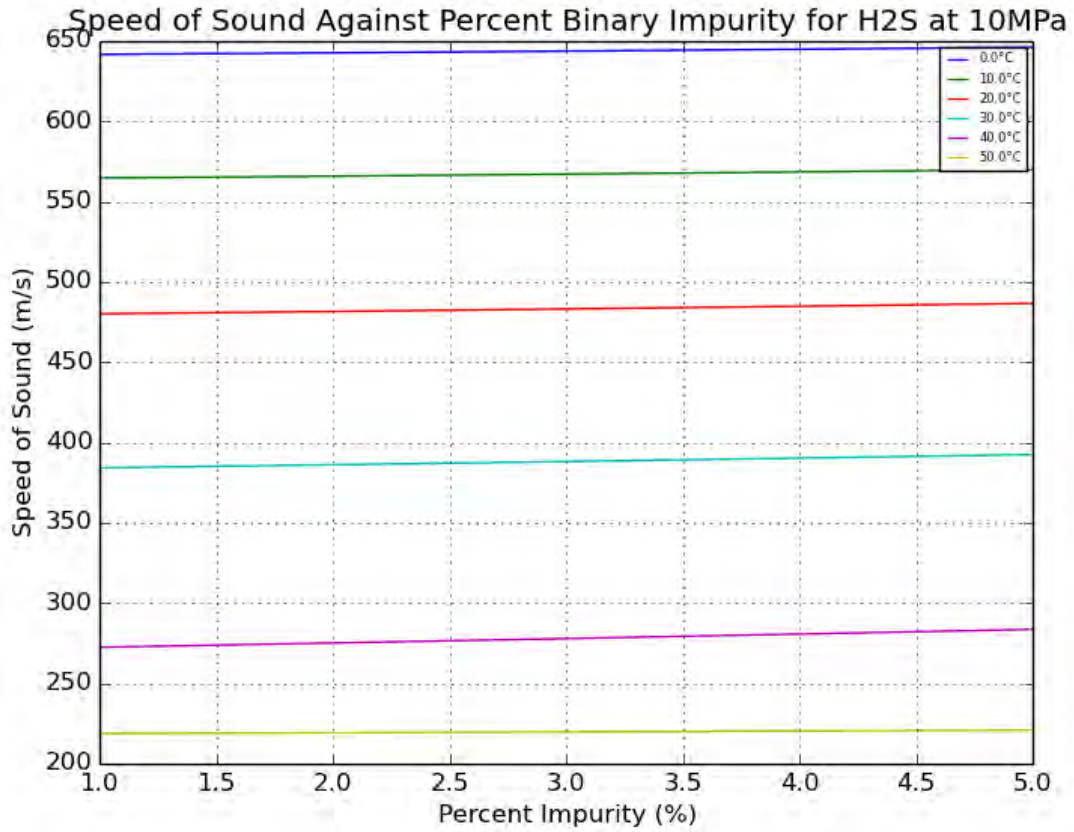


Figure A-95: Speed of sound of CO₂ with varying levels of H₂S at 10MPa

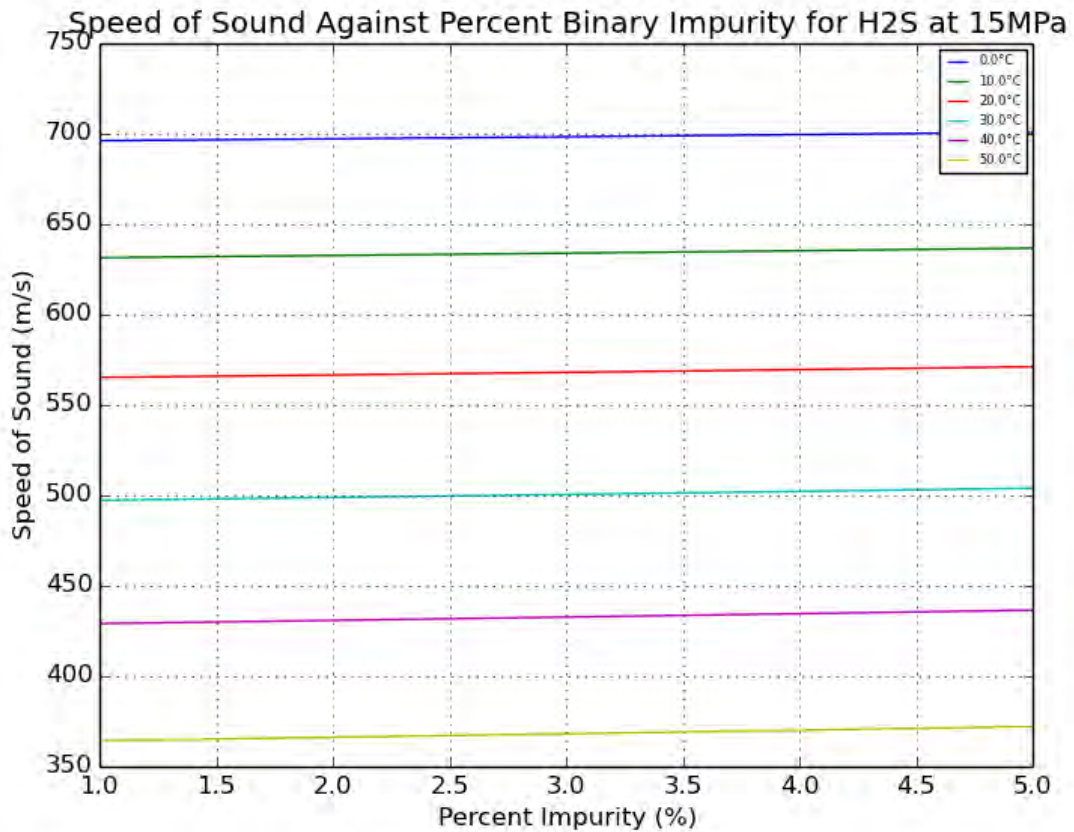


Figure A-96: Speed of sound of CO₂ with varying levels of H₂S at 15MPa

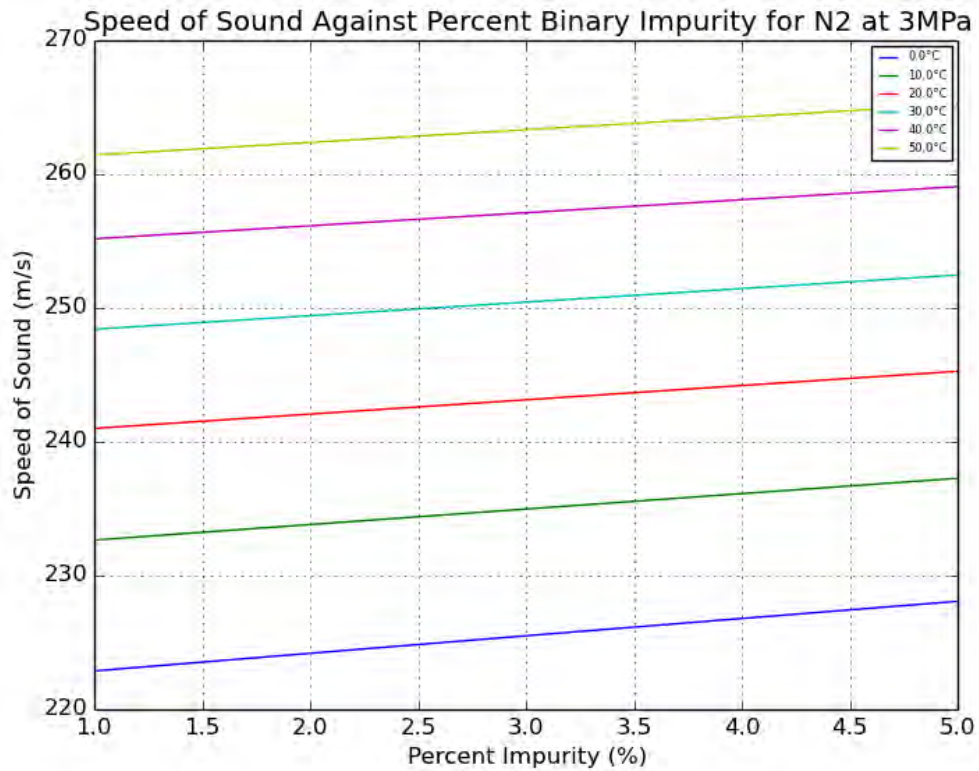


Figure A-97: Speed of sound of CO₂ with varying levels of N₂ at 3MPa

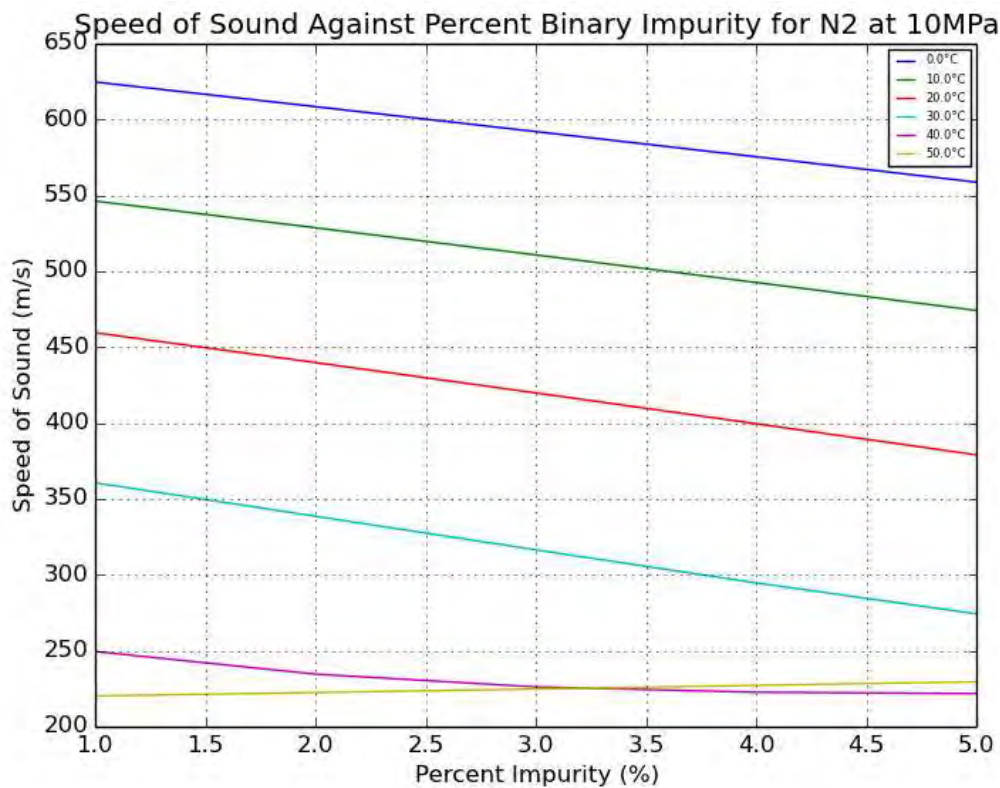


Figure A-98: Speed of sound of CO₂ with varying levels of N₂ at 10MPa

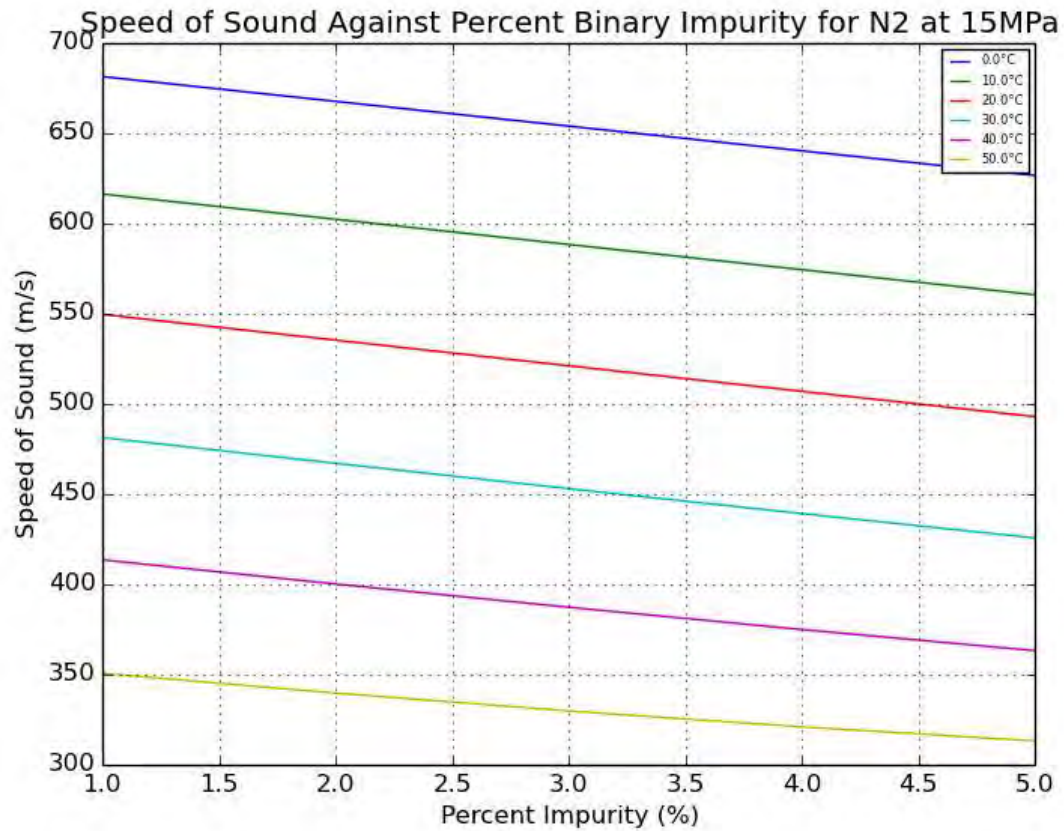


Figure A-99: Speed of sound of CO₂ with varying levels of N₂ at 15MPa

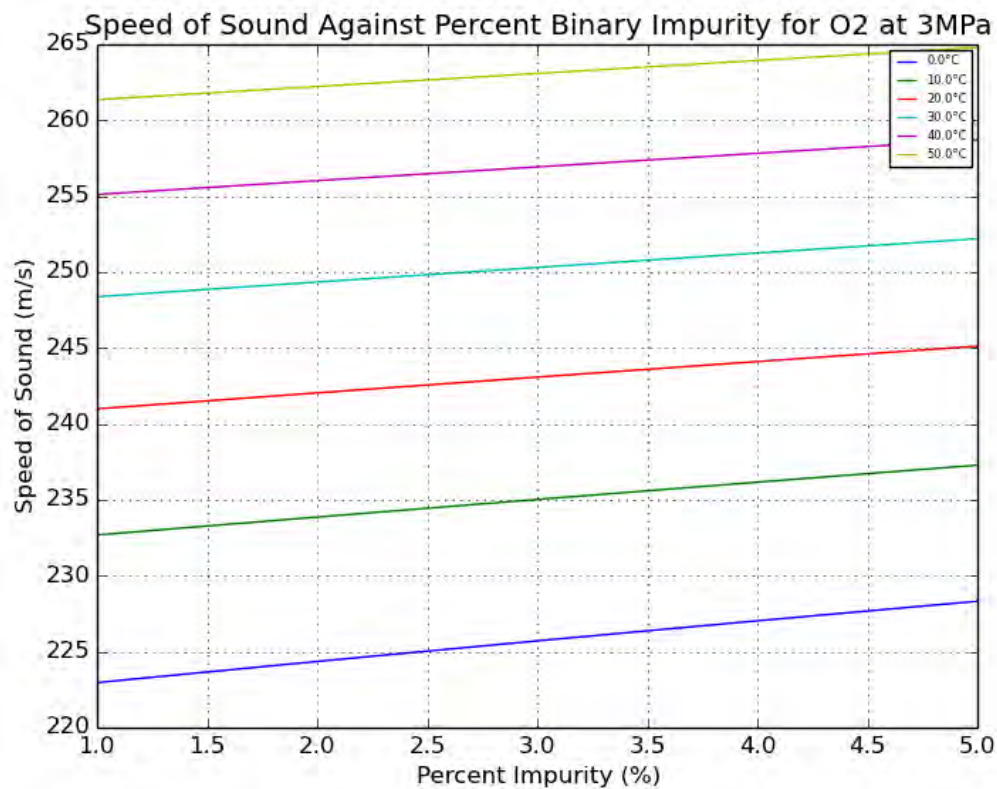


Figure A-100: Speed of sound of CO₂ with varying levels of O₂ at 3MPa

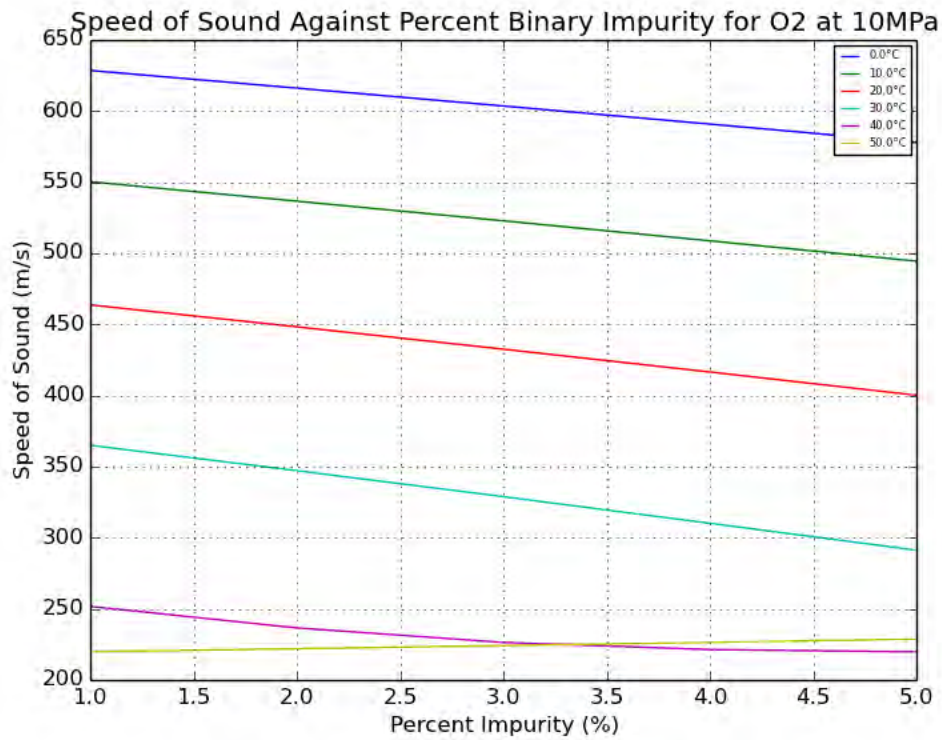


Figure A-101: Speed of sound of CO₂ with varying levels of O₂ at 10MPa

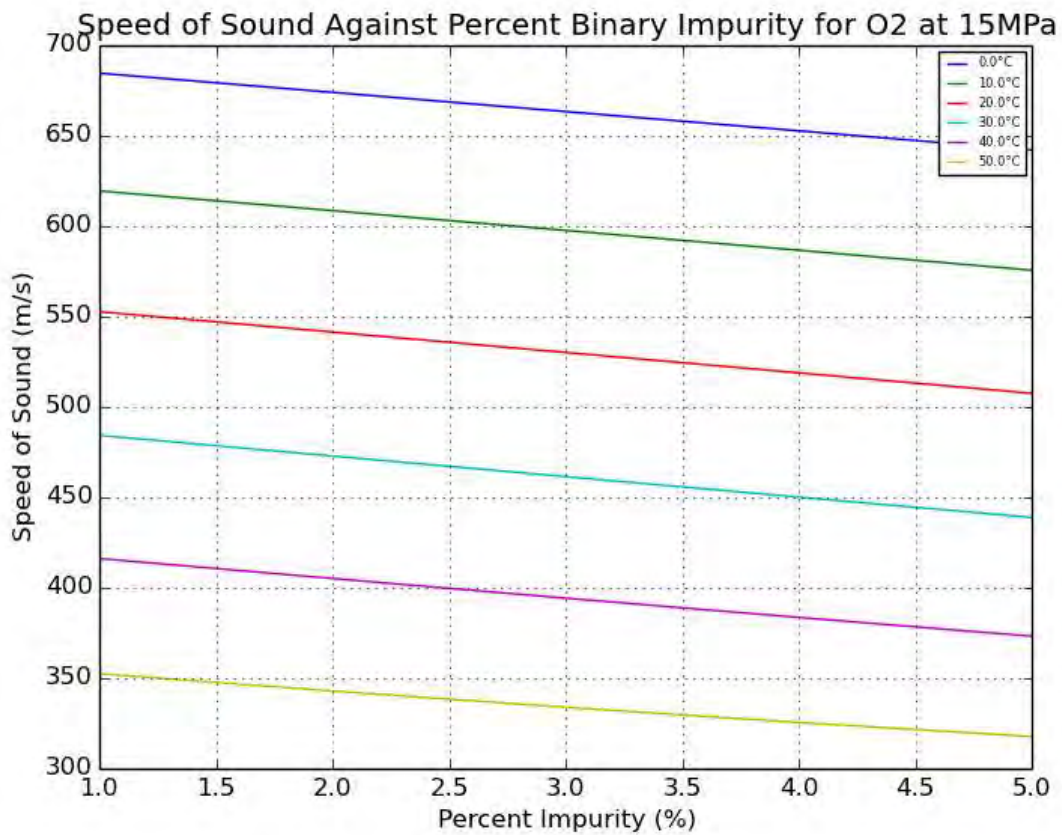


Figure A-102: Speed of sound of CO₂ with varying levels of O₂ at 15MPa

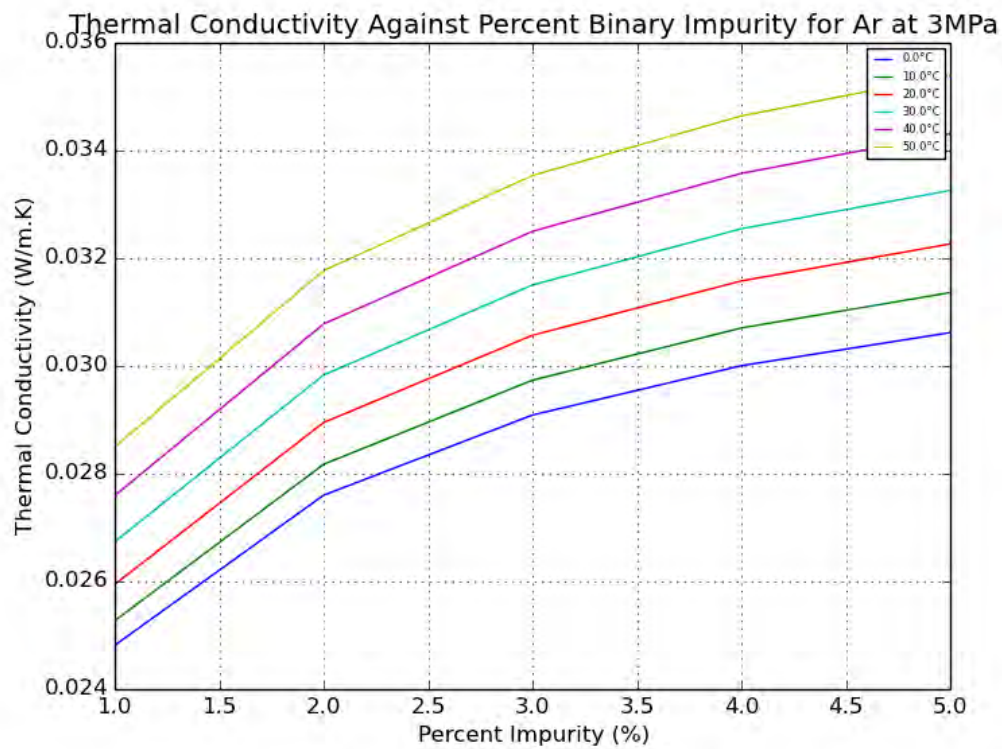


Figure A-103: Thermal conductivity of CO₂ with varying levels of Ar at 3MPa

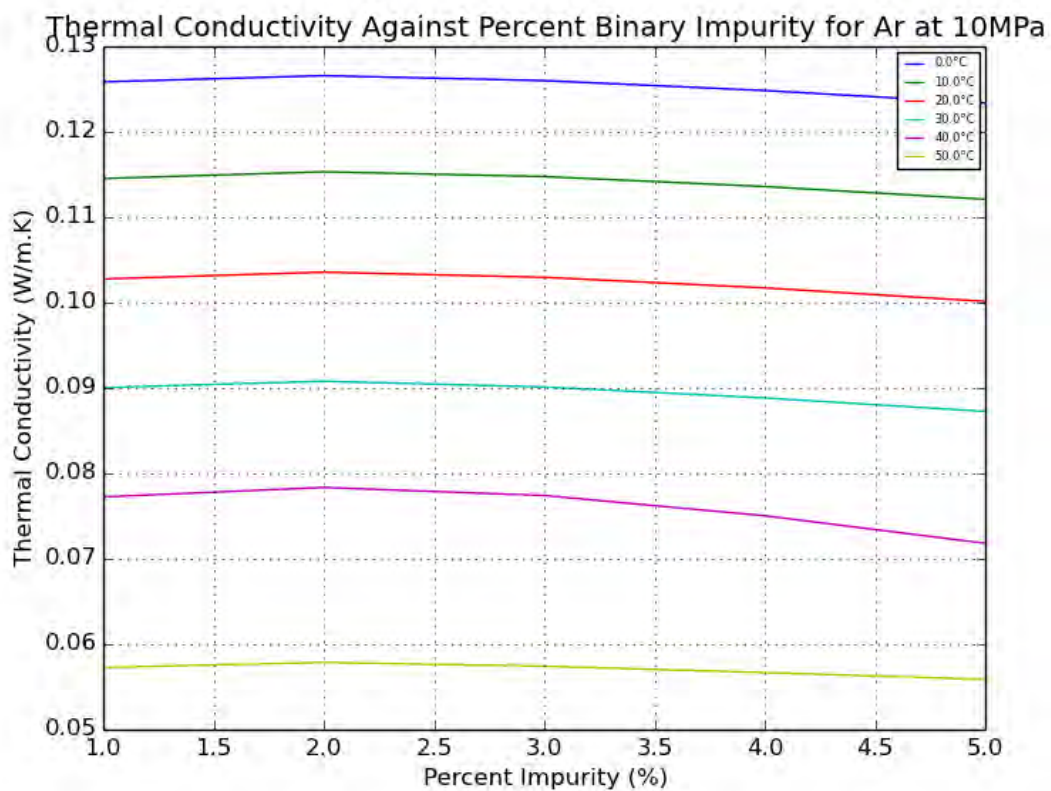


Figure A-104: Thermal conductivity of CO₂ with varying levels of Ar at 10MPa

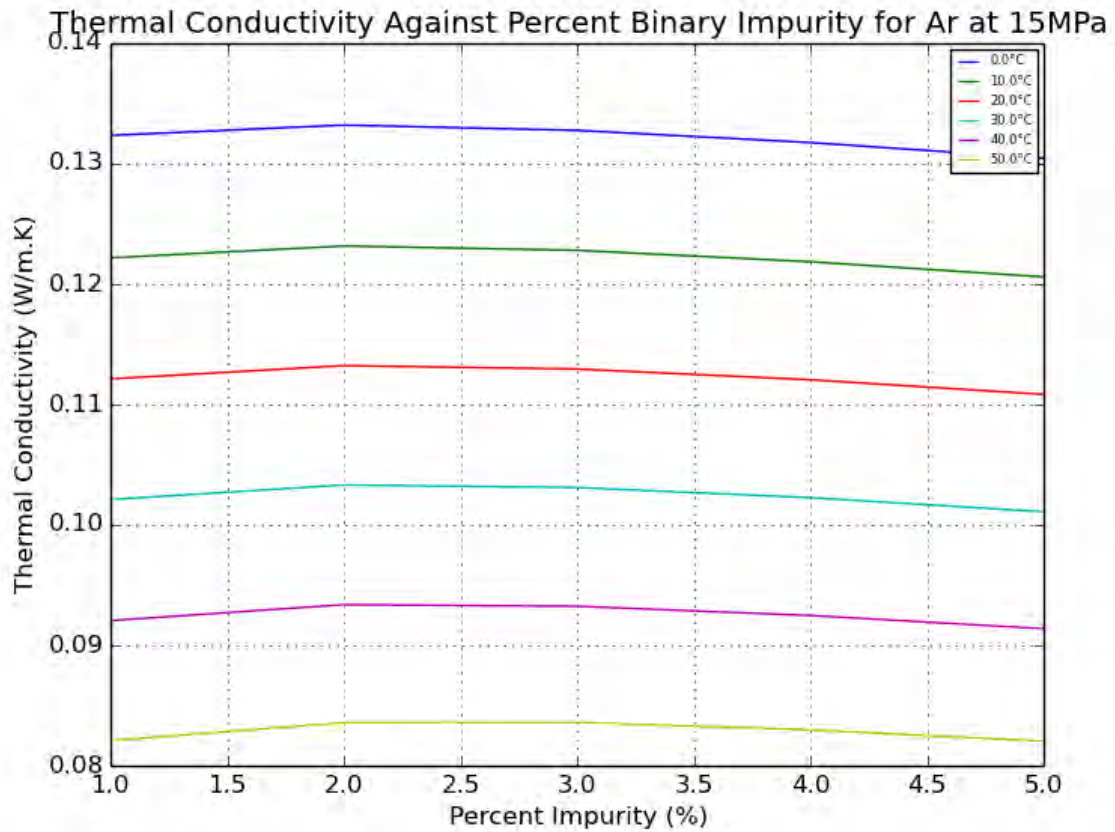


Figure A-105: Thermal conductivity of CO₂ with varying levels of Ar at 15MPa

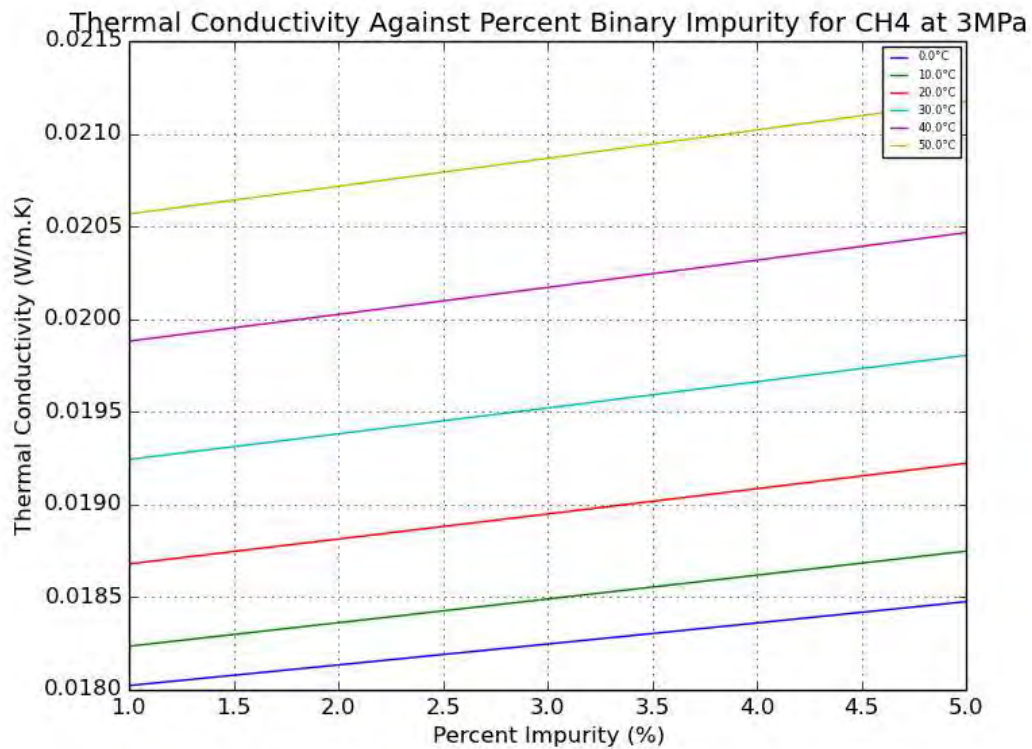


Figure A-106: Thermal conductivity of CO₂ with varying levels of CH₄ at 3MPa

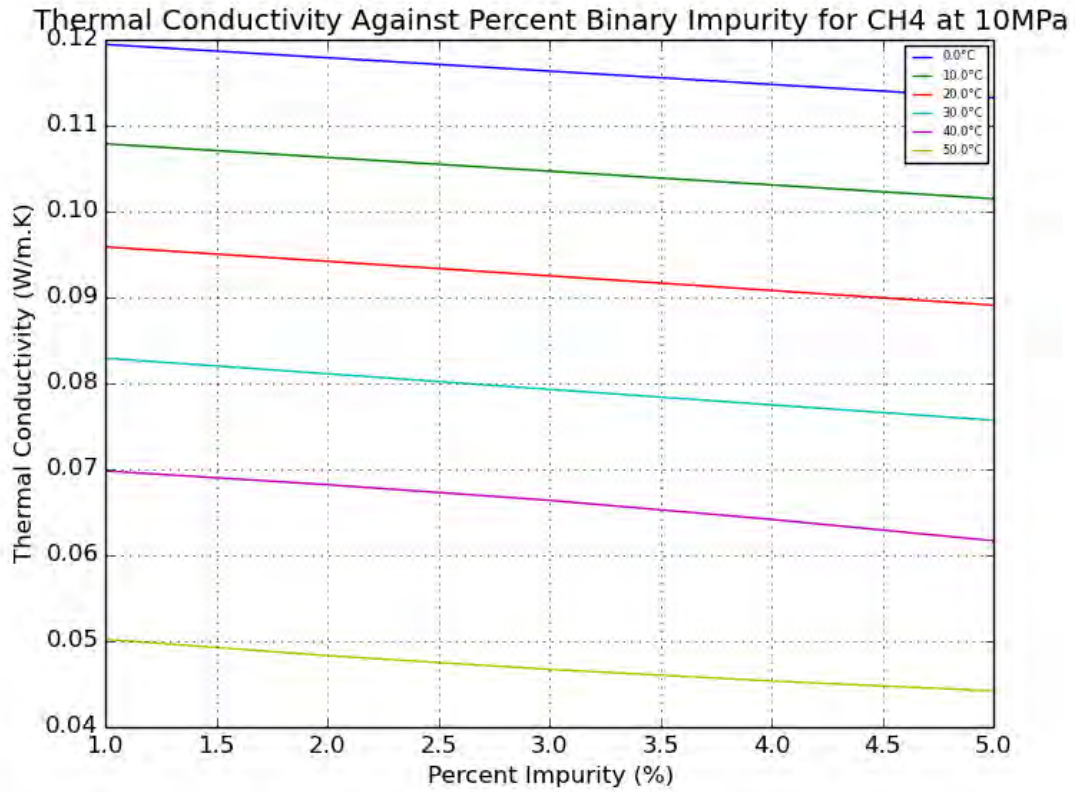


Figure A-107: Thermal conductivity of CO₂ with varying levels of CH₄ at 10MPa

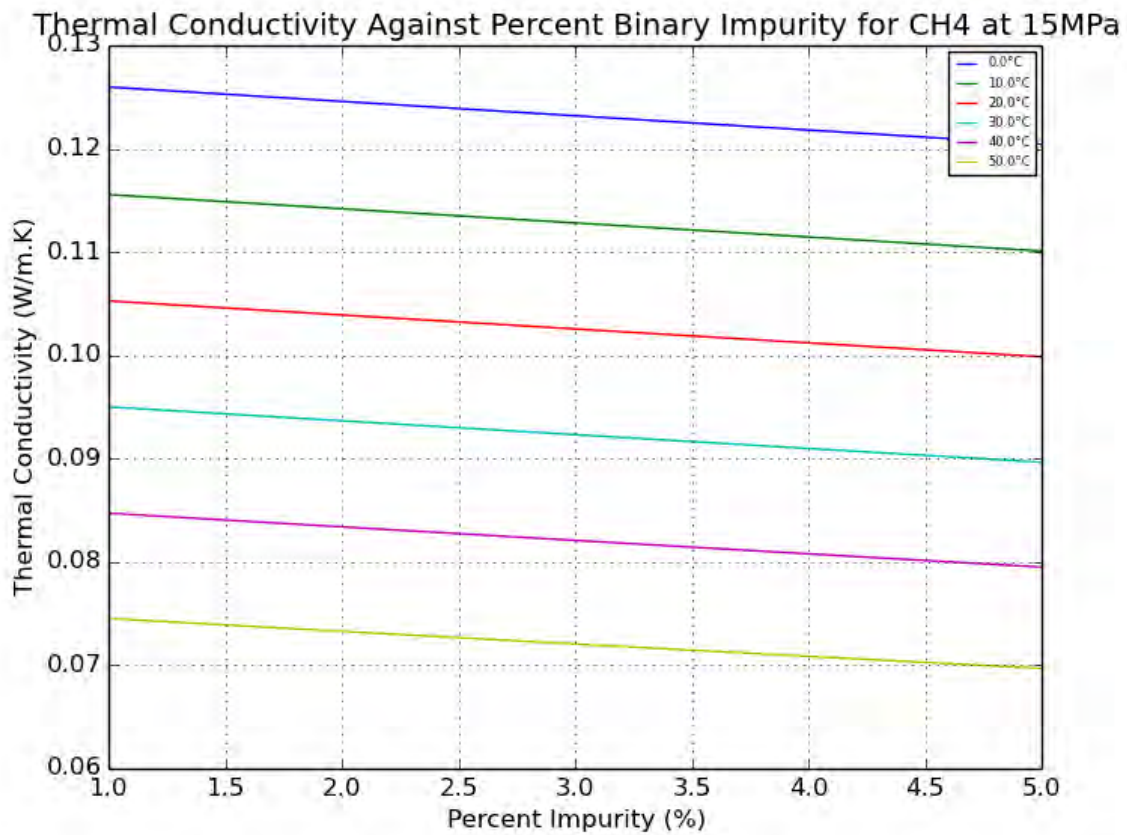


Figure A-108: Thermal conductivity of CO₂ with varying levels of CH₄ at 15MPa

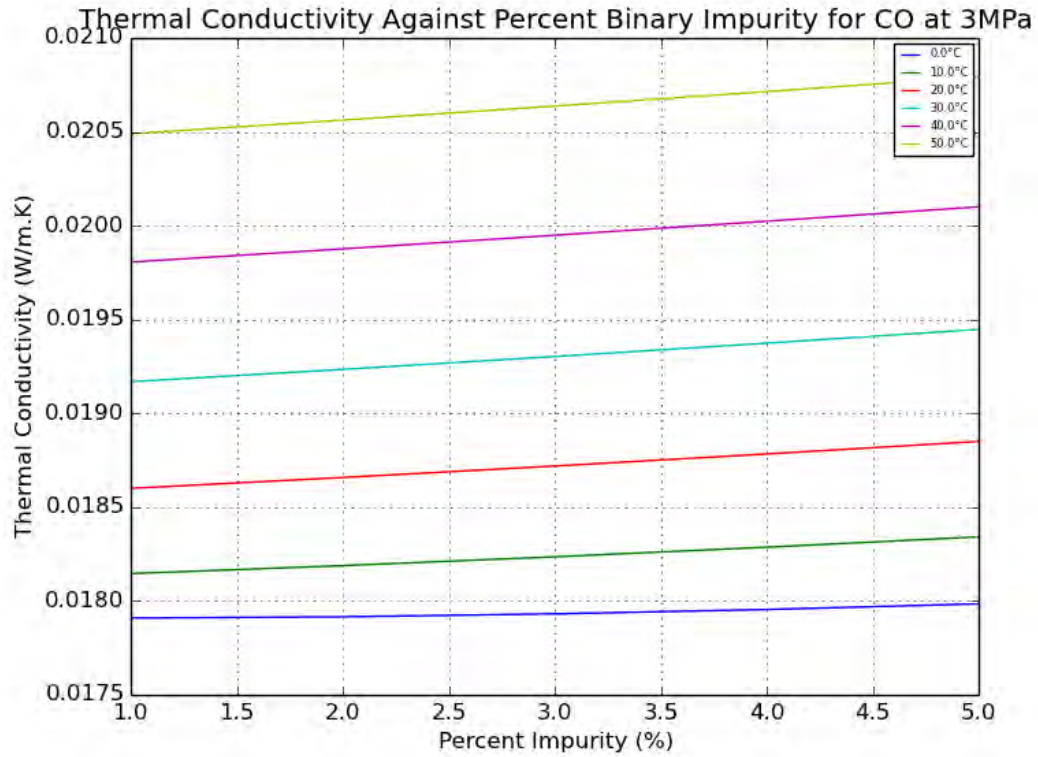


Figure A-109: Thermal conductivity of CO₂ with varying levels of CO at 3MPa

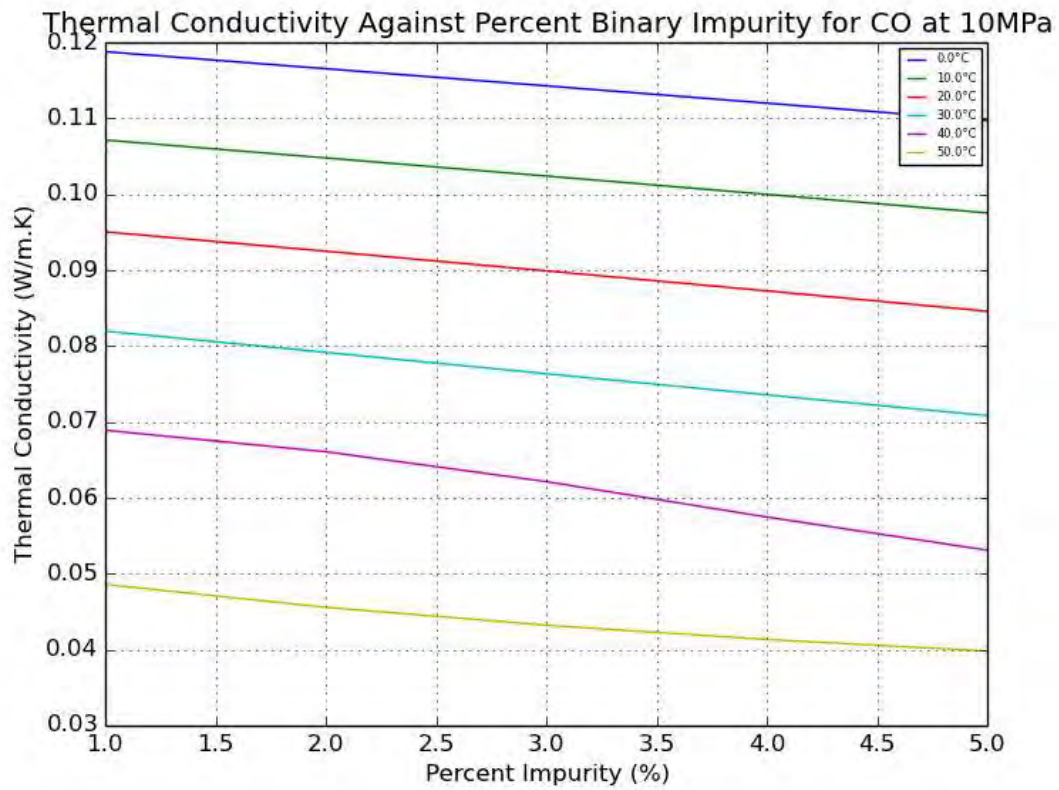


Figure A-110: Thermal conductivity of CO₂ with varying levels of CO at 10MPa

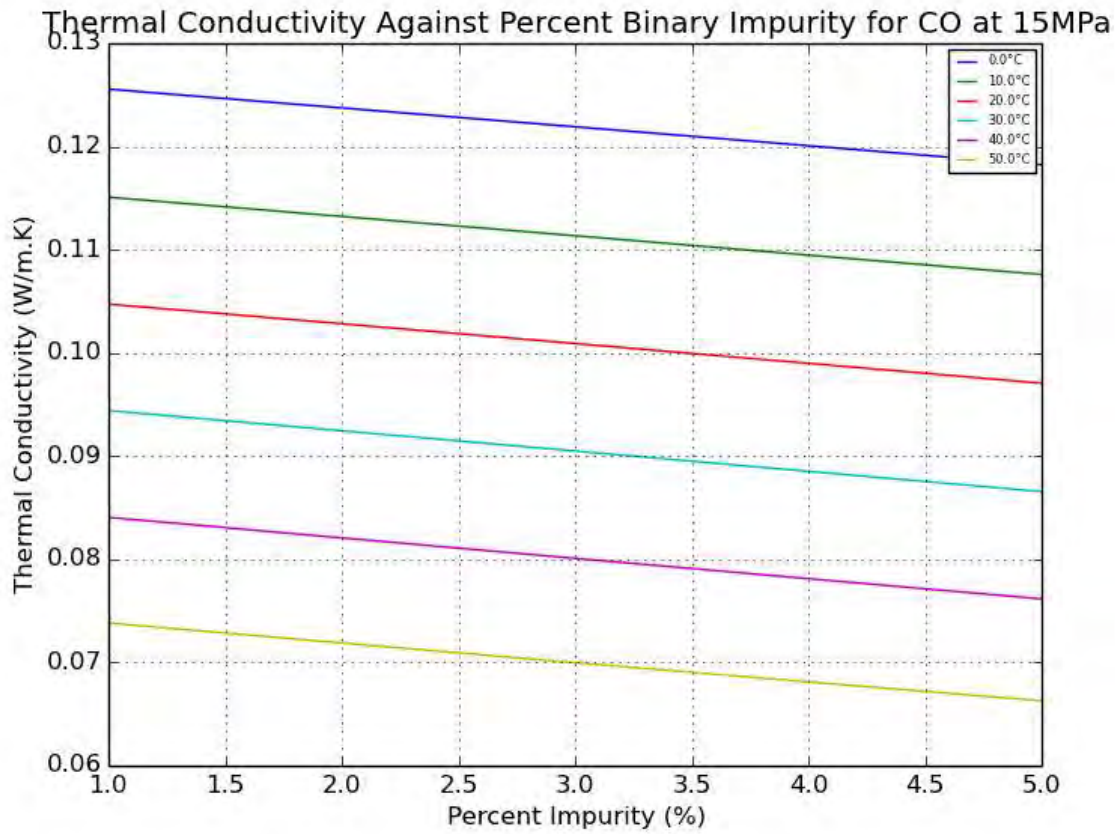


Figure A-111: Thermal conductivity of CO₂ with varying levels of CO at 15MPa

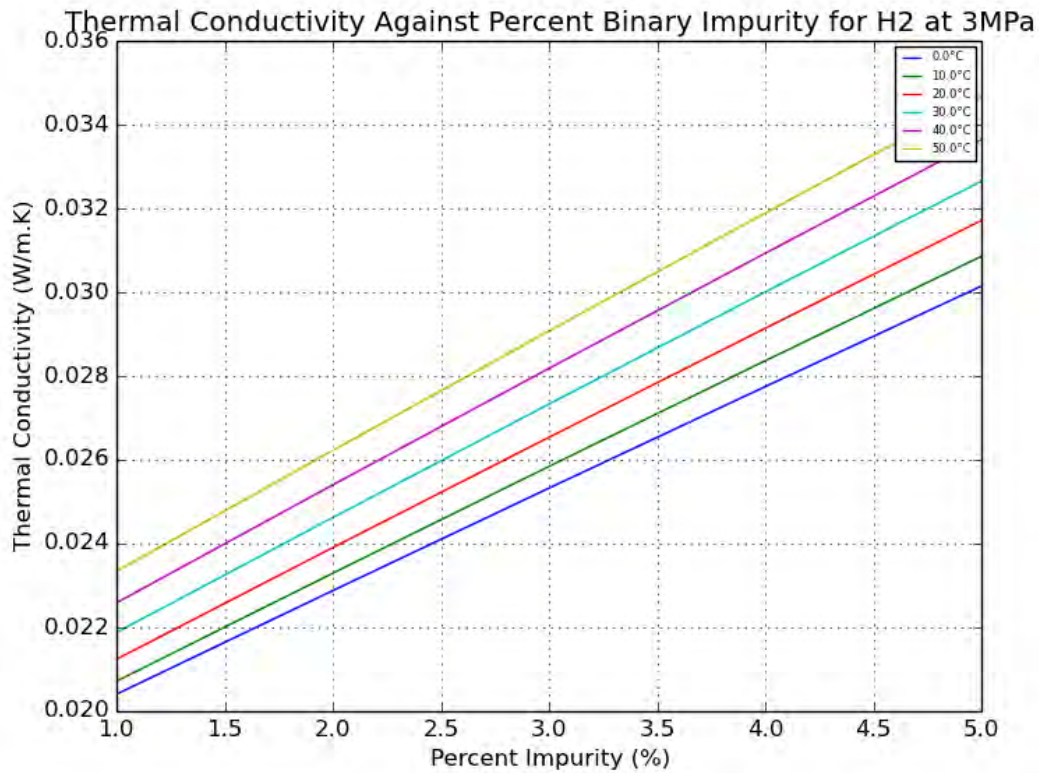


Figure A-112: Thermal conductivity of CO₂ with varying levels of H₂ at 3MPa

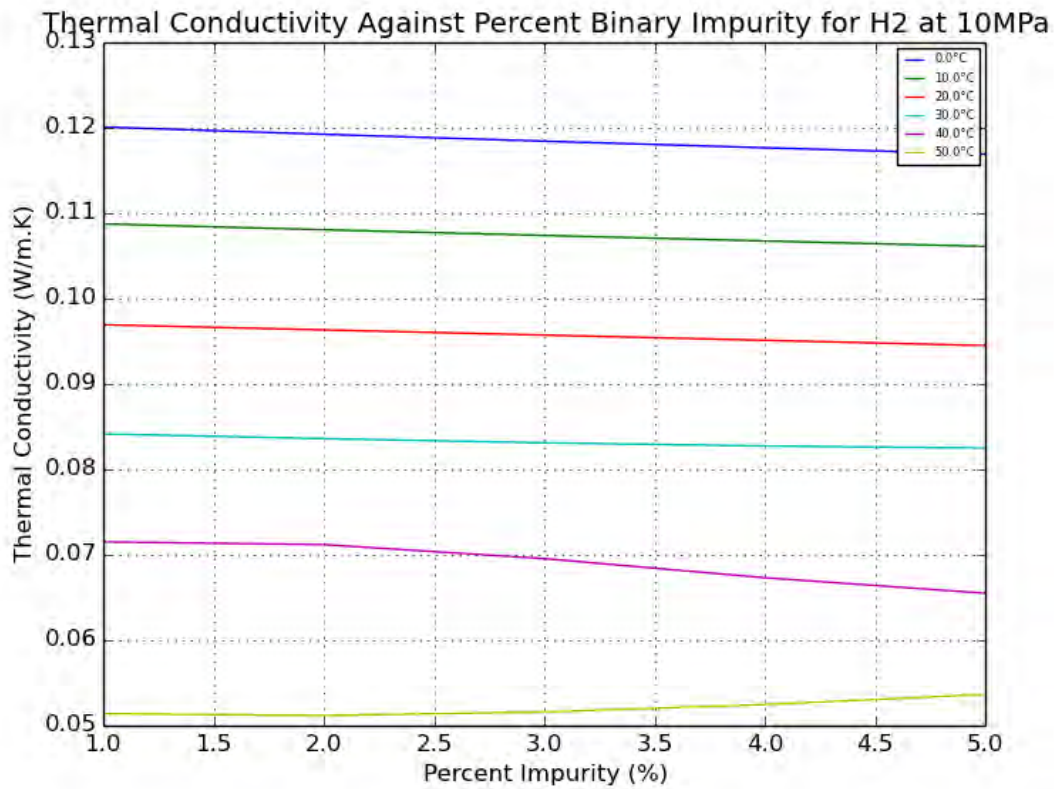


Figure A-113: Thermal conductivity of CO₂ with varying levels of H₂ at 10MPa

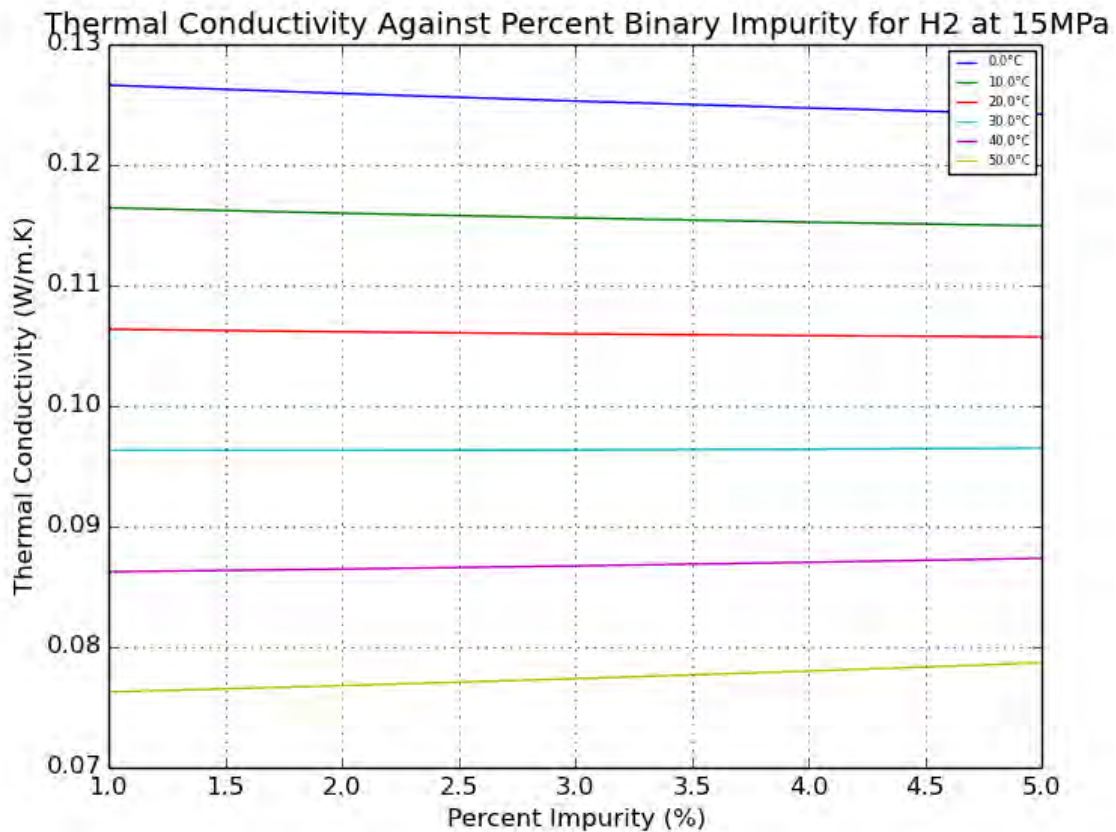


Figure A-114: Thermal conductivity of CO₂ with varying levels of H₂ at 15MPa

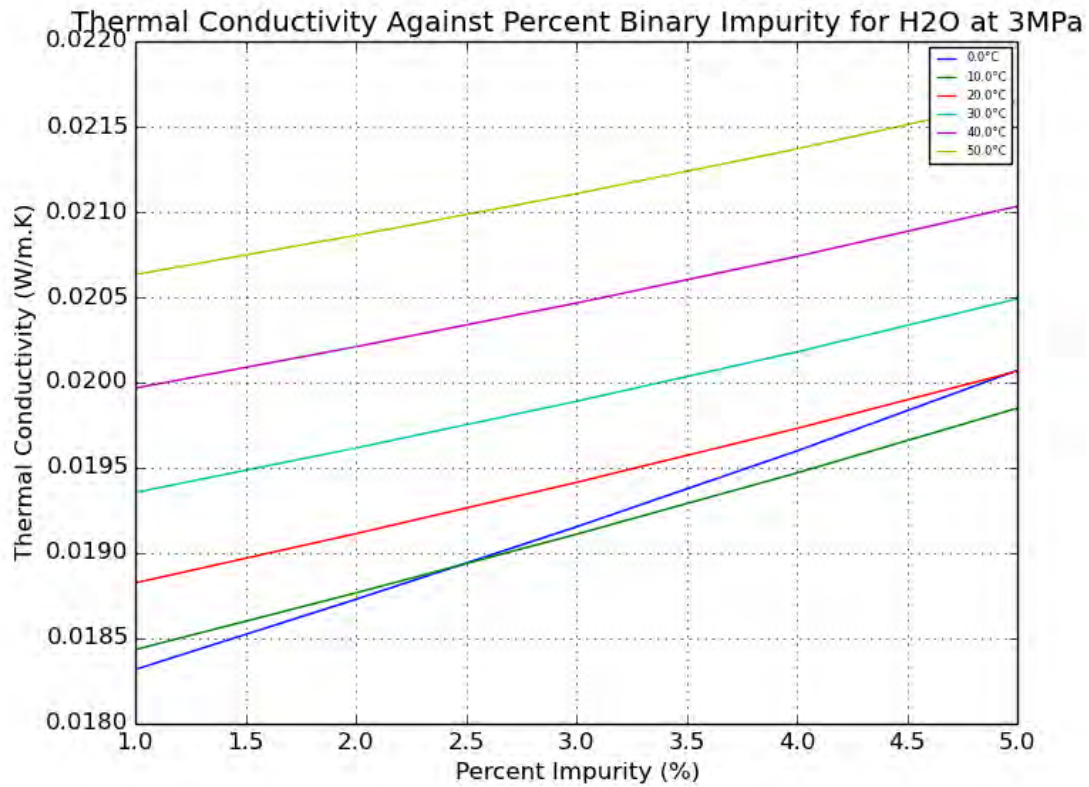


Figure A-115: Thermal conductivity of CO₂ with varying levels of H₂O at 3MPa

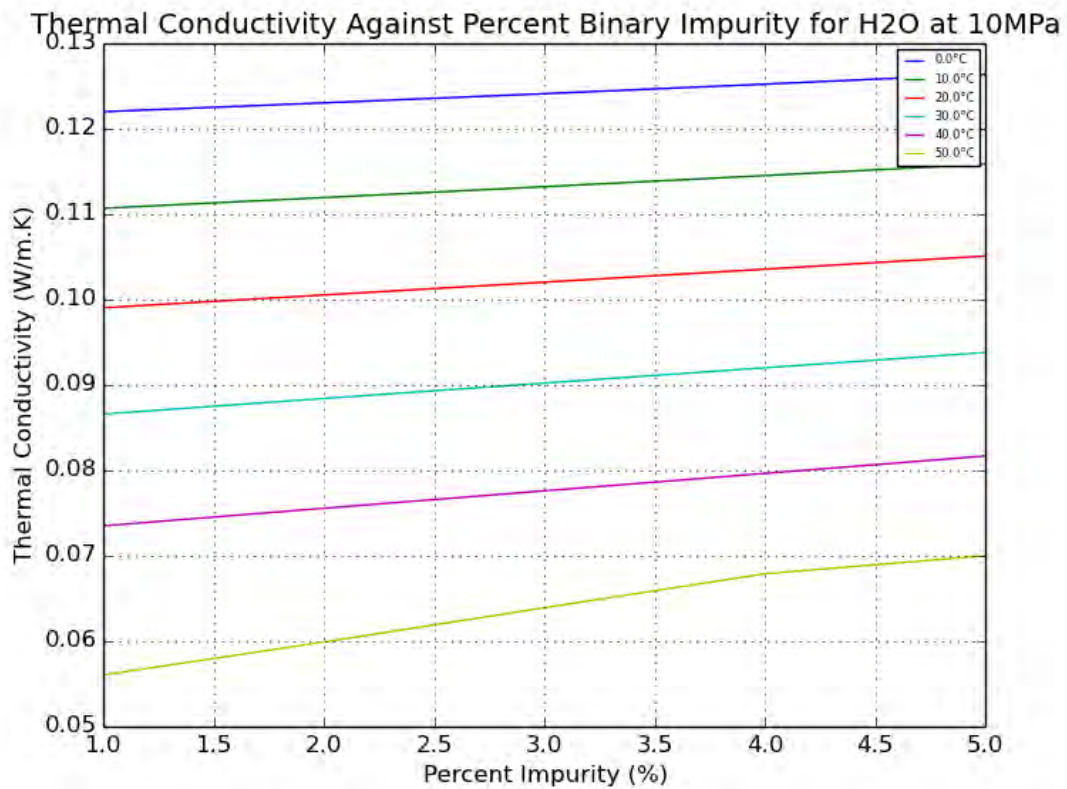


Figure A-116: Thermal conductivity of CO₂ with varying levels of H₂O at 10MPa

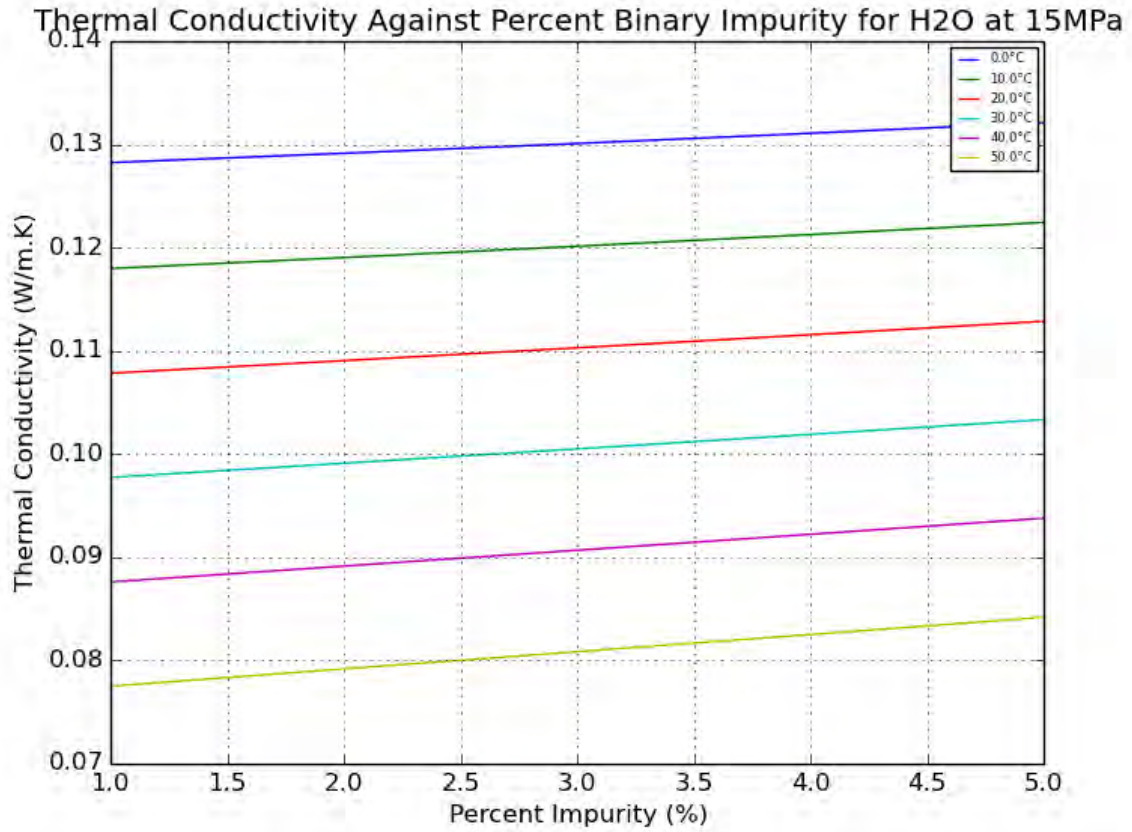


Figure A-117: Thermal conductivity of CO₂ with varying levels of H₂O at 15MPa

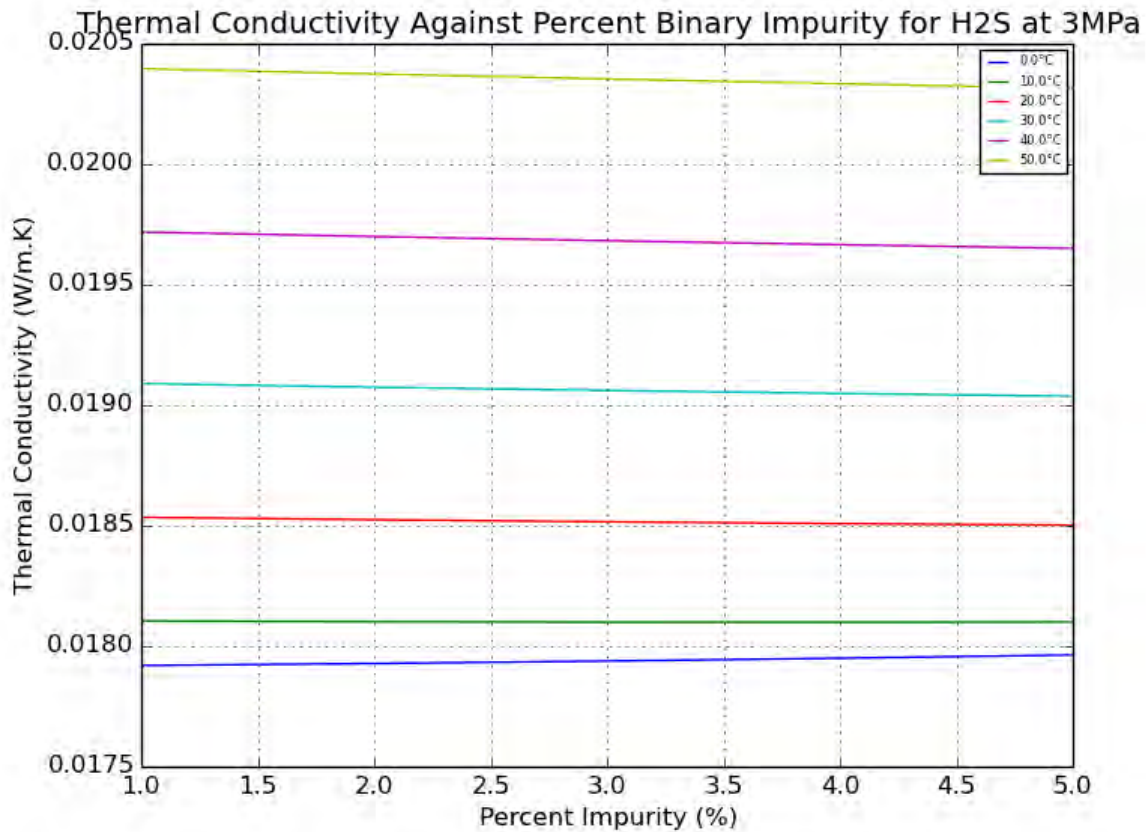


Figure A-118: Thermal conductivity of CO₂ with varying levels of H₂S at 3MPa

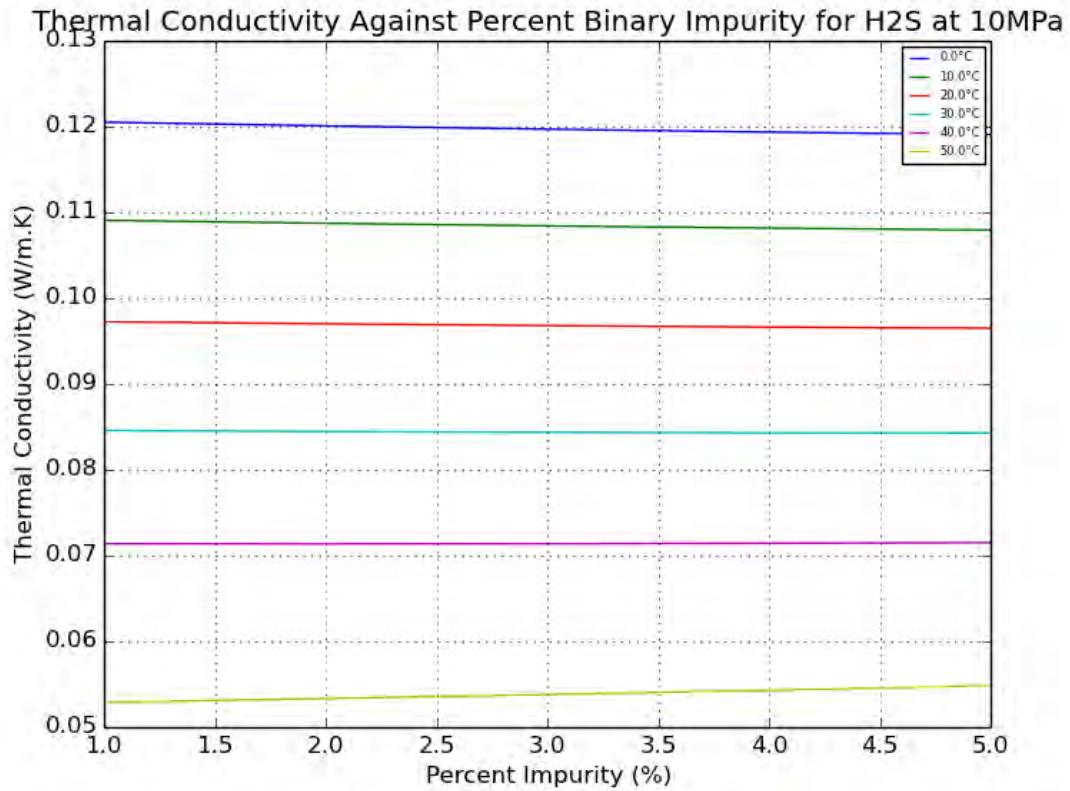


Figure A-119: Thermal conductivity of CO₂ with varying levels of H₂S at 10MPa

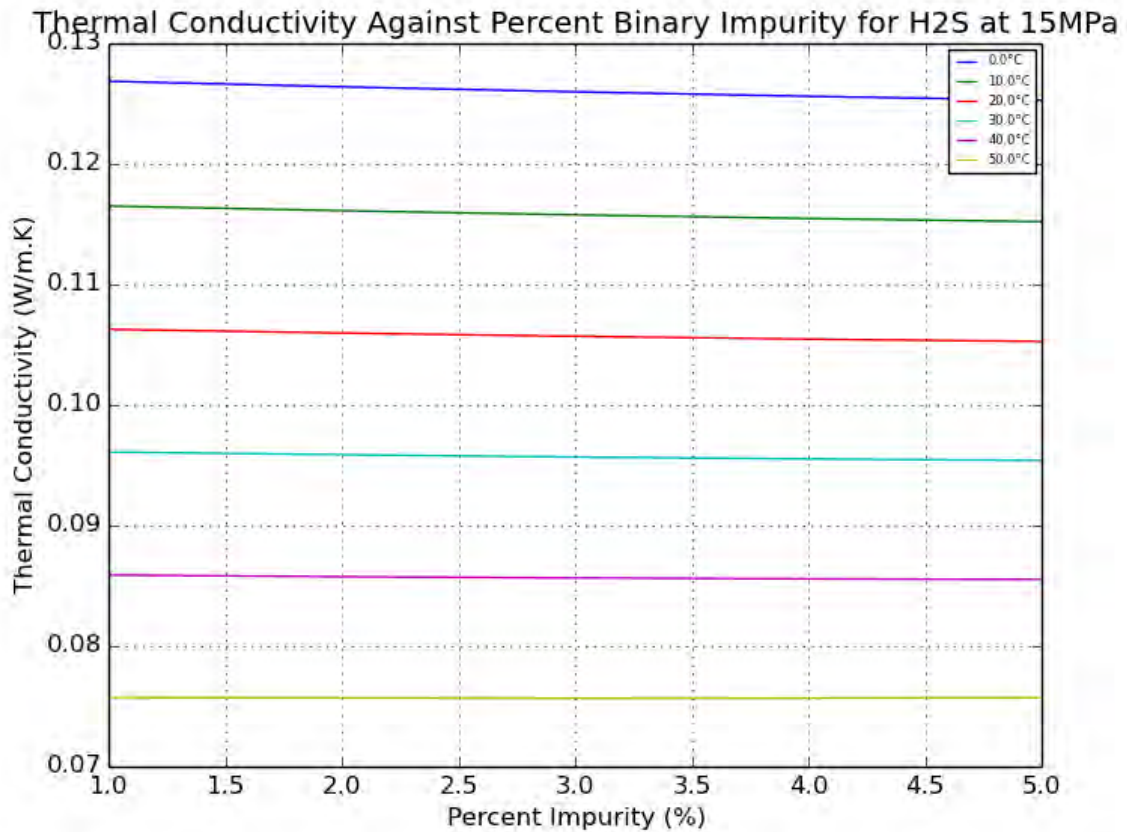


Figure A-120: Thermal conductivity of CO₂ with varying levels of H₂S at 15MPa

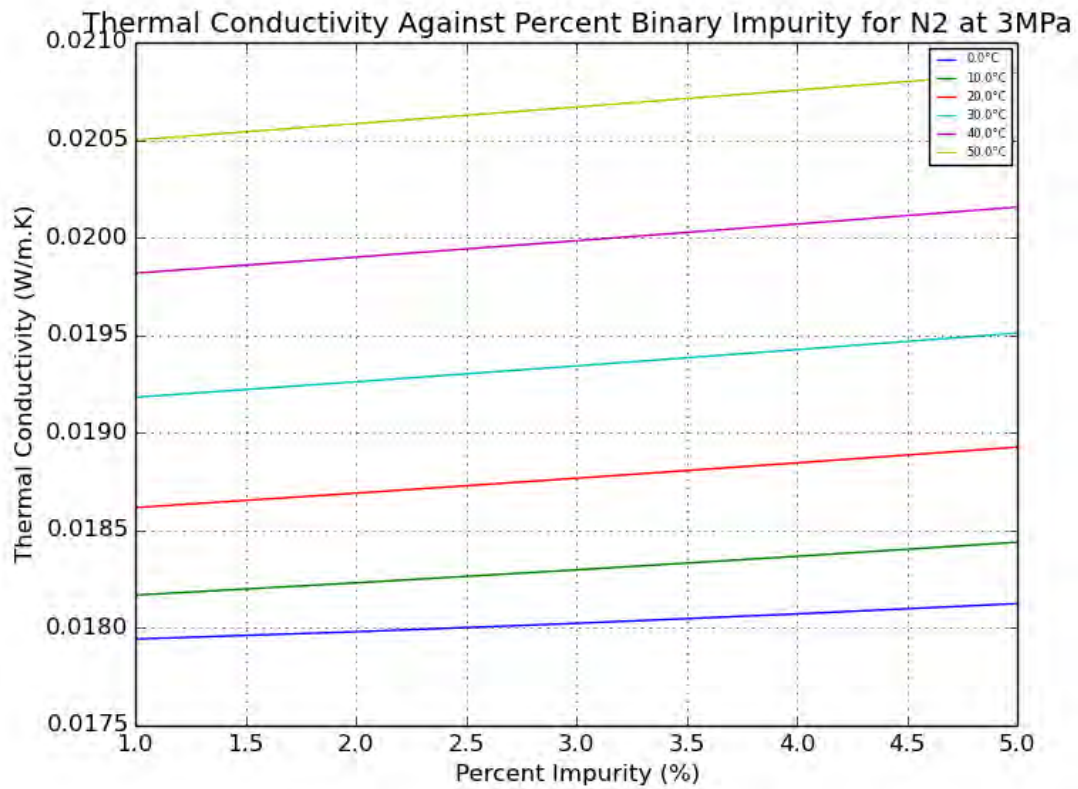


Figure A-121: Thermal conductivity of CO₂ with varying levels of N₂ at 3MPa

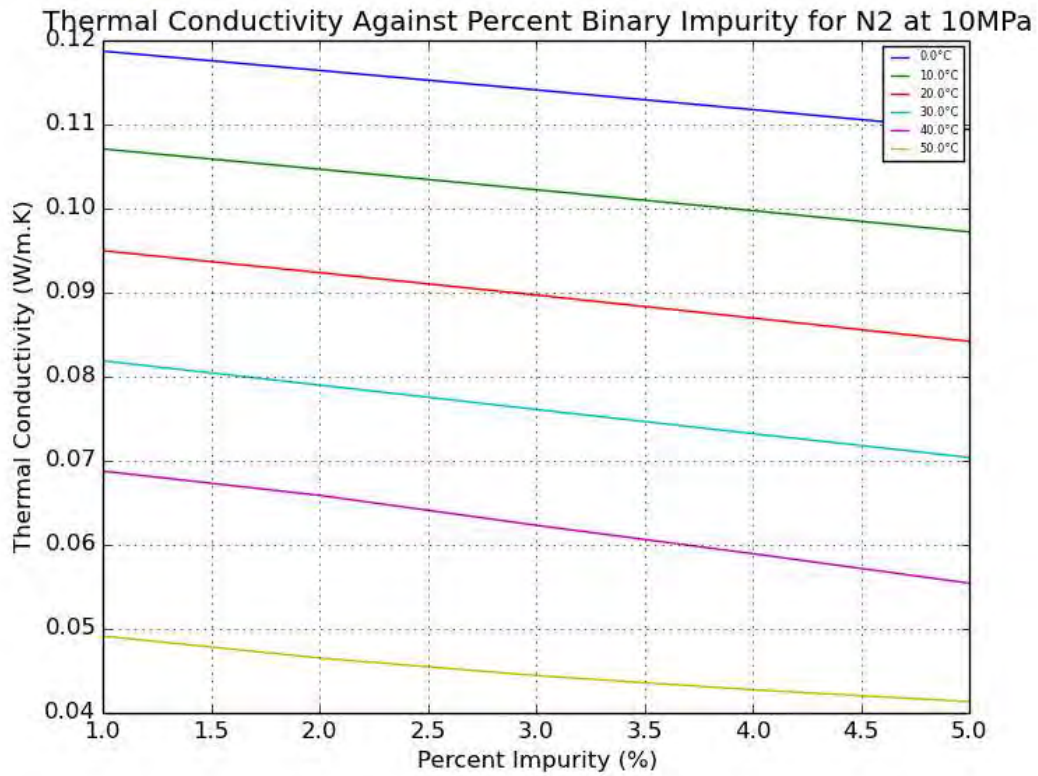


Figure A-122: Thermal conductivity of CO₂ with varying levels of N₂ at 10MPa

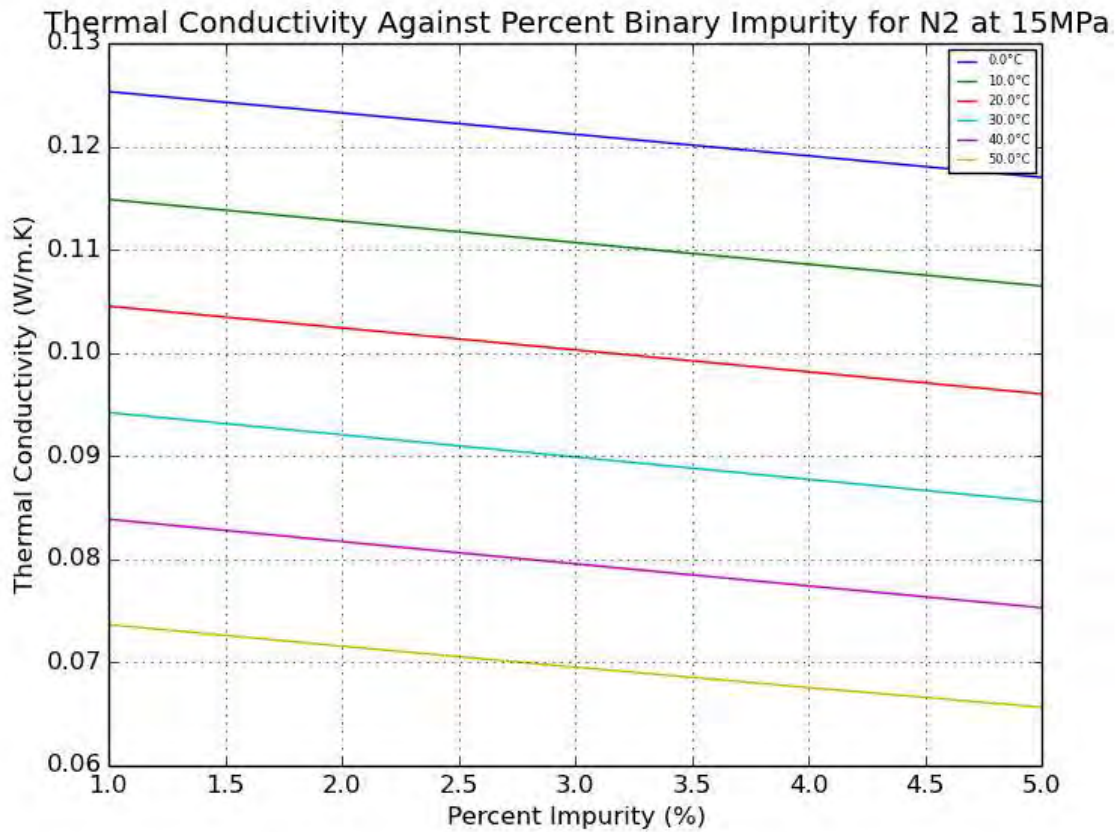


Figure A-123: Thermal conductivity of CO₂ with varying levels of N₂ at 15MPa

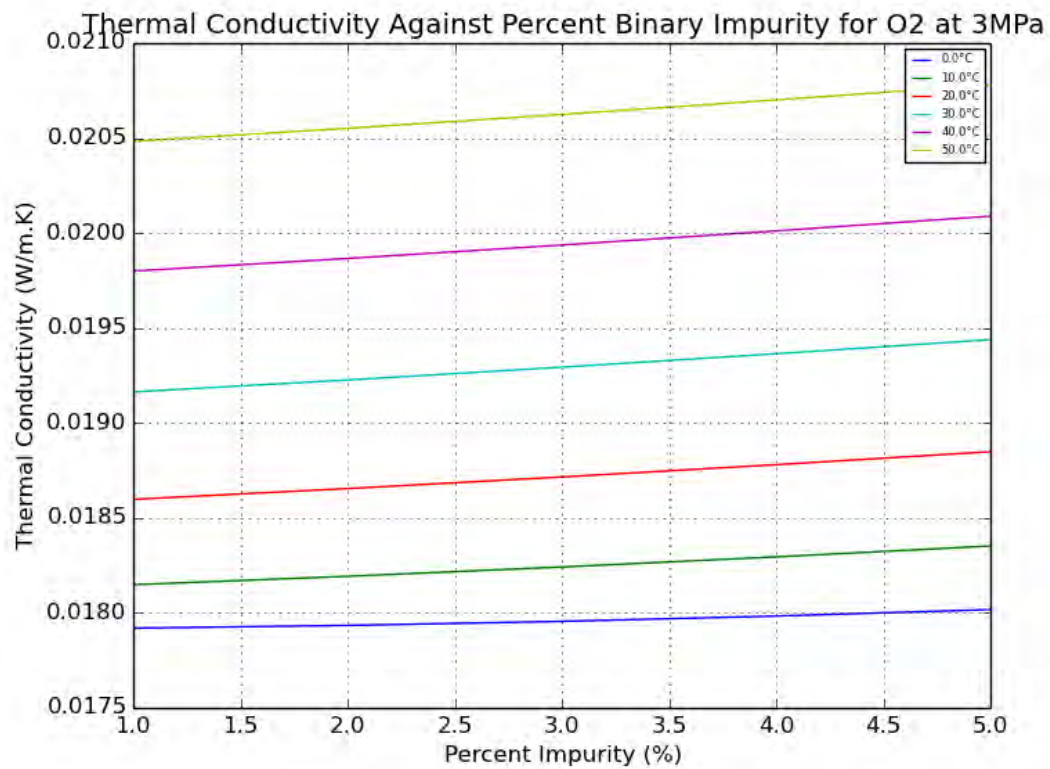


Figure A-124: Thermal conductivity of CO₂ with varying levels of O₂ at 3MPa

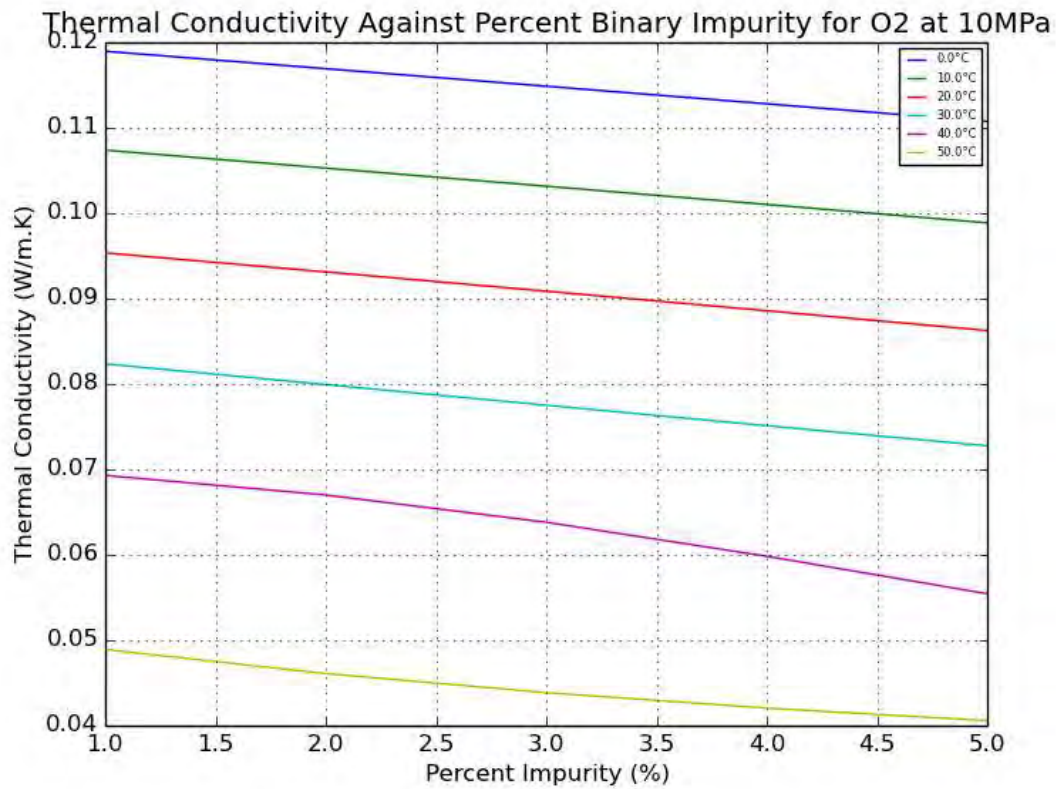


Figure A-125: Thermal conductivity of CO₂ with varying levels of O₂ at 10MPa

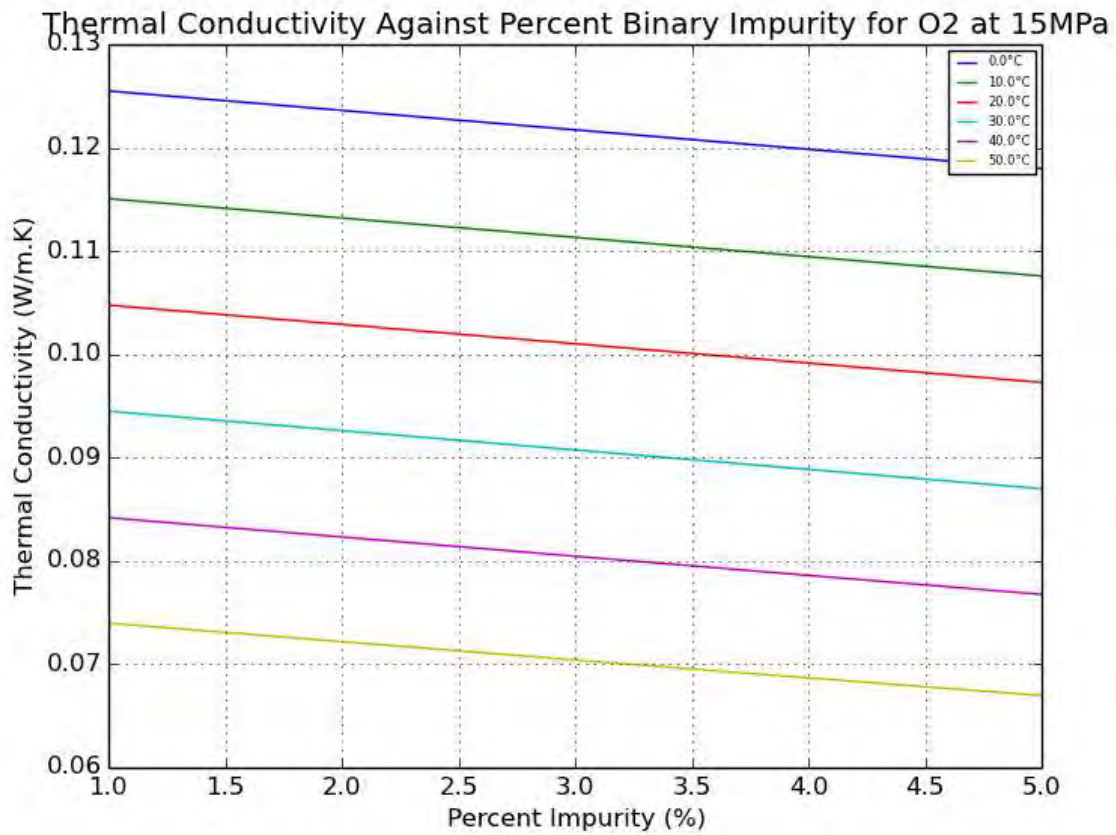


Figure A-126: Thermal conductivity of CO₂ with varying levels of O₂ at 15MPa

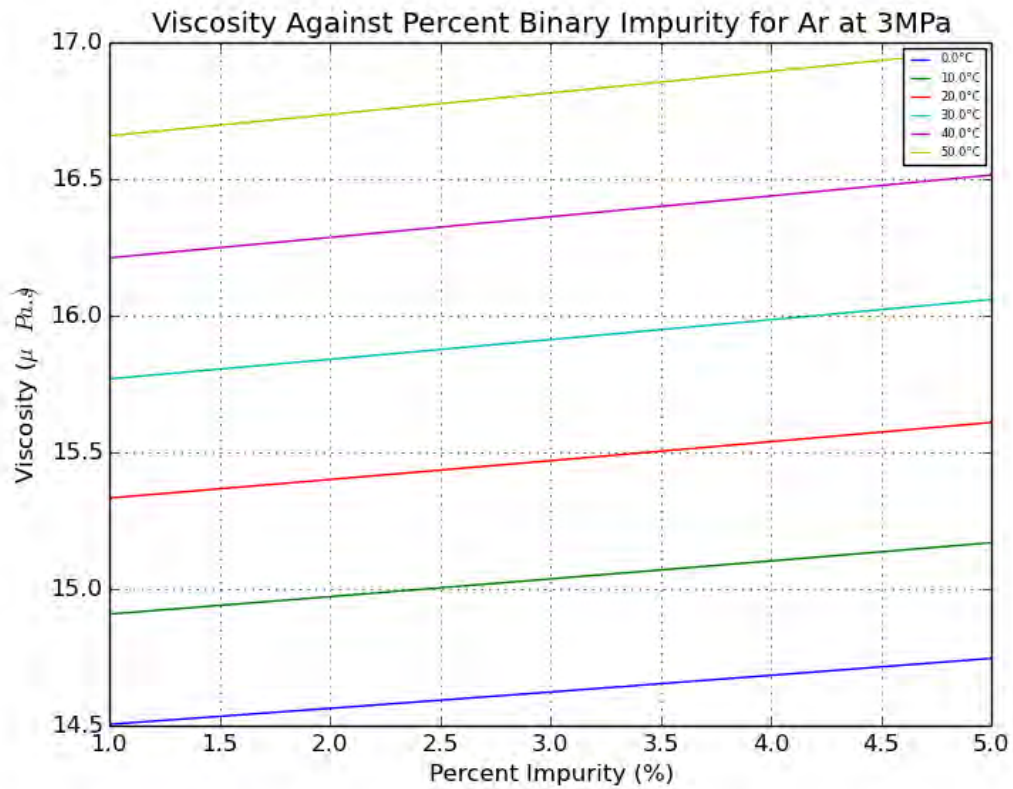


Figure A-127: Viscosity of CO₂ with varying levels of Ar at 3MPa

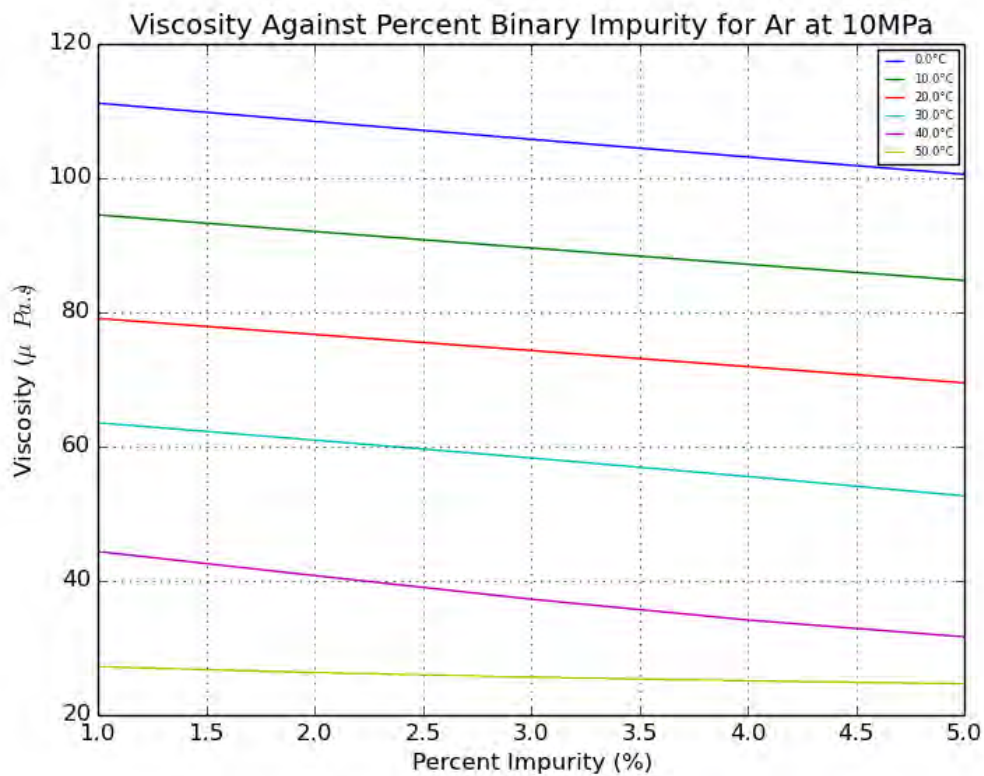


Figure A-128: Viscosity of CO₂ with varying levels of Ar at 10MPa

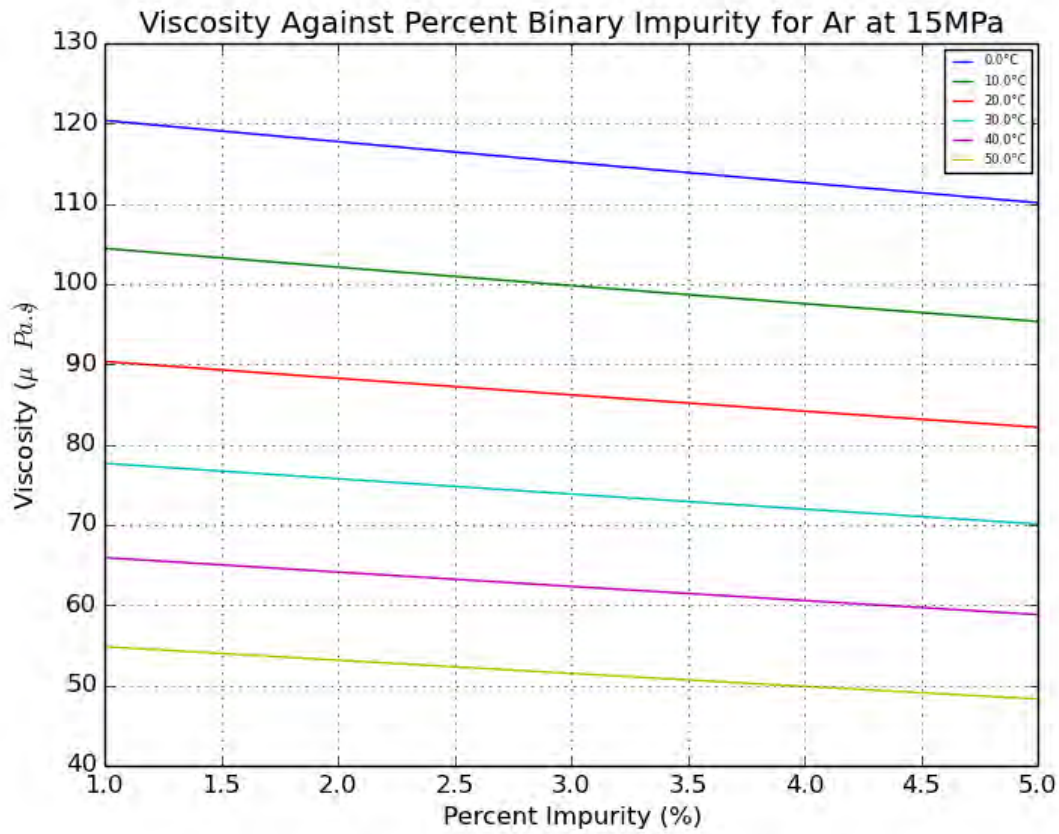


Figure A-129: Viscosity of CO₂ with varying levels of Ar at 15MPa

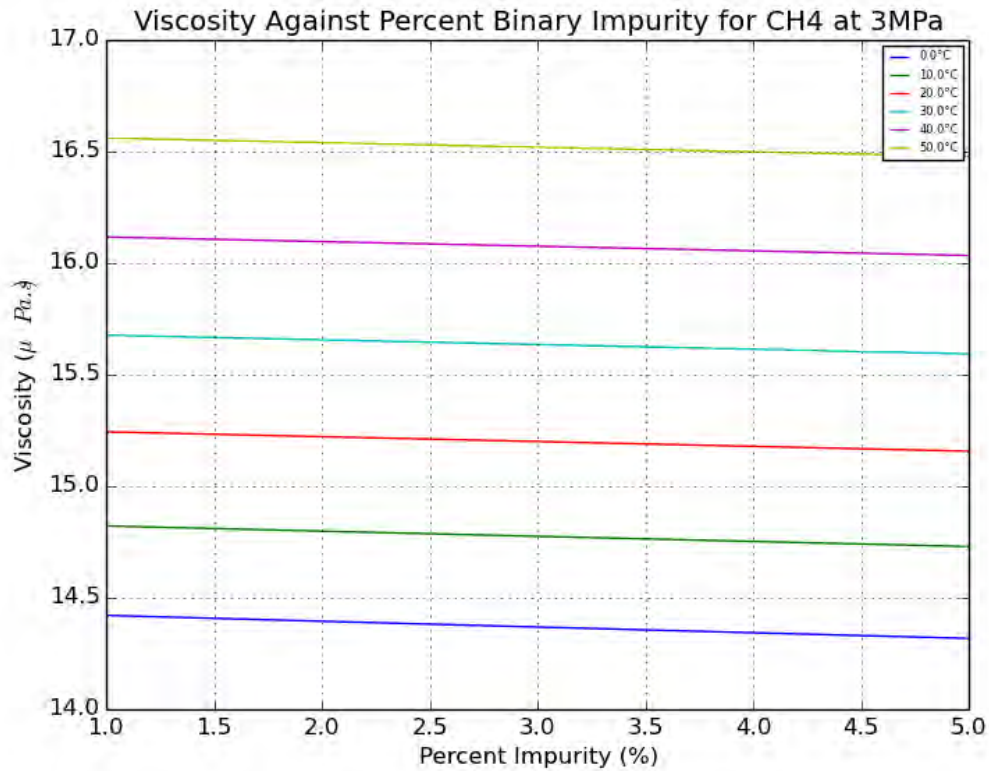


Figure A-130: Viscosity of CO₂ with varying levels of CH₄ at 3MPa

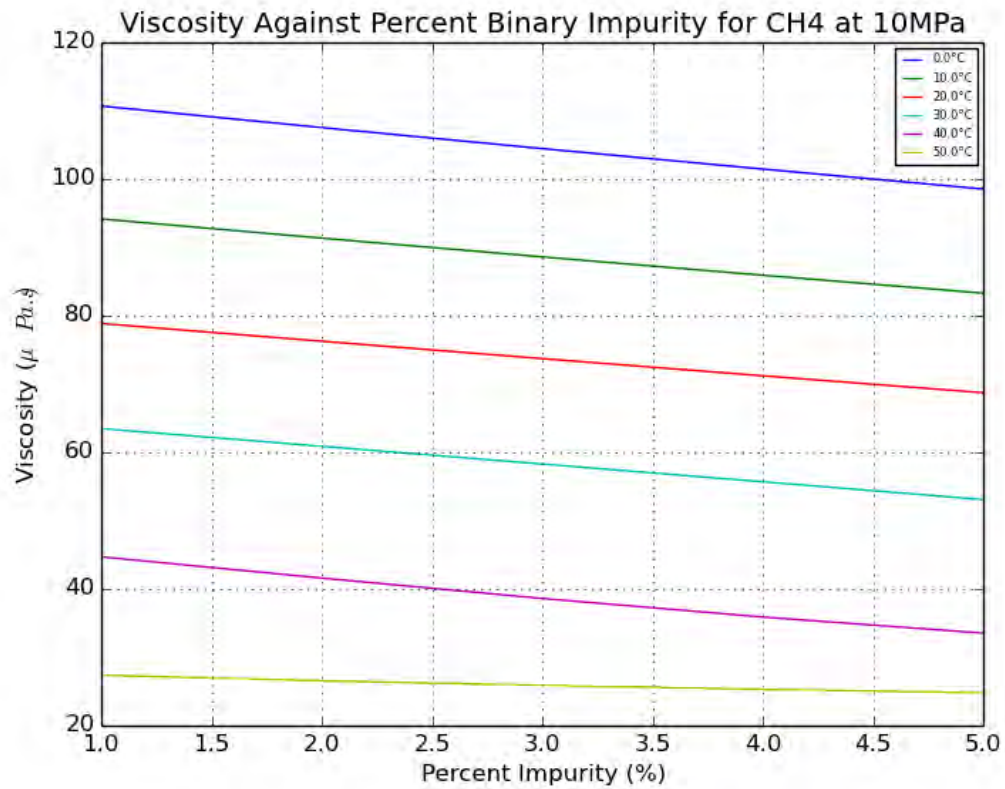


Figure A-131: Viscosity of CO₂ with varying levels of CH₄ at 10MPa

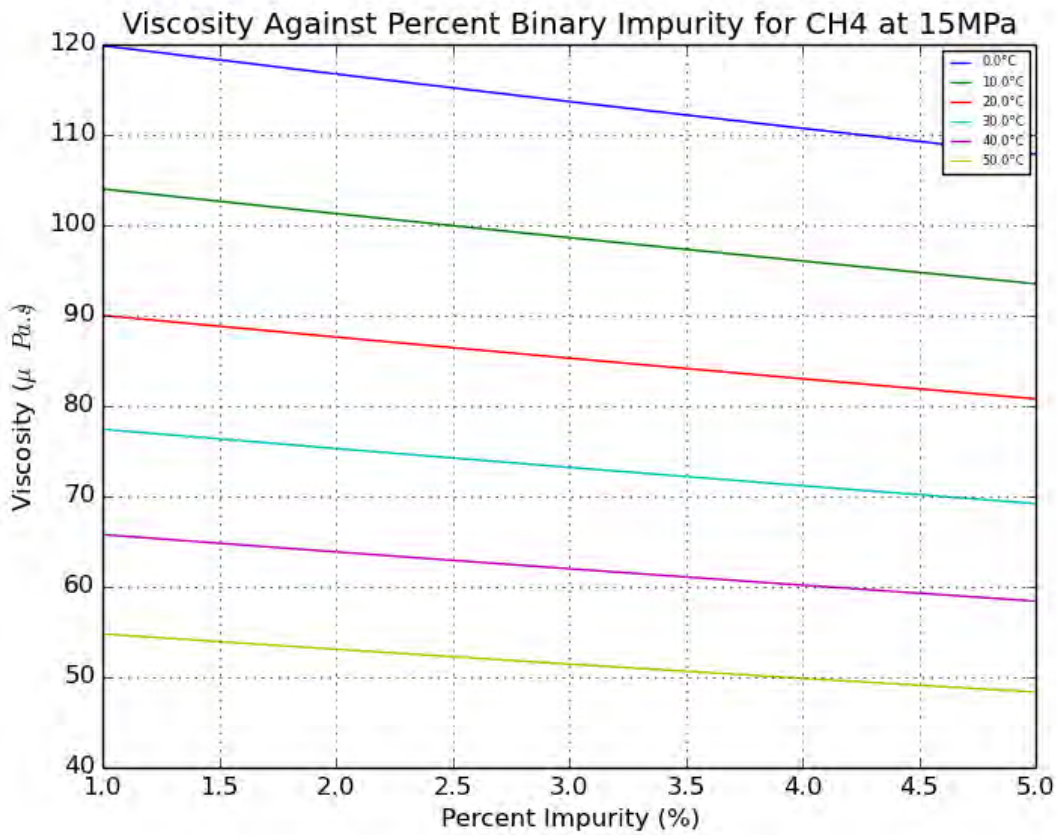


Figure A-132: Viscosity of CO₂ with varying levels of CH₄ at 15MPa

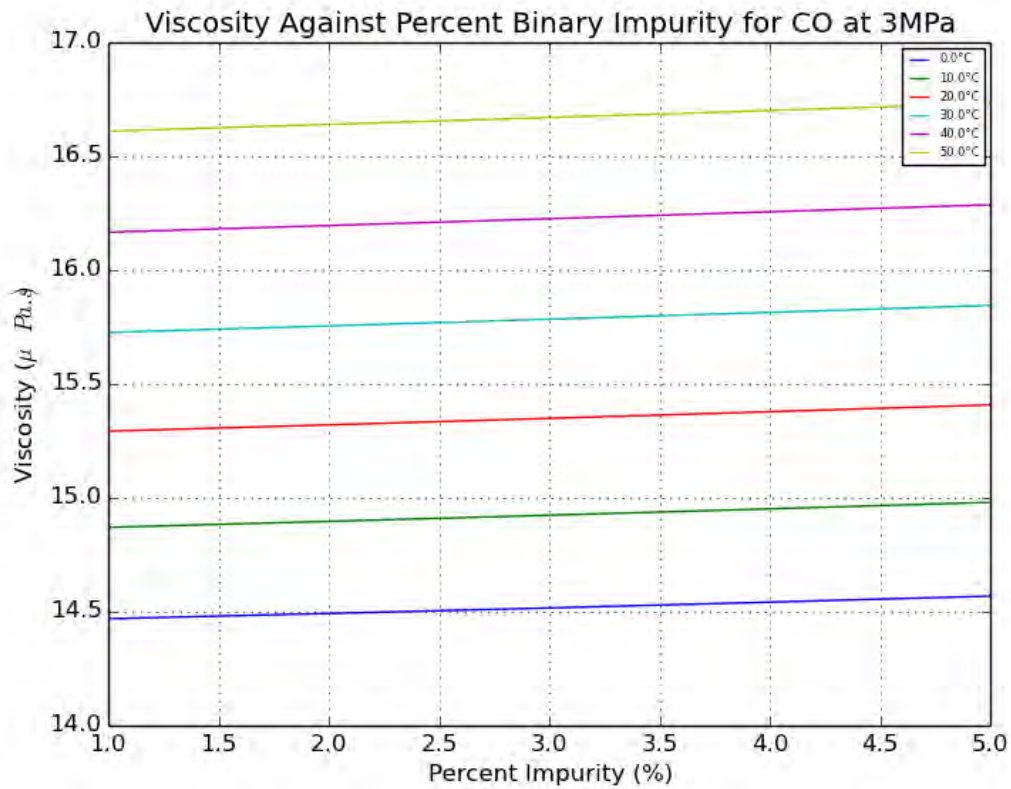


Figure A-133: Viscosity of CO₂ with varying levels of CH₄ at 3MPa

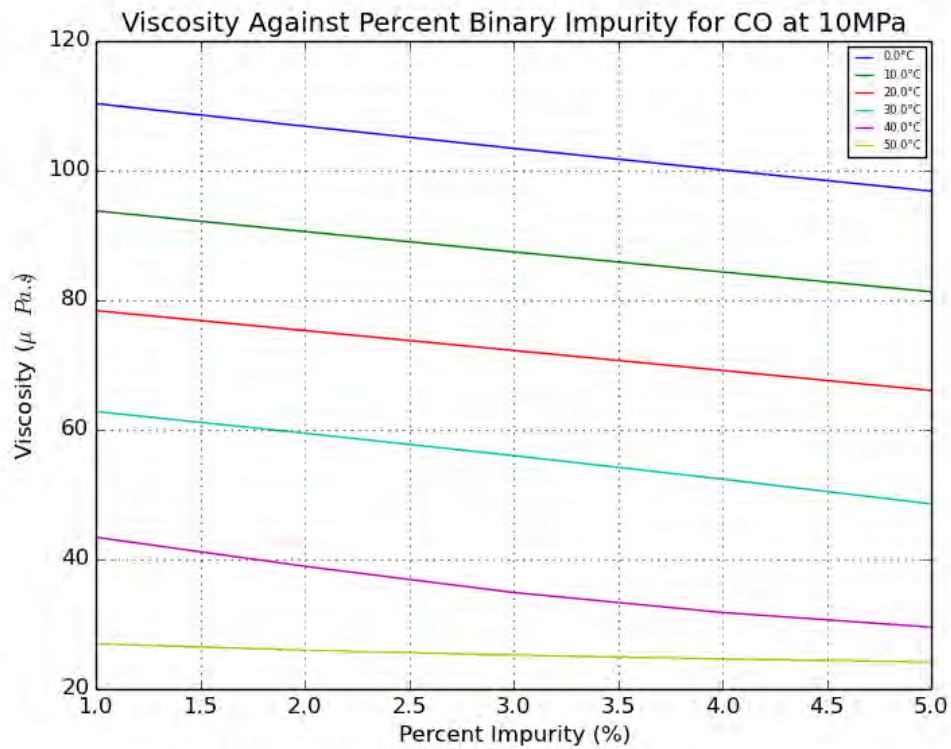


Figure A-134: Viscosity of CO₂ with varying levels of CO at 10MPa

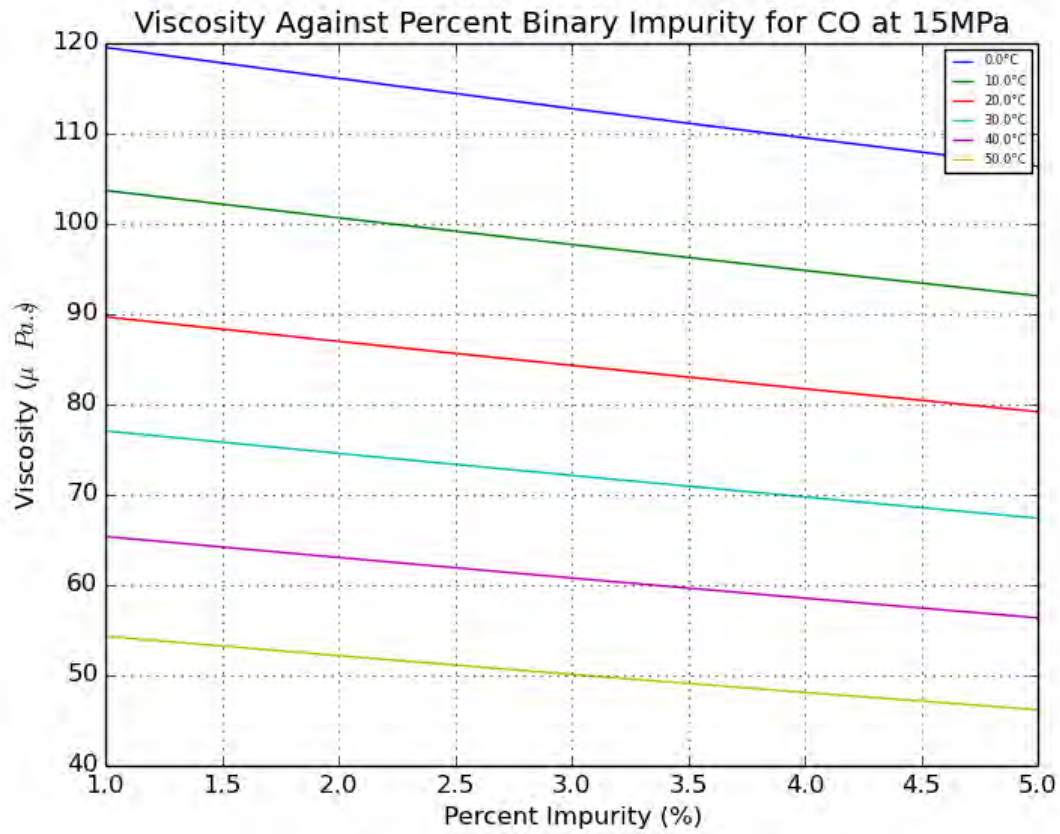


Figure A-135: Viscosity of CO₂ with varying levels of CO at 15MPa

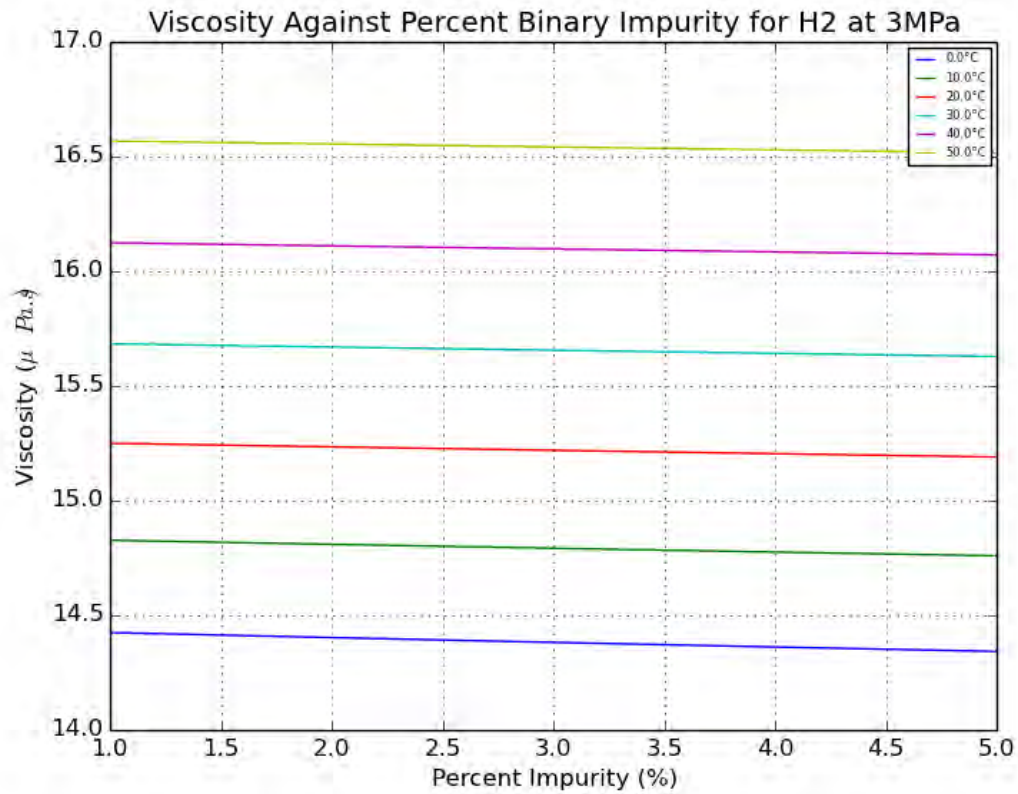


Figure A-136: Viscosity of CO₂ with varying levels of H₂ at 3MPa

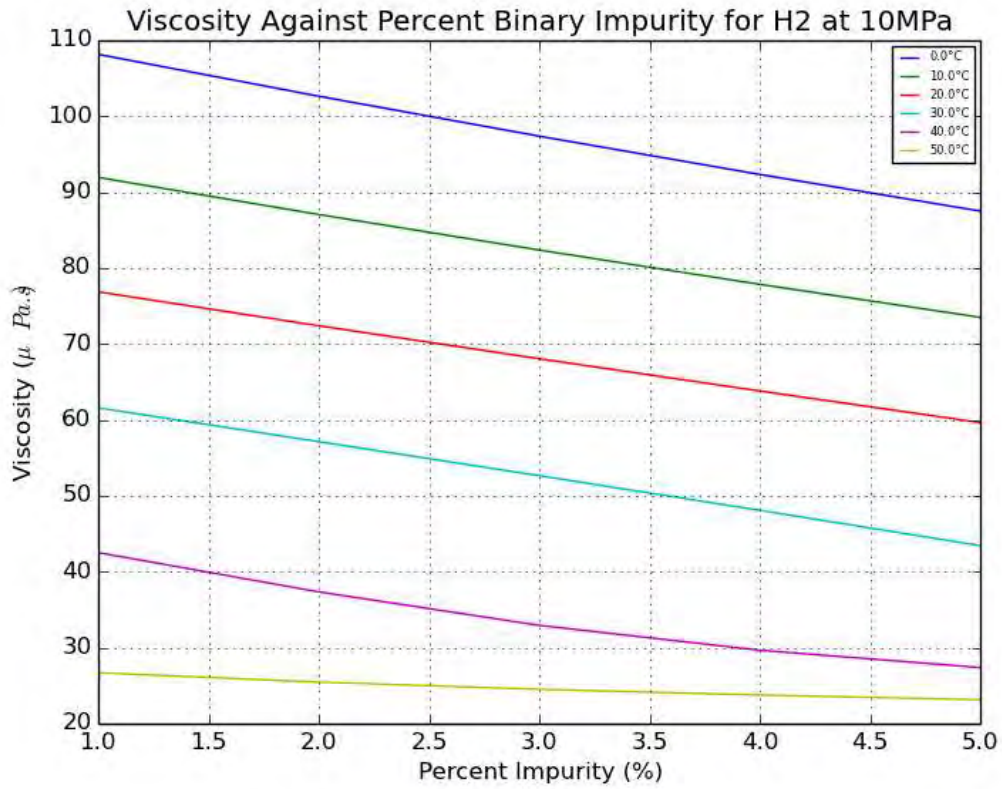


Figure A-137: Viscosity of CO₂ with varying levels of H₂ at 10MPa

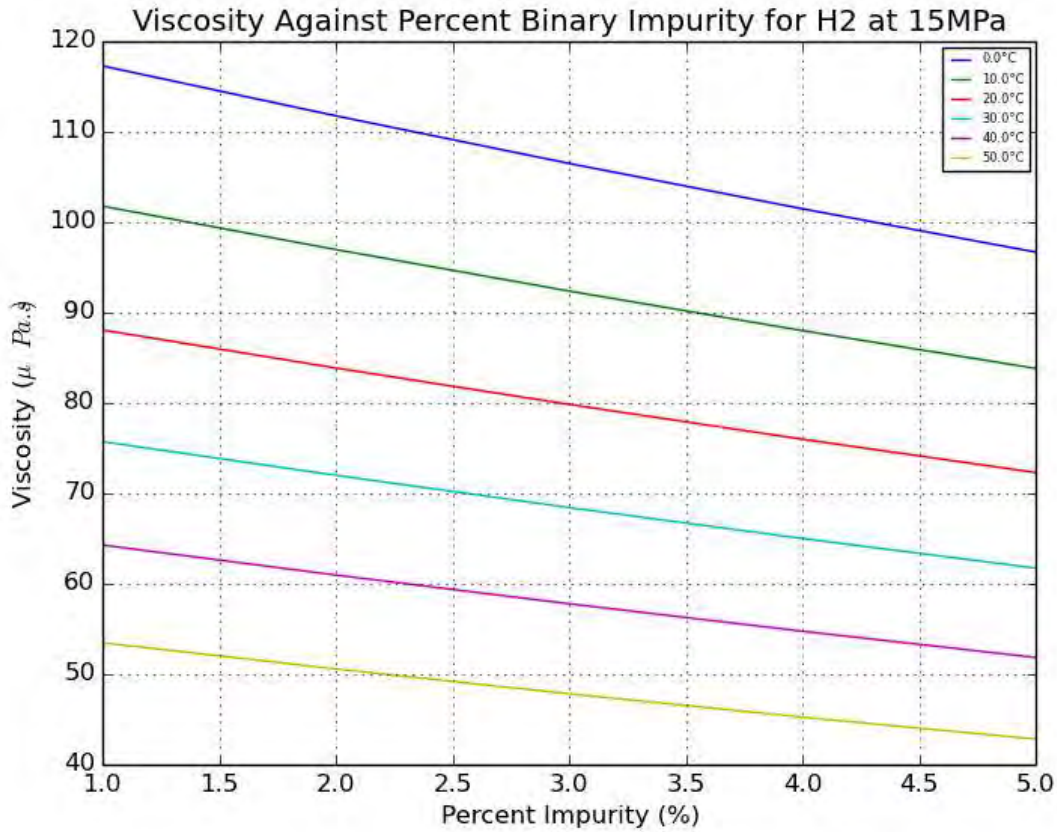


Figure A-138: Viscosity of CO₂ with varying levels of H₂ at 15MPa

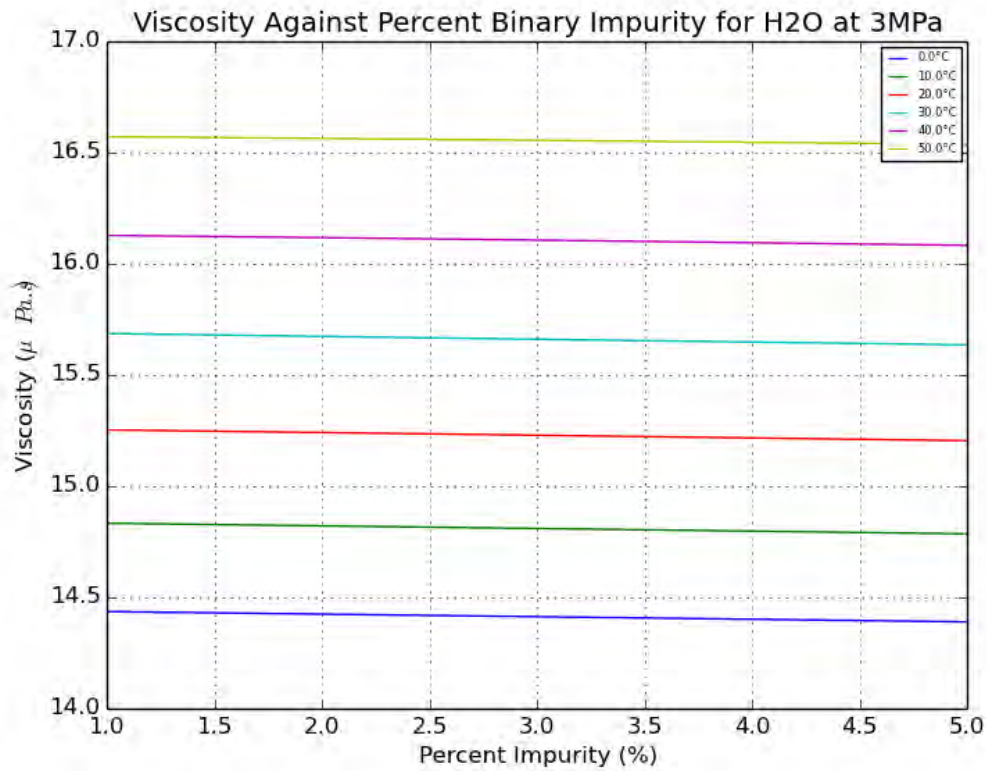


Figure A-139: Viscosity of CO₂ with varying levels of H₂O at 3MPa

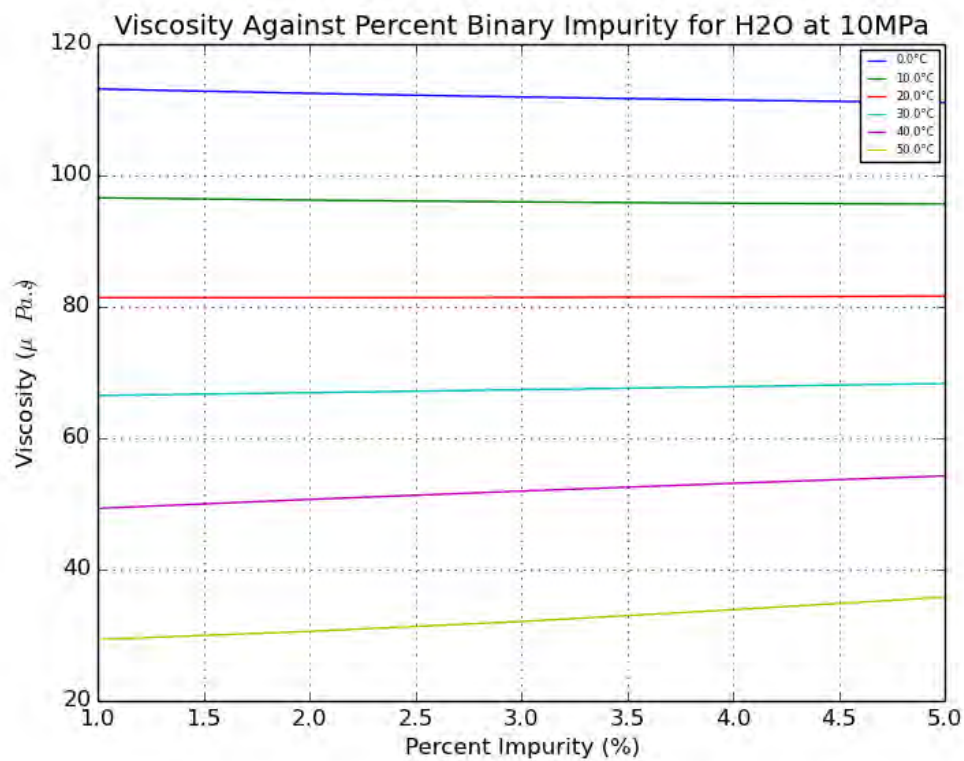


Figure A-140: Viscosity of CO₂ with varying levels of H₂O at 10MPa

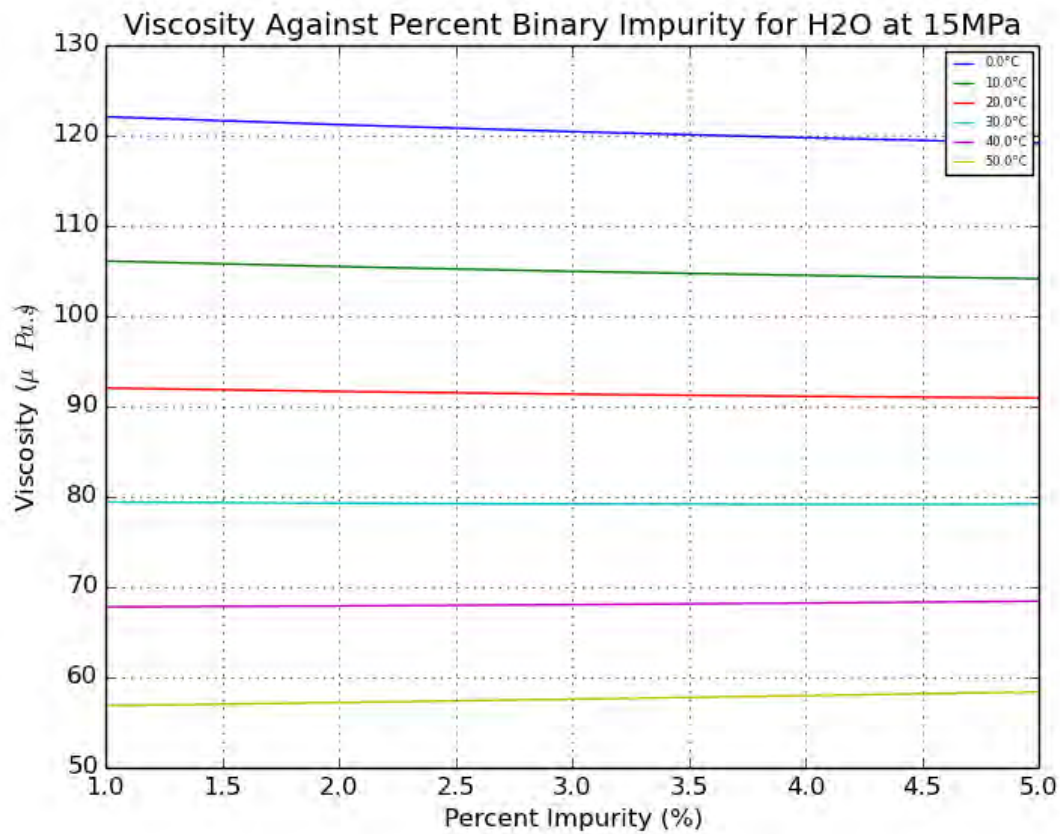


Figure A-141: Viscosity of CO₂ with varying levels of H₂O at 15MPa

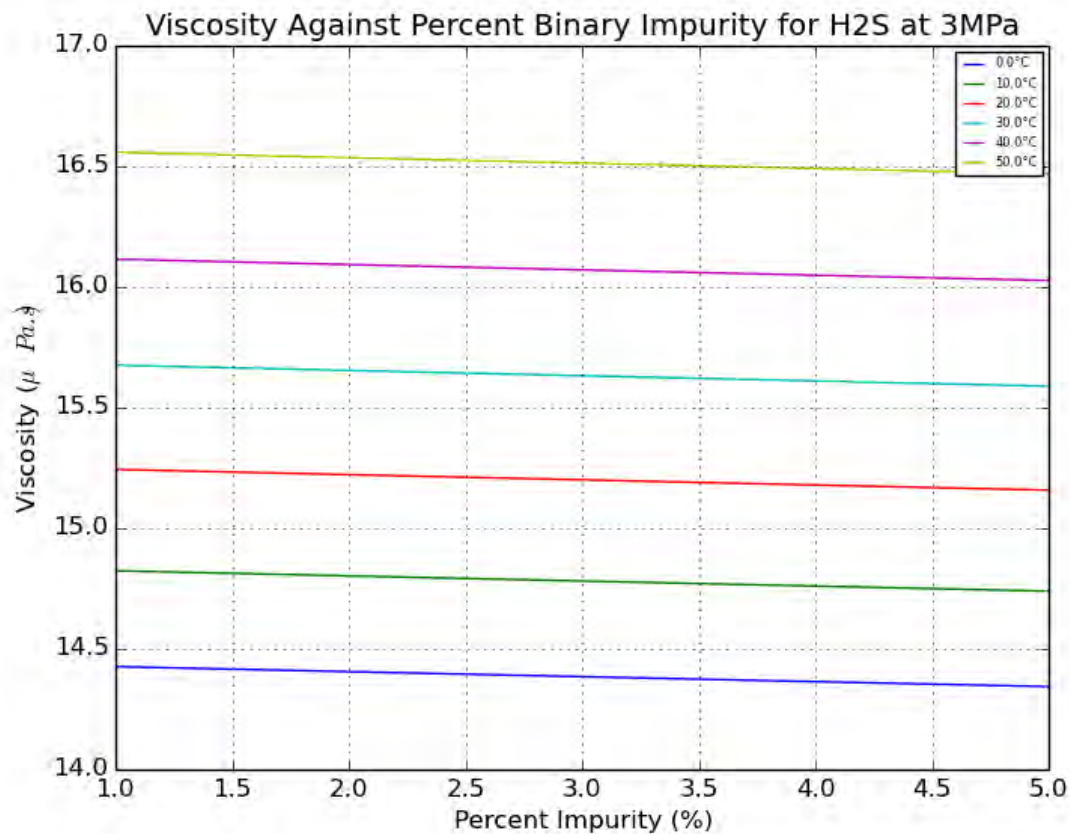


Figure A-142: Viscosity of CO₂ with varying levels of H₂S at 3MPa

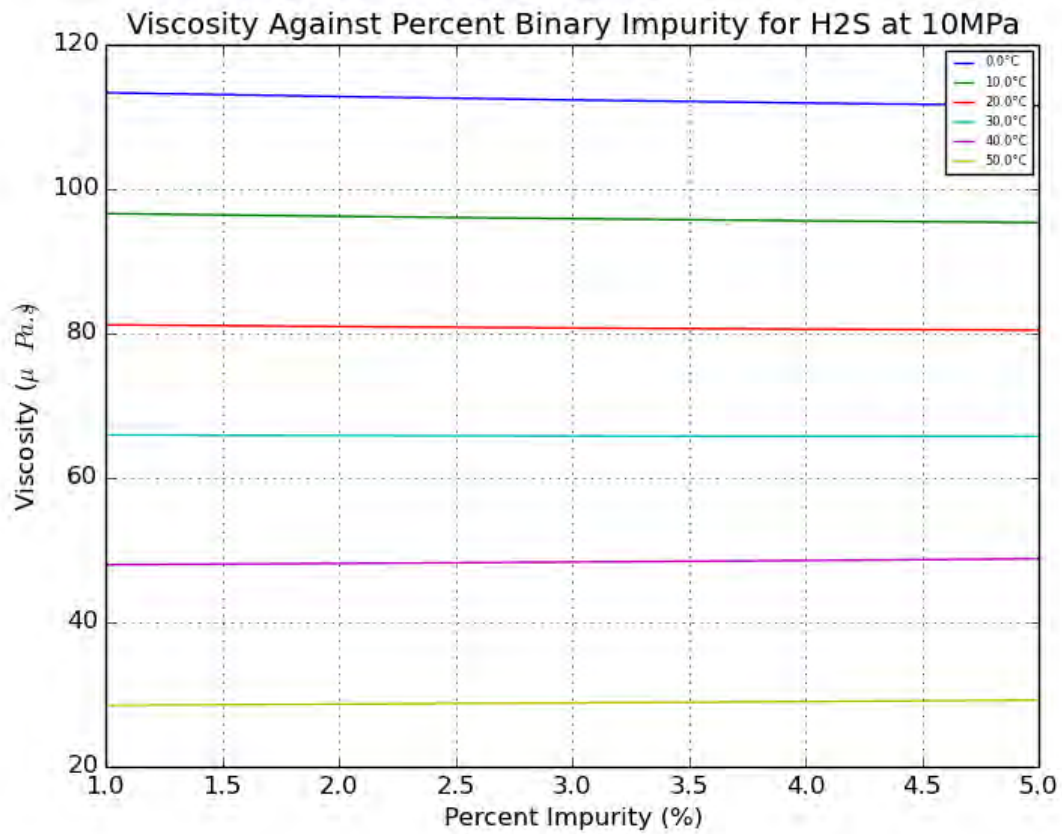


Figure A-143: Viscosity of CO₂ with varying levels of H₂S at 10MPa

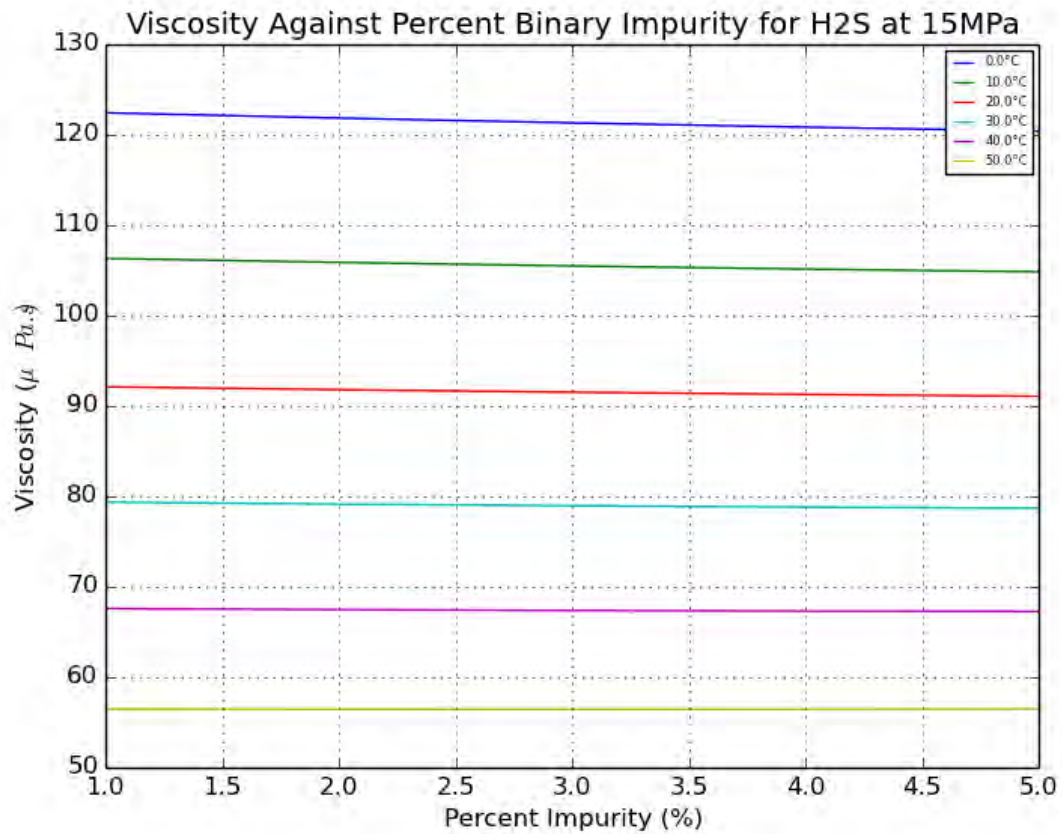


Figure A-144: Viscosity of CO₂ with varying levels of H₂S at 15MPa

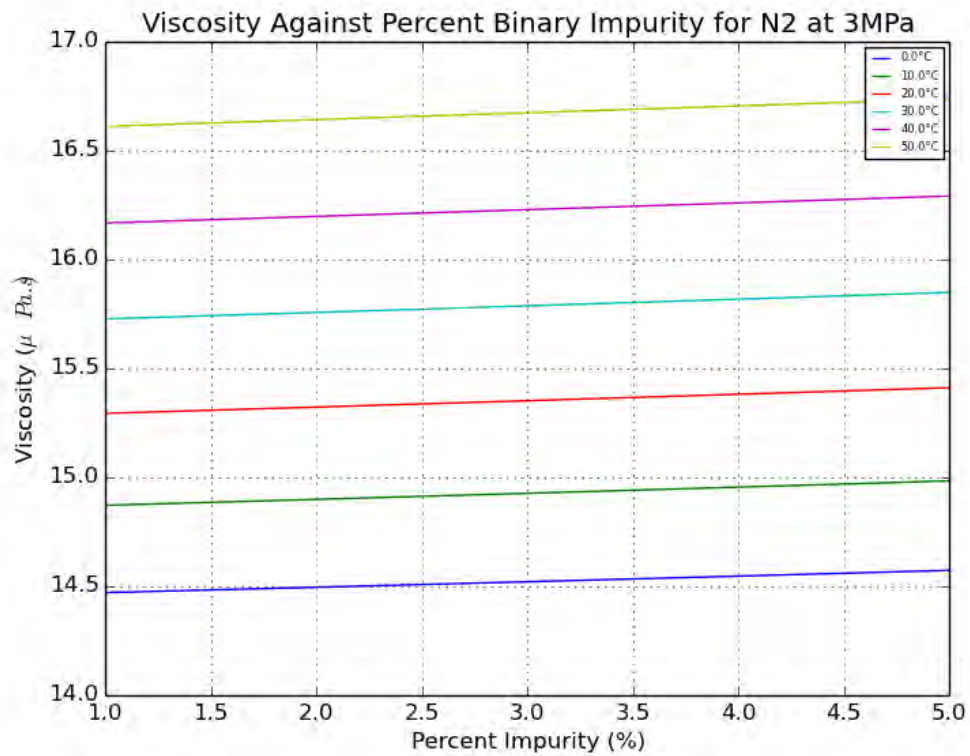


Figure A-145: Viscosity of CO₂ with varying levels of N₂ at 3MPa

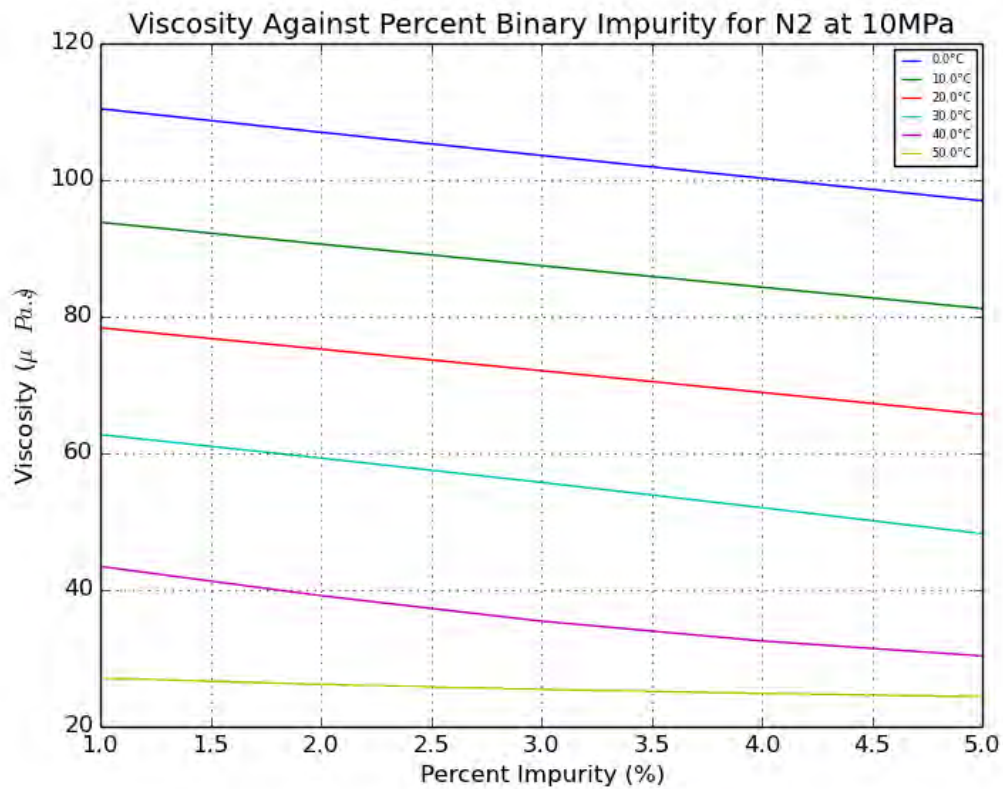


Figure A-146: Viscosity of CO₂ with varying levels of N₂ at 10MPa

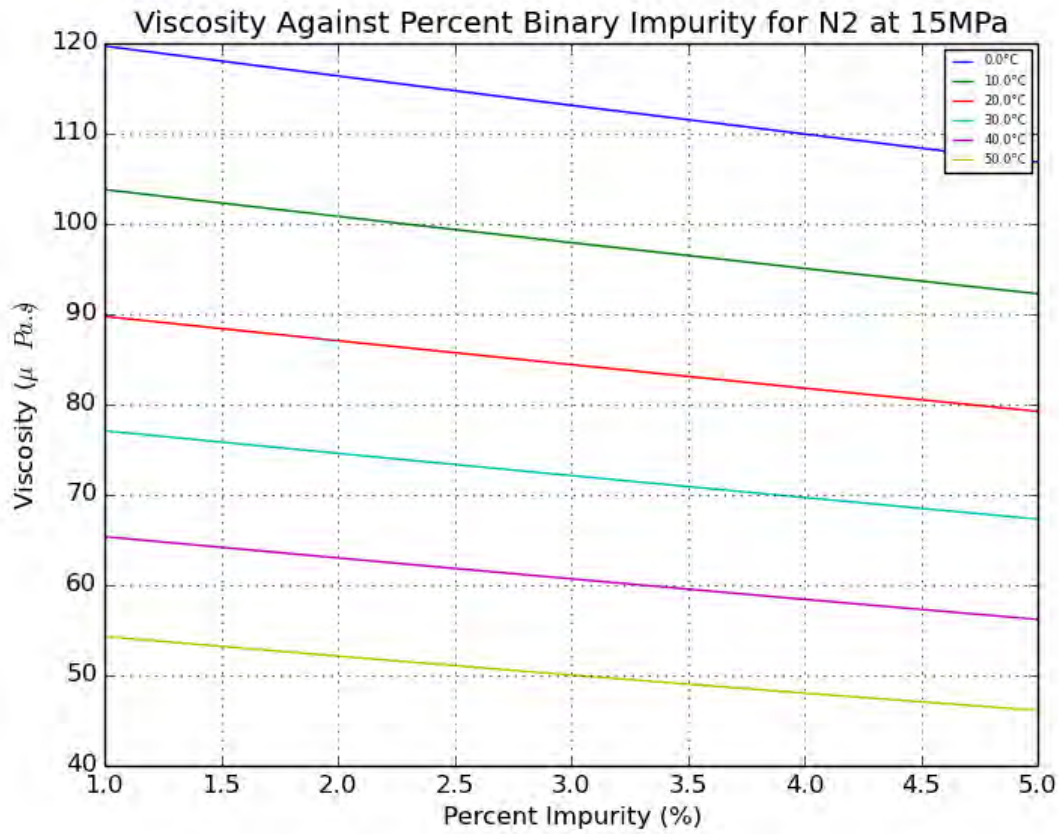


Figure A-147: Viscosity of CO₂ with varying levels of N₂ at 15MPa

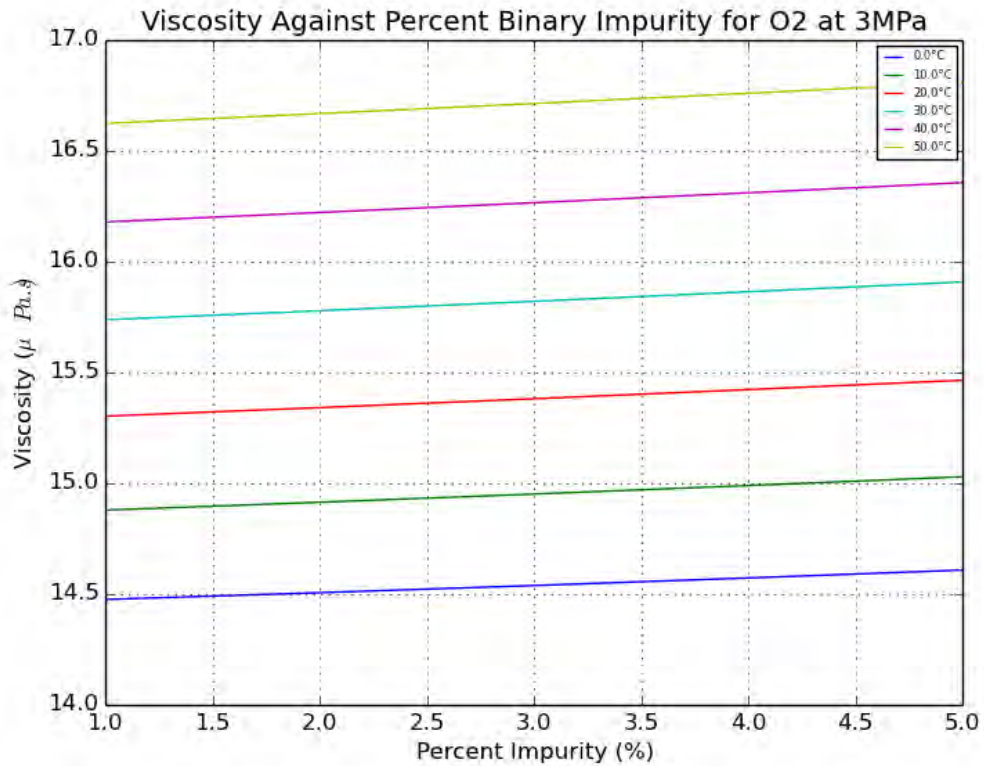


Figure A-148: Viscosity of CO₂ with varying levels of O₂ at 3MPa

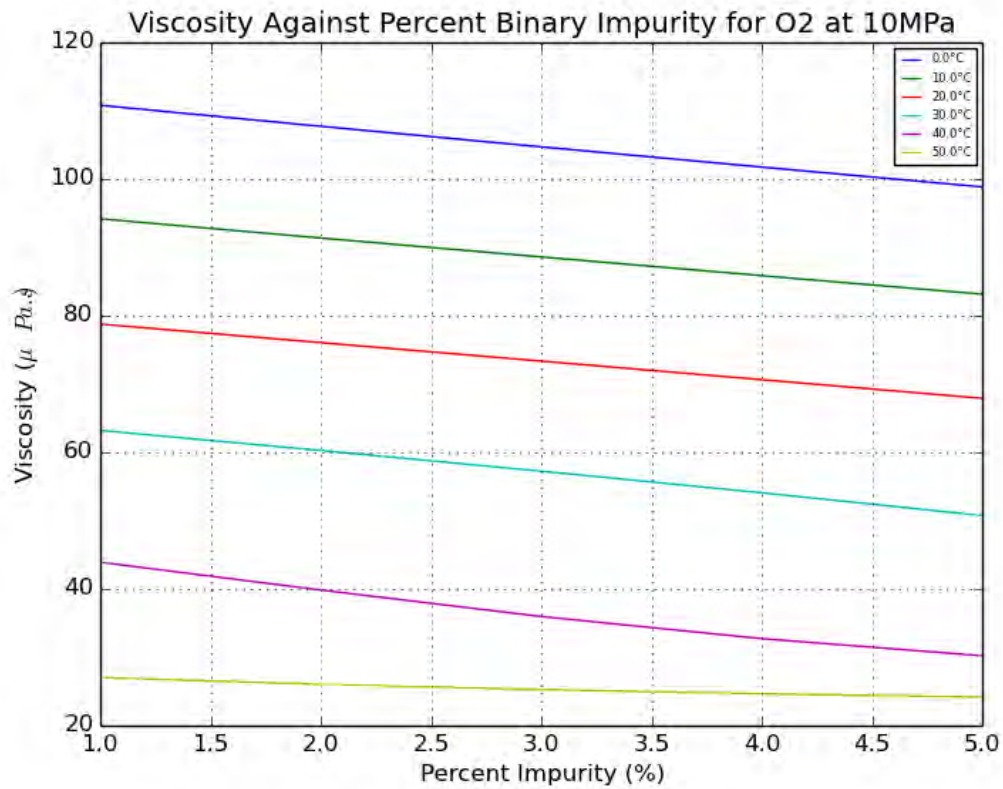


Figure A-149: Viscosity of CO₂ with varying levels of O₂ at 10MPa

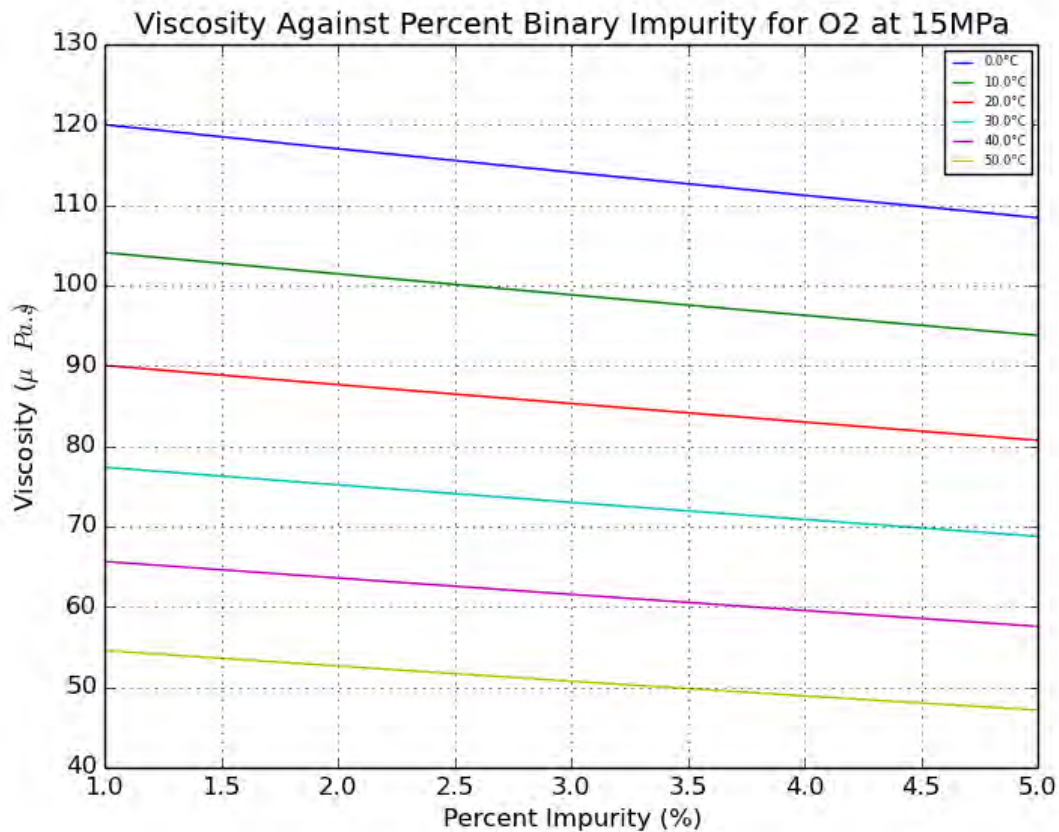


Figure A-150: Viscosity of CO₂ with varying levels of O₂ at 15MPa

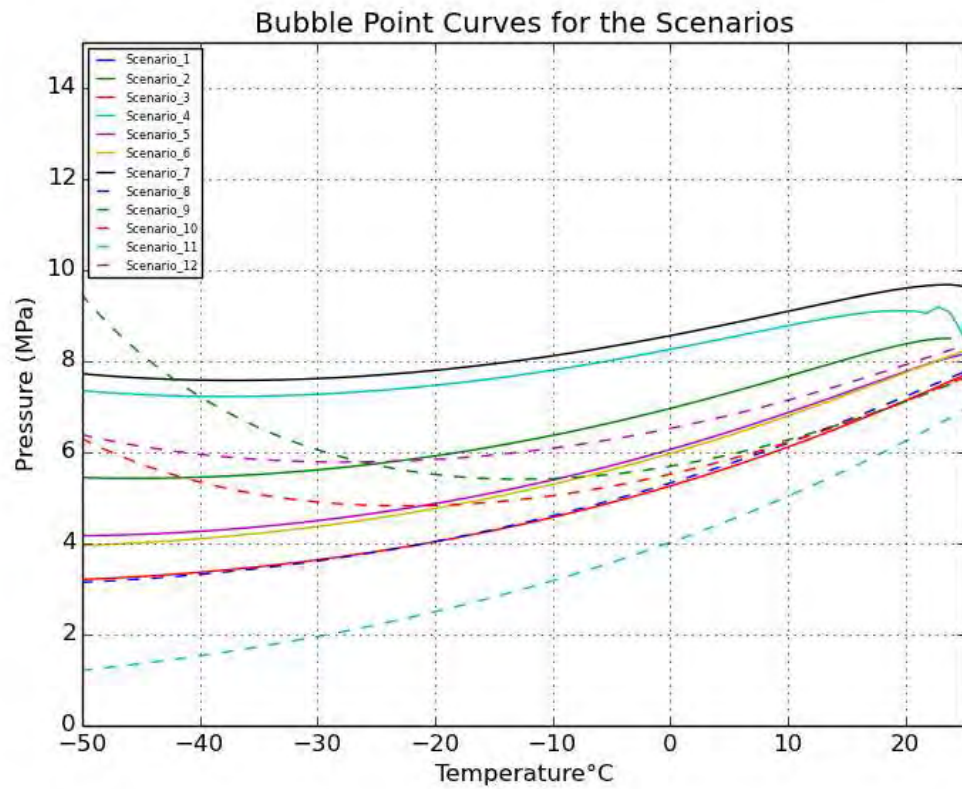


Figure A-151: The bubble point curves of all the scenarios

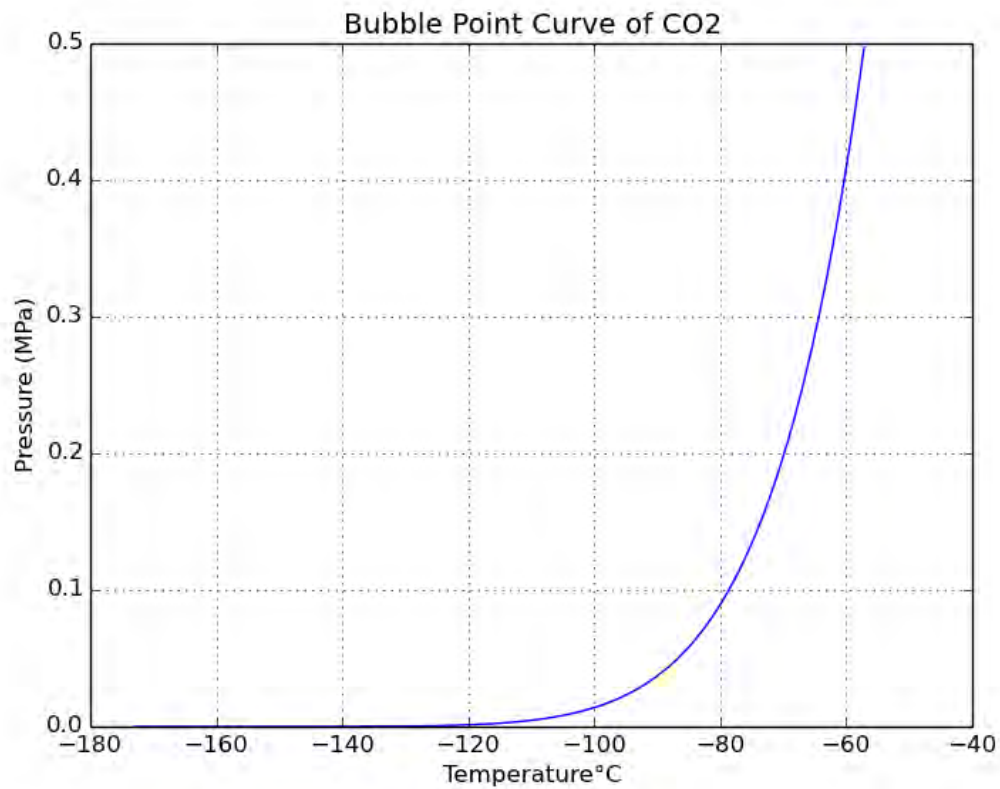


Figure A-152: The bubble point curve of pure CO₂

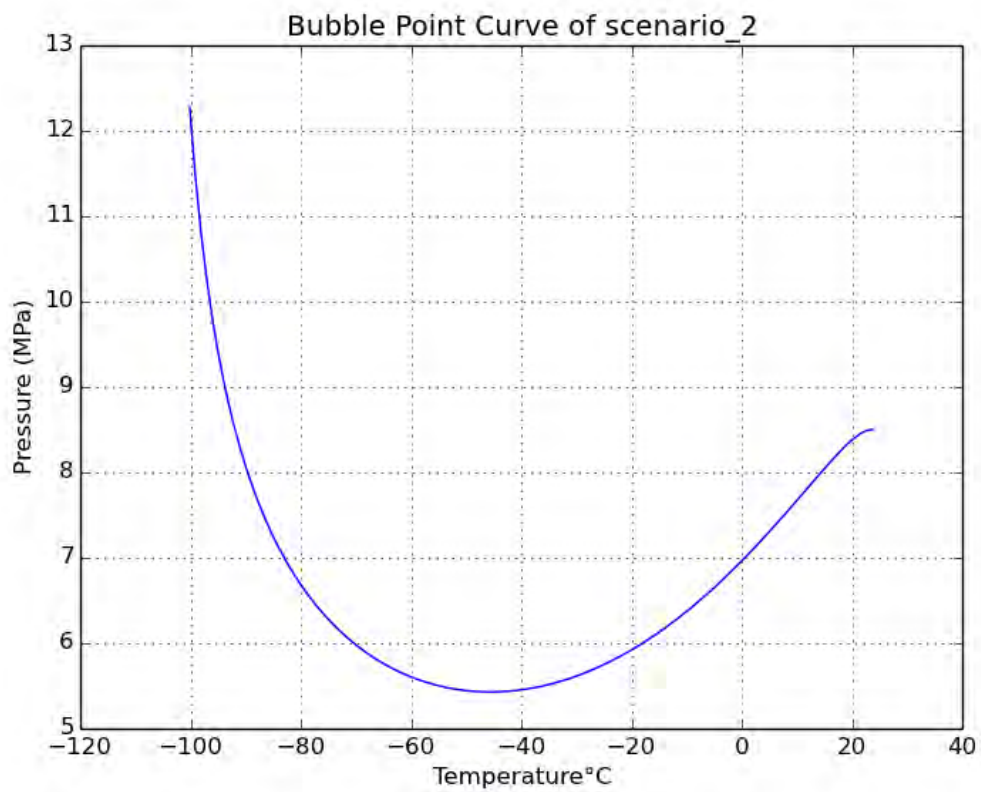


Figure A-153: The bubble point curve of scenario 2 (CO2MEM1)

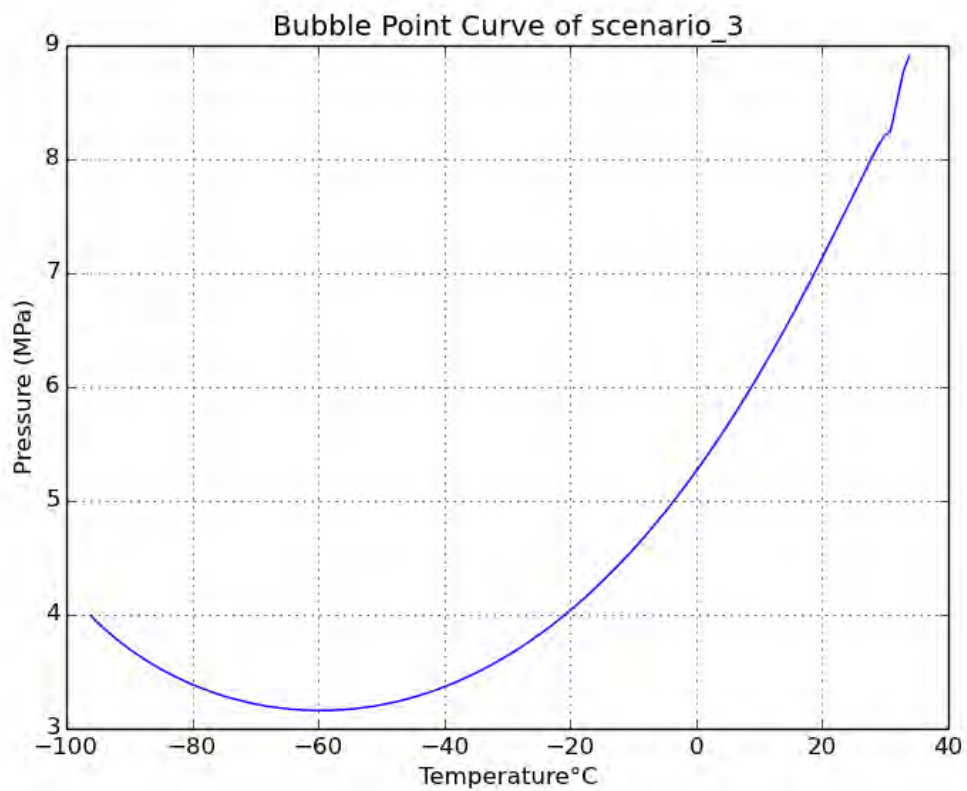


Figure A-154: The bubble point curve of scenario 3 (CO2MEM2)

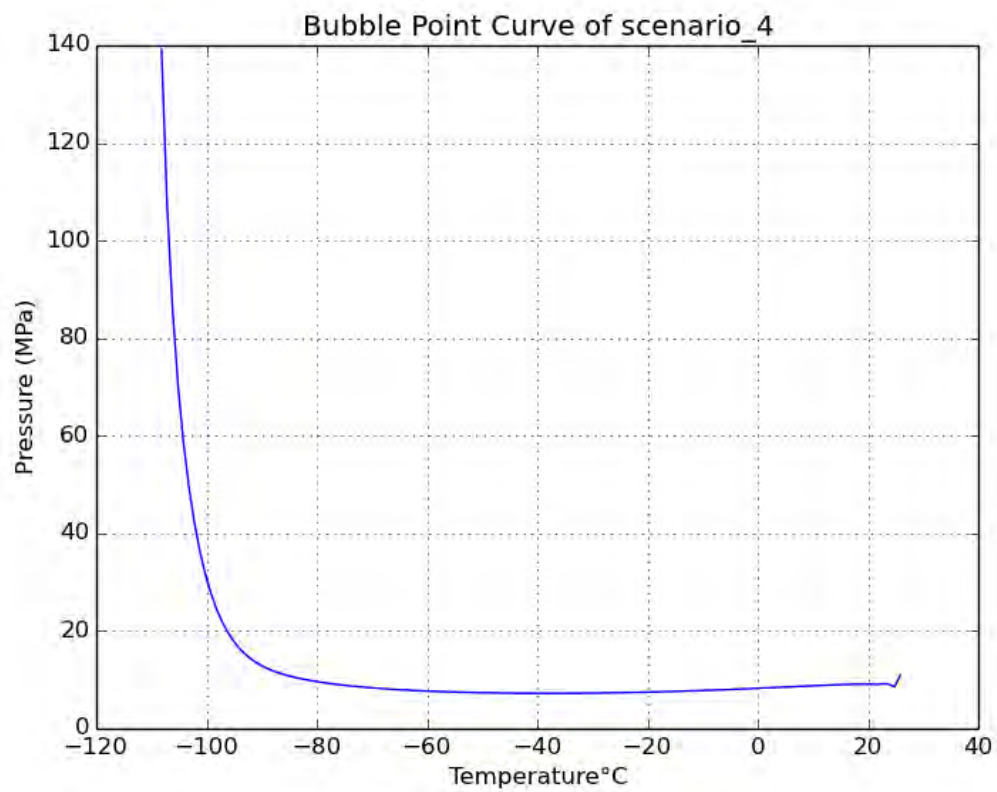


Figure A-155: The bubble point curve of scenario 4 (ADS1)

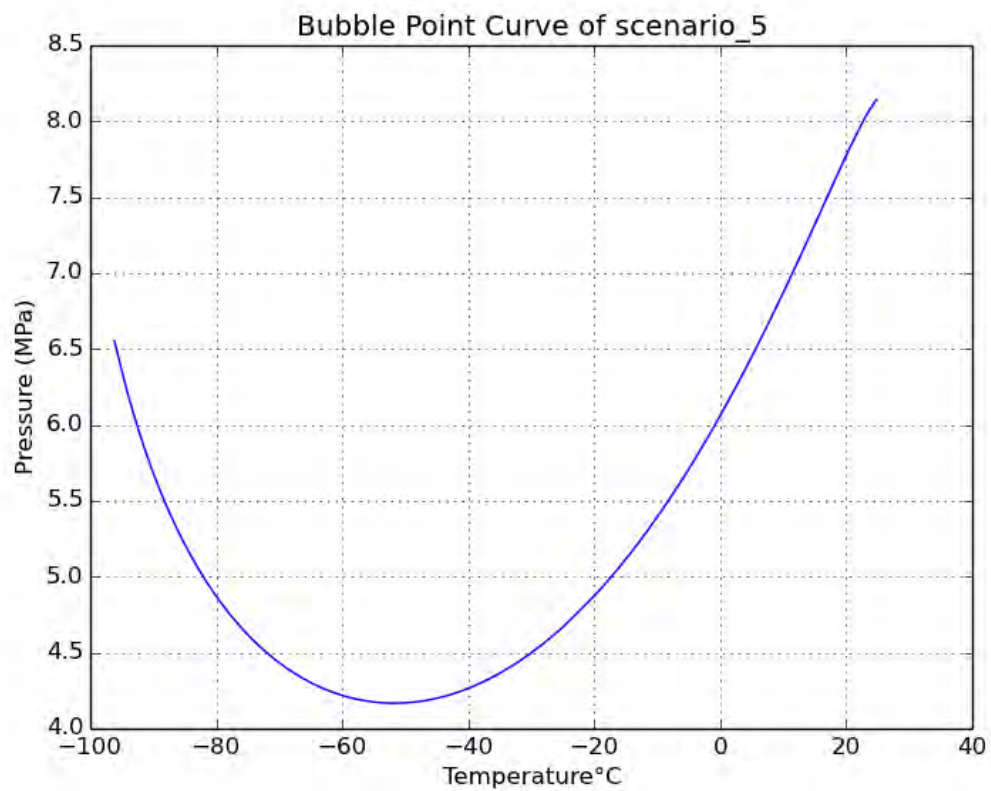


Figure A-156: The bubble point curve of scenario 5 (ADS2)

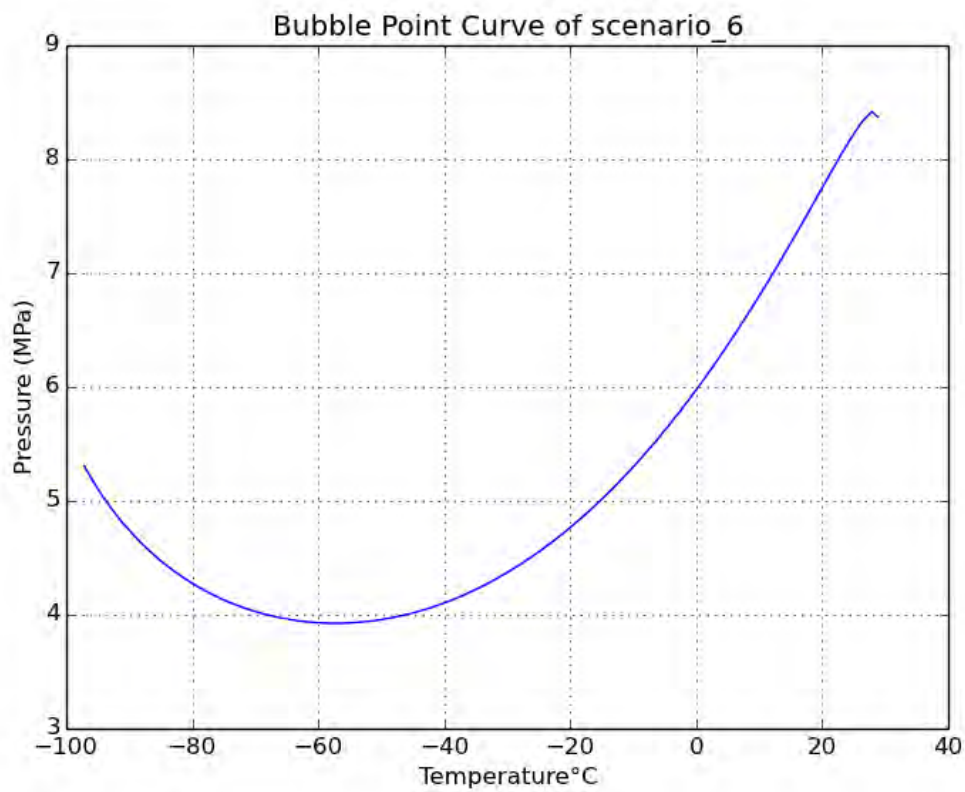


Figure A-157: The bubble point curve of scenario 6 (Ca Loop)

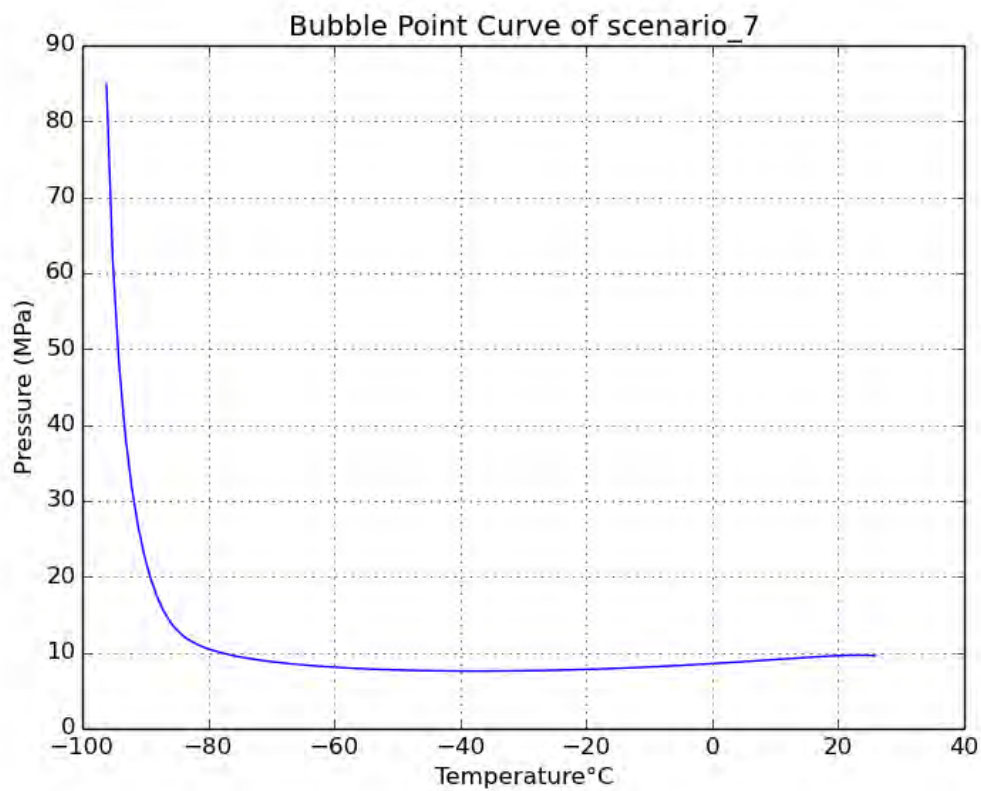


Figure A-158: The bubble point curve of scenario 7 (OXY1)

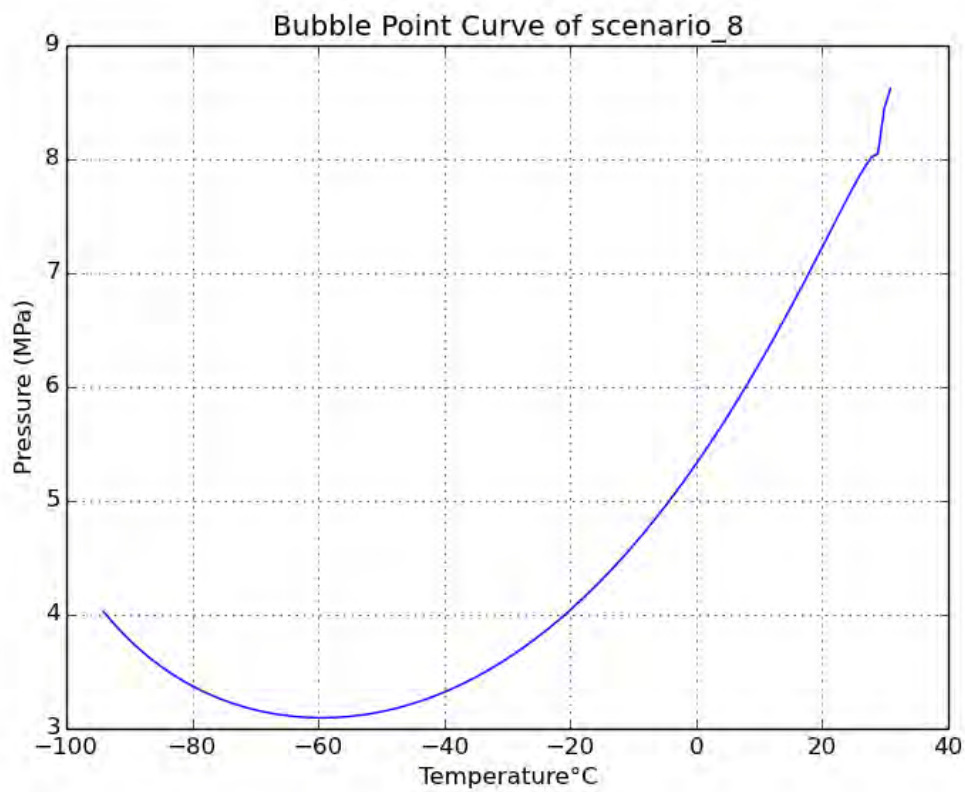


Figure A-159: The bubble point curve of scenario 8 (OXY2)

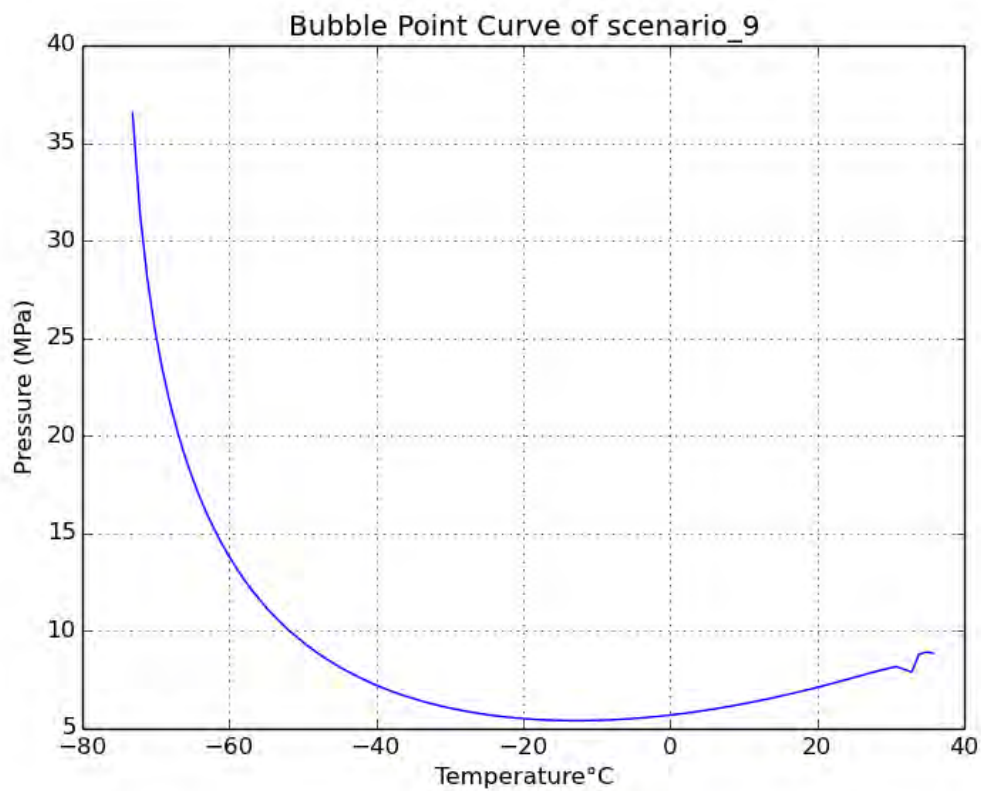


Figure A-160: The bubble point curve of scenario 9 (PRE)

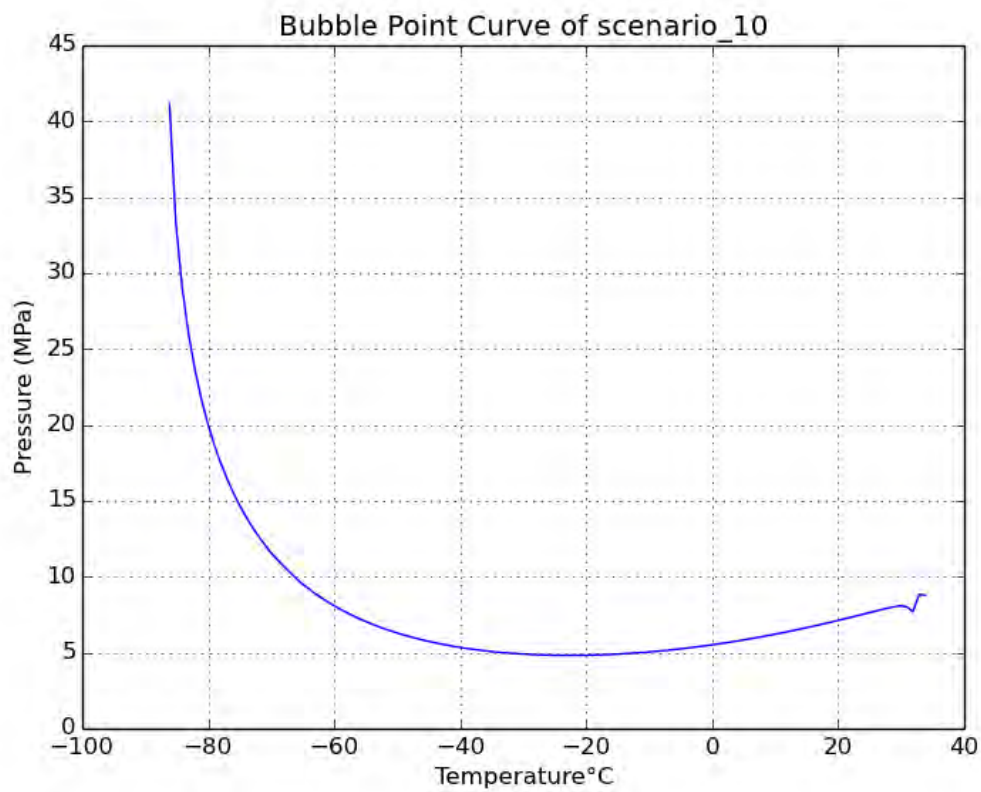


Figure A-161: The bubble point curve of scenario 10 (H₂ MEM)

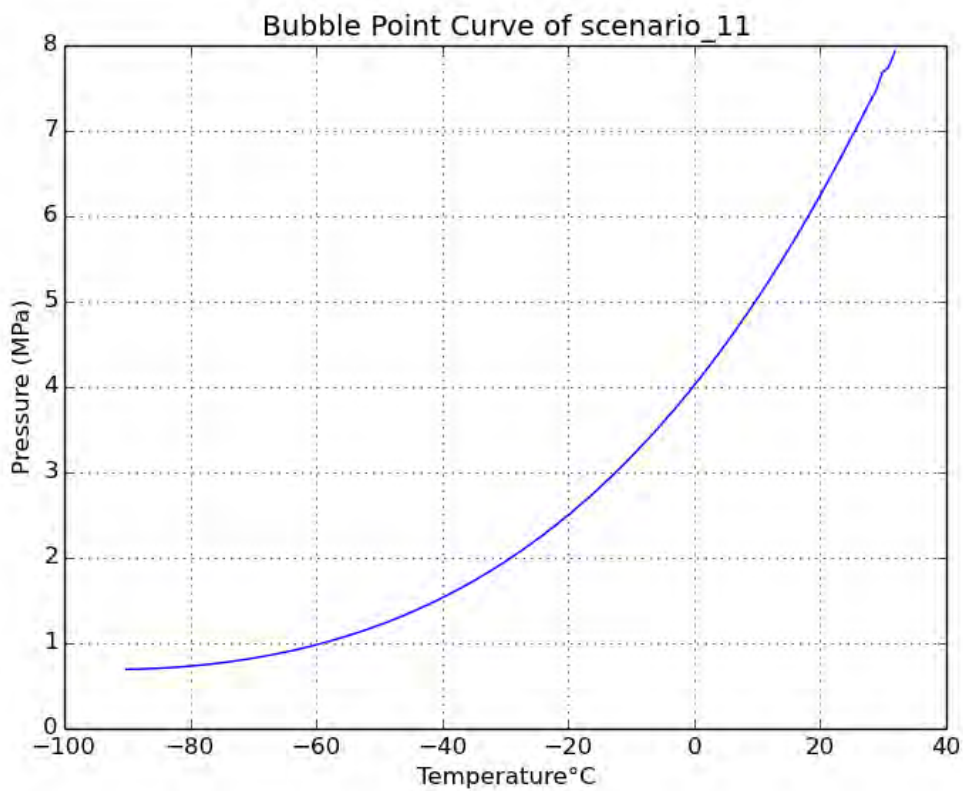


Figure A-162: The bubble point curve of scenario 11 (CH₄ MEM)

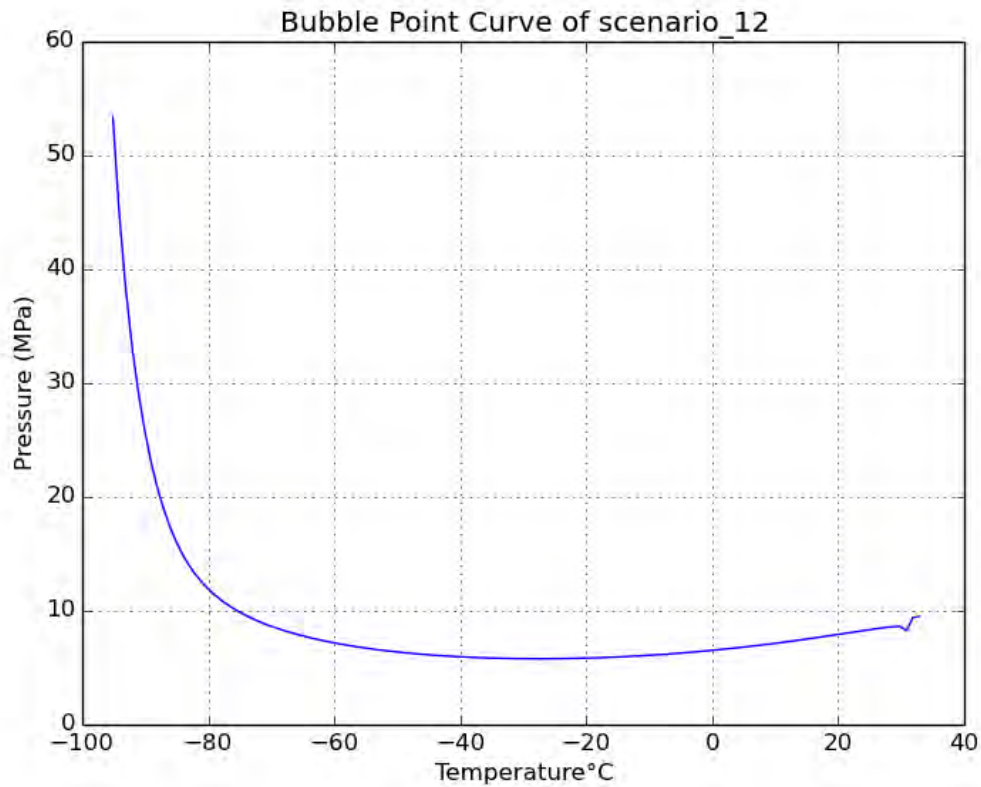


Figure A-163: The bubble point curve of scenario 12 (TGR-BF)

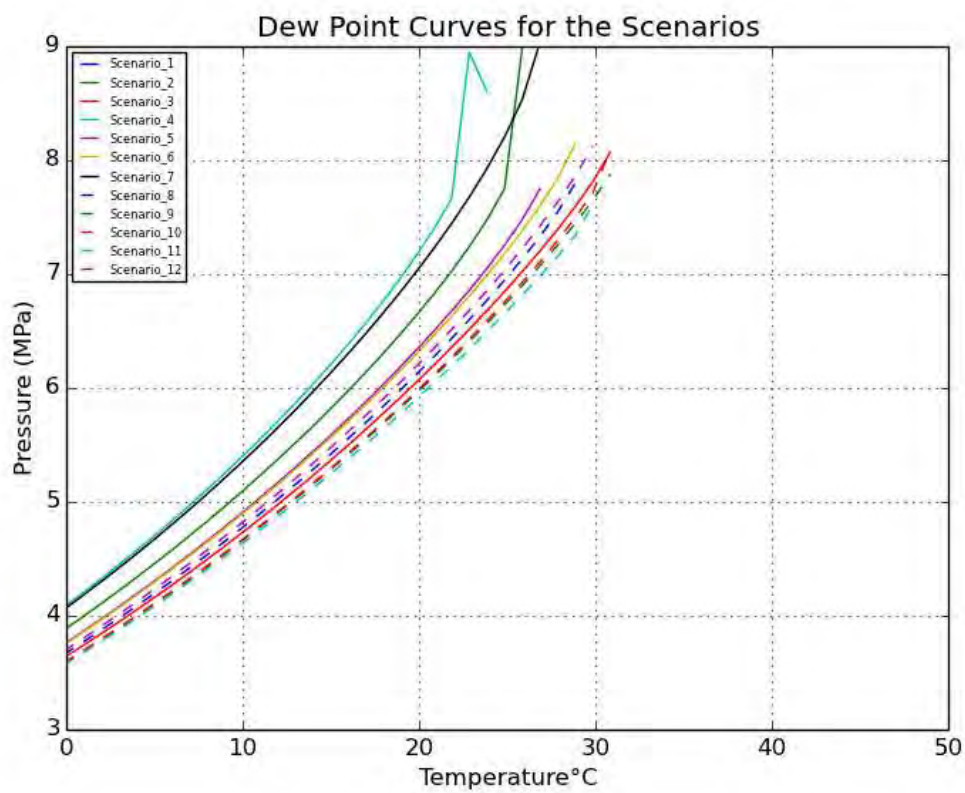


Figure A-164: The dew point curves of all the scenarios

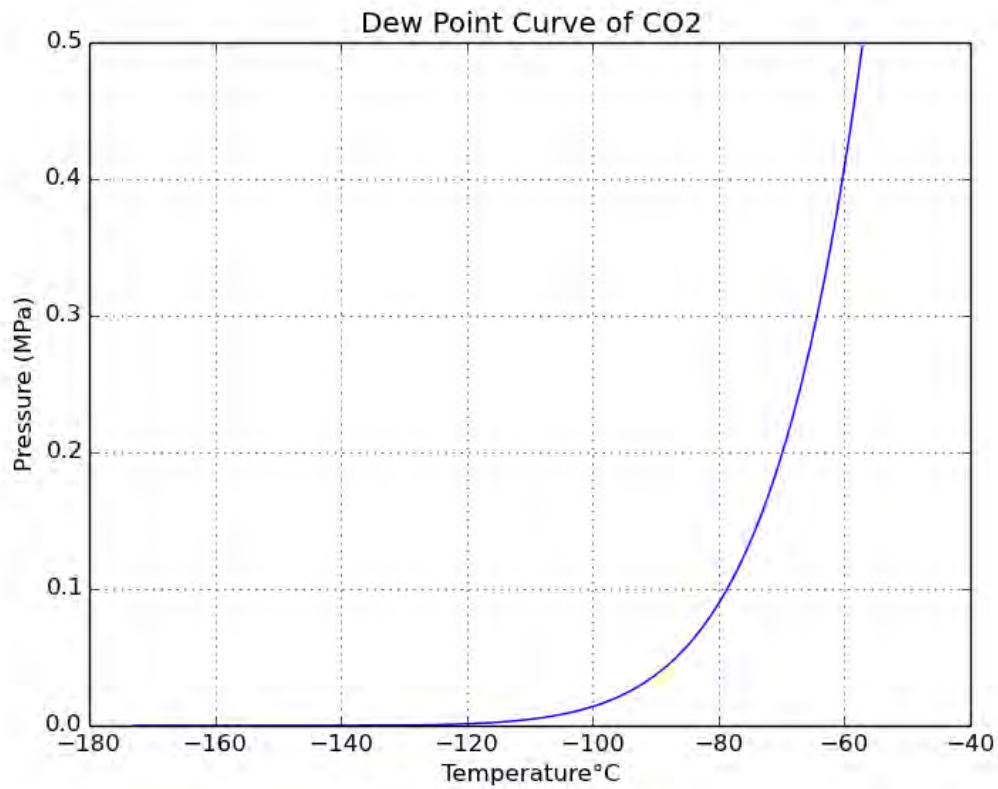


Figure A-165: The dew point curve of pure CO₂

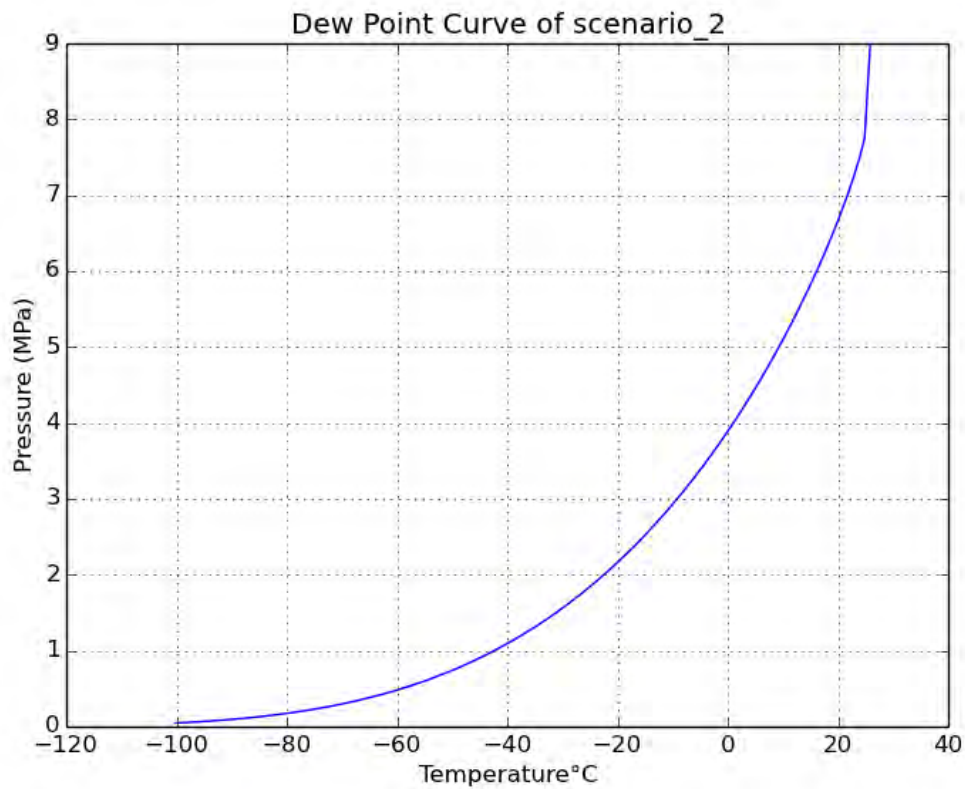


Figure A-166: The dew point curve of scenario 2 (CO₂MEM1)

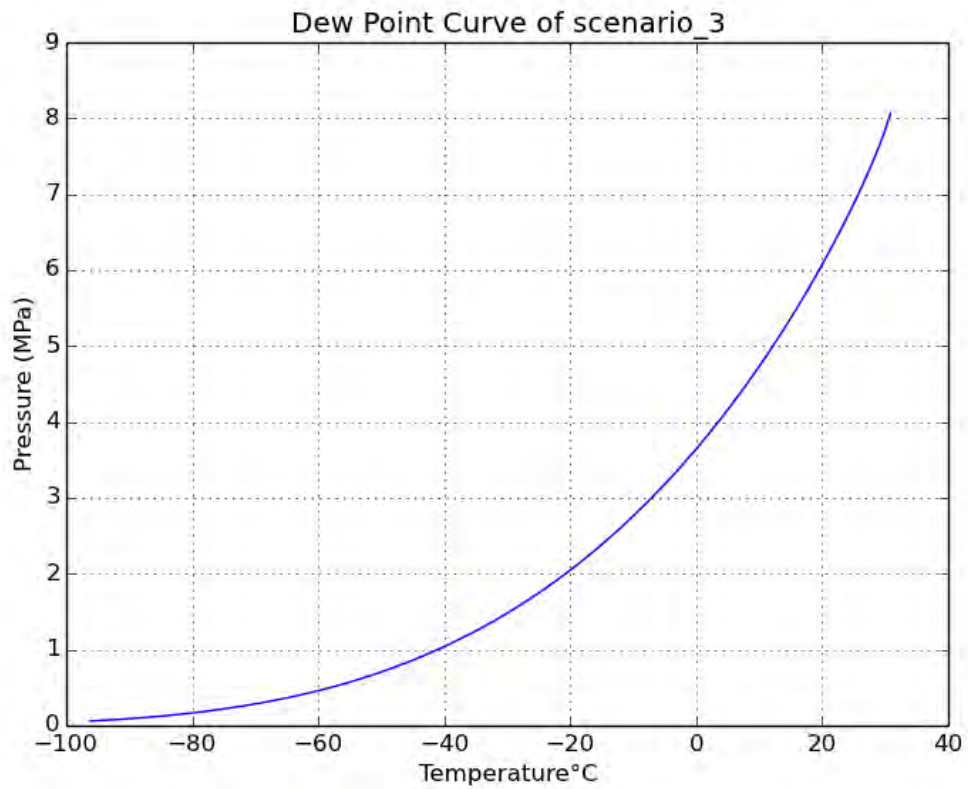


Figure A-167: The dew point curve of scenario 3 (CO2MEM2)

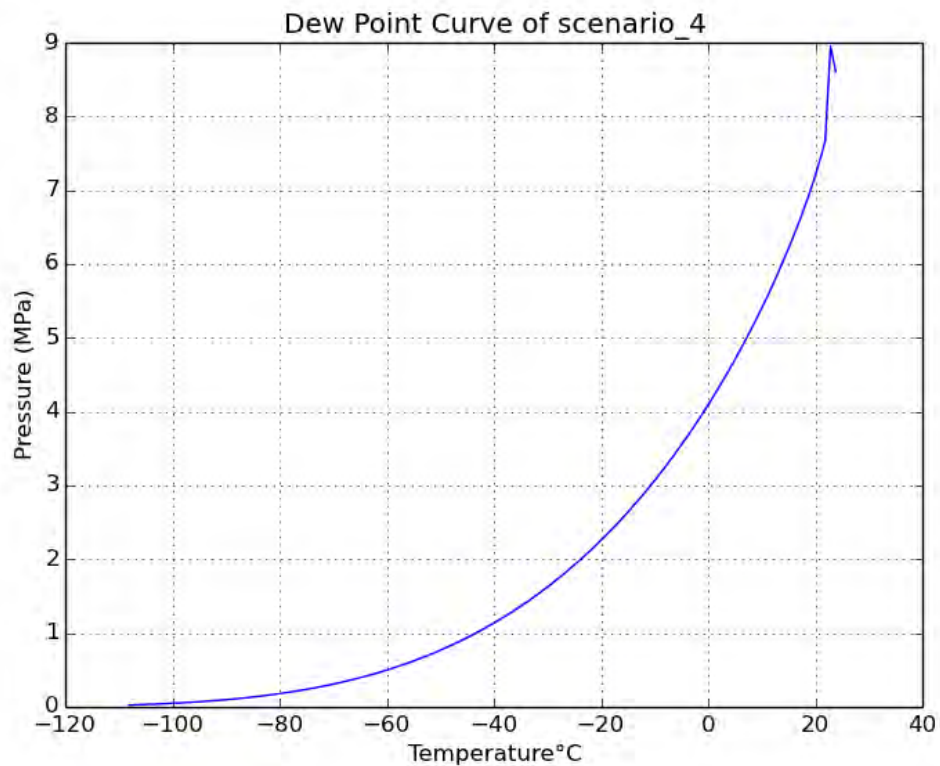


Figure A-168: The dew point curve of scenario 4 (ADS1)

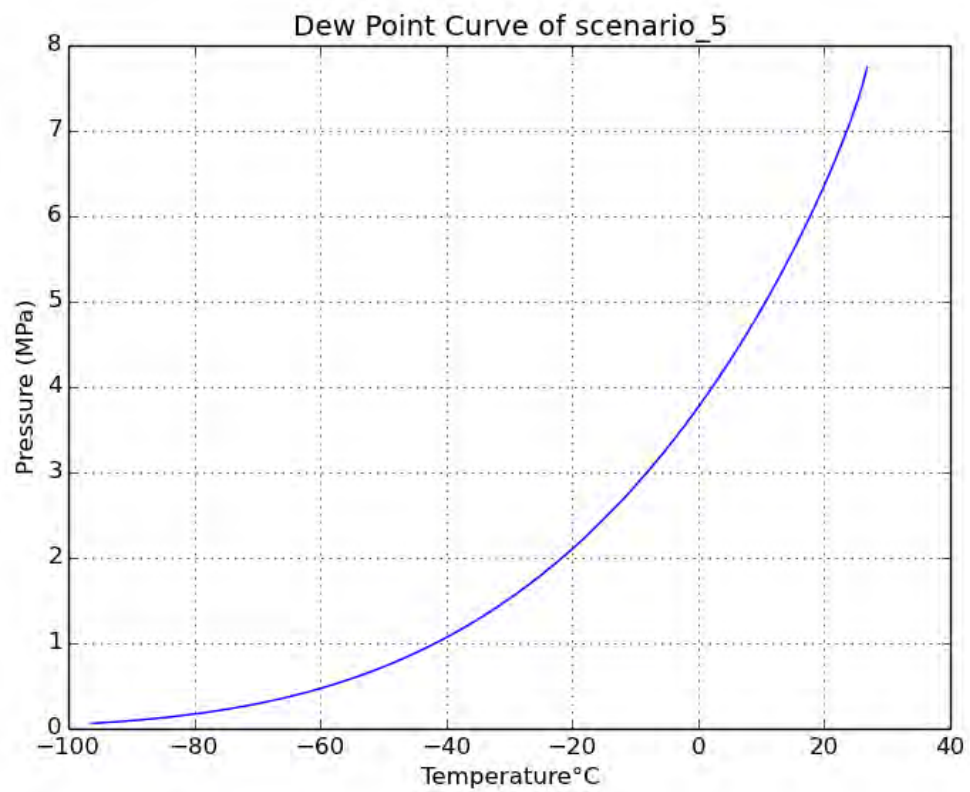


Figure A-169: The dew point curve of scenario 5 (ADS2)

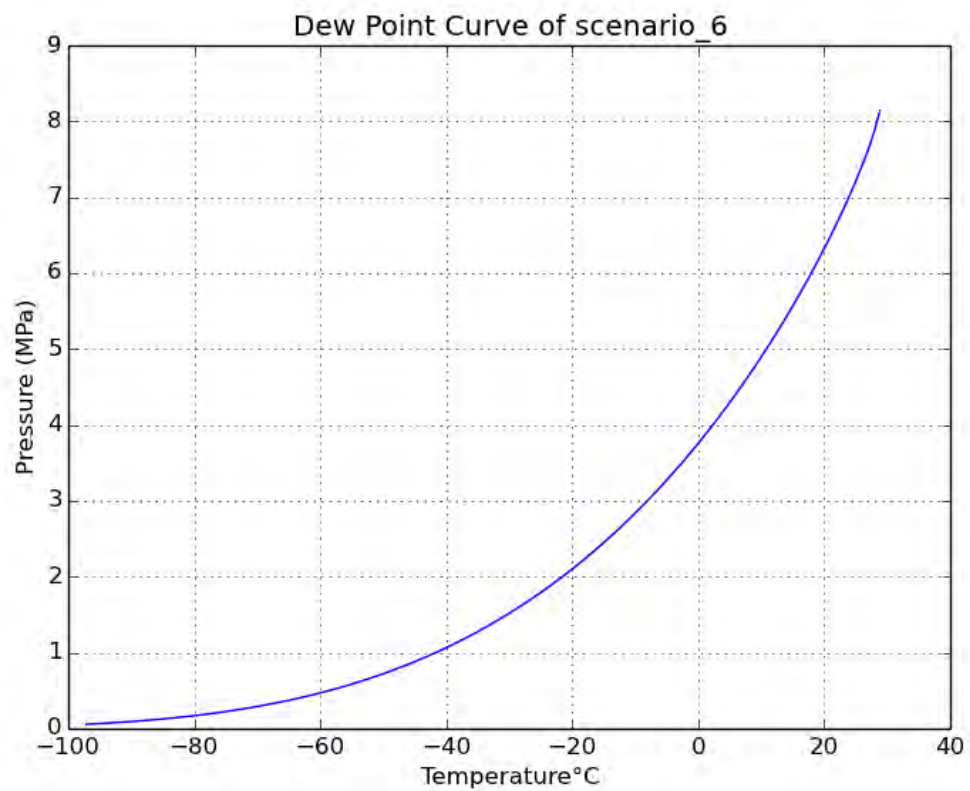


Figure A-170: The dew point curve of scenario 6 (Ca loop)

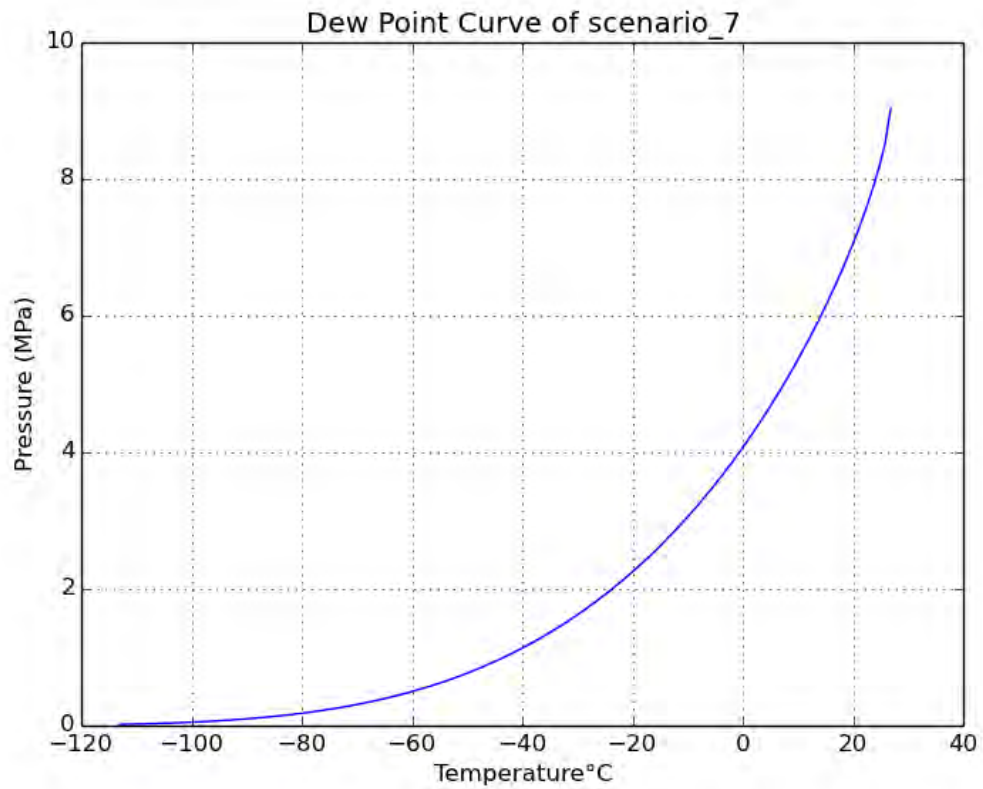


Figure A-171: The dew point curve of scenario 7 (OXY1)

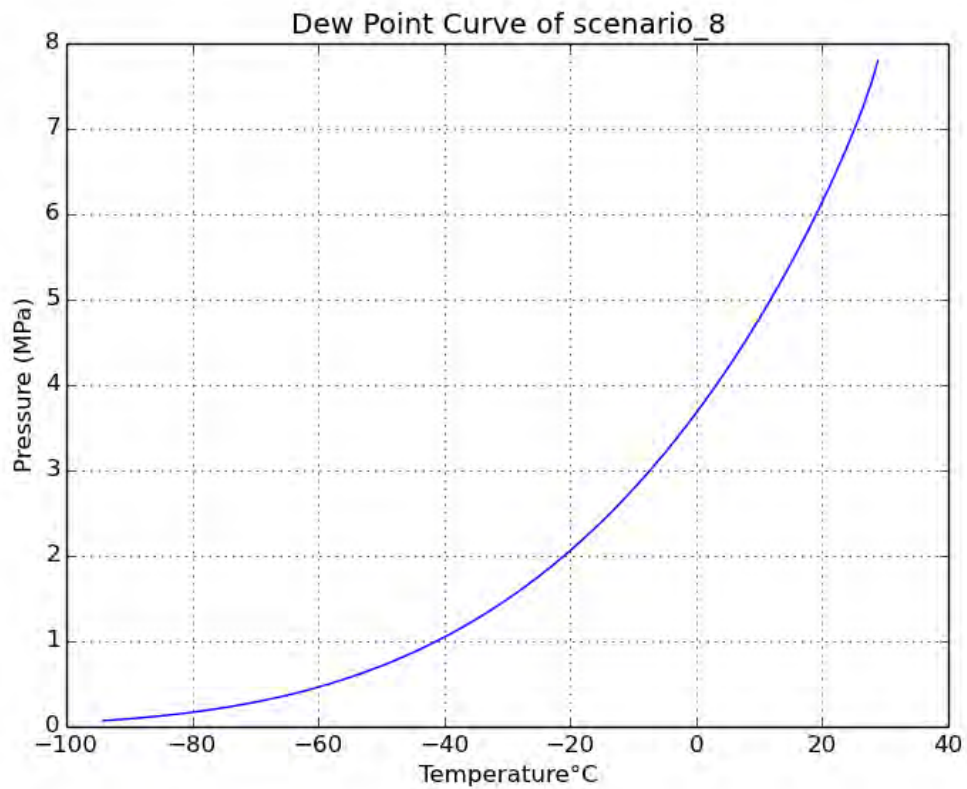


Figure A-172: The dew point curve of scenario 8 (OXY2)

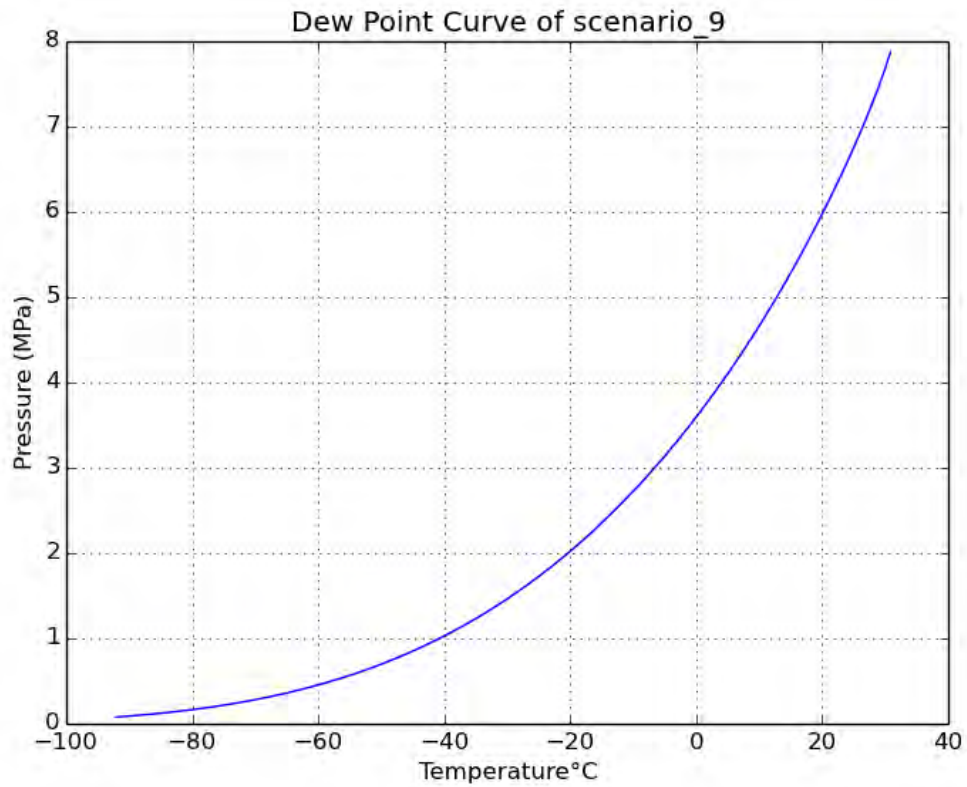


Figure A-173: The dew point curve of scenario 9 (PRE)

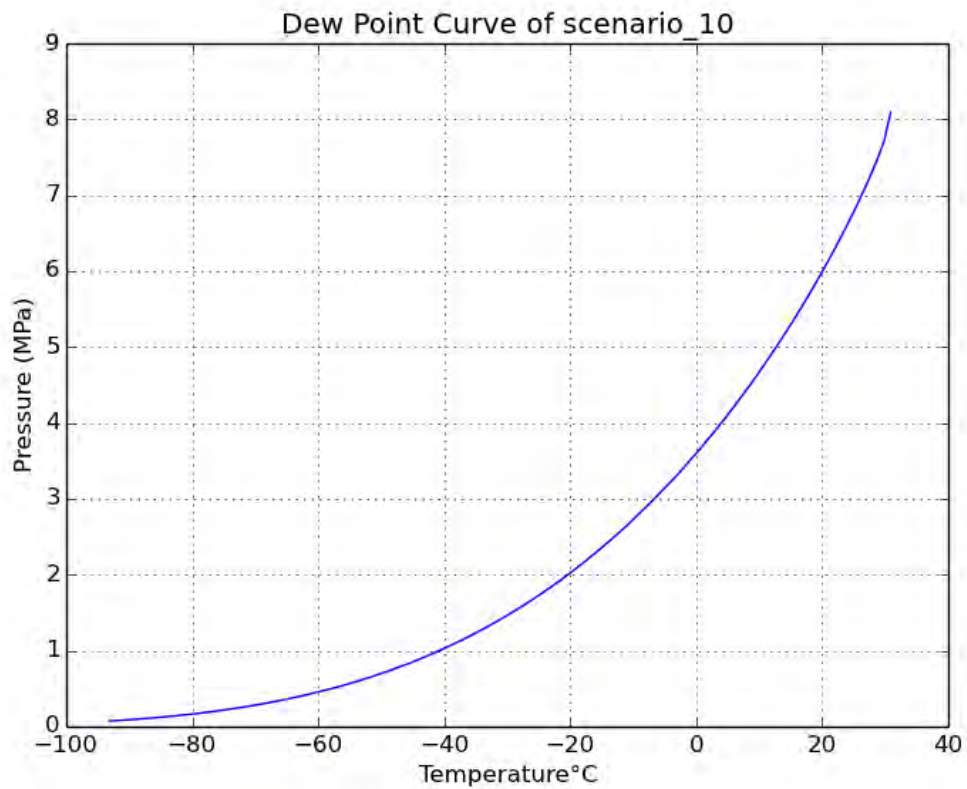


Figure A-174: The dew point curve of scenario 10 (H2MEM)

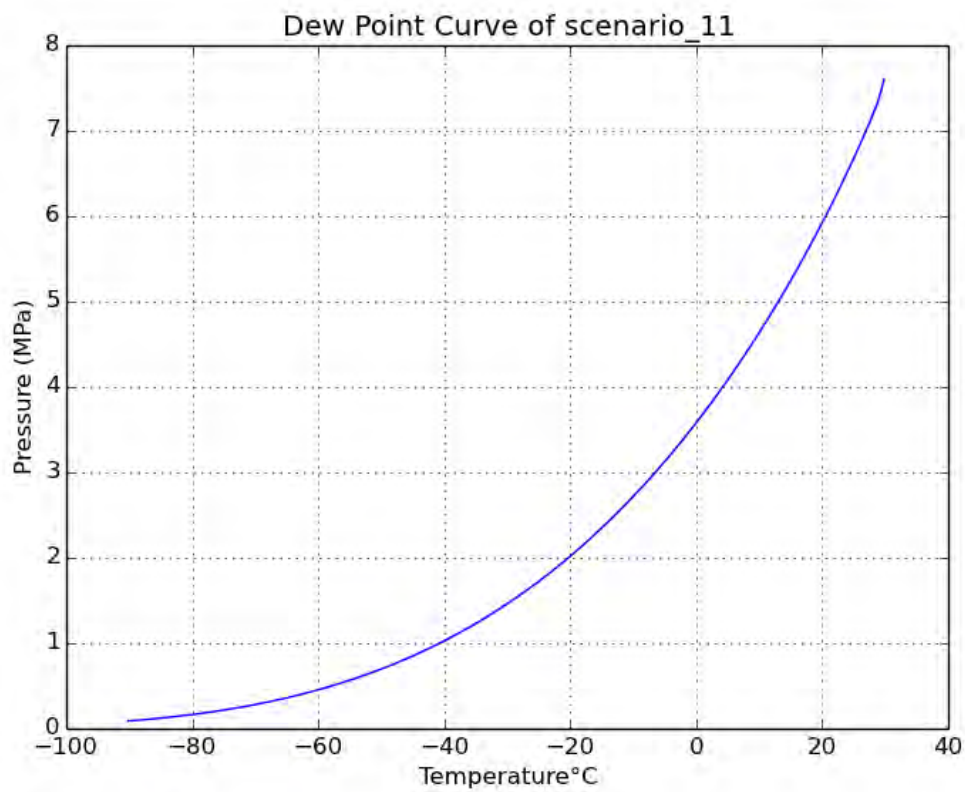


Figure A-175: The dew point curve of scenario 11 (CH₄-rich)

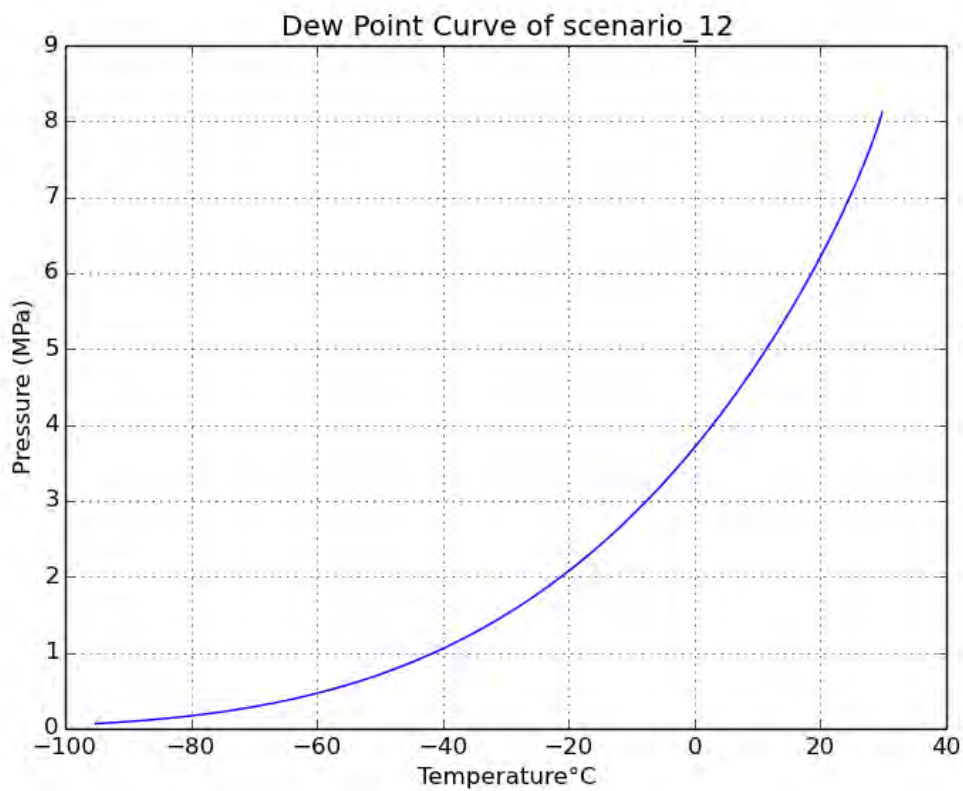


Figure A-176: The dew point curve of scenario 12 (TGR-BF)

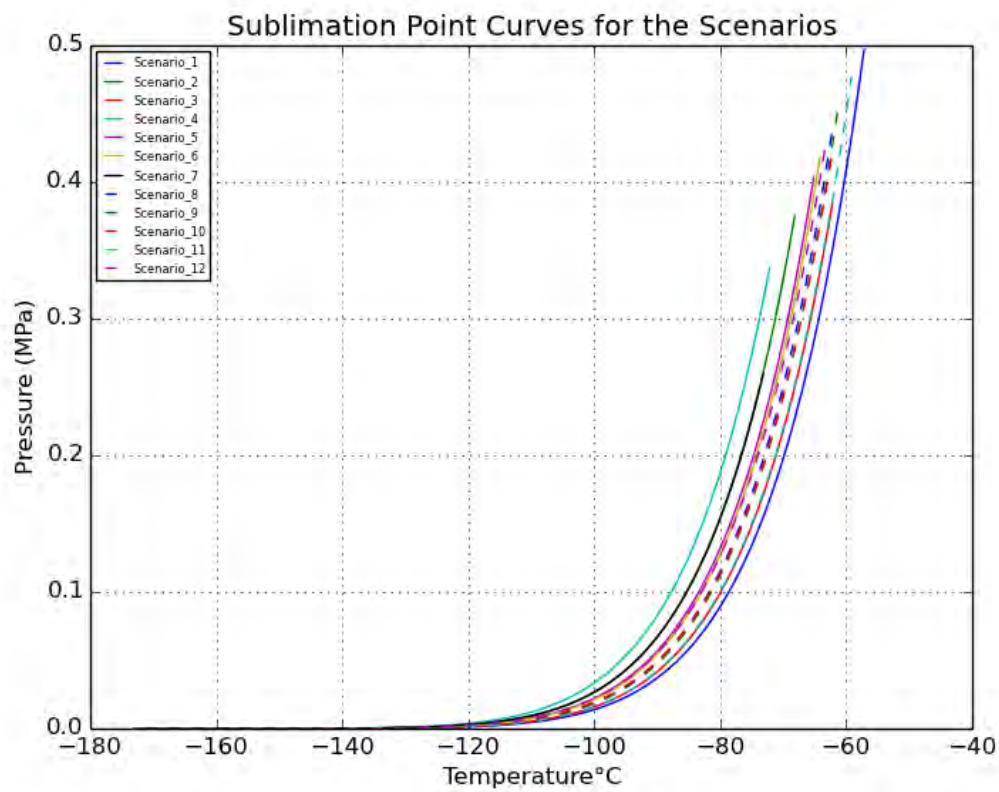


Figure A-177: The sublimation point curves of all the scenarios

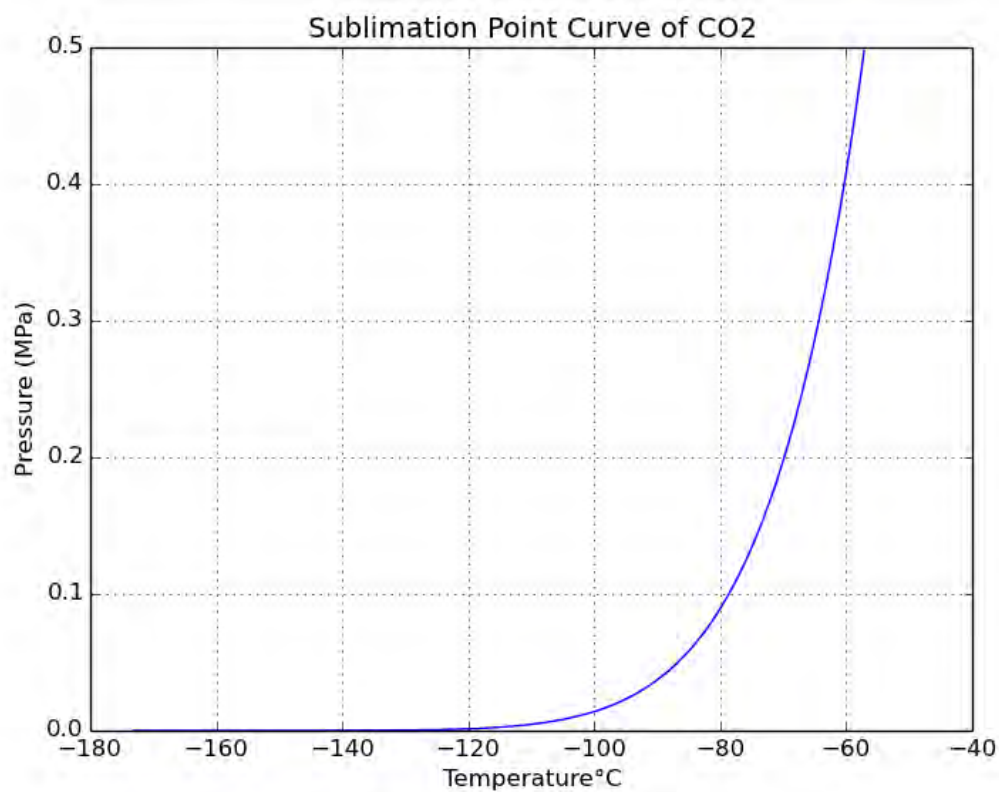


Figure A-178: The sublimation point curve of pure CO₂

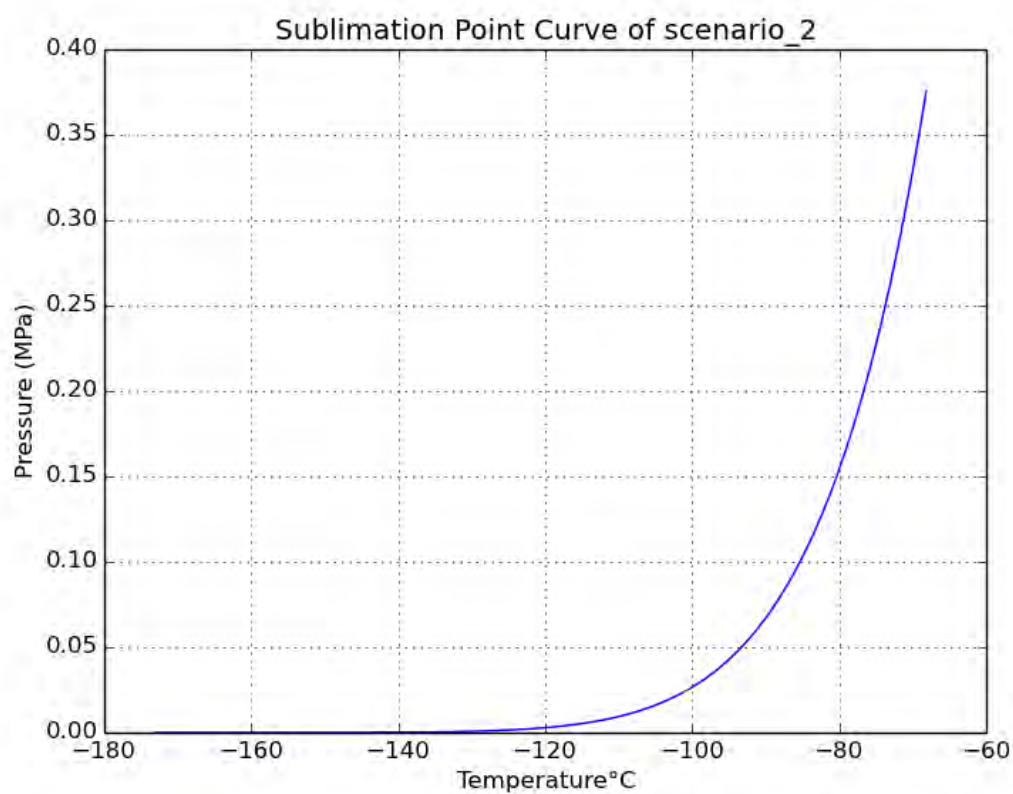


Figure A-179: The sublimation point curve of scenario 2 (CO2MEM1)

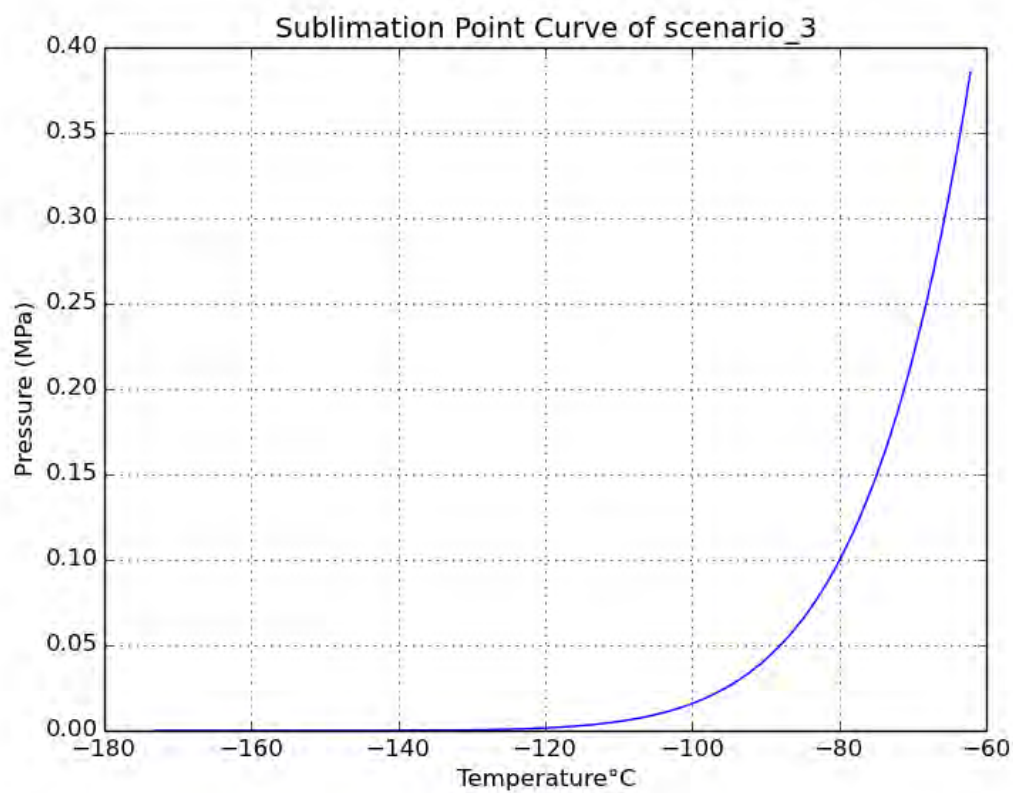


Figure A-180: The sublimation point curve of scenario 3 (CO2MEM2)

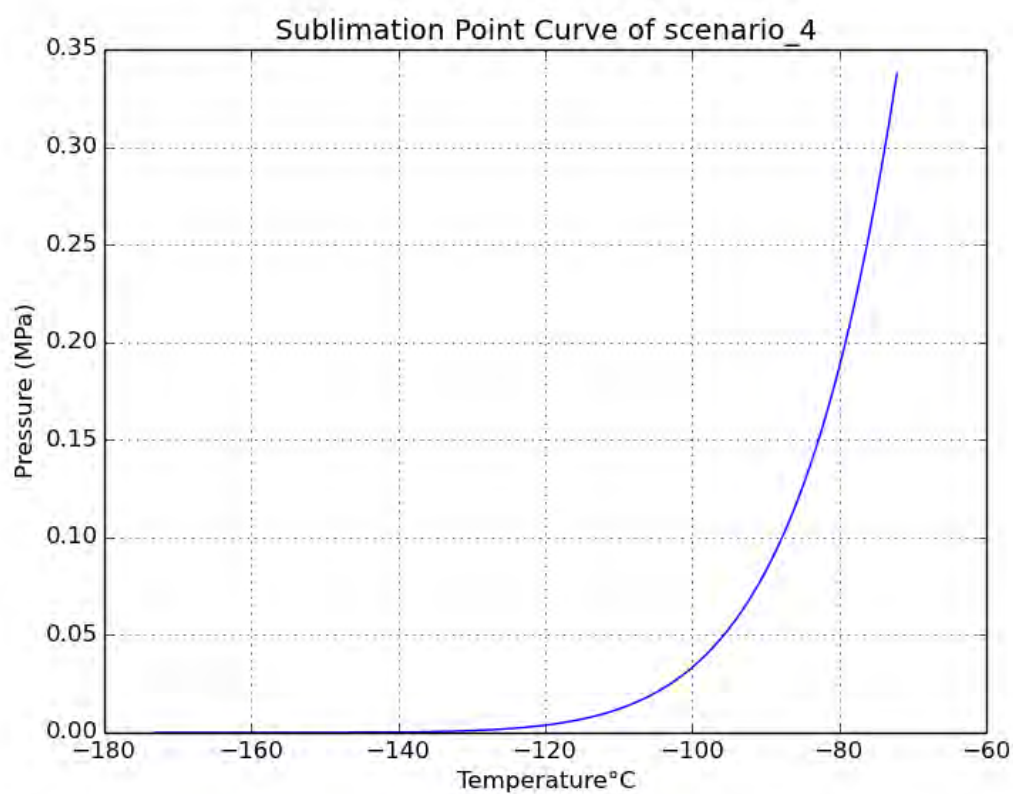


Figure A-181: The sublimation point curve of scenario 4 (ADS1)

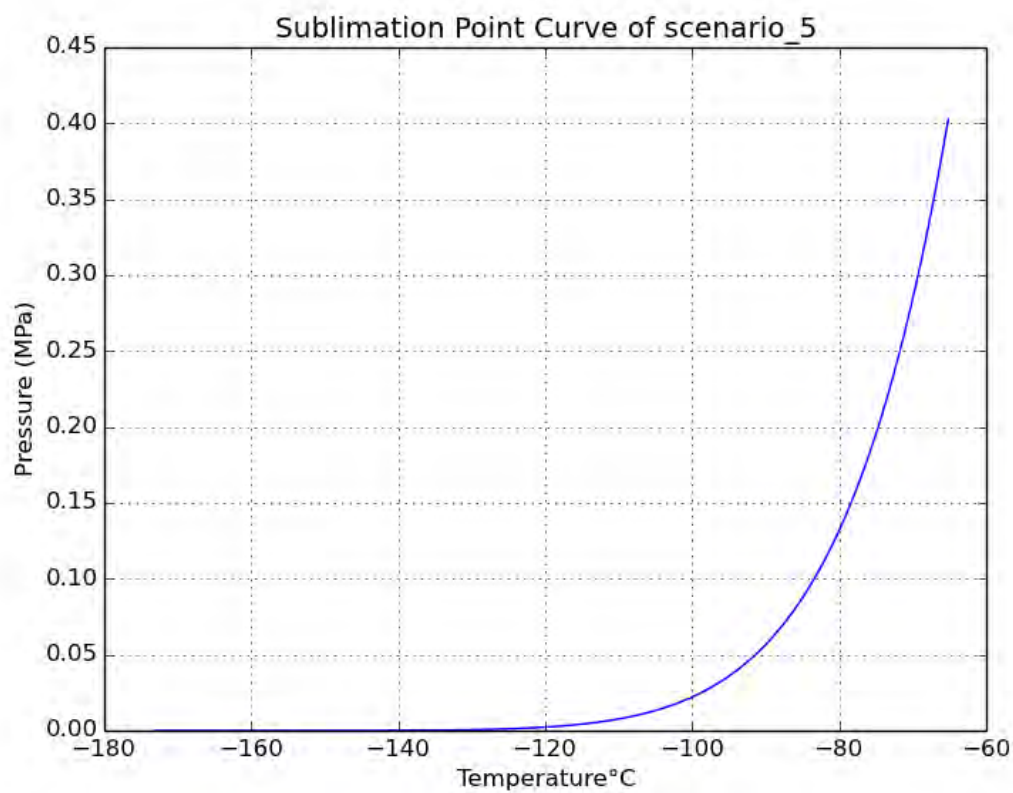


Figure A-182: The sublimation point curve of scenario 5 (ADS2)

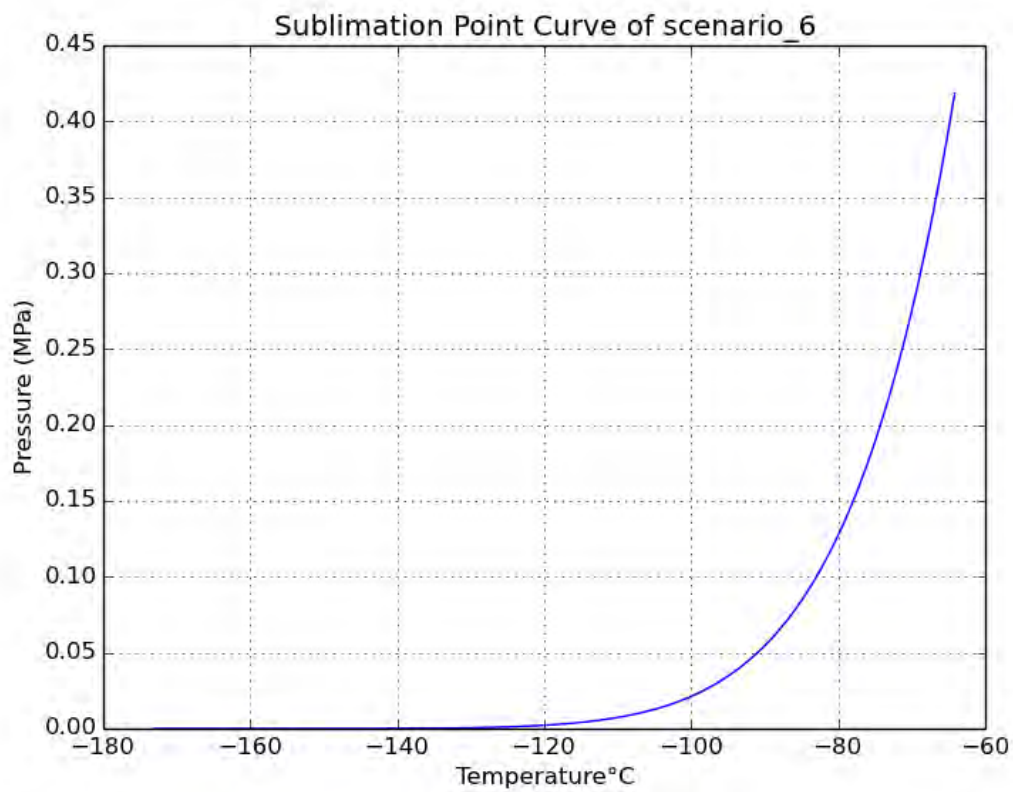


Figure A-183: The sublimation point curve of scenario 6 (Ca loop)

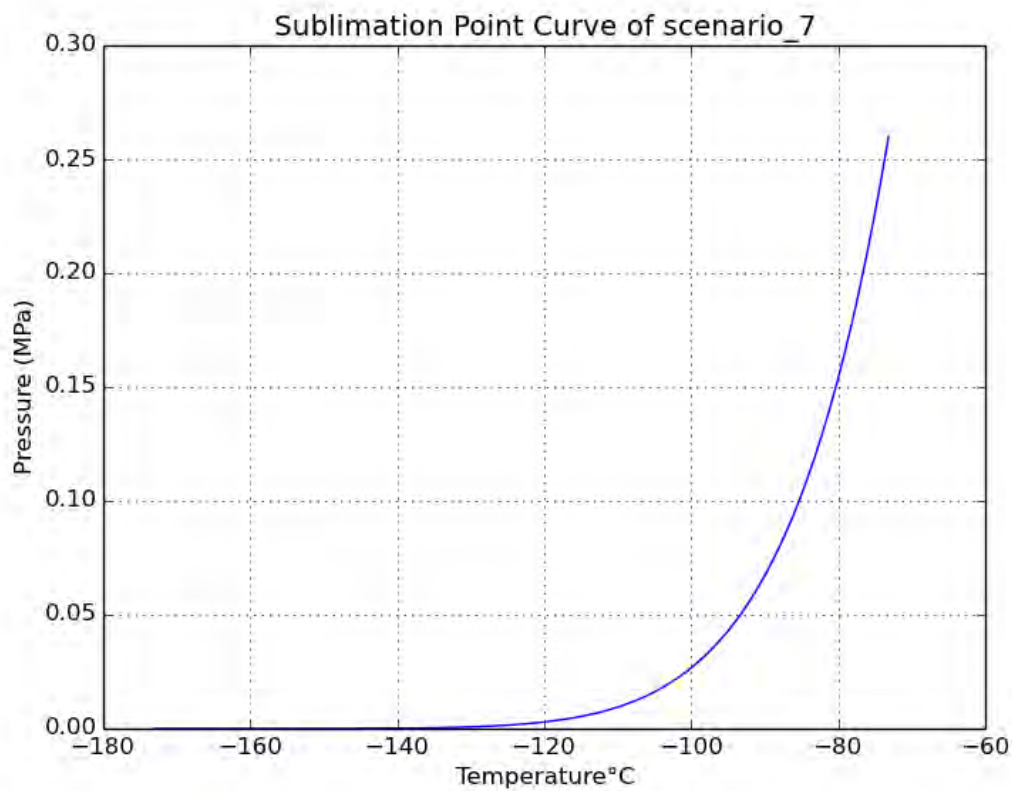


Figure A-184: The sublimation point curve of scenario 7 (OXY1)

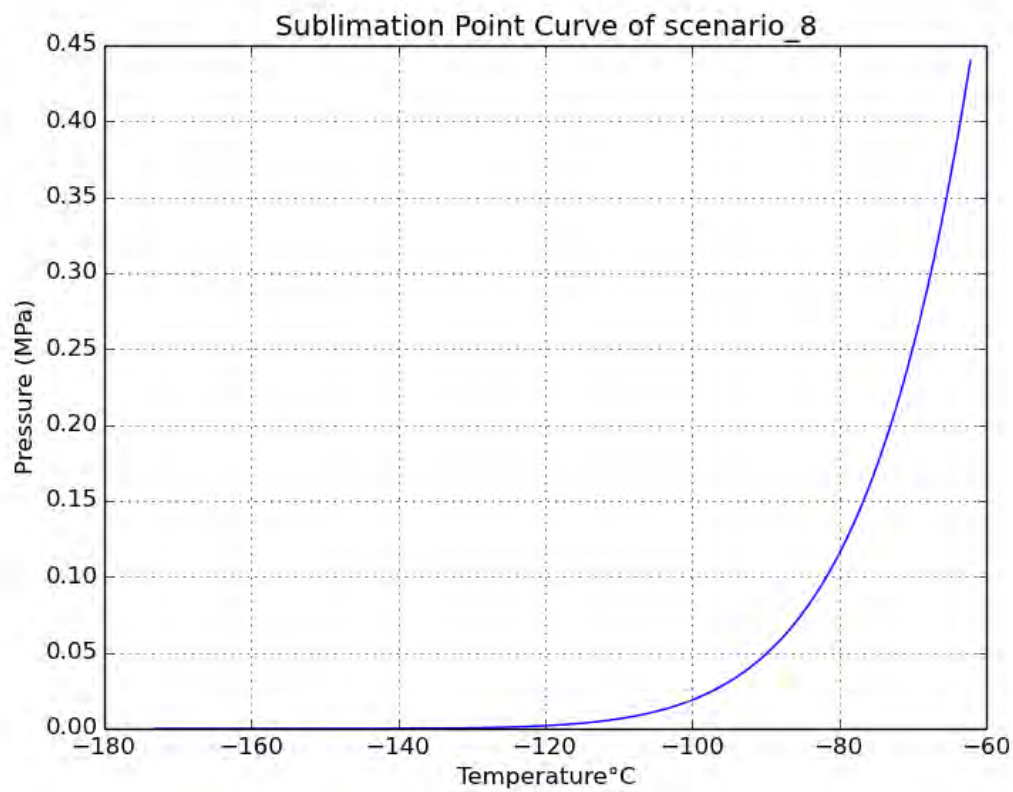


Figure A-185: The sublimation point curve of scenario 8 (OXY2)

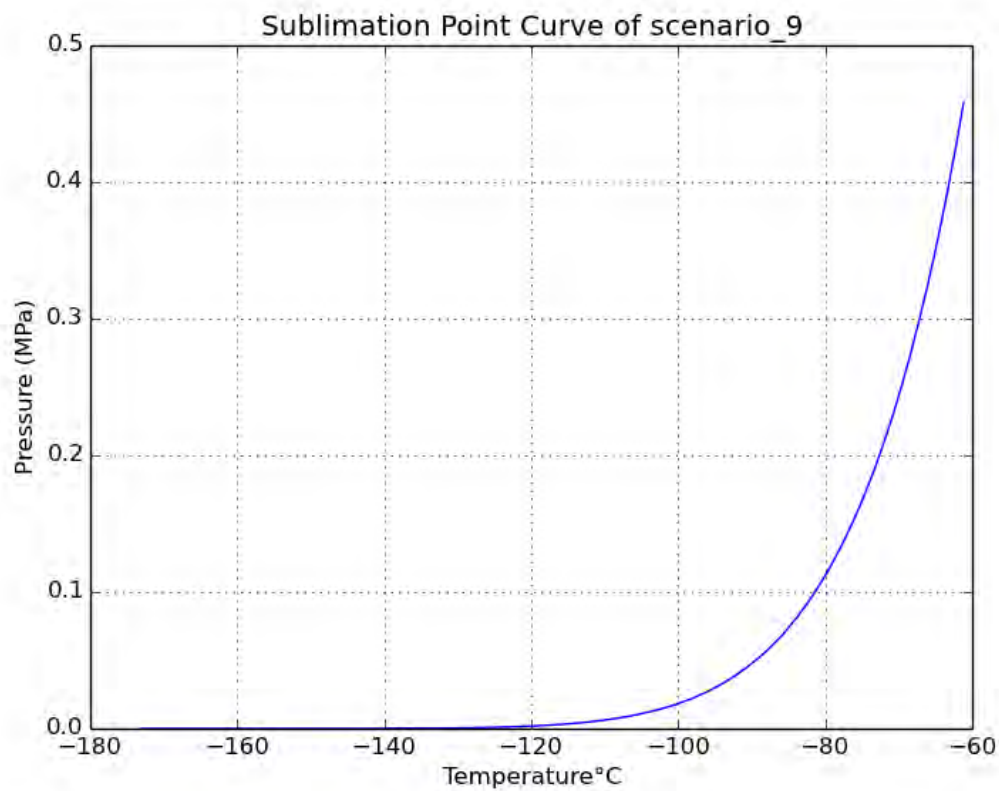


Figure A-186: The sublimation point curve of scenario 9 (PRE)

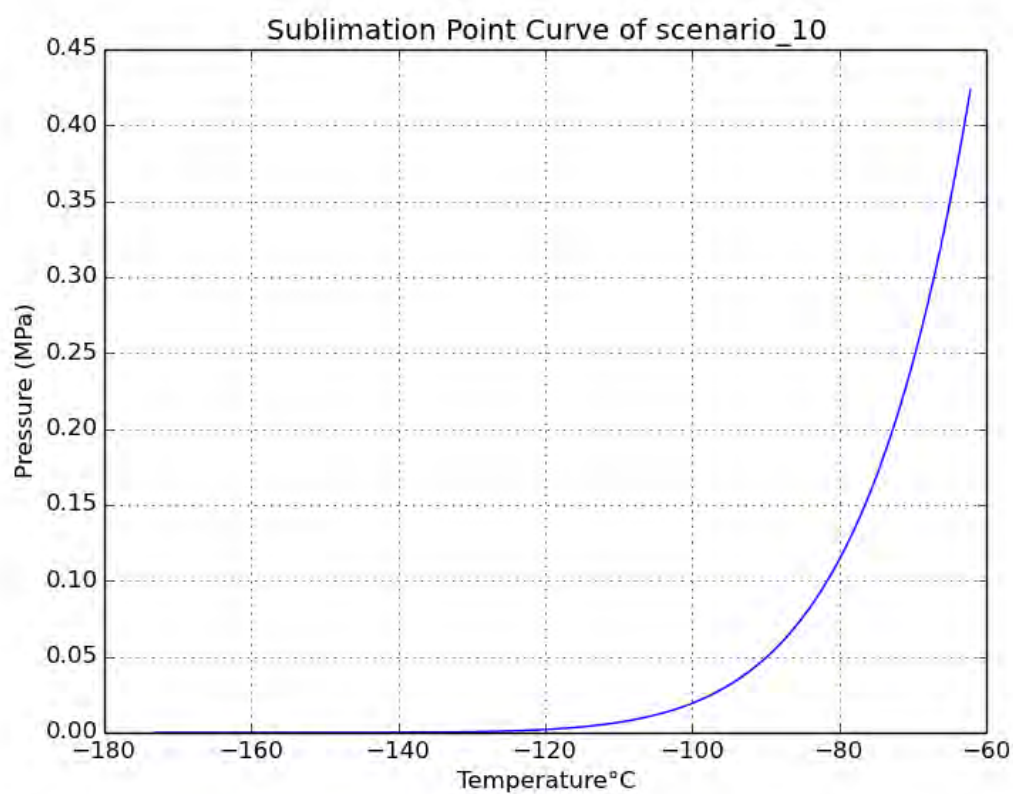


Figure A-187: The sublimation point curve of scenario 10 (H₂MEM)

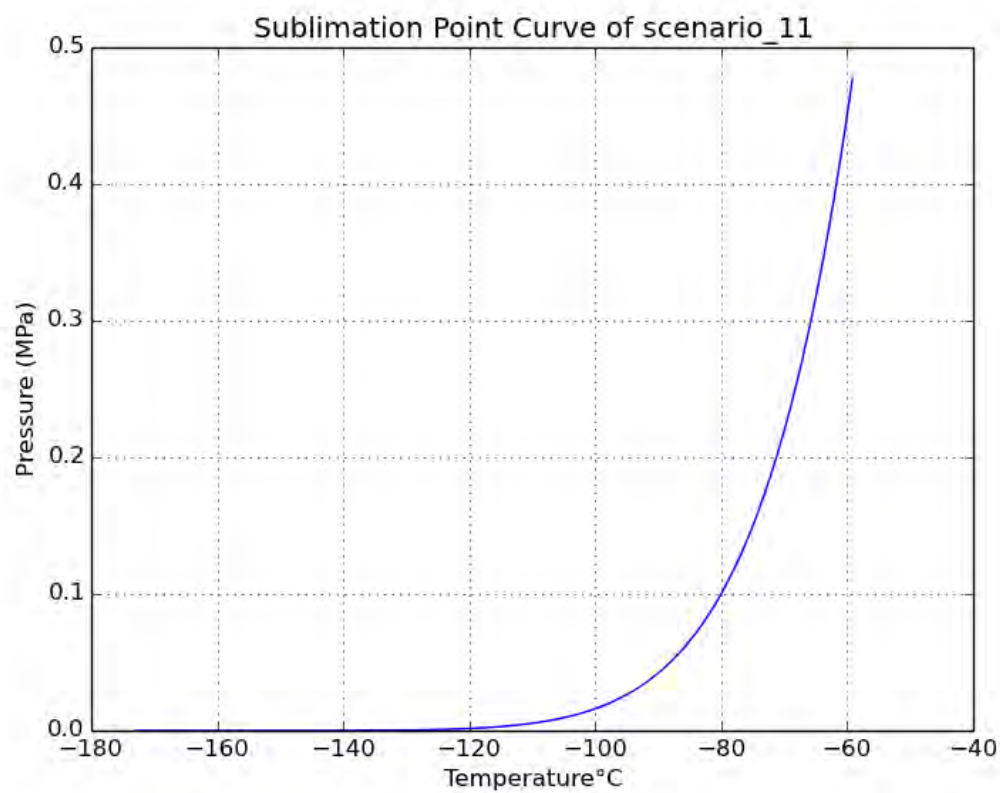


Figure A-188: The sublimation point curve of scenario 11 (CH₄ rich)

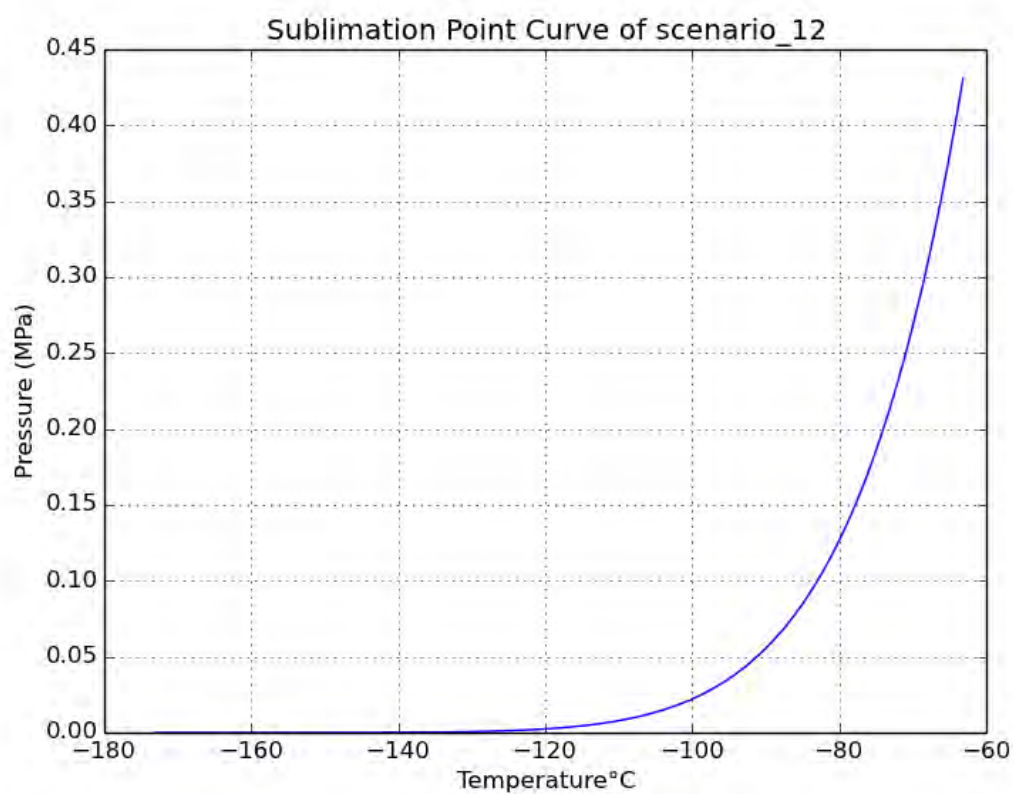


Figure A-189: The sublimation point curve of scenario 12 (TGR-BF)

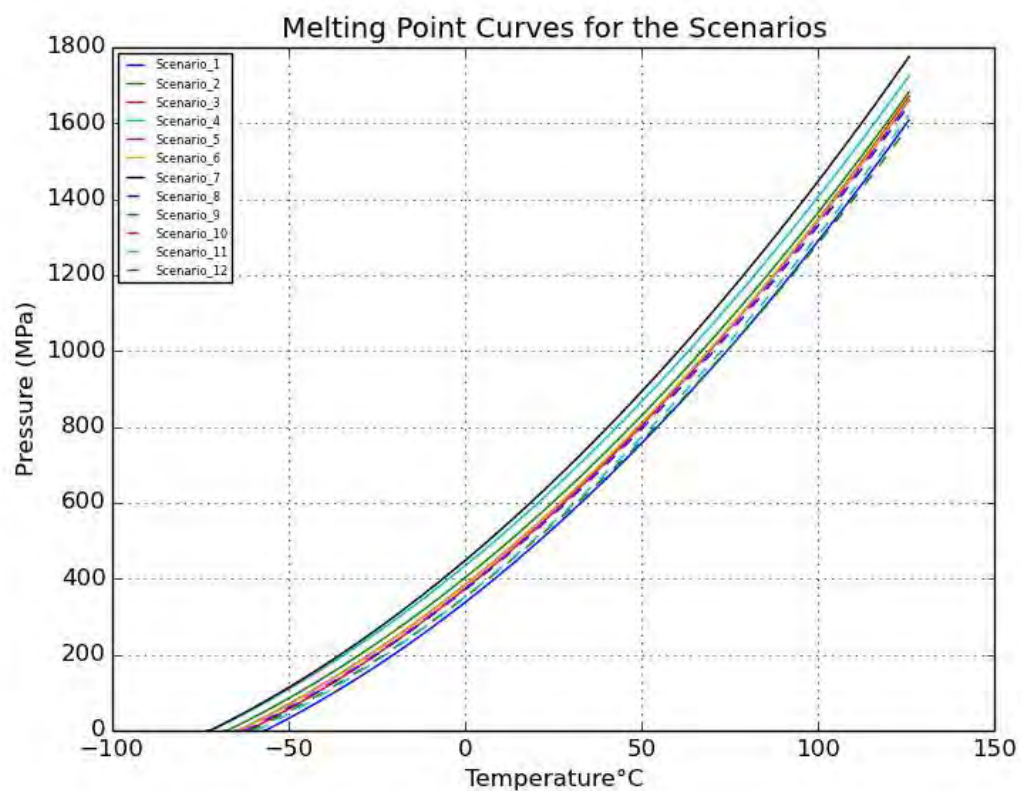


Figure A-190: The melting point curves of all of the scenarios

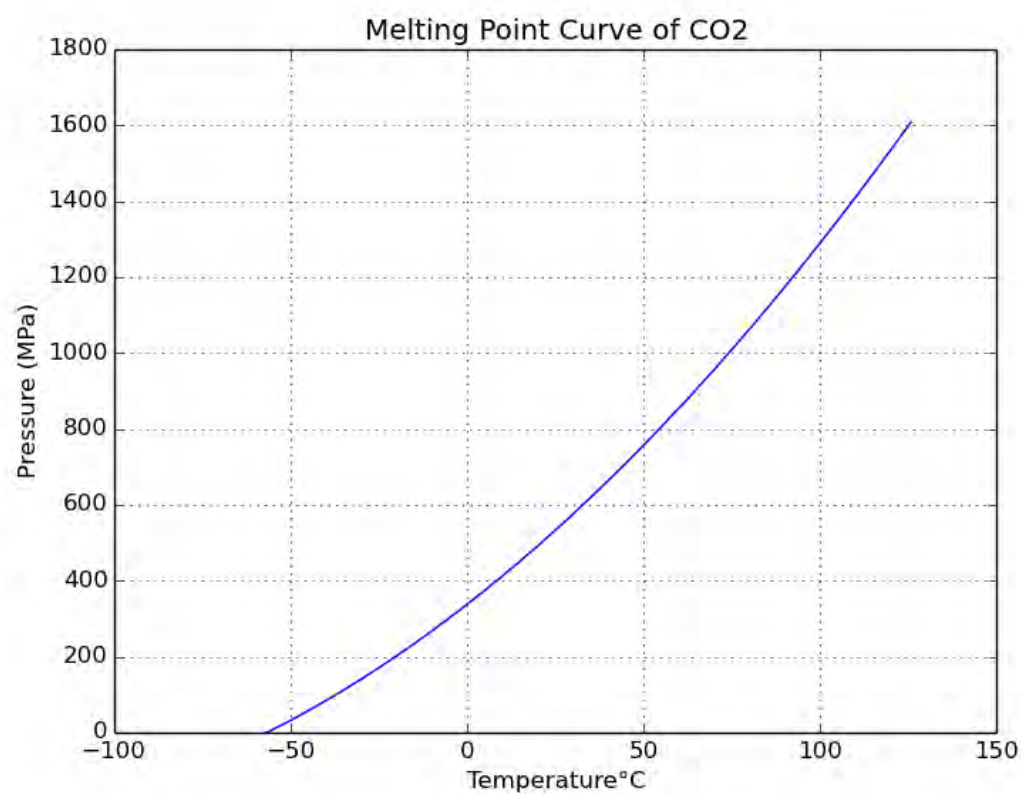


Figure A-191: The melting point curve of pure CO₂

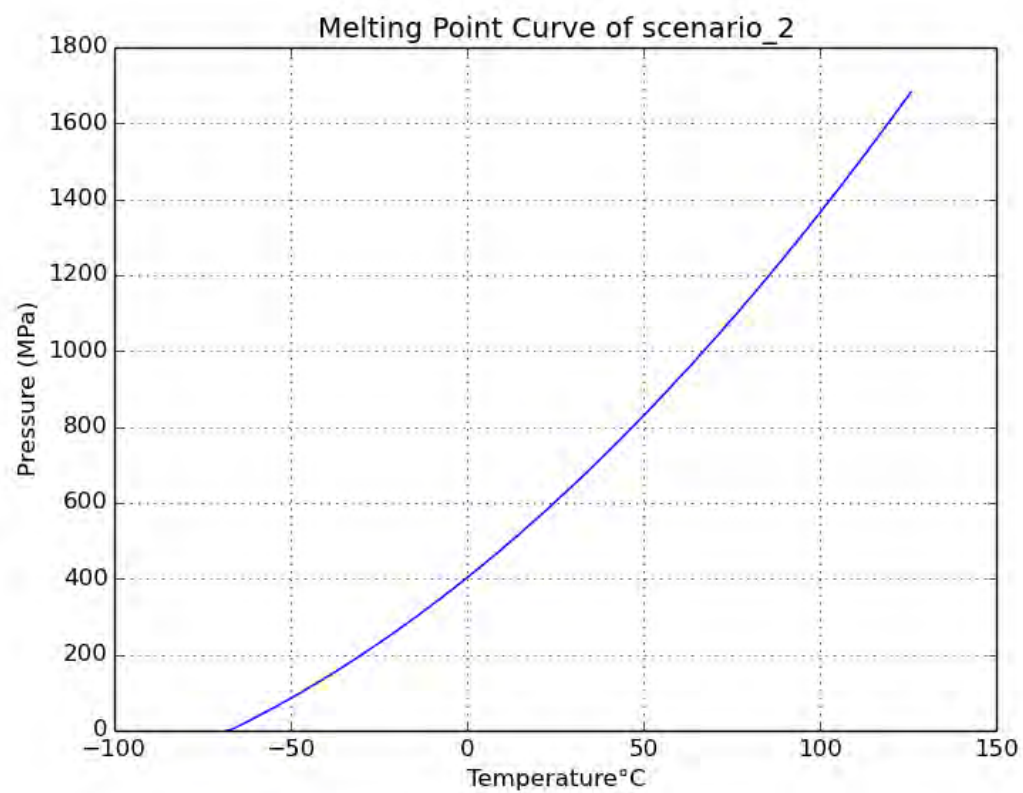


Figure A-192: The melting point curve of scenario 2 (CO2MEM1)

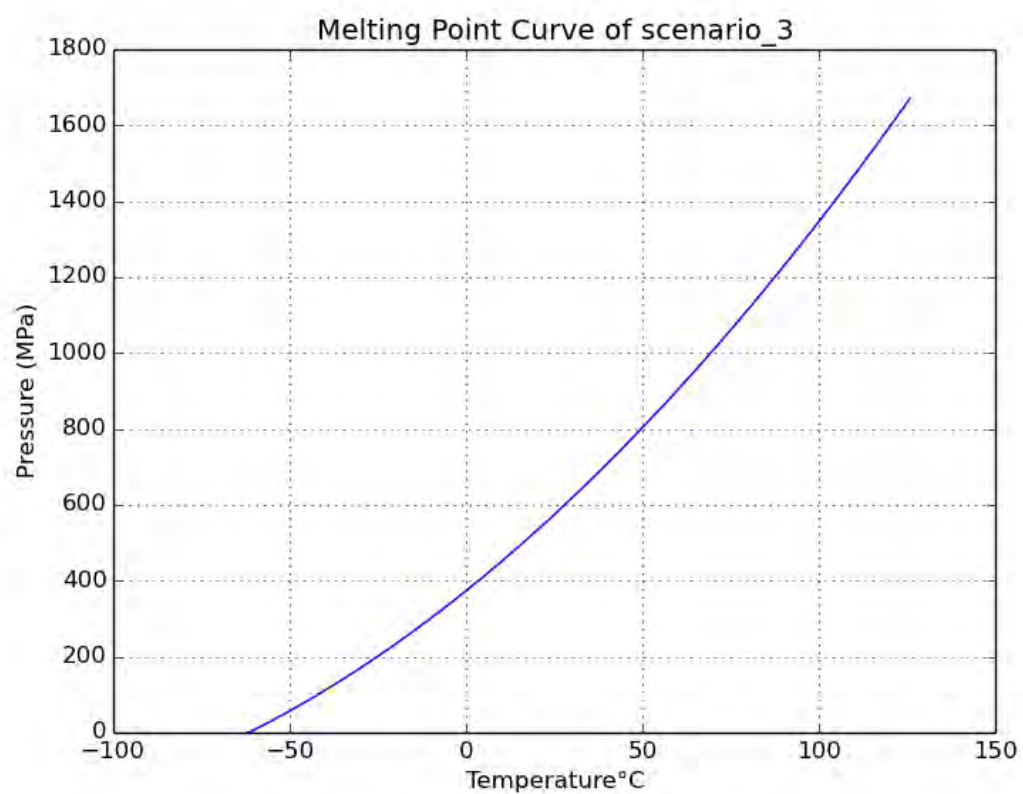


Figure A-193: The melting point curve of scenario 3 (CO2MEM2)

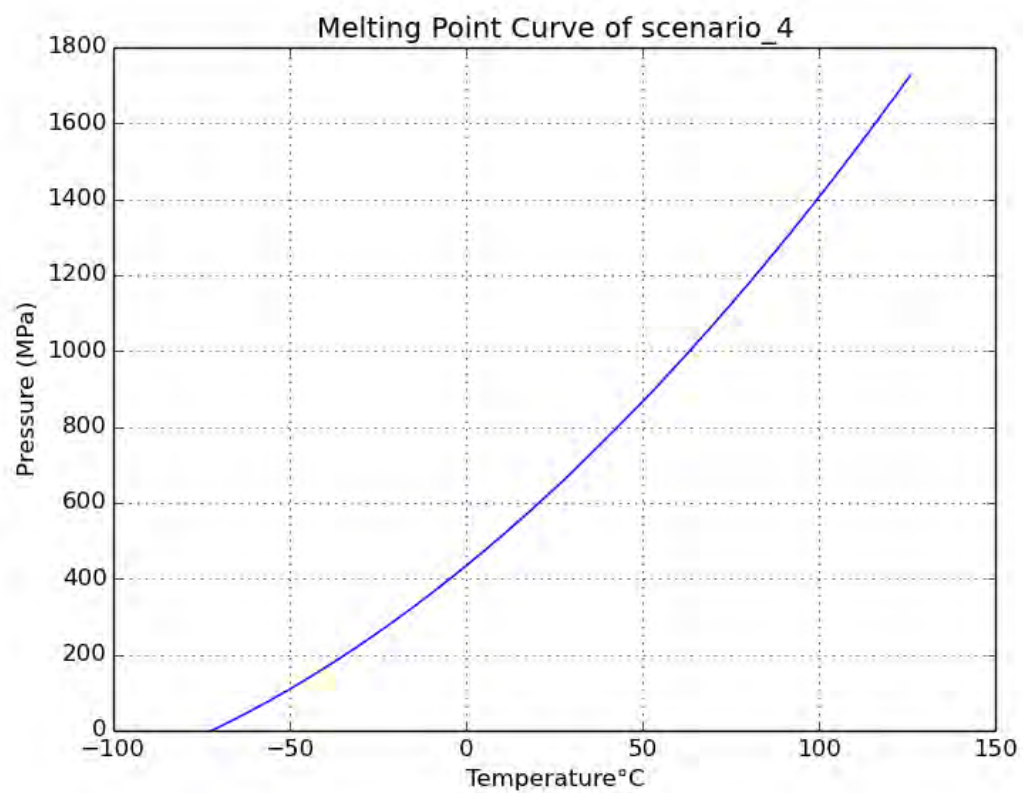


Figure A-194: The melting point curve of scenario 4 (ADS1)

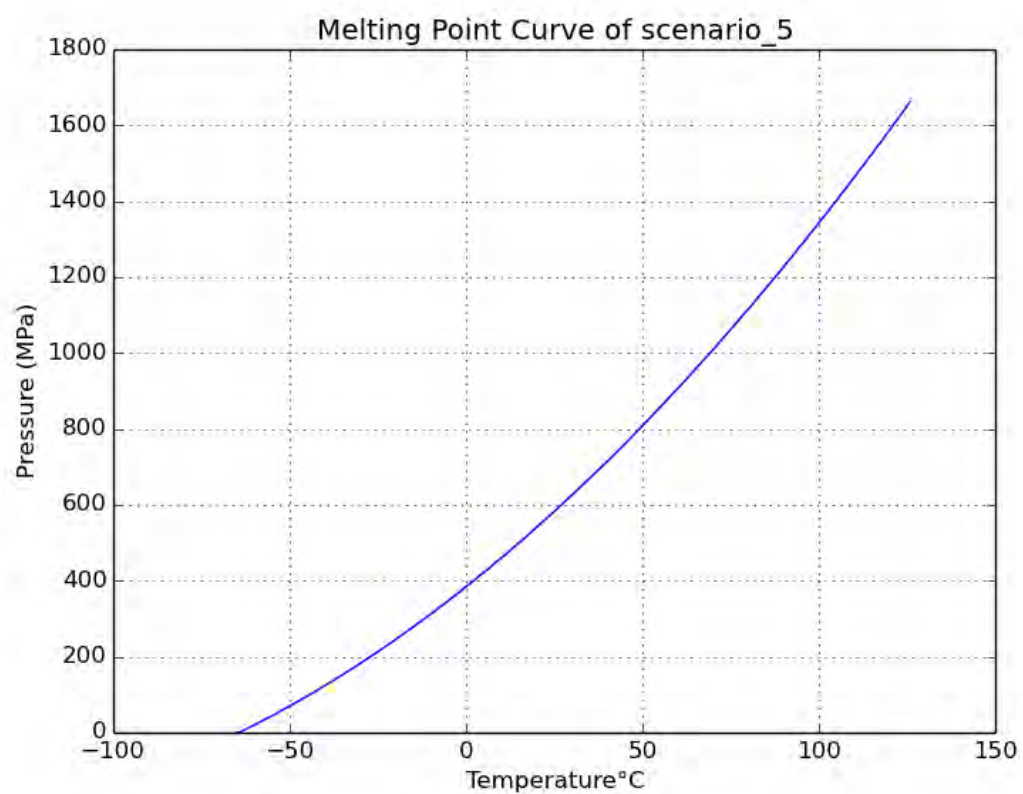


Figure A-195: The melting point curve of scenario 5 (ADS2)

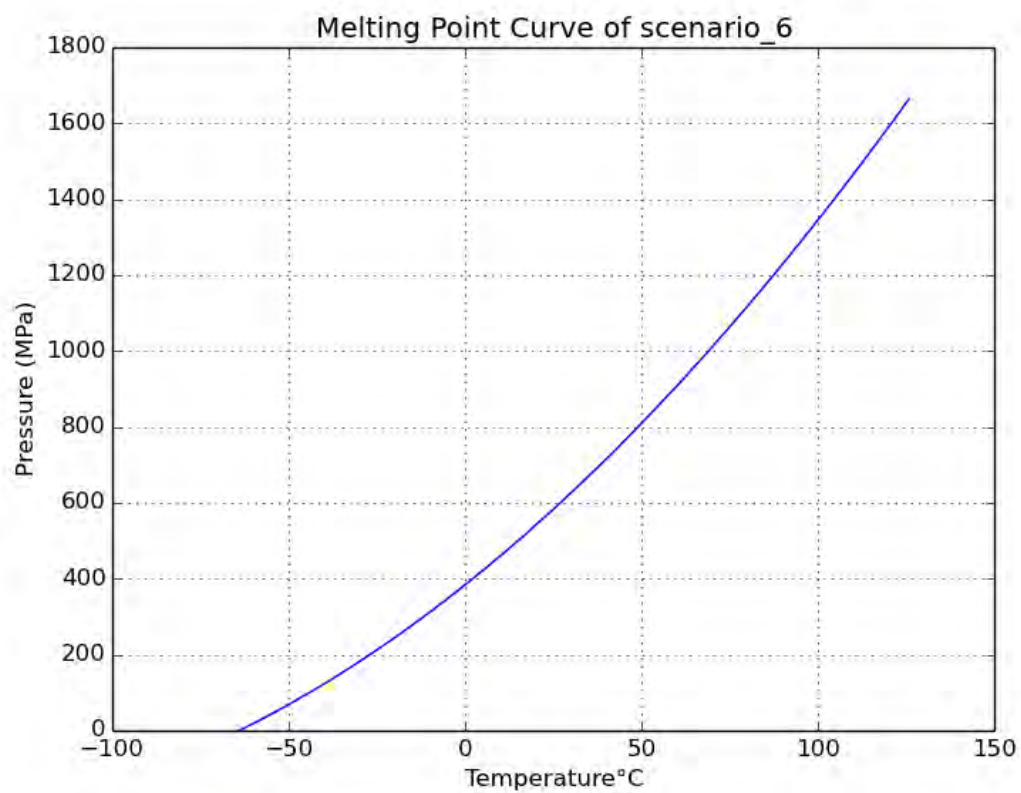


Figure A-196: The melting point curve of scenario 6 (Ca loop)

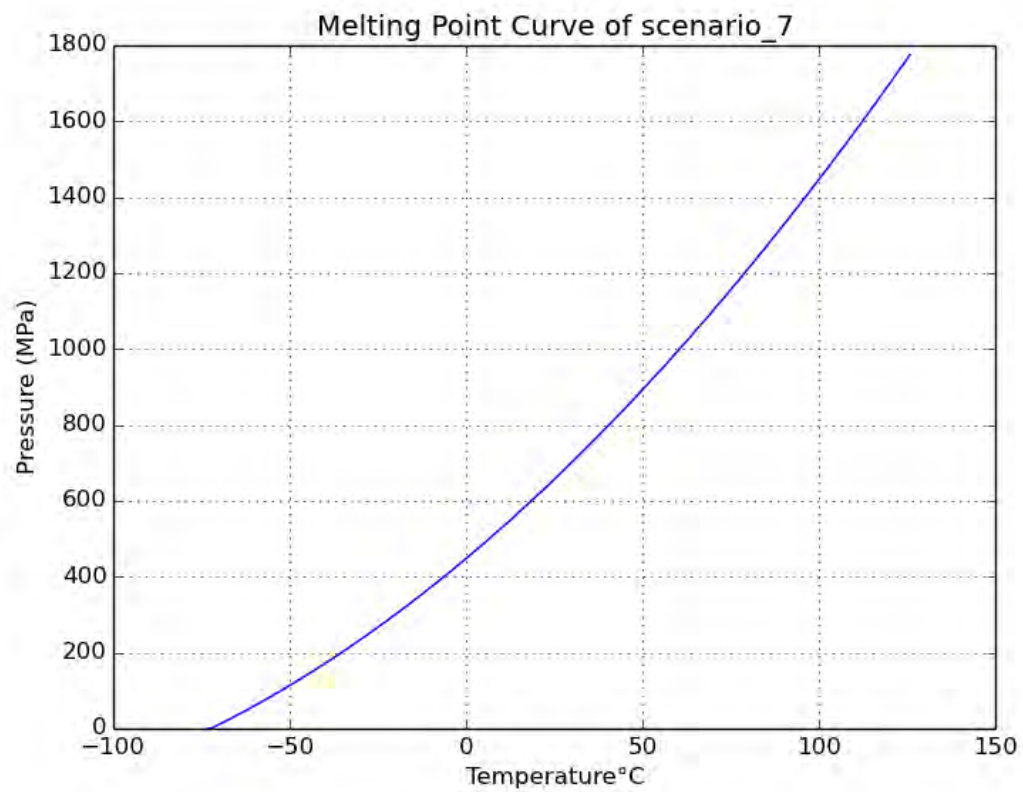


Figure A-197: The melting point curve of scenario 7 (OXY1)

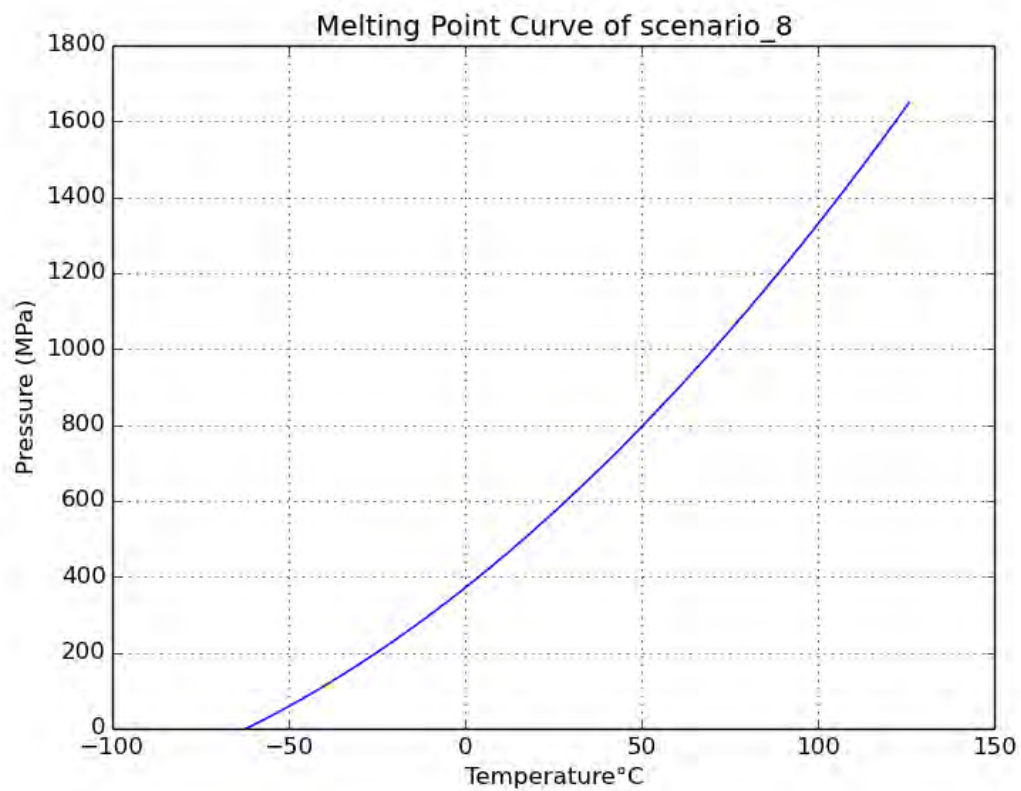


Figure A-198: The melting point curve of scenario 8 (OXY2)

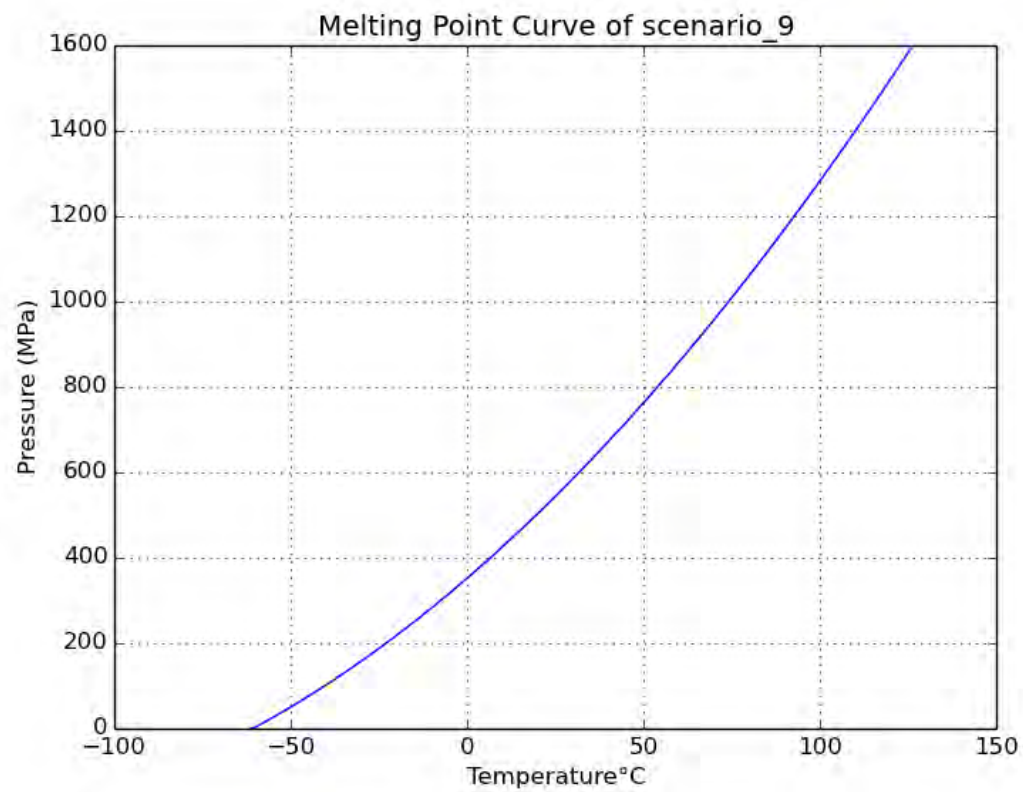


Figure A-199: The melting point curve of scenario 9 (PRE)

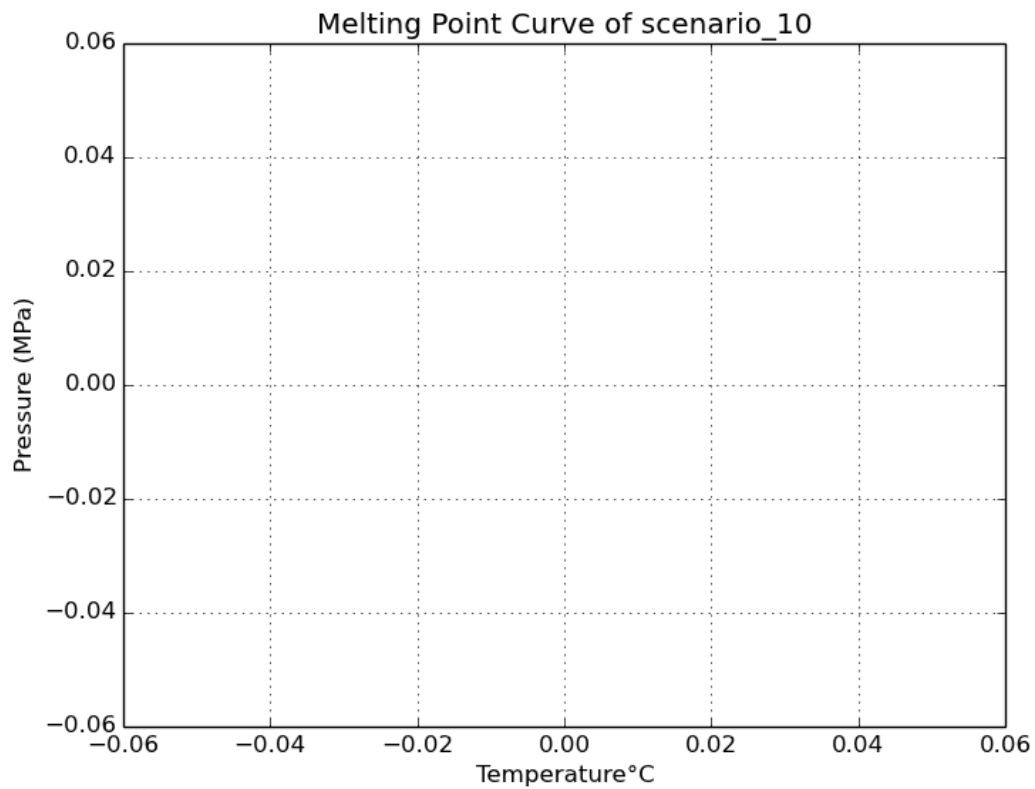


Figure A-200: The melting point curve of scenario 10 (H2MEM)

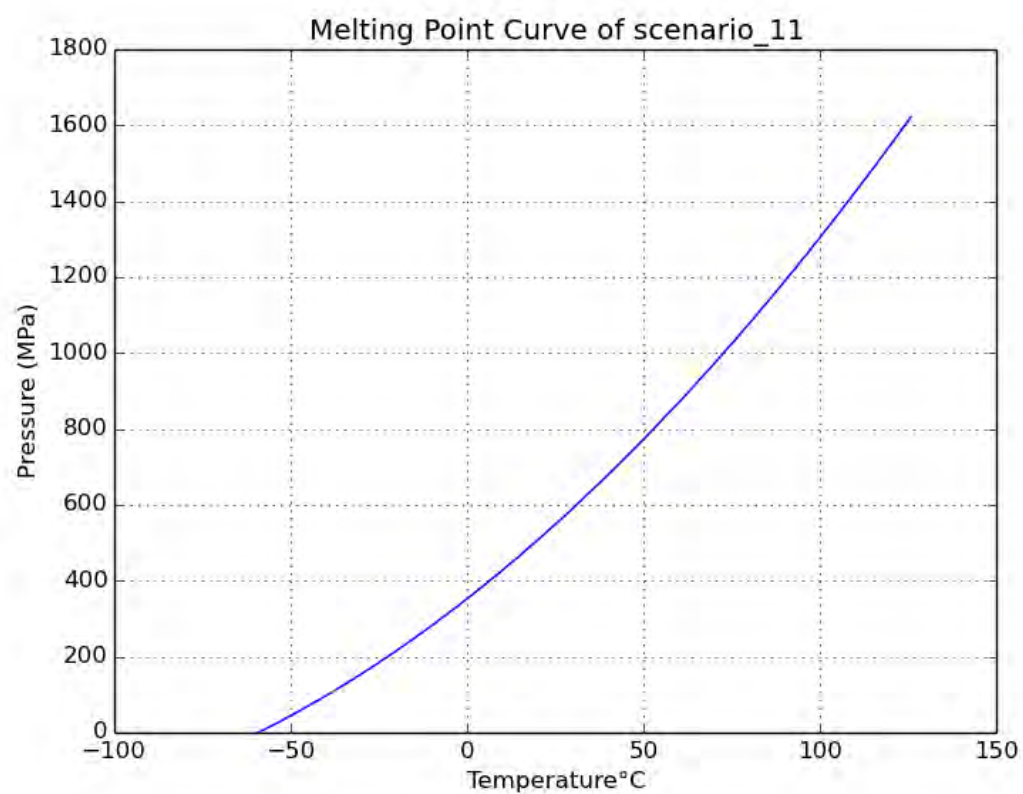


Figure A-201: The melting point curve of scenario 11 (CH₄ rich)

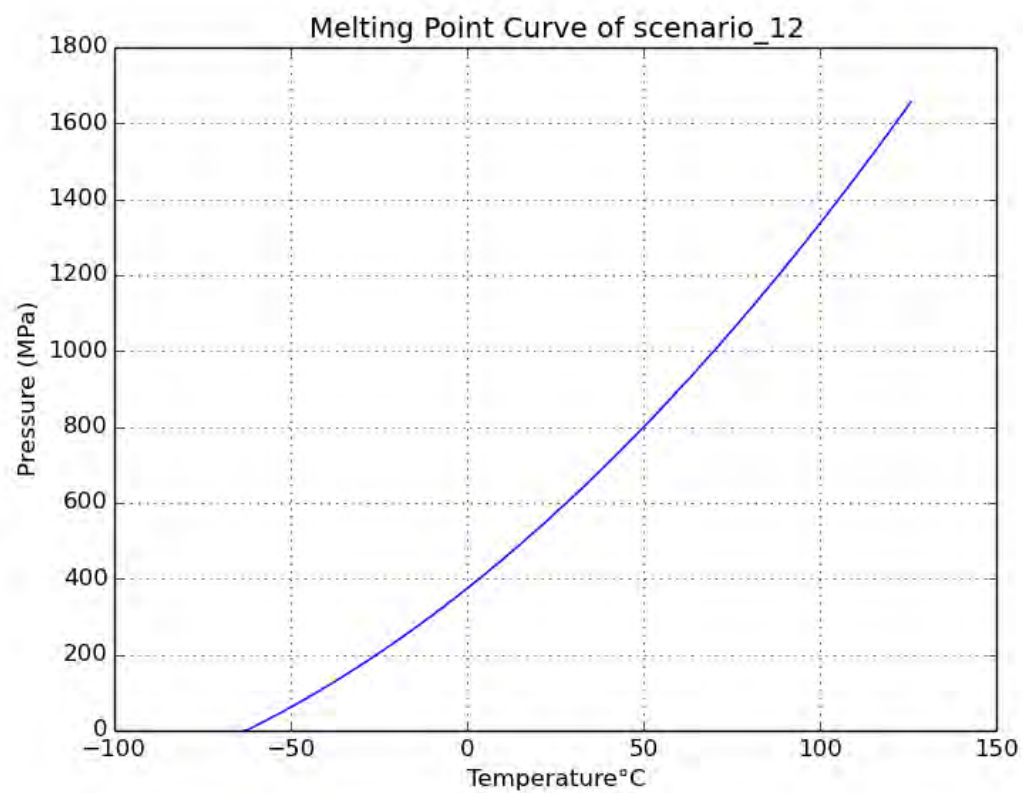


Figure A-202: The melting point curve of scenario 12 (TGR-BF)

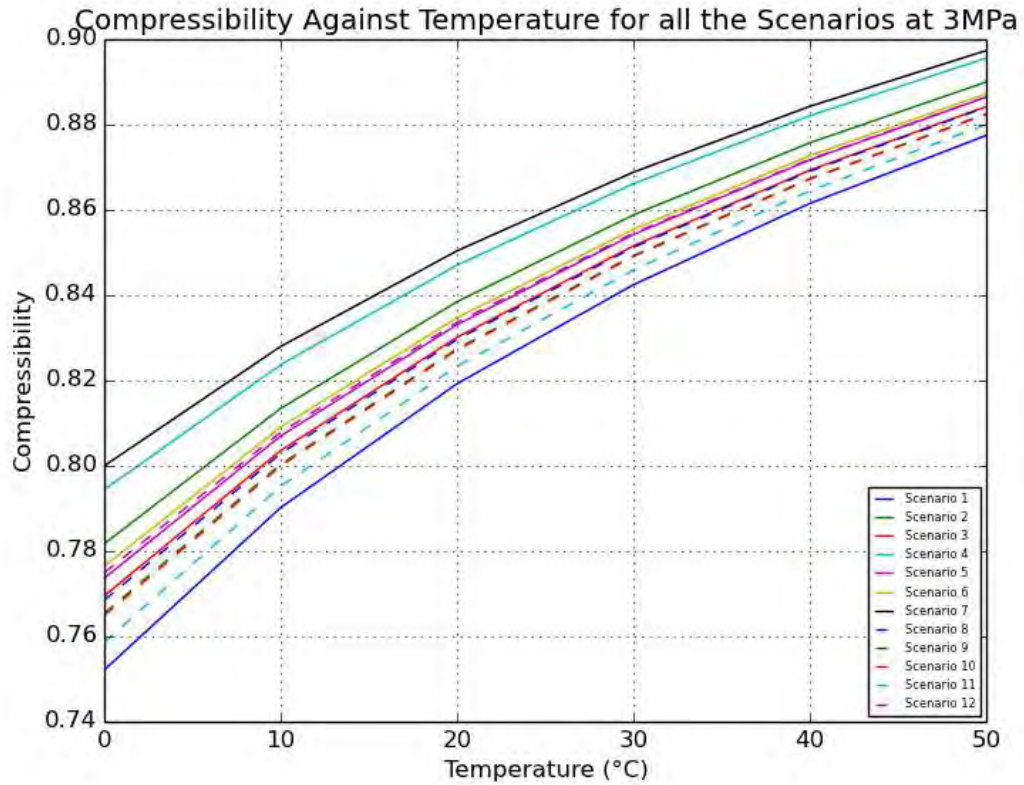


Figure A-203: Compressibility for all scenarios at 3MPa

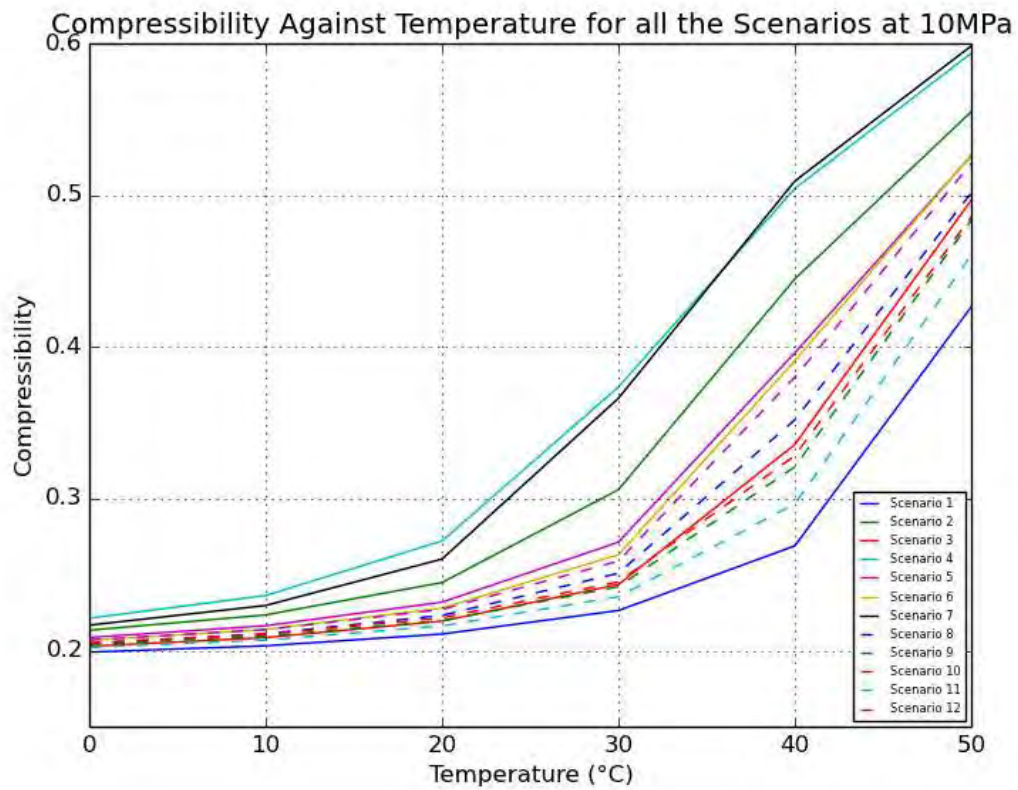


Figure A-204: Compressibility for all scenarios at 10MPa

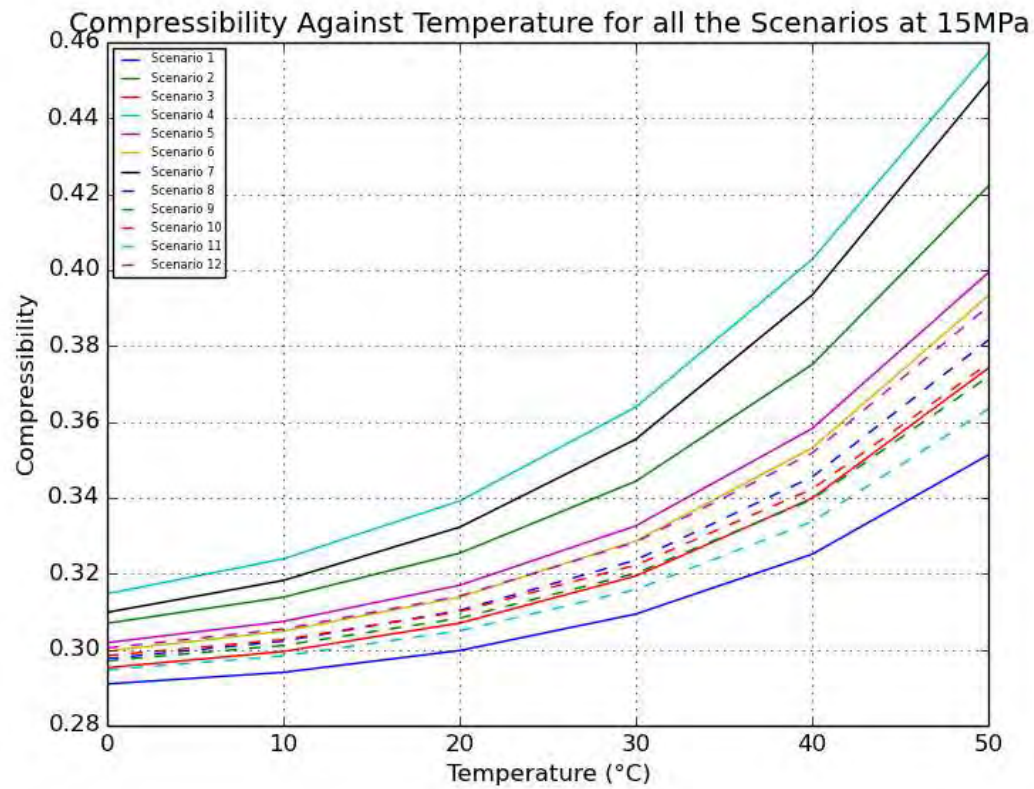


Figure A-205: Compressibility for all scenarios at 15MPa

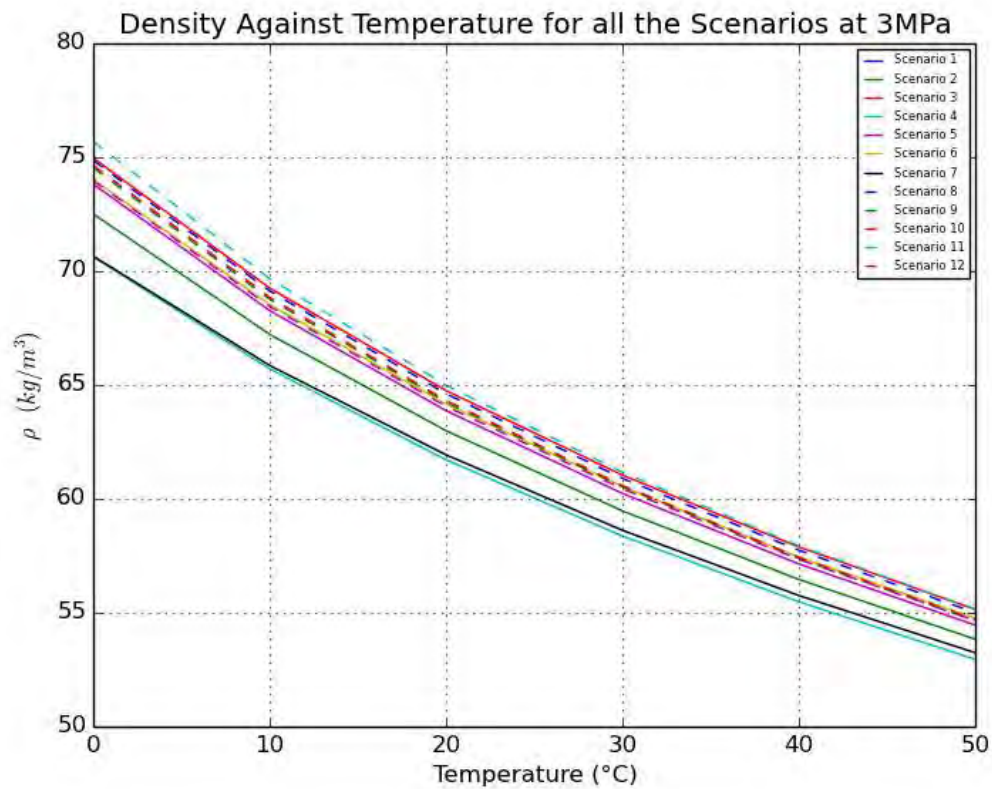


Figure A-206: Density for all scenarios at 3MPa

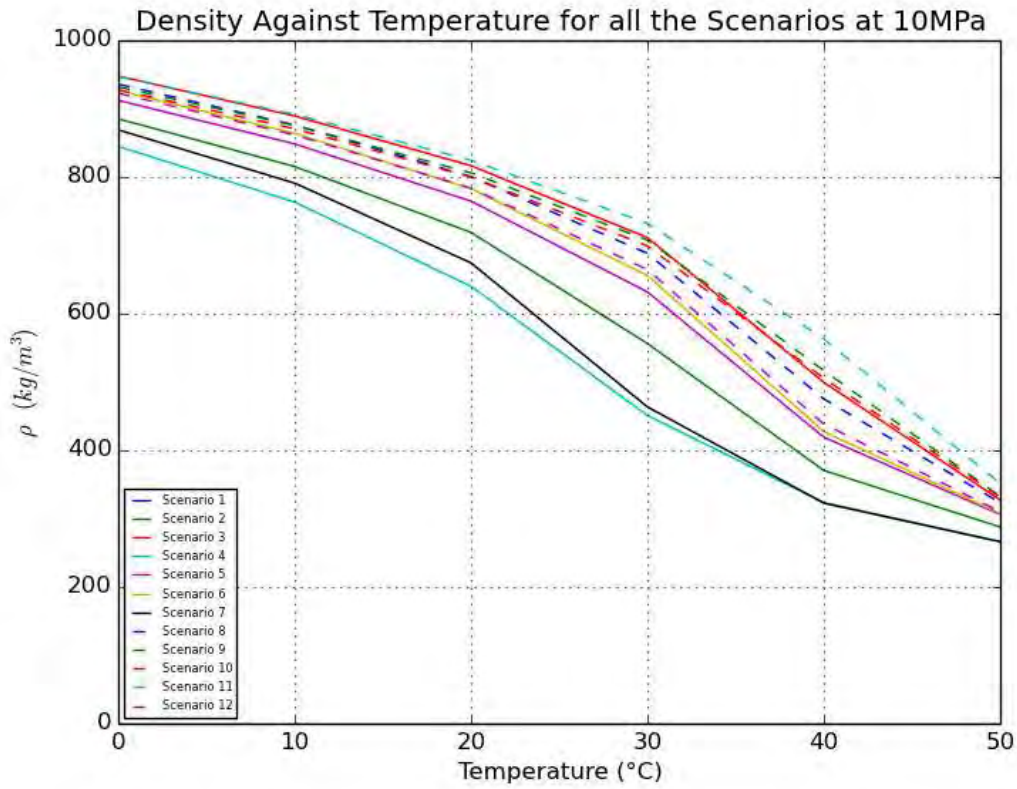


Figure A-207: Density for all scenarios at 10MPa

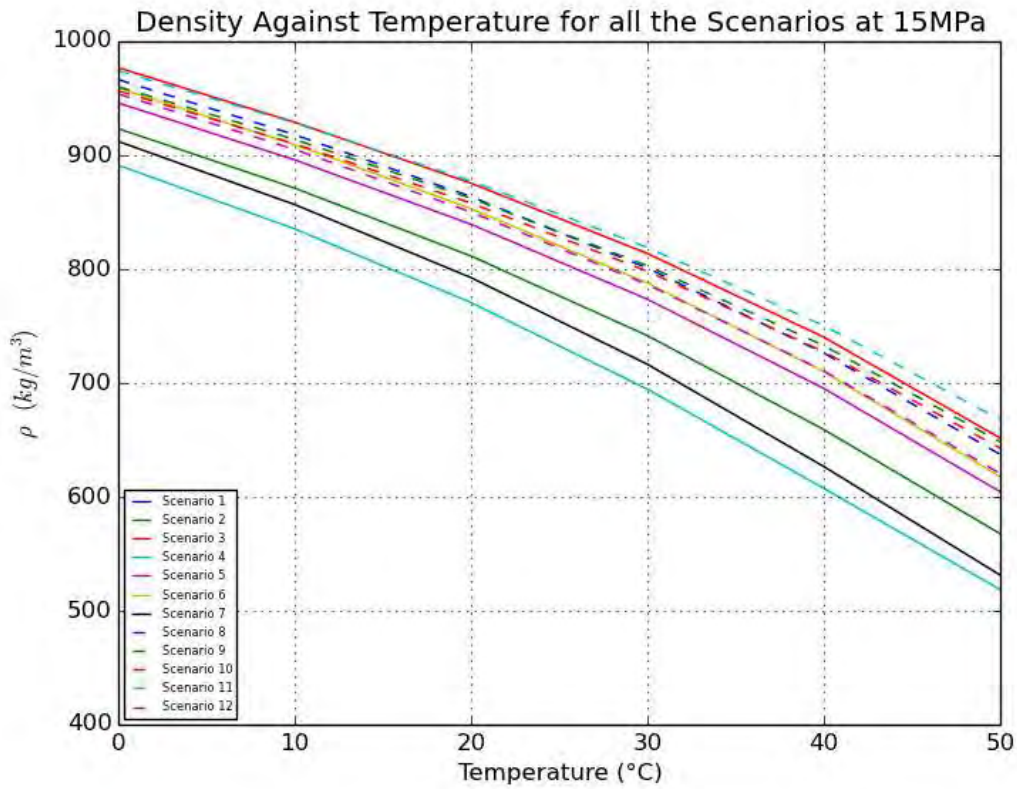


Figure A-208: Density for all scenarios at 15MPa

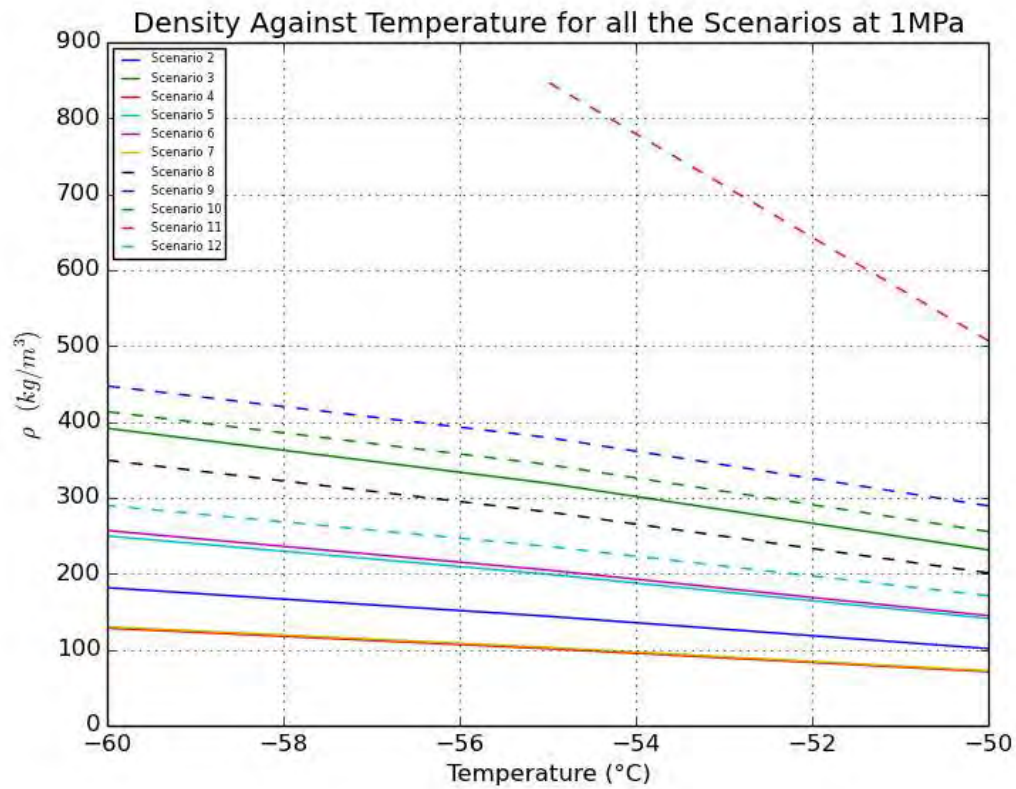


Figure A-209: Density for all scenarios at 1MPa

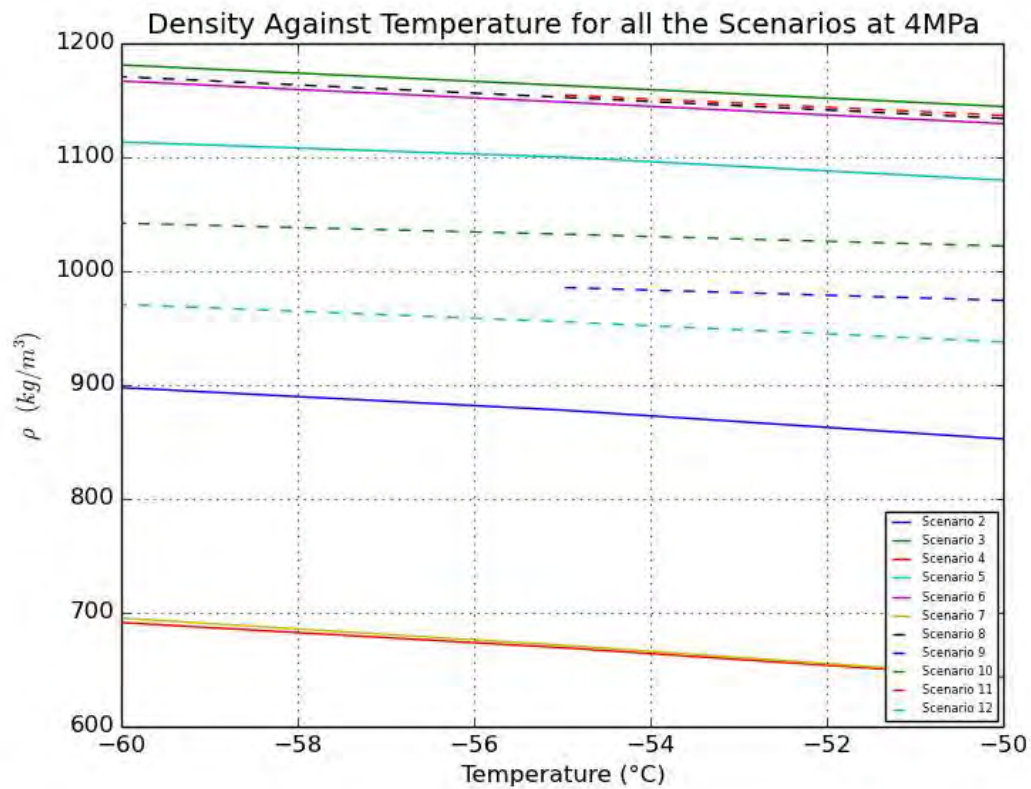


Figure A-210: Density for all scenarios at 4MPa

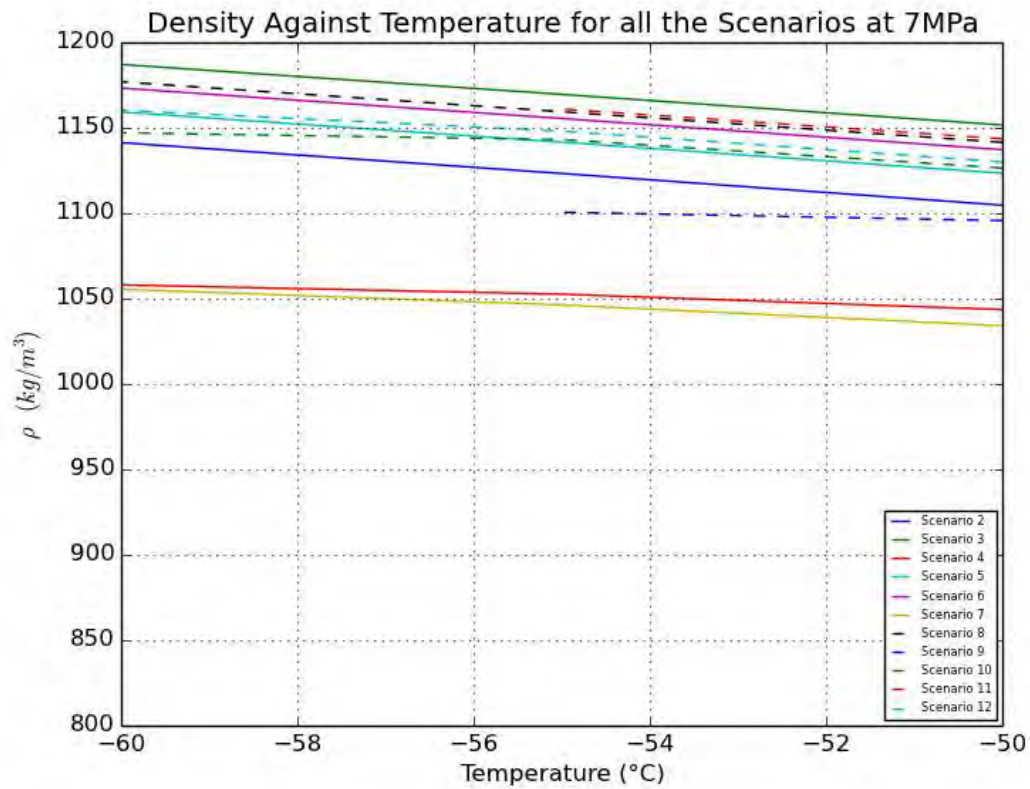


Figure A-211: Density for all scenarios at 7MPa

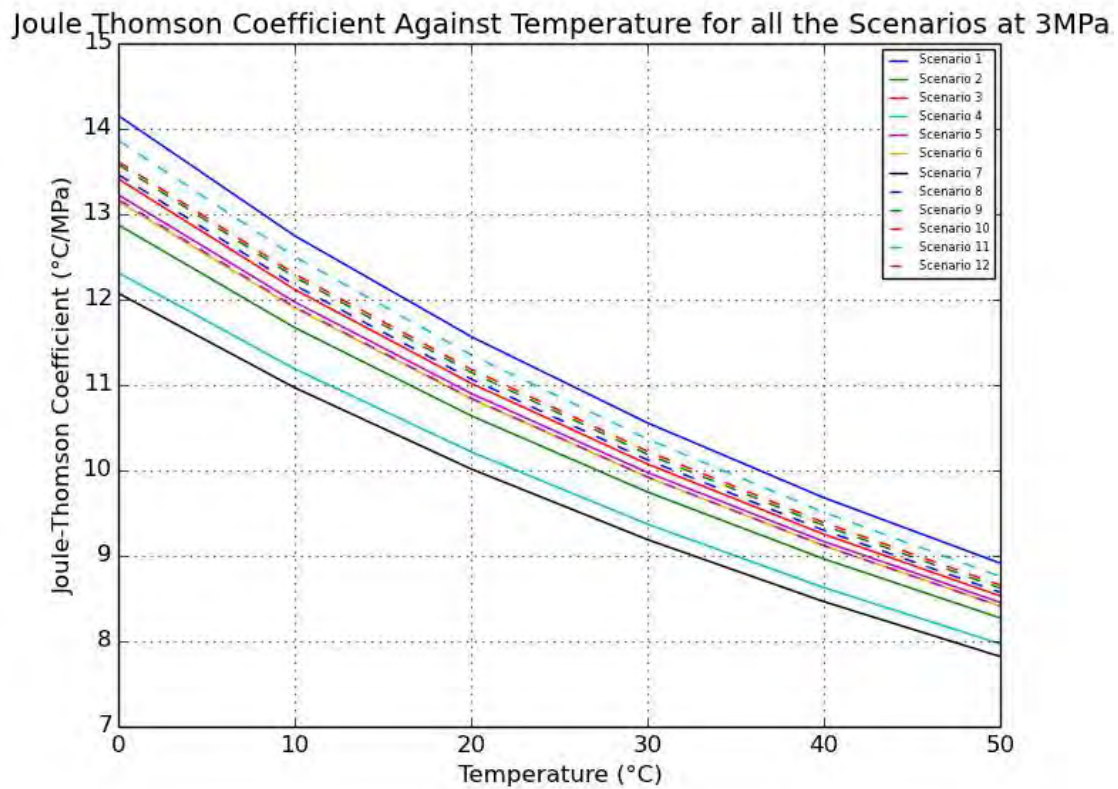


Figure A-212: Joule Thomson coefficient for all scenarios at 3MPa

Joule Thomson Coefficient Against Temperature for all the Scenarios at 10MPa

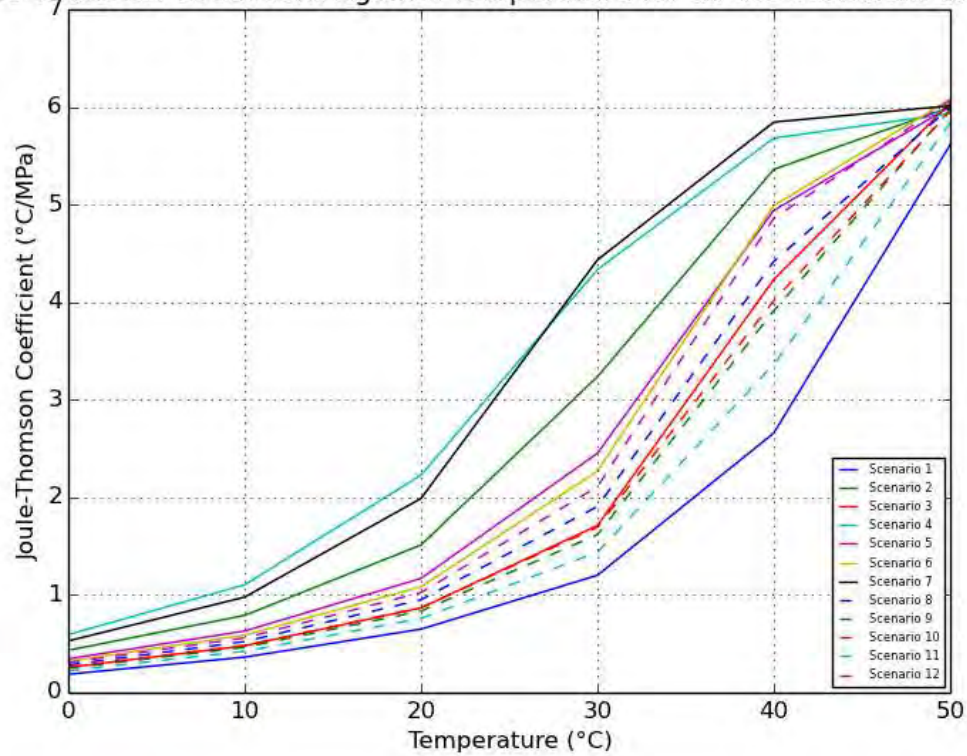


Figure A-213: Joule Thomson coefficient for all scenarios at 10MPa

Joule Thomson Coefficient Against Temperature for all the Scenarios at 15MPa

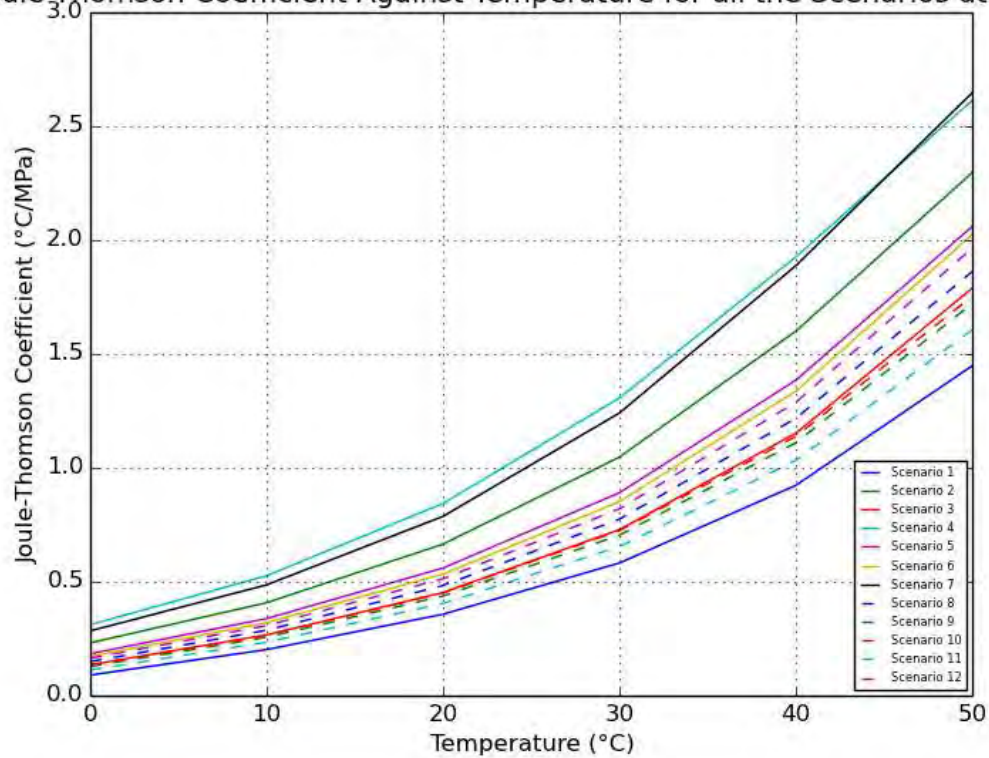


Figure A-214: Joule Thomson coefficient for all scenarios at 15MPa

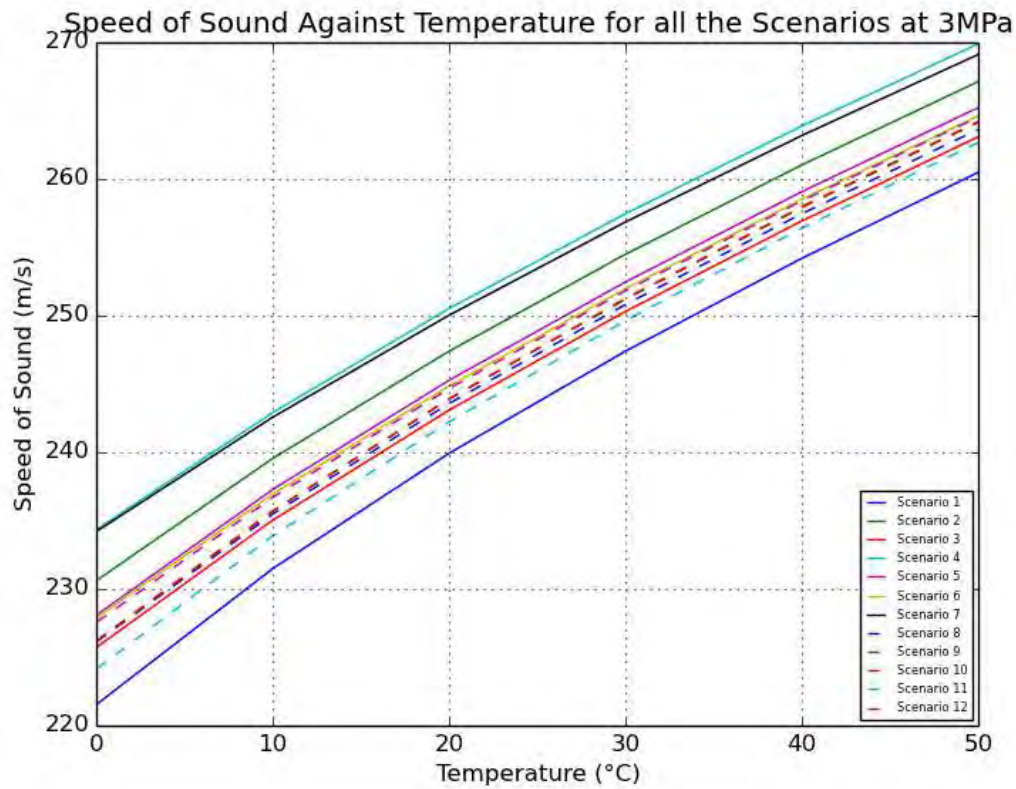


Figure A-215: Speed of sound for all scenarios at 3MPa

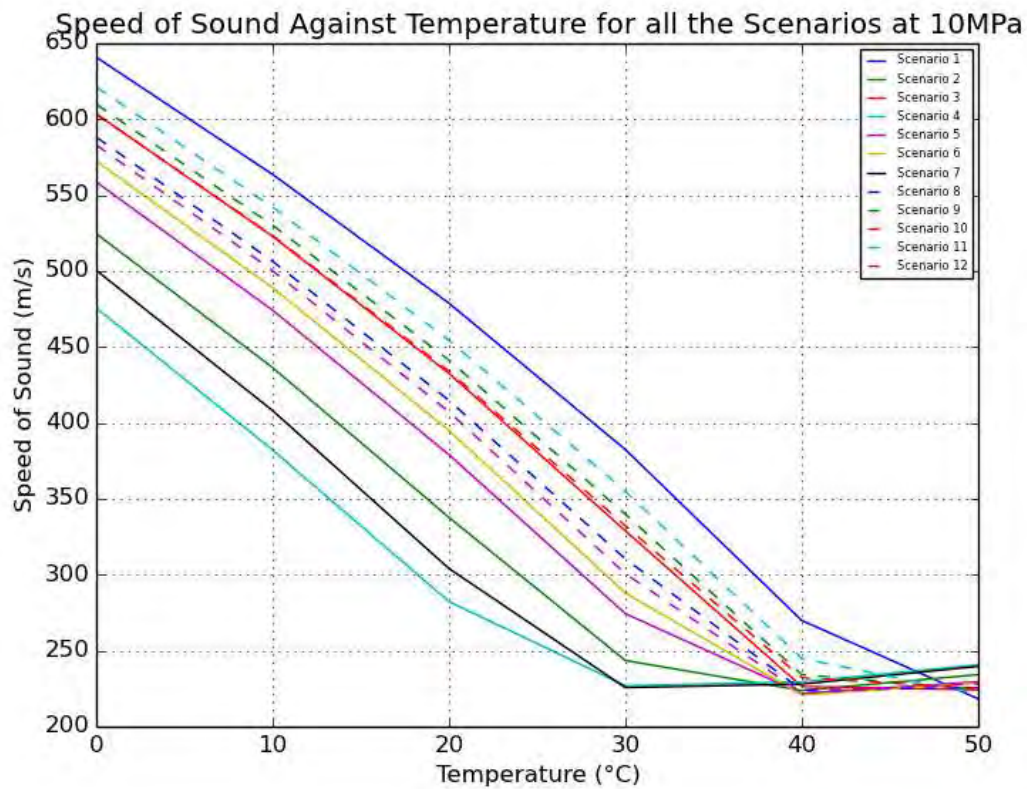


Figure A-216: Speed of sound for all scenarios at 10MPa

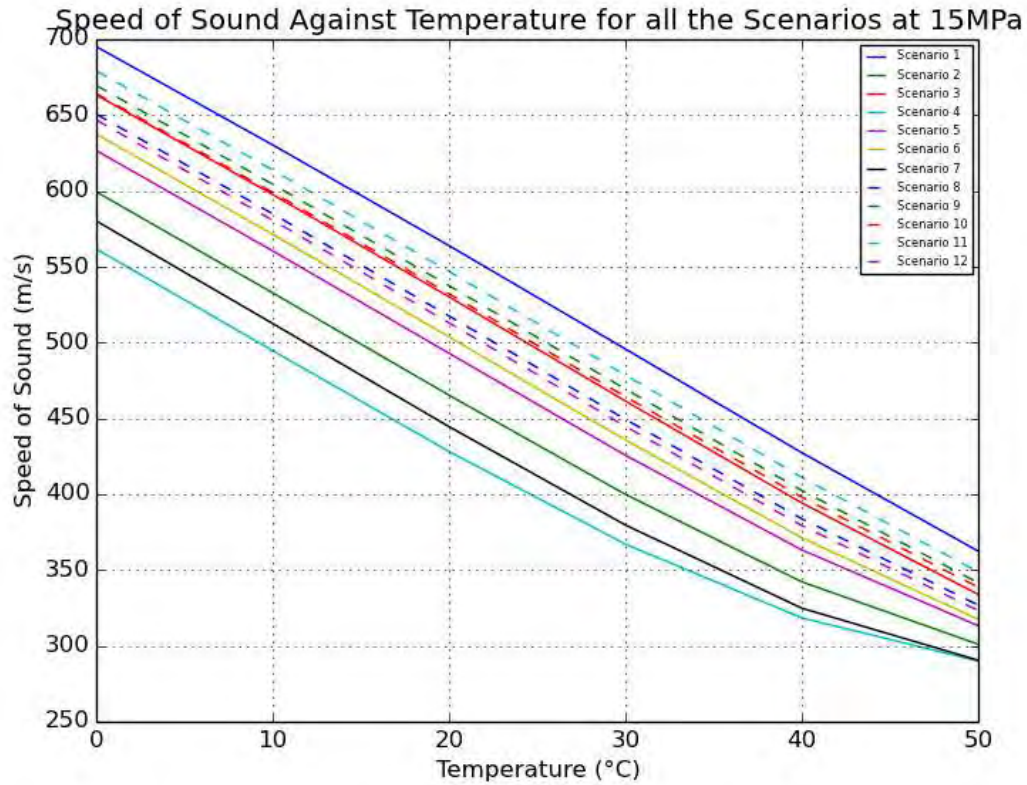


Figure A-217: Speed of sound for all scenarios at 15MPa

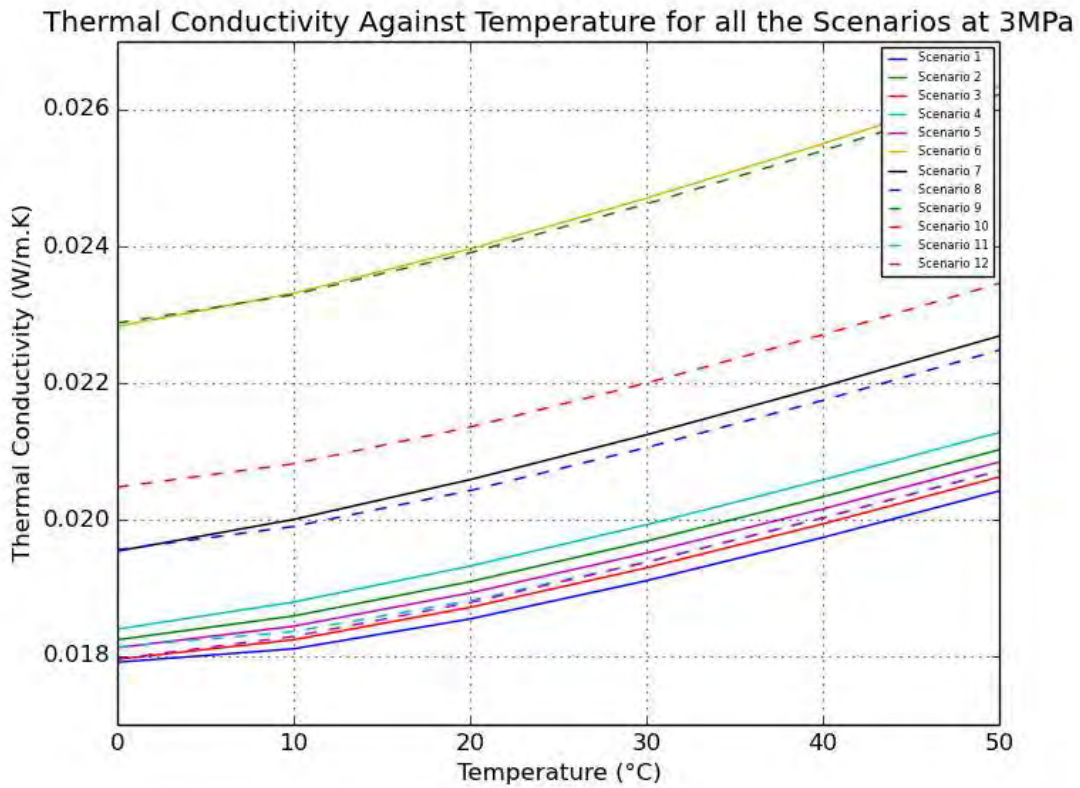


Figure A-218: Thermal conductivity for all scenarios at 3MPa

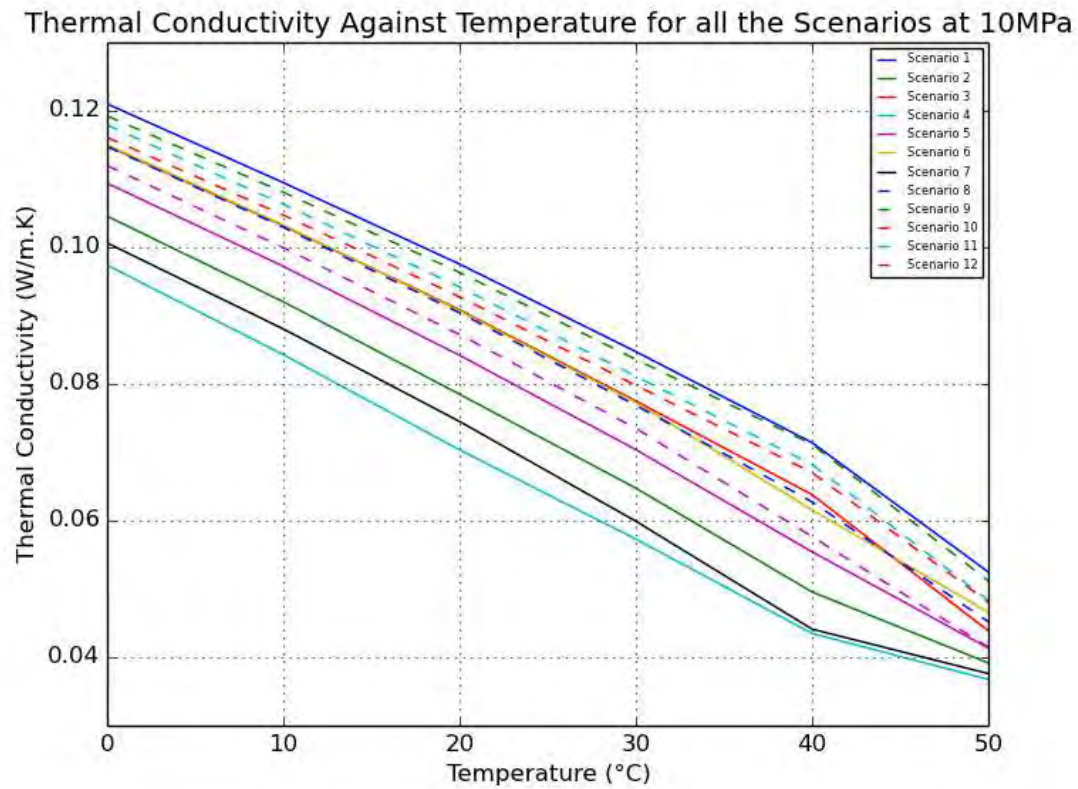


Figure A-219: Thermal conductivity for all scenarios at 10MPa

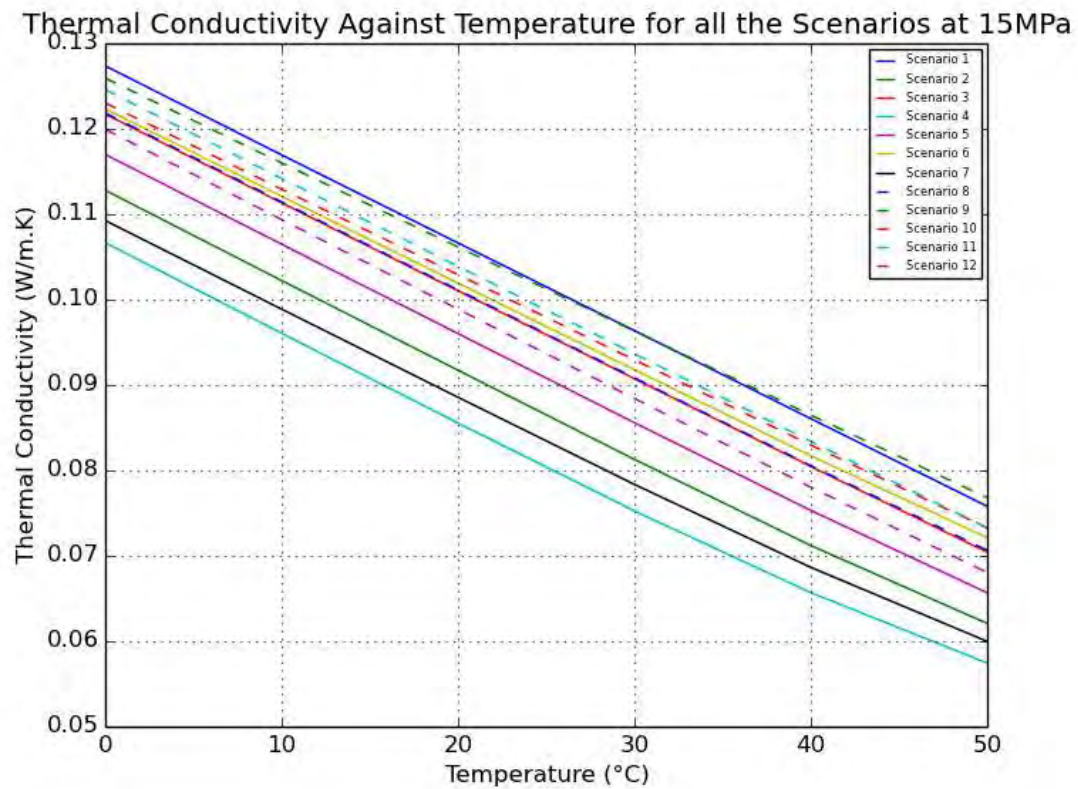


Figure A-220: Thermal conductivity for all scenarios at 15MPa

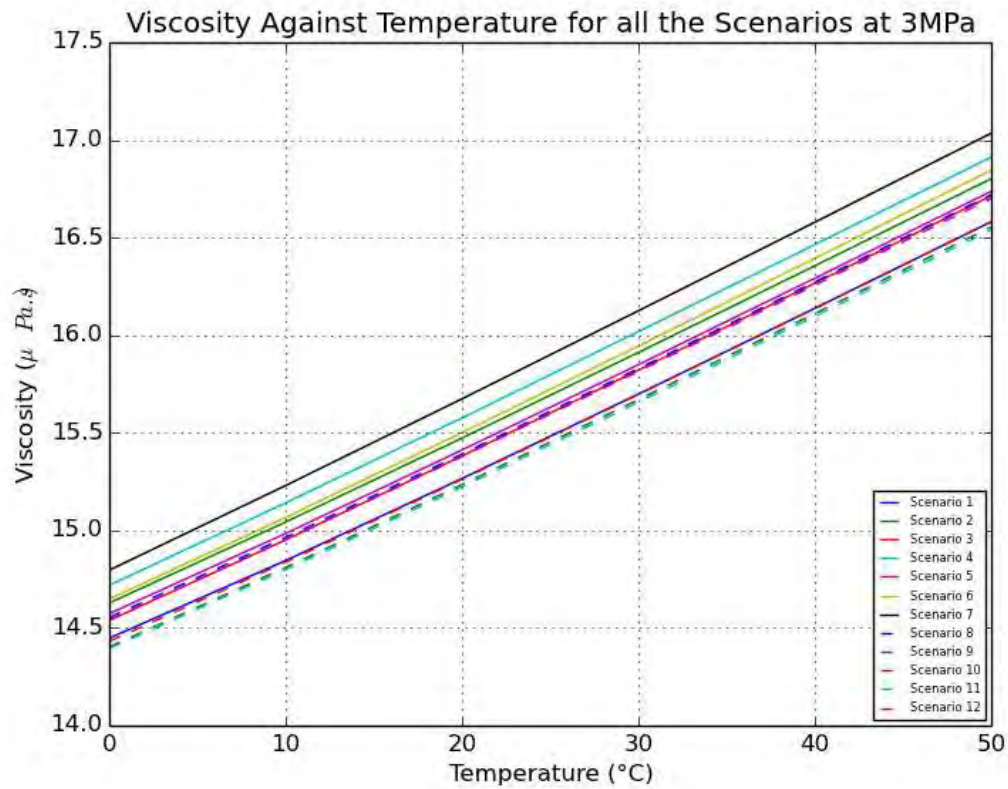


Figure A-221: Viscosity for all scenarios at 3MPa

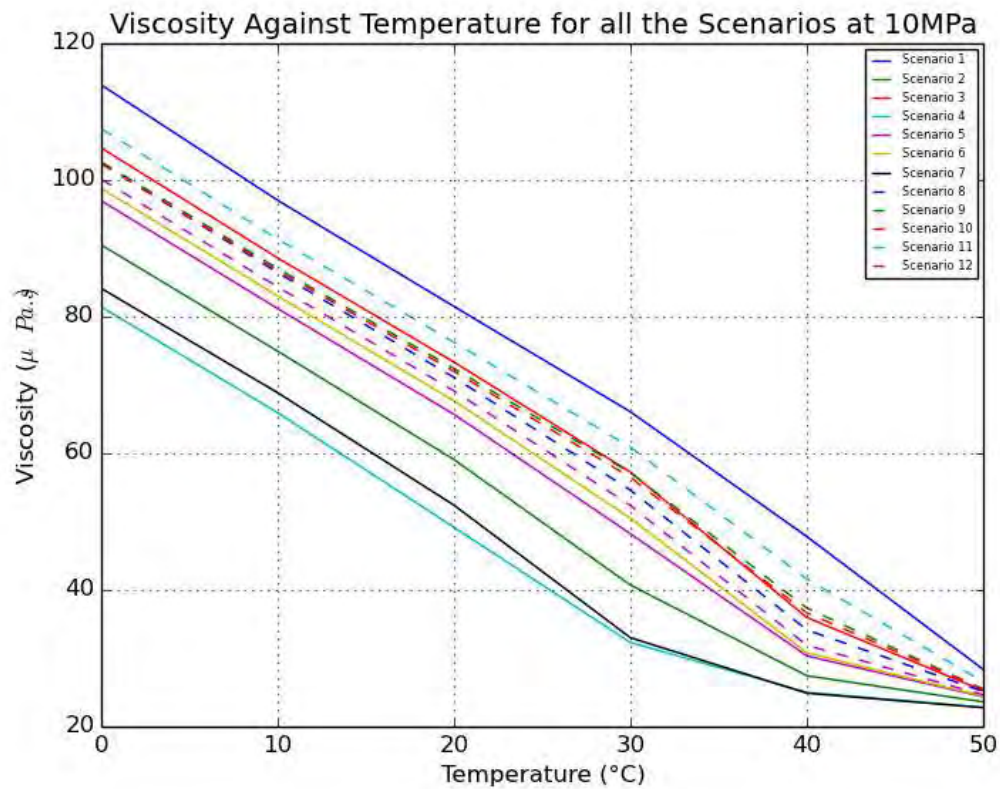


Figure A-222: Viscosity for all scenarios at 10MPa

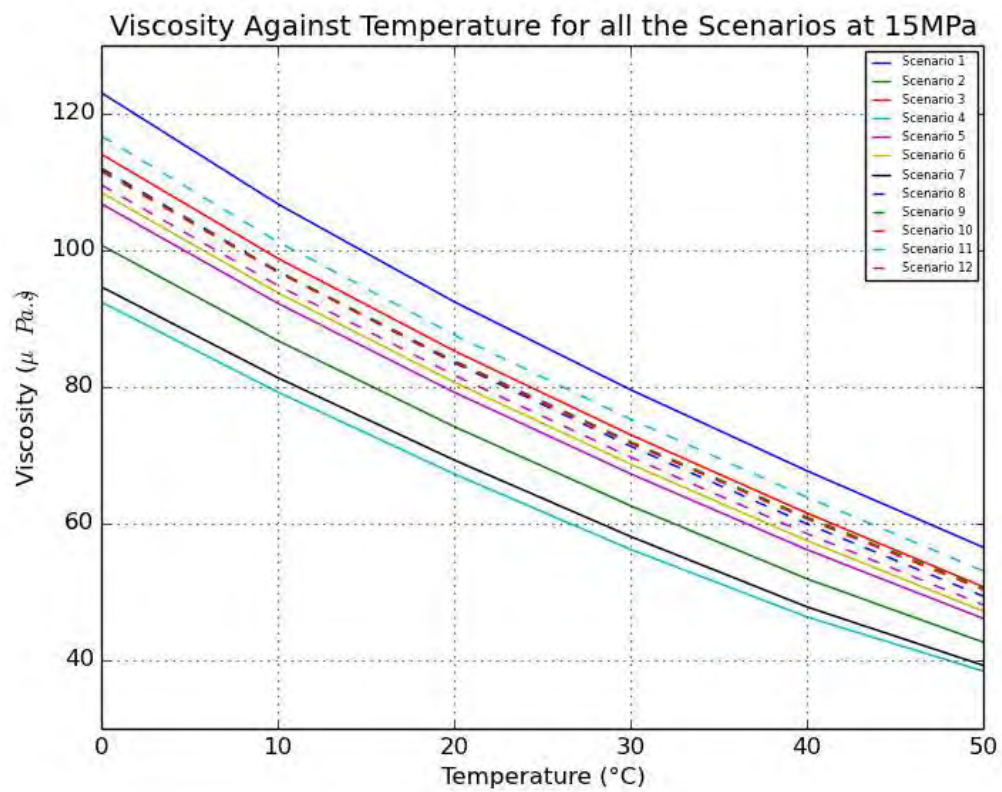


Figure A-223: Viscosity for all scenarios at 15MPa

APPENDIX B

Data Tables from Chapter 3

Table B1: Bubble Points for Carbon Dioxide and 1% Argon

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.7519389470801594
-87.14999999999998	0.7552310274613763
-86.14999999999998	0.7588951963634257
-85.14999999999998	0.7629412981334669
-84.14999999999998	0.7673793904323802
-83.14999999999998	0.7722197408388954
-82.14999999999998	0.777472823555033
-81.14999999999998	0.7831493161359857
-80.14999999999998	0.7892600963263838
-79.14999999999998	0.7958162389004011
-78.14999999999998	0.8028290126194496
-77.14999999999998	0.8103098771735567
-76.14999999999998	0.8182704802073735
-75.14999999999998	0.8267226543656243
-74.14999999999998	0.835678414353968
-73.14999999999998	0.8451499540185953
-72.14999999999998	0.8551496434328606
-71.14999999999998	0.865690025974714
-70.14999999999998	0.876783815390341
-69.14999999999998	0.8884438928293018
-68.14999999999998	0.9006833038598839
-67.14999999999998	0.9135152554332069
-66.14999999999998	0.9269531128159114
-65.14999999999998	0.9410103964757937
-64.14999999999998	0.9557007789115542
-63.14999999999998	0.9710380814476529
-62.14999999999998	0.987036270983302
-61.14999999999998	1.003709456680303
-60.14999999999998	1.0210718866395054
-59.14999999999998	1.0391379445277167
-58.14999999999998	1.0579221461933181
-57.14999999999998	1.0774391362492866
-56.14999999999998	1.0977036846769959
-55.14999999999998	1.1187306834240816
-54.14999999999998	1.1405351430264612
-53.14999999999998	1.163132189269988
-52.14999999999998	1.186537059905125
-51.14999999999998	1.2107651014273126
-50.14999999999998	1.2358317659319369
-49.14999999999998	1.26175260807899
-48.14999999999998	1.2885432821589462
-47.14999999999998	1.3162195392808094
-46.14999999999998	1.344797224696529

Temperature (degC)	Pressure (MPa)
-45.1499999999998	1.374292275268205
-44.1499999999998	1.4047207170904
-43.1499999999998	1.436098663265407
-42.1499999999998	1.4684423118471013
-41.1499999999998	1.501767943954514
-40.1499999999998	1.5360919220604425
-39.1499999999998	1.5714306884633757
-38.1499999999998	1.6078007639535261
-37.1499999999998	1.6452187466855783
-36.1499999999998	1.6837013112665278
-35.1499999999998	1.72326520810751
-34.1499999999998	1.763927263027988
-33.1499999999998	1.805704377187008
-32.1499999999998	1.848613527324192
-31.14999999999977	1.8926717664085029
-30.14999999999977	1.9378962246507734
-29.14999999999977	1.9843041109741841
-28.14999999999977	2.031912714899813
-27.14999999999977	2.0807394088817794
-26.14999999999977	2.130801651063749
-25.14999999999977	2.1821169884284433
-24.14999999999977	2.2347030602906788
-23.14999999999977	2.2885776020858906
-22.14999999999977	2.3437584493729156
-21.14999999999977	2.4002635419924965
-20.14999999999977	2.4581109283136504
-19.14999999999977	2.517318769506888
-18.14999999999977	2.577905343799112
-17.14999999999977	2.6398890507047392
-16.14999999999977	2.703288415213687
-15.14999999999977	2.7681220919882557
-14.14999999999977	2.8344088696029615
-13.14999999999977	2.9021676749239753
-12.14999999999977	2.9714175777181566
-11.14999999999977	3.0421777956165656
-10.14999999999977	3.1144676995672063
-9.14999999999977	3.1883068198989557
-8.14999999999977	3.2637148531426843
-7.14999999999977	3.3407116697221557
-6.14999999999977	3.4193173226060596
-5.14999999999977	3.499552056977195
-4.14999999999977	3.581436320905389
-3.149999999999773	3.664990776938381
-2.149999999999773	3.75023631440378
-1.149999999999773	3.8371940620763225

Temperature (degC)	Pressure (MPa)
-0.14999999999997726	3.9258854007024278
0.85000000000000227	4.016331974680143
1.85000000000000227	4.108555701971986
2.85000000000000227	4.202578781154052
3.85000000000000227	4.2984236943349154
4.8500000000000023	4.3961132045947044
5.8500000000000023	4.4956703466900345
6.8500000000000023	4.597118409979515
7.8500000000000023	4.70048091306272
8.8500000000000023	4.805781570361955
9.8500000000000023	4.9130442519097794
10.8500000000000023	5.022292938709886
11.8500000000000023	5.133551677051826
12.8500000000000023	5.246844535368179
13.8500000000000023	5.362195565911979
14.8500000000000023	5.479628768986167
15.8500000000000023	5.599168047510029
16.8500000000000023	5.72083712108941
17.8500000000000023	5.844659337063022
18.8500000000000023	5.970657266348764
19.8500000000000023	6.098851898989285
20.8500000000000023	6.229261154026302
21.8500000000000023	6.361897286703393
22.8500000000000023	6.496762602341801
23.8500000000000023	6.633842621917804
24.8500000000000023	6.773095293030111
25.8500000000000023	6.914433182654254
26.8500000000000023	7.057690239470495
27.8500000000000023	7.2025463480378615
28.8500000000000023	7.348323037507566
29.8500000000000023	7.49336236532052
30.8500000000000023	7.630436028462741
31.8500000000000023	7.748164062004227
32.850000000000002	7.97113968061181

Table B2: Bubble Points for Carbon Dioxide and 2% Argon

Temperature (degC)	Pressure (MPa)
-89.14999999999998	1.3899710046531806
-88.14999999999998	1.3896338542054463
-87.14999999999998	1.3897289324478563
-86.14999999999998	1.3902634338011723
-85.14999999999998	1.3912448606296766
-84.14999999999998	1.392681013217954
-83.14999999999998	1.394579980216518
-82.14999999999998	1.396950129620128
-81.14999999999998	1.3998001001333216
-80.14999999999998	1.4031387929934986
-79.14999999999998	1.406975364193641
-78.14999999999998	1.4113192170821882
-77.14999999999998	1.4161799953395535
-76.14999999999998	1.4215675762931081
-75.14999999999998	1.4274920645758336
-74.14999999999998	1.4339637861000405
-73.14999999999998	1.440993282324858
-72.14999999999998	1.4485913048208385
-71.14999999999998	1.4567688100988985
-70.14999999999998	1.465536954693676
-69.14999999999998	1.474907090489805
-68.14999999999998	1.4848907602772257
-67.14999999999998	1.4954996935021616
-66.14999999999998	1.5067458022226843
-65.14999999999998	1.5186411772414676
-64.14999999999998	1.5311980843922173
-63.14999999999998	1.5444289609740063
-62.14999999999998	1.5583464123336064
-61.14999999999998	1.572963208528972
-60.14999999999998	1.5882922811364937
-59.14999999999998	1.60434672010705
-58.14999999999998	1.6211397707165007
-57.14999999999998	1.6386848305767325
-56.14999999999998	1.6569954466883845
-55.14999999999998	1.6760853125317867
-54.14999999999998	1.6959682651887231
-53.14999999999998	1.7166582824810444
-52.14999999999998	1.7381694801164864
-51.14999999999998	1.7605161088383936
-50.14999999999998	1.783712551567497
-49.14999999999998	1.807773320542421
-48.14999999999998	1.8327130544325785
-47.14999999999998	1.858546515428419

Temperature (degC)	Pressure (MPa)
-46.1499999999998	1.8852885863258957
-45.1499999999998	1.9129542675568088
-44.1499999999998	1.9415586742023079
-43.1499999999998	1.9711170329740972
-42.1499999999998	2.0016446791482054
-41.1499999999998	2.033157053504832
-40.1499999999998	2.0656696992180756
-39.1499999999998	2.09919825877926
-38.1499999999998	2.133758470951164
-37.1499999999998	2.169366167794612
-36.1499999999998	2.2060372718115233
-35.1499999999998	2.2437877932982
-34.1499999999998	2.2826338279131146
-33.1499999999998	2.3225915545817784
-32.1499999999998	2.36367723377292
-31.14999999999977	2.4059072061991813
-30.14999999999977	2.449297891980443
-29.14999999999977	2.4938657902803345
-28.14999999999977	2.5396274793890634
-27.14999999999977	2.586599617208688
-26.14999999999977	2.6347989420358475
-25.14999999999977	2.684242273552798
-24.14999999999977	2.734946513872608
-23.14999999999977	2.786928648487858
-22.14999999999977	2.8402057469919475
-21.14999999999977	2.8947949634081294
-20.14999999999977	2.9507135360380476
-19.14999999999977	3.0079787867345895
-18.14999999999977	3.066608119570632
-17.14999999999977	3.1266190189191843
-16.14999999999977	3.188029046999926
-15.14999999999977	3.2508558409988946
-14.14999999999977	3.3151171099043544
-13.14999999999977	3.3808306312352756
-12.14999999999977	3.448014247841695
-11.14999999999977	3.516685864969423
-10.14999999999977	3.5868634477513077
-9.14999999999977	3.658565019263486
-8.14999999999977	3.7318086592097424
-7.14999999999977	3.8066125032154208
-6.14999999999977	3.882994742593585
-5.14999999999977	3.960973624262227
-4.14999999999977	4.0405674503255335
-3.149999999999773	4.121794576527042
-2.149999999999773	4.204673408487773

Temperature (degC)	Pressure (MPa)
-1.149999999999773	4.289222394355844
-0.1499999999997726	4.375460012005409
0.8500000000000227	4.463404748664684
1.8500000000000227	4.553075070489719
2.8500000000000227	4.644489379437237
3.8500000000000227	4.737665954795576
4.850000000000023	4.832622877066319
5.850000000000023	4.929377932572651
6.850000000000023	5.027948498270945
7.850000000000023	5.128351407794439
8.850000000000023	5.230602801522414
9.850000000000023	5.334717965177902
10.850000000000023	5.440711162427254
11.850000000000023	5.548595466133016
12.850000000000023	5.6583825884723
13.850000000000023	5.770082699573387
14.850000000000023	5.883704204037273
15.850000000000023	5.99925340952881
16.850000000000023	6.116733966353141
17.850000000000023	6.236145875544484
18.850000000000023	6.357483751929915
19.850000000000023	6.480733881243095
20.850000000000023	6.605869496982168
21.850000000000023	6.732843357011994
22.850000000000023	6.8615766486953715
23.850000000000023	6.991942763990121
24.850000000000023	7.123742156570082
25.850000000000023	7.256661002889494
26.850000000000023	7.390191140043051
27.850000000000023	7.523441815178921
28.850000000000023	7.6546774049265505
29.850000000000023	7.779938756924626
30.850000000000023	7.8736589449614796
31.850000000000023	7.847210716744067

Table B3: Bubble Points for Carbon Dioxide and 3% Argon

Temperature (degC)	Pressure (MPa)
-91.14999999999998	2.025266922625569
-90.14999999999998	2.0204252619215626
-89.14999999999998	2.0161028541490498
-88.14999999999998	2.012301817586006
-87.14999999999998	2.0090248509791073
-86.14999999999998	2.006275202511463
-85.14999999999998	2.004056641155059
-84.14999999999998	2.002373430099537
-83.14999999999998	2.0012303021247857
-82.14999999999998	2.0006324366972095
-81.14999999999998	2.00058543867733
-80.14999999999998	2.0010953184579265
-79.14999999999998	2.002168473458713
-78.14999999999998	2.0038116708321745
-77.14999999999998	2.006032031296837
-76.14999999999998	2.008837014028093
-75.14999999999998	2.01223440249996
-74.14999999999998	2.016232291253534
-73.14999999999998	2.0208390734394195
-72.14999999999998	2.026063429206918
-71.14999999999998	2.0319143147761554
-70.14999999999998	2.0384009521929793
-69.14999999999998	2.0455328197216525
-68.14999999999998	2.0533196428286824
-67.14999999999998	2.06177138570856
-66.14999999999998	2.0708982433393053
-65.14999999999998	2.0807106340186152
-64.14999999999998	2.091219192344941
-63.14999999999998	2.1024347626242146
-62.14999999999998	2.1143683926617216
-61.14999999999998	2.127031327932006
-60.14999999999998	2.140435006072087
-59.14999999999998	2.154591051681734
-58.14999999999998	2.169511271437987
-57.14999999999998	2.1852076494261117
-56.14999999999998	2.2016923427566364
-55.14999999999998	2.218977677359918
-54.14999999999998	2.2370761439922644
-53.14999999999998	2.2560003944117586
-52.14999999999998	2.2757632376934676
-51.14999999999998	2.2963776366740745
-50.14999999999998	2.3178567045087113
-49.14999999999998	2.3402137012875

Temperature (degC)	Pressure (MPa)
-48.1499999999998	2.3634620307281984
-47.1499999999998	2.38761523689041
-46.1499999999998	2.412687000893257
-45.1499999999998	2.438691137628071
-44.1499999999998	2.4656415924225867
-43.1499999999998	2.493552437656565
-42.1499999999998	2.522437869315323
-41.1499999999998	2.552312203466321
-40.1499999999998	2.583189872703778
-39.1499999999998	2.6150854225524296
-38.1499999999998	2.6480135078742943
-37.1499999999998	2.681988889374242
-36.1499999999998	2.71702643022026
-35.1499999999998	2.75314109288538
-34.1499999999998	2.790347936279535
-33.1499999999998	2.8286621132349756
-32.1499999999998	2.8680988683952187
-31.14999999999977	2.908673536528875
-30.14999999999977	2.9504015412387923
-29.14999999999977	2.9932983940190594
-28.14999999999977	3.037379693539801
-27.14999999999977	3.082661125001242
-26.14999999999977	3.1291584593879755
-25.14999999999977	3.1768875523849105
-24.14999999999977	3.2258643427584275
-23.14999999999977	3.276104849965258
-22.14999999999977	3.3276251708247346
-21.14999999999977	3.3804414751106178
-20.14999999999977	3.434569999961093
-19.14999999999977	3.4900270431280367
-18.14999999999977	3.546828955091971
-17.14999999999977	3.6049921301666172
-16.14999999999977	3.6645329968007796
-15.14999999999977	3.725468007262516
-14.14999999999977	3.787813626995843
-13.14999999999977	3.8515863238793413
-12.14999999999977	3.916802557655469
-11.14999999999977	3.9834787696885514
-10.14999999999977	4.051631373207742
-9.14999999999977	4.121276743998378
-8.14999999999977	4.192431211427214
-7.14999999999977	4.265111049416817
-6.14999999999977	4.339332466762472
-5.14999999999977	4.415111595841129
-4.14999999999977	4.4924644783893175

Temperature (degC)	Pressure (MPa)
-3.149999999999773	4.571407046482247
-2.149999999999773	4.651955096557127
-1.149999999999773	4.7341242535140875
-0.1499999999997726	4.817929921737273
0.8500000000000227	4.90338721937932
1.8500000000000227	4.990510892220831
2.8500000000000227	5.079315203631682
3.8500000000000227	5.169813797874416
4.850000000000023	5.262019535324906
5.850000000000023	5.355944300008077
6.850000000000023	5.451598782355065
7.850000000000023	5.548992242724248
8.850000000000023	5.648132263666871
9.850000000000023	5.749024500039719
10.850000000000023	5.851672434381718
11.850000000000023	5.956077138103978
12.850000000000023	6.062237023592288
13.850000000000023	6.170147543926879
14.850000000000023	6.279800749544993
15.850000000000023	6.391184539458242
16.850000000000023	6.504281343373835
17.850000000000023	6.619065840304121
18.850000000000023	6.7355011660043775
19.850000000000023	6.853532901995851
20.850000000000023	6.973079984335825
21.850000000000023	7.094021670459469
22.850000000000023	7.216178008971768
23.850000000000023	7.339284837069008
24.850000000000023	7.462951205860789
25.850000000000023	7.586587326392129
26.850000000000023	7.709255703199614
27.850000000000023	7.829341628315493
28.850000000000023	7.943830646117491

Table B4: Bubble Points for Carbon Dioxide and 4% Argon

Temperature (degC)	Pressure (MPa)
-93.14999999999998	2.6647854939375364
-92.14999999999998	2.6546272015406895
-91.14999999999998	2.6451367565685104
-90.14999999999998	2.6363065799541627
-89.14999999999998	2.628130368220379
-88.14999999999998	2.6206029967446516
-87.14999999999998	2.613720432761601
-86.14999999999998	2.607479656896047
-85.14999999999998	2.601878592234369
-84.14999999999998	2.5969160400026094
-83.14999999999998	2.592591621099575
-82.14999999999998	2.5889057228416252
-81.14999999999998	2.585859450341279
-80.14999999999998	2.583454582002845
-79.14999999999998	2.581693528737339
-78.14999999999998	2.580579296492985
-77.14999999999998	2.580115451781778
-76.14999999999998	2.580306089914076
-75.14999999999998	2.58115580567708
-74.14999999999998	2.58266966622283
-73.14999999999998	2.5848531859979555
-72.14999999999998	2.5877123035036296
-71.14999999999998	2.591253359736574
-70.14999999999998	2.595483078177667
-69.14999999999998	2.6004085461983326
-68.14999999999998	2.606037197763188
-67.14999999999998	2.6123767973324643
-66.14999999999998	2.6194354248642946
-65.14999999999998	2.6272214618544365
-64.14999999999998	2.6357435782988534
-63.14999999999998	2.645010720546147
-62.14999999999998	2.65503209994586
-61.14999999999998	2.6658171822617494
-60.14999999999998	2.6773756777569844
-59.14999999999998	2.6897175319390483
-58.14999999999998	2.7028529168951234
-57.14999999999998	2.716792223164486
-56.14999999999998	2.7315460521334542
-55.14999999999998	2.7471252088800853
-54.14999999999998	2.7635406954429778
-53.14999999999998	2.7808037044908778
-52.14999999999998	2.7989256133087754
-51.14999999999998	2.8179179781195876

Temperature (degC)	Pressure (MPa)
-50.14999999999998	2.837792528649136
-49.14999999999998	2.858561162932957
-48.14999999999998	2.8802359422981603
-47.14999999999998	2.9028290864876465
-46.14999999999998	2.9263529688996774
-45.14999999999998	2.9508201118848407
-44.14999999999998	2.976243182087352
-43.14999999999998	3.0026349858069192
-42.14999999999998	3.0300084643574827
-41.14999999999998	3.058376689467231
-40.14999999999998	3.087752858707299
-39.14999999999998	3.11815029101643
-38.14999999999998	3.1495824223757105
-37.14999999999998	3.182062801727866
-36.14999999999998	3.215605087167903
-35.14999999999998	3.250223042560751
-34.14999999999998	3.2859305345685037
-33.14999999999998	3.3227415301622742
-32.14999999999998	3.3606700945826407
-31.149999999999977	3.3997303896903825
-30.149999999999977	3.43993667258426
-29.149999999999977	3.4813032943011346
-28.149999999999977	3.523844698367728
-27.149999999999977	3.56757541893065
-26.149999999999977	3.612510078175145
-25.149999999999977	3.658663382751485
-24.149999999999977	3.7060501189281636
-23.149999999999977	3.754685146264012
-22.149999999999977	3.8045833896606633
-21.149999999999977	3.855759829709306
-20.149999999999977	3.908229491384309
-19.149999999999977	3.962007431163479
-18.149999999999977	4.017108722810046
-17.149999999999977	4.073548442041817
-16.149999999999977	4.1313416504177525
-15.149999999999977	4.190503378765458
-14.149999999999977	4.251048610458991
-13.149999999999977	4.31299226482963
-12.149999999999977	4.3763491809076225
-11.149999999999977	4.441134101557503
-10.149999999999977	4.507361657943918
-9.149999999999977	4.575046353989223
-8.149999999999977	4.6442025502484725
-7.149999999999977	4.714844446239547
-6.149999999999977	4.78698605980463

Temperature (degC)	Pressure (MPa)
-5.14999999999977	4.8606412016504414
-4.14999999999977	4.935823442484452
-3.149999999999773	5.01254606967419
-2.149999999999773	5.0908220296548485
-1.149999999999773	5.170663851873343
-0.1499999999997726	5.252083549714929
0.8500000000000227	5.335092493963422
1.8500000000000227	5.419701254903466
2.8500000000000227	5.50591941041495
3.8500000000000227	5.593755319420841
4.850000000000023	5.683215862802558
5.850000000000023	5.774306157308533
6.850000000000023	5.8670292515915765
7.850000000000023	5.961385816549308
8.850000000000023	6.057373843405319
9.850000000000023	6.154988360385101
10.850000000000023	6.2542211696479075
11.850000000000023	6.355060586549478
12.850000000000023	6.457491127888021
13.850000000000023	6.561493039260936
14.850000000000023	6.667041468047649
15.850000000000023	6.774104975072593
16.850000000000023	6.882642938413661
17.850000000000023	6.992601250832447
18.850000000000023	7.103905534512627
19.850000000000023	7.216451303756182
20.850000000000023	7.330089406583465
21.850000000000023	7.444606741223207
22.850000000000023	7.559700431547526
23.850000000000023	7.6749383425102256
24.850000000000023	7.78969893609267
25.850000000000023	7.903053705383707

Table B5: Bubble Points for Carbon Dioxide and 5% Argon

Temperature (degC)	Pressure (MPa)
-94.14999999999998	3.297560623362293
-93.14999999999998	3.2816734029338717
-92.14999999999998	3.2666873388890423
-91.14999999999998	3.2525779657003526
-90.14999999999998	3.239323628823583
-89.14999999999998	3.2269052096902953
-88.14999999999998	3.215305885135041
-87.14999999999998	3.2045109161595953
-86.14999999999998	3.1945074616374867
-85.14999999999998	3.1852844134910345
-84.14999999999998	3.1768322502554938
-83.14999999999998	3.169142906646305
-82.14999999999998	3.1622096569366906
-81.14999999999998	3.1560270103887302
-80.14999999999998	3.150590617261628
-79.14999999999998	3.1458971840476604
-78.14999999999998	3.141944396857771
-77.14999999999998	3.1387308520242887
-76.14999999999998	3.136255993046261
-75.14999999999998	3.134520053232617
-74.14999999999998	3.1335240033722283
-73.14999999999998	3.1332695039287173
-72.14999999999998	3.1337588612702256
-71.14999999999998	3.1349949875409178
-70.14999999999998	3.13698136379417
-69.14999999999998	3.139722006092693
-68.14999999999998	3.1432214342692273
-67.14999999999998	3.1474846431217687
-66.14999999999998	3.152517075799891
-65.14999999999998	3.15832459921932
-64.14999999999998	3.164913481277251
-63.14999999999998	3.1722903697671856
-62.14999999999998	3.180462272804285
-61.14999999999998	3.1894365406702847
-60.14999999999998	3.1992208489333462
-59.14999999999998	3.2098231827482273
-58.14999999999998	3.221251822246586
-57.14999999999998	3.233515328921764
-56.14999999999998	3.246622532922955
-55.14999999999998	3.2605825211882737
-54.14999999999998	3.275404626340563
-53.14999999999998	3.2910984162775136
-52.14999999999998	3.307673684385969

Temperature (degC)	Pressure (MPa)
-51.1499999999998	3.325140440312204
-50.1499999999998	3.343508901242973
-49.1499999999998	3.362789483593401
-48.1499999999998	3.3829927950787053
-47.1499999999998	3.4041296271045103
-46.1499999999998	3.426210947387674
-45.1499999999998	3.4492478928177204
-44.1499999999998	3.4732517624838035
-43.1499999999998	3.4982340108841234
-42.1499999999998	3.5242062412984856
-41.1499999999998	3.551180199369024
-40.1499999999998	3.5791677669297233
-39.1499999999998	3.608180956160486
-38.1499999999998	3.6382319041317595
-37.1499999999998	3.669332867826495
-36.1499999999998	3.701496219729499
-35.1499999999998	3.7347344439555896
-34.1499999999998	3.7690601330235323
-33.1499999999998	3.8044859851166
-32.1499999999998	3.8410248017706485
-31.14999999999977	3.878689485779643
-30.14999999999977	3.9174930390497424
-29.14999999999977	3.957448560123668
-28.14999999999977	3.9985692409991698
-27.14999999999977	4.040868362886711
-26.14999999999977	4.084359290604483
-25.14999999999977	4.129055465255202
-24.14999999999977	4.174970395011778
-23.14999999999977	4.22211764385314
-22.14999999999977	4.270510818224037
-21.14999999999977	4.320163551718854
-20.14999999999977	4.371089487961235
-19.14999999999977	4.423302261942814
-18.14999999999977	4.476815480193976
-17.14999999999977	4.531642700135163
-16.14999999999977	4.587797409010288
-15.14999999999977	4.645293002758557
-14.14999999999977	4.704142765087527
-13.14999999999977	4.764359846942499
-12.14999999999977	4.825957246358691
-11.14999999999977	4.888947788484278
-10.14999999999977	4.95334410529519
-9.14999999999977	5.019158614078193
-8.14999999999977	5.086403493440779
-7.14999999999977	5.155090654913239

Temperature (degC)	Pressure (MPa)
-6.14999999999977	5.22523170765763
-5.14999999999977	5.296837913084196
-4.14999999999977	5.369920125432577
-3.149999999999773	5.444488713719148
-2.149999999999773	5.5205534599841295
-1.149999999999773	5.5981234285551125
-0.1499999999997726	5.677206801426541
0.8500000000000227	5.757810675803793
1.8500000000000227	5.839940821759628
2.8500000000000227	5.923601400692867
3.8500000000000227	6.008794649003218
4.850000000000023	6.0955205357048365
5.850000000000023	6.18377640717463
6.850000000000023	6.273556635747167
7.850000000000023	6.364852290037285
8.850000000000023	6.457650841118418
9.850000000000023	6.551935907408214
10.850000000000023	6.647687017020015
11.850000000000023	6.744879325514222
12.850000000000023	6.843483162629051
13.850000000000023	6.943463189649523
14.850000000000023	7.044776828686382
15.850000000000023	7.147371483470036
16.850000000000023	7.251179928573806
17.850000000000023	7.356113055579689
18.850000000000023	7.462049738963784
19.850000000000023	7.568821448574428
20.850000000000023	7.6761935842698685
21.850000000000023	7.7838396170343565
22.850000000000023	7.891306771904637
23.850000000000023	7.9979640448665705

Table B6: Bubble Points for Carbon Dioxide and 1% Methane

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.40822480216992074
-87.14999999999998	0.4123777734168592
-86.14999999999998	0.41696608189926976
-85.14999999999998	0.4219949715258987
-84.14999999999998	0.4274703020264736
-83.14999999999998	0.433398510885978
-82.14999999999998	0.4397865784669495
-81.14999999999998	0.44664199604988036
-80.14999999999998	0.4539727363151846
-79.14999999999998	0.46178722617529194
-78.14999999999998	0.47009432154698116
-77.14999999999998	0.4789032839788801
-76.14999999999998	0.48822375885190183
-75.14999999999998	0.498065755094938
-74.14999999999998	0.5084396261745671
-73.14999999999998	0.5193560523172236
-72.14999999999998	0.530826023830766
-71.14999999999998	0.5428608254463355
-70.14999999999998	0.5554720215902506
-69.14999999999998	0.5686714425391658
-68.14999999999998	0.5824711714068754
-67.14999999999998	0.596883531879466
-66.14999999999998	0.6119210766956541
-65.14999999999998	0.6275965768178043
-64.14999999999998	0.6439230112499481
-63.14999999999998	0.6609135574847104
-62.14999999999998	0.6785815825503774
-61.14999999999998	0.696940634617283
-60.14999999999998	0.7160044351522554
-59.14999999999998	0.7357868715865716
-58.14999999999998	0.7563019904821217
-57.14999999999998	0.7775639911573109
-56.14999999999998	0.7995872197655086
-55.14999999999998	0.8223861638015009
-54.14999999999998	0.845975447010073
-53.14999999999998	0.8703698246685244
-52.14999999999998	0.8955841792442946
-51.14999999999998	0.9216335164026993
-50.14999999999998	0.948532961320679
-49.14999999999998	0.9762977553461741
-48.14999999999998	1.004943252917959
-47.14999999999998	1.0344849187972913
-46.14999999999998	1.0649383255499376

Temperature (degC)	Pressure (MPa)
-45.14999999999998	1.096319151289378
-44.14999999999998	1.1286431776662005
-43.14999999999998	1.1619262880882284
-42.14999999999998	1.1961844661544845
-41.14999999999998	1.231433794321025
-40.14999999999998	1.2676904527436477
-39.14999999999998	1.304970718358583
-38.14999999999998	1.3432909641195474
-37.14999999999998	1.3826676584577648
-36.14999999999998	1.4231173649329836
-35.14999999999998	1.4646567420993046
-34.14999999999998	1.5073025435817253
-33.14999999999998	1.5510716184036741
-32.14999999999998	1.5959809115727916
-31.149999999999977	1.6420474649497396
-30.149999999999977	1.6892884184410308
-29.149999999999977	1.7377210115297514
-28.149999999999977	1.7873625851795318
-27.149999999999977	1.8382305841297242
-26.149999999999977	1.8903425596047958
-25.149999999999977	1.9437161724373888
-24.149999999999977	1.9983691966156258
-23.149999999999977	2.05431952324305
-22.149999999999977	2.1115851648896258
-21.149999999999977	2.1701842603225794
-20.149999999999977	2.230135079584385
-19.149999999999977	2.291456029380655
-18.149999999999977	2.3541656587728057
-17.149999999999977	2.4182826651475393
-16.149999999999977	2.4838259004413494
-15.149999999999977	2.5508143776552066
-14.149999999999977	2.6192672776327024
-13.149999999999977	2.689203956197466
-12.149999999999977	2.760643951639709
-11.149999999999977	2.8336069926894645
-10.149999999999977	2.908113007014167
-9.149999999999977	2.9841821303930702
-8.149999999999977	3.0618347166789825
-7.149999999999977	3.141091348684029
-6.149999999999977	3.221972850138622
-5.149999999999977	3.304500298872044
-4.149999999999977	3.3886950413410966
-3.1499999999999773	3.474578708620004
-2.1499999999999773	3.5621732339054497
-1.1499999999999773	3.6515008715381208

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.7425842174280524
0.85000000000000227	3.835446230685459
1.85000000000000227	3.9301102560769934
2.85000000000000227	4.026600046807517
3.85000000000000227	4.124939786973318
4.8500000000000023	4.225154112883251
5.8500000000000023	4.32726813246378
6.8500000000000023	4.431307441991685
7.8500000000000023	4.537298139670833
8.8500000000000023	4.645266836058336
9.8500000000000023	4.755240662099302
10.8500000000000023	4.867247276465956
11.8500000000000023	4.981314875004217
12.8500000000000023	5.097472205931618
13.8500000000000023	5.215748594413741
14.8500000000000023	5.336173978261792
15.8500000000000023	5.458778950785189
16.8500000000000023	5.583594794836091
17.8500000000000023	5.710653469777773
18.8500000000000023	5.839987475955903
19.8500000000000023	5.971629463625688
20.8500000000000023	6.105611369976469
21.8500000000000023	6.2419627531035315
22.8500000000000023	6.380707832930665
23.8500000000000023	6.521860493483699
24.8500000000000023	6.665415922178853
25.8500000000000023	6.811335595659579
26.8500000000000023	6.959515190388183
27.8500000000000023	7.1096958284228995
28.8500000000000023	7.261167594304238

Table B7: Bubble Points for Carbon Dioxide and 2% Methane

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.6945694180403303
-89.14999999999998	0.6957860286816403
-88.14999999999998	0.6975438410230844
-87.14999999999998	0.6998398469336072
-86.14999999999998	0.7026722617477287
-85.14999999999998	0.7060404300815952
-84.14999999999998	0.7099447412204092
-83.14999999999998	0.7143865528194943
-82.14999999999998	0.7193681220479868
-81.14999999999998	0.7248925432224373
-80.14999999999998	0.7309636911878039
-79.14999999999998	0.737586169817192
-78.14999999999998	0.7447652650665518
-77.14999999999998	0.7525069020200104
-76.14999999999998	0.7608176055701146
-75.14999999999998	0.7697044642393034
-74.14999999999998	0.7791750969154438
-73.14999999999998	0.7892376221082174
-72.14999999999998	0.799900629496602
-71.14999999999998	0.8111731535297407
-70.14999999999998	0.8230646488805387
-69.14999999999998	0.8355849675423734
-68.14999999999998	0.8487443374402985
-67.14999999999998	0.8625533423918558
-66.14999999999998	0.8770229033159118
-65.14999999999998	0.8921642605490291
-64.14999999999998	0.9079889572061983
-63.14999999999998	0.9245088235158924
-62.14999999999998	0.9417359619854043
-61.14999999999998	0.9596827334429502
-60.14999999999998	0.9783617438211669
-59.14999999999998	0.997785831683358
-58.14999999999998	1.0179680564180815
-57.14999999999998	1.038921687127366
-56.14999999999998	1.0606601921076744
-55.14999999999998	1.083197228958532
-54.14999999999998	1.1065466352766928
-53.14999999999998	1.1307224199122548
-52.14999999999998	1.1557387547663263
-51.14999999999998	1.1816099671313975
-50.14999999999998	1.2083505325470945
-49.14999999999998	1.235975068142389
-48.14999999999998	1.2644983264782734

Temperature (degC)	Pressure (MPa)
-47.1499999999998	1.2939351898469778
-46.1499999999998	1.3243006650047542
-45.1499999999998	1.3556098783540167
-44.1499999999998	1.3878780715157795
-43.1499999999998	1.421120597288059
-42.1499999999998	1.455352915975448
-41.1499999999998	1.4905905920492353
-40.1499999999998	1.5268492911463305
-39.1499999999998	1.5641447773645796
-38.1499999999998	1.6024929108673696
-37.1499999999998	1.6419096457917364
-36.1499999999998	1.6824110284428744
-35.1499999999998	1.7240131958228793
-34.1499999999998	1.7667323744779408
-33.1499999999998	1.8105848797250266
-32.1499999999998	1.8555871152694696
-31.14999999999977	1.9017555732450868
-30.14999999999977	1.94910683472533
-29.14999999999977	1.9976575707057127
-28.14999999999977	2.047424543597449
-27.14999999999977	2.0984246091903915
-26.14999999999977	2.1506747191054325
-25.14999999999977	2.204191923666575
-24.14999999999977	2.2589933751271727
-23.14999999999977	2.3150963312067065
-22.14999999999977	2.372518158809961
-21.14999999999977	2.4312763378649347
-20.14999999999977	2.491388465162538
-19.14999999999977	2.552872258143076
-18.14999999999977	2.615745558528453
-17.14999999999977	2.68002633578712
-16.14999999999977	2.74573269039042
-15.14999999999977	2.8128828568899
-14.14999999999977	2.8814952068444866
-13.14999999999977	2.9515882516913496
-12.14999999999977	3.023180645640371
-11.14999999999977	3.0962911887261866
-10.14999999999977	3.170938830161942
-9.14999999999977	3.2471426721177425
-8.14999999999977	3.324921974089948
-7.14999999999977	3.4042961579314106
-6.14999999999977	3.4852848136584087
-5.14999999999977	3.5679077059816757
-4.14999999999977	3.65218478150214
-3.149999999999773	3.738136176296461

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.8257822234835537
-1.149999999999773	3.915143460122148
-0.149999999999726	4.0062406325268975
0.8500000000000227	4.099094698817539
1.8500000000000227	4.193726827197454
2.8500000000000227	4.290158388242563
3.8500000000000227	4.388410939263823
4.850000000000023	4.488506198833687
5.850000000000023	4.590466009716542
6.850000000000023	4.694312288968163
7.850000000000023	4.800066964684249
8.850000000000023	4.907751899992449
9.850000000000023	5.0173888058592215
10.850000000000023	5.12899914521921
11.850000000000023	5.24260403032261
12.850000000000023	5.358224112538503
13.850000000000023	5.475879456227296
14.850000000000023	5.595589373075327
15.850000000000023	5.717372165537953
16.850000000000023	5.841244682114632
17.850000000000023	5.967221516165504
18.850000000000023	6.095313577039666
19.850000000000023	6.225525621290037
20.850000000000023	6.357852144875874
21.850000000000023	6.492270779288684
22.850000000000023	6.628731903510434
23.850000000000023	6.7671421118337625
24.850000000000023	6.907335985176969
25.850000000000023	7.049018564145034
26.850000000000023	7.191626822878565
27.850000000000023	7.333934535394141
28.850000000000023	7.472755687819284

Table B8: Bubble Points for Carbon Dioxide and 3% Methane

Temperature (degC)	Pressure (MPa)
-92.14999999999998	0.9707288439705838
-91.14999999999998	0.9689303149680002
-90.14999999999998	0.9678025250916236
-89.14999999999998	0.9673317216869212
-88.14999999999998	0.9675062844898051
-87.14999999999998	0.9683165340151463
-86.14999999999998	0.9697545618950628
-85.14999999999998	0.9718140801695578
-84.14999999999998	0.9744902870527262
-83.14999999999998	0.977779747012485
-82.14999999999998	0.9816802833903551
-81.14999999999998	0.9861908819678524
-80.14999999999998	0.9913116041558215
-79.14999999999998	0.9970435086733757
-78.14999999999998	1.0033885807119516
-77.14999999999998	1.0103496676905097
-76.14999999999998	1.0179304209169568
-75.14999999999998	1.0261352424195676
-74.14999999999998	1.0349692364488607
-73.14999999999998	1.0444381650781804
-72.14999999999998	1.054548407511163
-71.14999999999998	1.0653069226853207
-70.14999999999998	1.0767212148044876
-69.14999999999998	1.0887993015454647
-68.14999999999998	1.1015496846042985
-67.14999999999998	1.1149813223974436
-66.14999999999998	1.1291036046710357
-65.14999999999998	1.1439263288423345
-64.14999999999998	1.1594596779030821
-63.14999999999998	1.1757141997297433
-62.14999999999998	1.1927007876844549
-61.14999999999998	1.2104306623743757
-60.14999999999998	1.2289153544803482
-59.14999999999998	1.2481666885536333
-58.14999999999998	1.2681967677159909
-57.14999999999998	1.2890179591859858
-56.14999999999998	1.3106428805786234
-55.14999999999998	1.3330843869142888
-54.14999999999998	1.3563555583199816
-53.14999999999998	1.38046968836218
-52.14999999999998	1.4054402729736866
-51.14999999999998	1.4312809999861948
-50.14999999999998	1.4580057391927324

Temperature (degC)	Pressure (MPa)
-49.1499999999998	1.4856285329517704
-48.1499999999998	1.5141635873066905
-47.1499999999998	1.5436252635763585
-46.1499999999998	1.574028070440544
-45.1499999999998	1.605386656462726
-44.1499999999998	1.637715803036228
-43.1499999999998	1.6710304177548743
-42.1499999999998	1.7053455281780954
-41.1499999999998	1.740676275959859
-40.1499999999998	1.7770379113656893
-39.1499999999998	1.8144457881553804
-38.1499999999998	1.8529153588266791
-37.1499999999998	1.8924621702860789
-36.1499999999998	1.933101859899568
-35.1499999999998	1.9748501520366577
-34.1499999999998	2.017722855114209
-33.1499999999998	2.061735859177291
-32.1499999999998	2.106905134106463
-31.14999999999977	2.1532467284548185
-30.14999999999977	2.200776768952496
-29.14999999999977	2.249511460682089
-28.14999999999977	2.299467087880419
-27.14999999999977	2.350660015333775
-26.14999999999977	2.4031066902589853
-25.14999999999977	2.4568236445458753
-24.14999999999977	2.5118274972217236
-23.14999999999977	2.5681349569762917
-22.14999999999977	2.625762824575388
-21.14999999999977	2.6847279949993226
-20.14999999999977	2.745047459165353
-19.14999999999977	2.8067383051224195
-18.14999999999977	2.869817718631616
-17.14999999999977	2.9343029831175556
-16.14999999999977	3.000211478980033
-15.14999999999977	3.0675606823555968
-14.14999999999977	3.1363681634109453
-13.14999999999977	3.206651584312647
-12.14999999999977	3.27842869704045
-11.14999999999977	3.3517173412025896
-10.14999999999977	3.42653544202409
-9.14999999999977	3.502901008627218
-8.14999999999977	3.580832132692762
-7.14999999999977	3.6603469874620713
-6.14999999999977	3.741463826944083
-5.14999999999977	3.824200984979162

Temperature (degC)	Pressure (MPa)
-4.14999999999977	3.908576873602805
-3.149999999999773	3.994609979840514
-2.149999999999773	4.082318859716735
-1.149999999999773	4.171722127883002
-0.1499999999997726	4.262838440824278
0.8500000000000227	4.355686471223946
1.8500000000000227	4.4502848707470815
2.8500000000000227	4.5466522183021185
3.8500000000000227	4.644806950957744
4.850000000000023	4.744767275043528
5.850000000000023	4.846551055765835
6.850000000000023	4.950175684856457
7.850000000000023	5.055657927149299
8.850000000000023	5.163013748219274
9.850000000000023	5.272258125896482
10.850000000000023	5.383404846496487
11.850000000000023	5.496466281209758
12.850000000000023	5.611453124923281
13.850000000000023	5.728374055236308
14.850000000000023	5.847235227071758
15.850000000000023	5.968039451175784
16.850000000000023	6.090784805277621
17.850000000000023	6.21546228889893
18.850000000000023	6.3420519535421045
19.850000000000023	6.470516715611227
20.850000000000023	6.600792765225702
21.850000000000023	6.732774979091459
22.850000000000023	6.866294519984033
23.850000000000023	7.001081476324993
24.850000000000023	7.136694235065836
25.850000000000023	7.272355714487949
26.850000000000023	7.406541101548803

Table B9: Bubble Points for Carbon Dioxide and 4% Methane

Temperature (degC)	Pressure (MPa)
-94.14999999999998	1.2364768736453642
-93.14999999999998	1.2315169934350612
-92.14999999999998	1.2273907253326815
-91.14999999999998	1.224069569273046
-90.14999999999998	1.221528613962481
-89.14999999999998	1.2197461631258713
-88.14999999999998	1.2187034108722221
-87.14999999999998	1.218384158500906
-86.14999999999998	1.2187745664806104
-85.14999999999998	1.2198629363787388
-84.14999999999998	1.2216395184683724
-83.14999999999998	1.2240963414140118
-82.14999999999998	1.2272270610067508
-81.14999999999998	1.231026825429704
-80.14999999999998	1.2354921548985713
-79.14999999999998	1.2406208338401468
-78.14999999999998	1.2464118140424965
-77.14999999999998	1.2528651274517548
-76.14999999999998	1.2599818074833897
-75.14999999999998	1.2677638177689685
-74.14999999999998	1.2762139875913865
-73.14999999999998	1.285335953155529
-72.14999999999998	1.295134104103122
-71.14999999999998	1.3056135346771525
-70.14999999999998	1.3167799990253166
-69.14999999999998	1.3286398702138404
-68.14999999999998	1.3412001025594837
-67.14999999999998	1.3544681969242434
-66.14999999999998	1.3684521686853572
-65.14999999999998	1.3831605180859359
-64.14999999999998	1.3986022027430893
-63.14999999999998	1.4147866120967731
-62.14999999999998	1.4317235436153462
-61.14999999999998	1.449423180551175
-60.14999999999998	1.4678960711561329
-59.14999999999998	1.4871531091620873
-58.14999999999998	1.5072055154516262
-57.14999999999998	1.5280648207912526
-56.14999999999998	1.5497428495323275
-55.14999999999998	1.5722517042134276
-54.14999999999998	1.5956037509557794
-53.14999999999998	1.6198116056441674
-52.14999999999998	1.6448881207787247

Temperature (degC)	Pressure (MPa)
-51.1499999999998	1.6708463729648644
-50.1499999999998	1.6976996510235984
-49.1499999999998	1.725461444628904
-48.1499999999998	1.7541454334781876
-47.1499999999998	1.783765476940032
-46.1499999999998	1.814335604139094
-45.1499999999998	1.845870004461033
-44.1499999999998	1.8783830184493133
-43.1499999999998	1.9118891290598383
-42.1499999999998	1.9464029532635891
-41.1499999999998	1.9819392339992188
-40.1499999999998	2.018512832463508
-39.1499999999998	2.0561387207811848
-38.1499999999998	2.0948319750626454
-37.1499999999998	2.1346077689256924
-36.1499999999998	2.1754813675209794
-35.1499999999998	2.2174681221620847
-34.1499999999998	2.2605834656106247
-33.1499999999998	2.3048429080925765
-32.1499999999998	2.3502620341257527
-31.14999999999977	2.3968565001598106
-30.14999999999977	2.4446420330229333
-29.14999999999977	2.4936344291697017
-28.14999999999977	2.5438495545827715
-27.14999999999977	2.5953033452249024
-26.14999999999977	2.6480118078466632
-25.14999999999977	2.7019910209238285
-24.14999999999977	2.757257135507147
-23.14999999999977	2.8138263757357183
-22.14999999999977	2.8717150387679085
-21.14999999999977	2.9309394939713007
-20.14999999999977	2.9915161811722055
-19.14999999999977	3.0534616079131705
-18.14999999999977	3.11679234563818
-17.14999999999977	3.1815250248772404
-16.14999999999977	3.2476763294963957
-15.14999999999977	3.3152629901716075
-14.14999999999977	3.384301777261372
-13.14999999999977	3.4548094933027222
-12.14999999999977	3.5268029653197903
-11.14999999999977	3.6002990371411454
-10.14999999999977	3.6753145618384413
-9.14999999999977	3.751866394324018
-8.14999999999977	3.8299713839675635
-7.14999999999977	3.909646366926016

Temperature (degC)	Pressure (MPa)
-6.14999999999977	3.9909081576068908
-5.14999999999977	4.073773538332092
-4.14999999999977	4.158259245888667
-3.149999999999773	4.244381953163066
-2.149999999999773	4.332158243550004
-1.149999999999773	4.421604575278371
-0.1499999999997726	4.512737232342883
0.8500000000000227	4.605572258360394
1.8500000000000227	4.700125369554878
2.8500000000000227	4.796411843332794
3.8500000000000227	4.894446379553654
4.850000000000023	4.994242932807052
5.850000000000023	5.0958145156055155
6.850000000000023	5.19917297433637
7.850000000000023	5.304328741189047
8.850000000000023	5.411290565553431
9.850000000000023	5.520065225400323
10.850000000000023	5.630657210472346
11.850000000000023	5.743068350687681
12.850000000000023	5.857297329361155
13.850000000000023	5.973338964889169
14.850000000000023	6.0911830583027795
15.850000000000023	6.210812480914386
16.850000000000023	6.332200012819263
17.850000000000023	6.455303241880574
18.850000000000023	6.58005659835343
19.850000000000023	6.706359312864379
20.850000000000023	6.834057595502148
21.850000000000023	6.96291809085272
22.850000000000023	7.092584470085112
23.850000000000023	7.222499993728677
24.850000000000023	7.351733824749282
25.850000000000023	7.478579536111738

Table B10: Bubble Points for Carbon Dioxide and 5% Methane

Temperature (degC)	Pressure (MPa)
-96.14999999999998	1.4918261956534886
-95.14999999999998	1.4834524554955408
-94.14999999999998	1.4761257846715714
-93.14999999999998	1.4697959809133812
-92.14999999999998	1.4644189857634455
-91.14999999999998	1.4599561296565462
-90.14999999999998	1.4563734942419138
-89.14999999999998	1.4536413701644506
-88.14999999999998	1.451733793179146
-87.14999999999998	1.450628145063382
-86.14999999999998	1.450304808476894
-85.14999999999998	1.4507468670509975
-84.14999999999998	1.4519398436355815
-83.14999999999998	1.4538714708571419
-82.14999999999998	1.4565314892713925
-81.14999999999998	1.459911469072418
-80.14999999999998	1.4640046521516736
-79.14999999999998	1.4688058116278464
-78.14999999999998	1.4743111266340438
-77.14999999999998	1.480518070292428
-76.14999999999998	1.487425309271105
-75.14999999999998	1.4950326134268275
-74.14999999999998	1.5033407743713108
-73.14999999999998	1.5123515318429404
-72.14999999999998	1.5220675070176166
-71.14999999999998	1.5324921419428952
-70.14999999999998	1.543629644404744
-69.14999999999998	1.555484937653845
-68.14999999999998	1.5680636144045201
-67.14999999999998	1.5813718947317021
-66.14999999999998	1.5954165873734203
-65.14999999999998	1.6102050541305069
-64.14999999999998	1.6257451770331959
-63.14999999999998	1.6420453279821583
-62.14999999999998	1.6591143406370579
-61.14999999999998	1.6769614842876843
-60.14999999999998	1.695596439561619
-59.14999999999998	1.7150292757515202
-58.14999999999998	1.735270429610214
-57.14999999999998	1.7563306854918104
-56.14999999999998	1.778221156682395
-55.14999999999998	1.8009532678359446
-54.14999999999998	1.8245387383754665

Temperature (degC)	Pressure (MPa)
-53.14999999999998	1.8489895668138263
-52.14999999999998	1.874318015870058
-51.14999999999998	1.900536598328048
-50.14999999999998	1.9276580635455736
-49.14999999999998	1.9556953845753018
-48.14999999999998	1.9846617458210083
-47.14999999999998	2.0145705311548614
-46.14999999999998	2.045435312482629
-45.14999999999998	2.0772698386821165
-44.14999999999998	2.110088024874358
-43.14999999999998	2.1439039420152244
-42.14999999999998	2.1787318068008177
-41.14999999999998	2.2145859718553798
-40.14999999999998	2.2514809162656566
-39.14999999999998	2.289431236486332
-38.14999999999998	2.3284516376939695
-37.14999999999998	2.36855692566624
-36.14999999999998	2.4097619992943495
-35.14999999999998	2.4520818438308583
-34.14999999999998	2.495531524961641
-33.14999999999998	2.5401261837707243
-32.14999999999998	2.5858810326503927
-31.149999999999977	2.6328113521271077
-30.149999999999977	2.680932488541506
-29.149999999999977	2.730259852460163
-28.149999999999977	2.7808089175957678
-27.149999999999977	2.8325952200316493
-26.149999999999977	2.885634357427247
-25.149999999999977	2.939941987911502
-24.149999999999977	2.995533828348969
-23.149999999999977	3.052425651698212
-22.149999999999977	3.1106332832012984
-21.149999999999977	3.170172595253153
-20.149999999999977	3.2310595008190695
-19.149999999999977	3.2933099454035824
-18.149999999999977	3.356939897622434
-17.149999999999977	3.4219653385303435
-16.149999999999977	3.488402249904583
-15.149999999999977	3.5562666017260565
-14.149999999999977	3.62557433915352
-13.149999999999977	3.6963413692095712
-12.149999999999977	3.768583547412184
-11.149999999999977	3.842316664455712
-10.149999999999977	3.9175564329042123
-9.149999999999977	3.9943184736824286

Temperature (degC)	Pressure (MPa)
-8.14999999999977	4.072618301845865
-7.14999999999977	4.152471310781621
-6.14999999999977	4.233892753544518
-5.14999999999977	4.316897719530549
-4.14999999999977	4.401501104073256
-3.149999999999773	4.487717567946214
-2.149999999999773	4.575561483112471
-1.149999999999773	4.665046860545936
-0.1499999999997726	4.756187255616192
0.8500000000000227	4.848995646527501
1.8500000000000227	4.943484281753283
2.8500000000000227	5.039664493482314
3.8500000000000227	5.1375464756508435
4.850000000000023	5.237139027502247
5.850000000000023	5.338449265663496
6.850000000000023	5.441482309706685
7.850000000000023	5.546240945811911
8.850000000000023	5.652725268861602
9.850000000000023	5.760932291450586
10.850000000000023	5.870855484265081
11.850000000000023	5.982484169554696
12.850000000000023	6.095802620296273
13.850000000000023	6.2107886145801725
14.850000000000023	6.327411052100173
15.850000000000023	6.445626058851047
16.850000000000023	6.565370797284579
17.850000000000023	6.686553976436969
18.850000000000023	6.809041807512683
19.850000000000023	6.932637730128455
20.850000000000023	7.057052701502972
21.850000000000023	7.181859564762191
22.850000000000023	7.306409929084363
23.850000000000023	7.42966178508281

Table B11: Bubble Points for Carbon Dioxide and 1% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-88.14999999999998	2.8155525953570493
-87.14999999999998	2.767601696090089
-86.14999999999998	2.722058210196978
-85.14999999999998	2.6788060510325535
-84.14999999999998	2.63774018117939
-83.14999999999998	2.598765384033354
-82.14999999999998	2.5617952051780724
-81.14999999999998	2.5267510359172762
-80.14999999999998	2.4935613164026282
-79.14999999999998	2.462160839972853
-78.14999999999998	2.4324901435074797
-77.14999999999998	2.4044949712543953
-76.14999999999998	2.378125801684992
-75.14999999999998	2.3533374286349975
-74.14999999999998	2.3300885894061727
-73.14999999999998	2.3083416336198823
-72.14999999999998	2.2880622275745903
-71.14999999999998	2.269219089659032
-70.14999999999998	2.251783752972003
-69.14999999999998	2.235730351906337
-68.14999999999998	2.2210354298351462
-67.14999999999998	2.2076777655248976
-66.14999999999998	2.1956382161011745
-65.14999999999998	2.1848995747656446
-64.14999999999998	2.1754464416237282
-63.14999999999998	2.167265106291541
-62.14999999999998	2.1603434409239313
-61.14999999999998	2.1546708026852537
-60.14999999999998	2.1502379446283433
-59.14999999999998	2.1470369341491597
-58.14999999999998	2.145061078247675
-57.14999999999998	2.1443048549033303
-56.14999999999998	2.1447638499629678
-55.14999999999998	2.1464346989765426
-54.14999999999998	2.149315033505139
-53.14999999999998	2.1534034314245867
-52.14999999999998	2.1586993708332924
-51.14999999999998	2.1652031872092694
-50.14999999999998	2.1729160334415414
-49.14999999999998	2.181839842486549
-48.14999999999998	2.1919772923172953
-47.14999999999998	2.2033317729431876
-46.14999999999998	2.21590735527954

Temperature (degC)	Pressure (MPa)
-45.1499999999998	2.229708761633694
-44.1499999999998	2.244741337648618
-43.1499999999998	2.2610110255132643
-42.1499999999998	2.278524338321355
-41.1499999999998	2.297288335443794
-40.1499999999998	2.3173105988265483
-39.1499999999998	2.338599210130452
-38.1499999999998	2.3611627286812578
-37.1499999999998	2.38501017019009
-36.1499999999998	2.410150986261261
-35.1499999999998	2.4365950446862077
-34.1499999999998	2.464352610564327
-33.1499999999998	2.493434328305604
-32.1499999999998	2.5238512045231216
-31.14999999999977	2.555614591894326
-30.14999999999977	2.5887361739872103
-29.14999999999977	2.623227951077021
-28.14999999999977	2.6591022269248943
-27.14999999999977	2.696371596489235
-26.14999999999977	2.7350489344927817
-25.14999999999977	2.775147384744305
-24.14999999999977	2.816680350107688
-23.14999999999977	2.8596614829679514
-22.14999999999977	2.9041046760777225
-21.14999999999977	2.9500240536308
-20.14999999999977	2.997433962485262
-19.14999999999977	3.0463489634499883
-18.14999999999977	3.09678382258738
-17.14999999999977	3.148753502594533
-16.14999999999977	3.202273154308554
-15.14999999999977	3.257358108466338
-14.14999999999977	3.314023867882001
-13.14999999999977	3.372286100251742
-12.14999999999977	3.432160631800527
-11.14999999999977	3.493663441979764
-10.14999999999977	3.5568106594472355
-9.14999999999977	3.621618559477553
-8.14999999999977	3.6881035629510124
-7.14999999999977	3.756282236944465
-6.14999999999977	3.826171296873892
-5.14999999999977	3.897787609996014
-4.14999999999977	3.9711481998985545
-3.149999999999773	4.046270251400873
-2.149999999999773	4.1231711150518695
-1.149999999999773	4.201868310077418

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	4.282379524376317
0.85000000000000227	4.364722609790026
1.85000000000000227	4.4489155706252355
2.85000000000000227	4.534976543211753
3.85000000000000227	4.622923764235049
4.8500000000000023	4.71277552580271
5.8500000000000023	4.804550115754327
6.8500000000000023	4.898265742614079
7.8500000000000023	4.993940445976569
8.8500000000000023	5.091591994782226
9.8500000000000023	5.1912377779373635
10.8500000000000023	5.292894693319265
11.8500000000000023	5.3965790421265565
12.8500000000000023	5.502306434297959
13.8500000000000023	5.610091705780073
14.8500000000000023	5.7199488371944645
15.8500000000000023	5.831890842389127
16.8500000000000023	5.9459295599351725
17.8500000000000023	6.062075225691872
18.8500000000000023	6.180335625172941
19.8500000000000023	6.300714518543094
20.8500000000000023	6.42320889927794
21.8500000000000023	6.547804495277318
22.8500000000000023	6.674468738783876
23.8500000000000023	6.803140195590347
24.8500000000000023	6.933712727193031
25.8500000000000023	7.066010940381177
26.8500000000000023	7.199746833959423
27.8500000000000023	7.334427402348441
28.8500000000000023	7.469122580764566
29.8500000000000023	7.601813244409893

Table B12: Bubble Points for Carbon Dioxide and 2% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-90.14999999999998	6.769781624969168
-89.14999999999998	6.554717601973487
-88.14999999999998	6.358005844161928
-87.14999999999998	6.1771072998678624
-86.14999999999998	6.009984868890445
-85.14999999999998	5.854980796636503
-84.14999999999998	5.7107289167212585
-83.14999999999998	5.576090663950131
-82.14999999999998	5.450107615215085
-81.14999999999998	5.331965733616887
-80.14999999999998	5.220968039861889
-79.14999999999998	5.116513448457515
-78.14999999999998	5.018080179217345
-77.14999999999998	4.9252126102906795
-76.14999999999998	4.837510752141353
-75.14999999999998	4.754621740491976
-74.14999999999998	4.676232901146769
-73.14999999999998	4.602066050737446
-72.14999999999998	4.531872778092749
-71.14999999999998	4.465430510432326
-70.14999999999998	4.40253921261814
-69.14999999999998	4.343018600898892
-68.14999999999998	4.286705777662021
-67.14999999999998	4.233453213039475
-66.14999999999998	4.183127013932514
-65.14999999999998	4.135605432657479
-64.14999999999998	4.0907775764256975
-63.14999999999998	4.048542286034623
-62.14999999999998	4.008807157789738
-61.14999999999998	3.9714876872797777
-60.14999999999998	3.9365065172143168
-59.14999999999998	3.903792774542025
-58.14999999999998	3.873281484445069
-57.14999999999998	3.844913050792954
-56.14999999999998	3.8186327942313856
-55.14999999999998	3.79439054046416
-54.14999999999998	3.7721402523173215
-53.14999999999998	3.751839700177137
-52.14999999999998	3.733450166131183
-51.14999999999998	3.716936177751688
-50.14999999999998	3.7022652680816317
-49.14999999999998	3.689407758769783
-48.14999999999998	3.678336563740821

Temperature (degC)	Pressure (MPa)
-47.1499999999998	3.669027011085058
-46.1499999999998	3.661456681163999
-45.1499999999998	3.65560525915749
-44.1499999999998	3.6514544004715574
-43.1499999999998	3.6489876076518426
-42.1499999999998	3.6481901175897815
-41.1499999999998	3.649048797932512
-40.1499999999998	3.6515520518106777
-39.1499999999998	3.6556897300010225
-38.1499999999998	3.6614530498988223
-37.1499999999998	3.6688345206403294
-36.1499999999998	3.677827873874835
-35.1499999999998	3.688427999729385
-34.1499999999998	3.7006308875707017
-33.1499999999998	3.714433571191235
-32.1499999999998	3.7298340780875665
-31.14999999999977	3.746831382462206
-30.14999999999977	3.765425361607916
-29.14999999999977	3.785616755261097
-28.14999999999977	3.8074071275277968
-27.14999999999977	3.8307988309071592
-26.14999999999977	3.855794971971771
-25.14999999999977	3.8823993782112836
-24.14999999999977	3.910616565589988
-23.14999999999977	3.9404517064196263
-22.14999999999977	3.9719105971781548
-21.14999999999977	4.004999626032858
-20.14999999999977	4.0397257398847835
-19.14999999999977	4.076096410922852
-18.14999999999977	4.114119602706594
-17.14999999999977	4.153803735985992
-16.14999999999977	4.195157654492073
-15.14999999999977	4.2381905910144475
-14.14999999999977	4.282912134171671
-13.14999999999977	4.329332196146941
-12.14999999999977	4.377460981857739
-11.14999999999977	4.427308959748142
-10.14999999999977	4.478886834420971
-9.14999999999977	4.53220552117519
-8.14999999999977	4.587276122297852
-7.14999999999977	4.644109904738116
-6.14999999999977	4.702718278497785
-5.14999999999977	4.7631127746781
-4.14999999999977	4.825305021675822
-3.149999999999773	4.889306717512822

Temperature (degC)	Pressure (MPa)
-2.149999999999773	4.955129595680074
-1.149999999999773	5.022785381331841
-0.1499999999997726	5.092285734097379
0.8500000000000227	5.163642173425329
1.8500000000000227	5.236865982261378
2.8500000000000227	5.3119680851791395
3.8500000000000227	5.388958897970686
4.850000000000023	5.4678481473200975
5.850000000000023	5.548644661544603
6.850000000000023	5.6313561365365645
7.850000000000023	5.715988884719552
8.850000000000023	5.802547578507214
9.850000000000023	5.891035002560163
10.850000000000023	5.981451829849329
11.850000000000023	6.073796432505912
12.850000000000023	6.168064727299152
13.850000000000023	6.264250032568003
14.850000000000023	6.362342873516297
15.850000000000023	6.462330609647824
16.850000000000023	6.564196666054547
17.850000000000023	6.667919026498514
18.850000000000023	6.7734674949366
19.850000000000023	6.880799068254797
20.850000000000023	6.989850588033073
21.850000000000023	7.100527906914578
22.850000000000023	7.212689998467896
23.850000000000023	7.326127552769475
24.850000000000023	7.440531931984609
25.850000000000023	7.555448296602672
26.850000000000023	7.670188952679297
27.850000000000023	7.783649871839023
28.850000000000023	7.893892315141715
29.850000000000023	7.997169364351462

Table B13: Bubble Points for Carbon Dioxide and 3% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-93.1499999999998	19.945114638855273
-92.1499999999998	17.889379609651275
-91.1499999999998	16.20580524588033
-90.1499999999998	14.823812487419698
-89.1499999999998	13.685554086033514
-88.1499999999998	12.742879925563454
-87.1499999999998	11.955808465624566
-86.1499999999998	11.29174769862463
-85.1499999999998	10.724802133230572
-84.1499999999998	10.234861203959069
-83.1499999999998	9.806526629206317
-82.1499999999998	9.42806255253276
-81.1499999999998	9.090497550540734
-80.1499999999998	8.786918277341169
-79.1499999999998	8.511939449072985
-78.1499999999998	8.261315281066082
-77.1499999999998	8.031656976963095
-76.1499999999998	7.820227168816997
-75.1499999999998	7.624789440827588
-74.1499999999998	7.443497181642986
-73.1499999999998	7.274810620938046
-72.1499999999998	7.117434213082339
-71.1499999999998	6.970268846492284
-70.1499999999998	6.832374967307742
-69.1499999999998	6.702943823525205
-68.1499999999998	6.5812748152264815
-67.1499999999998	6.466757484160975
-66.1499999999998	6.358857063607267
-65.1499999999998	6.257102786715824
-64.1499999999998	6.1610783517007635
-63.1499999999998	6.070414088063345
-62.1499999999998	5.984780475413043
-61.1499999999998	5.903882746150791
-60.1499999999998	5.82745636307091
-59.1499999999998	5.755263208093471
-58.1499999999998	5.687088352814932
-57.1499999999998	5.622737307977942
-56.1499999999998	5.562033669563688
-55.1499999999998	5.504817095052382
-54.1499999999998	5.4509415560802434
-53.1499999999998	5.400273823582572
-52.1499999999998	5.352692149410168
-51.1499999999998	5.3080851147408294

Temperature (degC)	Pressure (MPa)
-50.1499999999998	5.2663506206915365
-49.1499999999998	5.227395000617827
-48.1499999999998	5.191132237000064
-47.1499999999998	5.157483268482507
-46.1499999999998	5.12637537492233
-45.1499999999998	5.097741630175564
-44.1499999999998	5.071520413835742
-43.1499999999998	5.04765497451519
-42.1499999999998	5.026093038280289
-41.1499999999998	5.006786456784002
-40.1499999999998	4.989690890435501
-39.1499999999998	4.974765522598513
-38.1499999999998	4.961972801326589
-37.1499999999998	4.951278205701219
-36.1499999999998	4.942650034144726
-35.1499999999998	4.936059212408761
-34.1499999999998	4.931479119289583
-33.1499999999998	4.92888542819389
-32.1499999999998	4.928255962913672
-31.14999999999977	4.929570566043179
-30.14999999999977	4.932810978599214
-29.14999999999977	4.937960729429496
-28.14999999999977	4.945005033078775
-27.14999999999977	4.953930694875618
-26.14999999999977	4.9647260220423215
-25.14999999999977	4.977380739776216
-24.14999999999977	4.991885911361385
-23.14999999999977	5.008233861507768
-22.14999999999977	5.026418102303863
-21.14999999999977	5.04643326130305
-20.14999999999977	5.0682750114939426
-19.14999999999977	5.091940002974224
-18.14999999999977	5.117425796381123
-17.14999999999977	5.144730798183657
-16.14999999999977	5.173854198032421
-15.14999999999977	5.204795908421523
-14.14999999999977	5.237556506877488
-13.14999999999977	5.272137180896535
-12.14999999999977	5.308539675708289
-11.14999999999977	5.346766244843368
-10.14999999999977	5.386819603280669
-9.14999999999977	5.428702882556676
-8.14999999999977	5.472419587113146
-7.14999999999977	5.517973550395367
-6.14999999999977	5.56536888884142

Temperature (degC)	Pressure (MPa)
-5.14999999999977	5.614609951168084
-4.14999999999977	5.665701259559948
-3.149999999999773	5.718647438616772
-2.149999999999773	5.773453127120663
-1.149999999999773	5.830122867072373
-0.1499999999997726	5.888660964207716
0.8500000000000227	5.949071314423105
1.8500000000000227	6.011357191541662
2.8500000000000227	6.07552099377887
3.8500000000000227	6.14156394930388
4.850000000000023	6.209485785462335
5.850000000000023	6.279284371324054
6.850000000000023	6.350955348881504
7.850000000000023	6.424491773560257
8.850000000000023	6.4998837882328155
9.850000000000023	6.577118354832511
10.850000000000023	6.656179060765239
11.850000000000023	6.737045999899385
12.850000000000023	6.819695694710751
13.850000000000023	6.904100971139572
14.850000000000023	6.990230614552083
15.850000000000023	7.078048519194681
16.850000000000023	7.167511895869145
17.850000000000023	7.258567934954806
18.850000000000023	7.351148162020251
19.850000000000023	7.445159613542552
20.850000000000023	7.540471938512728
21.850000000000023	7.636899470211076
22.850000000000023	7.734178208751834
23.850000000000023	7.831933559658589
24.850000000000023	7.929638322470761
25.850000000000023	8.026542650010809
26.850000000000023	8.121543269406944
27.850000000000023	8.2129222268152
28.850000000000023	8.297809125851442
29.850000000000023	8.370450056430824

Table B14: Bubble Points for Carbon Dioxide and 4% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-84.14999999999998	19.594100977475595
-83.14999999999998	18.01791324796098
-82.14999999999998	16.691070468280685
-81.14999999999998	15.569363617687461
-80.14999999999998	14.616202818170308
-79.14999999999998	13.801198540837204
-78.14999999999998	13.09922684114262
-77.14999999999998	12.489723769024373
-76.14999999999998	11.956049518197807
-75.14999999999998	11.48486622009959
-74.14999999999998	11.06554173577631
-73.14999999999998	10.689611586135959
-72.14999999999998	10.350321020991807
-71.14999999999998	10.042252322371526
-70.14999999999998	9.761030416904203
-69.14999999999998	9.503094469902429
-68.14999999999998	9.265522271759679
-67.14999999999998	9.04589560363482
-66.14999999999998	8.842196886330985
-65.14999999999998	8.652729523794788
-64.14999999999998	8.476056154642489
-63.14999999999998	8.310950460285538
-62.14999999999998	8.15635927663079
-61.14999999999998	8.011372579932546
-60.14999999999998	7.875199529706337
-59.14999999999998	7.747149202396957
-58.14999999999998	7.6266149847626465
-57.14999999999998	7.513061842594544
-56.14999999999998	7.406015865066227
-55.14999999999998	7.3050556225713095
-54.14999999999998	7.209804979648198
-53.14999999999998	7.119927083085036
-52.14999999999998	7.035119305139654
-51.14999999999998	6.955108967698374
-50.14999999999998	6.879649708695007
-49.14999999999998	6.808518379608309
-48.14999999999998	6.741512384483461
-47.14999999999998	6.678447387786977
-46.14999999999998	6.619155331968874
-45.14999999999998	6.563482716209335
-44.14999999999998	6.511289096400562
-43.14999999999998	6.462445773433227
-42.14999999999998	6.416834642295327

Temperature (degC)	Pressure (MPa)
-41.1499999999998	6.374347179199005
-40.1499999999998	6.334883547533016
-39.1499999999998	6.298351806615468
-38.1499999999998	6.264667209631867
-37.1499999999998	6.233751579243142
-36.1499999999998	6.20553275104605
-35.1499999999998	6.179944076430746
-34.1499999999998	6.156923977541446
-33.1499999999998	6.136415547973219
-32.1499999999998	6.118366193617836
-31.14999999999977	6.10272730866156
-30.14999999999977	6.089453982422761
-29.14999999999977	6.078504733013507
-28.14999999999977	6.069841264394556
-27.14999999999977	6.063428243718226
-26.14999999999977	6.059233096241957
-25.14999999999977	6.057225815511699
-24.14999999999977	6.0573787868150655
-23.14999999999977	6.059666622285102
-22.14999999999977	6.06406600634012
-21.14999999999977	6.070555550445773
-20.14999999999977	6.079115656417764
-19.14999999999977	6.089728387732871
-18.14999999999977	6.102377348427269
-17.14999999999977	6.1170475693260355
-16.14999999999977	6.1337254013554965
-15.14999999999977	6.152398415736419
-14.14999999999977	6.173055310785422
-13.14999999999977	6.195685824945057
-12.14999999999977	6.220280655474483
-11.14999999999977	6.246831382008457
-10.14999999999977	6.275330393740032
-9.14999999999977	6.305770818588107
-8.14999999999977	6.338146452040085
-7.14999999999977	6.372451682584056
-6.14999999999977	6.408681409826052
-5.14999999999977	6.446830950338252
-4.14999999999977	6.486895925451247
-3.149999999999773	6.528872124174353
-2.149999999999773	6.5727553342657234
-1.149999999999773	6.618541134183731
-0.1499999999997726	6.666224639785585
0.8500000000000227	6.715800201401411
1.8500000000000227	6.76726105040873
2.8500000000000227	6.820598898796236

Temperature (degC)	Pressure (MPa)
3.85000000000000227	6.875803501474296
4.8500000000000023	6.932862197959661
5.8500000000000023	6.991759457344005
6.8500000000000023	7.052476456743523
7.8500000000000023	7.11499072688951
8.8500000000000023	7.179275896644484
9.8500000000000023	7.2453015575440105
10.8500000000000023	7.313033245498481
11.8500000000000023	7.382432494269455
12.8500000000000023	7.453456847965073
13.8500000000000023	7.52605962227273
14.8500000000000023	7.600189073723291
15.8500000000000023	7.6757864782052065
16.8500000000000023	7.75278245216415
17.8500000000000023	7.83109070966232
18.8500000000000023	7.910598387139519
19.8500000000000023	7.991152123593706
20.8500000000000023	8.072539379009987
21.8500000000000023	8.154464324769387
22.8500000000000023	8.236518111733679
23.8500000000000023	8.318140333276064
24.8500000000000023	8.39856451751149
25.8500000000000023	8.476725521277034
26.8500000000000023	8.551089526617707
27.8500000000000023	8.619340373889296
28.8500000000000023	8.677548657413665

Table B15: Bubble Points for Carbon Dioxide and 5% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-76.1499999999998	17.59806381956423
-75.1499999999998	16.577437294998028
-74.1499999999998	15.693963078042641
-73.1499999999998	14.924946655998866
-72.1499999999998	14.251502061777291
-71.1499999999998	13.657983439657817
-70.1499999999998	13.13150052764447
-69.1499999999998	12.661483984539343
-68.1499999999998	12.239292682464209
-67.1499999999998	11.857866291114542
-66.1499999999998	11.511427046342884
-65.1499999999998	11.195230848029238
-64.1499999999998	10.90536405094119
-63.1499999999998	10.638580079475867
-62.1499999999998	10.392169297473066
-61.1499999999998	10.16385586323087
-60.1499999999998	9.951716084499113
-59.1499999999998	9.754113717082888
-58.1499999999998	9.569648540648625
-57.1499999999998	9.397115318102093
-56.1499999999998	9.235470880501234
-55.1499999999998	9.083807585718638
-54.1499999999998	8.941331795015396
-53.1499999999998	8.807346317616412
-52.1499999999998	8.681236008756642
-51.1499999999998	8.562455887106797
-50.1499999999998	8.450521275982622
-49.1499999999998	8.344999579190707
-48.1499999999998	8.245503384436905
-47.1499999999998	8.15168465074622
-46.1499999999998	8.063229785747028
-45.1499999999998	7.979855457191591
-44.1499999999998	7.9013050134166125
-43.1499999999998	7.827345411272722
-42.1499999999998	7.757764568977255
-41.1499999999998	7.692369076450175
-40.1499999999998	7.630982207606608
-39.1499999999998	7.5734421889460934
-38.1499999999998	7.519600686350178
-37.1499999999998	7.469321478433203
-36.1499999999998	7.422479289861027
-35.1499999999998	7.378958762195684
-34.1499999999998	7.338653543266954

Temperature (degC)	Pressure (MPa)
-33.1499999999998	7.301465478866492
-32.1499999999998	7.267303892918054
-31.14999999999977	7.236084944229619
-30.14999999999977	7.207731049673738
-29.14999999999977	7.18217036492411
-28.14999999999977	7.1593363154232765
-27.14999999999977	7.139167171052753
-26.14999999999977	7.121605659137235
-25.14999999999977	7.10659861122687
-24.14999999999977	7.094096639810264
-23.14999999999977	7.084053841791635
-22.14999999999977	7.076427526069784
-21.14999999999977	7.071177963022964
-20.14999999999977	7.068268154035137
-19.14999999999977	7.067663619497529
-18.14999999999977	7.0693322038572175
-17.14999999999977	7.073243896449929
-16.14999999999977	7.079370666833268
-15.14999999999977	7.087686313307203
-14.14999999999977	7.098166323130985
-13.14999999999977	7.110787742672668
-12.14999999999977	7.125529055289737
-11.14999999999977	7.142370064158177
-10.14999999999977	7.161291776507164
-9.14999999999977	7.182276284748971
-8.14999999999977	7.205306638993845
-7.14999999999977	7.230366704251161
-6.14999999999977	7.257440994679382
-5.14999999999977	7.286514476406588
-4.14999999999977	7.317572330333091
-3.149999999999773	7.35059966682891
-2.149999999999773	7.385581186042049
-1.149999999999773	7.422500780676447
-0.1499999999997726	7.461341082825607
0.85000000000000227	7.5020829628839
1.85000000000000227	7.544704996283556
2.85000000000000227	7.589182922402505
3.85000000000000227	7.635489128234723
4.8500000000000023	7.683592195882294
5.8500000000000023	7.733456555207053
6.8500000000000023	7.785042278338432
7.8500000000000023	7.838305037266238
8.8500000000000023	7.893196215119144
9.8500000000000023	7.94966311047173
10.8500000000000023	8.007649097000861

Temperature (degC)	Pressure (MPa)
11.8500000000000023	8.067093493653333
12.8500000000000023	8.127930763237707
13.8500000000000023	8.190088498668668
14.8500000000000023	8.25348349907723
15.8500000000000023	8.318015123817803
16.8500000000000023	8.383555097689596
17.8500000000000023	8.449933077571114
18.8500000000000023	8.516917587421167
19.8500000000000023	8.584192272745296
20.8500000000000023	8.65132754768074
21.8500000000000023	8.717746575536975
22.8500000000000023	8.782681458590389
23.8500000000000023	8.845106959235922
24.8500000000000023	8.903625737750355
25.8500000000000023	8.95625827614104
26.8500000000000023	8.999947763073717
27.8500000000000023	9.028270283117253
28.8500000000000023	9.01817678174219
29.8500000000000023	8.690972206194328

Table B16: Bubble Points for Carbon Dioxide and 1% Water

Temperature (degC)	Pressure (MPa)
-87.14999999999998	0.10458669018307126
-86.14999999999998	0.1112551485181754
-85.14999999999998	0.11825571951155191
-84.14999999999998	0.1255998068471741
-83.14999999999998	0.13329899139073717
-82.14999999999998	0.14136502808262555
-81.14999999999998	0.14980984276828602
-80.14999999999998	0.1586455290143365
-79.14999999999998	0.1678843448634769
-78.14999999999998	0.17753870959840756
-77.14999999999998	0.18762120047505174
-76.14999999999998	0.19814454946417717
-75.14999999999998	0.2091216399708282
-74.14999999999998	0.22056550359460164
-73.14999999999998	0.2324893168744696
-72.14999999999998	0.2449063980702931
-71.14999999999998	0.2578302039708507
-70.14999999999998	0.27127432671972496
-69.14999999999998	0.2852524907165492
-68.14999999999998	0.29977854950759397
-67.14999999999998	0.31486648277957996
-66.14999999999998	0.33053039336687906
-65.14999999999998	0.3467845043514468
-64.14999999999998	0.36364315619844473
-63.14999999999998	0.38112080397739284
-62.14999999999998	0.399232014652101
-61.14999999999998	0.41799146444234264
-60.14999999999998	0.43741393627456227
-59.14999999999998	0.45751431731505454
-58.14999999999998	0.4783075965906398
-57.14999999999998	0.49980886269783337
-56.14999999999998	0.5220333016140744
-55.14999999999998	0.5449961946098802
-54.14999999999998	0.5687129162608612
-53.14999999999998	0.5931989325625443
-52.14999999999998	0.6184697991692577
-51.14999999999998	0.6445411597299121
-50.14999999999998	0.6714287443614074
-49.14999999999998	0.6991483682294201
-48.14999999999998	0.7277159302654044
-47.14999999999998	0.7571474120117471
-46.14999999999998	0.7874588766038685
-45.14999999999998	0.8186664678920477

Temperature (degC)	Pressure (MPa)
-44.1499999999998	0.850786409697261
-43.1499999999998	0.8838350052366265
-42.1499999999998	0.9178286366548302
-41.1499999999998	0.9527837647462359
-40.1499999999998	0.9887169287842371
-39.1499999999998	1.0256447465324852
-38.1499999999998	1.0635839143555788
-37.1499999999998	1.1025512075058128
-36.1499999999998	1.1425634805252773
-35.1499999999998	1.1836376677983467
-34.1499999999998	1.2257907842323215
-33.1499999999998	1.269039926105136
-32.1499999999998	1.3134022720509044
-31.14999999999977	1.3588950842367498
-30.14999999999977	1.4055357097230978
-29.14999999999977	1.4533415820520432
-28.14999999999977	1.5023302230859847
-27.14999999999977	1.5525192451129146
-26.14999999999977	1.6039263532793135
-25.14999999999977	1.6565693483631858
-24.14999999999977	1.7104661299189077
-23.14999999999977	1.7656346998309873
-22.14999999999977	1.822093166296778
-21.14999999999977	1.879859748252577
-20.14999999999977	1.9389527802708932
-19.14999999999977	1.9993907179330763
-18.14999999999977	2.061192143677105
-17.14999999999977	2.1243757731484165
-16.14999999999977	2.1889604620279512
-15.14999999999977	2.254965213361805
-14.14999999999977	2.3224091853924564
-13.14999999999977	2.391311699885711
-12.14999999999977	2.4616922509887433
-11.14999999999977	2.5335705146118257
-10.14999999999977	2.606966358393462
-9.14999999999977	2.681899852262383
-8.14999999999977	2.758391279663691
-7.14999999999977	2.8364611495260017
-6.14999999999977	2.916130209045136
-5.14999999999977	2.9974194574094324
-4.14999999999977	3.0803501605907506
-3.149999999999773	3.1649438673669623
-2.149999999999773	3.251222426760166
-1.149999999999773	3.33920800707255
-0.1499999999997726	3.4289231167741034

Temperature (degC)	Pressure (MPa)
0.85000000000000227	3.520390627424803
1.85000000000000227	3.613633798871999
2.85000000000000227	3.7086763068910225
3.85000000000000227	3.805542273405342
4.8500000000000023	3.9042562993342127
5.8500000000000023	4.004843499999277
6.8500000000000023	4.107329542910105
7.8500000000000023	4.211740687602612
8.8500000000000023	4.318103827110542
9.8500000000000023	4.4264465305911305
10.8500000000000023	4.53679708675458
11.8500000000000023	4.649184548008943
12.8500000000000023	4.763638775846695
13.8500000000000023	4.880190488919272
14.8500000000000023	4.998871316520689
15.8500000000000023	5.119713861696064
16.8500000000000023	5.242751779517112
17.8500000000000023	5.368019876304904
18.8500000000000023	5.495554233392937
19.8500000000000023	5.625392351534628
20.8500000000000023	5.757573295622971
21.8500000000000023	5.892137788282121
22.8500000000000023	6.029128148326953
23.8500000000000023	6.16858788781803
24.8500000000000023	6.3105606593960095
25.8500000000000023	6.455088061353958
26.8500000000000023	6.6022054745050465
27.8500000000000023	6.751934227186065
28.8500000000000023	6.904265216596403
29.8500000000000023	7.059116275816935
30.8500000000000023	7.216191491716953
31.8500000000000023	7.374405951919647

Table B17: Bubble Points for Carbon Dioxide and 2% Water

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.09747725478367039
-87.14999999999998	0.10377248937792607
-86.14999999999998	0.11038573110988677
-85.14999999999998	0.1173280860923518
-84.14999999999998	0.12461083769761802
-83.14999999999998	0.1322454434744151
-82.14999999999998	0.14024353197546066
-81.14999999999998	0.14861689956764274
-80.14999999999998	0.15737750720218596
-79.14999999999998	0.16653747713203104
-78.14999999999998	0.17610908963801716
-77.14999999999998	0.18610477971607142
-76.14999999999998	0.19653713376507706
-75.14999999999998	0.20741888627484395
-74.14999999999998	0.2187629165196601
-73.14999999999998	0.23058224525952287
-72.14999999999998	0.24289003146166996
-71.14999999999998	0.25569956905984437
-70.14999999999998	0.26902428370152465
-69.14999999999998	0.2828777295877365
-68.14999999999998	0.29727358631082507
-67.14999999999998	0.31222565575403693
-66.14999999999998	0.32774785904143805
-65.14999999999998	0.34385423353801725
-64.14999999999998	0.3605589299165286
-63.14999999999998	0.37787620927697013
-62.14999999999998	0.39582044034617214
-61.14999999999998	0.4144060967443813
-60.14999999999998	0.4336477543239172
-59.14999999999998	0.4535600885865802
-58.14999999999998	0.47415787219735483
-57.14999999999998	0.49545597256202467
-56.14999999999998	0.5174693495108521
-55.14999999999998	0.5402130530680109
-54.14999999999998	0.5637022213191198
-53.14999999999998	0.5879520783760082
-52.14999999999998	0.6129779324385923
-51.14999999999998	0.6387951739794893
-50.14999999999998	0.665419274010806
-49.14999999999998	0.6928657824886796
-48.14999999999998	0.7211503268177509
-47.14999999999998	0.7502886104821768
-46.14999999999998	0.7802964117933094

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8111895827753036
-44.14999999999998	0.8429840481609148
-43.14999999999998	0.8756958045298101
-42.14999999999998	0.9093409195739945
-41.14999999999998	0.943935531491193
-40.14999999999998	0.9794958485043456
-39.14999999999998	1.0160381485095566
-38.14999999999998	1.0535787788418418
-37.14999999999998	1.0921341561634164
-36.14999999999998	1.1317207664606395
-35.14999999999998	1.1723551651641064
-34.14999999999998	1.2140539773718504
-33.14999999999998	1.2568338982071623
-32.14999999999998	1.3007116932897915
-31.149999999999977	1.3457041993595087
-30.149999999999977	1.391828325049368
-29.149999999999977	1.4391010518390976
-28.149999999999977	1.4875394352138265
-27.149999999999977	1.5371606060430831
-26.149999999999977	1.5879817722206448
-25.149999999999977	1.6400202205824161
-24.149999999999977	1.693293319133574
-23.149999999999977	1.7478185195993505
-22.149999999999977	1.8036133603226003
-21.149999999999977	1.8606954695234355
-20.149999999999977	1.9190825689303046
-19.149999999999977	1.978792477762428
-18.149999999999977	2.03984311711781
-17.149999999999977	2.1022525146885203
-16.149999999999977	2.1660388098648427
-15.149999999999977	2.2312202591672547
-14.149999999999977	2.2978152420174696
-13.149999999999977	2.3658422668463843
-12.149999999999977	2.4353199775050456
-11.149999999999977	2.5062671600027624
-10.149999999999977	2.57870274954646
-9.149999999999977	2.652645837911808
-8.149999999999977	2.7281156811491765
-7.149999999999977	2.805131707647561
-6.149999999999977	2.8837135266199274
-5.149999999999977	2.9638809370219237
-4.149999999999977	3.0456539370053117
-3.1499999999999773	3.129052733965677
-2.1499999999999773	3.2140977552746084
-1.1499999999999773	3.3008096597955063

Temperature (degC)	Pressure (MPa)
-0.14999999999997726	3.38920935027623
0.8500000000000227	3.47931798668954
1.8500000000000227	3.5711570005805897
2.8500000000000227	3.6647481103922765
3.8500000000000227	3.760113337678184
4.850000000000023	3.857275023972758
5.850000000000023	3.9562558479245182
6.850000000000023	4.057078842078964
7.850000000000023	4.159767408481036
8.850000000000023	4.264345331978203
9.850000000000023	4.370836789902042
10.850000000000023	4.479266356570506
11.850000000000023	4.5896590010289495
12.850000000000023	4.702040076501974
13.850000000000023	4.816435300354655
14.850000000000023	4.932870723835324
15.850000000000023	5.051372691434094
16.850000000000023	5.171967789981916
17.850000000000023	5.294682786820589
18.850000000000023	5.419544553160991
19.850000000000023	5.546579960780239
20.850000000000023	5.675815723521587
21.850000000000023	5.8072781241461024
22.850000000000023	5.9409925140063615
23.850000000000023	6.076982387354997
24.850000000000023	6.21526770038519
25.850000000000023	6.355861906411113
26.850000000000023	6.498766867034789
27.850000000000023	6.643964233034233
28.850000000000023	6.791400564773912
29.850000000000023	6.940959608185292
30.850000000000023	7.092402582314893
31.850000000000023	7.245217070586499
32.85000000000002	7.3981990213109965
33.85000000000002	7.548686350189979
34.85000000000002	7.748688325985316
35.85000000000002	7.92660337557928

Table B18: Bubble Points for Carbon Dioxide and 3% Water

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.0968738827346134
-87.14999999999998	0.10312542756174237
-86.14999999999998	0.1096924334079026
-85.14999999999998	0.11658589575697842
-84.14999999999998	0.12381698430422161
-83.14999999999998	0.13139703979328451
-82.14999999999998	0.13933757084558346
-81.14999999999998	0.14765025071118043
-80.14999999999998	0.15634691398282216
-79.14999999999998	0.1654395533099217
-78.14999999999998	0.17494031603886476
-77.14999999999998	0.1848615008875341
-76.14999999999998	0.19521555456030976
-75.14999999999998	0.2060150684074441
-74.14999999999998	0.21727277505268347
-73.14999999999998	0.22900154504881853
-72.14999999999998	0.24121438353865543
-71.14999999999998	0.25392442694532785
-70.14999999999998	0.26714493969151387
-69.14999999999998	0.2808893109335365
-68.14999999999998	0.2951710513546771
-67.14999999999998	0.3100037899908776
-66.14999999999998	0.32540127109909794
-65.14999999999998	0.34137735108452555
-64.14999999999998	0.3579459954794656
-63.14999999999998	0.3751212759838934
-62.14999999999998	0.392917367564998
-61.14999999999998	0.4113485456283705
-60.14999999999998	0.43042918325948476
-59.14999999999998	0.45017374853428627
-58.14999999999998	0.4705968019056486
-57.14999999999998	0.4917129936873769
-56.14999999999998	0.5135370615913749
-55.14999999999998	0.5360838283752797
-54.14999999999998	0.5593681995654682
-53.14999999999998	0.583405161276909
-52.14999999999998	0.6082097781220908
-51.14999999999998	0.6337971912264526
-50.14999999999998	0.6601826163281119
-49.14999999999998	0.6873813419969583
-48.14999999999998	0.7154087279388357
-47.14999999999998	0.744280203436432
-46.14999999999998	0.7740112658688775

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8046174793690741
-44.14999999999998	0.8361144735814737
-43.14999999999998	0.8685179425404934
-42.14999999999998	0.9018436436659953
-41.14999999999998	0.9361073968615015
-40.14999999999998	0.971325083741322
-39.14999999999998	1.0075126469483247
-38.14999999999998	1.0446860895751044
-37.14999999999998	1.0828614747050385
-36.14999999999998	1.122054925018527
-35.14999999999998	1.1622826225153
-34.14999999999998	1.2035608083090072
-33.14999999999998	1.2459057825403799
-32.14999999999998	1.2893339043631589
-31.149999999999977	1.3338615920576733
-30.149999999999977	1.379505323266052
-29.149999999999977	1.4262816353576817
-28.149999999999977	1.474207125961986
-27.149999999999977	1.5232984536769973
-26.149999999999977	1.5735723389897642
-25.149999999999977	1.6250455654026514
-24.149999999999977	1.6777349808210722
-23.149999999999977	1.731657499191181
-22.149999999999977	1.7868301024134303
-21.149999999999977	1.843269842537318
-20.149999999999977	1.9009938442384935
-19.149999999999977	1.960019307581587
-18.149999999999977	2.0203635110499625
-17.149999999999977	2.082043814844479
-16.149999999999977	2.145077664426829
-15.149999999999977	2.2094825942708427
-14.149999999999977	2.2752762318481654
-13.149999999999977	2.3424763017613355
-12.149999999999977	2.4111006300436992
-11.149999999999977	2.481167148588768
-10.149999999999977	2.5526938996712105
-9.149999999999977	2.6256990405793905
-8.149999999999977	2.7002008483049673
-7.149999999999977	2.7762177242951434
-6.149999999999977	2.8537681992848687
-5.149999999999977	2.9328709381768125
-4.149999999999977	3.013544745017571
-3.1499999999999773	3.09580856806784
-2.1499999999999773	3.1796815049955445
-1.1499999999999773	3.265182808207641

Temperature (degC)	Pressure (MPa)
-0.14999999999997726	3.352331890337317
0.8500000000000227	3.441148329861488
1.8500000000000227	3.5316518767982346
2.8500000000000227	3.6238624583468653
3.8500000000000227	3.7178001842484814
4.850000000000023	3.8134853514795717
5.850000000000023	3.9109384477037707
6.850000000000023	4.010180152679578
7.850000000000023	4.111231336473658
8.850000000000023	4.214113053061483
9.850000000000023	4.3188465274607015
10.850000000000023	4.4254531342542025
11.850000000000023	4.53395436502099
12.850000000000023	4.64437178203202
13.850000000000023	4.756726955512806
14.850000000000023	4.871041381896819
15.850000000000023	4.987336380722071
16.850000000000023	5.105632967909134
17.850000000000023	5.225951702610347
18.850000000000023	5.348312502670664
19.850000000000023	5.472734418158533
20.850000000000023	5.599235340673679
21.850000000000023	5.727831603630368
22.850000000000023	5.858537389210948
23.850000000000023	5.991363792650378
24.850000000000023	6.126317293540882
25.850000000000023	6.263397234157427
26.850000000000023	6.4025916885937395
27.850000000000023	6.543870786134117
28.850000000000023	6.687176016231255
29.850000000000023	6.832402918591686
30.850000000000023	6.979371641286777
31.850000000000023	7.12777158506292
32.85000000000002	7.277044511445854
33.85000000000002	7.426119975411323
34.85000000000002	7.572785648512868
35.85000000000002	7.706948106935148
36.85000000000002	7.927199776876931

Table B19: Bubble Points for Carbon Dioxide and 4% Water

Temperature (degC)	Pressure (MPa)
-89.14999999999998	0.0905168318191246
-88.14999999999998	0.09643093577242333
-87.14999999999998	0.10264758200584123
-86.14999999999998	0.10917748835185824
-85.14999999999998	0.11603154682179813
-84.14999999999998	0.12322082049553335
-83.14999999999998	0.13075654033848566
-82.14999999999998	0.13865010197583708
-81.14999999999998	0.14691306240067392
-80.14999999999998	0.1555571366597686
-79.14999999999998	0.16459419449287893
-78.14999999999998	0.17403625695810448
-77.14999999999998	0.18389549303384747
-76.14999999999998	0.1941842162092419
-75.14999999999998	0.20491488106583924
-74.14999999999998	0.21610007987206287
-73.14999999999998	0.22775253917713106
-72.14999999999998	0.2398851164210961
-71.14999999999998	0.25251079655774816
-70.14999999999998	0.2656426887137003
-69.14999999999998	0.27929402286656585
-68.14999999999998	0.2934781465631872
-67.14999999999998	0.30820852168223933
-66.14999999999998	0.32349872122275447
-65.14999999999998	0.33936242615978135
-64.14999999999998	0.3558134223416207
-63.14999999999998	0.3728655974422764
-62.14999999999998	0.3905329379859565
-61.14999999999998	0.40882952640849235
-60.14999999999998	0.42776953821323077
-59.14999999999998	0.4473672391736399
-58.14999999999998	0.4676369826202214
-57.14999999999998	0.4885932068006028
-56.14999999999998	0.5102504323051453
-55.14999999999998	0.5326232595888125
-54.14999999999998	0.5557263665609917
-53.14999999999998	0.5795745062665799
-52.14999999999998	0.6041825046522368
-51.14999999999998	0.6295652584197876
-50.14999999999998	0.6557377329745215
-49.14999999999998	0.6827149604576861
-48.14999999999998	0.7105120378909008
-47.14999999999998	0.7391441253998424

Temperature (degC)	Pressure (MPa)
-46.14999999999998	0.7686264445564863
-45.14999999999998	0.7989742767997415
-44.14999999999998	0.8302029619853541
-43.14999999999998	0.8623278970172137
-42.14999999999998	0.8953645345880286
-41.14999999999998	0.9293283820174673
-40.14999999999998	0.964235000191925
-39.14999999999998	1.0001000025765068
-38.14999999999998	1.0369390543451087
-37.14999999999998	1.074767871563454
-36.14999999999998	1.1136022204625418
-35.14999999999998	1.1534579167783268
-34.14999999999998	1.194350825175456
-33.14999999999998	1.2362968587184275
-32.14999999999998	1.2793119784433908
-31.149999999999977	1.3234121930008786
-30.149999999999977	1.3686135583851842
-29.149999999999977	1.4149321777810446
-28.149999999999977	1.4623842015231578
-27.149999999999977	1.5109858271992556
-26.149999999999977	1.5607532999026699
-25.149999999999977	1.6117029126636953
-24.149999999999977	1.6638510070707124
-23.149999999999977	1.7172139740812846
-22.149999999999977	1.7718082550553165
-21.149999999999977	1.8276503429846045
-20.149999999999977	1.884756783957225
-19.149999999999977	1.9431441788025063
-18.149999999999977	2.002829184948365
-17.149999999999977	2.063828518441125
-16.149999999999977	2.1261589561299155
-15.149999999999977	2.1898373379638727
-14.149999999999977	2.2548805693961187
-13.149999999999977	2.321305623839179
-12.149999999999977	2.389129545144454
-11.149999999999977	2.458369450064502
-10.149999999999977	2.5290425306618967
-9.149999999999977	2.6011660566030907
-8.149999999999977	2.674757377348282
-7.149999999999977	2.7498339241424397
-6.149999999999977	2.8264132118138554
-5.149999999999977	2.9045128403425258
-4.149999999999977	2.9841504961600878
-3.1499999999999773	3.065343953175203
-2.1499999999999773	3.1481110734814655

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.2324698077321705
-0.1499999999997726	3.3184381951264066
0.8500000000000227	3.4060343629384504
1.8500000000000227	3.4952765254809783
2.8500000000000227	3.586182982295605
3.8500000000000227	3.6787721153103075
4.850000000000023	3.7730623844965874
5.850000000000023	3.869072321419413
6.850000000000023	3.9668205197726785
7.850000000000023	4.066325621712977
8.850000000000023	4.16760629840327
9.850000000000023	4.270681222778932
10.850000000000023	4.375569032096557
11.850000000000023	4.482288277415402
12.850000000000023	4.590857356781124
13.850000000000023	4.7012944286462846
14.850000000000023	4.813617301991518
15.850000000000023	4.927843299649452
16.850000000000023	5.043989091485536
17.850000000000023	5.162070494010445
18.850000000000023	5.282102232098211
19.850000000000023	5.4040976557275275
20.850000000000023	5.528068397987128
21.850000000000023	5.654023947213745
22.850000000000023	5.7819710811852465
23.850000000000023	5.9119130688025
24.850000000000023	6.043848476677349
25.850000000000023	6.177769315811421
26.850000000000023	6.313658118477394
27.850000000000023	6.451483338187215
28.850000000000023	6.5911921985912265
29.850000000000023	6.732699721355996
30.850000000000023	6.875871821740917
31.850000000000023	7.020499557338582
32.85000000000002	7.166253946064202
33.85000000000002	7.312606101437994
34.85000000000002	7.458669868719669
35.85000000000002	7.6028995363893825
36.85000000000002	7.742001342689748
37.85000000000002	7.998146348972421
38.85000000000002	7.992235895556258

Table B20: Bubble Points for Carbon Dioxide and 5% Water

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08466145568725789
-89.14999999999998	0.0902610369314931
-88.14999999999998	0.09615095616077934
-87.14999999999998	0.10234166429273954
-86.14999999999998	0.10884378638417536
-85.14999999999998	0.11566811854038436
-84.14999999999998	0.12282562475077267
-83.14999999999998	0.13032743367613947
-82.14999999999998	0.13818483535410675
-81.14999999999998	0.14640927788519956
-80.14999999999998	0.15501236404982205
-79.14999999999998	0.1640058479243245
-78.14999999999998	0.17340163143530793
-77.14999999999998	0.18321176092386596
-76.14999999999998	0.19344842368430903
-75.14999999999998	0.20412394449136706
-74.14999999999998	0.21525078214749938
-73.14999999999998	0.22684152601510396
-72.14999999999998	0.23890889257356018
-71.14999999999998	0.2514657219789189
-70.14999999999998	0.2645249746716148
-69.14999999999998	0.27809972798609967
-68.14999999999998	0.2922031728019855
-67.14999999999998	0.30684861023952503
-66.14999999999998	0.32204944838086347
-65.14999999999998	0.33781919905050317
-64.14999999999998	0.3541714746324434
-63.14999999999998	0.3711199849477393
-62.14999999999998	0.3886785341855928
-61.14999999999998	0.40686101788804163
-60.14999999999998	0.42568142000466025
-59.14999999999998	0.44515381000388093
-58.14999999999998	0.4652923400585402
-57.14999999999998	0.4861112422898741
-56.14999999999998	0.5076248260965466
-55.14999999999998	0.529847475548476
-54.14999999999998	0.5527936468532423
-53.14999999999998	0.5764778659180646
-52.14999999999998	0.6009147259636577
-51.14999999999998	0.6261188852473187
-50.14999999999998	0.652105064849563
-49.14999999999998	0.6788880465610744
-48.14999999999998	0.7064826708375997

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7349038348700738
-46.14999999999998	0.7641664907167195
-45.14999999999998	0.794285643549567
-44.14999999999998	0.8252763499751289
-43.14999999999998	0.8571537164592078
-42.14999999999998	0.8899328978241057
-41.14999999999998	0.9236290958528366
-40.14999999999998	0.95825755795801
-39.14999999999998	0.9938335759344639
-38.14999999999998	1.030372484789313
-37.14999999999998	1.0678896616288096
-36.14999999999998	1.106400524609239
-35.14999999999998	1.1459205319459578
-34.14999999999998	1.1864651809741031
-33.14999999999998	1.2280500072528426
-32.14999999999998	1.2706905837391322
-31.149999999999977	1.314402520012663
-30.149999999999977	1.3592014615548755
-29.149999999999977	1.405103089121526
-28.149999999999977	1.4521231181997325
-27.149999999999977	1.5002772985581612
-26.149999999999977	1.5495814139187196
-25.149999999999977	1.6000512817535422
-24.149999999999977	1.65170275322726
-23.149999999999977	1.7045517132790577
-22.149999999999977	1.7586140808645256
-21.149999999999977	1.8139058093457452
-20.149999999999977	1.8704428870380483
-19.149999999999977	1.9282413378856256
-18.149999999999977	1.9873172222841267
-17.149999999999977	2.047686637988931
-16.149999999999977	2.1093657211147034
-15.149999999999977	2.1723706471781696
-14.149999999999977	2.236717632156456
-13.149999999999977	2.302422933507127
-12.149999999999977	2.3695028511280767
-11.149999999999977	2.4379737281593576
-10.149999999999977	2.507851951649368
-9.149999999999977	2.5791539529341883
-8.149999999999977	2.65189620776982
-7.149999999999977	2.726095236092133
-6.149999999999977	2.8017676013753654
-5.149999999999977	2.87892990953436
-4.149999999999977	2.9575988073123742
-3.1499999999999773	3.037790980096182

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.119523149104378
-1.149999999999773	3.2028120678904384
-0.1499999999997726	3.287674518067072
0.8500000000000227	3.3741273041796487
1.8500000000000227	3.4621872475388744
2.8500000000000227	3.551871178871811
3.8500000000000227	3.6431959294324328
4.850000000000023	3.73617832018534
5.850000000000023	3.830835148428567
6.850000000000023	3.9271831710117535
7.850000000000023	4.0252390829912645
8.850000000000023	4.125019490204844
9.850000000000023	4.226540873795527
10.850000000000023	4.329819544264142
11.850000000000023	4.434871582116794
12.850000000000023	4.541712761716148
13.850000000000023	4.65035845456922
14.850000000000023	4.7608235080332495
15.850000000000023	4.873122095368742
16.850000000000023	4.987267533208392
17.850000000000023	5.103272062728708
18.850000000000023	5.221146590836988
19.850000000000023	5.340900386909064
20.850000000000023	5.462540727944091
21.850000000000023	5.586072478457381
22.850000000000023	5.711497578255452
23.850000000000023	5.838814386843851
24.850000000000023	5.968016792203605
25.850000000000023	6.099092927182749
26.850000000000023	6.232023242484273
27.850000000000023	6.366777556922973
28.850000000000023	6.503310542730273
29.850000000000023	6.641554906612396
30.850000000000023	6.781411282486182
31.850000000000023	6.922733447582017
32.85000000000002	7.065306885360787
33.85000000000002	7.208815966198332
34.85000000000002	7.3527915684971035
35.85000000000002	7.496520061108948
36.85000000000002	7.638889625404928
37.85000000000002	7.778188107507692
38.85000000000002	7.911839072686089

Table B21: Bubble Points for Carbon Dioxide and 1% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-87.1499999999998	0.10556140737651006
-86.1499999999998	0.11228565922603126
-85.1499999999998	0.11934455704448703
-84.1499999999998	0.1267495892581854
-83.1499999999998	0.13451242338957517
-82.1499999999998	0.1426449029706125
-81.1499999999998	0.15115904443529815
-80.1499999999998	0.1600670339503069
-79.1499999999998	0.16938122422815619
-78.1499999999998	0.17911413134107257
-77.1499999999998	0.18927843148600904
-76.1499999999998	0.19988695778797133
-75.1499999999998	0.210952697068731
-74.1499999999998	0.22248878666068445
-73.1499999999998	0.23450851120717
-72.1499999999998	0.2470252995132295
-71.1499999999998	0.26005272140024716
-70.1499999999998	0.2736044846234811
-69.1499999999998	0.2876944318069138
-68.1499999999998	0.30233653744854483
-67.1499999999998	0.31754490495351145
-66.1499999999998	0.33333376375132884
-65.1499999999998	0.34971746645901025
-64.1499999999998	0.3667104861134705
-63.1499999999998	0.38432741348767097
-62.1499999999998	0.4025829544752922
-61.1499999999998	0.42149192755531684
-60.1499999999998	0.44106926134741353
-59.1499999999998	0.46132999226613475
-58.1499999999998	0.48228926225078966
-57.1499999999998	0.5039623166021125
-56.1499999999998	0.5263645019341913
-55.1499999999998	0.5495112642083421
-54.1499999999998	0.5734181469052393
-53.1499999999998	0.5981007892825434
-52.1499999999998	0.623574924781619
-51.1499999999998	0.6498563795304413
-50.1499999999998	0.6769610709972045
-49.1499999999998	0.704905006757797
-48.1499999999998	0.7337042834224072
-47.1499999999998	0.7633750856785251
-46.1499999999998	0.7939336855088681
-45.1499999999998	0.8253964415420485

Temperature (degC)	Pressure (MPa)
-44.14999999999998	0.857779798570106
-43.14999999999998	0.8911002872233911
-42.14999999999998	0.9253745238059763
-41.14999999999998	0.960619210298442
-40.14999999999998	0.996851134516952
-39.14999999999998	1.0340871704474286
-38.14999999999998	1.0723442787235558
-37.14999999999998	1.1116395072848262
-36.14999999999998	1.1519899921788725
-35.14999999999998	1.1934129585289976
-34.14999999999998	1.2359257216712891
-33.14999999999998	1.2795456884744032
-32.14999999999998	1.3242903588226025
-31.14999999999977	1.3701773273384523
-30.14999999999977	1.4172242853187726
-29.14999999999977	1.4654490229360295
-28.14999999999977	1.5148694317357285
-27.14999999999977	1.5655035074734291
-26.14999999999977	1.6173693533085964
-25.14999999999977	1.6704851834127648
-24.14999999999977	1.7248693270393822
-23.14999999999977	1.7805402330540478
-22.14999999999977	1.8375164749971729
-21.14999999999977	1.895816756676666
-20.14999999999977	1.955459918339513
-19.14999999999977	2.016464943427626
-18.14999999999977	2.078850965933644
-17.14999999999977	2.1426372783797123
-16.14999999999977	2.207843340450705
-15.14999999999977	2.2744887882478846
-14.14999999999977	2.3425934442572967
-13.14999999999977	2.4121773279947
-12.14999999999977	2.483260667395947
-11.14999999999977	2.555863911006599
-10.14999999999977	2.6300077410009357
-9.14999999999977	2.7057130871364543
-8.14999999999977	2.78300114173486
-7.14999999999977	2.861893375810626
-6.14999999999977	2.9424115564887177
-5.14999999999977	3.024577765922346
-4.14999999999977	3.1084144218956054
-3.149999999999773	3.1939443003975616
-2.149999999999773	3.2811905604511704
-1.149999999999773	3.370176771538239
-0.1499999999997726	3.460926944015417

Temperature (degC)	Pressure (MPa)
0.85000000000000227	3.553465562920422
1.85000000000000227	3.6478176256357076
2.85000000000000227	3.744008683852223
3.85000000000000227	3.8420648903180896
4.8500000000000023	3.9420130508338773
5.8500000000000023	4.04388068193242
6.8500000000000023	4.1476960747132
7.8500000000000023	4.253488365317804
8.8500000000000023	4.361287612663194
9.8500000000000023	4.471124884336684
10.8500000000000023	4.583032352086524
11.8500000000000023	4.697043399223953
12.8500000000000023	4.813192743695912
13.8500000000000023	4.931516582592363
14.8500000000000023	5.052052766761069
15.8500000000000023	5.174841017787404
16.8500000000000023	5.299923203937202
17.8500000000000023	5.42734369624427
18.8500000000000023	5.557149829883151
19.8500000000000023	5.689392498206585
20.8500000000000023	5.824126905966298
21.8500000000000023	5.961413504518294
22.8500000000000023	6.101319130000698
23.8500000000000023	6.243918383446359
24.8500000000000023	6.389295376672276
25.8500000000000023	6.5375462294840485
26.8500000000000023	6.688783366399688
27.8500000000000023	6.843144103167912
28.8500000000000023	7.000808520835757
29.8500000000000023	7.162039090855826

Table B22: Bubble Points for Carbon Dioxide and 2% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.09912526861531112
-87.14999999999998	0.105517234582695
-86.14999999999998	0.11223174901039479
-85.14999999999998	0.11928007735840233
-84.14999999999998	0.12667366618469236
-83.14999999999998	0.13442414011978865
-82.14999999999998	0.14254329878893038
-81.14999999999998	0.15104311369139306
-80.14999999999998	0.1599357250566819
-79.14999999999998	0.16923343865410154
-78.14999999999998	0.17894872260450415
-77.14999999999998	0.18909420416673442
-76.14999999999998	0.19968266652563735
-75.14999999999998	0.21072704558998478
-74.14999999999998	0.2222404267872707
-73.14999999999998	0.23423604188583586
-72.14999999999998	0.24672726583766896
-71.14999999999998	0.2597276136445857
-70.14999999999998	0.2732507372785874
-69.14999999999998	0.28731042261790857
-68.14999999999998	0.3019205864498682
-67.14999999999998	0.31709527351951017
-66.14999999999998	0.332848653634596
-65.14999999999998	0.3491950188333861
-64.14999999999998	0.3661487806280014
-63.14999999999998	0.38372446730298276
-62.14999999999998	0.40193672130739555
-61.14999999999998	0.4208002967225086
-60.14999999999998	0.44033005681056936
-59.14999999999998	0.46054097165778596
-58.14999999999998	0.48144811591391445
-57.14999999999998	0.5030666666118075
-56.14999999999998	0.5254119011180978
-55.14999999999998	0.5484991951657574
-54.14999999999998	0.572344021002147
-53.14999999999998	0.59696194565666
-52.14999999999998	0.6223686293191076
-51.14999999999998	0.6485798238456894
-50.14999999999998	0.6756113713859806
-49.14999999999998	0.7034792031457644
-48.14999999999998	0.7321993382963206
-47.14999999999998	0.7617878829918061
-46.14999999999998	0.7922610295791498

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8236350559188942
-44.14999999999998	0.8559263248886136
-43.14999999999998	0.88915128402219
-42.14999999999998	0.9233264653338193
-41.14999999999998	0.9584684852748454
-40.14999999999998	0.9945940448843986
-39.14999999999998	1.0317199300695388
-38.14999999999998	1.0698630120696595
-37.14999999999998	1.1090402480657608
-36.14999999999998	1.1492686819456828
-35.14999999999998	1.1905654452383962
-34.14999999999998	1.2329477582006236
-33.14999999999998	1.2764329310881026
-32.14999999999998	1.3210383655996256
-31.149999999999977	1.3667815565329973
-30.149999999999977	1.4136800936671088
-29.149999999999977	1.4617516639033035
-28.149999999999977	1.5110140536850987
-27.149999999999977	1.5614851517700958
-26.149999999999977	1.6131829523321288
-25.149999999999977	1.6661255585010943
-24.149999999999977	1.7203311863102269
-23.149999999999977	1.7758181691525536
-22.149999999999977	1.8326049627130998
-21.149999999999977	1.8907101504654866
-20.149999999999977	1.9501524497022282
-19.149999999999977	2.0109507181614097
-18.149999999999977	2.0731239612400945
-17.149999999999977	2.1366913398345377
-16.149999999999977	2.2016721787778333
-15.149999999999977	2.2680859759522694
-14.149999999999977	2.335952412044383
-13.149999999999977	2.4052913609966438
-12.149999999999977	2.4761229011745685
-11.149999999999977	2.5484673273179257
-10.149999999999977	2.6223451632861816
-9.149999999999977	2.697777175747272
-8.149999999999977	2.7747843888218546
-7.149999999999977	2.853388099875645
-6.149999999999977	2.9336098965527215
-5.149999999999977	3.015471675257762
-4.149999999999977	3.0989956612960867
-3.1499999999999773	3.184204430901334
-2.1499999999999773	3.2711209354753077
-1.1499999999999773	3.3597685283357976

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.4501709943733077
0.85000000000000227	3.5423525830018385
1.85000000000000227	3.6363380448445692
2.85000000000000227	3.732152672600982
3.85000000000000227	3.8298223465400265
4.8500000000000023	3.92937358507269
5.8500000000000023	4.030833600821199
6.8500000000000023	4.134230362606943
7.8500000000000023	4.239592663818483
8.8500000000000023	4.3469501977135305
9.8500000000000023	4.456333640483278
10.8500000000000023	4.567774743396262
11.8500000000000023	4.681306436178049
12.8500000000000023	4.79696294512196
13.8500000000000023	4.914779931386009
14.8500000000000023	5.034794657591869
15.8500000000000023	5.1570461943305315
16.8500000000000023	5.281575682190761
17.8500000000000023	5.408426669209431
18.8500000000000023	5.537645547162683
19.8500000000000023	5.669282111782818
20.8500000000000023	5.803390270239175
21.8500000000000023	5.940028913808162
22.8500000000000023	6.079262968324225
23.8500000000000023	6.221164644543889
24.8500000000000023	6.365814975324414
25.8500000000000023	6.513305938598542
26.8500000000000023	6.6637440025396
27.8500000000000023	6.817257031941935
28.8500000000000023	6.97400812482639
29.8500000000000023	7.134220525214707

Table B23: Bubble Points for Carbon Dioxide and 3% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-88.1499999999998	0.09905689686483167
-87.1499999999998	0.10543861277394488
-86.1499999999998	0.11214205415040675
-85.1499999999998	0.11917844534935786
-84.1499999999998	0.12655919078838182
-83.1499999999998	0.13429587192079592
-82.1499999999998	0.14240024417076286
-81.1499999999998	0.15088423381044602
-80.1499999999998	0.1597599348212724
-79.1499999999998	0.16903960571413826
-78.1499999999998	0.17873566633197824
-77.1499999999998	0.18886069465459038
-76.1499999999998	0.1994274235846628
-75.1499999999998	0.21044873775067355
-74.1499999999998	0.22193767029611658
-73.1499999999998	0.23390739972743663
-72.1499999999998	0.2463712467360955
-71.1499999999998	0.25934267108610076
-70.1499999999998	0.27283526852675777
-69.1499999999998	0.28686276772613745
-68.1499999999998	0.3014390272979272
-67.1499999999998	0.3165780328222858
-66.1499999999998	0.33229389397802434
-65.1499999999998	0.3486008416900997
-64.1499999999998	0.36551322538418074
-63.1499999999998	0.38304551027974965
-62.1499999999998	0.4012122747859693
-61.1499999999998	0.4200282079566429
-60.1499999999998	0.4395081070432216
-59.1499999999998	0.45966687513566423
-58.1499999999998	0.48051951888368943
-57.1499999999998	0.50208114633042
-56.1499999999998	0.5243669648390926
-55.1499999999998	0.5473922791213078
-54.1499999999998	0.5711724893891397
-53.1499999999998	0.5957230895864334
-52.1499999999998	0.6210596657817526
-51.1499999999998	0.64719789464333
-50.1499999999998	0.674153542067124
-49.1499999999998	0.7019424619121755
-48.1499999999998	0.7305805948865752
-47.1499999999998	0.7600839675737322
-46.1499999999998	0.7904686915888136

Temperature (degC)	Pressure (MPa)
-45.1499999999998	0.8217509629023899
-44.1499999999998	0.8539470613022639
-43.1499999999998	0.8870733500222813
-42.1499999999998	0.9211462755229235
-41.1499999999998	0.9561823674357618
-40.1499999999998	0.9921982386663605
-39.1499999999998	1.0292105856535243
-38.1499999999998	1.0672361887915154
-37.1499999999998	1.106291913000566
-36.1499999999998	1.1463947084557529
-35.1499999999998	1.187561611477764
-34.1499999999998	1.229809745574456
-33.1499999999998	1.2731563226570863
-32.1499999999998	1.317618644438297
-31.14999999999977	1.3632141040294037
-30.14999999999977	1.4099601877589145
-29.14999999999977	1.4578744772451229
-28.14999999999977	1.506974651752078
-27.14999999999977	1.557278490866399
-26.14999999999977	1.6088038775314717
-25.14999999999977	1.6615688014775873
-24.14999999999977	1.715591363085059
-23.14999999999977	1.7708897777189887
-22.14999999999977	1.8274823805552198
-21.14999999999977	1.8853876319438085
-20.14999999999977	1.9446241233136563
-19.14999999999977	2.0052105836525573
-18.14999999999977	2.0671658865713574
-17.14999999999977	2.130509057968067
-16.14999999999977	2.1952592843115166
-15.14999999999977	2.261435921544439
-14.14999999999977	2.329058504649713
-13.14999999999977	2.3981467578758595
-12.14999999999977	2.4687206056707685
-11.14999999999977	2.540800184365529
-10.14999999999977	2.614405854660396
-9.14999999999977	2.689558214977481
-8.14999999999977	2.7662781157867955
-7.14999999999977	2.8445866750123323
-6.14999999999977	2.9245052946612593
-5.14999999999977	3.0060556788392705
-4.14999999999977	3.0892598533755122
-3.149999999999773	3.1741401872784425
-2.149999999999773	3.260719416323893
-1.149999999999773	3.3490206690801276

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.439067495734097
0.85000000000000227	3.530883900110969
1.85000000000000227	3.624494375307516
2.85000000000000227	3.71992394335176
3.85000000000000227	3.8171981993415813
4.8500000000000023	3.916343360468466
5.8500000000000023	4.017386320321376
6.8500000000000023	4.120354708873924
7.8500000000000023	4.225276958549727
8.8500000000000023	4.332182376876302
9.8500000000000023	4.441101226456278
10.8500000000000023	4.552064813464724
11.8500000000000023	4.665105586625671
12.8500000000000023	4.780257249920606
13.8500000000000023	4.897554894070591
14.8500000000000023	5.017035154403297
15.8500000000000023	5.138736405921798
16.8500000000000023	5.262699010182623
17.8500000000000023	5.38896563250213
18.8500000000000023	5.517581651114882
19.8500000000000023	5.648595680972736
20.8500000000000023	5.782060232265797
21.8500000000000023	5.918032516667774
22.8500000000000023	6.056575405404235
23.8500000000000023	6.197758544409485
24.8500000000000023	6.341659676403787
25.8500000000000023	6.488366382752271
26.8500000000000023	6.637978874911458
27.8500000000000023	6.790615233178355
28.8500000000000023	6.946421311317444
29.8500000000000023	7.105584464554095
30.8500000000000023	7.268301015260301

Table B24: Bubble Points for Carbon Dioxide and 4% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-89.1499999999998	0.09289904812788433
-88.1499999999998	0.09895946542504697
-87.1499999999998	0.10532975358724755
-86.1499999999998	0.11202091352685142
-85.1499999999998	0.11904412814854466
-84.1499999999998	0.12641075936016316
-83.1499999999998	0.13413234507976585
-82.1499999999998	0.14222059615368188
-81.1499999999998	0.15068739325147684
-80.1499999999998	0.15954478371717712
-79.1499999999998	0.16880497839613978
-78.1499999999998	0.17848034845516786
-77.1499999999998	0.1885834221669226
-76.1499999999998	0.19912688172278517
-75.1499999999998	0.21012356002151902
-74.1499999999998	0.22158643747809356
-73.1499999999998	0.2335286388518391
-72.1499999999998	0.24596343009730076
-71.1499999999998	0.2589042152354356
-70.1499999999998	0.27236453327051735
-69.1499999999998	0.2863580551428832
-68.1499999999998	0.3008985807254063
-67.1499999999998	0.31600003587744946
-66.1499999999998	0.3316764695485986
-65.1499999999998	0.3479420509548838
-64.1499999999998	0.3648110668027804
-63.1499999999998	0.38229791860252343
-62.1499999999998	0.40041712005113306
-61.1499999999998	0.41918329448632713
-60.1499999999998	0.4386111724351182
-59.1499999999998	0.4587155892493065
-58.1499999999998	0.4795114828220256
-57.1499999999998	0.5010138914173432
-56.1499999999998	0.5232379515827595
-55.1499999999998	0.5461988961725646
-54.1499999999998	0.5699120524847983
-53.1499999999998	0.5943928404943655
-52.1499999999998	0.6196567712188163
-51.1499999999998	0.6457194451878024
-50.1499999999998	0.6725965510495985
-49.1499999999998	0.7003038642999397
-48.1499999999998	0.7288572461397167
-47.1499999999998	0.7582726424838511

Temperature (degC)	Pressure (MPa)
-46.1499999999998	0.7885660831018106
-45.1499999999998	0.8197536809097337
-44.1499999999998	0.8518516314118147
-43.1499999999998	0.8848762122997119
-42.1499999999998	0.9188437832055342
-41.1499999999998	0.9537707856165805
-40.1499999999998	0.9896737429398038
-39.1499999999998	1.0265692607342152
-38.1499999999998	1.0644740270806552
-37.1499999999998	1.1034048131331047
-36.1499999999998	1.143378473789875
-35.1499999999998	1.1844119485444995
-34.1499999999998	1.2265222624808705
-33.1499999999998	1.2697265274341387
-32.1499999999998	1.3140419433395134
-31.14999999999977	1.3594857997595393
-30.14999999999977	1.4060754776492737
-29.14999999999977	1.453828451347894
-28.14999999999977	1.5027622908681455
-27.14999999999977	1.5528946644805703
-26.14999999999977	1.6042433416657047
-25.14999999999977	1.656826196434807
-24.14999999999977	1.7106612111009567
-23.14999999999977	1.7657664804868312
-22.14999999999977	1.8221602166364566
-21.14999999999977	1.8798607540404264
-20.14999999999977	1.9388865554040904
-19.14999999999977	1.9992562179685274
-18.14999999999977	2.060988480420874
-17.14999999999977	2.1241022303793087
-16.14999999999977	2.188616512486429
-15.14999999999977	2.2545505371213648
-14.14999999999977	2.3219236897427527
-13.14999999999977	2.3907555408783625
-12.14999999999977	2.4610658568198462
-11.14999999999977	2.5328746110156204
-10.14999999999977	2.60620199626596
-9.14999999999977	2.6810684377447056
-8.14999999999977	2.757494606964968
-7.14999999999977	2.835501436786645
-6.14999999999977	2.915110137601655
-5.14999999999977	2.9963422148564525
-4.14999999999977	3.0792194881273667
-3.149999999999773	3.163764111965625
-2.149999999999773	3.2499985987840234

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.3379458441027308
-0.1499999999997726	3.4276291544934687
0.8500000000000227	3.5190722785972612
1.8500000000000227	3.612299441621961
2.8500000000000227	3.7073353837111562
3.8500000000000227	3.804205402624671
4.850000000000023	3.9029354010911894
5.850000000000023	4.003551939226761
6.850000000000023	4.106082292360056
7.850000000000023	4.210554514623152
8.850000000000023	4.316997508762877
9.850000000000023	4.425441102785957
10.850000000000023	4.5359161345315515
11.850000000000023	4.64845454592533
12.850000000000023	4.763089489872976
13.850000000000023	4.879855454450225
14.850000000000023	4.998788411392268
15.850000000000023	5.119925998940781
16.850000000000023	5.24330775254818
17.850000000000023	5.368975400542781
18.850000000000023	5.496973244531162
19.850000000000023	5.6273486447923355
20.850000000000023	5.760152627483519
21.850000000000023	5.895440621841528
22.850000000000023	6.033273323225586
23.850000000000023	6.173717670954228
24.850000000000023	6.316847955023821
25.850000000000023	6.4627471823253755
26.850000000000023	6.611509093665345
27.850000000000023	6.763241976241965
28.850000000000023	6.918075248736033
29.850000000000023	7.076162906671898
30.850000000000023	7.237625817686356

Table B25: Bubble Points for Carbon Dioxide and 5% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08703738858537782
-89.14999999999998	0.0927879085722352
-88.14999999999998	0.09883668079198872
-87.14999999999998	0.10519448151618778
-86.14999999999998	0.11187227082531233
-85.14999999999998	0.11888118973414791
-84.14999999999998	0.12623255723168458
-83.14999999999998	0.13393786725584114
-82.14999999999998	0.142008785635254
-81.14999999999998	0.1504571469783839
-80.14999999999998	0.15929495152764583
-79.14999999999998	0.16853436199890973
-78.14999999999998	0.17818770039333082
-77.14999999999998	0.18826744479047172
-76.14999999999998	0.19878622616269606
-75.14999999999998	0.2097568251588315
-74.14999999999998	0.2211921689364848
-73.14999999999998	0.23310532797026054
-72.14999999999998	0.2455095129131109
-71.14999999999998	0.258418071473193
-70.14999999999998	0.27184448532842215
-69.14999999999998	0.2858023670790418
-68.14999999999998	0.3003054572436089
-67.14999999999998	0.3153676213207002
-66.14999999999998	0.33100284688797776
-65.14999999999998	0.3472252407652316
-64.14999999999998	0.364049026259434
-63.14999999999998	0.3814885404597799
-62.14999999999998	0.3995582316184457
-61.14999999999998	0.4182726566079438
-60.14999999999998	0.43764647845976923
-59.14999999999998	0.45769446399246233
-58.14999999999998	0.47843148152872883
-57.14999999999998	0.499872498709606
-56.14999999999998	0.5220325804031297
-55.14999999999998	0.5449268867172672
-54.14999999999998	0.5685706711262116
-53.14999999999998	0.5929792786879825
-52.14999999999998	0.6181681444046989
-51.14999999999998	0.6441527916691958
-50.14999999999998	0.6709488308588709
-49.14999999999998	0.6985719580461569
-48.14999999999998	0.7270379538399383

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7563626823674829
-46.14999999999998	0.7865620904003066
-45.14999999999998	0.8176522066105913
-44.14999999999998	0.8496491409948991
-43.14999999999998	0.8825690844463085
-42.14999999999998	0.9164283084681638
-41.14999999999998	0.9512431650585709
-40.14999999999998	0.9870300867480151
-39.14999999999998	1.023805586783268
-38.14999999999998	1.0615862594706669
-37.14999999999998	1.1003887806697
-36.14999999999998	1.1402299084394252
-35.14999999999998	1.1811264838254754
-34.14999999999998	1.2230954318108842
-33.14999999999998	1.266153762431981
-32.14999999999998	1.3103185720495578
-31.149999999999977	1.3556070448387123
-30.149999999999977	1.4020364544630588
-29.149999999999977	1.4496241660074023
-28.149999999999977	1.4983876381808698
-27.149999999999977	1.5483444258136463
-26.149999999999977	1.5995121827155443
-25.149999999999977	1.6519086648980663
-24.149999999999977	1.7055517342229918
-23.149999999999977	1.7604593625004736
-22.149999999999977	1.8166496360661541
-21.149999999999977	1.8741407608662943
-20.149999999999977	1.9329510680750954
-19.149999999999977	1.9930990202646017
-18.149999999999977	2.0546032181266565
-17.149999999999977	2.117482407789223
-16.149999999999977	2.1817554887037236
-15.149999999999977	2.2474415221495025
-14.149999999999977	2.3145597403431593
-13.149999999999977	2.383129556186928
-12.149999999999977	2.4531705736902656
-11.149999999999977	2.5247025990788843
-10.149999999999977	2.597745652667517
-9.149999999999977	2.672319981534137
-8.149999999999977	2.7484460731064666
-7.149999999999977	2.8261446697445107
-6.149999999999977	2.9054367844555817
-5.149999999999977	2.986343717899427
-4.149999999999977	3.068887076879791
-3.1499999999999773	3.1530887945295776

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.2389711524689897
-1.149999999999773	3.3265568052171366
-0.1499999999997726	3.4158688072016488
0.8500000000000227	3.5069306427064384
1.8500000000000227	3.5997662591648716
2.8500000000000227	3.6944001041651973
3.8500000000000227	3.7908571665644213
4.850000000000023	3.8891630220806492
5.850000000000023	3.989343883697418
6.850000000000023	4.091426657196256
7.850000000000023	4.195439002122992
8.850000000000023	4.301409398568749
9.850000000000023	4.40936722030331
10.850000000000023	4.519342815170939
11.850000000000023	4.631367594354121
12.850000000000023	4.7454741331162715
13.850000000000023	4.861696287281967
14.850000000000023	4.980069331859263
15.850000000000023	5.1006301310132125
16.850000000000023	5.223417351825658
17.850000000000023	5.348471737441487
18.850000000000023	5.475836457534226
19.850000000000023	5.605557553931259
20.850000000000023	5.737684495049331
21.850000000000023	5.872270842720616
22.850000000000023	6.0093750195369875
23.850000000000023	6.149061150472245
24.850000000000023	6.29139995973631
25.850000000000023	6.436469777728482
26.850000000000023	6.584357769478171
27.850000000000023	6.735163008663907
28.850000000000023	6.888998315757677
29.850000000000023	7.0459893380418155
30.850000000000023	7.206203119229034

Table B26: Bubble Points for Carbon Dioxide and 1% Hydrogen

Temperature (degC)	Pressure (MPa)
-88.14999999999998	38.78022831270196
-87.14999999999998	30.993163712862938
-86.14999999999998	26.859982615379973
-85.14999999999998	23.93443912207343
-84.14999999999998	21.663963073206475
-83.14999999999998	19.81498272666408
-82.14999999999998	18.263235793177895
-81.14999999999998	16.933584708803647
-80.14999999999998	15.77667348593677
-79.14999999999998	14.758135747503934
-78.14999999999998	13.852982214674666
-77.14999999999998	13.042422297257879
-76.14999999999998	12.31194359553251
-75.14999999999998	11.650090612982861
-74.14999999999998	11.04765528061691
-73.14999999999998	10.49712173296421
-72.14999999999998	9.99227433901415
-71.14999999999998	9.52791409369858
-70.14999999999998	9.099649005910637
-69.14999999999998	8.703736280131192
-68.14999999999998	8.336961538733664
-67.14999999999998	7.996545045515659
-66.14999999999998	7.680067947740343
-65.14999999999998	7.385413586768984
-64.14999999999998	7.110720307294592
-63.14999999999998	6.854343150153293
-62.14999999999998	6.614822485982372
-61.14999999999998	6.390858127807186
-60.14999999999998	6.181287809464119
-59.14999999999998	5.985069173107604
-58.14999999999998	5.801264599802308
-57.14999999999998	5.629028360684893
-56.14999999999998	5.4675956752537855
-55.14999999999998	5.316273346987939
-54.14999999999998	5.174431711347781
-53.14999999999998	5.041497681746162
-52.14999999999998	4.9169487189205485
-51.14999999999998	4.800307580629038
-50.14999999999998	4.69113773377262
-49.14999999999998	4.589039331247144
-48.14999999999998	4.493645672130022
-47.14999999999998	4.404620077033554
-46.14999999999998	4.321653121289294

Temperature (degC)	Pressure (MPa)
-45.1499999999998	4.244460177463663
-44.1499999999998	4.172779226028707
-43.1499999999998	4.106368899025762
-42.1499999999998	4.045006726611192
-41.1499999999998	3.9884875605563486
-40.1499999999998	3.936622152286232
-39.1499999999998	3.8892358660450466
-38.1499999999998	3.846167510288272
-37.1499999999998	3.807268272578419
-36.1499999999998	3.772400745143031
-35.1499999999998	3.741438029902745
-34.1499999999998	3.714262913241981
-33.1499999999998	3.690767102097659
-32.1499999999998	3.6708505141863346
-31.14999999999977	3.654420616258319
-30.14999999999977	3.6413918054200134
-29.14999999999977	3.6316848294272335
-28.14999999999977	3.625226243005914
-27.14999999999977	3.6219478979971447
-26.14999999999977	3.6217864660534302
-25.14999999999977	3.6246829933381095
-24.14999999999977	3.63058248729322
-23.14999999999977	3.6394335360456656
-22.14999999999977	3.6511879612082536
-21.14999999999977	3.6658005049855586
-20.14999999999977	3.683228552217252
-19.14999999999977	3.7034318876163006
-18.14999999999977	3.7263724878034394
-17.14999999999977	3.752014347027922
-16.14999999999977	3.780323334766956
-15.14999999999977	3.8112670829154887
-14.14999999999977	3.8448149000917695
-13.14999999999977	3.880937710436385
-12.14999999999977	3.9196080139099956
-11.14999999999977	3.960799864412813
-10.14999999999977	4.00448886118614
-9.14999999999977	4.050652148458544
-8.14999999999977	4.099268418475102
-7.14999999999977	4.150317914056174
-6.14999999999977	4.203782428137441
-5.14999999999977	4.259645298971698
-4.14999999999977	4.317891400484322
-3.149999999999773	4.378507127349626
-2.149999999999773	4.4414803743493385
-1.149999999999773	4.506800508846038

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	4.574458334877722
0.85000000000000227	4.644446046879865
1.85000000000000227	4.716757170804778
2.85000000000000227	4.791386490366113
3.85000000000000227	4.868329956345612
4.8500000000000023	4.947584577482197
5.8500000000000023	5.029148292411629
6.8500000000000023	5.113019823543173
7.8500000000000023	5.199198515632176
8.8500000000000023	5.287684164001032
9.8500000000000023	5.3784768396255975
10.8500000000000023	5.471576720051223
11.8500000000000023	5.566983935496129
12.8500000000000023	5.664698437046012
13.8500000000000023	5.764719886574884
14.8500000000000023	5.867047552821724
15.8500000000000023	5.97168017116625
16.8500000000000023	6.078615680996428
17.8500000000000023	6.187850689205804
18.8500000000000023	6.299379417235975
19.8500000000000023	6.413191771964868
20.8500000000000023	6.5292700428563215
21.8500000000000023	6.647583578847541
22.8500000000000023	6.768080636632596
23.8500000000000023	6.890676354081355
24.8500000000000023	7.015235202171061
25.8500000000000023	7.141544271203236
26.8500000000000023	7.269267289906162
27.8500000000000023	7.3978479165714335
28.8500000000000023	7.526272051547574

Table B27: Bubble Points for Carbon Dioxide and 2% Hydrogen

Temperature (degC)	Pressure (MPa)
-73.14999999999998	31.415920288041676
-72.14999999999998	28.066120179080755
-71.14999999999998	25.537146689926
-70.14999999999998	23.502901677438132
-69.14999999999998	21.805414813356137
-68.14999999999998	20.35422524067084
-67.14999999999998	19.091984115269675
-66.14999999999998	17.979736761748534
-65.14999999999998	16.989664080794473
-64.14999999999998	16.101128596252455
-63.14999999999998	15.298355311615419
-62.14999999999998	14.568991122255682
-61.14999999999998	13.90316792553558
-60.14999999999998	13.292869966601536
-59.14999999999998	12.73149299425204
-58.14999999999998	12.21352878665317
-57.14999999999998	11.734334170722324
-56.14999999999998	11.289958513207194
-55.14999999999998	10.877012619148507
-54.14999999999998	10.492567554160633
-53.14999999999998	10.13407548375435
-52.14999999999998	9.799306974222342
-51.14999999999998	9.486300780004898
-50.14999999999998	9.193323226344638
-49.14999999999998	8.918835053120699
-48.14999999999998	8.661464123149718
-47.14999999999998	8.419982785562892
-46.14999999999998	8.193288967847337
-45.14999999999998	7.9803902795510515
-44.14999999999998	7.780390567231142
-43.14999999999998	7.5924784789641
-42.14999999999998	7.415917687154332
-41.14999999999998	7.250038488344767
-40.14999999999998	7.094230553038379
-39.14999999999998	6.94793664116094
-38.14999999999998	6.8106471324263245
-37.14999999999998	6.681895247621415
-36.14999999999998	6.56125285826305
-35.14999999999998	6.44832679924704
-34.14999999999998	6.342755613064144
-33.14999999999998	6.244206665440448
-32.14999999999998	6.152373581479596
-31.149999999999977	6.066973958932401

Temperature (degC)	Pressure (MPa)
-30.14999999999977	5.987747321441857
-29.14999999999977	5.914453279739677
-28.14999999999977	5.8468698730775595
-27.14999999999977	5.784792066807562
-26.14999999999977	5.728030385104996
-25.14999999999977	5.676409660510929
-24.14999999999977	5.62976788438923
-23.14999999999977	5.587955144474904
-22.14999999999977	5.550832637668477
-21.14999999999977	5.518271748193878
-20.14999999999977	5.49015318280257
-19.14999999999977	5.466366156545836
-18.14999999999977	5.446807624206589
-17.14999999999977	5.431381554056103
-16.14999999999977	5.419998242040962
-15.14999999999977	5.412573665918029
-14.14999999999977	5.409028879969502
-13.14999999999977	5.40928945192007
-12.14999999999977	5.413284944313165
-11.14999999999977	5.4209484428848755
-10.14999999999977	5.432216134310326
-9.14999999999977	5.447026935150156
-8.14999999999977	5.465322172700786
-7.14999999999977	5.487045317020533
-6.14999999999977	5.51214176154923
-5.14999999999977	5.540558647724246
-4.14999999999977	5.572244727026476
-3.149999999999773	5.607150252149513
-2.149999999999773	5.645226887838957
-1.149999999999773	5.686427631319395
-0.1499999999997726	5.730706732170238
0.85000000000000227	5.7780196018304455
1.85000000000000227	5.8283227035693175
2.85000000000000227	5.881573415128012
3.85000000000000227	5.93772985853707
4.8500000000000023	5.99675069559826
5.8500000000000023	6.0585948926056234
6.8500000000000023	6.123221464110866
7.8500000000000023	6.19058921139548
8.8500000000000023	6.260656475441202
9.8500000000000023	6.3333809244846035
10.8500000000000023	6.4087193900970805
11.8500000000000023	6.486627749780448
12.8500000000000023	6.567060823640071
13.8500000000000023	6.64997220242834

Temperature (degC)	Pressure (MPa)
14.850000000000023	6.735313847839362
15.850000000000023	6.823035198610586
16.850000000000023	6.913081377274168
17.850000000000023	7.005389931167405
18.850000000000023	7.099885380266352
19.850000000000023	7.196470716781756
20.850000000000023	7.295014932987899
21.850000000000023	7.395335602985223
22.850000000000023	7.497175259436299
23.850000000000023	7.600168950070355
24.850000000000023	7.703795474027035
25.850000000000023	7.807290962736712
26.850000000000023	7.909466972806213
27.850000000000023	8.008314996471572
28.850000000000023	7.891397666795385

Table B28: Bubble Points for Carbon Dioxide and 3% Hydrogen

Temperature (degC)	Pressure (MPa)
-64.1499999999998	36.52347708541711
-63.1499999999998	32.18806359784801
-62.1499999999998	29.167066371134077
-61.1499999999998	26.822646498331657
-60.1499999999998	24.904761601489323
-59.1499999999998	23.28496532427934
-58.1499999999998	21.887123187714444
-57.1499999999998	20.66183897598693
-56.1499999999998	19.57499053295043
-55.1499999999998	18.601892589488084
-54.1499999999998	17.724041744330503
-53.1499999999998	16.927172519649332
-52.1499999999998	16.200032349969085
-51.1499999999998	15.5335754585949
-50.1499999999998	14.920413117350215
-49.1499999999998	14.354427355634815
-48.1499999999998	13.830492515441367
-47.1499999999998	13.344270086059188
-46.1499999999998	12.89205461320379
-45.1499999999998	12.470656005589378
-44.1499999999998	12.077308292664519
-43.1499999999998	11.709597942717721
-42.1499999999998	11.365406872576589
-41.1499999999998	11.042866647685742
-40.1499999999998	10.740321314473045
-39.1499999999998	10.456296968857455
-38.1499999999998	10.189476636834288
-37.1499999999998	9.938679384789543
-36.1499999999998	9.702842827584748
-35.1499999999998	9.481008388631077
-34.1499999999998	9.272308805628137
-33.1499999999998	9.07595748161189
-32.1499999999998	8.891239362085201
-31.14999999999977	8.717503081643729
-30.14999999999977	8.554154172377306
-29.14999999999977	8.40064916469437
-28.14999999999977	8.256490441598446
-27.14999999999977	8.121221731692492
-26.14999999999977	7.994424145613633
-25.14999999999977	7.875712676399173
-24.14999999999977	7.764733097039633
-23.14999999999977	7.661159199001473
-22.14999999999977	7.564690324111258

Temperature (degC)	Pressure (MPa)
-21.14999999999977	7.475049149322742
-20.14999999999977	7.391979689806852
-19.14999999999977	7.315245490718324
-18.14999999999977	7.244627982185806
-17.14999999999977	7.17992497537404
-16.14999999999977	7.12094928071123
-15.14999999999977	7.0675274316532
-14.14999999999977	7.019498499767203
-13.14999999999977	6.976712988887356
-12.14999999999977	6.939031797933765
-11.14999999999977	6.90632524370898
-10.14999999999977	6.878472136572179
-9.14999999999977	6.8553589033667945
-8.14999999999977	6.8368787533036315
-7.14999999999977	6.822930883621433
-6.14999999999977	6.813419722728787
-5.14999999999977	6.808254209100394
-4.14999999999977	6.807347104440385
-3.149999999999773	6.810614339570608
-2.149999999999773	6.817974391233161
-1.149999999999773	6.829347687607711
-0.1499999999997726	6.8446560402753285
0.8500000000000227	6.863822100601865
1.8500000000000227	6.886768839766022
2.8500000000000227	6.913419053896976
3.8500000000000227	6.94369489951862
4.850000000000023	6.977517469443792
5.850000000000023	7.014806425030863
6.850000000000023	7.055479705929672
7.850000000000023	7.099453340849706
8.850000000000023	7.146641379489299
9.850000000000023	7.1969559528561495
10.850000000000023	7.250307442655914
11.850000000000023	7.306604695437364
12.850000000000023	7.365755148346081
13.850000000000023	7.427664635298067
14.850000000000023	7.492236512286387
15.850000000000023	7.559369582633965
16.850000000000023	7.628954135332427
17.850000000000023	7.700865268474123
18.850000000000023	7.774952606856389
19.850000000000023	7.851025581720289
20.850000000000023	7.9288336006543
21.850000000000023	8.008040496759671
22.850000000000023	8.088191982927727

Temperature (degC)	Pressure (MPa)
23.850000000000023	8.168671819187669
24.850000000000023	8.248633893860223
25.850000000000023	8.326877101031595
26.850000000000023	8.401603058727163
27.850000000000023	8.46994712979105
28.850000000000023	8.164162420664573

Table B29: Bubble Points for Carbon Dioxide and 4% Hydrogen

Temperature (degC)	Pressure (MPa)
-56.1499999999998	35.6388377714756
-55.1499999999998	32.109811444578774
-54.1499999999998	29.481382672938736
-53.1499999999998	27.374804572583283
-52.1499999999998	25.616765513262415
-51.1499999999998	24.11102201035412
-50.1499999999998	22.797713865428264
-49.1499999999998	21.636697975670373
-48.1499999999998	20.599562412929114
-47.1499999999998	19.66536502936268
-46.1499999999998	18.81817240455322
-45.1499999999998	18.045549417448285
-44.1499999999998	17.337586336043774
-43.1499999999998	16.686246952925323
-42.1499999999998	16.08491727823251
-41.1499999999998	15.52808431145072
-40.1499999999998	15.011101911235317
-39.1499999999998	14.530016603739266
-38.1499999999998	14.081435633728757
-37.1499999999998	13.662425415821868
-36.1499999999998	13.270432272194753
-35.1499999999998	12.90321978019517
-34.1499999999998	12.558818683697531
-33.1499999999998	12.235486435304656
-32.1499999999998	11.93167421084206
-31.14999999999977	11.645999785613595
-30.14999999999977	11.377225055226681
-29.14999999999977	11.124237270668202
-28.14999999999977	10.886033268845662
-27.14999999999977	10.661706137823392
-26.14999999999977	10.45043387529786
-25.14999999999977	10.25146968987215
-24.14999999999977	10.064133664767091
-23.14999999999977	9.887805558026747
-22.14999999999977	9.721918555872165
-21.14999999999977	9.56595382941461
-20.14999999999977	9.419435771611035
-19.14999999999977	9.28192781250968
-18.14999999999977	9.153028727914123
-17.14999999999977	9.032369370212107
-16.14999999999977	8.919609761169266
-15.14999999999977	8.814436495367953
-14.14999999999977	8.71656041014626

Temperature (degC)	Pressure (MPa)
-13.14999999999977	8.625714483710077
-12.14999999999977	8.541651927567896
-11.14999999999977	8.464144443357755
-10.14999999999977	8.392980616786637
-9.14999999999977	8.327964423877571
-8.14999999999977	8.268913826549028
-7.14999999999977	8.215659436203321
-6.14999999999977	8.168043225664048
-5.14999999999977	8.125917271677798
-4.14999999999977	8.08914251261693
-3.149999999999773	8.057587509217274
-2.149999999999773	8.031127200448745
-1.149999999999773	8.009641652079349
-0.1499999999997726	7.993014802214143
0.8500000000000227	7.981133215977775
1.8500000000000227	7.9738848700601785
2.8500000000000227	7.971157996566769
3.8500000000000227	7.972840023386432
4.850000000000023	7.978816653907772
5.850000000000023	7.988971130681056
6.850000000000023	8.003183723550643
7.850000000000023	8.021331470376376
8.850000000000023	8.04328817494164
9.850000000000023	8.068924628150658
10.850000000000023	8.098108960884455
11.850000000000023	8.130706954039523
12.850000000000023	8.166582018464027
13.850000000000023	8.205594412842482
14.850000000000023	8.247599099428076
15.850000000000023	8.29244147110284
16.850000000000023	8.339950065907765
17.850000000000023	8.389925380599882
18.850000000000023	8.44212405760386
19.850000000000023	8.496238043154873
20.850000000000023	8.551868641654872
21.850000000000023	8.60849526321942
22.850000000000023	8.665436899723861
23.850000000000023	8.721799604600598
24.850000000000023	8.776391880749408
25.850000000000023	8.827564855081956
26.850000000000023	8.872915054731557
27.850000000000023	8.908405070926191
28.850000000000023	8.446993517354532

Table B30: Bubble Points for Carbon Dioxide and 5% Hydrogen

Temperature (degC)	Pressure (MPa)
-50.14999999999998	37.82140444925399
-49.14999999999998	34.0304935244232
-48.14999999999998	31.270545058097337
-47.14999999999998	29.080150385010292
-46.14999999999998	27.261387509737588
-45.14999999999998	25.70797341914561
-44.14999999999998	24.355165160343923
-43.14999999999998	23.160156363896803
-42.14999999999998	22.092958824344635
-41.14999999999998	21.131638083585152
-40.14999999999998	20.25960487845346
-39.14999999999998	19.46397306596713
-38.14999999999998	18.734512253011818
-37.14999999999998	18.06295166345783
-36.14999999999998	17.442501401772507
-35.14999999999998	16.867513626841028
-34.14999999999998	16.33323678917261
-33.14999999999998	15.835633548147959
-32.14999999999998	15.371243346673417
-31.149999999999977	14.9370769839981
-30.149999999999977	14.530534556007225
-29.149999999999977	14.14934075109067
-28.149999999999977	13.791493233521964
-27.149999999999977	13.455221031270678
-26.149999999999977	13.138950666902062
-25.149999999999977	12.841278349217058
-24.149999999999977	12.56094695801385
-23.149999999999977	12.296826855547133
-22.149999999999977	12.047899779944224
-21.149999999999977	11.813245240863377
-20.149999999999977	11.59202896195944
-19.149999999999977	11.383493009186788
-18.149999999999977	11.18694731642051
-17.149999999999977	11.001762375919345
-16.149999999999977	10.827362904722865
-15.149999999999977	10.663222332200759
-14.149999999999977	10.508857980672456
-13.149999999999977	10.363826832032801
-12.149999999999977	10.227721789728289
-11.149999999999977	10.100168358253963
-10.149999999999977	9.980821672229167
-9.149999999999977	9.869363814836852
-8.149999999999977	9.765501371276335

Temperature (degC)	Pressure (MPa)
-7.14999999999977	9.668963167959118
-6.14999999999977	9.579498152271277
-5.14999999999977	9.496873372302147
-4.14999999999977	9.420872020930219
-3.149999999999773	9.351291514995593
-2.149999999999773	9.287941588392314
-1.149999999999773	9.230642388058993
-0.1499999999997726	9.179222574113583
0.8500000000000227	9.133517439394286
1.8500000000000227	9.093367078523453
2.8500000000000227	9.058614650913428
3.8500000000000227	9.029104793809836
4.850000000000023	9.00468224790138
5.850000000000023	8.985190756098149
6.850000000000023	8.970472282296184
7.850000000000023	8.960366567269325
8.850000000000023	8.954710989202649
9.850000000000023	8.953340622394682
10.850000000000023	8.956088285746473
11.850000000000023	8.962784241725236
12.850000000000023	8.973255051225202
13.850000000000023	8.987320926143859
14.850000000000023	9.00479078098232
15.850000000000023	9.025454117022095
16.850000000000023	9.04906893713167
17.850000000000023	9.075345133793117
18.850000000000023	9.103923212538696
19.850000000000023	9.134348689248762
20.850000000000023	9.166042574711552
21.850000000000023	9.19826867294277
22.850000000000023	9.230091530623731
23.850000000000023	9.260318647980098
24.850000000000023	9.287395690092117
25.850000000000023	9.309198504935704
26.850000000000023	9.322472501548926
27.850000000000023	9.320568721743753
28.850000000000023	8.73976252197026

Table B31: Bubble Points for Carbon Dioxide and 1% Nitrogen

Temperature (degC)	Pressure (MPa)
-88.14999999999998	1.1851884277970297
-87.14999999999998	1.1756604920368097
-86.14999999999998	1.1670546809960438
-85.14999999999998	1.1593513369364534
-84.14999999999998	1.1525330545252992
-83.14999999999998	1.1465845145474887
-82.14999999999998	1.1414923331423443
-81.14999999999998	1.1372449247778034
-80.14999999999998	1.1338323774077597
-79.14999999999998	1.1312463383838147
-78.14999999999998	1.1294799099563009
-77.14999999999998	1.1285275532119463
-76.14999999999998	1.1283849995291129
-75.14999999999998	1.1290491687213169
-74.14999999999998	1.1305180930449954
-73.14999999999998	1.1327908464754064
-72.14999999999998	1.135867478651314
-71.14999999999998	1.139748952964174
-70.14999999999998	1.1444370883988098
-69.14999999999998	1.1499345047207725
-68.14999999999998	1.1562445707205022
-67.14999999999998	1.1633713552824392
-66.14999999999998	1.1713195810507755
-65.14999999999998	1.1800945805678702
-64.14999999999998	1.1897022547748912
-63.14999999999998	1.2001490338272944
-62.14999999999998	1.2114418401152731
-61.14999999999998	1.223588053563615
-60.14999999999998	1.2365954791438518
-59.14999999999998	1.2504723165790699
-58.14999999999998	1.2652271322965398
-57.14999999999998	1.2808688335433835
-56.14999999999998	1.2974066446775763
-55.14999999999998	1.3148500855930367
-54.14999999999998	1.3332089522292385
-53.14999999999998	1.3524932991273426
-52.14999999999998	1.3727134239258738
-51.14999999999998	1.3938798537830517
-50.14999999999998	1.4160033335644882
-49.14999999999998	1.4390948157249852
-48.14999999999998	1.4631654517291046
-47.14999999999998	1.4882265848729215
-46.14999999999998	1.5142897443527386

Temperature (degC)	Pressure (MPa)
-45.14999999999998	1.541366640416028
-44.14999999999998	1.5694691604390583
-43.14999999999998	1.5986093657828415
-42.14999999999998	1.6287994892854851
-41.14999999999998	1.6600519332495167
-40.14999999999998	1.692379267856702
-39.14999999999998	1.72579422986104
-38.14999999999998	1.7603097215325365
-37.14999999999998	1.7959388097721343
-36.14999999999998	1.8326947253621129
-35.14999999999998	1.8705908623440564
-34.14999999999998	1.9096407775138438
-33.14999999999998	1.9498581900373597
-32.14999999999998	1.991256981241926
-31.149999999999977	2.033851194572957
-30.149999999999977	2.0776550357841983
-29.149999999999977	2.1226828733663385
-28.149999999999977	2.1689492392506087
-27.149999999999977	2.2164688298005912
-26.149999999999977	2.265256507056296
-25.149999999999977	2.315327300243743
-24.149999999999977	2.3666964074775905
-23.149999999999977	2.419379197615655
-22.149999999999977	2.4733912121791244
-21.149999999999977	2.52874816729444
-20.149999999999977	2.58546595553154
-19.149999999999977	2.6435606476357534
-18.149999999999977	2.703048494047902
-17.149999999999977	2.7639459262255492
-16.149999999999977	2.826269557726424
-15.149999999999977	2.890036185121288
-14.149999999999977	2.955262788736942
-13.149999999999977	3.0219665333713226
-12.149999999999977	3.0901647690161163
-11.149999999999977	3.159875031772406
-10.149999999999977	3.2311150450532025
-9.149999999999977	3.3039027212139374
-8.149999999999977	3.3782561637709714
-7.149999999999977	3.454193670253107
-6.149999999999977	3.5317337358288987
-5.149999999999977	3.610895057641603
-4.149999999999977	3.691696539800501
-3.1499999999999773	3.774157298782962
-2.1499999999999773	3.858296668871644
-1.1499999999999773	3.9441342069852707

Temperature (degC)	Pressure (MPa)
-0.14999999999997726	4.031689696033336
0.8500000000000227	4.120983145623452
1.8500000000000227	4.212034788586547
2.8500000000000227	4.304865071541987
3.8500000000000227	4.399494637418403
4.850000000000023	4.495944297794352
5.850000000000023	4.5942349929469035
6.850000000000023	4.694387737957321
7.850000000000023	4.796423553887354
8.850000000000023	4.900363384171607
9.850000000000023	5.006227997768505
10.850000000000023	5.114037881959836
11.850000000000023	5.223813128536576
12.850000000000023	5.335573316285287
13.850000000000023	5.44933738849197
14.850000000000023	5.565123513708789
15.850000000000023	5.682948897245576
16.850000000000023	5.80282947365297
17.850000000000023	5.924779349782787
18.850000000000023	6.048809775143121
19.850000000000023	6.174927283748536
20.850000000000023	6.303130473104132
21.850000000000023	6.433404652717669
22.850000000000023	6.5657132749176075
23.850000000000023	6.699984483901645
24.850000000000023	6.836089697718602
25.850000000000023	6.973806186641975
26.850000000000023	7.112737785990335
27.850000000000023	7.2521064466480185
28.850000000000023	7.390114033693454
29.850000000000023	7.520839733086235

Table B32: Bubble Points for Carbon Dioxide and 2% Nitrogen

Temperature (degC)	Pressure (MPa)
-90.14999999999998	2.320949911068083
-89.14999999999998	2.2904637526792935
-88.14999999999998	2.2618193377846785
-87.14999999999998	2.234933386293999
-86.14999999999998	2.209730363970209
-85.14999999999998	2.186141717910357
-84.14999999999998	2.1641052054350585
-83.14999999999998	2.1435643029388776
-82.14999999999998	2.1244676835469796
-81.14999999999998	2.106768754122155
-80.14999999999998	2.0904252436985984
-79.14999999999998	2.0753988366311984
-78.14999999999998	2.061654844684348
-77.14999999999998	2.049161913216805
-76.14999999999998	2.037891757212182
-75.14999999999998	2.0278189235931112
-74.14999999999998	2.018920576620934
-73.14999999999998	2.0111763036943686
-72.14999999999998	2.004567939218981
-71.14999999999998	1.9990794043817748
-70.14999999999998	1.9946965611037801
-69.14999999999998	1.99140707854732
-68.14999999999998	1.9892003107440164
-67.14999999999998	1.988067184123966
-66.14999999999998	1.9880000938698763
-65.14999999999998	1.988992808069381
-64.14999999999998	1.991040378858219
-63.14999999999998	1.994139059751953
-62.14999999999998	1.998286228535488
-61.14999999999998	2.0034803150897047
-60.14999999999998	2.0097207336617253
-59.14999999999998	2.0170078191234784
-58.14999999999998	2.0253427668506663
-57.14999999999998	2.0347275758979015
-56.14999999999998	2.045164995170262
-55.14999999999998	2.056658472429541
-54.14999999999998	2.069212105908668
-53.14999999999998	2.082830598417927
-52.14999999999998	2.0975192138611094
-51.14999999999998	2.1132837360528556
-50.14999999999998	2.1301304298150336
-49.14999999999998	2.148066004339423
-48.14999999999998	2.167097578763677

Temperature (degC)	Pressure (MPa)
-47.1499999999998	2.1872326499914534
-46.1499999999998	2.2084790627382525
-45.1499999999998	2.230844981791075
-44.1499999999998	2.2543388664886224
-43.1499999999998	2.2789694473853936
-42.1499999999998	2.304745705046719
-41.1499999999998	2.33167685097069
-40.1499999999998	2.3597723105247277
-39.1499999999998	2.389041707856372
-38.1499999999998	2.4194948526801365
-37.1499999999998	2.451141728873745
-36.1499999999998	2.483992484797948
-35.1499999999998	2.51805742526483
-34.1499999999998	2.5533470050656675
-33.1499999999998	2.589871824025018
-32.1499999999998	2.6276426234545305
-31.14999999999977	2.6666702839574676
-30.14999999999977	2.7069658244581647
-29.14999999999977	2.748540402343473
-28.14999999999977	2.791405314552276
-27.14999999999977	2.8355719994234376
-26.14999999999977	2.8810520390986083
-25.14999999999977	2.927857162231436
-24.14999999999977	2.9759992467405034
-23.14999999999977	3.0254903223590706
-22.14999999999977	3.0763425727042546
-21.14999999999977	3.1285683366721027
-20.14999999999977	3.182180108894964
-19.14999999999977	3.237190539183158
-18.14999999999977	3.2936124307883685
-17.14999999999977	3.3514587374917357
-16.14999999999977	3.4107425595113297
-15.14999999999977	3.471477138294586
-14.14999999999977	3.5336758503435513
-13.14999999999977	3.597352200188351
-12.14999999999977	3.6625198127104337
-11.14999999999977	3.729192424961419
-10.14999999999977	3.7973838776559874
-9.14999999999977	3.867108106400572
-8.14999999999977	3.9383791327321407
-7.14999999999977	4.011211054796001
-6.14999999999977	4.08561803741482
-5.14999999999977	4.1616143009892985
-4.14999999999977	4.239214108387199
-3.149999999999773	4.318431748538049

Temperature (degC)	Pressure (MPa)
-2.149999999999773	4.399281514996297
-1.149999999999773	4.48177767711468
-0.149999999999726	4.56593444091978
0.8500000000000227	4.651765896111268
1.8500000000000227	4.739285945123159
2.8500000000000227	4.828508209836565
3.8500000000000227	4.919445911555471
4.850000000000023	5.012111720300136
5.850000000000023	5.106517570590742
6.850000000000023	5.202674442617468
7.850000000000023	5.300592110035763
8.850000000000023	5.400278858149272
9.850000000000023	5.501741178411352
10.850000000000023	5.6049834450341125
11.850000000000023	5.710007575298481
12.850000000000023	5.816812662287484
13.850000000000023	5.925394541760486
14.850000000000023	6.035745205251774
15.850000000000023	6.147851888277542
16.850000000000023	6.261695533858886
17.850000000000023	6.3772481592704455
18.850000000000023	6.494468281252183
19.850000000000023	6.613293757486557
20.850000000000023	6.733629858721994
21.850000000000023	6.855331651724562
22.850000000000023	6.97817726112924
23.850000000000023	7.101827329781302
24.850000000000023	7.2257570722219455
25.850000000000023	7.349120006923108
26.850000000000023	7.4704210209660475
27.850000000000023	7.586674522991368
28.850000000000023	7.690581794464477

Table B33: Bubble Points for Carbon Dioxide and 3% Nitrogen

Temperature (degC)	Pressure (MPa)
-92.14999999999998	3.5494700954117424
-91.14999999999998	3.49065408577577
-90.14999999999998	3.4353010648595563
-89.14999999999998	3.383183827851114
-88.14999999999998	3.334099452208847
-87.14999999999998	3.2878661649757075
-86.14999999999998	3.244320705274643
-85.14999999999998	3.2033160902791744
-84.14999999999998	3.1647197122130812
-83.14999999999998	3.128411708822062
-82.14999999999998	3.094283561188476
-81.14999999999998	3.0622368815624834
-80.14999999999998	3.0321823610072274
-79.14999999999998	3.004038852059394
-78.14999999999998	2.9777325660136027
-77.14999999999998	2.9531963680022284
-76.14999999999998	2.930369155847327
-75.14999999999998	2.9091953109454374
-74.14999999999998	2.8896242113488873
-73.14999999999998	2.8716097987205194
-72.14999999999998	2.855110192139667
-71.14999999999998	2.8400873427263478
-70.14999999999998	2.8265067239703385
-69.14999999999998	2.814337053383511
-68.14999999999998	2.803550041631637
-67.14999999999998	2.7941201659150012
-66.14999999999998	2.7860244647246426
-65.14999999999998	2.7792423514852036
-64.14999999999998	2.7737554449518487
-63.14999999999998	2.76954741442961
-62.14999999999998	2.7666038381584896
-61.14999999999998	2.7649120734031016
-60.14999999999998	2.7644611369275593
-59.14999999999998	2.7652415947434115
-58.14999999999998	2.7672454600843266
-57.14999999999998	2.770466098728136
-56.14999999999998	2.7748981408666054
-55.14999999999998	2.7805373988401065
-54.14999999999998	2.787380790089166
-53.14999999999998	2.7954262648113573
-52.14999999999998	2.8046727378453693
-51.14999999999998	2.8151200243615855
-50.14999999999998	2.8267687790155165

Temperature (degC)	Pressure (MPa)
-49.1499999999998	2.8396204382677905
-48.1499999999998	2.853677165603844
-47.1499999999998	2.8689417994543858
-46.1499999999998	2.8854178036330604
-45.1499999999998	2.9031092201632407
-44.1499999999998	2.922020624386561
-43.1499999999998	2.9421570822746648
-42.1499999999998	2.963524109898105
-41.1499999999998	2.9861276350572856
-40.1499999999998	3.0099739610486456
-39.1499999999998	3.035069732610345
-38.1499999999998	3.061421904116173
-37.1499999999998	3.089037710067903
-36.1499999999998	3.1179246379513024
-35.1499999999998	3.1480904035535056
-34.1499999999998	3.1795429287796373
-33.1499999999998	3.212290322017529
-32.1499999999998	3.2463408610292652
-31.14999999999977	3.281702978333616
-30.14999999999977	3.3183852489320307
-29.14999999999977	3.3563963802221948
-28.14999999999977	3.395745203805561
-27.14999999999977	3.4364406689155036
-26.14999999999977	3.4784918370435345
-25.14999999999977	3.521907877401854
-24.14999999999977	3.5666980627770233
-23.14999999999977	3.612871765356093
-22.14999999999977	3.6604384521652347
-21.14999999999977	3.7094076797599635
-20.14999999999977	3.7597890879054057
-19.14999999999977	3.8115923920832153
-18.14999999999977	3.864827374662632
-17.14999999999977	3.9195038747475954
-16.14999999999977	3.975631776714615
-15.14999999999977	4.033220997558029
-14.14999999999977	4.092281473131241
-13.14999999999977	4.152823143483515
-12.14999999999977	4.214855937338116
-11.14999999999977	4.278389755896258
-10.14999999999977	4.343434455820395
-9.14999999999977	4.40999831297603
-8.14999999999977	4.478095594744523
-7.14999999999977	4.547731355453395
-6.14999999999977	4.61891659505124
-5.14999999999977	4.691660638119024

Temperature (degC)	Pressure (MPa)
-4.14999999999977	4.765972615665268
-3.149999999999773	4.841861418366667
-2.149999999999773	4.919335635663924
-1.149999999999773	4.998403475850306
-0.1499999999997726	5.079072661544274
0.8500000000000227	5.161350294266578
1.8500000000000227	5.2452426816588575
2.8500000000000227	5.3307551212525635
3.8500000000000227	5.417891635907898
4.850000000000023	5.506654658228131
5.850000000000023	5.597044664367835
6.850000000000023	5.6890597617924445
7.850000000000023	5.782695239281417
8.850000000000023	5.877943090420359
9.850000000000023	5.974791520491009
10.850000000000023	6.0732244376598485
11.850000000000023	6.173220905920108
12.850000000000023	6.274754490366275
13.850000000000023	6.377792342510865
14.850000000000023	6.482293739653736
15.850000000000023	6.588207593174972
16.850000000000023	6.695468167965427
17.850000000000023	6.803987856070782
18.850000000000023	6.913645916289552
19.850000000000023	7.024270299667891
20.850000000000023	7.135611752412472
21.850000000000023	7.247306023522924
22.850000000000023	7.358818088139552
23.850000000000023	7.469353741892891
24.850000000000023	7.577685175269919
25.850000000000023	7.681761601275085

Table B34: Bubble Points for Carbon Dioxide and 4% Nitrogen

Temperature (degC)	Pressure (MPa)
-94.14999999999998	4.924325912294357
-93.14999999999998	4.823347927954388
-92.14999999999998	4.729089126448653
-91.14999999999998	4.640938910250889
-90.14999999999998	4.558369785675621
-89.14999999999998	4.48092315304468
-88.14999999999998	4.408198033667886
-87.14999999999998	4.339842031149944
-86.14999999999998	4.275544013446272
-85.14999999999998	4.215028135048708
-84.14999999999998	4.15804891369354
-83.14999999999998	4.104387144759192
-82.14999999999998	4.053846487023371
-81.14999999999998	4.006250590876142
-80.14999999999998	3.96144066818958
-79.14999999999998	3.9192734242676264
-78.14999999999998	3.879619288760484
-77.14999999999998	3.8423608947450423
-76.14999999999998	3.8073917652424654
-75.14999999999998	3.7746151738325433
-74.14999999999998	3.7439431523819504
-73.14999999999998	3.7152956234623202
-72.14999999999998	3.6885996390650004
-71.14999999999998	3.6637887103079674
-70.14999999999998	3.6408022152805244
-69.14999999999998	3.61958487432274
-68.14999999999998	3.6000862836395893
-67.14999999999998	3.5822604996133385
-66.14999999999998	3.5660656672265514
-65.14999999999998	3.5514636870938294
-64.14999999999998	3.5384199162438965
-63.14999999999998	3.526902898588398
-62.14999999999998	3.5168841214765063
-61.14999999999998	3.5083377953105033
-60.14999999999998	3.501240653470361
-59.14999999999998	3.495571770254294
-58.14999999999998	3.4913123947691367
-57.14999999999998	3.4884457989646327
-56.14999999999998	3.4869571382448172
-55.14999999999998	3.4868333232319753
-54.14999999999998	3.4880629014831035
-53.14999999999998	3.490635948025234
-52.14999999999998	3.4945439637735265

Temperature (degC)	Pressure (MPa)
-51.1499999999998	3.499779780940303
-50.1499999999998	3.5063374746991407
-49.1499999999998	3.514212280400124
-48.1499999999998	3.523400515744771
-47.1499999999998	3.533899507410688
-46.1499999999998	3.5457075216213654
-45.1499999999998	3.5588236983050274
-44.1499999999998	3.5732479884818984
-43.1499999999998	3.5889810946135325
-42.1499999999998	3.6060244136884805
-41.1499999999998	3.624379982899707
-40.1499999999998	3.644050427802258
-39.1499999999998	3.665038912901627
-38.1499999999998	3.6873490947142358
-37.1499999999998	3.7109850772389645
-36.1499999999998	3.7359513700213105
-35.1499999999998	3.762252848781004
-34.1499999999998	3.7898947187051433
-33.1499999999998	3.818882480407798
-32.1499999999998	3.8492218985557516
-31.14999999999977	3.8809189730583604
-30.14999999999977	3.9139799126747628
-29.14999999999977	3.9484111108172972
-28.14999999999977	3.9842191232458775
-27.14999999999977	4.021410647301762
-26.14999999999977	4.05999250230933
-25.14999999999977	4.0999716107092095
-24.14999999999977	4.1413549795484075
-23.14999999999977	4.1841496819434525
-22.14999999999977	4.228362838210099
-21.14999999999977	4.274001596405741
-20.14999999999977	4.321073112112489
-19.14999999999977	4.3695845273690574
-18.14999999999977	4.419542948739911
-17.14999999999977	4.4709554245685075
-16.14999999999977	4.523828921443436
-15.14999999999977	4.57817030011068
-14.14999999999977	4.633986290771919
-13.14999999999977	4.691283467905178
-12.14999999999977	4.750068224511746
-11.14999999999977	4.8103467455671325
-10.14999999999977	4.872124980213594
-9.14999999999977	4.935408611882685
-8.14999999999977	5.000203025105183
-7.14999999999977	5.06651326711363

Temperature (degC)	Pressure (MPa)
-6.14999999999977	5.134344001650553
-5.14999999999977	5.203699451429033
-4.14999999999977	5.274583324657986
-3.149999999999773	5.346998719921127
-2.149999999999773	5.420948002584844
-1.149999999999773	5.496432644976624
-0.1499999999997726	5.573453022066102
0.8500000000000227	5.652008154497035
1.8500000000000227	5.732095391885711
2.8500000000000227	5.81371003169937
3.8500000000000227	5.896844872608926
4.850000000000023	5.981489706357977
5.850000000000023	6.067630758014798
6.850000000000023	6.155250090085276
7.850000000000023	6.24432498901864
8.850000000000023	6.334827349412641
9.850000000000023	6.42672305571342
10.850000000000023	6.519971324350098
11.850000000000023	6.614523898411829
12.850000000000023	6.710323866032045
13.850000000000023	6.807303684712132
14.850000000000023	6.90538172423366
15.850000000000023	7.004456273182188
16.850000000000023	7.104395485967841
17.850000000000023	7.205022611632287
18.850000000000023	7.306090435883991
19.850000000000023	7.407249710700852
20.850000000000023	7.508001365944586
21.850000000000023	7.60763125846883

Table B35: Bubble Points for Carbon Dioxide and 5% Nitrogen

Temperature (degC)	Pressure (MPa)
-96.14999999999998	6.5549810730654805
-95.14999999999998	6.38149208757774
-94.14999999999998	6.222658114119615
-93.14999999999998	6.076581323174115
-92.14999999999998	5.941714741108492
-91.14999999999998	5.816781320185623
-90.14999999999998	5.700714988420793
-89.14999999999998	5.592616932551997
-88.14999999999998	5.491722645568928
-87.14999999999998	5.397376718134502
-86.14999999999998	5.309013292787353
-85.14999999999998	5.226140721650844
-84.14999999999998	5.148329387878404
-83.14999999999998	5.075201938440976
-82.14999999999998	5.0064253764818725
-81.14999999999998	4.94170460326173
-80.14999999999998	4.88077710131229
-79.14999999999998	4.823408524518413
-78.14999999999998	4.76938901501098
-77.14999999999998	4.718530107296318
-76.14999999999998	4.67066211037982
-75.14999999999998	4.625631881635297
-74.14999999999998	4.5833009238859175
-73.14999999999998	4.5435437508006205
-72.14999999999998	4.506246476244833
-71.14999999999998	4.471305591650158
-70.14999999999998	4.438626901991794
-69.14999999999998	4.408124596210469
-68.14999999999998	4.379720432123882
-67.14999999999998	4.353343019247586
-66.14999999999998	4.328927185673881
-65.14999999999998	4.306413417388134
-64.14999999999998	4.28574736024503
-63.14999999999998	4.266879376317206
-62.14999999999998	4.2497641475498575
-61.14999999999998	4.234360320753261
-60.14999999999998	4.22063018873567
-59.14999999999998	4.2085394031715735
-58.14999999999998	4.198056715372501
-57.14999999999998	4.189153741652102
-56.14999999999998	4.181804750365393
-55.14999999999998	4.175986468186917
-54.14999999999998	4.171677903310371

Temperature (degC)	Pressure (MPa)
-53.1499999999998	4.1688601837522565
-52.1499999999998	4.167516408967663
-51.1499999999998	4.16763151329833
-50.1499999999998	4.169192139949273
-49.1499999999998	4.1721865242374205
-48.1499999999998	4.1766043851354695
-47.1499999999998	4.182436824123808
-46.1499999999998	4.189676230561136
-45.1499999999998	4.198316192825887
-44.1499999999998	4.208351414632475
-43.1499999999998	4.219777635978559
-42.1499999999998	4.232591558284482
-41.1499999999998	4.246790773375804
-40.1499999999998	4.26237369604109
-39.1499999999998	4.279339499948365
-38.1499999999998	4.297688056787919
-37.1499999999998	4.317419878526092
-36.1499999999998	4.3385360626963125
-35.1499999999998	4.361038240635769
-34.1499999999998	4.38492852857978
-33.1499999999998	4.410209481444216
-32.1499999999998	4.436884049138212
-31.14999999999977	4.464955535131037
-30.14999999999977	4.4944275569636964
-29.14999999999977	4.525304008340866
-28.14999999999977	4.557589022410611
-27.14999999999977	4.591286935797254
-26.14999999999977	4.626402253013212
-25.14999999999977	4.662939610870549
-24.14999999999977	4.700903742585447
-23.14999999999977	4.740299441359352
-22.14999999999977	4.781131523335363
-21.14999999999977	4.823404789837375
-20.14999999999977	4.867123988992105
-19.14999999999977	4.9122937768377195
-18.14999999999977	4.958918678080701
-17.14999999999977	5.007003046726013
-16.14999999999977	5.056551026710204
-15.14999999999977	5.107566512692723
-14.14999999999977	5.160053110987155
-13.14999999999977	5.214014100463548
-12.14999999999977	5.2694523929990655
-11.14999999999977	5.326370492686587
-10.14999999999977	5.384770452531846
-9.14999999999977	5.444653826706501

Temperature (degC)	Pressure (MPa)
-8.14999999999977	5.506021615637251
-7.14999999999977	5.5688742001524725
-6.14999999999977	5.633211259759414
-5.14999999999977	5.699031668739814
-4.14999999999977	5.766333362451443
-3.149999999999773	5.835113164904396
-2.149999999999773	5.90536656786299
-1.149999999999773	5.977087451375641
-0.1499999999997726	6.050267736582094
0.8500000000000227	6.124896963574916
1.8500000000000227	6.200961791135235
2.8500000000000227	6.27844542069265
3.8500000000000227	6.357326954199952
4.850000000000023	6.437580703609229
5.850000000000023	6.519175476720596
6.850000000000023	6.6020738670356085
7.850000000000023	6.686231568654976
8.850000000000023	6.7715967130446675
9.850000000000023	6.8581091706081185
10.850000000000023	6.945699660781802
11.850000000000023	7.034288349753431
12.850000000000023	7.123782356435178
13.850000000000023	7.214071273914644
14.850000000000023	7.305019625776216
15.850000000000023	7.396453519418756
16.850000000000023	7.488141456145808
17.850000000000023	7.579764940179282
18.850000000000023	7.670878825671832

Table B36: Bubble Points for Carbon Dioxide and 1% Oxygen

Temperature (degC)	Pressure (MPa)
-89.14999999999998	1.2680672422636554
-88.14999999999998	1.2629812776572524
-87.14999999999998	1.2584566887576054
-86.14999999999998	1.254495284169396
-85.14999999999998	1.2510994660828207
-84.14999999999998	1.248272201173616
-83.14999999999998	1.2460169936539391
-82.14999999999998	1.2443378603244717
-81.14999999999998	1.2432393074253583
-80.14999999999998	1.2427263091688363
-79.14999999999998	1.2428042877904124
-78.14999999999998	1.2434790950299675
-77.14999999999998	1.244756994925473
-76.14999999999998	1.2466446477855424
-75.14999999999998	1.2491490953082913
-74.14999999999998	1.252277746704811
-73.14999999999998	1.2560383657965084
-72.14999999999998	1.2604390589714685
-71.14999999999998	1.2654882639584584
-70.14999999999998	1.271194739346708
-69.14999999999998	1.2775675547839185
-68.14999999999998	1.2846160817904733
-67.14999999999998	1.292349985156241
-66.14999999999998	1.3007792148376465
-65.14999999999998	1.3099139983180004
-64.14999999999998	1.3197648333861696
-63.14999999999998	1.330342481272779
-62.14999999999998	1.3416579601171212
-61.14999999999998	1.3537225387066774
-60.14999999999998	1.366547730459358
-59.14999999999998	1.3801452876029843
-58.14999999999998	1.3945271955291094
-57.14999999999998	1.4097056672766262
-56.14999999999998	1.4256931381300721
-55.14999999999998	1.4425022602898905
-54.14999999999998	1.4601458976117154
-53.14999999999998	1.478637120380102
-52.14999999999998	1.4979892001172255
-51.14999999999998	1.5182156043945811
-50.14999999999998	1.5393299916754397
-49.14999999999998	1.561346206137174
-48.14999999999998	1.5842782725147704
-47.14999999999998	1.6081403909410086

Temperature (degC)	Pressure (MPa)
-46.1499999999998	1.6329469318031657
-45.1499999999998	1.6587124306048153
-44.1499999999998	1.685451582857173
-43.1499999999998	1.7131792389947285
-42.1499999999998	1.7419103993376777
-41.1499999999998	1.7716602091026221
-40.1499999999998	1.802443953489524
-39.1499999999998	1.8342770528573025
-38.1499999999998	1.8671750580294748
-37.1499999999998	1.9011536457449265
-36.1499999999998	1.936228614311229
-35.1499999999998	1.9724158795173239
-34.1499999999998	2.009731470833206
-33.1499999999998	2.0481915279905207
-32.1499999999998	2.0878122979885285
-31.14999999999977	2.1286101325824274
-30.14999999999977	2.1706014863063428
-29.14999999999977	2.213802915074507
-28.14999999999977	2.2582310753562482
-27.14999999999977	2.3039027239391845
-26.14999999999977	2.3508347182305367
-25.14999999999977	2.3990440170596212
-24.14999999999977	2.448547681872149
-23.14999999999977	2.499362878252743
-22.14999999999977	2.551506877654282
-21.14999999999977	2.6049970592235976
-20.14999999999977	2.6598509116369096
-19.14999999999977	2.7160860348687983
-18.14999999999977	2.7737201418208675
-17.14999999999977	2.8327710598247235
-16.14999999999977	2.8932567320110736
-15.14999999999977	2.95519521859291
-14.14999999999977	3.01860469819016
-13.14999999999977	3.08350346926921
-12.14999999999977	3.1499099518616895
-11.14999999999977	3.217842689729421
-10.14999999999977	3.28732035311078
-9.14999999999977	3.358361742233344
-8.14999999999977	3.430985791700677
-7.14999999999977	3.5052115758750753
-6.14999999999977	3.581058315290615
-5.14999999999977	3.6585453840661644
-4.14999999999977	3.7376923181951485
-3.149999999999773	3.8185188244481854
-2.149999999999773	3.901044789455417

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.985290288345887
-0.1499999999997726	4.071275592095364
0.8500000000000227	4.159021172462676
1.8500000000000227	4.248547703171338
2.8500000000000227	4.3398760557663625
3.8500000000000227	4.433027288461429
4.850000000000023	4.528022626208069
5.850000000000023	4.624883430615622
6.850000000000023	4.723631158545878
7.850000000000023	4.824287309213793
8.850000000000023	4.926873360599681
9.850000000000023	5.031410697318786
10.850000000000023	5.137920533454401
11.850000000000023	5.246423834782268
12.850000000000023	5.35694124458321
13.850000000000023	5.469493014597458
14.850000000000023	5.584098935749341
15.850000000000023	5.700778249130791
16.850000000000023	5.819549492894976
17.850000000000023	5.940430199862469
18.850000000000023	6.063436299156358
19.850000000000023	6.188580988226895
20.850000000000023	6.315872726637526
21.850000000000023	6.445311858779356
22.850000000000023	6.576885190363221
23.850000000000023	6.710557570682896
24.850000000000023	6.84625894875189
25.850000000000023	6.983863561268694
26.850000000000023	7.123152776695677
27.850000000000023	7.263734031903963
28.850000000000023	7.404828889446602
29.850000000000023	7.5446596498450536

Table B37: Bubble Points for Carbon Dioxide and 2% Oxygen

Temperature (degC)	Pressure (MPa)
-93.14999999999998	2.540253210853647
-92.14999999999998	2.516900433446833
-91.14999999999998	2.4946903573823342
-90.14999999999998	2.4735874236816566
-89.14999999999998	2.4535596547264698
-88.14999999999998	2.4345783100934533
-87.14999999999998	2.4166175847071183
-86.14999999999998	2.399654343011588
-85.14999999999998	2.3836678841177124
-84.14999999999998	2.368639733458279
-83.14999999999998	2.354553457491446
-82.14999999999998	2.341394498326003
-81.14999999999998	2.329150025717567
-80.14999999999998	2.3178088042605087
-79.14999999999998	2.307361073925729
-78.14999999999998	2.2977984422866475
-77.14999999999998	2.2891137871595664
-76.14999999999998	2.2813011683972886
-75.14999999999998	2.2743557478458976
-74.14999999999998	2.2682737165716755
-73.14999999999998	2.2630522285959316
-72.14999999999998	2.2586893404419652
-71.14999999999998	2.2551839559226203
-70.14999999999998	2.252535775625034
-69.14999999999998	2.2507452506588757
-68.14999999999998	2.2498135402435477
-67.14999999999998	2.2497424727733697
-66.14999999999998	2.250534510059186
-65.14999999999998	2.2521927144317475
-64.14999999999998	2.2547207184695415
-63.14999999999998	2.2581226971096053
-62.14999999999998	2.262403341951508
-61.14999999999998	2.2675678375193935
-60.14999999999998	2.2736218393761027
-59.14999999999998	2.280571453864595
-58.14999999999998	2.2884232193967677
-57.14999999999998	2.297184089100418
-56.14999999999998	2.3068614147407045
-55.14999999999998	2.3174629318039344
-54.14999999999998	2.328996745599222
-53.14999999999998	2.3414713183347473
-52.14999999999998	2.3548954570445964
-51.14999999999998	2.369278302284264

Temperature (degC)	Pressure (MPa)
-50.14999999999998	2.384629317524928
-49.14999999999998	2.400958279153664
-48.14999999999998	2.4182752670291605
-47.14999999999998	2.436590655498948
-46.14999999999998	2.455915104820085
-45.14999999999998	2.4762595529366456
-44.14999999999998	2.4976352075219537
-43.14999999999998	2.5200535382599973
-42.14999999999998	2.5435262693133365
-41.14999999999998	2.568065371918347
-40.14999999999998	2.593683057138756
-39.14999999999998	2.620391768699917
-38.14999999999998	2.648204175960653
-37.14999999999998	2.6771331670299046
-36.14999999999998	2.7071918420634624
-35.14999999999998	2.7383935068110334
-34.14999999999998	2.770751666453313
-33.14999999999998	2.804280019814381
-32.14999999999998	2.8389924539840967
-31.149999999999977	2.874903039398351
-30.149999999999977	2.9120260253864627
-29.149999999999977	2.950375836157446
-28.149999999999977	2.9899670671433998
-27.149999999999977	3.030814481627173
-26.149999999999977	3.072933007459147
-25.149999999999977	3.116337733725733
-24.149999999999977	3.1610439071389984
-23.149999999999977	3.2070669279704958
-22.149999999999977	3.254422345318413
-21.149999999999977	3.3031258515798765
-20.149999999999977	3.353193275985394
-19.149999999999977	3.4046405771737867
-18.149999999999977	3.457483834805646
-17.149999999999977	3.511739240310469
-16.149999999999977	3.5674230869119103
-15.149999999999977	3.6245517591324603
-14.149999999999977	3.683141722032771
-13.149999999999977	3.7432095104435037
-12.149999999999977	3.8047717184644596
-11.149999999999977	3.8678449895032516
-10.149999999999977	3.9324460070231315
-9.149999999999977	3.9985914861649983
-8.149999999999977	4.066298166250314
-7.149999999999977	4.135582804049164
-6.149999999999977	4.20646216749881

Temperature (degC)	Pressure (MPa)
-5.14999999999977	4.278953029314943
-4.14999999999977	4.353072159644143
-3.149999999999773	4.428836316539114
-2.149999999999773	4.5062622326239286
-1.149999999999773	4.585366595872631
-0.1499999999997726	4.66616602197295
0.8500000000000227	4.7486770153228415
1.8500000000000227	4.832915915454264
2.8500000000000227	4.9188988255855985
3.8500000000000227	5.006641520293817
4.850000000000023	5.096159329970714
5.850000000000023	5.187467000980443
6.850000000000023	5.280578532243471
7.850000000000023	5.3755069911232525
8.850000000000023	5.472264314235683
9.850000000000023	5.570861100759075
10.850000000000023	5.6713064070337795
11.850000000000023	5.773607549553932
12.850000000000023	5.8777699169867486
13.850000000000023	5.983796777341843
14.850000000000023	6.091689039543452
15.850000000000023	6.201444883952777
16.850000000000023	6.313059108004359
17.850000000000023	6.426521935881062
18.850000000000023	6.541816914236339
19.850000000000023	6.658917364044419
20.850000000000023	6.777780694260685
21.850000000000023	6.898339714281421
22.850000000000023	7.020489874511272
23.850000000000023	7.144070923312358
24.850000000000023	7.268840103006572
25.850000000000023	7.3944295372697795
26.850000000000023	7.52026679628183
27.850000000000023	7.645401575850213
28.850000000000023	7.7680947617718585
29.850000000000023	7.884783117116728

Table B38: Bubble Points for Carbon Dioxide and 3% Oxygen

Temperature (degC)	Pressure (MPa)
-96.14999999999998	3.9938268322590784
-95.14999999999998	3.9390897369526368
-94.14999999999998	3.8873587580224203
-93.14999999999998	3.8384073793348583
-92.14999999999998	3.7920391625082823
-91.14999999999998	3.74808272010203
-90.14999999999998	3.7063877265593796
-89.14999999999998	3.6668217153207046
-88.14999999999998	3.629267479820056
-87.14999999999998	3.593620944178741
-86.14999999999998	3.55978940345663
-85.14999999999998	3.5276900576229573
-84.14999999999998	3.497248781295005
-83.14999999999998	3.4683990843109926
-82.14999999999998	3.4410812280641068
-81.14999999999998	3.4152414698564892
-80.14999999999998	3.3908314133087147
-79.14999999999998	3.3678074470712844
-78.14999999999998	3.3461302576266134
-77.14999999999998	3.3257644044938126
-76.14999999999998	3.306677948373741
-75.14999999999998	3.2888421243285078
-74.14999999999998	3.2722310535681842
-73.14999999999998	3.2568214883801576
-72.14999999999998	3.2425925856721984
-71.14999999999998	3.2295257053342787
-70.14999999999998	3.217604230186344
-69.14999999999998	3.206813404780905
-68.14999999999998	3.197140190699522
-67.14999999999998	3.18857313638821
-66.14999999999998	3.1811022598031156
-65.14999999999998	3.1747189423645708
-64.14999999999998	3.169415832969506
-63.14999999999998	3.1651867609540534
-62.14999999999998	3.1620266570019573
-61.14999999999998	3.159931481207287
-60.14999999999998	3.1588981575047677
-59.14999999999998	3.158924513839327
-58.14999999999998	3.160009227492583
-57.14999999999998	3.1621517750672252
-56.14999999999998	3.165352386663745
-55.14999999999998	3.1696120038447964
-54.14999999999998	3.174932241062902

Temperature (degC)	Pressure (MPa)
-53.1499999999998	3.1813153501534908
-52.1499999999998	3.1887641876813975
-51.1499999999998	3.1972821848392154
-50.1499999999998	3.206873319614011
-49.1499999999998	3.2175420910896912
-48.1499999999998	3.229293495605513
-47.1499999999998	3.2421330045980543
-46.1499999999998	3.2560665439709426
-45.1499999999998	3.271100474806761
-44.1499999999998	3.287241575307989
-43.1499999999998	3.3044970237729347
-42.1499999999998	3.3228743825870057
-41.1499999999998	3.342381583069533
-40.1499999999998	3.3630269111372098
-39.1499999999998	3.3848189937540694
-38.1499999999998	3.407766786144592
-37.1499999999998	3.431879559772936
-36.1499999999998	3.4571668911169926
-35.1499999999998	3.4836386512725745
-34.1499999999998	3.511304996390266
-33.1499999999998	3.5401763589780746
-32.1499999999998	3.5702634400220017
-31.14999999999977	3.601577201873419
-30.14999999999977	3.6341288617607304
-29.14999999999977	3.6679298857742397
-28.14999999999977	3.702991983076738
-27.14999999999977	3.739327100055802
-26.14999999999977	3.776947414132765
-25.14999999999977	3.8158653268907354
-24.14999999999977	3.856093456219915
-23.14999999999977	3.897644627215005
-22.14999999999977	3.940531861621726
-21.14999999999977	3.984768365677236
-20.14999999999977	4.03036751634546
-19.14999999999977	4.077342845969581
-18.14999999999977	4.1257080255062135
-17.14999999999977	4.175476846588407
-16.14999999999977	4.226663202690953
-15.14999999999977	4.279281069755994
-14.14999999999977	4.333344486640801
-13.14999999999977	4.388867535694445
-12.14999999999977	4.445864323794336
-11.14999999999977	4.504348964009626
-10.14999999999977	4.564335557979625
-9.14999999999977	4.625838178894007

Temperature (degC)	Pressure (MPa)
-8.14999999999977	4.688870854739735
-7.14999999999977	4.753447551174268
-6.14999999999977	4.819582153003308
-5.14999999999977	4.887288442794743
-4.14999999999977	4.956580074638617
-3.149999999999773	5.027470540422679
-2.149999999999773	5.099973125433713
-1.149999999999773	5.174100849447146
-0.1499999999997726	5.249866389048616
0.8500000000000227	5.327281976685895
1.8500000000000227	5.406359272113173
2.8500000000000227	5.48710920266259
3.8500000000000227	5.569541770056107
4.850000000000023	5.653665823859908
5.850000000000023	5.739488804486767
6.850000000000023	5.827016462358059
7.850000000000023	5.916252563558647
8.850000000000023	6.007198595463094
9.850000000000023	6.099853486985441
10.850000000000023	6.19421335531906
11.850000000000023	6.290271281339868
12.850000000000023	6.388017095369105
13.850000000000023	6.487437118371366
14.850000000000023	6.588513745099941
15.850000000000023	6.691224669375441
16.850000000000023	6.7955414341809215
17.850000000000023	6.901426844712843
18.850000000000023	7.008830624139259
19.850000000000023	7.11768254611723
20.850000000000023	7.227882142089511
21.850000000000023	7.339284376757863
22.850000000000023	7.451678580673062
23.850000000000023	7.5647625768245
24.850000000000023	7.678101335116774
25.850000000000023	7.7910614869988635
26.850000000000023	7.9026828906665685
27.850000000000023	8.011410603033909
28.850000000000023	8.11455739599462
29.850000000000023	8.206381089216638

Table B39: Bubble Points for Carbon Dioxide and 4% Oxygen

Temperature (degC)	Pressure (MPa)
-99.14999999999998	5.939128157350534
-98.14999999999998	5.792359515890121
-97.14999999999998	5.661539742913631
-96.14999999999998	5.543436961787959
-95.14999999999998	5.4357927118246305
-94.14999999999998	5.336953577983851
-93.14999999999998	5.245665672106773
-92.14999999999998	5.160951463020575
-91.14999999999998	5.08203175149784
-90.14999999999998	5.008274004500193
-89.14999999999998	4.939156880591706
-88.14999999999998	4.874245124251791
-87.14999999999998	4.8131713369063975
-86.14999999999998	4.755622446361344
-85.14999999999998	4.701329469706144
-84.14999999999998	4.650059637101916
-83.14999999999998	4.601610241441923
-82.14999999999998	4.5558037718389635
-81.14999999999998	4.512484017142873
-80.14999999999998	4.471512912588712
-79.14999999999998	4.432767963067837
-78.14999999999998	4.396140118923981
-77.14999999999998	4.3615320106304125
-76.14999999999998	4.328856470814674
-75.14999999999998	4.298035288405289
-74.14999999999998	4.268998151787697
-73.14999999999998	4.241681747064365
-72.14999999999998	4.216028984455572
-71.14999999999998	4.191988331274628
-70.14999999999998	4.169513234085673
-69.14999999999998	4.148561615882526
-68.14999999999998	4.129095436784693
-67.14999999999998	4.1110803086925385
-66.14999999999998	4.09448515608098
-65.14999999999998	4.079281916336515
-64.14999999999998	4.065445274262024
-63.14999999999998	4.052952426042409
-62.14999999999998	4.041782868873015
-61.14999999999998	4.031918212926848
-60.14999999999998	4.023342012877226
-59.14999999999998	4.016039616564669
-58.14999999999998	4.009998028765132
-57.14999999999998	4.005205788298802

Temperature (degC)	Pressure (MPa)
-56.14999999999998	4.0016528569150704
-55.14999999999998	3.9993305186773664
-54.14999999999998	3.998231288641536
-53.14999999999998	3.9983488298273904
-52.14999999999998	3.999677877620421
-51.14999999999998	4.002214170784541
-50.14999999999998	4.005954388394541
-49.14999999999998	4.010896092110237
-48.14999999999998	4.017037673141032
-47.14999999999998	4.024378303551248
-46.14999999999998	4.032917891334178
-45.14999999999998	4.042657038940816
-44.14999999999998	4.053597004900192
-43.14999999999998	4.065739668236511
-42.14999999999998	4.079087495444169
-41.14999999999998	4.093643509816488
-40.14999999999998	4.109411262956381
-39.14999999999998	4.126394808409973
-38.14999999999998	4.144598677248237
-37.14999999999998	4.164027855619075
-36.14999999999998	4.184687764181019
-35.14999999999998	4.206584239342465
-34.14999999999998	4.2297235162490106
-33.14999999999998	4.254112213382815
-32.14999999999998	4.279757318563094
-31.149999999999977	4.306666176152819
-30.149999999999977	4.334846475110238
-29.149999999999977	4.364306237549376
-28.149999999999977	4.395053807407757
-27.149999999999977	4.427097838758603
-26.149999999999977	4.4604472833911
-25.149999999999977	4.4951113772352524
-24.149999999999977	4.531099625361333
-23.149999999999977	4.568421785269061
-22.149999999999977	4.607087848411968
-21.149999999999977	4.647108019898067
-20.149999999999977	4.688492696536796
-19.149999999999977	4.731252443407702
-18.149999999999977	4.77539796930344
-17.149999999999977	4.820940101390603
-16.149999999999977	4.86788975950665
-15.149999999999977	4.916257930451645
-14.149999999999977	4.966055642697276
-13.149999999999977	5.017293941686802
-12.149999999999977	5.069983865907617

Temperature (degC)	Pressure (MPa)
-11.14999999999977	5.124136423668058
-10.14999999999977	5.179762570264871
-9.14999999999977	5.236873184927379
-8.14999999999977	5.295479046498967
-7.14999999999977	5.355590806326033
-6.14999999999977	5.417218956224556
-5.14999999999977	5.480373788694994
-4.14999999999977	5.545065345827124
-3.149999999999773	5.611303352560293
-2.149999999999773	5.679097129349639
-1.149999999999773	5.748455478810971
-0.1499999999997726	5.819386540949825
0.8500000000000227	5.891897611995384
1.8500000000000227	5.965994923354183
2.8500000000000227	6.041683379306361
3.8500000000000227	6.1189662554286
4.850000000000023	6.197844863922041
5.850000000000023	6.278318196935957
6.850000000000023	6.360382563832367
7.850000000000023	6.444031242163981
8.850000000000023	6.529254163179699
9.850000000000023	6.616037648486286
10.850000000000023	6.7043642017680085
11.850000000000023	6.794212333619738
12.850000000000023	6.8855563532635085
13.850000000000023	6.978365992211427
14.850000000000023	7.072605626772503
15.850000000000023	7.168232738536835
16.850000000000023	7.265195101698589
17.850000000000023	7.363426035531337
18.850000000000023	7.462836944773353
19.850000000000023	7.5633063295508265
20.850000000000023	7.6646644433257975
21.850000000000023	7.766673176289746
22.850000000000023	7.868998909323931
23.850000000000023	7.971178049999837
24.850000000000023	8.072561889294205
25.850000000000023	8.172224750850578
26.850000000000023	8.268784877061544
27.850000000000023	8.360080905396249
28.850000000000023	8.442399943558353
29.850000000000023	8.503759208938062

Table B40: Bubble Points for Carbon Dioxide and 5% Oxygen

Temperature (degC)	Pressure (MPa)
-96.14999999999998	7.658779525301643
-95.14999999999998	7.356348342744952
-94.14999999999998	7.117894856686301
-93.14999999999998	6.918631397813582
-92.14999999999998	6.746550385711455
-91.14999999999998	6.594755549501428
-90.14999999999998	6.458852472081462
-89.14999999999998	6.3358372661094755
-88.14999999999998	6.223549815308621
-87.14999999999998	6.120376108948149
-86.14999999999998	6.025073511680976
-85.14999999999998	5.936662034022491
-84.14999999999998	5.854353444979402
-83.14999999999998	5.777503260270699
-82.14999999999998	5.705577173910593
-81.14999999999998	5.638126947900263
-80.14999999999998	5.574772690545721
-79.14999999999998	5.5151895669900055
-78.14999999999998	5.4590976569676215
-77.14999999999998	5.406254093576606
-76.14999999999998	5.35644688535096
-75.14999999999998	5.309490000875645
-74.14999999999998	5.265219414163918
-73.14999999999998	5.223489890703174
-72.14999999999998	5.18417235145681
-71.14999999999998	5.14715169263131
-70.14999999999998	5.112324968535008
-69.14999999999998	5.07959986627252
-68.14999999999998	5.048893417036241
-67.14999999999998	5.020130900656433
-66.14999999999998	4.993244909219408
-65.14999999999998	4.968174542415973
-64.14999999999998	4.944864712754611
-63.14999999999998	4.92326554284792
-62.14999999999998	4.903331840365731
-61.14999999999998	4.88502263880472
-60.14999999999998	4.868300794290739
-59.14999999999998	4.853132630362628
-58.14999999999998	4.839487623933098
-57.14999999999998	4.827338126794379
-56.14999999999998	4.816659117932542
-55.14999999999998	4.807427982572244
-54.14999999999998	4.799624314551173

Temperature (degC)	Pressure (MPa)
-53.1499999999998	4.7932297391141505
-52.1499999999998	4.788227753588425
-51.1499999999998	4.784603583809822
-50.1499999999998	4.782344054403773
-49.1499999999998	4.781437471339574
-48.1499999999998	4.7818735153044
-47.1499999999998	4.783643144734333
-46.1499999999998	4.7867385073386455
-45.1499999999998	4.791152859324805
-44.1499999999998	4.796880491415479
-43.1499999999998	4.803916661057772
-42.1499999999998	4.812257530205295
-41.1499999999998	4.821900108222376
-40.1499999999998	4.832842199513109
-39.1499999999998	4.8450823555409075
-38.1499999999998	4.858619830945792
-37.1499999999998	4.873454543518261
-36.1499999999998	4.889587037755562
-35.1499999999998	4.907018451728714
-34.1499999999998	4.92575048694658
-33.1499999999998	4.945785380839757
-32.1499999999998	4.9671258814411345
-31.14999999999977	4.989775223773442
-30.14999999999977	5.013737107410068
-29.14999999999977	5.039015674671426
-28.14999999999977	5.0656154888656015
-27.14999999999977	5.093541512128142
-26.14999999999977	5.122799082339552
-25.14999999999977	5.153393888834194
-24.14999999999977	5.185331946654862
-23.14999999999977	5.2186195692663935
-22.14999999999977	5.253263339772637
-21.14999999999977	5.289270080836476
-20.14999999999977	5.326646823561226
-19.14999999999977	5.365400775727401
-18.14999999999977	5.405539289782959
-17.14999999999977	5.447069831017592
-16.14999999999977	5.489999946301943
-15.14999999999977	5.5343372337096595
-14.14999999999977	5.580089313202223
-13.14999999999977	5.62726379837275
-12.14999999999977	5.675868269038586
-11.14999999999977	5.7259102440965295
-10.14999999999977	5.777397153718399
-9.14999999999977	5.830336309399037

Temperature (degC)	Pressure (MPa)
-8.14999999999977	5.884734869775608
-7.14999999999977	5.940599799393302
-6.14999999999977	5.997937816759511
-5.14999999999977	6.056755327161575
-4.14999999999977	6.117058334904527
-3.149999999999773	6.178852328948558
-2.149999999999773	6.242142135664545
-1.149999999999773	6.306931732625067
-0.149999999999726	6.3732240184202515
0.8500000000000227	6.441020535524988
1.8500000000000227	6.510321146431933
2.8500000000000227	6.581123667665585
3.8500000000000227	6.653423471742972
4.850000000000023	6.727213073112005
5.850000000000023	6.802481719856423
6.850000000000023	6.879215017023924
7.850000000000023	6.9573946078635975
8.850000000000023	7.036997933369256
9.850000000000023	7.117998074409174
10.850000000000023	7.200363650093013
11.850000000000023	7.28405869526845
12.850000000000023	7.369042363608084
13.850000000000023	7.455268197941737
14.850000000000023	7.542682576842405
15.850000000000023	7.631221798909113
16.850000000000023	7.720807128020806
17.850000000000023	7.811337052775472
18.850000000000023	7.902675982133723
19.850000000000023	7.994638818868006
20.850000000000023	8.086970949057347
21.850000000000023	8.179323139117546
22.850000000000023	8.271219800266442
23.850000000000023	8.36201557506835
24.850000000000023	8.450826315667223
25.850000000000023	8.536407516715611
26.850000000000023	8.616941456489535
27.850000000000023	8.689609663188003
28.850000000000023	8.748468155493441
29.850000000000023	8.769149094928613

Table B41: Dew Points for Carbon Dioxide and 1% Argon

Temperature (degC)	Pressure (MPa)
-88.1499999999998	0.10018596983909082
-87.1499999999998	0.10666213843959693
-86.1499999999998	0.11346597936757713
-85.1499999999998	0.1206089794192768
-84.1499999999998	0.12810281210007324
-83.1499999999998	0.1359593346623534
-82.1499999999998	0.1441905850713324
-81.1499999999998	0.1528087789381626
-80.1499999999998	0.16182630641994253
-79.1499999999998	0.17125572910837591
-78.1499999999998	0.18110977688565916
-77.1499999999998	0.19140134478122975
-76.1499999999998	0.2021434898381624
-75.1499999999998	0.21334942797320447
-74.1499999999998	0.22503253085400432
-73.1499999999998	0.23720632280512816
-72.1499999999998	0.24988447774254893
-71.1499999999998	0.26308081613979684
-70.1499999999998	0.2768093020316288
-69.1499999999998	0.2910840400767996
-68.1499999999998	0.3059192726644844
-67.1499999999998	0.3213293770897565
-66.1499999999998	0.3373288627904817
-65.1499999999998	0.3539323686495647
-64.1499999999998	0.3711546603782348
-63.1499999999998	0.3890106279883323
-62.1499999999998	0.4075152833364213
-61.1499999999998	0.4266837577699025
-60.1499999999998	0.44653129987152296
-59.1499999999998	0.4670732732796773
-58.1499999999998	0.48832515466668247
-57.1499999999998	0.5103025317665634
-56.1499999999998	0.5330211015623321
-55.1499999999998	0.5564966685715955
-54.1499999999998	0.580745143269606
-53.1499999999998	0.6057825406317126
-52.1499999999998	0.6316249788164139
-51.1499999999998	0.6582886779888227
-50.1499999999998	0.6857899592947616
-49.1499999999998	0.7141452439787529
-48.1499999999998	0.743371052669539
-47.1499999999998	0.7734840048270036
-46.1499999999998	0.8045008183623672

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8364383094426491
-44.14999999999998	0.8693133924642893
-43.14999999999998	0.9031430802373532
-42.14999999999998	0.9379444843465035
-41.14999999999998	0.9737348157117383
-40.14999999999998	1.010531385357028
-39.14999999999998	1.0483516053606523
-38.14999999999998	1.0872129900191756
-37.14999999999998	1.12713315720356
-36.14999999999998	1.168129829921651
-35.14999999999998	1.2102208380906492
-34.14999999999998	1.2534241205189056
-33.14999999999998	1.2977577271303742
-32.14999999999998	1.3432398214376664
-31.149999999999977	1.389888683288122
-30.149999999999977	1.4377227119330187
-29.149999999999977	1.4867604294408403
-28.149999999999977	1.5370204845041493
-27.149999999999977	1.5885216566962284
-26.149999999999977	1.641282861214535
-25.149999999999977	1.695323154168251
-24.149999999999977	1.7506617384573349
-23.149999999999977	1.8073179702938824
-22.149999999999977	1.8653113664155963
-21.149999999999977	1.9246616120145643
-20.149999999999977	1.9853885694449225
-19.149999999999977	2.0475122877444263
-18.149999999999977	2.1110530129855265
-17.149999999999977	2.176031199541039
-16.149999999999977	2.2424675222586536
-15.149999999999977	2.3103828896325327
-14.149999999999977	2.379798458029401
-13.149999999999977	2.4507356470093984
-12.149999999999977	2.523216155879838
-11.149999999999977	2.597261981551195
-10.149999999999977	2.6728954378553924
-9.149999999999977	2.750139176470809
-8.149999999999977	2.8290162096622553
-7.149999999999977	2.909549935072453
-6.149999999999977	2.991764162852821
-5.149999999999977	3.075683145472966
-4.149999999999977	3.1613316106274847
-3.1499999999999773	3.24873479771136
-2.1499999999999773	3.337918498446496
-1.1499999999999773	3.4289091023108327

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.5217336475553163
0.85000000000000227	3.6164198786747077
1.85000000000000227	3.712996311359018
2.85000000000000227	3.8114923060748787
3.85000000000000227	3.911938151574446
4.8500000000000023	4.014365159848507
5.8500000000000023	4.118805774244676
6.8500000000000023	4.225293692849804
7.8500000000000023	4.333864009667828
8.8500000000000023	4.445533769137295
9.8500000000000023	4.557400192796033
10.8500000000000023	4.672444820908892
11.8500000000000023	4.789729849825897
12.8500000000000023	4.9093004052561415
13.8500000000000023	5.0312045324692685
14.8500000000000023	5.1554936743238855
15.8500000000000023	5.282223280882108
16.8500000000000023	5.411453601238337
17.8500000000000023	5.543250728461649
18.8500000000000023	5.677687996866189
19.8500000000000023	5.814847872320913
20.8500000000000023	5.954824541883791
21.8500000000000023	6.097727523796723
22.8500000000000023	6.243686841987439
23.8500000000000023	6.392860781510304
24.8500000000000023	6.545448308013678
25.8500000000000023	6.701710779582342
26.8500000000000023	6.862014048758983
27.8500000000000023	7.0269201452257395
28.8500000000000023	7.197417361024386
29.8500000000000023	7.375653857713424
30.8500000000000023	7.569313988185806

Table B42: Dew Points for Carbon Dioxide and 2% Argon

Temperature (degC)	Pressure (MPa)
-89.14999999999998	0.09500916505535882
-88.14999999999998	0.10123455948962404
-87.14999999999998	0.10777983562773154
-86.14999999999998	0.11465642970091876
-85.14999999999998	0.12187597115284464
-84.14999999999998	0.1294502797923642
-83.14999999999998	0.13739136286793602
-82.14999999999998	0.14571141209661728
-81.14999999999998	0.15442280067045208
-80.14999999999998	0.16353808022830332
-79.14999999999998	0.17306997780108777
-78.14999999999998	0.18303139275426752
-77.14999999999998	0.19343539373076876
-76.14999999999998	0.20429521557816593
-75.14999999999998	0.21562425630804416
-74.14999999999998	0.22743607407451086
-73.14999999999998	0.2397443841730387
-72.14999999999998	0.2525630560529274
-71.14999999999998	0.2659061104249728
-70.14999999999998	0.27978771635893207
-69.14999999999998	0.2942221884664443
-68.14999999999998	0.30922398413397284
-67.14999999999998	0.32480770083475713
-66.14999999999998	0.34098807349121957
-65.14999999999998	0.35777997193225347
-64.14999999999998	0.3751983984397332
-63.14999999999998	0.39325848535851565
-62.14999999999998	0.41197549283130797
-61.14999999999998	0.43136480661309196
-60.14999999999998	0.4514419360112875
-59.14999999999998	0.47222251190742065
-58.14999999999998	0.49372228493504433
-57.14999999999998	0.5159571237408215
-56.14999999999998	0.5389430134005507
-55.14999999999998	0.5626960539581235
-54.14999999999998	0.5872324590975413
-53.14999999999998	0.6125685549754215
-52.14999999999998	0.6387207791903946
-51.14999999999998	0.6657056799161867
-50.14999999999998	0.6935399151986581
-49.14999999999998	0.722240252433307
-48.14999999999998	0.7518235680051122
-47.14999999999998	0.7823068471386971

Temperature (degC)	Pressure (MPa)
-46.14999999999998	0.8137071839314318
-45.14999999999998	0.8460417815999647
-44.14999999999998	0.8793279529201554
-43.14999999999998	0.913583120915085
-42.14999999999998	0.9488248197414363
-41.14999999999998	0.9850706958070181
-40.14999999999998	1.0223385091274428
-39.14999999999998	1.060646134897339
-38.14999999999998	1.100011565315091
-37.14999999999998	1.140452911626055
-36.14999999999998	1.1819884064199957
-35.14999999999998	1.2246364061838433
-34.14999999999998	1.2684153941144738
-33.14999999999998	1.313343983232245
-32.14999999999998	1.3594409198168473
-31.149999999999977	1.4067250871935475
-30.149999999999977	1.4552155099279165
-29.149999999999977	1.504931358472173
-28.149999999999977	1.5558919543119354
-27.149999999999977	1.6081167756760584
-26.149999999999977	1.661625463873019
-25.149999999999977	1.7164378303117847
-24.149999999999977	1.7725738642480284
-23.149999999999977	1.8300537413436702
-22.149999999999977	1.888897833073242
-21.149999999999977	1.9491267170436994
-20.149999999999977	2.0107611882682694
-19.149999999999977	2.073822271482638
-18.149999999999977	2.138331234527013
-17.149999999999977	2.2043096028935825
-16.149999999999977	2.271779175491713
-15.149999999999977	2.3407620417491137
-14.149999999999977	2.4112806001262355
-13.149999999999977	2.4833575781875115
-12.149999999999977	2.5570160543638623
-11.149999999999977	2.6322794816040433
-10.149999999999977	2.7091717131064215
-9.149999999999977	2.7877170303903185
-8.149999999999977	2.8679401740245596
-7.149999999999977	2.949866377348148
-6.149999999999977	3.0335214036293823
-5.149999999999977	3.1189315871874883
-4.149999999999977	3.2061238790525626
-3.1499999999999773	3.295125897928546
-2.1499999999999773	3.38596598728067

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.4786732795821704
-0.1499999999997726	3.573277768879429
0.8500000000000227	3.6698103930992447
1.8500000000000227	3.7683031276822074
2.8500000000000227	3.868789092462479
3.8500000000000227	3.9713026740241646
4.850000000000023	4.075879666135351
5.850000000000023	4.182557431445091
6.850000000000023	4.291375088268347
7.850000000000023	4.402373727312594
8.850000000000023	4.515596664537792
9.850000000000023	4.6310897384282015
10.850000000000023	4.748901662878591
11.850000000000023	4.869084451238922
12.850000000000023	4.991693933358275
13.850000000000023	5.116790396517746
14.850000000000023	5.244439394154299
15.850000000000023	5.374712784841983
16.850000000000023	5.507690090439602
17.850000000000023	5.643460300751805
18.850000000000023	5.782124308708754
19.850000000000023	5.923798247954109
20.850000000000023	6.0686181493096205
21.850000000000023	6.216746589727592
22.850000000000023	6.368382502022918
23.850000000000023	6.52377633705163
24.850000000000023	6.68325502835543
25.850000000000023	6.847266520399143
26.850000000000023	7.016467089647556
27.850000000000023	7.191912790319409
28.850000000000023	7.375546201059152
29.850000000000023	7.571796591239758
30.850000000000023	7.803783548234898

Table B43: Dew Points for Carbon Dioxide and 3% Argon

Temperature (degC)	Pressure (MPa)
-91.14999999999998	0.08435259560187525
-90.14999999999998	0.0900319380262293
-89.14999999999998	0.09601218501207939
-88.14999999999998	0.1023045127666887
-87.14999999999998	0.10892029980572515
-86.14999999999998	0.1158711242608661
-85.14999999999998	0.12316876115244363
-84.14999999999998	0.13082517957858725
-83.14999999999998	0.13885253985417415
-82.14999999999998	0.14726319060968138
-81.14999999999998	0.1560696658659171
-80.14999999999998	0.16528468206720273
-79.14999999999998	0.17492113510808213
-78.14999999999998	0.18499209735314293
-77.14999999999998	0.1955108146494663
-76.14999999999998	0.2064907033733705
-75.14999999999998	0.21794534743015676
-74.14999999999998	0.2298884953753407
-73.14999999999998	0.24233405747454487
-72.14999999999998	0.255296102858578
-71.14999999999998	0.26878885670595254
-70.14999999999998	0.2828266974802881
-69.14999999999998	0.29742415422482243
-68.14999999999998	0.3125959039375382
-67.14999999999998	0.3283567690045874
-66.14999999999998	0.3447217147082068
-65.14999999999998	0.3617058468482058
-64.14999999999998	0.3793244094253389
-63.14999999999998	0.39759278244328666
-62.14999999999998	0.41652647980422186
-61.14999999999998	0.4361411473186033
-60.14999999999998	0.4564525608289585
-59.14999999999998	0.47747662445690636
-58.14999999999998	0.49922936898354525
-57.14999999999998	0.5217269503517327
-56.14999999999998	0.5449856483212938
-55.14999999999998	0.569021865263236
-54.14999999999998	0.5938521251163051
-53.14999999999998	0.6194930724839606
-52.14999999999998	0.6459614719329433
-51.14999999999998	0.6732742074302384
-50.14999999999998	0.7014482819997884
-49.14999999999998	0.7305008175461711

Temperature (degC)	Pressure (MPa)
-48.14999999999998	0.7604490548998046
-47.14999999999998	0.7913103540632498
-46.14999999999998	0.8231021946913882
-45.14999999999998	0.8558421767918706
-44.14999999999998	0.8895480216666751
-43.14999999999998	0.9242375731140001
-42.14999999999998	0.9599287988536945
-41.14999999999998	0.9966397922372712
-40.14999999999998	1.0343887741932316
-39.14999999999998	1.0731940954550028
-38.14999999999998	1.1130742390364243
-37.14999999999998	1.1540478229984008
-36.14999999999998	1.1961336035014363
-35.14999999999998	1.2393504781555114
-34.14999999999998	1.283717489710027
-33.14999999999998	1.3292538301046775
-32.14999999999998	1.3759788449195756
-31.149999999999977	1.423912038285245
-30.149999999999977	1.4730730782881538
-29.149999999999977	1.5234818029499488
-28.149999999999977	1.5751582268222688
-27.149999999999977	1.6281225482870199
-26.149999999999977	1.6823951576011547
-25.149999999999977	1.7379966457736964
-24.149999999999977	1.79494781432593
-23.149999999999977	1.8532696860111975
-22.149999999999977	1.9129835165480498
-21.149999999999977	1.9741108074548257
-20.149999999999977	2.0366733200351153
-19.149999999999977	2.1006930906202257
-18.149999999999977	2.16619244712607
-17.149999999999977	2.2331940270731545
-16.149999999999977	2.3017207971273983
-15.149999999999977	2.371796074336332
-14.149999999999977	2.4434435492232582
-13.149999999999977	2.5166873108787424
-12.149999999999977	2.591551874311109
-11.149999999999977	2.6680622102825513
-10.149999999999977	2.7462437779292928
-9.149999999999977	2.8261225605343774
-8.149999999999977	2.9077251048420436
-7.149999999999977	2.9910785644341855
-6.149999999999977	3.0762107477413445
-5.149999999999977	3.1631501713847796
-4.149999999999977	3.2519261196914915

Temperature (degC)	Pressure (MPa)
-3.149999999999773	3.3425687113661326
-2.149999999999773	3.4351089744861496
-1.149999999999773	3.5295789312331665
-0.1499999999997726	3.6260116939886973
0.8500000000000227	3.72444157476796
1.8500000000000227	3.8249042102889783
2.8500000000000227	3.927436705425028
3.8500000000000227	4.032077798287801
4.850000000000023	4.138868050879061
5.850000000000023	4.2478500700307915
6.850000000000023	4.35906876453918
7.850000000000023	4.472571645896256
8.850000000000023	4.5884091822110795
9.850000000000023	4.706635217995983
10.850000000000023	4.827307476970406
11.850000000000023	4.950488171498315
12.850000000000023	5.076244751608055
13.850000000000023	5.204650840098048
14.850000000000023	5.335787419736286
15.850000000000023	5.469744366888781
16.850000000000023	5.606622467185714
17.850000000000023	5.746536109967742
18.850000000000023	5.889616951636718
19.850000000000023	6.036018986250091
20.850000000000023	6.185925711626437
21.850000000000023	6.339560529671216
22.850000000000023	6.497202391400705
23.850000000000023	6.659210503762635
24.850000000000023	6.826065914813453
25.850000000000023	6.998447289453917
26.850000000000023	7.177382766116881
27.850000000000023	7.364591910391186
28.850000000000023	7.563392645741776
29.850000000000023	7.782089109401006

Table B44: Dew Points for Carbon Dioxide and 4% Argon

Temperature (degC)	Pressure (MPa)
-93.14999999999998	0.07463714803424627
-92.14999999999998	0.0798024688173803
-91.14999999999998	0.08525006688540436
-90.14999999999998	0.09099083658232164
-89.14999999999998	0.09703588317982292
-88.14999999999998	0.10339652043433822
-87.14999999999998	0.11008426801593847
-86.14999999999998	0.11711084891164913
-85.14999999999998	0.12448818673879287
-84.14999999999998	0.13222840298301033
-83.14999999999998	0.14034381422027745
-82.14999999999998	0.14884692927766197
-81.14999999999998	0.15775044636544328
-80.14999999999998	0.16706725019491656
-79.14999999999998	0.17681040907777426
-78.14999999999998	0.18699317202827906
-77.14999999999998	0.1976289658623619
-76.14999999999998	0.20873139231154877
-75.14999999999998	0.22031422516079718
-74.14999999999998	0.23239140742163253
-73.14999999999998	0.24497704852386856
-72.14999999999998	0.2580854215648928
-71.14999999999998	0.27173096062197527
-70.14999999999998	0.2859282580947545
-69.14999999999998	0.30069206213811195
-68.14999999999998	0.3160372741646753
-67.14999999999998	0.3319789464173008
-66.14999999999998	0.34853227964013267
-65.14999999999998	0.365712620843544
-64.14999999999998	0.3835354611526497
-63.14999999999998	0.4020164337912745
-62.14999999999998	0.4211713121553553
-61.14999999999998	0.44101600801817625
-60.14999999999998	0.461566569858493
-59.14999999999998	0.48283918132631276
-58.14999999999998	0.5048501598445229
-57.14999999999998	0.5276159553517046
-56.14999999999998	0.55115314922289
-55.14999999999998	0.5754784533140801
-54.14999999999998	0.6006087092113324
-53.14999999999998	0.6265608876377485
-52.14999999999998	0.6533520880491535
-51.14999999999998	0.680995384315592

Temperature (degC)	Pressure (MPa)
-50.14999999999998	0.7095205953017923
-49.14999999999998	0.7389327439247729
-48.14999999999998	0.7692535987536532
-47.14999999999998	0.800500904120432
-46.14999999999998	0.8326925351638803
-45.14999999999998	0.8658464990083065
-44.14999999999998	0.8999809362449546
-43.14999999999998	0.9351141226287327
-42.14999999999998	0.971264471101094
-41.14999999999998	1.0084505340827514
-40.14999999999998	1.0466910060344505
-39.14999999999998	1.0860047263401456
-38.14999999999998	1.1264106824881233
-37.14999999999998	1.1679280135582817
-36.14999999999998	1.2105760140717285
-35.14999999999998	1.2543741381875066
-34.14999999999998	1.299342004324228
-33.14999999999998	1.3454994002071787
-32.14999999999998	1.39286628844005
-31.149999999999977	1.4414628126083557
-30.149999999999977	1.4913093040180514
-29.149999999999977	1.5424262891126561
-28.149999999999977	1.5948344976448774
-27.149999999999977	1.6485548716700427
-26.149999999999977	1.7036085754291053
-25.149999999999977	1.7600170062015934
-24.149999999999977	1.8178018061825634
-23.149999999999977	1.8769848754825436
-22.149999999999977	1.9375883863086927
-21.149999999999977	1.9996347984245764
-20.149999999999977	2.063146875984596
-19.149999999999977	2.1281477058471028
-18.149999999999977	2.1946607175019652
-17.149999999999977	2.2627097047248417
-16.149999999999977	2.3323188491563456
-15.149999999999977	2.4035127459519376
-14.149999999999977	2.476316431757597
-13.149999999999977	2.5507554152169174
-12.149999999999977	2.6268557103258527
-11.149999999999977	2.704643872948746
-10.149999999999977	2.7841470408962117
-9.149999999999977	2.8653929780226357
-8.149999999999977	2.9484101228675335
-7.149999999999977	3.033227642501467
-6.149999999999977	3.119875492327495

Temperature (degC)	Pressure (MPa)
-5.14999999999977	3.2083844827361268
-4.14999999999977	3.298786353698696
-3.149999999999773	3.391113858596317
-2.149999999999773	3.4854008587923775
-1.149999999999773	3.581682430810784
-0.1499999999997726	3.6799949882676533
0.8500000000000227	3.780376421186066
1.8500000000000227	3.882866255756333
2.8500000000000227	3.9875058382782034
3.8500000000000227	4.0943385476992304
4.850000000000023	4.2034100421746246
5.850000000000023	4.31476854620736
6.850000000000023	4.4284651866298885
7.850000000000023	4.544554387835177
8.850000000000023	4.663094339778851
9.850000000000023	4.784147556660249
10.850000000000023	4.90778155045086
11.850000000000023	5.034069652523437
12.850000000000023	5.163092029776435
13.850000000000023	5.294936960706055
14.850000000000023	5.429702464719825
15.850000000000023	5.567498418729623
16.850000000000023	5.708449355583634
17.850000000000023	5.852698230263408
18.850000000000023	6.000411582314148
19.850000000000023	6.151786754525916
20.850000000000023	6.307062225925004
21.850000000000023	6.46653284651482
22.850000000000023	6.630573191515367
23.850000000000023	6.799675254417933
24.850000000000023	6.974513447379861
25.850000000000023	7.1560662667963575
26.850000000000023	7.345867761972058
27.850000000000023	7.54659804371354
28.850000000000023	7.763766360387455
29.850000000000023	8.014509089808724

Table B45: Dew Points for Carbon Dioxide and 5% Argon

Temperature (degC)	Pressure (MPa)
-94.14999999999998	0.07049080698892918
-93.14999999999998	0.07543771636570061
-92.14999999999998	0.0806592649005188
-91.14999999999998	0.08616626327507788
-90.14999999999998	0.0919697390041332
-89.14999999999998	0.09808093412951274
-88.14999999999998	0.10451130283052273
-87.14999999999998	0.1112725089187788
-86.14999999999998	0.11837642327816056
-85.14999999999998	0.12583512125349453
-84.14999999999998	0.13366087995476503
-83.14999999999998	0.14186617552736952
-82.14999999999998	0.1504636803942825
-81.14999999999998	0.15946626045992954
-80.14999999999998	0.16888697229698738
-79.14999999999998	0.17873906033336687
-78.14999999999998	0.18903595402209997
-77.14999999999998	0.19979126504961175
-76.14999999999998	0.21101878452662728
-75.14999999999998	0.2227324802260912
-74.14999999999998	0.2349464938639015
-73.14999999999998	0.2476751383816463
-72.14999999999998	0.2609328953425779
-71.14999999999998	0.2747344123168397
-70.14999999999998	0.2890945003872902
-69.14999999999998	0.30402813169944237
-68.14999999999998	0.3195504370993109
-67.14999999999998	0.33567670386383186
-66.14999999999998	0.3524223735204357
-65.14999999999998	0.3698030397689813
-64.14999999999998	0.3878344465157395
-63.14999999999998	0.40653248602904424
-62.14999999999998	0.4259131971998587
-61.14999999999998	0.4459927639692359
-60.14999999999998	0.4667875138379018
-59.14999999999998	0.48831391658487855
-58.14999999999998	0.5105885830905128
-57.14999999999998	0.533628264336676
-56.14999999999998	0.5574498505844636
-55.14999999999998	0.5820703707079248
-54.14999999999998	0.6075069917376357
-53.14999999999998	0.6337770185779806
-52.14999999999998	0.6608978939420656

Temperature (degC)	Pressure (MPa)
-51.14999999999998	0.6888871985049938
-50.14999999999998	0.7177626512764701
-49.14999999999998	0.7475421102321028
-48.14999999999998	0.7782435731655178
-47.14999999999998	0.8098851788359195
-46.14999999999998	0.8424852083772287
-45.14999999999998	0.8760620869843052
-44.14999999999998	0.9106343858972169
-43.14999999999998	0.946220824688261
-42.14999999999998	0.9828402738374532
-41.14999999999998	1.0205117576392781
-40.14999999999998	1.0592544574195017
-39.14999999999998	1.0990877150771872
-38.14999999999998	1.1400310369990754
-37.14999999999998	1.1821040983210256
-36.14999999999998	1.2253267476158507
-35.14999999999998	1.269719012008567
-34.14999999999998	1.3153011027967412
-33.14999999999998	1.3620934216002127
-32.14999999999998	1.4101165671266518
-31.149999999999977	1.4593913426021827
-30.149999999999977	1.5099387639369266
-29.149999999999977	1.5617800686997962
-28.149999999999977	1.6149367259724632
-27.149999999999977	1.6694304471462542
-26.149999999999977	1.7252831977497691
-25.149999999999977	1.782517210370658
-24.149999999999977	1.8411549987658582
-23.149999999999977	1.9012193732289628
-22.149999999999977	1.9627334573488877
-21.149999999999977	2.025720706217497
-20.149999999999977	2.0902049262697044
-19.149999999999977	2.156210296847046
-18.149999999999977	2.223761393688679
-17.149999999999977	2.2928832144958813
-16.149999999999977	2.3636012068241543
-15.149999999999977	2.435941298488994
-14.149999999999977	2.5099299308147125
-13.149999999999977	2.5855940950033465
-12.149999999999977	2.6629613719892795
-11.149999999999977	2.742059976223267
-10.149999999999977	2.8229188038376223
-9.149999999999977	2.905567485801493
-8.149999999999977	2.9900364467173826
-7.149999999999977	3.076356970074486

Temperature (degC)	Pressure (MPa)
-6.149999999999977	3.1645612709046786
-5.149999999999977	3.2546825769865864
-4.149999999999977	3.3467552199472363
-3.149999999999973	3.4408147378955647
-2.149999999999973	3.5368979915251058
-1.149999999999973	3.6350432960272876
-0.1499999999999726	3.735290571584401
0.85000000000000227	3.837681515792017
1.85000000000000227	3.9422598020171944
2.85000000000000227	4.049071308488104
3.85000000000000227	4.158164383965965
4.8500000000000023	4.269590157078131
5.8500000000000023	4.383402898084197
6.8500000000000023	4.499660444056514
7.8500000000000023	4.618424701448406
8.8500000000000023	4.739762244258793
9.8500000000000023	4.863745031938617
10.8500000000000023	4.990451279724584
11.8500000000000023	5.119966526414499
12.8500000000000023	5.252384962545733
13.8500000000000023	5.387811108107353
14.8500000000000023	5.52636196750099
15.8500000000000023	5.6681698466459025
16.8500000000000023	5.813386103368198
17.8500000000000023	5.962186234781278
18.8500000000000023	6.114776916395523
19.8500000000000023	6.2714059576765555
20.8500000000000023	6.4323767528510105
21.8500000000000023	6.598069952601655
22.8500000000000023	6.768977372835844
23.8500000000000023	6.945758058686182
24.8500000000000023	7.129337710118632
25.8500000000000023	7.321100967114796
26.8500000000000023	7.523305248520224
27.8500000000000023	7.7401095043993005
28.8500000000000023	7.9809800477667485
29.8500000000000023	8.4179684023943

Table B46: Dew Points for Carbon Dioxide and 1% Methane

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.10018451962748105
-87.14999999999998	0.10666046628837886
-86.14999999999998	0.11346405593899836
-85.14999999999998	0.12060677207856742
-84.14999999999998	0.12810028462463358
-83.14999999999998	0.13595644690073677
-82.14999999999998	0.14418729259765514
-81.14999999999998	0.15280503267721776
-80.14999999999998	0.16182205224944865
-79.14999999999998	0.17125090742403207
-78.14999999999998	0.1811043221529312
-77.14999999999998	0.19139518505032702
-76.14999999999998	0.20213654622022756
-75.14999999999998	0.2133416140887897
-74.14999999999998	0.2250237522589247
-73.14999999999998	0.23719647636959773
-72.14999999999998	0.24987345098701633
-71.14999999999998	0.2630684865445871
-70.14999999999998	0.2767955363016851
-69.14999999999998	0.2910686933599092
-68.14999999999998	0.30590218773228844
-67.14999999999998	0.3213103834668671
-66.14999999999998	0.3373077758356151
-65.14999999999998	0.35390898858857817
-64.14999999999998	0.3711287712850199
-63.14999999999998	0.3889819967154398
-62.14999999999998	0.40748365837324135
-61.14999999999998	0.4266488680649977
-60.14999999999998	0.44649285356575324
-59.14999999999998	0.4670309564054388
-58.14999999999998	0.48827862974954533
-57.14999999999998	0.5102514363771019
-56.14999999999998	0.5329650467904076
-55.14999999999998	0.5564352374168505
-54.14999999999998	0.5806778889617625
-53.14999999999998	0.6057089848564913
-52.14999999999998	0.6315446098697195
-51.14999999999998	0.6582009488253884
-50.14999999999998	0.6856942854829998
-49.14999999999998	0.7140410015631697
-48.14999999999998	0.743257575921682
-47.14999999999998	0.773360583886578
-46.14999999999998	0.8043666967641538

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8362926815175796
-44.14999999999998	0.8691554006235174
-43.14999999999998	0.9029718121036142
-42.14999999999998	0.9377589697575343
-41.14999999999998	0.973534023574476
-40.14999999999998	1.010314220329819
-39.14999999999998	1.0481169043849277
-38.14999999999998	1.0869595186731176
-37.14999999999998	1.1268596058629092
-36.14999999999998	1.1678348097342799
-35.14999999999998	1.209902876736055
-34.14999999999998	1.2530816577522919
-33.14999999999998	1.2973891100968333
-32.14999999999998	1.342843299720915
-31.149999999999977	1.3894624037096448
-30.149999999999977	1.43726471304723
-29.149999999999977	1.4862686357315935
-28.149999999999977	1.536492700245792
-27.149999999999977	1.5879555594550387
-26.149999999999977	1.6406759949604914
-25.149999999999977	1.6946729219767234
-24.149999999999977	1.7499653947601108
-23.149999999999977	1.806572612646691
-22.149999999999977	1.8645139267425674
-21.149999999999977	1.9238088472878996
-20.149999999999977	1.9844770517672479
-19.149999999999977	2.046538393761093
-18.149999999999977	2.110012912602477
-17.149999999999977	2.1749208438474095
-16.149999999999977	2.2412826306255766
-15.149999999999977	2.3091189358890793
-14.149999999999977	2.378450655621362
-13.149999999999977	2.449298933064908
-12.149999999999977	2.5216851740470867
-11.149999999999977	2.5956310634972812
-10.149999999999977	2.671158583269503
-9.149999999999977	2.748290031412101
-8.149999999999977	2.8270480430743183
-7.149999999999977	2.907455613240143
-6.149999999999977	2.989536121564533
-5.149999999999977	3.073313359616872
-4.149999999999977	3.1588115608976257
-3.1499999999999773	3.246055434066425
-2.1499999999999773	3.3350701998956396
-1.1499999999999773	3.425881632541419

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.518516105821106
0.85000000000000227	3.613000645285434
1.85000000000000227	3.7093629869681646
2.85000000000000227	3.8076316438151587
3.85000000000000227	3.9078359809117083
4.8500000000000023	4.010006300788
5.8500000000000023	4.114173940238173
6.8500000000000023	4.220371380391267
7.8500000000000023	4.328632372140421
8.8500000000000023	4.43899207969157
9.8500000000000023	4.551487245945209
10.8500000000000023	4.666156384980603
11.8500000000000023	4.783040009187278
12.8500000000000023	4.9021809020612945
13.8500000000000023	5.023624452624576
14.8500000000000023	5.1474190745263915
15.8500000000000023	5.2736167425805744
16.8500000000000023	5.402273693012142
17.8500000000000023	5.533451351815426
18.8500000000000023	5.667217581104099
19.8500000000000023	5.803648370400555
20.8500000000000023	5.942830159639559
21.8500000000000023	6.084863089360401
22.8500000000000023	6.229865696069974
23.8500000000000023	6.377982068755662
24.8500000000000023	6.529393674282106
25.8500000000000023	6.6843410970538
26.8500000000000023	6.843169364637557
27.8500000000000023	7.00643750230868
28.8500000000000023	7.175245564939566
29.8500000000000023	7.352739602688496

Table B47: Dew Points for Carbon Dioxide and 2% Methane

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08909059615911546
-89.14999999999998	0.0950070455439322
-88.14999999999998	0.10123209337823787
-87.14999999999998	0.10777697474296624
-86.14999999999998	0.11465312022858758
-85.14999999999998	0.12187215311447065
-84.14999999999998	0.12944588646073382
-83.14999999999998	0.1373863201291254
-82.14999999999998	0.14570563779861267
-81.14999999999998	0.15441620389926583
-80.14999999999998	0.16353056054316506
-79.14999999999998	0.17306142442045358
-78.14999999999998	0.1830216836765627
-77.14999999999998	0.19342439480168439
-76.14999999999998	0.20428277950295792
-75.14999999999998	0.21561022160265056
-74.14999999999998	0.22742026393391893
-73.14999999999998	0.23972660528178383
-72.14999999999998	0.25254309733655556
-71.14999999999998	0.26588374168877454
-70.14999999999998	0.2797626868869116
-69.14999999999998	0.29419422551772373
-68.14999999999998	0.3091927913542601
-67.14999999999998	0.32477295657668237
-66.14999999999998	0.3409494290482595
-65.14999999999998	0.35773704967262693
-64.14999999999998	0.3751507898237364
-63.14999999999998	0.39320574887394794
-62.14999999999998	0.41191715179738525
-61.14999999999998	0.4313003468804936
-60.14999999999998	0.4513708035278578
-59.14999999999998	0.47214411017893565
-58.14999999999998	0.4936359723254801
-57.14999999999998	0.5158622106638393
-56.14999999999998	0.5388387593488708
-55.14999999999998	0.5625816643891227
-54.14999999999998	0.5871070821608727
-53.14999999999998	0.6124312780811321
-52.14999999999998	0.6385706253937008
-51.14999999999998	0.6655416041433336
-50.14999999999998	0.6933608002640164
-49.14999999999998	0.7220449048651801
-48.14999999999998	0.7516107136778313

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7820751266726664
-46.14999999999998	0.8134551478677141
-45.14999999999998	0.8457678853374695
-44.14999999999998	0.8790305514076306
-43.14999999999998	0.9132604630618689
-42.14999999999998	0.9484750425713199
-41.14999999999998	0.9846918183049086
-40.14999999999998	1.0219284257893253
-39.14999999999998	1.0602026089595211
-38.14999999999998	1.099532221645016
-37.14999999999998	1.1399352292548588
-36.14999999999998	1.1814297107091214
-35.14999999999998	1.2240338605795205
-34.14999999999998	1.267765991490236
-33.14999999999998	1.3126445367774395
-32.14999999999998	1.358688053426599
-31.149999999999977	1.4059152253455653
-30.149999999999977	1.4543448669866736
-29.149999999999977	1.5039959273819323
-28.149999999999977	1.554887494632574
-27.149999999999977	1.6070388009068854
-26.149999999999977	1.6604692280131823
-25.149999999999977	1.7151983135857058
-24.149999999999977	1.771245757964168
-23.149999999999977	1.8286314318001797
-22.149999999999977	1.8873753844531995
-21.149999999999977	1.9474978532173157
-20.149999999999977	2.009019273442447
-19.149999999999977	2.071960289592705
-18.149999999999977	2.136341767280672
-17.149999999999977	2.202184806346274
-16.149999999999977	2.2695107550610047
-15.149999999999977	2.338341225477792
-14.149999999999977	2.4086981100711804
-13.149999999999977	2.480603599732052
-12.149999999999977	2.554080203254371
-11.149999999999977	2.629150768469711
-10.149999999999977	2.705838505198476
-9.149999999999977	2.7841670102401297
-8.149999999999977	2.864160294680921
-7.149999999999977	2.945842813810474
-6.149999999999977	3.029239500056447
-5.149999999999977	3.1143757993668006
-4.149999999999977	3.2012777116076454
-3.1499999999999773	3.289971835605353

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.380485419608758
-1.149999999999773	3.47284641806305
-0.1499999999997726	3.567083555756916
0.8500000000000227	3.663226400577616
1.8500000000000227	3.761305446295925
2.8500000000000227	3.861352207061513
3.8500000000000227	3.9633993255461935
4.850000000000023	4.067480697039043
5.850000000000023	4.17363161223192
6.850000000000023	4.2818889220802925
7.850000000000023	4.392291229009696
8.850000000000023	4.504879110035593
9.850000000000023	4.61969537934396
10.850000000000023	4.7367854007553145
11.850000000000023	4.856197464812008
12.850000000000023	4.977983251532012
13.850000000000023	5.102198409090366
14.850000000000023	5.228903291935818
15.850000000000023	5.358163921057101
16.850000000000023	5.490053256730952
17.850000000000023	5.624652914943351
18.850000000000023	5.7620555207457285
19.850000000000023	5.9023679922073615
20.850000000000023	6.04571622357428
21.850000000000023	6.19225196969841
22.850000000000023	6.342163426898668
23.850000000000023	6.495692567066362
24.850000000000023	6.653166090625623
25.850000000000023	6.815057045120685
26.850000000000023	6.982125042313826
27.850000000000023	7.1557978371575786
28.850000000000023	7.339581253150158
29.850000000000023	7.606401734076035

Table B48: Dew Points for Carbon Dioxide and 3% Methane

Temperature (degC)	Pressure (MPa)
-92.1499999999998	0.07896162328788485
-91.1499999999998	0.08435073551765333
-90.1499999999998	0.09002973496402866
-89.1499999999998	0.0960095870465088
-88.1499999999998	0.1023014614857905
-87.1499999999998	0.10891672962262809
-86.1499999999998	0.11586696172959277
-85.1499999999998	0.12316392417898797
-84.1499999999998	0.13081957660089263
-83.1499999999998	0.13884606894579538
-82.1499999999998	0.14725573853691856
-81.1499999999998	0.15606110705093543
-80.1499999999998	0.16527487749571335
-79.1499999999998	0.1749099311610186
-78.1499999999998	0.18497932454306543
-77.1499999999998	0.19549628630079502
-76.1499999999998	0.2064742141761115
-75.1499999999998	0.2179266719530569
-74.1499999999998	0.22986738642409787
-73.1499999999998	0.2423102443953853
-72.1499999999998	0.2552692897128463
-71.1499999999998	0.2687587203386751
-70.1499999999998	0.28279288547940873
-69.1499999999998	0.2973862827536812
-68.1499999999998	0.31255355543858326
-67.1499999999998	0.32830948977599816
-66.1499999999998	0.3446690123501228
-65.1499999999998	0.36164718754771363
-64.1499999999998	0.37925921510918975
-63.1499999999998	0.3975204277664378
-62.1499999999998	0.41644628896855623
-61.1499999999998	0.43605239073643304
-60.1499999999998	0.4563544515987564
-59.1499999999998	0.47736831465663593
-58.1499999999998	0.4991099457717171
-57.1499999999998	0.521595431865229
-56.1499999999998	0.5448409793579337
-55.1499999999998	0.5688629127537459
-54.1499999999998	0.5936776733553418
-53.1499999999998	0.6193018181317969
-52.1499999999998	0.6457520187535971
-51.1499999999998	0.6730450607747107
-50.1499999999998	0.7011978430043866

Temperature (degC)	Pressure (MPa)
-49.1499999999998	0.7302273770472072
-48.1499999999998	0.7601507870374463
-47.1499999999998	0.790985309573074
-46.1499999999998	0.8227482938456293
-45.1499999999998	0.855457202010026
-44.1499999999998	0.889129609738538
-43.1499999999998	0.9237832070435212
-42.1499999999998	0.9594357993023515
-41.1499999999998	0.9961053085438452
-40.1499999999998	1.033809774955833
-39.1499999999998	1.0725673586400288
-38.1499999999998	1.112396341623395
-37.1499999999998	1.153315130095382
-36.1499999999998	1.1953422569272405
-35.1499999999998	1.2384963844459567
-34.1499999999998	1.2827963074947644
-33.1499999999998	1.3282609568304922
-32.1499999999998	1.3749094028403674
-31.14999999999977	1.422760859684616
-30.14999999999977	1.4718346898485537
-29.14999999999977	1.5221504092116167
-28.14999999999977	1.5737276926706438
-27.14999999999977	1.6265863803681777
-26.14999999999977	1.6807464846207298
-25.14999999999977	1.7362281975835807
-24.14999999999977	1.7930518997336558
-23.14999999999977	1.8512381692101314
-22.14999999999977	1.9108077921171303
-21.14999999999977	1.971781773791773
-20.14999999999977	2.0341813511579514
-19.14999999999977	2.0980280061873975
-18.14999999999977	2.1633434805885368
-17.14999999999977	2.2301497917421056
-16.14999999999977	2.2984692500575057
-15.14999999999977	2.368324477776094
-14.14999999999977	2.4397384294263396
-13.14999999999977	2.5127344140332566
-12.14999999999977	2.587336119271649
-11.14999999999977	2.6635676378191717
-10.14999999999977	2.7414534961030554
-9.14999999999977	2.821018685811749
-8.14999999999977	2.9022886984987517
-7.14999999999977	2.9852895637481907
-6.14999999999977	3.0700478914109244
-5.14999999999977	3.1565909185600582

Temperature (degC)	Pressure (MPa)
-4.14999999999977	3.244946561920247
-3.149999999999773	3.335143476665063
-2.149999999999773	3.4272111226795614
-1.149999999999773	3.5211798395419383
-0.1499999999997726	3.6170809317670543
0.8500000000000227	3.714946766085645
1.8500000000000227	3.8148108829163174
2.8500000000000227	3.9167081245243156
3.8500000000000227	4.020674782912146
4.850000000000023	4.126748771069665
5.850000000000023	4.234969822044614
6.850000000000023	4.34537972144031
7.850000000000023	4.458022580486887
8.850000000000023	4.5729451591579355
9.850000000000023	4.690197252104507
10.850000000000023	4.809832155081572
11.850000000000023	4.931907236743438
12.850000000000023	5.05648465126343
13.850000000000023	5.1836322428381285
14.850000000000023	5.3134247159873755
15.850000000000023	5.445945179648193
16.850000000000023	5.581287224088494
17.850000000000023	5.719557768741382
18.850000000000023	5.8608810462706975
19.850000000000023	6.005404305472956
20.850000000000023	6.15330621417984
21.850000000000023	6.304809735052514
22.850000000000023	6.460202953644872
23.850000000000023	6.619875338484629
24.850000000000023	6.784387210981425
25.850000000000023	6.954620056462001
26.850000000000023	7.132158300464946
27.850000000000023	7.320532888432251
28.850000000000023	7.532630784666799

Table B49: Dew Points for Carbon Dioxide and 4% Methane

Temperature (degC)	Pressure (MPa)
-94.14999999999998	0.06974241386151744
-93.14999999999998	0.07463589838479395
-92.14999999999998	0.07980093700783238
-91.14999999999998	0.08524820492810407
-90.14999999999998	0.09098858997313446
-89.14999999999998	0.09703319018660096
-88.14999999999998	0.10339331131512329
-87.14999999999998	0.11008046419886779
-86.14999999999998	0.11710636209448443
-85.14999999999998	0.12448291790668047
-84.14999999999998	0.13222224137128605
-83.14999999999998	0.14033663618498268
-82.14999999999998	0.14883859707946911
-81.14999999999998	0.15774080687125236
-80.14999999999998	0.16705613349255113
-79.14999999999998	0.17679762697581075
-78.14999999999998	0.18697851647107283
-77.14999999999998	0.19761220721718467
-76.14999999999998	0.208712277562024
-75.14999999999998	0.22029247597047066
-74.14999999999998	0.23236671806920464
-73.14999999999998	0.24494908371875893
-72.14999999999998	0.2580538141207714
-71.14999999999998	0.2716953089778357
-70.14999999999998	0.28588812370324784
-69.14999999999998	0.3006469666861076
-68.14999999999998	0.31598669662882234
-67.14999999999998	0.3319223199592151
-66.14999999999998	0.34846898831098777
-65.14999999999998	0.3656419961073026
-64.14999999999998	0.3834567782182791
-63.14999999999998	0.40192890773423184
-62.14999999999998	0.42107409383050765
-61.14999999999998	0.4409081797492046
-60.14999999999998	0.46144714090451106
-59.14999999999998	0.4827070830907923
-58.14999999999998	0.5047042408456827
-57.14999999999998	0.5274549759282935
-56.14999999999998	0.5509757759539815
-55.14999999999998	0.5752832531625579
-54.14999999999998	0.6003941433646035
-53.14999999999998	0.6263253050268291
-52.14999999999998	0.6530937185479616

Temperature (degC)	Pressure (MPa)
-51.1499999999998	0.6807164856999949
-50.1499999999998	0.7092108292770702
-49.1499999999998	0.7385940929165619
-48.1499999999998	0.7688837411614876
-47.1499999999998	0.8000973597112246
-46.1499999999998	0.8322526559240012
-45.1499999999998	0.8653674595439562
-44.1499999999998	0.8994597236790793
-43.1499999999998	0.9345475260384197
-42.1499999999998	0.9706490704059093
-41.1499999999998	1.0077826884035148
-40.1499999999998	1.0459668415012218
-39.1499999999998	1.0852201232952503
-38.1499999999998	1.1255612620719937
-37.1499999999998	1.1670091236481388
-36.1499999999998	1.2095827145006464
-35.1499999999998	1.2533011852248448
-34.1499999999998	1.2981838343335614
-33.1499999999998	1.344250112429569
-32.1499999999998	1.3915196268127779
-31.14999999999977	1.4400121465574012
-30.14999999999977	1.4897476081227266
-29.14999999999977	1.540746121576897
-28.14999999999977	1.5930279774662075
-27.14999999999977	1.646613654439074
-26.14999999999977	1.7015238276710496
-25.14999999999977	1.7577793781614706
-24.14999999999977	1.8154014029935257
-23.14999999999977	1.8744112265964805
-22.14999999999977	1.9348304131173806
-21.14999999999977	1.9966807799490798
-20.14999999999977	2.059984412518854
-19.14999999999977	2.1247636804170273
-18.14999999999977	2.19104125496785
-17.14999999999977	2.258840128359526
-16.14999999999977	2.3281836344752778
-15.14999999999977	2.3990954715568122
-14.14999999999977	2.471599726927633
-13.14999999999977	2.54572090391968
-12.14999999999977	2.6214839513350405
-11.14999999999977	2.6989142956620604
-10.14999999999977	2.778037876466677
-9.14999999999977	2.858881185304043
-8.14999999999977	2.9414713087108195
-7.14999999999977	3.0258359758318765

Temperature (degC)	Pressure (MPa)
-6.149999999999977	3.1120036114023004
-5.149999999999977	3.2000033949292574
-4.149999999999977	3.289865327112045
-3.149999999999973	3.381620304689438
-2.149999999999973	3.4753002052147877
-1.149999999999973	3.5709379834779424
-0.1499999999999726	3.6685677817085556
0.8500000000000227	3.7682250560464903
1.8500000000000227	3.8699467223146025
2.8500000000000227	3.9737713247211355
3.8500000000000227	4.079739231902741
4.850000000000023	4.187892865715817
5.850000000000023	4.298276969513547
6.850000000000023	4.410938924462712
7.850000000000023	4.5259291249929765
8.850000000000023	4.643301428151684
9.850000000000023	4.763113696897442
10.850000000000023	4.885428465190981
11.850000000000023	5.010313764165527
12.850000000000023	5.137844165683005
13.850000000000023	5.268102124828618
14.850000000000023	5.401179740926422
15.850000000000023	5.537181114431979
16.850000000000023	5.6762255670672594
17.850000000000023	5.818452137348245
18.850000000000023	5.964026007652209
19.850000000000023	6.1131479556934485
20.850000000000023	6.266068762454213
21.850000000000023	6.423112253355486
22.850000000000023	6.584714597195334
23.850000000000023	6.751497302288575
24.850000000000023	6.924418718302295
25.850000000000023	7.1051382084283725
26.850000000000023	7.297102588124197
27.850000000000023	7.510520479942574

Table B50: Dew Points for Carbon Dioxide and 5% Methane

Temperature (degC)	Pressure (MPa)
-96.1499999999998	0.061378397856828956
-95.1499999999998	0.06580742313851996
-94.1499999999998	0.07049009123681957
-93.1499999999998	0.07543676734634498
-92.1499999999998	0.08065803714473092
-91.1499999999998	0.08616470464048931
-90.1499999999998	0.09196778990730796
-89.1499999999998	0.0980785267199032
-88.1499999999998	0.10450836007376159
-87.1499999999998	0.11126894362142459
-86.1499999999998	0.11837213702756616
-85.1499999999998	0.12583000326641258
-84.1499999999998	0.13365480583726336
-83.1499999999998	0.141859005945404
-82.1499999999998	0.1504552596345119
-81.1499999999998	0.15945641488091977
-80.1499999999998	0.1688755086857085
-79.1499999999998	0.17872576411999613
-78.1499999999998	0.18902058739394623
-77.1499999999998	0.19977356491107948
-76.1499999999998	0.2109984603367672
-75.1499999999998	0.22270921169534358
-74.1499999999998	0.23491992847673016
-73.1499999999998	0.24764488879312263
-72.1499999999998	0.2608985365732891
-71.1499999999998	0.2746954788100689
-70.1499999999998	0.28905048285330937
-69.1499999999998	0.30397847378848786
-68.1499999999998	0.31949453186881244
-67.1499999999998	0.33561389003538394
-66.1499999999998	0.3523519315260866
-65.1499999999998	0.3697241875551467
-64.1499999999998	0.3877463351338003
-63.1499999999998	0.406434194956931
-62.1499999999998	0.4258037294148992
-61.1499999999998	0.4458710407358893
-60.1499999999998	0.46665236924400727
-59.1499999999998	0.48816409174899345
-58.1499999999998	0.5104227200765339
-57.1499999999998	0.533444899753224
-56.1499999999998	0.5572474088352107
-55.1499999999998	0.5818471568911803
-54.1499999999998	0.6072611841863802

Temperature (degC)	Pressure (MPa)
-53.14999999999998	0.6335066610024801
-52.14999999999998	0.6606008871787226
-51.14999999999998	0.6885612918317512
-50.14999999999998	0.7174054332931045
-49.14999999999998	0.7471509992522735
-48.14999999999998	0.7778158071526098
-47.14999999999998	0.8094178048059101
-46.14999999999998	0.8419750712725953
-45.14999999999998	0.8755058180016928
-44.14999999999998	0.9100283902314568
-43.14999999999998	0.9455612686825752
-42.14999999999998	0.9821230715200953
-41.14999999999998	1.0197325566085722
-40.14999999999998	1.0584086240516721
-39.14999999999998	1.0981703190385195
-38.14999999999998	1.1390368349950497
-37.14999999999998	1.1810275170497129
-36.14999999999998	1.2241618658533224
-35.14999999999998	1.2684595417705227
-34.14999999999998	1.3139403694758542
-33.14999999999998	1.360624343011685
-32.14999999999998	1.4085316313605036
-31.149999999999977	1.4576825845812422
-30.149999999999977	1.5080977406034457
-29.149999999999977	1.559797832717746
-28.149999999999977	1.6128037978612542
-27.149999999999977	1.6671367857650456
-26.149999999999977	1.7228181690354183
-25.149999999999977	1.7798695542560778
-24.149999999999977	1.8383127941821296
-23.149999999999977	1.8981700011064337
-22.149999999999977	1.959463561504558
-21.149999999999977	2.022216152021771
-20.149999999999977	2.086450756945889
-19.149999999999977	2.1521906872539462
-18.149999999999977	2.2194596013878405
-17.149999999999977	2.288281527906202
-16.149999999999977	2.3586808902056995
-15.149999999999977	2.430682533508773
-14.149999999999977	2.504311754363925
-13.149999999999977	2.57959433293717
-12.149999999999977	2.656556568446608
-11.149999999999977	2.7352253180973247
-10.149999999999977	2.8156280399918696
-9.149999999999977	2.8977928405664106

Temperature (degC)	Pressure (MPa)
-8.14999999999977	2.9817485271826736
-7.14999999999977	3.0675246666569276
-6.14999999999977	3.1551516506595316
-5.14999999999977	3.244660769086492
-4.14999999999977	3.3360842927524894
-3.14999999999973	3.42945556702465
-2.14999999999973	3.5248091183279757
-1.14999999999973	3.6221807758978417
-0.149999999999726	3.721607811587952
0.8500000000000227	3.8231291011792057
1.8500000000000227	3.9267853113466247
2.8500000000000227	4.032619117329215
3.8500000000000227	4.140675457551053
4.850000000000023	4.251001832912788
5.850000000000023	4.363648660507061
6.850000000000023	4.478669694308115
7.850000000000023	4.5961225292573
8.850000000000023	4.716069210813733
9.850000000000023	4.838576980157022
10.850000000000023	4.963719197226193
11.850000000000023	5.091576501589085
12.850000000000023	5.222238297790061
13.850000000000023	5.355804692069294
14.850000000000023	5.492389069245076
15.850000000000023	5.6321215951115855
16.850000000000023	5.775154085204057
17.850000000000023	5.921666940713377
18.850000000000023	6.071879309647981
19.850000000000023	6.22606448860251
20.850000000000023	6.384574310078944
21.850000000000023	6.547880051682237
22.850000000000023	6.71664652884014
23.850000000000023	6.891880596638468
24.850000000000023	7.07527190701751
25.850000000000023	7.270141930036716
26.850000000000023	7.485163482594009

Table B51: Dew Points for Carbon Dioxide and 1% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.10018697444376888
-87.14999999999998	0.10666328625531726
-86.14999999999998	0.11346728845870263
-85.14999999999998	0.12061046981760476
-84.14999999999998	0.12810450601175571
-83.14999999999998	0.1359612566574121
-82.14999999999998	0.1441927622927038
-81.14999999999998	0.1528112413373042
-80.14999999999998	0.1618290870072108
-79.14999999999998	0.17125886420642122
-78.14999999999998	0.18111330642655668
-77.14999999999998	0.19140531260268787
-76.14999999999998	0.2021479440064503
-75.14999999999998	0.21335442113545577
-74.14999999999998	0.225038120607774
-73.14999999999998	0.23721257209693275
-72.14999999999998	0.2498914552904197
-71.14999999999998	0.26308859687492747
-70.14999999999998	0.2768179675942393
-69.14999999999998	0.2910936793183653
-68.14999999999998	0.30592998219552503
-67.14999999999998	0.3213412618572745
-66.14999999999998	0.33734203669964985
-65.14999999999998	0.3539469552070126
-64.14999999999998	0.37117079340316095
-63.14999999999998	0.38902845234145006
-62.14999999999998	0.4075349557072537
-61.14999999999998	0.426705447510942
-60.14999999999998	0.4465551898754196
-59.14999999999998	0.4670995609347909
-58.14999999999998	0.488354052825999
-57.14999999999998	0.5103342698201068
-56.14999999999998	0.5330559265464457
-55.14999999999998	0.5565348463570603
-54.14999999999998	0.5807869598134439
-53.14999999999998	0.6058283033063677
-52.14999999999998	0.6316750178209003
-51.14999999999998	0.6583433478451548
-50.14999999999998	0.6858496404260773
-49.14999999999998	0.7142103443837697
-48.14999999999998	0.7434420097068001
-47.14999999999998	0.7735612870931965
-46.14999999999998	0.8045849276932433

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8365297830301135
-44.14999999999998	0.8694128051035332
-43.14999999999998	0.9032510467141759
-42.14999999999998	0.9380616619623401
-41.14999999999998	0.973861906970261
-40.14999999999998	1.0106691408080262
-39.14999999999998	1.0485008266277724
-38.14999999999998	1.087374533001683
-37.14999999999998	1.12730793548376
-36.14999999999998	1.1683188183719968
-35.14999999999998	1.2104250767128322
-34.14999999999998	1.2536447185165307
-33.14999999999998	1.2979958672429628
-32.14999999999998	1.3434967645441063
-31.149999999999977	1.3901657733209276
-30.149999999999977	1.4380213811109273
-29.149999999999977	1.4870822038531084
-28.149999999999977	1.537366990089157
-27.149999999999977	1.5888946256324192
-26.149999999999977	1.6416841387688672
-25.149999999999977	1.6957547060400522
-24.149999999999977	1.7511256586638482
-23.149999999999977	1.8078164896374977
-22.149999999999977	1.8658468615815595
-21.149999999999977	1.9252366153612732
-20.149999999999977	1.986005779540565
-19.149999999999977	2.0481745807054526
-18.149999999999977	2.1117634547137913
-17.149999999999977	2.1767930589065787
-16.149999999999977	2.2432842853569706
-15.149999999999977	2.3112582751974027
-14.149999999999977	2.38073643410926
-13.149999999999977	2.451740449084758
-12.149999999999977	2.5242923065304477
-11.149999999999977	2.598414311875407
-10.149999999999977	2.6741291108324967
-9.149999999999977	2.7514597124947597
-8.149999999999977	2.830429514515848
-7.149999999999977	2.911062330630449
-6.149999999999977	2.9933824208736195
-5.149999999999977	3.0774145248522515
-4.149999999999977	3.1631838985944007
-3.1499999999999773	3.2507163554858813
-2.1499999999999773	3.3400383119785904
-1.1499999999999773	3.4311768388304733

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.5241597187838893
0.85000000000000227	3.6190155117152925
1.85000000000000227	3.7157736284754215
2.85000000000000227	3.814464414805031
3.85000000000000227	3.915119246922716
4.8500000000000023	4.0177706406847316
5.8500000000000023	4.122452376484513
6.8500000000000023	4.229199642590419
7.8500000000000023	4.33804920018456
8.8500000000000023	4.449039574357424
9.8500000000000023	4.562211276648406
10.8500000000000023	4.677607066780396
11.8500000000000023	4.795272264250176
12.8500000000000023	4.915255124799515
13.8500000000000023	5.037607303152247
14.8500000000000023	5.162384432368544
15.8500000000000023	5.28964686286543
16.8500000000000023	5.419460621897503
17.8500000000000023	5.5518986793247125
18.8500000000000023	5.687042641286884
19.8500000000000023	5.8249850468339295
20.8500000000000023	5.965832527481675
21.8500000000000023	6.109710236482564
22.8500000000000023	6.256768231808835
23.8500000000000023	6.4071910630628475
24.8500000000000023	6.561213045423193
25.8500000000000023	6.719144544797105
26.8500000000000023	6.8814215590476975
27.8500000000000023	7.048709440181304
28.8500000000000023	7.222148630593573
29.8500000000000023	7.404057513998676
30.8500000000000023	7.601004200704638

Table B52: Dew Points for Carbon Dioxide and 2% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08909368912101667
-89.14999999999998	0.09501063988392343
-88.14999999999998	0.10123625891910444
-87.14999999999998	0.10778178955021663
-86.14999999999998	0.11465867143742699
-85.14999999999998	0.12187853778780162
-84.14999999999998	0.129453212529829
-83.14999999999998	0.13739470741648174
-82.14999999999998	0.14571521908783455
-81.14999999999998	0.15442712610341516
-80.14999999999998	0.1635429859516419
-79.14999999999998	0.17307553202792683
-78.14999999999998	0.18303767062066972
-77.14999999999998	0.19344247787929167
-76.14999999999998	0.20430319679884862
-75.14999999999998	0.21563323422509478
-74.14999999999998	0.22744615785910113
-73.14999999999998	0.23975569332830632
-72.14999999999998	0.2525757212433183
-71.14999999999998	0.2659202743525337
-70.14999999999998	0.27980353471390534
-69.14999999999998	0.29423983092824024
-68.14999999999998	0.30924363544263306
-67.14999999999998	0.3248295619260298
-66.14999999999998	0.34101236270963403
-65.14999999999998	0.3578069263242184
-64.14999999999998	0.3752282751081487
-63.14999999999998	0.39329156293625667
-62.14999999999998	0.41201207301262255
-61.14999999999998	0.431405215802258
-60.14999999999998	0.4514865270543907
-59.14999999999998	0.47227166595249476
-58.14999999999998	0.4937764133801869
-57.14999999999998	0.5160166703199562
-56.14999999999998	0.5390084563865348
-55.14999999999998	0.5627679084966889
-54.14999999999998	0.5873112796907872
-53.14999999999998	0.6126549381029117
-52.14999999999998	0.6388153660936597
-51.14999999999998	0.6658091595505322
-50.14999999999998	0.6936530273645506
-49.14999999999998	0.7223637910890408
-48.14999999999998	0.7519583847898395

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7824538551029235
-46.14999999999998	0.8138673614971822
-45.14999999999998	0.8462161767572889
-44.14999999999998	0.8795176876931149
-43.14999999999998	0.913789396085994
-42.14999999999998	0.9490489198616967
-41.14999999999998	0.9853139945238298
-40.14999999999998	1.022602474818737
-39.14999999999998	1.0609323366493197
-38.14999999999998	1.1003216792507204
-37.14999999999998	1.1407887276193207
-36.14999999999998	1.182351835207137
-35.14999999999998	1.225029486912079
-34.14999999999998	1.2688403023534933
-33.14999999999998	1.313803039496707
-32.14999999999998	1.3599365986317382
-31.14999999999977	1.407260026773512
-30.14999999999977	1.4557925225123143
-29.14999999999977	1.5055534413755245
-28.14999999999977	1.5565623017724
-27.14999999999977	1.608838791555482
-26.14999999999977	1.6624027752972854
-25.14999999999977	1.7172743022981378
-24.14999999999977	1.773473615447694
-23.14999999999977	1.831021160932666
-22.14999999999977	1.8899375989166238
-21.14999999999977	1.950243815207925
-20.14999999999977	2.0119609340125133
-19.14999999999977	2.0751103318175668
-18.14999999999977	2.1397136525065474
-17.14999999999977	2.205792823776506
-16.14999999999977	2.2733700749637795
-15.14999999999977	2.3424679563957196
-14.14999999999977	2.4131093604032925
-13.14999999999977	2.4853175441482835
-12.14999999999977	2.5591161544558645
-11.14999999999977	2.634529254878463
-10.14999999999977	2.7115813552363877
-9.14999999999977	2.790297443953582
-8.14999999999977	2.870703023556422
-7.14999999999977	2.952824149755428
-6.14999999999977	3.0366874746308796
-5.14999999999977	3.122320294541338
-4.14999999999977	3.209750603460889
-3.149999999999773	3.299007152631627

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.390119517523675
-1.149999999999773	3.4831181733468295
-0.1499999999997726	3.5780345805109444
0.8500000000000227	3.6749012817374247
1.8500000000000227	3.773752012804101
2.8500000000000227	3.874621829277221
3.8500000000000227	3.977547251986264
4.850000000000023	4.082566434590919
5.850000000000023	4.189719357218227
6.850000000000023	4.299048051089665
7.850000000000023	4.410596860303253
8.850000000000023	4.524412748648895
9.850000000000023	4.640545661812185
10.850000000000023	4.759048958893321
11.850000000000023	4.879979932206529
12.850000000000023	5.003400441752048
13.850000000000023	5.1293777012670185
14.850000000000023	5.2579852679125105
15.850000000000023	5.389304309363914
16.850000000000023	5.52342525329235
17.850000000000023	5.660449969665633
18.850000000000023	5.800494704024695
19.850000000000023	5.943694084374416
20.850000000000023	6.090206694373732
21.850000000000023	6.240223000490685
22.850000000000023	6.393976969130272
23.850000000000023	6.5517637996916696
24.850000000000023	6.713968503518486
25.850000000000023	6.881115230340172
26.850000000000023	7.053959655327077
27.850000000000023	7.233679301019946
28.850000000000023	7.422314654712571
29.850000000000023	7.623994887275825
30.850000000000023	7.850738239970036

Table B53: Dew Points for Carbon Dioxide and 3% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-93.14999999999998	0.07385389891547842
-92.14999999999998	0.07896430860526371
-91.14999999999998	0.0843539132917475
-90.14999999999998	0.09003348015809784
-89.14999999999998	0.09601398413920784
-88.14999999999998	0.10230660545632057
-87.14999999999998	0.10892272703028243
-86.14999999999998	0.1158739318644392
-85.14999999999998	0.12317200031978288
-84.14999999999998	0.13082890736048403
-83.14999999999998	0.13885681972896874
-82.14999999999998	0.14726809309390307
-81.14999999999998	0.15607526915818126
-80.14999999999998	0.16529107275683205
-79.14999999999998	0.17492840893030245
-78.14999999999998	0.18500035998979258
-77.14999999999998	0.19552018261520743
-76.14999999999998	0.20650130492230612
-75.14999999999998	0.21795732357658168
-74.14999999999998	0.2299020009476578
-73.14999999999998	0.24234926225609027
-72.14999999999998	0.25531319280833437
-71.14999999999998	0.26880803525707075
-70.14999999999998	0.2828481869270224
-69.14999999999998	0.2974481972101472
-68.14999999999998	0.31262276501216923
-67.14999999999998	0.32838673631438775
-66.14999999999998	0.34475510178846214
-65.14999999999998	0.36174299451293873
-64.14999999999998	0.37936568779457186
-63.14999999999998	0.3976385930898304
-62.14999999999998	0.41657725803600737
-61.14999999999998	0.43619736460632397
-60.14999999999998	0.4565147273783128
-59.14999999999998	0.47754529194720485
-58.14999999999998	0.4993051334617302
-57.14999999999998	0.5218104553157709
-56.14999999999998	0.5450775879831324
-55.14999999999998	0.5691229880128296
-54.14999999999998	0.5939632371847274
-53.14999999999998	0.6196150418553438
-52.14999999999998	0.6460952324556826
-51.14999999999998	0.6734207632154671

Temperature (degC)	Pressure (MPa)
-50.14999999999998	0.7016087120568631
-49.14999999999998	0.7306762807199647
-48.14999999999998	0.7606407951020165
-47.14999999999998	0.7915197058256148
-46.14999999999998	0.8233305890626945
-45.14999999999998	0.8560911475875665
-44.14999999999998	0.8898192121089092
-43.14999999999998	0.9245327428554446
-42.14999999999998	0.9602498314415739
-41.14999999999998	0.9969887029983138
-40.14999999999998	1.034767718596616
-39.14999999999998	1.0736053779518604
-38.14999999999998	1.1135203224242145
-37.14999999999998	1.1545313383350586
-36.14999999999998	1.1966573606146775
-35.14999999999998	1.239917476790457
-34.14999999999998	1.2843309313892746
-33.14999999999998	1.3299171307534277
-32.14999999999998	1.3766956483383503
-31.149999999999977	1.4246862305544299
-30.149999999999977	1.4739088031911884
-29.149999999999977	1.5243834785143346
-28.149999999999977	1.5761305630653508
-27.149999999999977	1.6291705662710532
-26.149999999999977	1.683524209900161
-25.149999999999977	1.7392124384416976
-24.149999999999977	1.796256430490119
-23.149999999999977	1.854677611180714
-22.149999999999977	1.9144976657795931
-21.149999999999977	1.9757385544936963
-20.149999999999977	2.038422528592675
-19.149999999999977	2.1025721479598394
-18.149999999999977	2.1682103001644553
-17.149999999999977	2.235360221218023
-16.149999999999977	2.304045518134851
-15.149999999999977	2.3742901934985037
-14.149999999999977	2.4461186722236166
-13.149999999999977	2.519555830739354
-12.149999999999977	2.5946270288824023
-11.149999999999977	2.671358144790935
-10.149999999999977	2.749775613182327
-9.149999999999977	2.8299064674231804
-8.149999999999977	2.9117783859232
-7.149999999999977	2.9954197434131125
-6.149999999999977	3.080859667844315

Temperature (degC)	Pressure (MPa)
-5.14999999999977	3.168128103721121
-4.14999999999977	3.2572558828810076
-3.149999999999773	3.348274803899346
-2.149999999999773	3.441217721530852
-1.149999999999773	3.536118647867401
-0.1499999999997726	3.6330128672154833
0.8500000000000227	3.731937067066
1.8500000000000227	3.8329294879819864
2.8500000000000227	3.93603009578753
3.8500000000000227	4.041280780084185
4.850000000000023	4.148725583979166
5.850000000000023	4.258410970945534
6.850000000000023	4.370386136163802
7.850000000000023	4.484703371561581
8.850000000000023	4.6014184963611635
9.850000000000023	4.720591368622424
10.850000000000023	4.842286498417575
11.850000000000023	4.966573790699269
12.850000000000023	5.093529456514274
13.850000000000023	5.223237146542934
14.850000000000023	5.3557893829572425
15.850000000000023	5.491289397526427
16.850000000000023	5.629853530585059
17.850000000000023	5.771614414579254
18.850000000000023	5.916725270957621
19.850000000000023	6.065365814163673
20.850000000000023	6.2177505285927674
21.850000000000023	6.374140559332951
22.850000000000023	6.534861340272542
23.850000000000023	6.70032982987268
24.850000000000023	6.8710988986321
25.850000000000023	7.047934634607377
26.850000000000023	7.231962070329518
27.850000000000023	7.424966691870606
28.850000000000023	7.630096120719976
29.850000000000023	7.853882086196924
30.850000000000023	8.119149342910605

Table B54: Dew Points for Carbon Dioxide and 4% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-95.14999999999998	0.06511144579187157
-94.14999999999998	0.06974417609145372
-93.14999999999998	0.07463806053896195
-92.14999999999998	0.07980356795164052
-91.14999999999998	0.0852513830576209
-90.14999999999998	0.09099240427592999
-89.14999999999998	0.09703774141121023
-88.14999999999998	0.10339871321363481
-87.14999999999998	0.11008684490295717
-86.14999999999998	0.11711386557657869
-85.14999999999998	0.12449170558202764
-84.14999999999998	0.13223249381971405
-83.14999999999998	0.1403485549989688
-82.14999999999998	0.14885240686808626
-81.14999999999998	0.15775675740317435
-80.14999999999998	0.1670745019946501
-79.14999999999998	0.17681872061531845
-78.14999999999998	0.1870026749886281
-77.14999999999998	0.19763980577664322
-76.14999999999998	0.20874372976617797
-75.14999999999998	0.2203282371027832
-74.14999999999998	0.23240728853834478
-73.14999999999998	0.24499501274890284
-72.14999999999998	0.2581057036600315
-71.14999999999998	0.27175381787817704
-70.14999999999998	0.28595397214719054
-69.14999999999998	0.3007209409122616
-68.14999999999998	0.3160696539255619
-67.14999999999998	0.33201519398826707
-66.14999999999998	0.34857279473489483
-65.14999999999998	0.3657578385609246
-64.14999999999998	0.38358585464215844
-63.14999999999998	0.4020725170649689
-62.14999999999998	0.42123364309586037
-61.14999999999998	0.44108519156418213
-60.14999999999998	0.46164326139884854
-59.14999999999998	0.48292409029180816
-58.14999999999998	0.5049440535280582
-57.14999999999998	0.5277196629689495
-56.14999999999998	0.5512675662088453
-55.14999999999998	0.5756045458904164
-54.14999999999998	0.6007475192319253
-53.14999999999998	0.6267135377261326

Temperature (degC)	Pressure (MPa)
-52.14999999999998	0.6535197870595836
-51.14999999999998	0.6811835872362
-50.14999999999998	0.7097223929408432
-49.14999999999998	0.7391537941275288
-48.14999999999998	0.7694955168729198
-47.14999999999998	0.8007654244817844
-46.14999999999998	0.8329815188683762
-45.14999999999998	0.8661619422204121
-44.14999999999998	0.9003249789390825
-43.14999999999998	0.9354890578966033
-42.14999999999998	0.9716727549723986
-41.14999999999998	1.008894795914873
-40.14999999999998	1.0471740595157173
-39.14999999999998	1.0865295811108355
-38.14999999999998	1.1269805564419193
-37.14999999999998	1.1685463458882877
-36.14999999999998	1.211246479106172
-35.14999999999998	1.2551006601067711
-34.14999999999998	1.3001287728394586
-33.14999999999998	1.3463508873192422
-32.14999999999998	1.3937872663504305
-31.149999999999977	1.4424583729341545
-30.149999999999977	1.4923848783868154
-29.149999999999977	1.543587671281811
-28.149999999999977	1.596087867244167
-27.149999999999977	1.6499068196789017
-26.149999999999977	1.7050661315185291
-25.149999999999977	1.7615876680366669
-24.149999999999977	1.8194935708276623
-23.149999999999977	1.8788062730368895
-22.149999999999977	1.9395485159233332
-21.149999999999977	2.001743366887165
-20.149999999999977	2.065414239072712
-19.149999999999977	2.130584912686417
-18.149999999999977	2.1972795582077986
-17.149999999999977	2.2655227616592164
-16.149999999999977	2.3353395521587816
-15.149999999999977	2.4067554319756077
-14.149999999999977	2.479796409382971
-13.149999999999977	2.554489034587842
-12.149999999999977	2.63086043911741
-11.149999999999977	2.708938379041578
-10.149999999999977	2.7887512825375285
-9.149999999999977	2.8703283023162385
-8.149999999999977	2.953699373587906

Temperature (degC)	Pressure (MPa)
-7.149999999999977	3.0388952783145204
-6.149999999999977	3.125947716674174
-5.149999999999977	3.214889386806245
-4.149999999999977	3.3057540741432407
-3.149999999999973	3.3985767518553236
-2.149999999999973	3.4933936942577413
-1.149999999999973	3.5902426053714285
-0.1499999999999726	3.68916276527102
0.8500000000000227	3.790195197342496
1.8500000000000227	3.8933828602268408
2.8500000000000227	3.998770868936368
3.8500000000000227	4.106406750575703
4.850000000000023	4.216340741258376
5.850000000000023	4.328626132268506
6.850000000000023	4.443319675483048
7.850000000000023	4.560482060668418
8.850000000000023	4.680178480840053
9.850000000000023	4.802479306866349
10.850000000000023	4.927460899557064
11.850000000000023	5.055206597540662
12.850000000000023	5.1858079336843765
13.850000000000023	5.3193661537302
14.850000000000023	5.455994141114295
15.850000000000023	5.595818896355814
16.850000000000023	5.738984785045737
17.850000000000023	5.885657867280119
18.850000000000023	6.036031773590961
19.850000000000023	6.190335835618817
20.850000000000023	6.348846585499401
21.850000000000023	6.511904453365988
22.850000000000023	6.67993883038327
23.850000000000023	6.85350732466191
24.850000000000023	7.033360658547546
25.850000000000023	7.220557318265328
26.850000000000023	7.416682749725989
27.850000000000023	7.624309906889693
28.850000000000023	7.848105720802529
29.850000000000023	8.098492929347415
30.850000000000023	8.475668376302592

Table B55: Dew Points for Carbon Dioxide and 5% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-97.1499999999998	0.05719332573489885
-96.1499999999998	0.06137907006052484
-95.1499999999998	0.0658083628891353
-94.1499999999998	0.07049135465684214
-93.1499999999998	0.07543841926583392
-92.1499999999998	0.08066015214274666
-91.1499999999998	0.08616736820991071
-90.1499999999998	0.09197109971079025
-89.1499999999998	0.09808259395576001
-88.1499999999998	0.10451331096933124
-87.1499999999998	0.11127492105345776
-86.1499999999998	0.11837930228720794
-85.1499999999998	0.1258385379445543
-84.1499999999998	0.13366491388804586
-83.1499999999998	0.1418709158989125
-82.1499999999998	0.15046922698569315
-81.1499999999998	0.15947272467272594
-80.1499999999998	0.16889447825361711
-79.1499999999998	0.17874774607722058
-78.1499999999998	0.1890459728071548
-77.1499999999998	0.19980278670971047
-76.1499999999998	0.21103199696467698
-75.1499999999998	0.22274759100682245
-74.1499999999998	0.2349637319059732
-73.1499999999998	0.24769475579980688
-72.1499999999998	0.26095516938039476
-71.1499999999998	0.2747596474500052
-70.1499999999998	0.28912303053956034
-69.1499999999998	0.3040603226310006
-68.1499999999998	0.3195866889462178
-67.1499999999998	0.335717453844076
-66.1499999999998	0.35246809880825813
-65.1499999999998	0.3698542605842367
-64.1499999999998	0.3878917293865906
-63.1499999999998	0.406596447273843
-62.1499999999998	0.4259845066327969
-61.1499999999998	0.4460721488274667
-60.1499999999998	0.4668757629742285
-59.1499999999998	0.48841188490792864
-58.1499999999998	0.5106971962822907
-57.1499999999998	0.5337485238691688
-56.1499999999998	0.5575828390362728
-55.1499999999998	0.5822172574258925

Temperature (degC)	Pressure (MPa)
-54.1499999999998	0.6076690388251896
-53.1499999999998	0.6339555872709521
-52.1499999999998	0.6610944513789883
-51.1499999999998	0.6891033249106763
-50.1499999999998	0.7180000475994042
-49.1499999999998	0.7478026062406439
-48.1499999999998	0.7785291360658528
-47.1499999999998	0.8101979223957719
-46.1499999999998	0.8428274026072909
-45.1499999999998	0.8764361683901416
-44.1499999999998	0.9110429683410675
-43.1499999999998	0.9466667108570136
-42.1499999999998	0.9833264673864488
-41.1499999999998	1.0210414760062165
-40.1499999999998	1.0598311453840281
-39.1499999999998	1.0997150591219313
-38.1499999999998	1.140712980497223
-37.1499999999998	1.1828448576934976
-36.1499999999998	1.2261308295140623
-35.1499999999998	1.2705912316400376
-34.1499999999998	1.3162466035124947
-33.1499999999998	1.3631176958735718
-32.1499999999998	1.4112254790380476
-31.14999999999977	1.4605911519701824
-30.14999999999977	1.5112361522166744
-29.14999999999977	1.5631821667640209
-28.14999999999977	1.616451143904423
-27.14999999999977	1.6710653061617564
-26.14999999999977	1.7270471643652265
-25.14999999999977	1.784419532959632
-24.14999999999977	1.8432055466428727
-23.14999999999977	1.9034286784411123
-22.14999999999977	1.9651127593522915
-21.14999999999977	2.028281999700422
-20.14999999999977	2.0929610123646256
-19.14999999999977	2.1591748380739637
-18.14999999999977	2.226948972970279
-17.14999999999977	2.296309398692214
-16.14999999999977	2.367282615224224
-15.14999999999977	2.4398956768374327
-14.14999999999977	2.5141762314347424
-13.14999999999977	2.590152563702632
-12.14999999999977	2.66785364250456
-11.14999999999977	2.7473091730099095
-10.14999999999977	2.828549654169147

Temperature (degC)	Pressure (MPa)
-9.149999999999977	2.911606442201838
-8.149999999999977	2.9965118209140567
-7.149999999999977	3.083299079807044
-6.149999999999977	3.1720026011044453
-5.149999999999977	3.262657957059203
-4.149999999999977	3.3553020191604586
-3.149999999999973	3.4499730811712563
-2.149999999999973	3.546710998319019
-1.149999999999973	3.645557345410217
-0.1499999999999726	3.7465555972042694
0.8500000000000227	3.849751335022285
1.8500000000000227	3.955192484394729
2.8500000000000227	4.062929589507153
3.8500000000000227	4.173016131424377
4.850000000000023	4.2855088986023135
5.850000000000023	4.40046842013091
6.850000000000023	4.517959474748727
7.850000000000023	4.638051692080629
8.850000000000023	4.760820267303114
9.850000000000023	4.886346816997071
10.850000000000023	5.014720413257429
11.850000000000023	5.146038846445666
12.850000000000023	5.280410186080637
13.850000000000023	5.417954737244914
14.850000000000023	5.55880753055439
15.850000000000023	5.70312154396754
16.850000000000023	5.85107194476363
17.850000000000023	6.0028617774372375
18.850000000000023	6.158729738110861
19.850000000000023	6.3189610240839125
20.850000000000023	6.483902836018746
21.850000000000023	6.653987160691066
22.850000000000023	6.829765447630264
23.850000000000023	7.011963778668308
24.850000000000023	7.201575645590432
25.850000000000023	7.40002891533187
26.850000000000023	7.6095118879368915
27.850000000000023	7.83368032100789
28.850000000000023	8.079492853076967
29.850000000000023	8.364881357307864
30.850000000000023	8.799196109646966

Table B56: Dew Points for Carbon Dioxide and 1% Water

Temperature (degC)	Pressure (MPa)
-39.14999999999998	0.0020629599198909417
-38.14999999999998	0.002286299231316267
-37.14999999999998	0.0025311735721249315
-36.14999999999998	0.002799455550221118
-35.14999999999998	0.0030931378197125857
-34.14999999999998	0.0034143449475424136
-33.14999999999998	0.0037653557288629823
-32.14999999999998	0.00414860590340926
-31.149999999999977	0.004566707475152943
-30.149999999999977	0.005022449996498408
-29.149999999999977	0.005518816538927763
-28.149999999999977	0.0060589897282597935
-27.149999999999977	0.0066463676285685915
-26.149999999999977	0.007284573876561472
-25.149999999999977	0.007977468102888848
-24.149999999999977	0.008729163747149304
-23.149999999999977	0.009544034806016994
-22.149999999999977	0.010426733822537526
-21.149999999999977	0.01138220609800835
-20.149999999999977	0.012415703973752723
-19.149999999999977	0.013532804910942418
-18.149999999999977	0.01473942116063292
-17.149999999999977	0.016041825861664374
-16.149999999999977	0.017446664668150976
-15.149999999999977	0.018960976393556737
-14.149999999999977	0.020592211433731165
-13.149999999999977	0.0223482516729727
-12.149999999999977	0.024237432737525922
-11.149999999999977	0.026268563967377416
-10.149999999999977	0.028450951894420266
-9.149999999999977	0.030794422774501087
-8.149999999999977	0.033309348572732565
-7.149999999999977	0.036006669932102324
-6.149999999999977	0.038897925980427676
-5.149999999999977	0.0419952789546007
-4.149999999999977	0.045311543910678945
-3.1499999999999773	0.04886021924804388
-2.1499999999999773	0.052655517661131114
-1.1499999999999773	0.05671239876672898
-0.14999999999997726	0.06104660298287256
0.85000000000000227	0.06567468755568717
1.85000000000000227	0.07061406374601449
2.85000000000000227	0.07588303609265945

Temperature (degC)	Pressure (MPa)
3.8500000000000227	0.08150084235931052
4.850000000000023	0.08748769802558322
5.850000000000023	0.09386483924950902
6.850000000000023	0.10065457159508424
7.850000000000023	0.10788031962690911
8.850000000000023	0.11556667756015794
9.850000000000023	0.1237394659620884
10.850000000000023	0.1324257889153224
11.850000000000023	0.14165409483977423
12.850000000000023	0.15145424242992866
13.850000000000023	0.1618575669649214
14.850000000000023	0.1728969549331082
15.850000000000023	0.1846069192158242
16.850000000000023	0.19702368151952435
17.850000000000023	0.2101852584813139
18.850000000000023	0.22413155515994204
19.850000000000023	0.23890446247497718
20.850000000000023	0.2545479628482913
21.850000000000023	0.2711082433376094
22.850000000000023	0.2886338156181283
23.850000000000023	0.3071756460391703
24.850000000000023	0.3267872946445141
25.850000000000023	0.3475250654856547
26.850000000000023	0.36944816826085547
27.850000000000023	0.39261889337225525
28.850000000000023	0.41710280145740036
29.850000000000023	0.44296892901694873
30.850000000000023	0.47029001201693876
31.850000000000023	0.49914272952373767
32.85000000000002	0.5296079697442824
33.85000000000002	0.5617711211804322
34.85000000000002	0.5957223920083285
35.85000000000002	0.6315571612678083
36.85000000000002	0.6693763659901717
37.85000000000002	0.7092869290658804
38.85000000000002	0.751402233417058
39.85000000000002	0.7958426489899
40.85000000000002	0.8427361201843692
41.85000000000002	0.8922188227052464
42.85000000000002	0.9444359004274515
43.85000000000002	0.9995422948957096
44.85000000000002	1.0577036824600856
45.85000000000002	1.119097537103794
46.85000000000002	1.1839143448392522
47.85000000000002	1.2523589673213744

Temperature (degC)	Pressure (MPa)
48.850000000000002	1.3246522717214073
49.850000000000002	1.4010329232851837
50.850000000000002	1.4817595577653473
51.850000000000002	1.5671132140562907
52.850000000000002	1.6574003023282253
53.850000000000002	1.7529560255548222
54.850000000000002	1.8541484852564138
55.850000000000002	1.9613835963855604
56.850000000000002	2.0751110263797545
57.850000000000002	2.195831435801146
58.850000000000002	2.3241053921954262
59.850000000000002	2.4605644863231837
60.850000000000002	2.6059252359123435
61.850000000000002	2.76100699058438
62.850000000000002	2.9267549721701003
63.850000000000002	3.1042706814625727
64.850000000000002	3.294852689500883
65.850000000000002	3.500052577316018
66.850000000000002	3.721753601489705
67.850000000000002	3.9622846241551306
68.850000000000002	4.224590995552126
69.850000000000002	4.512502089330608
70.850000000000002	4.83117206819228
71.850000000000002	5.1878577062756515
72.850000000000002	5.593415014908968
73.850000000000002	6.065555674608874
74.850000000000002	6.637367008090874
75.850000000000002	7.3881018023360205
76.850000000000002	8.722953388870298

Table B57: Dew Points for Carbon Dioxide and 2% Water

Temperature (degC)	Pressure (MPa)
-39.14999999999998	0.0010311770122746497
-38.14999999999998	0.0011427826458777557
-37.14999999999998	0.0012651426812646713
-36.14999999999998	0.0013991943013236666
-35.14999999999998	0.0015459272148339396
-34.14999999999998	0.0017064028538603807
-33.14999999999998	0.0018817548809826811
-32.14999999999998	0.002073199621072571
-31.149999999999977	0.002282036657020167
-30.149999999999977	0.0025096551332907855
-29.149999999999977	0.002757540043501815
-28.149999999999977	0.003027275751064639
-27.149999999999977	0.0033205528328546117
-26.149999999999977	0.003639170469504364
-25.149999999999977	0.0039850512185665606
-24.149999999999977	0.004360232999771487
-23.149999999999977	0.004766892154392148
-22.149999999999977	0.005207335489369694
-21.149999999999977	0.005684015449116319
-20.149999999999977	0.006199535335954136
-19.149999999999977	0.006756657178031882
-18.149999999999977	0.007358308412957425
-17.149999999999977	0.008007588992159491
-16.149999999999977	0.008707784987182216
-15.149999999999977	0.009462370514056446
-14.149999999999977	0.01027502084260407
-13.149999999999977	0.011149619935101692
-12.149999999999977	0.012090270924562331
-11.149999999999977	0.013101305765697705
-10.149999999999977	0.014187294695077577
-9.149999999999977	0.01535305834766873
-8.149999999999977	0.016603677058557136
-7.149999999999977	0.01794450315385556
-6.149999999999977	0.019381172885614226
-5.149999999999977	0.020919617276910083
-4.149999999999977	0.02256607600370979
-3.1499999999999773	0.024327109100065282
-2.1499999999999773	0.026209610872900156
-1.1499999999999773	0.028220824394484336
-0.14999999999997726	0.03036835390841086
0.85000000000000227	0.03266018082256844
1.85000000000000227	0.03510467880400019
2.85000000000000227	0.03771062901355846

Temperature (degC)	Pressure (MPa)
3.85000000000000227	0.04048723720734264
4.85000000000000023	0.043444148749250455
5.85000000000000023	0.046591467650378
6.85000000000000023	0.049939774488158
7.85000000000000023	0.05350014381380991
8.85000000000000023	0.057284164030978045
9.85000000000000023	0.06130395763358452
10.85000000000000023	0.06557220135217047
11.85000000000000023	0.07010214781698332
12.85000000000000023	0.07490764755108303
13.85000000000000023	0.08000317211377209
14.85000000000000023	0.08540383826715243
15.85000000000000023	0.09112543240197676
16.85000000000000023	0.09718443690814939
17.85000000000000023	0.10359805617475636
18.85000000000000023	0.11038424582326122
19.85000000000000023	0.11756174061520246
20.85000000000000023	0.125150086046053
21.85000000000000023	0.13316966925293455
22.85000000000000023	0.14164175218696992
23.85000000000000023	0.1505885070598399
24.85000000000000023	0.1600330515450131
25.85000000000000023	0.16999948792460295
26.85000000000000023	0.18051294163906637
27.85000000000000023	0.19159960411715343
28.85000000000000023	0.20328677642466092
29.85000000000000023	0.21560291471771575
30.85000000000000023	0.2285776799703309
31.85000000000000023	0.24224198790645327
32.8500000000000002	0.25662806442440045
33.8500000000000002	0.2717695014379681
34.8500000000000002	0.28770131752761285
35.8500000000000002	0.30446002211303325
36.8500000000000002	0.3220836825445237
37.8500000000000002	0.3406119963931414
38.8500000000000002	0.360086367458397
39.8500000000000002	0.38054998693361525
40.8500000000000002	0.4020479200552059
41.8500000000000002	0.424627197869958
42.8500000000000002	0.4483369161559244
43.8500000000000002	0.4732283405632226
44.8500000000000002	0.4993550196611652
45.8500000000000002	0.5267729055793968
46.8500000000000002	0.5555404844632023
47.8500000000000002	0.5857189163461295

Temperature (degC)	Pressure (MPa)
48.850000000000002	0.6173721858099938
49.850000000000002	0.6505672648916936
50.850000000000002	0.6853742892236823
51.850000000000002	0.7218667484049522
52.850000000000002	0.7601216932844841
53.850000000000002	0.8002199604348617
54.850000000000002	0.8422464174879535
55.850000000000002	0.8862902298959806
56.850000000000002	0.9324451535849134
57.850000000000002	0.9808098623587584
58.850000000000002	1.0314882665546707
59.850000000000002	1.0845899547104332
60.850000000000002	1.1402305801060497
61.850000000000002	1.1985323435040847
62.850000000000002	1.2596245161225428
63.850000000000002	1.3236440208507891
64.850000000000002	1.3907360799152728
65.850000000000002	1.4610549609971217
66.850000000000002	1.534764736013486
67.850000000000002	1.6120402555799906
68.850000000000002	1.693068150021515
69.850000000000002	1.778048005875794
70.850000000000002	1.8671936965691591
71.850000000000002	1.9607349017055216
72.850000000000002	2.058918850006454
73.850000000000002	2.162012326471917
74.850000000000002	2.2703039965450102
75.850000000000002	2.3841071103848908
76.850000000000002	2.5037626671767335
77.850000000000002	2.6296431397503968
78.850000000000002	2.762156886792926
79.850000000000002	2.9017534586757865
80.850000000000002	3.048929791231152
81.850000000000002	3.204238038997489
82.850000000000002	3.368294848195771
83.850000000000002	3.541792944556831
84.850000000000002	3.7255155629766485
85.850000000000002	3.9203546628730375
86.850000000000002	4.127334225303798
87.850000000000002	4.3476404884455
88.850000000000002	4.582661838670334
89.850000000000002	4.8340424308377035
90.850000000000002	5.1037558154510405
91.850000000000002	5.3942086565695915
92.850000000000002	5.708390595360778

Temperature (degC)	Pressure (MPa)
93.85000000000002	6.050099518839749
94.85000000000002	6.4242927433684205
95.85000000000002	6.837664191342411
96.85000000000002	7.299654960502997
97.85000000000002	7.824376836375942
98.85000000000002	8.434718786407661
99.85000000000002	9.172723386319447
100.85000000000002	10.13442953775862
101.85000000000002	11.698121317550303

Table B58: Dew Points for Carbon Dioxide and 3% Water

Temperature (degC)	Pressure (MPa)
-39.14999999999998	0.0006873833528379983
-38.14999999999998	0.000761772760416063
-37.14999999999998	0.0008433297001095691
-36.14999999999998	0.0009326766499775024
-35.14999999999998	0.0010304752127002085
-34.14999999999998	0.0011374296109391891
-33.14999999999998	0.0012542985553049971
-32.14999999999998	0.0013818882709128412
-31.149999999999977	0.0015210655966627698
-30.149999999999977	0.0016727552038017597
-29.149999999999977	0.0018379461738755635
-28.149999999999977	0.002017692073394699
-27.149999999999977	0.00221311841955296
-26.149999999999977	0.002425424304062375
-25.149999999999977	0.0026558845225681444
-24.149999999999977	0.002905859254871289
-23.149999999999977	0.0031767936633747386
-22.149999999999977	0.00347022210920659
-21.149999999999977	0.0037877748830654895
-20.149999999999977	0.004131183556354967
-19.149999999999977	0.00450228242928495
-18.149999999999977	0.004903016769458354
-17.149999999999977	0.005335446140872656
-16.149999999999977	0.005801753409336019
-15.149999999999977	0.006304243561402929
-14.149999999999977	0.006845356213577178
-13.149999999999977	0.007427668657929607
-12.149999999999977	0.008053901639163882
-11.149999999999977	0.008726927349333198
-10.149999999999977	0.009449775202373474
-9.149999999999977	0.010225637769517987
-8.149999999999977	0.011057879712269937
-7.149999999999977	0.011950043998181574
-6.149999999999977	0.012905858323249237
-5.149999999999977	0.013929245057432831
-4.149999999999977	0.01502432672711749
-3.149999999999973	0.01619543727575382
-2.149999999999973	0.017447126619445537
-1.149999999999973	0.01878417240605027
-0.1499999999999726	0.020211587887183597
0.85000000000000227	0.0217346298021687
1.85000000000000227	0.02335881033327492
2.85000000000000227	0.025089904803500696

Temperature (degC)	Pressure (MPa)
3.8500000000000227	0.026933962094971488
4.850000000000023	0.028897315850980026
5.850000000000023	0.030986593060914724
6.850000000000023	0.033208727457898414
7.850000000000023	0.035570968300393226
8.850000000000023	0.0380808939707362
9.850000000000023	0.04074642186886031
10.850000000000023	0.04357582207717671
11.850000000000023	0.04657772953528583
12.850000000000023	0.049761156470080246
13.850000000000023	0.053135506090326294
14.850000000000023	0.0567105863996838
15.850000000000023	0.06049662455247552
16.850000000000023	0.06450428077412433
17.850000000000023	0.06874466371872189
18.850000000000023	0.07322934643598664
19.850000000000023	0.07797038141536135
20.850000000000023	0.0829803185698945
21.850000000000023	0.08827222119873634
22.850000000000023	0.09385968358949157
23.850000000000023	0.09975685046910365
24.850000000000023	0.10597843494790543
25.850000000000023	0.11253973853105713
26.850000000000023	0.11945667136722286
27.850000000000023	0.12674577339934845
28.850000000000023	0.13442423656712993
29.850000000000023	0.14250992659201214
30.850000000000023	0.15102140787037377
31.850000000000023	0.15997796731225272
32.85000000000002	0.16939964011203976
33.85000000000002	0.17930723631440287
34.85000000000002	0.18972236893755554
35.85000000000002	0.200667482459844
36.85000000000002	0.212165883861168
37.85000000000002	0.2242417736129248
38.85000000000002	0.23692027915505656
39.85000000000002	0.25022748977958464
40.85000000000002	0.26419049247946486
41.85000000000002	0.2788374108032464
42.85000000000002	0.2941974444150621
43.85000000000002	0.3103009116461733
44.85000000000002	0.3271792936722526
45.85000000000002	0.34486528125016036
46.85000000000002	0.3633928240426601
47.85000000000002	0.38279718284643754

Temperature (degC)	Pressure (MPa)
48.850000000000002	0.403114984236992
49.850000000000002	0.4243842792462162
50.850000000000002	0.44664460420450314
51.850000000000002	0.46993704712570367
52.850000000000002	0.494304316049019
53.850000000000002	0.5197908135524202
54.850000000000002	0.5464427146693407
55.850000000000002	0.5743080507877157
56.850000000000002	0.6034367984722905
57.850000000000002	0.6338809749599009
58.850000000000002	0.6656947396990531
59.850000000000002	0.6989345034522185
60.850000000000002	0.7336590451969753
61.850000000000002	0.7699296371992724
62.850000000000002	0.8078101805779474
63.850000000000002	0.8473673498851574
64.850000000000002	0.8886707499964686
65.850000000000002	0.9317930850663599
66.850000000000002	0.9768103415486946
67.850000000000002	1.0238019863068895
68.850000000000002	1.072851181437404
69.850000000000002	1.1240450183059871
70.850000000000002	1.1774747717826408
71.850000000000002	1.2332361778523753
72.850000000000002	1.29142973725879
73.850000000000002	1.352161047703201
74.850000000000002	1.4155411559643507
75.850000000000002	1.4816870213258178
76.850000000000002	1.5507218332758563
77.850000000000002	1.6227756238711257
78.850000000000002	1.6979857464818233
79.850000000000002	1.7764974884413633
80.850000000000002	1.8584647391795974
81.850000000000002	1.9440507359410566
82.850000000000002	2.0334288985178417
83.850000000000002	2.126783766439656
84.850000000000002	2.2243120545687147
85.850000000000002	2.326223846062803
86.850000000000002	2.432743945336005
87.850000000000002	2.544113418261748
88.850000000000002	2.66059135246585
89.850000000000002	2.782456877603108
90.850000000000002	2.9100114943860724
91.850000000000002	3.0435817722730096
92.850000000000002	3.1835225393157858

Temperature (degC)	Pressure (MPa)
93.85000000000002	3.330220398839455
94.85000000000002	3.4840982663067943
95.85000000000002	3.645620375651254
96.85000000000002	3.8152984241190926
97.85000000000002	3.993698921482125
98.85000000000002	4.181452088958738
99.85000000000002	4.379262727034625
100.85000000000002	4.587923612171098
101.85000000000002	4.808332180385349
102.85000000000002	5.041511539140391
103.85000000000002	5.288637261498677
104.85000000000002	5.5510720295959315
105.85000000000002	5.830411124938363
106.85000000000002	6.128543324121448
107.85000000000002	6.447733455817186
108.85000000000002	6.790738298809857
109.85000000000002	7.1609717514947375
110.85000000000002	7.562749004405385
111.85000000000002	8.001660354249912
112.85000000000002	8.485169491716936
113.85000000000002	9.023624833121055
114.85000000000002	9.632092508450587
115.85000000000002	10.33399305476946
116.85000000000002	11.169296647908634
117.85000000000002	12.216818282847198
118.85000000000002	13.678229630309474

Table B59: Dew Points for Carbon Dioxide and 4% Water

Temperature (degC)	Pressure (MPa)
-39.14999999999998	0.0005155130052103731
-38.14999999999998	0.0005712992146976878
-37.14999999999998	0.0006324606058177972
-36.14999999999998	0.0006994645027346726
-35.14999999999998	0.0007728044170543965
-34.14999999999998	0.000853008004951616
-33.14999999999998	0.000940646813699744
-32.14999999999998	0.001036323881027382
-31.149999999999977	0.0011406897315116111
-30.149999999999977	0.00125443623774232
-29.149999999999977	0.0013783046889959715
-28.149999999999977	0.0015130851032277598
-27.149999999999977	0.0016596199468353423
-26.149999999999977	0.001818809422067819
-25.149999999999977	0.0019916086075416864
-24.149999999999977	0.0021790342142102227
-23.149999999999977	0.0023821705491020723
-22.149999999999977	0.002602166878450408
-21.149999999999977	0.0028402444713151015
-20.149999999999977	0.0030976992514497492
-19.149999999999977	0.0033759053110001417
-18.149999999999977	0.0036763196066880465
-17.149999999999977	0.004000483625975344
-16.149999999999977	0.004350030022904167
-15.149999999999977	0.004726686153848124
-14.149999999999977	0.005132276429011329
-13.149999999999977	0.005568729475997252
-12.149999999999977	0.00603808014093341
-11.149999999999977	0.00654247703081734
-10.149999999999977	0.007084185723573672
-9.149999999999977	0.007665592780370219
-8.149999999999977	0.008289213117993561
-7.149999999999977	0.00895769474048749
-6.149999999999977	0.009673822737751908
-5.149999999999977	0.010440526530815406
-4.149999999999977	0.011260885153792232
-3.149999999999973	0.012138133340508131
-2.149999999999973	0.013075666952793096
-1.149999999999973	0.014077050547356897
-0.1499999999999726	0.015146022474112694
0.85000000000000227	0.01628650282270453
1.85000000000000227	0.017502598840077918
2.85000000000000227	0.018798613135571633

Temperature (degC)	Pressure (MPa)
3.85000000000000227	0.020179050373035197
4.85000000000000023	0.02164862437207204
5.85000000000000023	0.0232122663537255
6.85000000000000023	0.02487513161919292
7.85000000000000023	0.02664260867933533
8.85000000000000023	0.028520327226142783
9.85000000000000023	0.03051416535579928
10.85000000000000023	0.03263025963019982
11.85000000000000023	0.034875012845904656
12.85000000000000023	0.037255103978413244
13.85000000000000023	0.03977749649050615
14.85000000000000023	0.04244944850654682
15.85000000000000023	0.04527852280730644
16.85000000000000023	0.04827259573858641
17.85000000000000023	0.05143986882908346
18.85000000000000023	0.05478887877767304
19.85000000000000023	0.05832850793140582
20.85000000000000023	0.06206799652826689
21.85000000000000023	0.06601695267715538
22.85000000000000023	0.07018536574228762
23.85000000000000023	0.07458361744746361
24.85000000000000023	0.07922249472372817
25.85000000000000023	0.08411320235481158
26.85000000000000023	0.08926737660935362
27.85000000000000023	0.09469709844145388
28.85000000000000023	0.10041490803689372
29.85000000000000023	0.10643381885180686
30.85000000000000023	0.11276733277470159
31.85000000000000023	0.1194294559051376
32.8500000000000002	0.12643471392234287
33.8500000000000002	0.13379816918010295
34.8500000000000002	0.1415354371528924
35.8500000000000002	0.14966270495078013
36.8500000000000002	0.15819674880531556
37.8500000000000002	0.1671549535116486
38.8500000000000002	0.1765553322255695
39.8500000000000002	0.18641654645241704
40.8500000000000002	0.1967579278087924
41.8500000000000002	0.20759949954339513
42.8500000000000002	0.2189619999754753
43.8500000000000002	0.2308669062222056
44.8500000000000002	0.24333645918750235
45.8500000000000002	0.25639368932100476
46.8500000000000002	0.2700624439721281
47.8500000000000002	0.284367415893512

Temperature (degC)	Pressure (MPa)
48.850000000000002	0.2993341723823595
49.850000000000002	0.3149891868171366
50.850000000000002	0.3313598708042078
51.850000000000002	0.3484746084690337
52.850000000000002	0.36636279198536487
53.850000000000002	0.3850548591735478
54.850000000000002	0.4045823331561546
55.850000000000002	0.4249778636548782
56.850000000000002	0.4462752708659365
57.850000000000002	0.4685095914469446
58.850000000000002	0.49171712743910173
59.850000000000002	0.5159354974016426
60.850000000000002	0.5412036910052496
61.850000000000002	0.5675621264184385
62.850000000000002	0.5950527114541843
63.850000000000002	0.6237189081979636
64.850000000000002	0.6536058015701544
65.850000000000002	0.6847601726420484
66.850000000000002	0.7172305760988734
67.850000000000002	0.7510674231918975
68.850000000000002	0.7863230699388711
69.850000000000002	0.8230519115080924
70.850000000000002	0.8613104831104319
71.850000000000002	0.901157567770325
72.850000000000002	0.9426543120934389
73.850000000000002	0.9858643505286326
74.850000000000002	1.0308539386021736
75.850000000000002	1.077692096448674
76.850000000000002	1.1264507636600671
77.850000000000002	1.1772049659649648
78.850000000000002	1.2300329956763343
79.850000000000002	1.2850166068062938
80.850000000000002	1.342241226596262
81.850000000000002	1.4017961851411183
82.850000000000002	1.463774965219523
83.850000000000002	1.5282754740124294
84.850000000000002	1.5954003403059225
85.850000000000002	1.6652572386227222
86.850000000000002	1.7379592447518737
87.850000000000002	1.8136252259159646
88.850000000000002	1.8923802694097407
89.850000000000002	1.9743561554458604
90.850000000000002	2.0596918791841183
91.850000000000002	2.148534228860933
92.850000000000002	2.2410384269877506

Temperature (degC)	Pressure (MPa)
93.85000000000002	2.337368844108291
94.85000000000002	2.4376997948436925
95.85000000000002	2.5422164283656787
96.85000000000002	2.651115727420528
97.85000000000002	2.7646076325220883
98.85000000000002	2.8829163110823104
99.85000000000002	3.006281595004549
100.85000000000002	3.1349606149086537
101.85000000000002	3.269229664880298
102.85000000000002	3.4093863924725425
103.85000000000002	3.55575207730067
104.85000000000002	3.708674708668418
105.85000000000002	3.868532143753315
106.85000000000002	4.035735990284288
107.85000000000002	4.210736125273342
108.85000000000002	4.3940260285693356
109.85000000000002	4.586149117473474
110.85000000000002	4.787706320851079
111.85000000000002	4.9993652013979935
112.85000000000002	5.22187102451135
113.85000000000002	5.456060316343813
114.85000000000002	5.70287760120852
115.85000000000002	5.963396297781706
116.85000000000002	6.238845080574129
117.85000000000002	6.530641548179914
118.85000000000002	6.84043596549252
119.85000000000002	7.170168086350041
120.85000000000002	7.522144266191869
121.85000000000002	7.899141385404553
122.85000000000002	8.30455196940535
123.85000000000002	8.74259103356937
124.85000000000002	9.218599542794177
125.85000000000002	9.739504602272572

Table B60: Dew Points for Carbon Dioxide and 5% Water

Temperature (degC)	Pressure (MPa)
-39.14999999999998	0.0004123980703036957
-38.14999999999998	0.0004570250191024709
-37.14999999999998	0.0005059507360650701
-36.14999999999998	0.0005595496042600475
-35.14999999999998	0.0006182168990737318
-34.14999999999998	0.0006823765017892444
-33.14999999999998	0.0007524830466786365
-32.14999999999998	0.0008290156866713077
-31.14999999999997	0.0009124998417532718
-30.14999999999997	0.0010034872203399394
-29.14999999999997	0.0011025698593470558
-28.14999999999997	0.0012103801231999076
-27.14999999999997	0.0013275921999675868
-26.14999999999997	0.0014549240968880308
-25.14999999999997	0.0015931404737531316
-24.14999999999997	0.001743055053262638
-23.14999999999997	0.0019055333530042212
-22.14999999999997	0.002081494337411194
-21.14999999999997	0.002271915342401291
-20.14999999999997	0.002477830439893587
-19.14999999999997	0.002700338775822088
-18.14999999999997	0.002940603633524571
-17.14999999999997	0.003199860033842501
-16.14999999999997	0.0034794093476494736
-15.14999999999997	0.0037806329912613017
-14.14999999999997	0.004104987804525469
-13.14999999999997	0.004454015320105691
-12.14999999999997	0.004829341130777348
-11.14999999999997	0.005232680942413893
-10.14999999999997	0.005665843058122395
-9.14999999999997	0.006130734389175037
-8.14999999999997	0.006629362883233232
-7.14999999999997	0.0071638414421135105
-6.14999999999997	0.0077363933509677005
-5.14999999999997	0.008349356833343617
-4.14999999999997	0.009005188469977263
-3.149999999999973	0.009706468685603608
-2.149999999999973	0.010455906162961643
-1.149999999999973	0.011256344041756162
-0.1499999999999726	0.012110762536681571
0.8500000000000027	0.013022286634178145
1.8500000000000027	0.013994190078393264
2.8500000000000027	0.015029900563717362

Temperature (degC)	Pressure (MPa)
3.8500000000000027	0.01613300724497299
4.8500000000000023	0.017307263324253586
5.8500000000000023	0.018556595379473517
6.8500000000000023	0.019885106521152402
7.8500000000000023	0.02129708486519596
8.8500000000000023	0.02279700780773795
9.8500000000000023	0.024389549924712272
10.8500000000000023	0.026079589072377944
11.8500000000000023	0.027872213313485626
12.8500000000000023	0.02977272731777208
13.8500000000000023	0.031786660275474714
14.8500000000000023	0.033919772340420144
15.8500000000000023	0.03617806294052768
16.8500000000000023	0.038567777967958565
17.8500000000000023	0.041095416886437926
18.8500000000000023	0.043767742077015545
19.8500000000000023	0.04659178589912478
20.8500000000000023	0.04957485954315446
21.8500000000000023	0.05272456152703037
22.8500000000000023	0.056048786526194674
23.8500000000000023	0.059555734080296886
24.8500000000000023	0.06325391818520903
25.8500000000000023	0.06715217664299356
26.8500000000000023	0.07125968069738131
27.8500000000000023	0.07558594469380539
28.8500000000000023	0.08014083715196199
29.8500000000000023	0.08493459041688256
30.8500000000000023	0.08997781166189994
31.8500000000000023	0.09528149400849513
32.850000000000002	0.10085702820434227
33.850000000000002	0.10671621354545795
34.850000000000002	0.11287127090524635
35.850000000000002	0.11933485436415071
36.850000000000002	0.12612006428273806
37.850000000000002	0.13324046048708446
38.850000000000002	0.14071007590573992
39.850000000000002	0.14854343014733384
40.850000000000002	0.15675554486204263
41.850000000000002	0.16536195764999387
42.850000000000002	0.1743787382329876
43.850000000000002	0.18382250415022888
44.850000000000002	0.19371043744621744
45.850000000000002	0.20406030184149718
46.850000000000002	0.2148904601860236
47.850000000000002	0.22621989345005555

Temperature (degC)	Pressure (MPa)
48.850000000000002	0.2380682195136519
49.850000000000002	0.2504557131023382
50.850000000000002	0.26340332663540467
51.850000000000002	0.2769327116277061
52.850000000000002	0.29106624119396435
53.850000000000002	0.3058270333475408
54.850000000000002	0.32123897573250987
55.850000000000002	0.3373267504517871
56.850000000000002	0.35411586129652795
57.850000000000002	0.3716326613153614
58.850000000000002	0.3899043817290233
59.850000000000002	0.40895916283782907
60.850000000000002	0.42882608578418163
61.850000000000002	0.44953520591162677
62.850000000000002	0.47111758858588154
63.850000000000002	0.4936053453042081
64.850000000000002	0.5170316736619345
65.850000000000002	0.5414308976213553
66.850000000000002	0.5668385109989933
67.850000000000002	0.5932912231628998
68.850000000000002	0.6208270069141772
69.850000000000002	0.6494851497470202
70.850000000000002	0.6793063071453822
71.850000000000002	0.710332559997953
72.850000000000002	0.7426074746738301
73.850000000000002	0.7761761674871192
74.850000000000002	0.8110853720408906
75.850000000000002	0.8473835123161062
76.850000000000002	0.8851207789843207
77.850000000000002	0.9243492118120292
78.850000000000002	0.9651227867885582
79.850000000000002	1.0074975095329062
80.850000000000002	1.0515315150948539
81.850000000000002	1.0972851744359347
82.850000000000002	1.144821209013481
83.850000000000002	1.194204813121638
84.850000000000002	1.2455037857620412
85.850000000000002	1.2987886718975432
86.850000000000002	1.3541329152257673
87.850000000000002	1.4116130219969285
88.850000000000002	1.4713087386986008
89.850000000000002	1.5333032435954497
90.850000000000002	1.597683354272942
91.850000000000002	1.6645397527240495
92.850000000000002	1.7339672296113504

Temperature (degC)	Pressure (MPa)
93.85000000000002	1.8060649500169803
94.85000000000002	1.880936743179243
95.85000000000002	1.9586914182057023
96.85000000000002	2.0394431096980385
97.85000000000002	2.123311656219444
98.85000000000002	2.210423015280881
99.85000000000002	2.300909720164337
100.85000000000002	2.3949113828583277
101.85000000000002	2.4925752497447395
102.85000000000002	2.594056816208964
103.85000000000002	2.699520508888215
104.85000000000002	2.80914044123282
105.85000000000002	2.9231012680903183
106.85000000000002	3.041599118943101
107.85000000000002	3.1648426643995347
108.85000000000002	3.293054305610035
109.85000000000002	3.4264715489041038
110.85000000000002	3.5653484182490844
111.85000000000002	3.709957322952064
112.85000000000002	3.8605909378137957
113.85000000000002	4.017564470550073
114.85000000000002	4.181218242873418
115.85000000000002	4.351920666608525
116.85000000000002	4.5300716906978575
117.85000000000002	4.716106812616225
118.85000000000002	4.910501770244264
119.85000000000002	5.1137780592249245
120.85000000000002	5.326509458398368
121.85000000000002	5.54932979499842
122.85000000000002	5.782942246191126
123.85000000000002	6.0281305598090125
124.85000000000002	6.285772693703724
125.85000000000002	6.556857531541158

Table B61: Dew Points for Carbon Dioxide and 1% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-87.14999999999998	0.10556073997641795
-86.14999999999998	0.11228450285971156
-85.14999999999998	0.11934275194208575
-84.14999999999998	0.12674695980747416
-83.14999999999998	0.13450877752176144
-82.14999999999998	0.142640031578031
-81.14999999999998	0.15115272078646982
-80.14999999999998	0.1600590131284848
-79.14999999999998	0.16937124259757558
-78.14999999999998	0.1791019060140097
-77.14999999999998	0.18926365983497997
-76.14999999999998	0.19986931696123614
-75.14999999999998	0.21093184354153136
-74.14999999999998	0.22246435580909468
-73.14999999999998	0.23448011690732348
-72.14999999999998	0.2469925337703095
-71.14999999999998	0.26001515400936454
-70.14999999999998	0.27356166285632666
-69.14999999999998	0.2876458801386746
-68.14999999999998	0.30228175730363244
-67.14999999999998	0.31748337449805875
-66.14999999999998	0.333264937721031
-65.14999999999998	0.34964077600897403
-64.14999999999998	0.36662533871927666
-63.14999999999998	0.3842331928779951
-62.14999999999998	0.402479020601971
-61.14999999999998	0.4213776166136949
-60.14999999999998	0.44094388581920013
-59.14999999999998	0.4611928410161934
-58.14999999999998	0.48213960066335587
-57.14999999999998	0.5037993867611058
-56.14999999999998	0.5261875228413375
-55.14999999999998	0.549319432058815
-54.14999999999998	0.5732106353871662
-53.14999999999998	0.5978767499504418
-52.14999999999998	0.623333487448558
-51.14999999999998	0.6495966527347771
-50.14999999999998	0.6766821424970182
-49.14999999999998	0.7046059440863847
-48.14999999999998	0.7333841344871304
-47.14999999999998	0.7630328794249162
-46.14999999999998	0.7935684326193543
-45.14999999999998	0.8250071352040026

Temperature (degC)	Pressure (MPa)
-44.14999999999998	0.8573654152896178
-43.14999999999998	0.8906597876988883
-42.14999999999998	0.9249068538634497
-41.14999999999998	0.9601233018756696
-40.14999999999998	0.9963259067246872
-39.14999999999998	1.0335315306756827
-38.14999999999998	1.071757123830218
-37.14999999999998	1.11101972483823
-36.14999999999998	1.1513364617729511
-35.14999999999998	1.1927245531743738
-34.14999999999998	1.2352013092575478
-33.14999999999998	1.278784133300263
-32.14999999999998	1.323490523220354
-31.14999999999977	1.369338073362565
-30.14999999999977	1.416344476531045
-29.14999999999977	1.4645275262708872
-28.14999999999977	1.5139051194557753
-27.14999999999977	1.5644952592176398
-26.14999999999977	1.6163160582390508
-25.14999999999977	1.6693857424739034
-24.14999999999977	1.7237226553086922
-23.14999999999977	1.7793452622170174
-22.14999999999977	1.8362721559435273
-21.14999999999977	1.894522062229935
-20.14999999999977	1.9541138461222514
-19.14999999999977	2.0150665188739643
-18.14999999999977	2.077399245467802
-17.14999999999977	2.141131352771041
-16.14999999999977	2.2062823383423558
-15.14999999999977	2.2728718799059533
-14.14999999999977	2.340919845521494
-13.14999999999977	2.4104463044749647
-12.14999999999977	2.4814715389252067
-11.14999999999977	2.5540160563595578
-10.14999999999977	2.6281006029299867
-9.14999999999977	2.703746177727144
-8.14999999999977	2.7809740481202185
-7.14999999999977	2.85980576627633
-6.14999999999977	2.9402631870191134
-5.14999999999977	3.0223684872076917
-4.14999999999977	3.1061441868741424
-3.149999999999773	3.1916131723834624
-2.149999999999773	3.2787987219006243
-1.149999999999773	3.367724533553476
-0.1499999999997726	3.458414756665748

Temperature (degC)	Pressure (MPa)
0.85000000000000227	3.5508940264928492
1.85000000000000227	3.6451875029389855
2.85000000000000227	3.741320913736327
3.85000000000000227	3.839320602592613
4.8500000000000023	3.9392135828027937
5.8500000000000023	4.041027596841942
6.8500000000000023	4.14479118242521
7.8500000000000023	4.250533745636058
8.8500000000000023	4.358285641810311
9.8500000000000023	4.468078265205972
10.8500000000000023	4.579944149019959
11.8500000000000023	4.693917078269509
12.8500000000000023	4.810032219500331
13.8500000000000023	4.928326273419931
14.8500000000000023	5.048837659524739
15.8500000000000023	5.171606745598019
16.8500000000000023	5.296676139571884
17.8500000000000023	5.424091066313074
18.8500000000000023	5.5538998566938185
19.8500000000000023	5.686154579833479
20.8500000000000023	5.820911850889199
21.8500000000000023	5.9582338468764275
22.8500000000000023	6.098189568099493
23.8500000000000023	6.240856413555329
24.8500000000000023	6.386322249736808
25.8500000000000023	6.534688473643545
26.8500000000000023	6.686075391815502
27.8500000000000023	6.840633178058871
28.8500000000000023	6.99856633288022
29.8500000000000023	7.1601957223568755

Table B62: Dew Points for Carbon Dioxide and 2% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-88.1499999999998	0.09911838746542205
-87.1499999999998	0.10550816261735932
-86.1499999999998	0.11222009009786364
-85.1499999999998	0.11926540193371049
-84.1499999999998	0.12665551011419754
-83.1499999999998	0.13440200358400756
-82.1499999999998	0.14251664521880117
-81.1499999999998	0.15101136872835827
-80.1499999999998	0.1598982755670401
-79.1499999999998	0.16918963177522456
-78.1499999999998	0.17889786484745457
-77.1499999999998	0.18903556056094464
-76.1499999999998	0.1996154598288626
-75.1499999999998	0.21065045553531503
-74.1499999999998	0.22215358939361687
-73.1499999999998	0.23413804883283765
-72.1499999999998	0.24661716389821647
-71.1499999999998	0.2596044041809696
-70.1499999999998	0.27311337579869377
-69.1499999999998	0.28715781840615767
-68.1499999999998	0.30175160226406045
-67.1499999999998	0.31690872535753123
-66.1499999999998	0.3326433105721542
-65.1499999999998	0.34896960294388335
-64.1499999999998	0.36590196696239474
-63.1499999999998	0.3834548839649854
-62.1499999999998	0.4016429495962558
-61.1499999999998	0.4204808713573173
-60.1499999999998	0.4399834662357422
-59.1499999999998	0.4601656584362976
-58.1499999999998	0.4810424771939503
-57.1499999999998	0.5026290546977744
-56.1499999999998	0.5249406241085727
-55.1499999999998	0.5479925176918455
-54.1499999999998	0.5718001650533002
-53.1499999999998	0.5963790914936336
-52.1499999999998	0.6217449164866635
-51.1499999999998	0.6479133522744798
-50.1499999999998	0.674900202595637
-49.1499999999998	0.7027213615366695
-48.1499999999998	0.731392812546473
-47.1499999999998	0.7609306275599192
-46.1499999999998	0.7913509662998788

Temperature (degC)	Pressure (MPa)
-45.1499999999998	0.8226700757121173
-44.1499999999998	0.8549042895708895
-43.1499999999998	0.88807002823477
-42.1499999999998	0.9221837985748956
-41.1499999999998	0.9572621940617915
-40.1499999999998	0.9933218950185806
-39.1499999999998	1.0303796690402947
-38.1499999999998	1.0684523715780112
-37.1499999999998	1.1075569466758604
-36.1499999999998	1.1477104278859624
-35.1499999999998	1.188929939326722
-34.1499999999998	1.2312326969278866
-33.1499999999998	1.2746360098415785
-32.1499999999998	1.3191572820482607
-31.14999999999977	1.3648140141658618
-30.14999999999977	1.411623805505895
-29.14999999999977	1.4596043563665413
-28.14999999999977	1.5087734706614535
-27.14999999999977	1.5591490588384058
-26.14999999999977	1.6107491412074872
-25.14999999999977	1.6635918516561736
-24.14999999999977	1.7176954418387793
-23.14999999999977	1.7730782858323353
-22.14999999999977	1.8297588853348137
-21.14999999999977	1.8877558754067063
-20.14999999999977	1.9470880307855496
-19.14999999999977	2.0077742728164396
-18.14999999999977	2.0698336769813386
-17.14999999999977	2.1332854810932207
-16.14999999999977	2.198149094121161
-15.14999999999977	2.2644441056963056
-14.14999999999977	2.3321902963237373
-13.14999999999977	2.401407648308303
-12.14999999999977	2.472116357454082
-11.14999999999977	2.5443368455647066
-10.14999999999977	2.618089773833013
-9.14999999999977	2.6933960571790982
-8.14999999999977	2.770276879644007
-7.14999999999977	2.8487537109848287
-6.14999999999977	2.9288483245969834
-5.14999999999977	3.010582816973316
-4.14999999999977	3.0939796289169066
-3.149999999999773	3.179061568778447
-2.149999999999773	3.265851838023078
-1.149999999999773	3.3543740594892646

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.4446523087200065
0.85000000000000227	3.5367111488351646
1.85000000000000227	3.6305756693918867
2.85000000000000227	3.726271529755054
3.85000000000000227	3.8238250074838747
4.8500000000000023	3.9232630522620178
5.8500000000000023	4.024613345914235
6.8500000000000023	4.127904369036761
7.8500000000000023	4.2331654748679775
8.8500000000000023	4.340426971156121
9.8500000000000023	4.449720211071924
10.8500000000000023	4.561077694778413
11.8500000000000023	4.674533184191471
12.8500000000000023	4.790121834876843
13.8500000000000023	4.90788035115287
14.8500000000000023	5.027847173405407
15.8500000000000023	5.1500627103956855
16.8500000000000023	5.274569634064275
17.8500000000000023	5.401413259543383
18.8500000000000023	5.53064203834835
19.8500000000000023	5.662308197164966
20.8500000000000023	5.796468557413517
21.8500000000000023	5.933185573561823
22.8500000000000023	6.072528636112197
23.8500000000000023	6.214575720647684
24.8500000000000023	6.359415579789068
25.8500000000000023	6.507151004485589
26.8500000000000023	6.657904508476238
27.8500000000000023	6.811829752603614
28.8500000000000023	6.96913801710701
29.8500000000000023	7.1301652192626985
30.8500000000000023	7.295683643359808

Table B63: Dew Points for Carbon Dioxide and 3% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.09902700924503875
-87.14999999999998	0.10540274200872171
-86.14999999999998	0.11209943584555615
-85.14999999999998	0.11912826078323621
-84.14999999999998	0.12650056537146243
-83.14999999999998	0.1342278737262898
-82.14999999999998	0.14232188250670755
-81.14999999999998	0.15079445788954587
-80.14999999999998	0.1596576324755524
-79.14999999999998	0.16892360219448055
-78.14999999999998	0.17860472319976944
-77.14999999999998	0.18871350872907505
-76.14999999999998	0.19926262600766997
-75.14999999999998	0.21026489310595578
-74.14999999999998	0.2217332758559525
-73.14999999999998	0.23368088476126714
-72.14999999999998	0.24612097193675486
-71.14999999999998	0.2590669280904713
-70.14999999999998	0.2725322795338113
-69.14999999999998	0.2865306852336157
-68.14999999999998	0.30107593392204945
-67.14999999999998	0.3161819412544675
-66.14999999999998	0.3318627470218426
-65.14999999999998	0.3481325124441374
-64.14999999999998	0.3650055175129495
-63.14999999999998	0.3824961584178559
-62.14999999999998	0.40061894504380396
-61.14999999999998	0.4193884985684109
-60.14999999999998	0.43881954912088017
-59.14999999999998	0.45892693354360004
-58.14999999999998	0.4797255932573827
-57.14999999999998	0.5012305722026842
-56.14999999999998	0.5234570149039807
-55.14999999999998	0.5464201646307008
-54.14999999999998	0.5701353616698169
-53.14999999999998	0.5946180417106336
-52.14999999999998	0.6198837343574737
-51.14999999999998	0.6459480617475309
-50.14999999999998	0.672826737319527
-49.14999999999998	0.70053556469354
-48.14999999999998	0.7290904367056529
-47.14999999999998	0.7585073345665817
-46.14999999999998	0.7888023271845495

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8199915706343182
-44.14999999999998	0.8520913077821608
-43.14999999999998	0.8851178680677797
-42.14999999999998	0.9190876674580183
-41.14999999999998	0.9540172085573408
-40.14999999999998	0.9899230808847553
-39.14999999999998	1.0268219613209326
-38.14999999999998	1.064730614708274
-37.14999999999998	1.1036658946241062
-36.14999999999998	1.1436447443083548
-35.14999999999998	1.184684197754675
-34.14999999999998	1.226801380974441
-33.14999999999998	1.270013513434412
-32.14999999999998	1.3143379096753391
-31.149999999999977	1.3597919811559023
-30.149999999999977	1.4063932383077167
-29.149999999999977	1.4541592928642761
-28.149999999999977	1.5031078604717552
-27.149999999999977	1.5532567636532801
-26.149999999999977	1.6046239351150253
-25.149999999999977	1.6572274214806422
-24.149999999999977	1.711085387475397
-23.149999999999977	1.7662161205977331
-22.149999999999977	1.8226380363061003
-21.149999999999977	1.8803696837631818
-20.149999999999977	1.9394297521737922
-19.149999999999977	1.999837077710438
-18.149999999999977	2.061610651059295
-17.149999999999977	2.124769625627125
-16.149999999999977	2.189333326388923
-15.149999999999977	2.255321259424012
-14.149999999999977	2.322753122156267
-13.149999999999977	2.3916488143168286
-12.149999999999977	2.462028449682019
-11.149999999999977	2.533912368626616
-10.149999999999977	2.6073211515558645
-9.149999999999977	2.6822756333020346
-8.149999999999977	2.7587969185812895
-7.149999999999977	2.836906398639235
-6.149999999999977	2.9166257692494684
-5.149999999999977	2.9979770502305216
-4.149999999999977	3.080982606734604
-3.1499999999999773	3.1656651725531595
-2.1499999999999773	3.2520478757641134
-1.1499999999999773	3.3401542670614397

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.4300083511903328
0.85000000000000227	3.521634621904838
1.85000000000000227	3.615058100969774
2.85000000000000227	3.7103043816869268
3.85000000000000227	3.807399677489299
4.8500000000000023	3.9063708761863785
5.8500000000000023	4.007245600368435
6.8500000000000023	4.110052274601001
7.8500000000000023	4.214820200045921
8.8500000000000023	4.3215796373067406
9.8500000000000023	4.430361898607008
10.8500000000000023	4.541199450930626
11.8500000000000023	4.654126032660703
12.8500000000000023	4.769176787648408
13.8500000000000023	4.88638842270317
14.8500000000000023	5.005799397398317
15.8500000000000023	5.127450158869309
16.8500000000000023	5.251383439015321
17.8500000000000023	5.377644636959792
18.8500000000000023	5.506282315229546
19.8500000000000023	5.637348843984607
20.8500000000000023	5.770901230493001
21.8500000000000023	5.907002178233106
22.8500000000000023	6.045721429262964
23.8500000000000023	6.187137483111183
24.8500000000000023	6.331339903286916
25.8500000000000023	6.478432773129234
26.8500000000000023	6.628540571209638
27.8500000000000023	6.781820208253891
28.8500000000000023	6.93848774750533
29.8500000000000023	7.0988889400854704
30.8500000000000023	7.263800548849686

Table B64: Dew Points for Carbon Dioxide and 4% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-89.1499999999998	0.09282986267952203
-88.1499999999998	0.09887926519367302
-87.1499999999998	0.1052373552619284
-86.1499999999998	0.11191505816445242
-85.1499999999998	0.11892347928009758
-84.1499999999998	0.12627390122249468
-83.1499999999998	0.13397778090940785
-82.1499999999998	0.14204674659302216
-81.1499999999998	0.15049259485139022
-80.1499999999998	0.15932728755114212
-79.1499999999998	0.16856294878653053
-78.1499999999998	0.17821186180331933
-77.1499999999998	0.18828646592310808
-76.1499999999998	0.19879935345295902
-75.1499999999998	0.2097632666215527
-74.1499999999998	0.22119109450185112
-73.1499999999998	0.23309586998189824
-72.1499999999998	0.24549076674285364
-71.1499999999998	0.25838909627145246
-70.1499999999998	0.2718043049170333
-69.1499999999998	0.2857499709888392
-68.1499999999998	0.3002398018856727
-67.1499999999998	0.3152876313161492
-66.1499999999998	0.3309074165358979
-65.1499999999998	0.3471132356753744
-64.1499999999998	0.363919285130026
-63.1499999999998	0.3813398770146634
-62.1499999999998	0.3993894367048432
-61.1499999999998	0.41808250046126005
-60.1499999999998	0.43743371312150364
-59.1499999999998	0.457457825908793
-58.1499999999998	0.4781696943120301
-57.1499999999998	0.4995842760748133
-56.1499999999998	0.5217166292791692
-55.1499999999998	0.5445819105452413
-54.1499999999998	0.5681953733253983
-53.1499999999998	0.5925723663265119
-52.1499999999998	0.617728332039171
-51.1499999999998	0.6436788053972154
-50.1499999999998	0.6704394125559426
-49.1499999999998	0.6980258698088443
-48.1499999999998	0.7264539826354615
-47.1499999999998	0.7557396448979473

Temperature (degC)	Pressure (MPa)
-46.1499999999998	0.785898838172686
-45.1499999999998	0.8169476312438729
-44.1499999999998	0.8489021797541643
-43.1499999999998	0.8817787259949469
-42.1499999999998	0.915593598896496
-41.1499999999998	0.9503632141448615
-40.1499999999998	0.9861040744814085
-39.1499999999998	1.0228327701719575
-38.1499999999998	1.06056597962347
-37.1499999999998	1.099320470180636
-36.1499999999998	1.139113099074376
-35.1499999999998	1.1799608145297018
-34.1499999999998	1.2218806570523293
-33.1499999999998	1.264889760880299
-32.1499999999998	1.309005355631825
-31.14999999999977	1.3542447681432213
-30.14999999999977	1.4006254245596663
-29.14999999999977	1.448164852659913
-28.14999999999977	1.4968806844795617
-27.14999999999977	1.5467906592685006
-26.14999999999977	1.597912626806352
-25.14999999999977	1.6502645511345226
-24.14999999999977	1.7038645147269877
-23.14999999999977	1.7587307231637204
-22.14999999999977	1.8148815103087559
-21.14999999999977	1.8723353440557466
-20.14999999999977	1.9311108326540987
-19.14999999999977	1.9912267316359455
-18.14999999999977	2.052701951378539
-17.14999999999977	2.1155555653088256
-16.14999999999977	2.179806818773254
-15.14999999999977	2.245475138591221
-14.14999999999977	2.312580143321925
-13.14999999999977	2.381141654263818
-12.14999999999977	2.4511797072230093
-11.14999999999977	2.5227145651191303
-10.14999999999977	2.5957667314543365
-9.14999999999977	2.670356964773813
-8.14999999999977	2.746506294166454
-7.14999999999977	2.824236035977146
-6.14999999999977	2.903567811860786
-5.14999999999977	2.9845235683586036
-4.14999999999977	3.0671255982549566
-3.149999999999773	3.151396563941365
-2.149999999999773	3.237359523119515

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.3250379572076914
-0.1499999999997726	3.4144558028344036
0.8500000000000227	3.505637486887219
1.8500000000000227	3.598607965605148
2.8500000000000227	3.69339276824276
3.8500000000000227	3.7900180458626562
4.850000000000023	3.8885106258313153
5.850000000000023	3.988898072620632
6.850000000000023	4.091208755531223
7.850000000000023	4.195471924048194
8.850000000000023	4.301717791664618
9.850000000000023	4.409977629326547
10.850000000000023	4.520283870134518
11.850000000000023	4.632670227856037
12.850000000000023	4.747171833116505
13.850000000000023	4.863825393182298
14.850000000000023	4.982669384062314
15.850000000000023	5.103744287427647
16.850000000000023	5.22709288967199
17.850000000000023	5.352760665529242
18.850000000000023	5.480796277587456
19.850000000000023	5.611252221906665
20.850000000000023	5.744185667011852
21.850000000000023	5.879659530180902
22.850000000000023	6.01774385500252
23.850000000000023	6.158517593177626
24.850000000000023	6.30207099683261
25.850000000000023	6.448509385039331
26.850000000000023	6.59795877704347
27.850000000000023	6.750578645241574
28.850000000000023	6.906588507959055
29.850000000000023	7.066338668742793
30.850000000000023	7.2305875042742915

Table B65: Dew Points for Carbon Dioxide and 5% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08690517283127112
-89.14999999999998	0.0926378198678819
-88.14999999999998	0.09866702915397207
-87.14999999999998	0.10500347857467927
-86.14999999999998	0.11165802772616695
-85.14999999999998	0.11864171513927123
-84.14999999999998	0.1259657554471131
-83.14999999999998	0.13364153650403257
-82.14999999999998	0.14168061644373878
-81.14999999999998	0.15009472072357308
-80.14999999999998	0.15889573912022012
-79.14999999999998	0.16809572271188386
-78.14999999999998	0.177706880847535
-77.14999999999998	0.18774157810405642
-76.14999999999998	0.1982123312432846
-75.14999999999998	0.2091318061855429
-74.14999999999998	0.22051281497304287
-73.14999999999998	0.23236831278726103
-72.14999999999998	0.24471139494932023
-71.14999999999998	0.257555293993335
-70.14999999999998	0.2709133767441449
-69.14999999999998	0.2847991414585966
-68.14999999999998	0.2992262150013413
-67.14999999999998	0.3142083500812022
-66.14999999999998	0.32975942254426754
-65.14999999999998	0.34589342872790074
-64.14999999999998	0.3626244828782116
-63.14999999999998	0.3799668146494799
-62.14999999999998	0.3979347666788365
-61.14999999999998	0.41654279222134705
-60.14999999999998	0.43580545290107403
-59.14999999999998	0.45573741652885225
-58.14999999999998	0.47635345502097465
-57.14999999999998	0.4976684424091792
-56.14999999999998	0.5196973529621911
-55.14999999999998	0.5424552593937693
-54.14999999999998	0.5659573312016091
-53.14999999999998	0.5902188331010704
-52.14999999999998	0.6152551235803344
-51.14999999999998	0.6410816535818172
-50.14999999999998	0.6677139653059713
-49.14999999999998	0.6951676911377146
-48.14999999999998	0.7234585527283225

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7526023601902425
-46.14999999999998	0.7826150114683448
-45.14999999999998	0.8135124918337795
-44.14999999999998	0.8453108735504251
-43.14999999999998	0.8780263156971521
-42.14999999999998	0.9116750641492352
-41.14999999999998	0.9462734517246224
-40.14999999999998	0.9818378985003703
-39.14999999999998	1.0183849122852637
-38.14999999999998	1.0559310892691203
-37.14999999999998	1.0944931148164991
-36.14999999999998	1.1340877644440404
-35.14999999999998	1.174731904946809
-34.14999999999998	1.2164424956911006
-33.14999999999998	1.259236590094066
-32.14999999999998	1.3031313372685085
-31.149999999999977	1.3481439838972606
-30.149999999999977	1.394291876304126
-29.149999999999977	1.4415924628011185
-28.149999999999977	1.490063296308522
-27.149999999999977	1.5397220373113776
-26.149999999999977	1.5905864571634525
-25.149999999999977	1.6426744418140007
-24.149999999999977	1.696003995964488
-23.149999999999977	1.7505932477302277
-22.149999999999977	1.806460453802797
-21.149999999999977	1.8636240051838595
-20.149999999999977	1.9221024335056447
-19.149999999999977	1.9819144179385402
-18.149999999999977	2.0430787927710976
-17.149999999999977	2.1056145555992023
-16.149999999999977	2.1695408762160504
-15.149999999999977	2.2348771061806674
-14.149999999999977	2.301642789105455
-13.149999999999977	2.3698576716819764
-12.149999999999977	2.4395417154933745
-11.149999999999977	2.5107151096489257
-10.149999999999977	2.5833982843155954
-9.149999999999977	2.657611925208098
-8.149999999999977	2.7333769891634008
-7.149999999999977	2.810714720892012
-6.149999999999977	2.8896466710987423
-5.149999999999977	2.9701947161109157
-4.149999999999977	3.05238107928398
-3.1499999999999773	3.136228354429086

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.221759531554176
-1.149999999999773	3.308998025332517
-0.1499999999997726	3.3979677066354013
0.8500000000000227	3.4886929376369147
1.8500000000000227	3.5811986109907226
2.8500000000000227	3.6755101936014
3.8500000000000227	3.7716537755471937
4.850000000000023	3.8696561248522316
5.850000000000023	3.969544748591213
6.850000000000023	4.071347961159704
7.850000000000023	4.175094960307295
8.850000000000023	4.280815911930974
9.850000000000023	4.388542044751004
10.850000000000023	4.498305756569053
11.850000000000023	4.610140734608278
12.850000000000023	4.724082093772138
13.850000000000023	4.840166538591414
14.850000000000023	4.958432557404975
15.850000000000023	5.078920661054923
16.850000000000023	5.201673683180431
17.850000000000023	5.326737163137395
18.850000000000023	5.454159850593647
19.850000000000023	5.583994346565648
20.850000000000023	5.7162979512302545
21.850000000000023	5.851133752906393
22.850000000000023	5.988572034538188
23.850000000000023	6.128692108883192
24.850000000000023	6.27158483584473
25.850000000000023	6.4173565252405815
26.850000000000023	6.566134347352818
27.850000000000023	6.718079708569963
28.850000000000023	6.873413836148455
29.850000000000023	7.032486896699468
30.850000000000023	7.196024654118492

Table B66: Dew Points for Carbon Dioxide and 1% Hydrogen

Temperature (degC)	Pressure (MPa)
-89.1499999999998	0.09402768411847445
-88.1499999999998	0.10018768895564446
-87.1499999999998	0.1066640953804201
-86.1499999999998	0.11346820344335716
-85.1499999999998	0.12061150309067024
-84.1499999999998	0.12810567129117245
-83.1499999999998	0.13596256905505316
-82.1499999999998	0.1441942384512032
-81.1499999999998	0.15281289955360114
-80.1499999999998	0.16183094737337947
-79.1499999999998	0.17126094876596262
-78.1499999999998	0.181115639326366
-77.1499999999998	0.19140792027704218
-76.1499999999998	0.20215085535798447
-75.1499999999998	0.21335766772312045
-74.1499999999998	0.22504173686739087
-73.1499999999998	0.2372165955575652
-72.1499999999998	0.24989592681237346
-71.1499999999998	0.2630935609052203
-70.1499999999998	0.27682347242244437
-69.1499999999998	0.29109977737513915
-68.1499999999998	0.3059367303449704
-67.1499999999998	0.3213487217176858
-66.1499999999998	0.3373502749734374
-65.1499999999998	0.3539560440522481
-64.1499999999998	0.3711808107997277
-63.1499999999998	0.38903948249310544
-62.1499999999998	0.40754708946836166
-61.1499999999998	0.426718782823485
-60.1499999999998	0.44656983225134156
-59.1499999999998	0.4671156239320058
-58.1499999999998	0.4883716585946003
-57.1499999999998	0.5103535496404406
-56.1499999999998	0.533077021411672
-55.1499999999998	0.5565579075879733
-54.1499999999998	0.5808121497000948
-53.1499999999998	0.6058557957915433
-52.1499999999998	0.6317049992103342
-51.1499999999998	0.6583760175638013
-50.1499999999998	0.6858852117987312
-49.1499999999998	0.7142490454879461
-48.1499999999998	0.7434840842284531
-47.1499999999998	0.7736069952644802

Temperature (degC)	Pressure (MPa)
-46.14999999999998	0.8046345472580091
-45.14999999999998	0.8365836102618793
-44.14999999999998	0.8694711558913852
-43.14999999999998	0.9033142576884543
-42.14999999999998	0.9381300916906744
-41.14999999999998	0.973935937215733
-40.14999999999998	1.0107491778519717
-39.14999999999998	1.0485873026598898
-38.14999999999998	1.0874679075913136
-37.14999999999998	1.127408697115957
-36.14999999999998	1.168427486081668
-35.14999999999998	1.2105422017847711
-34.14999999999998	1.2537708862957289
-33.14999999999998	1.2981316990278813
-32.14999999999998	1.343642919591323
-31.149999999999977	1.3903229509619366
-30.149999999999977	1.438190322986233
-29.149999999999977	1.4872636962877879
-28.149999999999977	1.5375618665960809
-27.149999999999977	1.5891037695899932
-26.149999999999977	1.641908486256096
-25.149999999999977	1.695995248858838
-24.149999999999977	1.7513834475651135
-23.149999999999977	1.8080926377611732
-22.149999999999977	1.8661425481260747
-21.149999999999977	1.9255530895139095
-20.149999999999977	1.986344364677277
-19.149999999999977	2.048536678888113
-18.149999999999977	2.112150551513996
-17.149999999999977	2.177206728574981
-16.149999999999977	2.2437261963804955
-15.149999999999977	2.3117301962808297
-14.149999999999977	2.38124024061767
-13.149999999999977	2.4522781300065293
-12.149999999999977	2.5248659720039037
-11.149999999999977	2.599026201359223
-10.149999999999977	2.674781601978974
-9.149999999999977	2.7521553308228377
-8.149999999999977	2.8311709439730084
-7.149999999999977	2.911852425160293
-6.149999999999977	2.9942242171077953
-5.149999999999977	3.078311256087127
-4.149999999999977	3.1641390102101212
-3.1499999999999773	3.251733522012689
-2.1499999999999773	3.3411214560390015

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.432330152231036
-0.1499999999997726	3.5253876860716034
0.8500000000000227	3.6203229365900813
1.8500000000000227	3.7171656635096686
2.8500000000000227	3.815946595007655
3.8500000000000227	3.9166975278409266
4.850000000000023	4.0194514418178775
5.850000000000023	4.1242426310232085
6.850000000000023	4.231106854678751
7.850000000000023	4.3400815112069155
8.850000000000023	4.451205840098744
9.850000000000023	4.5645211576395806
10.850000000000023	4.6800711347281725
11.850000000000023	4.797902128207166
12.850000000000023	4.918063581751999
13.850000000000023	5.040608519060004
14.850000000000023	5.165594161563112
15.850000000000023	5.293082716344744
16.850000000000023	5.423142398866485
17.850000000000023	5.555848781792986
18.850000000000023	5.691286599924216
19.850000000000023	5.829552198835924
20.850000000000023	5.970756906782444
21.850000000000023	6.115031767371251
22.850000000000023	6.262534366069349
23.850000000000023	6.413459080120288
24.850000000000023	6.568053364342394
25.850000000000023	6.726645604479327
26.850000000000023	6.889697123277134
27.850000000000023	7.05790939875347
28.850000000000023	7.232472811694129
29.850000000000023	7.415753581633894
30.850000000000023	7.614053902277808

Table B67: Dew Points for Carbon Dioxide and 2% Hydrogen

Temperature (degC)	Pressure (MPa)
-92.14999999999998	0.07814308260950163
-91.14999999999998	0.08347579811261276
-90.14999999999998	0.0890953154296042
-89.14999999999998	0.09501247935841149
-88.14999999999998	0.10123833656208786
-87.14999999999998	0.10778413294209627
-86.14999999999998	0.11466131096755455
-85.14999999999998	0.12188150690111046
-84.14999999999998	0.1294565479870478
-83.14999999999998	0.1373984495767831
-82.14999999999998	0.14571941220999268
-81.14999999999998	0.15443181867446068
-80.14999999999998	0.16354823102629676
-79.14999999999998	0.17308138759405853
-78.14999999999998	0.18304419999864363
-77.14999999999998	0.19344975013129923
-76.14999999999998	0.2043112871835959
-75.14999999999998	0.2156422246579025
-74.14999999999998	0.22745613743419407
-73.14999999999998	0.23976675882407675
-72.14999999999998	0.2525879777225305
-71.14999999999998	0.2659338357364228
-70.14999999999998	0.27981852443223965
-69.14999999999998	0.2942563825877429
-68.14999999999998	0.3092618935523028
-67.14999999999998	0.3248496826337261
-66.14999999999998	0.34103451462166623
-65.14999999999998	0.3578312913294
-64.14999999999998	0.37525504928651804
-63.14999999999998	0.39332095748485363
-62.14999999999998	0.41204431524847457
-61.14999999999998	0.4314405502009575
-60.14999999999998	0.4515252163617554
-59.14999999999998	0.4723139923373373
-58.14999999999998	0.49382267966891696
-57.14999999999998	0.5160672012768442
-56.14999999999998	0.539063600079637
-55.14999999999998	0.5628280377188417
-54.14999999999998	0.5873767934673103
-53.14999999999998	0.6127262632703844
-52.14999999999998	0.6388929589657373
-51.14999999999998	0.6658935076661894
-50.14999999999998	0.693744651327661

Temperature (degC)	Pressure (MPa)
-49.14999999999998	0.7224632465026155
-48.14999999999998	0.7520662643000848
-47.14999999999998	0.7825707905334309
-46.14999999999998	0.8139940261112352
-45.14999999999998	0.8463532876276052
-44.14999999999998	0.8796660082030449
-43.14999999999998	0.9139497385507744
-42.14999999999998	0.9492221483029881
-41.14999999999998	0.9855010275658916
-40.14999999999998	1.0228042887410953
-39.14999999999998	1.0611499685999202
-38.14999999999998	1.1005562306105963
-37.14999999999998	1.1410413675408235
-36.14999999999998	1.1826238043311033
-35.14999999999998	1.2253221012658462
-34.14999999999998	1.2691549574683638
-33.14999999999998	1.3141412147345761
-32.14999999999998	1.3602998617545523
-31.149999999999977	1.4076500387765698
-30.149999999999977	1.4562110427379786
-29.149999999999977	1.5060023329464898
-28.149999999999977	1.557043537356795
-27.149999999999977	1.6093544595139073
-26.149999999999977	1.6629550862080158
-25.149999999999977	1.7178655959368365
-24.149999999999977	1.7741063681985
-23.149999999999977	1.8316979937186642
-22.149999999999977	1.8906612856399405
-21.149999999999977	1.9510172917600264
-20.149999999999977	2.012787307886319
-19.149999999999977	2.0759928923732858
-18.149999999999977	2.1406558819414814
-17.149999999999977	2.2067984088606525
-16.149999999999977	2.274442919608583
-15.149999999999977	2.343612195154862
-14.149999999999977	2.4143293729676327
-13.149999999999977	2.486617970979558
-12.149999999999977	2.560501913664299
-11.149999999999977	2.636005560484875
-10.149999999999977	2.71315373698756
-9.149999999999977	2.7919717688733905
-8.149999999999977	2.8724855194325083
-7.149999999999977	2.9547214308067384
-6.149999999999977	3.0387065696187254
-5.149999999999977	3.1244686776381556

Temperature (degC)	Pressure (MPa)
-4.14999999999977	3.212036228226153
-3.149999999999773	3.3014384895058706
-2.149999999999773	3.3927055953307024
-1.149999999999773	3.4858686253416384
-0.1499999999997726	3.5809596956437804
0.8500000000000227	3.678012061921928
1.8500000000000227	3.7770602371092066
2.8500000000000227	3.8781401261511186
3.8500000000000227	3.9812891808831257
4.850000000000023	4.086546578587382
5.850000000000023	4.193953428622138
6.850000000000023	4.303553012430403
7.850000000000023	4.415391063642037
8.850000000000023	4.529516096821798
9.850000000000023	4.645979796062532
10.850000000000023	4.764837478378026
11.850000000000023	4.88614865227866
12.850000000000023	5.0099776996674565
13.850000000000023	5.136394720339826
14.850000000000023	5.265476594365042
15.850000000000023	5.397308340593221
16.850000000000023	5.531984882651101
17.850000000000023	5.6696133820818275
18.850000000000023	5.810316370423708
19.850000000000023	5.954236023210919
20.850000000000023	6.101540099124844
21.850000000000023	6.252430377807711
22.850000000000023	6.407155000396728
23.850000000000023	6.5660272366543335
24.850000000000023	6.729455537706337
25.850000000000023	6.897994899133741
26.850000000000023	7.072441747360145
27.850000000000023	7.25402580389324
28.850000000000023	7.444843097541794
29.850000000000023	7.649004740763328
30.850000000000023	7.8774832013036

Table B68: Dew Points for Carbon Dioxide and 3% Hydrogen

Temperature (degC)	Pressure (MPa)
-95.14999999999998	0.06443031744835469
-94.14999999999998	0.06901402573440864
-93.14999999999998	0.07385605556773762
-92.14999999999998	0.07896675466953305
-91.14999999999998	0.08435668342999064
-90.14999999999998	0.09003661268497364
-89.14999999999998	0.09601752133920174
-88.14999999999998	0.10231059393885726
-87.14999999999998	0.10892721811464409
-86.14999999999998	0.11587898197479507
-85.14999999999998	0.12317767142926081
-84.14999999999998	0.13083526745213922
-83.14999999999998	0.13886394329555896
-82.14999999999998	0.14727606166365811
-81.14999999999998	0.1560841718714771
-80.14999999999998	0.16530100696230324
-79.14999999999998	0.17493948083363697
-78.14999999999998	0.18501268534088205
-77.14999999999998	0.19553388743179767
-76.14999999999998	0.20651652626893566
-75.14999999999998	0.2179742103902871
-74.14999999999998	0.2299207149037596
-73.14999999999998	0.24236997870102236
-72.14999999999998	0.255336101743736
-71.14999999999998	0.2688333423688347
-70.14999999999998	0.28287611469688007
-69.14999999999998	0.2974789860729963
-68.14999999999998	0.31265667459268925
-67.14999999999998	0.3284240467227261
-66.14999999999998	0.3447961149897986
-65.14999999999998	0.3617880357883939
-64.14999999999998	0.3794151072615173
-63.14999999999998	0.39769276731773484
-62.14999999999998	0.4166365917465524
-61.14999999999998	0.4362622924577005
-60.14999999999998	0.45658571586241675
-59.14999999999998	0.4776228413699973
-58.14999999999998	0.499389780035416
-57.14999999999998	0.5219027733537427
-56.14999999999998	0.5451781922185763
-55.14999999999998	0.5692325360300878
-54.14999999999998	0.5940824319821228
-53.14999999999998	0.6197446345318517

Temperature (degC)	Pressure (MPa)
-52.14999999999998	0.6462360250410819
-51.14999999999998	0.6735736116505023
-50.14999999999998	0.7017745293201297
-49.14999999999998	0.7308560401224047
-48.14999999999998	0.7608355337453655
-47.14999999999998	0.7917305282564658
-46.14999999999998	0.8235586710904131
-45.14999999999998	0.8563377403270657
-44.14999999999998	0.8900856462097568
-43.14999999999998	0.9248204329498592
-42.14999999999998	0.9605602808165732
-41.14999999999998	0.9973235084973583
-40.14999999999998	1.0351285757544393
-39.14999999999998	1.073994086385212
-38.14999999999998	1.11393879148428
-37.14999999999998	1.1549815930363065
-36.14999999999998	1.1971415478529315
-35.14999999999998	1.240437871906916
-34.14999999999998	1.2848899450644315
-33.14999999999998	1.330517316292014
-32.14999999999998	1.3773397093830857
-31.149999999999977	1.4253770292510661
-30.149999999999977	1.4746493688646183
-29.149999999999977	1.5251770168743173
-28.149999999999977	1.5769804660214148
-27.149999999999977	1.630080422353881
-26.149999999999977	1.6844978153644503
-25.149999999999977	1.740253809083709
-24.149999999999977	1.7973698142018675
-23.149999999999977	1.8558675013284776
-22.149999999999977	1.9157688154127013
-21.149999999999977	1.9770959914715018
-20.149999999999977	2.0398715716817386
-19.149999999999977	2.1041184239797786
-18.149999999999977	2.1698597622746765
-17.149999999999977	2.237119168451309
-16.149999999999977	2.3059206162913055
-15.149999999999977	2.376288497553681
-14.149999999999977	2.4482476503970996
-13.149999999999977	2.521823390414143
-12.149999999999977	2.597041544573701
-11.149999999999977	2.673928488404496
-10.149999999999977	2.7525111868129244
-9.149999999999977	2.8328172389976443
-8.149999999999977	2.9148749279962334

Temperature (degC)	Pressure (MPa)
-7.149999999999977	2.998713275523397
-6.149999999999977	3.084362102820146
-5.149999999999977	3.1718520984471748
-4.149999999999977	3.261214894068476
-3.149999999999973	3.3524831495096445
-2.149999999999973	3.4456906486014054
-1.149999999999973	3.5408724076183327
-0.1499999999999726	3.638064798472112
0.8500000000000227	3.7373056892139376
1.8500000000000227	3.838634604927822
2.8500000000000227	3.9420929126476185
3.8500000000000227	4.0477240347179695
4.850000000000023	4.155573695871461
5.850000000000023	4.265690210500748
6.850000000000023	4.378124818111404
7.850000000000023	4.492932076963921
8.850000000000023	4.610170328719362
9.850000000000023	4.729902250804247
10.850000000000023	4.852195518683543
11.850000000000023	4.977123608086291
12.850000000000023	5.104766778449819
13.850000000000023	5.235213294991674
14.850000000000023	5.36856097011794
15.850000000000023	5.504919138687982
16.850000000000023	5.644411231142463
17.850000000000023	5.7871781820106625
18.850000000000023	5.9333830227978686
19.850000000000023	6.083217183415539
20.850000000000023	6.236909313210422
21.850000000000023	6.394737929392716
22.850000000000023	6.557050113144381
23.850000000000023	6.724290255676166
24.850000000000023	6.897046550910117
25.850000000000023	7.076131067606921
26.850000000000023	7.2627283765195205
27.850000000000023	7.458696621347445
28.850000000000023	7.667247499683102
29.850000000000023	7.894817669095632
30.850000000000023	8.161123223578038

Table B69: Dew Points for Carbon Dioxide and 4% Hydrogen

Temperature (degC)	Pressure (MPa)
-98.14999999999998	0.052680572132036134
-97.14999999999998	0.05659071949866153
-96.14999999999998	0.06073196302918818
-95.14999999999998	0.06511411536135397
-94.14999999999998	0.06974721129053281
-93.14999999999998	0.07464150599583004
-92.14999999999998	0.07980747306570675
-91.14999999999998	0.08525580242884621
-90.14999999999998	0.09099739818970452
-89.14999999999998	0.0970433763183813
-88.14999999999998	0.10340506228832909
-87.14999999999998	0.1100939886117022
-86.14999999999998	0.11712189230456525
-85.14999999999998	0.12450071229461757
-84.14999999999998	0.1322425867676976
-83.14999999999998	0.14035985047634436
-82.14999999999998	0.14886503202068196
-81.14999999999998	0.15777085108328542
-80.14999999999998	0.1670902156869029
-79.14999999999998	0.17683621939997454
-78.14999999999998	0.1870221385860285
-77.14999999999998	0.1976614296405496
-76.14999999999998	0.20876772625996318
-75.14999999999998	0.22035483673253362
-74.14999999999998	0.23243674127639605
-73.14999999999998	0.24502758941318808
-72.14999999999998	0.25814169739918763
-71.14999999999998	0.2717935457258416
-70.14999999999998	0.2859977766753448
-69.14999999999998	0.300769191970122
-68.14999999999998	0.3161227504874266
-67.14999999999998	0.3320735660893222
-66.14999999999998	0.34863690552890614
-65.14999999999998	0.36582818648650217
-64.14999999999998	0.3836629756941148
-63.14999999999998	0.4021569872082508
-62.14999999999998	0.4213260807937059
-61.14999999999998	0.4411862604428875
-60.14999999999998	0.46175367305903864
-59.14999999999998	0.4830446072576975
-58.14999999999998	0.5050754923591269
-57.14999999999998	0.5278628975221581
-56.14999999999998	0.5514235310743204

Temperature (degC)	Pressure (MPa)
-55.14999999999998	0.5757742400114402
-54.14999999999998	0.6009320096931308
-53.14999999999998	0.6269139637583938
-52.14999999999998	0.6537373642295442
-51.14999999999998	0.681419611868762
-50.14999999999998	0.7099782467607082
-49.14999999999998	0.7394309491460425
-48.14999999999998	0.769795540520189
-47.14999999999998	0.8010899850122053
-46.14999999999998	0.8333323910237174
-45.14999999999998	0.8665410131884804
-44.14999999999998	0.900734254604188
-43.14999999999998	0.9359306693912415
-42.14999999999998	0.9721489655396842
-41.14999999999998	1.0094080081010874
-40.14999999999998	1.0477268227038563
-39.14999999999998	1.0871245994142231
-38.14999999999998	1.1276206969913545
-37.14999999999998	1.1692346475263091
-36.14999999999998	1.211986161547157
-35.14999999999998	1.2558951335856285
-34.14999999999998	1.300981648316086
-33.14999999999998	1.347265987274114
-32.14999999999998	1.3947686362334002
-31.149999999999977	1.4435102933077655
-30.149999999999977	1.4935118778473715
-29.149999999999977	1.5447945401632117
-28.149999999999977	1.5973796722009797
-27.149999999999977	1.6512889191574525
-26.149999999999977	1.7065441921950033
-25.149999999999977	1.7631676822528355
-24.149999999999977	1.8211818750936364
-23.149999999999977	1.8806095676495957
-22.149999999999977	1.9414738857939198
-21.149999999999977	2.0037983036422338
-20.149999999999977	2.0676066645467617
-19.149999999999977	2.1329232039275774
-18.149999999999977	2.199772574119594
-17.149999999999977	2.2681798714652355
-16.149999999999977	2.3381706658472523
-15.149999999999977	2.409771032959236
-14.149999999999977	2.4830075895873067
-13.149999999999977	2.5579075322474716
-12.149999999999977	2.6344986795543095
-11.149999999999977	2.7128095187846024

Temperature (degC)	Pressure (MPa)
-10.149999999999977	2.7928692571065272
-9.149999999999977	2.874707878120563
-8.149999999999977	2.9583562043750806
-7.149999999999977	3.0438459667031266
-6.149999999999977	3.131209881360802
-5.149999999999977	3.2204817361274167
-4.149999999999977	3.3116964867752485
-3.149999999999973	3.404890365560187
-2.149999999999973	3.5001010037377167
-1.149999999999973	3.5973675704650696
-0.1499999999999726	3.696730930962455
0.8500000000000227	3.7982338273211123
1.8500000000000227	3.9019210860524804
2.8500000000000227	4.007839857282503
3.8500000000000227	4.116039891504683
4.850000000000023	4.226573861075543
5.850000000000023	4.339497735236408
6.850000000000023	4.454871219577786
7.850000000000023	4.57275827362685
8.850000000000023	4.6932277241508595
9.850000000000023	4.8163539970068285
10.850000000000023	4.942217997959239
11.850000000000023	5.070908183506849
12.850000000000023	5.202521878131933
13.850000000000023	5.337166916517955
14.850000000000023	5.474963721477343
15.850000000000023	5.616047975562618
16.850000000000023	5.760574114257398
17.850000000000023	5.90871997403772
18.850000000000023	6.060693090879729
19.850000000000023	6.2167394031873515
20.850000000000023	6.3771555416182855
21.850000000000023	6.542306636506177
22.850000000000023	6.712652956007072
23.850000000000023	6.888791398126056
24.850000000000023	7.071523499412578
25.850000000000023	7.261974107594029
26.850000000000023	7.461814502417978
27.850000000000023	7.673721224857645
28.850000000000023	7.902448222530747
29.850000000000023	8.158193225571788
30.850000000000023	8.482098043871794

Table B70: Dew Points for Carbon Dioxide and 5% Hydrogen

Temperature (degC)	Pressure (MPa)
-101.14999999999998	0.042692449230959065
-100.14999999999998	0.04600122868675913
-99.14999999999998	0.049515256749402374
-98.14999999999998	0.05324377747372499
-97.14999999999998	0.057196265027327345
-96.14999999999998	0.06138242241921339
-95.14999999999998	0.06581217999600228
-94.14999999999998	0.0704956938576788
-93.14999999999998	0.07544334408549055
-92.14999999999998	0.08066573286064224
-91.14999999999998	0.08617368246540556
-90.14999999999998	0.09197823316649655
-89.14999999999998	0.0980906410004891
-88.14999999999998	0.10452237547330395
-87.14999999999998	0.11128511717749023
-86.14999999999998	0.11839075533746418
-85.14999999999998	0.1258513853184525
-84.14999999999998	0.13367930604949102
-83.14999999999998	0.14188701742757917
-82.14999999999998	0.15048721771274562
-81.14999999999998	0.15949280085808543
-80.14999999999998	0.16891685387825905
-79.14999999999998	0.1787726541864027
-78.14999999999998	0.18907366694449165
-77.14999999999998	0.19983354245022458
-76.14999999999998	0.21106611352922586
-75.14999999999998	0.22278539298072
-74.14999999999998	0.2350055710535691
-73.14999999999998	0.24774101299281234
-72.14999999999998	0.2610062566288075
-71.14999999999998	0.2748160100609031
-70.14999999999998	0.28918514939324047
-69.14999999999998	0.30412871657447965
-68.14999999999998	0.3196619173443039
-67.14999999999998	0.3358001192428637
-66.14999999999998	0.35255884977464724
-65.14999999999998	0.3699537946675204
-64.14999999999998	0.3880007962639189
-63.14999999999998	0.40671585204866056
-62.14999999999998	0.42611511331758445
-61.14999999999998	0.4462148839985014
-60.14999999999998	0.467031619629218
-59.14999999999998	0.488581926511678

Temperature (degC)	Pressure (MPa)
-58.14999999999998	0.5108825610302813
-57.14999999999998	0.5339504291683685
-56.14999999999998	0.5578025862111322
-55.14999999999998	0.5824562366734762
-54.14999999999998	0.6079287344165517
-53.14999999999998	0.634237583039159
-52.14999999999998	0.6614004364530183
-51.14999999999998	0.6894350997886719
-50.14999999999998	0.7183595305014496
-49.14999999999998	0.7481918397957591
-48.14999999999998	0.7789502943364429
-47.14999999999998	0.8106533182571102
-46.14999999999998	0.8433194954712139
-45.14999999999998	0.876967572323543
-44.14999999999998	0.9116164605489343
-43.14999999999998	0.9472852405783005
-42.14999999999998	0.9839931651969109
-41.14999999999998	1.0217596635700157
-40.14999999999998	1.060604345669737
-39.14999999999998	1.1005470071120207
-38.14999999999998	1.1416076344690507
-37.14999999999998	1.1838064110864928
-36.14999999999998	1.2271637234561112
-35.14999999999998	1.2717001681857492
-34.14999999999998	1.3174365596727637
-33.14999999999998	1.3643939384822028
-32.14999999999998	1.4125935805266776
-31.149999999999977	1.4620570071033219
-30.149999999999977	1.512805995845684
-29.149999999999977	1.5648625926614583
-28.149999999999977	1.6182491247109931
-27.149999999999977	1.6729882145192794
-26.149999999999977	1.7291027952874474
-25.149999999999977	1.7866161275044234
-24.149999999999977	1.845551816968339
-23.149999999999977	1.9059338343380496
-22.149999999999977	1.9677865363639433
-21.149999999999977	2.0311346889610054
-20.149999999999977	2.096003492305798
-19.149999999999977	2.1624186081774184
-18.149999999999977	2.2304061897690226
-17.149999999999977	2.299992914242567
-16.149999999999977	2.371206018305197
-15.149999999999977	2.4440733371524446
-14.149999999999977	2.518623347133993

Temperature (degC)	Pressure (MPa)
-13.14999999999977	2.594885212570995
-12.14999999999977	2.6728888371927924
-11.14999999999977	2.752664920739331
-10.14999999999977	2.8342450213855757
-9.14999999999977	2.9176616247092984
-8.14999999999977	3.0029482200939857
-7.14999999999977	3.090139385603695
-6.14999999999977	3.179270882559328
-5.14999999999977	3.2703797612991976
-4.14999999999977	3.363504479870701
-3.149999999999773	3.4586850377650133
-2.149999999999773	3.5559631272292025
-1.149999999999773	3.6553823051531555
-0.1499999999997726	3.7569881891855714
0.8500000000000227	3.860828682403022
1.8500000000000227	3.966954231783673
2.8500000000000227	4.075418126764556
3.8500000000000227	4.186276845513357
4.850000000000023	4.2995904582058735
5.850000000000023	4.415423098700532
6.850000000000023	4.533843518827319
7.850000000000023	4.654925743181788
8.850000000000023	4.778749847416011
9.850000000000023	4.9054028900609055
10.850000000000023	5.0349800378260925
11.850000000000023	5.167585938513861
12.850000000000023	5.303336416089052
13.850000000000023	5.442360592092367
14.850000000000023	5.584803581061923
15.850000000000023	5.730829971918683
16.850000000000023	5.880628403692131
17.850000000000023	6.034417690992311
18.850000000000023	6.192455184208638
19.850000000000023	6.355048419469278
20.850000000000023	6.522571734850734
21.850000000000023	6.695490625564543
22.850000000000023	6.874398655214308
23.850000000000023	7.060075783485533
24.850000000000023	7.25358547191253
25.850000000000023	7.456447034964559
26.850000000000023	7.670966359936731
27.850000000000023	7.900938496382295
28.850000000000023	8.153422386565625
29.850000000000023	8.44552623009593
30.850000000000023	8.858625851636162

Table B71: Dew Points for Carbon Dioxide and 1% Nitrogen

Temperature (degC)	Pressure (MPa)
-88.14999999999998	0.10018719151406855
-87.14999999999998	0.10666350969275096
-86.14999999999998	0.11346751611707019
-85.14999999999998	0.12061069902280555
-84.14999999999998	0.1281047334796589
-83.14999999999998	0.1359614784144749
-82.14999999999998	0.1441929735905822
-81.14999999999998	0.15281143655438295
-80.14999999999998	0.16182925953663282
-79.14999999999998	0.17125900635619543
-78.14999999999998	0.18111340928146608
-77.14999999999998	0.19140536590221777
-76.14999999999998	0.2021479359986337
-75.14999999999998	0.21335433841601684
-74.14999999999998	0.22503794795947998
-73.14999999999998	0.23721229230860322
-72.14999999999998	0.2498910489643413
-71.14999999999998	0.2630880422262361
-70.14999999999998	0.27681724022431525
-69.14999999999998	0.2910927519822249
-68.14999999999998	0.30592882455505493
-67.14999999999998	0.3213398402096954
-66.14999999999998	0.33734031368961054
-65.14999999999998	0.35394488954060727
-64.14999999999998	0.37116833950502753
-63.14999999999998	0.3890255600255681
-62.14999999999998	0.407531569816932
-61.14999999999998	0.42670150752850294
-60.14999999999998	0.4465506295162595
-59.14999999999998	0.46709430771516525
-58.14999999999998	0.4883480276124919
-57.14999999999998	0.5103273863403595
-56.14999999999998	0.5330480908879217
-55.14999999999998	0.556525956417743
-54.14999999999998	0.5807769047376472
-53.14999999999998	0.6058169628820038
-52.14999999999998	0.6316622618492606
-51.14999999999998	0.6583290354637965
-50.14999999999998	0.685833619401313
-49.14999999999998	0.7141924503724817
-48.14999999999998	0.7434220654583834
-47.14999999999998	0.7735391016268565
-46.14999999999998	0.8045602954143173

Temperature (degC)	Pressure (MPa)
-45.14999999999998	0.8365024828030273
-44.14999999999998	0.8693825992790422
-43.14999999999998	0.9032176800920279
-42.14999999999998	0.9380248607042013
-41.14999999999998	0.9738213774513156
-40.14999999999998	1.0106245684040815
-39.14999999999998	1.04845187443582
-38.14999999999998	1.0873208404920105
-37.14999999999998	1.127249117079037
-36.14999999999998	1.1682544619571191
-35.14999999999998	1.210354742046279
-34.14999999999998	1.2535679355767118
-33.14999999999998	1.2979121344656144
-32.14999999999998	1.3434055469676554
-31.149999999999977	1.3900665006202482
-30.149999999999977	1.4379134455138864
-29.149999999999977	1.4869649579302933
-28.149999999999977	1.5372397443960741
-27.149999999999977	1.5887566462073994
-26.149999999999977	1.6415346444511054
-25.149999999999977	1.6955928656196058
-24.149999999999977	1.7509505878299962
-23.149999999999977	1.8076272477222262
-22.149999999999977	1.8656424480737313
-21.149999999999977	1.9250159661913735
-20.149999999999977	1.9857677631013373
-19.149999999999977	2.0479179936111835
-18.149999999999977	2.111487017269732
-17.149999999999977	2.176495410260138
-16.149999999999977	2.2429639783256037
-15.149999999999977	2.310913770732612
-14.149999999999977	2.3803660953733847
-13.149999999999977	2.4513425351076648
-12.149999999999977	2.5238649653921406
-11.149999999999977	2.597955573403288
-10.149999999999977	2.673636878723579
-9.149999999999977	2.7509317558447517
-8.149999999999977	2.8298634586774583
-7.149999999999977	2.9104556473377388
-6.149999999999977	2.9927324175552408
-5.149999999999977	3.0767183330749015
-4.149999999999977	3.162438461527074
-3.1499999999999773	3.2499184143014186
-2.1499999999999773	3.339184391098403
-1.1499999999999773	3.4302632298970885

Temperature (degC)	Pressure (MPa)
-0.149999999999997726	3.52318246324286
0.85000000000000227	3.6179703818920963
1.85000000000000227	3.714656107007405
2.85000000000000227	3.8132696722936683
3.85000000000000227	3.9138421176877256
4.8500000000000023	4.016405596465902
5.8500000000000023	4.120993498012357
6.8500000000000023	4.227640588935836
7.8500000000000023	4.336383175916471
8.8500000000000023	4.447259294643922
9.8500000000000023	4.560308930676085
10.8500000000000023	4.675574280237929
11.8500000000000023	4.793100062231812
12.8500000000000023	4.912933897476793
13.8500000000000023	5.03512677814921
14.8500000000000023	5.159733660325343
15.8500000000000023	5.286814226854431
16.8500000000000023	5.416433888052107
17.8500000000000023	5.548665117302785
18.8500000000000023	5.6835892621991055
19.8500000000000023	5.821299039808592
20.8500000000000023	5.961902037787919
21.8500000000000023	6.105525748479856
22.8500000000000023	6.252325070637264
23.8500000000000023	6.402494091279391
24.8500000000000023	6.556286002622199
25.8500000000000023	6.714050165319591
26.8500000000000023	6.876309768760705
27.8500000000000023	7.043950715185882
28.8500000000000023	7.21879212448784
29.8500000000000023	7.406230447404638

Table B72: Dew Points for Carbon Dioxide and 2% Nitrogen

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08909527697747832
-89.14999999999998	0.09501238606645267
-88.14999999999998	0.10123817482262741
-87.14999999999998	0.10778388689738434
-86.14999999999998	0.11466096221715846
-85.14999999999998	0.1218810342075338
-84.14999999999998	0.12945592693439387
-83.14999999999998	0.13739765220557607
-82.14999999999998	0.14571840662703014
-81.14999999999998	0.15443056861149912
-80.14999999999998	0.16354669538410224
-79.14999999999998	0.1730795199491713
-78.14999999999998	0.18304194803751117
-77.14999999999998	0.19344705508583038
-76.14999999999998	0.20430808319207122
-75.14999999999998	0.2156384380943913
-74.14999999999998	0.22745168617565723
-73.14999999999998	0.23976155148761719
-72.14999999999998	0.25258191281818454
-71.14999999999998	0.2659268007956483
-70.14999999999998	0.2798103950431729
-69.14999999999998	0.2942470213962944
-68.14999999999998	0.30925114917054536
-67.14999999999998	0.3248373885123629
-66.14999999999998	0.34102048780605587
-65.14999999999998	0.3578153311850432
-64.14999999999998	0.3752369361082591
-63.14999999999998	0.39330045104396555
-62.14999999999998	0.41202115324172167
-61.14999999999998	0.4314144466174766
-60.14999999999998	0.4514958597380878
-59.14999999999998	0.47228104393530823
-58.14999999999998	0.4937857715241681
-57.14999999999998	0.5160259341600528
-56.14999999999998	0.5390175413185269
-55.14999999999998	0.5627767189254186
-54.14999999999998	0.5873197081214442
-53.14999999999998	0.6126628641757554
-52.14999999999998	0.6388226555665675
-51.14999999999998	0.6658156632221833
-50.14999999999998	0.6936585799292143
-49.14999999999998	0.7223682099291194
-48.14999999999998	0.751961468700433

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7824553829353651
-46.14999999999998	0.813867090732538
-45.14999999999998	0.84621384199622
-44.14999999999998	0.87951299905726
-43.14999999999998	0.9137820375392206
-42.14999999999998	0.9490385474341585
-41.14999999999998	0.9853002344479443
-40.14999999999998	1.0225849215591358
-39.14999999999998	1.060910550848891
-38.14999999999998	1.1002951855745275
-37.14999999999998	1.1407570124799309
-36.14999999999998	1.1823143444032262
-35.14999999999998	1.224985623129248
-34.14999999999998	1.2687894225551972
-33.14999999999998	1.3137444521700405
-32.14999999999998	1.3598695608823912
-31.149999999999977	1.40718374125526
-30.149999999999977	1.4557061341577415
-29.149999999999977	1.5054560339360754
-28.149999999999977	1.5564528941201607
-27.149999999999977	1.6087163337484447
-26.149999999999977	1.6622661443748468
-25.149999999999977	1.7171222978171239
-24.149999999999977	1.773304954712666
-23.149999999999977	1.8308344739491822
-22.149999999999977	1.8897314230310287
-21.149999999999977	1.95001658944716
-20.149999999999977	2.0117109931086903
-19.149999999999977	2.0748358999121574
-18.149999999999977	2.1394128365491314
-17.149999999999977	2.2054636065712327
-16.149999999999977	2.273010307891586
-15.149999999999977	2.3420753517784063
-14.149999999999977	2.4126814835021455
-13.149999999999977	2.4848518047717523
-12.149999999999977	2.5586097981796
-11.149999999999977	2.6339793538336123
-10.149999999999977	2.7109847984791196
-9.149999999999977	2.789650927398187
-8.149999999999977	2.8700030394680325
-7.149999999999977	2.952066975827963
-6.149999999999977	3.0358691626851586
-5.149999999999977	3.1214366588849334
-4.149999999999977	3.208797209013373
-3.1499999999999773	3.2979793029371374

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.3890122428374556
-1.149999999999773	3.4819262190437246
-0.1499999999997726	3.576752396172075
0.8500000000000227	3.6735230113799155
1.8500000000000227	3.7722714868985214
2.8500000000000227	3.873032559388894
3.8500000000000227	3.9758424292255996
4.850000000000023	4.080738933409288
5.850000000000023	4.187761746678824
6.850000000000023	4.296952616527389
7.850000000000023	4.408355639366531
8.850000000000023	4.522017587297721
9.850000000000023	4.637988298104415
10.850000000000023	4.756321145654493
11.850000000000023	4.877073614572367
12.850000000000023	5.000308012760026
13.850000000000023	5.126092369674347
14.850000000000023	5.254501589254071
15.850000000000023	5.385618957560534
16.850000000000023	5.5195381521099
17.850000000000023	5.65636597189385
18.850000000000023	5.796226121636045
19.850000000000023	5.939264574536516
20.850000000000023	6.085657374742856
21.850000000000023	6.235622378744357
22.850000000000023	6.389437737763072
23.850000000000023	6.547472806400966
24.850000000000023	6.710244135759205
25.850000000000023	6.878527972287304
26.850000000000023	7.053618928869834
27.850000000000023	7.238049121139362
28.850000000000023	7.630069071370448

Table B73: Dew Points for Carbon Dioxide and 3% Nitrogen

Temperature (degC)	Pressure (MPa)
-92.14999999999998	0.07896769482630706
-91.14999999999998	0.08435767771497801
-90.14999999999998	0.0900376565546625
-89.14999999999998	0.0960186083957202
-88.14999999999998	0.10231171559855656
-87.14999999999998	0.10892836328678748
-86.14999999999998	0.11588013667452435
-85.14999999999998	0.12317881836447074
-84.14999999999998	0.13083638556109628
-83.14999999999998	0.13886500724814743
-82.14999999999998	0.14727704131701402
-81.14999999999998	0.15608503166378485
-80.14999999999998	0.16530170527077684
-79.14999999999998	0.1749399692599682
-78.14999999999998	0.18501290794867684
-77.14999999999998	0.1955337799184986
-76.14999999999998	0.20651601506396783
-75.14999999999998	0.21797321169890888
-74.14999999999998	0.229919133657089
-73.14999999999998	0.24236770744740518
-72.14999999999998	0.25533301943893044
-71.14999999999998	0.2688293131118235
-70.14999999999998	0.28287098632884633
-69.14999999999998	0.2974725887170865
-68.14999999999998	0.31264881909119846
-67.14999999999998	0.3284145229502435
-66.14999999999998	0.34478469008057094
-65.14999999999998	0.3617744522222644
-64.14999999999998	0.3793990808597251
-63.14999999999998	0.3976739850887637
-62.14999999999998	0.4166147096083179
-61.14999999999998	0.4362369328356445
-60.14999999999998	0.45655646511802733
-59.14999999999998	0.47758924709676825
-58.14999999999998	0.49935134818749427
-57.14999999999998	0.5218589652312511
-56.14999999999998	0.5451284212445461
-55.14999999999998	0.5691761643742863
-54.14999999999998	0.5940187669954722
-53.14999999999998	0.6196729249613387
-52.14999999999998	0.6461554570659357
-51.14999999999998	0.6734833046669484
-50.14999999999998	0.7016735315202612

Temperature (degC)	Pressure (MPa)
-49.1499999999998	0.7307433238145908
-48.1499999999998	0.7607099904291165
-47.1499999999998	0.7915909634153485
-46.1499999999998	0.823403798720425
-45.1499999999998	0.8561661771571507
-44.1499999999998	0.8898959056341978
-43.1499999999998	0.924610918645542
-42.1499999999998	0.9603292800422898
-41.1499999999998	0.9970691850741078
-40.1499999999998	1.0348489627064625
-39.1499999999998	1.0736870782479655
-38.1499999999998	1.1136021362490764
-37.1499999999998	1.1546128837233567
-36.1499999999998	1.1967382136789522
-35.1499999999998	1.239997169017765
-34.1499999999998	1.2844089467736894
-33.1499999999998	1.329992902803821
-32.1499999999998	1.3767685569065304
-31.14999999999977	1.4247555984722813
-30.14999999999977	1.4739738926989954
-29.14999999999977	1.5244434874533141
-28.14999999999977	1.5761846208382082
-27.14999999999977	1.6292177295382047
-26.14999999999977	1.6835634580324834
-25.14999999999977	1.7392426687270277
-24.14999999999977	1.7962764530961566
-23.14999999999977	1.8546861439211555
-22.14999999999977	1.9144933286690278
-21.14999999999977	1.9757198641513183
-20.14999999999977	2.038387892507977
-19.14999999999977	2.102519858655225
-18.14999999999977	2.168138529279193
-17.14999999999977	2.235267013561939
-16.14999999999977	2.3039287857342083
-15.14999999999977	2.374147709676173
-14.14999999999977	2.445948065764833
-13.14999999999977	2.5193545802001136
-12.14999999999977	2.5943924571067853
-11.14999999999977	2.6710874137491665
-10.14999999999977	2.7494657192323886
-9.14999999999977	2.829554237185191
-8.14999999999977	2.9113804729568966
-7.14999999999977	2.9949726259855276
-6.14999999999977	3.080359648124317
-5.14999999999977	3.167571308869495

Temperature (degC)	Pressure (MPa)
-4.14999999999977	3.2566382685920843
-3.149999999999773	3.347592161123528
-2.149999999999773	3.440465687302981
-1.149999999999773	3.535292721436501
-0.1499999999997726	3.6321084329591224
0.8500000000000227	3.7309494261347367
1.8500000000000227	3.8318539011662947
2.8500000000000227	3.9348618408135008
3.8500000000000227	4.040015227545335
4.850000000000023	4.147358297394656
5.850000000000023	4.256937838224602
6.850000000000023	4.36880354216889
7.850000000000023	4.483008424825707
8.850000000000023	4.599609327735504
9.850000000000023	4.718667526306232
10.850000000000023	4.840249473468675
11.850000000000023	4.9644277211406465
12.850000000000023	5.091282079032923
13.850000000000023	5.220901096090546
14.850000000000023	5.353383988729563
15.850000000000023	5.488843199134474
16.850000000000023	5.627407859023281
17.850000000000023	5.769228581771252
18.850000000000023	5.914484250943374
19.850000000000023	6.063391900955164
20.850000000000023	6.216221576466408
21.850000000000023	6.37331962328712
22.850000000000023	6.535147215492182
23.850000000000023	6.702348763963194
24.850000000000023	6.8758852535200425
25.850000000000023	7.057328498710195
26.850000000000023	7.249633887224395
27.850000000000023	7.459835909865323
28.850000000000023	7.859025286233094

Table B74: Dew Points for Carbon Dioxide and 4% Nitrogen

Temperature (degC)	Pressure (MPa)
-94.1499999999998	0.06974932750668864
-93.1499999999998	0.0746438240160316
-92.1499999999998	0.07981000328778483
-91.1499999999998	0.08525855447941524
-90.1499999999998	0.09100038064128949
-89.1499999999998	0.09704659637817394
-88.1499999999998	0.10340852545480049
-87.1499999999998	0.11009769827665472
-86.1499999999998	0.11712584932223345
-85.1499999999998	0.1245049144637421
-84.1499999999998	0.13224702831389049
-83.1499999999998	0.14036452144535042
-82.1499999999998	0.14886991760454985
-81.1499999999998	0.1577759309051891
-80.1499999999998	0.16709546298991854
-79.1499999999998	0.17684160018271097
-78.1499999999998	0.18702761064982426
-77.1499999999998	0.19766694155969383
-76.1499999999998	0.20877321624968564
-75.1499999999998	0.22036023145050315
-74.1499999999998	0.23244195449261643
-73.1499999999998	0.24503252060482722
-72.1499999999998	0.25814623022753935
-71.1499999999998	0.27179754638856524
-70.1499999999998	0.2860010921579557
-69.1499999999998	0.30077164814746293
-68.1499999999998	0.31612415011813577
-67.1499999999998	0.33207368664691417
-66.1499999999998	0.34863549690741275
-65.1499999999998	0.36582496853402036
-64.1499999999998	0.38365763560683236
-63.1499999999998	0.4021491767406122
-62.1499999999998	0.42131541330089944
-61.1499999999998	0.4411723077404706
-60.1499999999998	0.46173596208563406
-59.1499999999998	0.48302261654220435
-58.1499999999998	0.5050486482825768
-57.1499999999998	0.5278305703551105
-56.1499999999998	0.5513850307838821
-55.1499999999998	0.5757288118389619
-54.1499999999998	0.6008788294650289
-53.1499999999998	0.6268521329422163
-52.1499999999998	0.6536659047100809

Temperature (degC)	Pressure (MPa)
-51.1499999999998	0.6813374604341321
-50.1499999999998	0.7098842492716151
-49.1499999999998	0.7393238543905574
-48.1499999999998	0.7696739937358642
-47.1499999999998	0.8009525210425272
-46.1499999999998	0.8331774271417347
-45.1499999999998	0.8663668415293434
-44.1499999999998	0.900539034241048
-43.1499999999998	0.9357124180207695
-42.1499999999998	0.9719055508030655
-41.1499999999998	1.0091371385003554
-40.1499999999998	1.0474260381255676
-39.1499999999998	1.0867912612400048
-38.1499999999998	1.1272519777520609
-37.1499999999998	1.168827520087875
-36.1499999999998	1.211537387746544
-35.1499999999998	1.2554012523019786
-34.1499999999998	1.300438962866279
-33.1499999999998	1.346670552079103
-32.1499999999998	1.3941162426978067
-31.14999999999977	1.4427964548215821
-30.14999999999977	1.492731813851365
-29.14999999999977	1.5439431592533
-28.14999999999977	1.5964515541860904
-27.14999999999977	1.650278296102697
-26.14999999999977	1.7054449283802429
-25.14999999999977	1.7619732530866663
-24.14999999999977	1.8198853449514187
-23.14999999999977	1.8792035666560194
-22.14999999999977	1.9399505855281207
-21.14999999999977	2.0021493917762325
-20.14999999999977	2.0658233183776487
-19.14999999999977	2.130996062767102
-18.14999999999977	2.197691710523702
-17.14999999999977	2.2659347612005285
-16.14999999999977	2.335750156568187
-15.14999999999977	2.407163311508103
-14.14999999999977	2.4802001478535964
-13.14999999999977	2.5548871315274613
-12.14999999999977	2.6312513133750635
-11.14999999999977	2.7093203741638803
-10.14999999999977	2.789122674301113
-9.14999999999977	2.870687308899775
-8.14999999999977	2.954044168988453
-7.14999999999977	3.0392240097479326

Temperature (degC)	Pressure (MPa)
-6.149999999999977	3.1262585268873417
-5.149999999999977	3.2151804424451176
-4.149999999999977	3.3060236016076345
-3.149999999999973	3.3988230824069348
-2.149999999999973	3.493615320627966
-1.149999999999973	3.590438252627591
-0.1499999999999726	3.6893314794887155
0.8500000000000227	3.7903364565388324
1.8500000000000227	3.8934967132513316
2.8500000000000227	3.9988581096399836
3.8500000000000227	4.106469136715747
4.850000000000023	4.216381270472903
5.850000000000023	4.328649391336459
6.850000000000023	4.443332284378018
7.850000000000023	4.56049324023776
8.850000000000023	4.68020078316837
9.850000000000023	4.802529561921193
10.850000000000023	4.927561452569611
11.850000000000023	5.055386942105658
12.850000000000023	5.186106890905124
13.850000000000023	5.319834816391758
14.850000000000023	5.456699908010973
15.850000000000023	5.596851089763093
16.850000000000023	5.740462617200588
17.850000000000023	5.887741979079651
18.850000000000023	6.038941364492712
19.850000000000023	6.194374850848797
20.850000000000023	6.3544452032112595
21.850000000000023	6.519687797823915
22.850000000000023	6.69084742684216
23.850000000000023	6.869024573659739
24.850000000000023	7.055987918102994
25.850000000000023	7.254959029111896
26.850000000000023	7.47315002298521
27.850000000000023	7.736111375972541

Table B75: Dew Points for Carbon Dioxide and 5% Nitrogen

Temperature (degC)	Pressure (MPa)
-96.14999999999998	0.06138568861288504
-95.14999999999998	0.06581580626857558
-94.14999999999998	0.07049970855127678
-93.14999999999998	0.07544777632953462
-92.14999999999998	0.08067061238240919
-91.14999999999998	0.0861790393677798
-90.14999999999998	0.0919840976589578
-89.14999999999998	0.09809704309473621
-88.14999999999998	0.10452934462822308
-87.14999999999998	0.11129268188269478
-86.14999999999998	0.11839894265939864
-85.14999999999998	0.1258602203642597
-84.14999999999998	0.1336888113798957
-83.14999999999998	0.14189721240061942
-82.14999999999998	0.1504981177412055
-81.14999999999998	0.1595044166002872
-80.14999999999998	0.16892919032810486
-79.14999999999998	0.17878570968642984
-78.14999999999998	0.189087432100046
-77.14999999999998	0.1998479989282138
-76.14999999999998	0.21108123277121416
-75.14999999999998	0.22280113477670616
-74.14999999999998	0.2350218820124346
-73.14999999999998	0.24775782487499973
-72.14999999999998	0.2610234845508634
-71.14999999999998	0.27483355054737324
-70.14999999999998	0.2892028782909508
-69.14999999999998	0.3041464868108895
-68.14999999999998	0.31967955650049695
-67.14999999999998	0.3358174269799334
-66.14999999999998	0.3525755950616298
-65.14999999999998	0.3699697128256448
-64.14999999999998	0.3880155858120375
-63.14999999999998	0.40672917133917885
-62.14999999999998	0.42612657695658496
-61.14999999999998	0.44622405903596546
-60.14999999999998	0.4670380215202495
-59.14999999999998	0.4885850148162339
-58.14999999999998	0.5108817348674394
-57.14999999999998	0.5339450223868302
-56.14999999999998	0.557791862290744
-55.14999999999998	0.5824393833039967
-54.14999999999998	0.6079048577949965

Temperature (degC)	Pressure (MPa)
-53.14999999999998	0.6342057018022275
-52.14999999999998	0.6613594753001051
-51.14999999999998	0.6893838827061961
-50.14999999999998	0.7182967736310661
-49.14999999999998	0.748116143916486
-48.14999999999998	0.7788601369235004
-47.14999999999998	0.8105470451419294
-46.14999999999998	0.8431953120942598
-45.14999999999998	0.8768235345553759
-44.14999999999998	0.9114504650944572
-43.14999999999998	0.9470950149705547
-42.14999999999998	0.9837762573545111
-41.14999999999998	1.0215134309111733
-40.14999999999998	1.0603259437635353
-39.14999999999998	1.100233377824291
-38.14999999999998	1.1412554935658763
-37.14999999999998	1.1834122352114527
-36.14999999999998	1.226723736424856
-35.14999999999998	1.2712103265336814
-34.14999999999998	1.3168925373480855
-33.14999999999998	1.363791110624712
-32.14999999999998	1.4119270062800702
-31.149999999999977	1.4613214113936603
-30.149999999999977	1.5119957501007508
-29.149999999999977	1.5639716944552025
-28.149999999999977	1.6172711763434877
-27.149999999999977	1.6719164005351608
-26.149999999999977	1.727929858966118
-25.149999999999977	1.7853343463608053
-24.149999999999977	1.8441529772768723
-23.149999999999977	1.9044092047230774
-22.149999999999977	1.9661268404655439
-21.149999999999977	2.0293300771801808
-20.149999999999977	2.094043512639616
-19.149999999999977	2.1602921761161835
-18.149999999999977	2.2281015572589307
-17.149999999999977	2.2974976376863343
-16.149999999999977	2.368506925627602
-15.149999999999977	2.441156493917258
-14.149999999999977	2.5154740218048
-13.149999999999977	2.591487840977586
-12.149999999999977	2.6692269863897797
-11.149999999999977	2.7487212524791627
-10.149999999999977	2.8300012555286793
-9.149999999999977	2.9130985030390564

Temperature (degC)	Pressure (MPa)
-8.149999999999977	2.9980454711152884
-7.149999999999977	3.084875691130047
-6.149999999999977	3.1736238470969664
-5.149999999999977	3.2643258855419583
-4.149999999999977	3.357019140003045
-3.149999999999973	3.4517424727373656
-2.149999999999973	3.548536436787536
-1.149999999999973	3.6474434622215615
-0.1499999999999726	3.7485080712364574
0.8500000000000227	3.851777127858822
1.8500000000000227	3.9573001293193752
2.8500000000000227	4.065129547876318
3.8500000000000227	4.175321234055833
4.850000000000023	4.287934895151761
5.850000000000023	4.403034666661833
6.850000000000023	4.520689799568549
7.850000000000023	4.640975493597665
8.850000000000023	4.763973916809513
9.850000000000023	4.889775466583851
10.850000000000023	5.018480348475664
11.850000000000023	5.150200581270217
12.850000000000023	5.285062584595699
13.850000000000023	5.423210579221324
14.850000000000023	5.5648111460451
15.850000000000023	5.710059475975994
16.850000000000023	5.859188152296677
17.850000000000023	6.012479839879452
18.850000000000023	6.170286218155302
19.850000000000023	6.3330573346373
20.850000000000023	6.5013893234192714
21.850000000000023	6.676106814151338
22.850000000000023	6.858416988739988
23.850000000000023	7.050230025876262
24.850000000000023	7.2549335090805664
25.850000000000023	7.479749888344092
26.850000000000023	7.7470445314675676

Table B76: Dew Points for Carbon Dioxide and 1% Oxygen

Temperature (degC)	Pressure (MPa)
-89.1499999999998	0.09402663629925226
-88.1499999999998	0.10018649799625848
-87.1499999999998	0.1066627437155457
-86.1499999999998	0.11346667160608993
-85.1499999999998	0.1206097695342744
-84.1499999999998	0.12810371219878036
-83.1499999999998	0.13596035813368815
-82.1499999999998	0.14419174671932505
-81.1499999999998	0.1528100950879398
-80.1499999999998	0.1618277950641438
-79.1499999999998	0.17125741004780282
-78.1499999999998	0.18111167188109825
-77.1499999999998	0.19140347772035407
-76.1499999999998	0.2021458869064209
-75.1499999999998	0.21335211783942004
-74.1499999999998	0.225035544882939
-73.1499999999998	0.23720969525818714
-72.1499999999998	0.24988824601056214
-71.1499999999998	0.2630850209822589
-70.1499999999998	0.27681398783663574
-69.1499999999998	0.29108925513892964
-68.1499999999998	0.3059250694730872
-67.1499999999998	0.32133581263834915
-66.1499999999998	0.33733599890592053
-65.1499999999998	0.35394027234980874
-64.1499999999998	0.37116340423418764
-63.1499999999998	0.38902029052325887
-62.1499999999998	0.4075259494465706
-61.1499999999998	0.4266955191636016
-60.1499999999998	0.44654425553684807
-59.1499999999998	0.4670875299989074
-58.1499999999998	0.48834082752597546
-57.1499999999998	0.5103197447204539
-56.1499999999998	0.5330399880322022
-55.1499999999998	0.5565173720723128
-54.1499999999998	0.5807678180652961
-53.1499999999998	0.6058073524476104
-52.1499999999998	0.6316521055842008
-51.1499999999998	0.6583183106303512
-50.1499999999998	0.6858223025563567
-49.1499999999998	0.7141805173177783
-48.1499999999998	0.7434094911902418
-47.1499999999998	0.7735258602681069

Temperature (degC)	Pressure (MPa)
-46.14999999999998	0.8045463601494867
-45.14999999999998	0.8364878257925812
-44.14999999999998	0.8693671915724506
-43.14999999999998	0.9032014915199645
-42.14999999999998	0.9380078597549145
-41.14999999999998	0.9738035311461627
-40.14999999999998	1.0106058421418131
-39.14999999999998	1.0484322318177008
-38.14999999999998	1.0873002431389889
-37.14999999999998	1.1272275244142118
-36.14999999999998	1.168231830961509
-35.14999999999998	1.2103310269986027
-34.14999999999998	1.2535430877509661
-33.14999999999998	1.2978861017989891
-32.14999999999998	1.3433782736975277
-31.14999999999977	1.3900379268761769
-30.14999999999977	1.437883506866218
-29.14999999999977	1.4869335848989431
-28.14999999999977	1.5372068619044224
-27.14999999999977	1.5887221729697574
-26.14999999999977	1.6414984923232911
-25.14999999999977	1.6955549388501194
-24.14999999999977	1.750910782255415
-23.14999999999977	1.807585449861277
-22.14999999999977	1.8655985341326669
-21.14999999999977	1.9249698009476426
-20.14999999999977	1.9857191986767544
-19.14999999999977	2.04786686808601
-18.14999999999977	2.111433153141487
-17.14999999999977	2.176438612729885
-16.14999999999977	2.2429040333627506
-15.14999999999977	2.310850442913904
-14.14999999999977	2.380299125456497
-13.14999999999977	2.4512716372943033
-12.14999999999977	2.5237898242565615
-11.14999999999977	2.5978758404158517
-10.14999999999977	2.6735521683344237
-9.14999999999977	2.7508416410427015
-8.14999999999977	2.829767465943984
-7.14999999999977	2.910353250924119
-6.14999999999977	2.9926230329450485
-5.14999999999977	3.076601309513897
-4.14999999999977	3.1623130734542158
-3.149999999999773	3.249783851496807
-2.149999999999773	3.3390397473016806

Temperature (degC)	Pressure (MPa)
-1.149999999999773	3.4301074896292
-0.1499999999997726	3.523014486466448
0.8500000000000227	3.617788886109353
1.8500000000000227	3.71445964623761
2.8500000000000227	3.8130566123089045
3.8500000000000227	3.9136106066627954
4.850000000000023	4.016153530028685
5.850000000000023	4.120718477378055
6.850000000000023	4.227339870452595
7.850000000000023	4.336053609869363
8.850000000000023	4.446897250489412
9.850000000000023	4.559910205000482
10.850000000000023	4.675133982461681
11.850000000000023	4.792612471326266
12.850000000000023	4.912392280439551
13.850000000000023	5.034523157261564
14.850000000000023	5.159058510800522
15.850000000000023	5.286056078177741
16.850000000000023	5.4155787897051875
17.850000000000023	5.547695909578753
18.850000000000023	5.682484560646761
19.850000000000023	5.820031788076106
20.850000000000023	5.960437389931351
21.850000000000023	6.103817869779969
22.850000000000023	6.250312109134534
23.850000000000023	6.40008986108938
24.850000000000023	6.553365280588415
25.850000000000023	6.710420311994891
26.850000000000023	6.871649231231886
27.850000000000023	7.037653218630386
28.850000000000023	7.209469390319553
29.850000000000023	7.389251447103226
30.850000000000023	7.583541498132138

Table B77: Dew Points for Carbon Dioxide and 2% Oxygen

Temperature (degC)	Pressure (MPa)
-93.14999999999998	0.07308493146149278
-92.14999999999998	0.07814126323314433
-91.14999999999998	0.08347372850243723
-90.14999999999998	0.08909296460174052
-89.14999999999998	0.09500981293452955
-88.14999999999998	0.10123531645128749
-87.14999999999998	0.10778071699427677
-86.14999999999998	0.11465745259531579
-85.14999999999998	0.12187715468718038
-84.14999999999998	0.12945164524761296
-83.14999999999998	0.1373929338938893
-82.14999999999998	0.14571321494514927
-81.14999999999998	0.15442486442609
-80.14999999999998	0.16354043705798052
-79.14999999999998	0.1730726632388004
-78.14999999999998	0.18303444598233892
-77.14999999999998	0.19343885789741086
-76.14999999999998	0.20429913813294434
-75.14999999999998	0.21562868936329305
-74.14999999999998	0.2274410747901067
-73.14999999999998	0.2397500151499266
-72.14999999999998	0.2525693857913512
-71.14999999999998	0.26591321377688826
-70.14999999999998	0.27979567502655406
-69.14999999999998	0.2942310915281541
-68.14999999999998	0.3092339286136553
-67.14999999999998	0.3248187922879858
-66.14999999999998	0.3410004266498202
-65.14999999999998	0.35779371138014354
-64.14999999999998	0.37521365931812867
-63.14999999999998	0.39327541413717915
-62.14999999999998	0.4119942481174101
-61.14999999999998	0.4313855600022553
-60.14999999999998	0.4514648729977463
-59.14999999999998	0.4722478328542694
-58.14999999999998	0.4937502060847231
-57.14999999999998	0.5159878783060426
-56.14999999999998	0.5389768527052744
-55.14999999999998	0.5627332486579943
-54.14999999999998	0.5872733004632268
-53.14999999999998	0.6126133562528293
-52.14999999999998	0.6387698770477254
-51.14999999999998	0.665759435967742

Temperature (degC)	Pressure (MPa)
-50.14999999999998	0.6935987176283994
-49.14999999999998	0.7223045176981672
-48.14999999999998	0.751893742662583
-47.14999999999998	0.7823834097603082
-46.14999999999998	0.8137906471429559
-45.14999999999998	0.8461326942361417
-44.14999999999998	0.8794269023184611
-43.14999999999998	0.9136907353268614
-42.14999999999998	0.9489417709084246
-41.14999999999998	0.985197701668051
-40.14999999999998	1.0224763367047622
-39.14999999999998	1.0607956033440478
-38.14999999999998	1.1001735491397429
-37.14999999999998	1.140628344112793
-36.14999999999998	1.1821782832558967
-35.14999999999998	1.224841789291435
-34.14999999999998	1.2686374157318316
-33.14999999999998	1.3135838502387096
-32.14999999999998	1.359699918338565
-31.149999999999977	1.4070045874982524
-30.149999999999977	1.4555169716504834
-29.149999999999977	1.505256336186699
-28.149999999999977	1.5562421034883522
-27.149999999999977	1.6084938590503233
-26.149999999999977	1.662031358264909
-25.149999999999977	1.716874533921732
-24.149999999999977	1.773043504481346
-23.149999999999977	1.8305585831875721
-22.149999999999977	1.8894402880816774
-21.149999999999977	1.949709352968683
-20.149999999999977	2.011386739391514
-19.149999999999977	2.074493649708302
-18.149999999999977	2.139051541285901
-17.149999999999977	2.2050821419493576
-16.149999999999977	2.272607466724147
-15.149999999999977	2.3416498360032767
-14.149999999999977	2.41223189524217
-13.149999999999977	2.484376636327728
-12.149999999999977	2.558107420789294
-11.149999999999977	2.6334480050377644
-10.149999999999977	2.7104225678728215
-9.149999999999977	2.7890557405446263
-8.149999999999977	2.8693726396776613
-7.149999999999977	2.9513989034667234
-6.149999999999977	3.035160731605892

Temperature (degC)	Pressure (MPa)
-5.14999999999977	3.120684929511404
-4.14999999999977	3.2079989574819394
-3.149999999999773	3.297130985601263
-2.149999999999773	3.388109955295306
-1.149999999999773	3.4809656486347023
-0.1499999999997726	3.5757287666907396
0.8500000000000227	3.6724310184293922
1.8500000000000227	3.7711052219446026
2.8500000000000227	3.871785420094937
3.8500000000000227	3.9745070130168467
4.850000000000023	4.079306910409359
5.850000000000023	4.186223707107721
6.850000000000023	4.295297886220409
7.850000000000023	4.406572055201284
8.850000000000023	4.520091221736718
9.850000000000023	4.635903118529157
10.850000000000023	4.754058589231346
11.850000000000023	4.874612052363243
12.850000000000023	4.997622066726675
13.850000000000023	5.123152031358607
14.850000000000023	5.251271066770616
15.850000000000023	5.382055143739273
16.850000000000023	5.515588553902594
17.850000000000023	5.651965856792982
18.850000000000023	5.791294497799564
19.850000000000023	5.933698383524549
20.850000000000023	6.079322850800714
21.850000000000023	6.228341727355544
22.850000000000023	6.380967674635076
23.850000000000023	6.537467997429932
24.850000000000023	6.69819024131689
25.850000000000023	6.863606776343582
26.850000000000023	7.034399489999887
27.850000000000023	7.211637773598428
28.850000000000023	7.397203705253848
29.850000000000023	7.595036284499661
30.850000000000023	7.817807715219255

Table B78: Dew Points for Carbon Dioxide and 3% Oxygen

Temperature (degC)	Pressure (MPa)
-96.14999999999998	0.060092859073668736
-95.14999999999998	0.0644281033030842
-94.14999999999998	0.06901150090995806
-93.14999999999998	0.07385318077900555
-92.14999999999998	0.07896348623104449
-91.14999999999998	0.08435297282633296
-90.14999999999998	0.09003240611490884
-89.14999999999998	0.09601275921965996
-88.14999999999998	0.1023052103565454
-87.14999999999998	0.10892114026219658
-86.14999999999998	0.11587212952705742
-85.14999999999998	0.12316995586752519
-84.14999999999998	0.13082659134939092
-83.14999999999998	0.13885419955304837
-82.14999999999998	0.14726513268642977
-81.14999999999998	0.1560719286744553
-80.14999999999998	0.16528730823635063
-79.14999999999998	0.1749241719309223
-78.14999999999998	0.1849955972064016
-77.14999999999998	0.19551483544136292
-76.14999999999998	0.20649530900961316
-75.14999999999998	0.21795060835827187
-74.14999999999998	0.22989448910729446
-73.14999999999998	0.24234086917982384
-72.14999999999998	0.2553038260035774
-71.14999999999998	0.2687975937098228
-70.14999999999998	0.2828365604358049
-69.14999999999998	0.2974352656620966
-68.14999999999998	0.31260839762292447
-67.14999999999998	0.32837079080833176
-66.14999999999998	0.34473742352721026
-65.14999999999998	0.36172341557222
-64.14999999999998	0.3793440259789508
-63.14999999999998	0.39761465088316195
-62.14999999999998	0.41655082149031103
-61.14999999999998	0.43616820215275737
-60.14999999999998	0.4564825885696942
-59.14999999999998	0.47750990612242256
-58.14999999999998	0.49926620832520296
-57.14999999999998	0.521767675422177
-56.14999999999998	0.5450306131446052
-55.14999999999998	0.5690714515937165
-54.14999999999998	0.5939067442993192

Temperature (degC)	Pressure (MPa)
-53.14999999999998	0.6195531674463594
-52.14999999999998	0.6460275192690538
-51.14999999999998	0.6733467196244939
-50.14999999999998	0.7015278097816039
-49.14999999999998	0.7305879523786968
-48.14999999999998	0.7605444316209234
-47.14999999999998	0.7914146536871761
-46.14999999999998	0.8232161473714215
-45.14999999999998	0.8559665649543536
-44.14999999999998	0.8896836833507437
-43.14999999999998	0.924385405485911
-42.14999999999998	0.9600897619412687
-41.14999999999998	0.9968149128736863
-40.14999999999998	1.0345791501993908
-39.14999999999998	1.0734009000503628
-38.14999999999998	1.1132987255202091
-37.14999999999998	1.1542913296933421
-36.14999999999998	1.196397558999857
-35.14999999999998	1.2396364068695098
-34.14999999999998	1.284027017777392
-33.14999999999998	1.3295886916537085
-32.14999999999998	1.3763408887500803
-31.149999999999977	1.4243032349867504
-30.149999999999977	1.4734955278381512
-29.149999999999977	1.5239377428406062
-28.149999999999977	1.5756500407482275
-27.149999999999977	1.6286527754465714
-26.149999999999977	1.6829665026493468
-25.149999999999977	1.7386119894840393
-24.149999999999977	1.795610224998624
-23.149999999999977	1.8539824316857856
-22.149999999999977	1.9137500780826717
-21.149999999999977	1.9749348925126822
-20.149999999999977	2.0375588780793468
-19.149999999999977	2.101644328961753
-18.149999999999977	2.167213848152626
-17.149999999999977	2.234290366723329
-16.149999999999977	2.3028971647525407
-15.149999999999977	2.3730578940978257
-14.149999999999977	2.44479660313438
-13.149999999999977	2.5181377637234834
-12.149999999999977	2.5931063005922925
-11.149999999999977	2.669727623444855
-10.149999999999977	2.7480276621120994
-9.149999999999977	2.8280329051231794

Temperature (degC)	Pressure (MPa)
-8.14999999999977	2.9097704421500126
-7.14999999999977	2.9932680108716903
-6.14999999999977	3.0785540488774723
-5.14999999999977	3.1656577513701825
-4.14999999999977	3.2546091355756848
-3.14999999999973	3.345439112896006
-2.14999999999973	3.438179570117308
-1.14999999999973	3.5328634611292844
-0.149999999999726	3.629524910974237
0.8500000000000227	3.7281993343317374
1.8500000000000227	3.8289235709324343
2.8500000000000227	3.931736040895112
3.8500000000000227	4.036676923531488
4.850000000000023	4.143788363877089
5.850000000000023	4.253114712135245
6.850000000000023	4.3647028024380505
7.850000000000023	4.478602278953271
8.850000000000023	4.594865979697016
9.850000000000023	4.713550391613831
10.850000000000023	4.834716195176624
11.850000000000023	4.958428923389594
12.850000000000023	5.084759769690963
13.850000000000023	5.213786593090643
14.850000000000023	5.345595188762405
15.850000000000023	5.4802809210834456
16.850000000000023	5.617950857909679
17.850000000000023	5.758726606494932
18.850000000000023	5.90274814471392
19.850000000000023	6.0501790874723715
20.850000000000023	6.201214070146317
21.850000000000023	6.356089356733949
22.850000000000023	6.515098582207881
23.850000000000023	6.678617150407068
24.850000000000023	6.847142258290824
25.850000000000023	7.021363386545683
26.850000000000023	7.202297428570062
27.850000000000023	7.391575176878184
28.850000000000023	7.592133451353384
29.850000000000023	7.810327272206404
30.850000000000023	8.072352216972408

Table B79: Dew Points for Carbon Dioxide and 4% Oxygen

Temperature (degC)	Pressure (MPa)
-99.14999999999998	0.048989948339226846
-98.14999999999998	0.05267829851329912
-97.14999999999998	0.0565881178671599
-96.14999999999998	0.060728990705059424
-95.14999999999998	0.06511072471879592
-94.14999999999998	0.06974334929530954
-93.14999999999998	0.074637113653565
-92.14999999999998	0.07980248484280132
-91.14999999999998	0.08525014564123294
-90.14999999999998	0.09099099231283576
-89.14999999999998	0.09703613226897236
-88.14999999999998	0.10339688164149534
-87.14999999999998	0.110084762752385
-86.14999999999998	0.1171115015272663
-85.14999999999998	0.1244890248247371
-84.14999999999998	0.132229457717303
-83.14999999999998	0.14034512073521288
-82.14999999999998	0.14884852704625035
-81.14999999999998	0.15775237963372257
-80.14999999999998	0.16706956843543252
-79.14999999999998	0.17681316748679235
-78.14999999999998	0.1869964320507887
-77.14999999999998	0.1976327957622608
-76.14999999999998	0.20873586778965658
-75.14999999999998	0.22031943000133003
-74.14999999999998	0.23239743418843936
-73.14999999999998	0.24498399931487727
-72.14999999999998	0.2580934088189853
-71.14999999999998	0.271740107957703
-70.14999999999998	0.28593870123394144
-69.14999999999998	0.30070394987873905
-68.14999999999998	0.31605076941084265
-67.14999999999998	0.33199422728922057
-66.14999999999998	0.34854954064875543
-65.14999999999998	0.3657320741355422
-64.14999999999998	0.38355733785146945
-63.14999999999998	0.4020409854004295
-62.14999999999998	0.4211988120641925
-61.14999999999998	0.4410467530975714
-60.14999999999998	0.4616008821516625
-59.14999999999998	0.4828774098446261
-58.14999999999998	0.5048926824742437
-57.14999999999998	0.5276631808810338

Temperature (degC)	Pressure (MPa)
-56.14999999999998	0.5512055194694419
-55.14999999999998	0.575536445413329
-54.14999999999998	0.6006728380115697
-53.14999999999998	0.6266317082600066
-52.14999999999998	0.6534301985889233
-51.14999999999998	0.6810855828291399
-50.14999999999998	0.7096152663759747
-49.14999999999998	0.7390367865965387
-48.14999999999998	0.7693678134608987
-47.14999999999998	0.8006261504354139
-46.14999999999998	0.8328297356217729
-45.14999999999998	0.8659966431791807
-44.14999999999998	0.9001450850137959
-43.14999999999998	0.9352934127617802
-42.14999999999998	0.9714601200428565
-41.14999999999998	1.008663845042649
-40.14999999999998	1.046923373362871
-39.14999999999998	1.0862576412127736
-38.14999999999998	1.1266857389098346
-37.14999999999998	1.1682269147314162
-36.14999999999998	1.2109005791318197
-35.14999999999998	1.2547263093657144
-34.14999999999998	1.2997238545490808
-33.14999999999998	1.3459131412136522
-32.14999999999998	1.3933142794052449
-31.149999999999977	1.4419475693789032
-30.149999999999977	1.4918335089819175
-29.149999999999977	1.5429928017429673
-28.149999999999977	1.595446365794647
-27.149999999999977	1.6492153436486947
-26.149999999999977	1.704321112923136
-25.149999999999977	1.760785298085643
-24.149999999999977	1.8186297832885536
-23.149999999999977	1.8778767263639955
-22.149999999999977	1.938548574095551
-21.149999999999977	2.00066807882874
-20.149999999999977	2.0642583165468027
-19.149999999999977	2.1293427065289454
-18.149999999999977	2.1959450327311028
-17.149999999999977	2.2640894670415457
-16.149999999999977	2.3338005946081526
-15.149999999999977	2.4051034414066743
-14.149999999999977	2.4780235043419787
-13.149999999999977	2.5525867840949537
-12.149999999999977	2.6288198210696736

Temperature (degC)	Pressure (MPa)
-11.149999999999977	2.7067497347819742
-10.149999999999977	2.786404267120829
-9.149999999999977	2.86781182996925
-8.149999999999977	2.951001557774833
-7.149999999999977	3.036003365743856
-6.149999999999977	3.1228480144958675
-5.149999999999977	3.211567182116433
-4.149999999999977	3.3021935447961965
-3.149999999999973	3.3947608674026073
-2.149999999999973	3.489304105641288
-1.149999999999973	3.585859521759093
-0.1499999999999726	3.684464816110706
0.8500000000000227	3.785159277373465
1.8500000000000227	3.8879839547228436
2.8500000000000227	3.9929818559289965
3.8500000000000227	4.100198176122683
4.850000000000023	4.209680563004195
5.850000000000023	4.321479425522376
6.850000000000023	4.435648294766199
7.850000000000023	4.552244248090561
8.850000000000023	4.671328410667674
9.850000000000023	4.792966553100752
10.850000000000023	4.917229810073886
11.850000000000023	5.044195554066975
12.850000000000023	5.17394847123633
13.850000000000023	5.306581905414122
14.850000000000023	5.442199563528734
15.850000000000023	5.580917715621214
16.850000000000023	5.722868081358192
17.850000000000023	5.8682016828634085
18.850000000000023	6.01709407882187
19.850000000000023	6.169752610407993
20.850000000000023	6.326426651099692
21.850000000000023	6.487422495644504
22.850000000000023	6.653125743151881
23.850000000000023	6.8240364949892625
24.850000000000023	7.000827999690812
25.850000000000023	7.184451609186893
26.850000000000023	7.376341389320488
27.850000000000023	7.578856127266382
28.850000000000023	7.796383273785914
29.850000000000023	8.039184495177553
30.850000000000023	8.570747761298684

Table B80: Dew Points for Carbon Dioxide and 5% Oxygen

Temperature (degC)	Pressure (MPa)
-102.1499999999998	0.03957808561838787
-101.1499999999998	0.0426903544389799
-100.1499999999998	0.04599882157743054
-99.1499999999998	0.04951249526211772
-98.1499999999998	0.05324061450527685
-97.1499999999998	0.05719264793106242
-96.1499999999998	0.06137829241040221
-95.1499999999998	0.06580747155270587
-94.1499999999998	0.0704903340428335
-93.1499999999998	0.07543725182338687
-92.1499999999998	0.08065881816360125
-91.1499999999998	0.08616584557444035
-90.1499999999998	0.09196936364518223
-89.1499999999998	0.09808061674683669
-88.1499999999998	0.10451106167073956
-87.1499999999998	0.11127236514184638
-86.1499999999998	0.11837640131119169
-85.1499999999998	0.12583524914303013
-84.1499999999998	0.1336611897643727
-83.1499999999998	0.141866703774002
-82.1499999999998	0.15046446850245995
-81.1499999999998	0.1594673552729521
-80.1499999999998	0.16888842661341807
-79.1499999999998	0.17874093348599365
-78.1499999999998	0.1890383125212403
-77.1499999999998	0.19979418324611145
-76.1499999999998	0.2110223453405017
-75.1499999999998	0.22273677592162353
-74.1499999999998	0.23495162689071855
-73.1499999999998	0.24768122226320574
-72.1499999999998	0.26094005562758477
-71.1499999999998	0.27474278761190485
-70.1499999999998	0.28910424344052077
-69.1499999999998	0.3040394105676211
-68.1499999999998	0.3195634363880621
-67.1499999999998	0.33569162605828856
-66.1499999999998	0.35243944038756747
-65.1499999999998	0.36982249386613314
-64.1499999999998	0.38785655278863773
-63.1499999999998	0.4065575335057648
-62.1499999999998	0.42594150081278925
-61.1499999999998	0.4460246664530255
-60.1499999999998	0.4668233877923238

Temperature (degC)	Pressure (MPa)
-59.1499999999998	0.4883541666228525
-58.1499999999998	0.510633648142133
-57.1499999999998	0.5336786200926555
-56.1499999999998	0.5575060120727092
-55.1499999999998	0.582132895048313
-54.1499999999998	0.607576481040262
-53.1499999999998	0.6338541230374439
-52.1499999999998	0.6609833151067317
-51.1499999999998	0.6889816927445909
-50.1499999999998	0.71786703346688
-49.1499999999998	0.7476572576499828
-48.1499999999998	0.7783704296259687
-47.1499999999998	0.810024759076761
-46.1499999999998	0.8426386026931006
-45.1499999999998	0.8762304661418455
-44.1499999999998	0.9108190063253614
-43.1499999999998	0.9464230339669111
-42.1499999999998	0.9830615165008476
-41.1499999999998	1.0207535813049717
-40.1499999999998	1.0595185192531908
-39.1499999999998	1.099375788645123
-38.1499999999998	1.1403450195085694
-37.1499999999998	1.1824460182964047
-36.1499999999998	1.2256987730431543
-35.1499999999998	1.2701234590048125
-34.1499999999998	1.3157404448319803
-33.1499999999998	1.3625702993461328
-32.1499999999998	1.410633798973827
-31.14999999999977	1.459951935899604
-30.14999999999977	1.5105459270182362
-29.14999999999977	1.5624372237352155
-28.14999999999977	1.615647522714504
-27.14999999999977	1.6701987776095433
-26.14999999999977	1.7261132118873537
-25.14999999999977	1.7834133328007125
-24.14999999999977	1.8421219466028642
-23.14999999999977	1.902262175109991
-22.14999999999977	1.9638574737054544
-21.14999999999977	2.026931650911328
-20.14999999999977	2.091508889686113
-19.14999999999977	2.157613770580003
-18.14999999999977	2.225271296941236
-17.14999999999977	2.2945069223933086
-16.14999999999977	2.3653465807947196
-15.14999999999977	2.437816718936783

Temperature (degC)	Pressure (MPa)
-14.149999999999977	2.5119443323200654
-13.149999999999977	2.5877570042961535
-12.149999999999977	2.66528294900843
-11.149999999999977	2.7445510585473243
-10.149999999999977	2.825590954879786
-9.149999999999977	2.9084330471305204
-8.149999999999977	2.9931085949569076
-7.149999999999977	3.0796497788673505
-6.149999999999977	3.168089778486382
-5.149999999999977	3.2584628599810412
-4.149999999999977	3.350804474083436
-3.149999999999973	3.4451513664277864
-2.149999999999973	3.5415417022559765
-1.149999999999973	3.64001520795143
-0.1499999999999726	3.7406133323352044
0.8500000000000227	3.8433794312422314
1.8500000000000227	3.9483589795962963
2.8500000000000227	4.055599816024804
3.8500000000000227	4.165152426156103
4.850000000000023	4.277070271996691
5.850000000000023	4.391410176541248
6.850000000000023	4.508232774990275
7.850000000000023	4.627603046963221
8.850000000000023	4.749590948316453
9.850000000000023	4.874272167001583
10.850000000000023	5.001729035746157
11.850000000000023	5.1320516462885655
12.850000000000023	5.2653392271220385
13.850000000000023	5.4017018717750265
14.850000000000023	5.541262741126357
15.850000000000023	5.684160917168739
16.850000000000023	5.830555165723554
17.850000000000023	5.980628987502987
18.850000000000023	6.134597526763077
19.850000000000023	6.292717214758348
20.850000000000023	6.455299548867432
21.850000000000023	6.622731352331211
22.850000000000023	6.7955056705661105
23.850000000000023	6.974271162501949
24.850000000000023	7.159915924345657
25.850000000000023	7.353720596531855
26.850000000000023	7.5576638518404335
27.850000000000023	7.775103449409419
28.850000000000023	8.0125979974362
29.850000000000023	8.288074383757086

Table B81: Melting Points for Carbon Dioxide and 1% Argon

Temperature (degC)	Pressure (MPa)
-58.1499999999998	0.5076058095115822
-57.1499999999998	3.9454768073743525
-56.1499999999998	8.65463655697936
-55.1499999999998	13.408870306320374
-54.1499999999998	18.208214792301852
-53.1499999999998	23.052674486613466
-52.1499999999998	27.942249413959733
-51.1499999999998	32.87693843076982
-50.1499999999998	37.85673998232382
-49.1499999999998	42.8816523436666
-48.1499999999998	47.95167371295471
-47.1499999999998	53.06680225286494
-46.1499999999998	58.227036110874984
-45.1499999999998	63.43237342996383
-44.1499999999998	68.68281235459958
-43.1499999999998	73.97835103423684
-42.1499999999998	79.31898762543499
-41.1499999999998	84.70472029316696
-40.1499999999998	90.1355472116426
-39.1499999999998	95.61146656482447
-38.1499999999998	101.13247654674927
-37.1499999999998	106.69857536171551
-36.1499999999998	112.30976122438979
-35.1499999999998	117.9660323598462
-34.1499999999998	123.66738700357058
-33.1499999999998	129.41382340143005
-32.1499999999998	135.20533980962588
-31.14999999999977	141.04193449462878
-30.14999999999977	146.92360573310378
-29.14999999999977	152.8503518118299
-28.14999999999977	158.82217102761004
-27.14999999999977	164.83906168718283
-26.14999999999977	170.90102210712533
-25.14999999999977	177.00805061375993
-24.14999999999977	183.16014554305673
-23.14999999999977	189.3573052405365
-22.14999999999977	195.59952806117366
-21.14999999999977	201.88681236930023
-20.14999999999977	208.2191565385072
-19.14999999999977	214.59655895155203
-18.14999999999977	221.01901800025976
-17.14999999999977	227.48653208543308
-16.14999999999977	233.99909961675473

Temperature (degC)	Pressure (MPa)
-15.14999999999977	240.5567190126997
-14.14999999999977	247.15938870044246
-13.14999999999977	253.80710711576415
-12.14999999999977	260.49987270296856
-11.14999999999977	267.2376839147915
-10.14999999999977	274.0205392123152
-9.14999999999977	280.84843706488175
-8.14999999999977	287.72137595001095
-7.14999999999977	294.639354353315
-6.14999999999977	301.60237076841764
-5.14999999999977	308.61042369687294
-4.14999999999977	315.6635116480867
-3.149999999999773	322.76163313923416
-2.149999999999773	329.90478669518774
-1.149999999999773	337.0929708484356
-0.1499999999997726	344.32618413901076
0.8500000000000227	351.60442511441124
1.8500000000000227	358.9276923295322
2.8500000000000227	366.29598434659
3.8500000000000227	373.70929973505173
4.850000000000023	381.16763707156554
5.850000000000023	388.6709949398902
6.850000000000023	396.2193719308283
7.850000000000023	403.8127666421552
8.850000000000023	411.45117767855805
9.850000000000023	419.13460365156294
10.850000000000023	426.86304317947764
11.850000000000023	434.63649488732244
12.850000000000023	442.4549574067676
13.850000000000023	450.3184293760738
14.850000000000023	458.2269094400288
15.850000000000023	466.18039624988626
16.850000000000023	474.1788884633087
17.850000000000023	482.2223847443048
18.850000000000023	490.31088376317444
19.850000000000023	498.4443841964501
20.850000000000023	506.6228847268397
21.850000000000023	514.8463840431715
22.850000000000023	523.1148808403373
23.850000000000023	531.4283738192405
24.850000000000023	539.7868616867416
25.850000000000023	548.1903431556035
26.850000000000023	556.6388169444398
27.850000000000023	565.1322817776631
28.850000000000023	573.6707363854382

Temperature (degC)	Pressure (MPa)
29.850000000000023	582.2541795036228
30.850000000000023	590.8826098737256
31.850000000000023	599.5560262428526
32.850000000000002	608.274427363662
33.850000000000002	617.0378119943141
34.850000000000002	625.8461788984235
35.850000000000002	634.6995268450138
36.850000000000002	643.5978546084727
37.850000000000002	652.5411609685025
38.850000000000002	661.5294447100782
39.850000000000002	670.5627046234005
40.850000000000002	679.640939503857
41.850000000000002	688.7641481519736
42.850000000000002	697.9323293733734
43.850000000000002	707.1454819787316
44.850000000000002	716.4036047837441
45.850000000000002	725.706696609069
46.850000000000002	735.054756280303
47.850000000000002	744.4477826279274
48.850000000000002	753.8857744872804
49.850000000000002	763.3687306985062
50.850000000000002	772.8966501065257
51.850000000000002	782.4695315609891
52.850000000000002	792.0873739162472
53.850000000000002	801.7501760313066
54.850000000000002	811.4579367697959
55.850000000000002	821.2106549999266
56.850000000000002	831.0083295944621
57.850000000000002	840.8509594306751
58.850000000000002	850.7385433903154
59.850000000000002	860.6710803595761
60.850000000000002	870.6485692290586
61.850000000000002	880.6710088937348
62.850000000000002	890.7383982529167
63.850000000000002	900.8507362102233
64.850000000000002	911.0080216735429
65.850000000000002	921.2102535550106
66.850000000000002	931.4574307709585
67.850000000000002	941.7495522419063
68.850000000000002	952.0866168925069
69.850000000000002	962.4686236515328
70.850000000000002	972.8955714518361
71.850000000000002	983.3674592303183
72.850000000000002	993.8842859279056
73.850000000000002	1004.446050489508

Temperature (degC)	Pressure (MPa)
74.85000000000002	1015.0527518640059
75.85000000000002	1025.7043890042046
76.85000000000002	1036.4009608668161
77.85000000000002	1047.1424664124245
78.85000000000002	1057.9289046054594
79.85000000000002	1068.7602744141718
80.85000000000002	1079.6365748106002
81.85000000000002	1090.557804770544
82.85000000000002	1101.5239632735438
83.85000000000002	1112.5350493028413
84.85000000000002	1123.5910618453643
85.85000000000002	1134.6919998916985
86.85000000000002	1145.8378624360548
87.85000000000002	1157.0286484762503
88.85000000000002	1168.2643570136806
89.85000000000002	1179.5449870532943
90.85000000000002	1190.8705376035648
91.85000000000002	1202.2410076764745
92.85000000000002	1213.6563962874816
93.85000000000002	1225.1167024554982
94.85000000000002	1236.6219252028684
95.85000000000002	1248.1720635553447
96.85000000000002	1259.767116542061
97.85000000000002	1271.4070831955105
98.85000000000002	1283.0919625515276
99.85000000000002	1294.8217536492584
100.85000000000002	1306.59645553114
101.85000000000002	1318.416067242883
102.85000000000002	1330.2805878334402
103.85000000000002	1342.1900163549947
104.85000000000002	1354.1443518629314
105.85000000000002	1366.1435934158183
106.85000000000002	1378.187740075382
107.85000000000002	1390.276790906494
108.85000000000002	1402.410744977143
109.85000000000002	1414.5896013584172
110.85000000000002	1426.8133591244768
111.85000000000002	1439.0820173525485
112.85000000000002	1451.3955751228966
113.85000000000002	1463.7540315187953
114.85000000000002	1476.1573856265265
115.85000000000002	1488.6056365353481
116.85000000000002	1501.0987833374734
117.85000000000002	1513.6368251280642
118.85000000000002	1526.2197610051992

Temperature (degC)	Pressure (MPa)
119.85000000000002	1538.8475900698613
120.85000000000002	1551.5203114259143
121.85000000000002	1564.2379241800957
122.85000000000002	1577.0004274419834
123.85000000000002	1589.8078203239927
124.85000000000002	1602.6601019413433
125.85000000000002	1615.557271412052

Table B82: Melting Points for Carbon Dioxide and 2% Argon

Temperature (degC)	Pressure (MPa)
-60.1499999999998	0.4974682070661422
-59.1499999999998	0.7941996485630808
-58.1499999999998	5.451360761327954
-57.1499999999998	10.152129199131187
-56.1499999999998	14.897705775339702
-55.1499999999998	19.68812380554866
-54.1499999999998	24.5233875247604
-53.1499999999998	29.403495831365138
-52.1499999999998	34.32844604850733
-51.1499999999998	39.298234909169906
-50.1499999999998	44.31285889364971
-49.1499999999998	49.37231436694595
-48.1499999999998	54.4765976419122
-47.1499999999998	59.6257050110125
-46.1499999999998	64.81963276342488
-45.1499999999998	70.05837719475447
-44.1499999999998	75.34193461277658
-43.1499999999998	80.67030134093527
-42.1499999999998	86.0434737205164
-41.1499999999998	91.46144811201084
-40.1499999999998	96.92422089596302
-39.1499999999998	102.43178847348577
-38.1499999999998	107.98414726655803
-37.1499999999998	113.58129371816827
-36.1499999999998	119.22322429235638
-35.1499999999998	124.90993547418519
-34.1499999999998	130.64142376965924
-33.1499999999998	136.4176857056082
-32.1499999999998	142.23871782954322
-31.14999999999977	148.10451670949834
-30.14999999999977	154.01507893385465
-29.14999999999977	159.9704011111573
-28.14999999999977	165.97047986992692
-27.14999999999977	172.01531185846574
-26.14999999999977	178.1048937446604
-25.14999999999977	184.23922221578482
-24.14999999999977	190.4182939783021
-23.14999999999977	196.6421057576674
-22.14999999999977	202.91065429812878
-21.14999999999977	209.22393636253372
-20.14999999999977	215.58194873213404
-19.14999999999977	221.98468820639079
-18.14999999999977	228.43215160278714

Temperature (degC)	Pressure (MPa)
-17.14999999999977	234.92433575663836
-16.14999999999977	241.46123752090446
-15.14999999999977	248.04285376600623
-14.14999999999977	254.669181379644
-13.14999999999977	261.34021726661797
-12.14999999999977	268.05595834864977
-11.14999999999977	274.8164015642088
-10.14999999999977	281.62154386833885
-9.14999999999977	288.4713822324892
-8.14999999999977	295.3659136443431
-7.14999999999977	302.30513510765735
-6.14999999999977	309.28904364209563
-5.14999999999977	316.31763628306675
-4.14999999999977	323.39091008156834
-3.149999999999773	330.5088621040306
-2.149999999999773	337.6714894321567
-1.149999999999773	344.8787891627791
-0.1499999999997726	352.1307584077008
0.8500000000000227	359.42739429355373
1.8500000000000227	366.7686939616476
2.8500000000000227	374.1546545678315
3.8500000000000227	381.58527328234777
4.850000000000023	389.0605472896916
5.850000000000023	396.58047378847783
6.850000000000023	404.1450499913
7.850000000000023	411.75427312459846
8.850000000000023	419.4081404285253
9.850000000000023	427.1066491568188
10.850000000000023	434.84979657666867
11.850000000000023	442.63757996859187
12.850000000000023	450.4699966263101
13.850000000000023	458.34704385662116
14.850000000000023	466.26871897927697
15.850000000000023	474.2350193268679
16.850000000000023	482.2459422446996
17.850000000000023	490.3014850906798
18.850000000000023	498.40164523519644
19.850000000000023	506.54642006101153
20.850000000000023	514.7358069631395
21.850000000000023	522.9698033487455
22.850000000000023	531.2484066370282
23.850000000000023	539.5716142591167
24.850000000000023	547.9394236579603
25.850000000000023	556.3518322882234
26.850000000000023	564.8088376161822

Temperature (degC)	Pressure (MPa)
27.850000000000023	573.3104371196254
28.850000000000023	581.8566282877437
29.850000000000023	590.4474086210386
30.850000000000023	599.0827756312207
31.850000000000023	607.7627268411085
32.850000000000002	616.4872597845382
33.850000000000002	625.2563720062617
34.850000000000002	634.0700610618607
35.850000000000002	642.9283245176431
36.850000000000002	651.8311599505639
37.850000000000002	660.7785649481232
38.850000000000002	669.7705371082855
39.850000000000002	678.8070740393836
40.850000000000002	687.8881733600406
41.850000000000002	697.0138326990735
42.850000000000002	706.1840496954178
43.850000000000002	715.3988219980334
44.850000000000002	724.6581472658311
45.850000000000002	733.9620231675847
46.850000000000002	743.3104473818495
47.850000000000002	752.7034175968902
48.850000000000002	762.1409315105863
49.850000000000002	771.6229868303709
50.850000000000002	781.1495812731423
51.850000000000002	790.7207125651915
52.850000000000002	800.3363784421254
53.850000000000002	809.9965766487943
54.850000000000002	819.7013049392153
55.850000000000002	829.4505610765007
56.850000000000002	839.2443428327884
57.850000000000002	849.0826479891642
58.850000000000002	858.9654743355998
59.850000000000002	868.8928196708752
60.850000000000002	878.8646818025168
61.850000000000002	888.8810585467248
62.850000000000002	898.9419477283055
63.850000000000002	909.047347180609
64.850000000000002	919.1972547454616
65.850000000000002	929.3916682730978
66.850000000000002	939.6305856220987
67.850000000000002	949.9140046593308
68.850000000000002	960.2419232598793
69.850000000000002	970.6143393069855
70.850000000000002	981.0312506919881
71.850000000000002	991.4926553142637

Temperature (degC)	Pressure (MPa)
72.85000000000002	1001.9985510811617
73.85000000000002	1012.5489359079464
74.85000000000002	1023.1438077177423
75.85000000000002	1033.783164441471
76.85000000000002	1044.4670040177953
77.85000000000002	1055.1953243930625
78.85000000000002	1065.9681235212502
79.85000000000002	1076.7853993639053
80.85000000000002	1087.647149890094
81.85000000000002	1098.5533730763427
82.85000000000002	1109.5040669065902
83.85000000000002	1120.4992293721275
84.85000000000002	1131.5388584715497
85.85000000000002	1142.6229522107033
86.85000000000002	1153.751508602631
87.85000000000002	1164.9245256675229
88.85000000000002	1176.1420014326668
89.85000000000002	1187.4039339323979
90.85000000000002	1198.7103212080458
91.85000000000002	1210.061161307894
92.85000000000002	1221.4564522871135
93.85000000000002	1232.8961922077406
94.85000000000002	1244.3803791386056
95.85000000000002	1255.9090111552969
96.85000000000002	1267.482086340118
97.85000000000002	1279.09960278203
98.85000000000002	1290.7615585766118
99.85000000000002	1302.467951826022
100.85000000000002	1314.2187806389377
101.85000000000002	1326.0140431305272
102.85000000000002	1337.8537374223947
103.85000000000002	1349.7378616425426
104.85000000000002	1361.6664139253232
105.85000000000002	1373.639392411405
106.85000000000002	1385.6567952477194
107.85000000000002	1397.7186205874282
108.85000000000002	1409.8248665898745
109.85000000000002	1421.9755314205504
110.85000000000002	1434.1706132510494
111.85000000000002	1446.4101102590269
112.85000000000002	1458.694020628167
113.85000000000002	1471.0223425481338
114.85000000000002	1483.3950742145348
115.85000000000002	1495.8122138288952
116.85000000000002	1508.2737595985948

Temperature (degC)	Pressure (MPa)
117.85000000000002	1520.779709736852
118.85000000000002	1533.3300624626759
119.85000000000002	1545.9248160008353
120.85000000000002	1558.5639685818132
121.85000000000002	1571.247518441774
122.85000000000002	1583.9754638225306
123.85000000000002	1596.7478029715098
124.85000000000002	1609.5645341417096
125.85000000000002	1622.4256555916709

Table B83: Melting Points for Carbon Dioxide and 3% Argon

Temperature (degC)	Pressure (MPa)
-61.1499999999998	0.48753306680970054
-60.1499999999998	2.299272903339403
-59.1499999999998	6.947500709759666
-58.1499999999998	11.63998691307094
-57.1499999999998	16.377024847266224
-56.1499999999998	21.158639198694768
-55.1499999999998	25.984832202531063
-54.1499999999998	30.85560105904851
-53.1499999999998	35.77094133656169
-52.1499999999998	40.73084795981693
-51.1499999999998	45.7353155710043
-50.1499999999998	50.78433868334979
-49.1499999999998	55.877911754021014
-48.1499999999998	61.01602922168809
-47.1499999999998	66.19868552712762
-46.1499999999998	71.42587512508675
-45.1499999999998	76.69759249136747
-44.1499999999998	82.01383212716598
-43.1499999999998	87.37458856177486
-42.1499999999998	92.77985635426663
-41.1499999999998	98.22963009453171
-40.1499999999998	103.72390440389492
-39.1499999999998	109.26267393544386
-38.1499999999998	114.84593337416867
-37.1499999999998	120.47367743696846
-36.1499999999998	126.14590087256181
-35.1499999999998	131.86259846133336
-34.1499999999998	137.62376501513452
-33.1499999999998	143.42939537704774
-32.1499999999998	149.27948442112955
-31.14999999999977	155.17402705213675
-30.14999999999977	161.11301820523914
-29.14999999999977	167.0964528457269
-28.14999999999977	173.12432596871085
-27.14999999999977	179.1966325988212
-26.14999999999977	185.31336778990405
-25.14999999999977	191.47452662471952
-24.14999999999977	197.68010421463845
-23.14999999999977	203.9300956993424
-22.14999999999977	210.2244962465253
-21.14999999999977	216.56330105159725
-20.14999999999977	222.9465053373929
-19.14999999999977	229.37410435387994

Temperature (degC)	Pressure (MPa)
-18.14999999999977	235.84609337787262
-17.14999999999977	242.36246771275142
-16.14999999999977	248.92322268817958
-15.14999999999977	255.52835365982943
-14.14999999999977	262.1778560091109
-13.14999999999977	268.87172514289944
-12.14999999999977	275.6099564932731
-11.14999999999977	282.3925455172521
-10.14999999999977	289.2194876965381
-9.14999999999977	296.09077853726234
-8.14999999999977	303.00641356973284
-7.14999999999977	309.96638834818896
-6.14999999999977	316.97069845055637
-5.14999999999977	324.0193394782076
-4.14999999999977	331.112307055722
-3.149999999999773	338.24959683065924
-2.149999999999773	345.4312044733202
-1.149999999999773	352.6571256765251
-0.1499999999997726	359.92735615538976
0.85000000000000227	367.24189164710236
1.85000000000000227	374.6007279107055
2.85000000000000227	382.00386072688525
3.85000000000000227	389.4512858977556
4.8500000000000023	396.9429992466517
5.8500000000000023	404.4789966179235
6.8500000000000023	412.0592738767318
7.8500000000000023	419.6838269088516
8.8500000000000023	427.35265162046835
9.8500000000000023	435.0657439379899
10.8500000000000023	442.82309980785016
11.8500000000000023	450.6247151963216
12.8500000000000023	458.47058608932554
13.8500000000000023	466.3607084922541
14.8500000000000023	474.2950784297802
15.8500000000000023	482.27369194568195
16.8500000000000023	490.29654510266903
17.8500000000000023	498.3636339822024
18.8500000000000023	506.4749546843229
19.8500000000000023	514.630503327485
20.8500000000000023	522.8302760483848
21.8500000000000023	531.0742690017958
22.8500000000000023	539.3624783604076
23.8500000000000023	547.6949003146585
24.8500000000000023	556.0715310725847
25.8500000000000023	564.4923668596563

Temperature (degC)	Pressure (MPa)
26.850000000000023	572.9574039186243
27.850000000000023	581.4666385093684
28.850000000000023	590.0200669087455
29.850000000000023	598.6176854104388
30.850000000000023	607.2594903248134
31.850000000000023	615.9454779787671
32.850000000000002	624.675644715589
33.850000000000002	633.4499868948187
34.850000000000002	642.2685008921047
35.850000000000002	651.1311830990621
36.850000000000002	660.0380299231463
37.850000000000002	668.9890377875076
38.850000000000002	677.9842031308634
39.850000000000002	687.0235224073656
40.850000000000002	696.1069920864704
41.850000000000002	705.234608652808
42.850000000000002	714.4063686060606
43.850000000000002	723.6222684608329
44.850000000000002	732.8823047465271
45.850000000000002	742.1864740072273
46.850000000000002	751.5347728015698
47.850000000000002	760.9271977026322
48.850000000000002	770.3637452978098
49.850000000000002	779.8444121887003
50.850000000000002	789.369194990989
51.850000000000002	798.9380903343349
52.850000000000002	808.5510948622591
53.850000000000002	818.2082052320329
54.850000000000002	827.9094181145674
55.850000000000002	837.6547301943053
56.850000000000002	847.4441381691119
57.850000000000002	857.277638750174
58.850000000000002	867.1552286618889
59.850000000000002	877.076904641765
60.850000000000002	887.0426634403175
61.850000000000002	897.0525018209652
62.850000000000002	907.1064165599382
63.850000000000002	917.2044044461655
64.850000000000002	927.3464622811914
65.850000000000002	937.5325868790671
66.850000000000002	947.7627750662631
67.850000000000002	958.0370236815701
68.850000000000002	968.3553295760051
69.850000000000002	978.7176896127232
70.850000000000002	989.1241006669208

Temperature (degC)	Pressure (MPa)
71.85000000000002	999.5745596257478
72.85000000000002	1010.0690633882172
73.85000000000002	1020.6076088651183
74.85000000000002	1031.190192978927
75.85000000000002	1041.816812663718
76.85000000000002	1052.4874648650818
77.85000000000002	1063.202146540044
78.85000000000002	1073.960854656968
79.85000000000002	1084.7635861954855
80.85000000000002	1095.6103381464068
81.85000000000002	1106.501107511646
82.85000000000002	1117.4358913041308
83.85000000000002	1128.414686547736
84.85000000000002	1139.4374902771888
85.85000000000002	1150.5042995380115
86.85000000000002	1161.6151113864191
87.85000000000002	1172.7699228892693
88.85000000000002	1183.9687311239663
89.85000000000002	1195.2115331783984
90.85000000000002	1206.4983261508592
91.85000000000002	1217.8291071499768
92.85000000000002	1229.203873294635
93.85000000000002	1240.6226217139108
94.85000000000002	1252.0853495470035
95.85000000000002	1263.592053943151
96.85000000000002	1275.142732061578
97.85000000000002	1286.737381071414
98.85000000000002	1298.3759981516337
99.85000000000002	1310.0585804909854
100.85000000000002	1321.7851252879227
101.85000000000002	1333.555629750544
102.85000000000002	1345.370091096523
103.85000000000002	1357.2285065530466
104.85000000000002	1369.130873356747
105.85000000000002	1381.0771887536393
106.85000000000002	1393.0674499990666
107.85000000000002	1405.1016543576231
108.85000000000002	1417.1797991031056
109.85000000000002	1429.3018815184448
110.85000000000002	1441.4678988956514
111.85000000000002	1453.6778485357474
112.85000000000002	1465.9317277487135
113.85000000000002	1478.2295338534338
114.85000000000002	1490.5712641776267
115.85000000000002	1502.9569160577935

Temperature (degC)	Pressure (MPa)
116.85000000000002	1515.3864868391663
117.85000000000002	1527.8599738756402
118.85000000000002	1540.377374529734
119.85000000000002	1552.9386861725095
120.85000000000002	1565.5439061835473
121.85000000000002	1578.1930319508676
122.85000000000002	1590.8860608708849
123.85000000000002	1603.6229903483602
124.85000000000002	1616.4038177963446
125.85000000000002	1629.2285406361182

Table B84: Melting Points for Carbon Dioxide and 4% Argon

Temperature (degC)	Pressure (MPa)
-62.1499999999998	0.4777963452873877
-61.1499999999998	3.793916993610104
-60.1499999999998	8.434083787034181
-59.1499999999998	13.118407480453593
-58.1499999999998	17.847028770497207
-57.1499999999998	22.619964072770447
-56.1499999999998	27.437212991784772
-55.1499999999998	32.29877075005322
-54.1499999999998	37.20463103732616
-53.1499999999998	42.154786913386125
-52.1499999999998	47.149231156847144
-51.1499999999998	52.187956419537
-50.1499999999998	57.27095530194348
-49.1499999999998	62.398220392952595
-48.1499999999998	67.56974429201586
-47.1499999999998	72.78551962206865
-46.1499999999998	78.04553903730987
-45.1499999999998	83.34979522798697
-44.1499999999998	88.6982809233712
-43.1499999999998	94.09098889360122
-42.1499999999998	99.5279119507955
-41.1499999999998	105.00904294969008
-40.1499999999998	110.53437478794845
-39.1499999999998	116.10390040625559
-38.1499999999998	121.71761278825491
-37.1499999999998	127.37550496038095
-36.1499999999998	133.07756999161464
-35.1499999999998	138.82380099318425
-34.1499999999998	144.61419111823005
-33.1499999999998	150.4487335614392
-32.1499999999998	156.32742155866413
-31.14999999999977	162.2502483865271
-30.14999999999977	168.2172073620152
-29.14999999999977	174.22829184207322
-28.14999999999977	180.2834952231903
-27.14999999999977	186.38281094098937
-26.14999999999977	192.52623246981375
-25.14999999999977	198.71375332231898
-24.14999999999977	204.94536704906517
-23.14999999999977	211.22106723811393
-22.14999999999977	217.54084751462767
-21.14999999999977	223.90470154047355
-20.14999999999977	230.3126230138345

Temperature (degC)	Pressure (MPa)
-19.14999999999977	236.76460566881977
-18.14999999999977	243.26064327508433
-17.14999999999977	249.80072963745283
-16.14999999999977	256.3848585955448
-15.14999999999977	263.01302402341145
-14.14999999999977	269.6852198291694
-13.14999999999977	276.40143995464643
-12.14999999999977	283.1616783750291
-11.14999999999977	289.96592909851336
-10.14999999999977	296.81418616596505
-9.14999999999977	303.70644365057984
-8.14999999999977	310.6426956575528
-7.14999999999977	317.62293632374804
-6.14999999999977	324.64715981737606
-5.14999999999977	331.71536033767677
-4.14999999999977	338.8275321146021
-3.149999999999773	345.9836694085094
-2.149999999999773	353.18376650985306
-1.149999999999773	360.4278177388843
-0.1499999999997726	367.71581744535683
0.8500000000000227	375.0477600082297
1.8500000000000227	382.4236398353828
2.8500000000000227	389.8434513633295
3.8500000000000227	397.3071890569382
4.850000000000023	404.81484740915454
5.850000000000023	412.36642094072744
6.850000000000023	419.9619041999427
7.850000000000023	427.6012917623569
8.850000000000023	435.28457823053475
9.850000000000023	443.01175823379117
10.850000000000023	450.78282642793823
11.850000000000023	458.59777749503303
12.850000000000023	466.4566061431299
13.850000000000023	474.3593071060357
14.850000000000023	482.30587514307047
15.850000000000023	490.29630503882976
16.850000000000023	498.33059160294687
17.850000000000023	506.40872966986535
18.850000000000023	514.5307140986098
19.850000000000023	522.6965397725561
20.850000000000023	530.9062015992168
21.850000000000023	539.1596945100159
22.850000000000023	547.457013460074
23.850000000000023	555.7981534279938
24.850000000000023	564.183109415653

Temperature (degC)	Pressure (MPa)
25.850000000000023	572.6118764479895
26.850000000000023	581.0844495728008
27.850000000000023	589.6008238605423
28.850000000000023	598.1609944041206
29.850000000000023	606.7649563187026
30.850000000000023	615.4127047415166
31.850000000000023	624.1042348316605
32.850000000000002	632.8395417699107
33.850000000000002	641.618620758537
34.850000000000002	650.4414670211144
35.850000000000002	659.3080758023392
36.850000000000002	668.218442367851
37.850000000000002	677.1725620040519
38.850000000000002	686.1704300179317
39.850000000000002	695.2120417368919
40.850000000000002	704.2973925085737
41.850000000000002	713.4264777006882
42.850000000000002	722.5992927008506
43.850000000000002	731.8158329164105
44.850000000000002	741.0760937742912
45.850000000000002	750.3800707208242
46.850000000000002	759.7277592215958
47.850000000000002	769.1191547612777
48.850000000000002	778.5542528434836
49.850000000000002	788.0330489906075
50.850000000000002	797.5555387436708
51.850000000000002	807.1217176621756
52.850000000000002	816.7315813239517
53.850000000000002	826.3851253250118
54.850000000000002	836.0823452794062
55.850000000000002	845.8232368190769
56.850000000000002	855.6077955937177
57.850000000000002	865.4360172706333
58.850000000000002	875.307897534598
59.850000000000002	885.2234320877235
60.850000000000002	895.1826166493165
61.850000000000002	905.1854469557512
62.850000000000002	915.2319187603297
63.850000000000002	925.3220278331607
64.850000000000002	935.4557699610178
65.850000000000002	945.633140947222
66.850000000000002	955.8541366115071
67.850000000000002	966.1187527899003
68.850000000000002	976.4269853345942
69.850000000000002	986.7788301138236

Temperature (degC)	Pressure (MPa)
70.85000000000002	997.1742830117507
71.85000000000002	1007.6133399283383
72.85000000000002	1018.0959967792321
73.85000000000002	1028.622249495649
74.85000000000002	1039.1920940242542
75.85000000000002	1049.8055263270517
76.85000000000002	1060.462542381265
77.85000000000002	1071.1631381792336
78.85000000000002	1081.9073097282912
79.85000000000002	1092.695053050666
80.85000000000002	1103.526364183366
81.85000000000002	1114.4012391780718
82.85000000000002	1125.3196741010322
83.85000000000002	1136.28166503296
84.85000000000002	1147.2872080689203
85.85000000000002	1158.3362993182416
86.85000000000002	1169.428934904396
87.85000000000002	1180.5651109649202
88.85000000000002	1191.7448236512853
89.85000000000002	1202.968069128836
90.85000000000002	1214.2348435766562
91.85000000000002	1225.5451431874974
92.85000000000002	1236.898964167671
93.85000000000002	1248.29630273696
94.85000000000002	1259.7371551285185
95.85000000000002	1271.2215175887843
96.85000000000002	1282.749386377383
97.85000000000002	1294.3207577670403
98.85000000000002	1305.9356280434897
99.85000000000002	1317.5939935053864
100.85000000000002	1329.2958504642147
101.85000000000002	1341.0411952442053
102.85000000000002	1352.8300241822415
103.85000000000002	1364.662333627783
104.85000000000002	1376.538119942774
105.85000000000002	1388.4573795015624
106.85000000000002	1400.4201086908145
107.85000000000002	1412.426303909439
108.85000000000002	1424.4759615684943
109.85000000000002	1436.5690780911195
110.85000000000002	1448.7056499124417
111.85000000000002	1460.8856734795113
112.85000000000002	1473.1091452512187
113.85000000000002	1485.3760616982006
114.85000000000002	1497.686419302793

Temperature (degC)	Pressure (MPa)
115.85000000000002	1510.0402145589344
116.85000000000002	1522.4374439720862
117.85000000000002	1534.8781040591798
118.85000000000002	1547.36219134852
119.85000000000002	1559.889702379728
120.85000000000002	1572.460633703654
121.85000000000002	1585.0749818823251
122.85000000000002	1597.7327434888546
123.85000000000002	1610.433915107383
124.85000000000002	1623.1784933329925
125.85000000000002	1635.9664747716736

Table B85: Melting Points for Carbon Dioxide and 5% Argon

Temperature (degC)	Pressure (MPa)
-64.1499999999998	0.4682540797978174
-63.1499999999998	0.6873468885382499
-62.1499999999998	5.278986623754873
-61.1499999999998	9.911305994999593
-60.1499999999998	14.587590789178225
-59.1499999999998	19.3079197241758
-58.1499999999998	24.07230216517715
-57.1499999999998	28.88073491226702
-56.1499999999998	33.73321108203908
-55.1499999999998	38.62972241984011
-54.1499999999998	43.5702600890057
-53.1499999999998	48.55481499132014
-52.1499999999998	53.58337791399396
-51.1499999999998	58.655939603425374
-50.1499999999998	63.772490804835535
-49.1499999999998	68.93302228471534
-48.1499999999998	74.13752484404823
-47.1499999999998	79.38598932632469
-46.1499999999998	84.67840662248285
-45.1499999999998	90.01476767396986
-44.1499999999998	95.39506347461553
-43.1499999999998	100.81928507173706
-42.1499999999998	106.28742356673331
-41.1499999999998	111.79947011533422
-40.1499999999998	117.35541592761275
-39.1499999999998	122.95525226783339
-38.1499999999998	128.59897045418302
-37.1499999999998	134.28656185842127
-36.1499999999998	140.01801790547236
-35.1499999999998	145.79333007297564
-34.1499999999998	151.61248989080815
-33.1499999999998	157.47548894058704
-32.1499999999998	163.3823188551579
-31.14999999999977	169.33297131807709
-30.14999999999977	175.32743806308642
-29.14999999999977	181.3657108735885
-28.14999999999977	187.44778158212185
-27.14999999999977	193.57364206983618
-26.14999999999977	199.743284265973
-25.14999999999977	205.95670014734833
-24.14999999999977	212.21388173784243
-23.14999999999977	218.51482110789084
-22.14999999999977	224.859510373986

Temperature (degC)	Pressure (MPa)
-21.14999999999977	231.24794169817997
-20.14999999999977	237.68010728759668
-19.14999999999977	244.15599939394752
-18.14999999999977	250.67561031305846
-17.14999999999977	257.2389323843957
-16.14999999999977	263.84595799060395
-15.14999999999977	270.4966795570501
-14.14999999999977	277.19108955136994
-13.14999999999977	283.929180483026
-12.14999999999977	290.7109449028667
-11.14999999999977	297.5363754026971
-10.14999999999977	304.40546461485127
-9.14999999999977	311.3182052117724
-8.14999999999977	318.27458990560064
-7.14999999999977	325.27461144776254
-6.14999999999977	332.3182626285715
-5.14999999999977	339.4055362768307
-4.14999999999977	346.53642525944036
-3.149999999999773	353.7109224810179
-2.149999999999773	360.92902088351286
-1.149999999999773	368.19071344583523
-0.1499999999997726	375.4959931834871
0.8500000000000227	382.84485314819807
1.8500000000000227	390.23728642756646
2.8500000000000227	397.6732861447072
3.8500000000000227	405.15284545790144
4.850000000000023	412.67595756025474
5.850000000000023	420.2426156793583
6.850000000000023	427.8528130769525
7.850000000000023	435.50654304859916
8.850000000000023	443.20379892335774
9.850000000000023	450.9445740634625
10.850000000000023	458.72886186400626
11.850000000000023	466.5566557526321
12.850000000000023	474.42794918922266
13.850000000000023	482.3427356655968
14.850000000000023	490.30100870521284
15.850000000000023	498.30276186287
16.850000000000023	506.34798872442065
17.850000000000023	514.43668290648
18.850000000000023	522.5688380561447
19.850000000000023	530.7444478507107
20.850000000000023	538.9635059973998
21.850000000000023	547.2260062330864
22.850000000000023	555.5319423240263

Temperature (degC)	Pressure (MPa)
23.850000000000023	563.8813080655965
24.850000000000023	572.2740972820268
25.850000000000023	580.7103038261466
26.850000000000023	589.1899215791291
27.850000000000023	597.7129444502344
28.850000000000023	606.2793663765679
29.850000000000023	614.8891813228303
30.850000000000023	623.5423832810772
31.850000000000023	632.2389662704787
32.850000000000002	640.9789243370843
33.850000000000002	649.7622515535891
34.850000000000002	658.5889420191038
35.850000000000002	667.458989858925
36.850000000000002	676.3723892243141
37.850000000000002	685.3291342922769
38.850000000000002	694.3292192653361
39.850000000000002	703.3726383713234
40.850000000000002	712.4593858631644
41.850000000000002	721.5894560186636
42.850000000000002	730.7628431402982
43.850000000000002	739.9795415550134
44.850000000000002	749.2395456140183
45.850000000000002	758.5428496925839
46.850000000000002	767.889448189844
47.850000000000002	777.2793355285999
48.850000000000002	786.7125061551272
49.850000000000002	796.1889545389855
50.850000000000002	805.7086751728235
51.850000000000002	815.271662572197
52.850000000000002	824.8779112753836
53.850000000000002	834.5274158431976
54.850000000000002	844.2201708588117
55.850000000000002	853.9561709275779
56.850000000000002	863.7354106768503
57.850000000000002	873.5578847558115
58.850000000000002	883.4235878353
59.850000000000002	893.3325146076389
60.850000000000002	903.2846597864723
61.850000000000002	913.2800181065892
62.850000000000002	923.3185843237696
63.850000000000002	933.4003532146146
64.850000000000002	943.5253195763894
65.850000000000002	953.6934782268596
66.850000000000002	963.9048240041409
67.850000000000002	974.1593517665369

Temperature (degC)	Pressure (MPa)
68.85000000000002	984.4570563923891
69.85000000000002	994.7979327799217
70.85000000000002	1005.1819758470972
71.85000000000002	1015.6091805314575
72.85000000000002	1026.0795417899908
73.85000000000002	1036.5930545989697
74.85000000000002	1047.1497139538217
75.85000000000002	1057.7495148689786
76.85000000000002	1068.3924523777405
77.85000000000002	1079.0785215321296
78.85000000000002	1089.80771740276
79.85000000000002	1100.5800350786958
80.85000000000002	1111.395469667322
81.85000000000002	1122.2540162942041
82.85000000000002	1133.1556701029615
83.85000000000002	1144.1004262551382
84.85000000000002	1155.0882799300637
85.85000000000002	1166.1192263247385
86.85000000000002	1177.193260653696
87.85000000000002	1188.3103781488858
88.85000000000002	1199.4705740595455
89.85000000000002	1210.6738436520789
90.85000000000002	1221.920182209933
91.85000000000002	1233.2095850334842
92.85000000000002	1244.5420474399098
93.85000000000002	1255.9175647630814
94.85000000000002	1267.3361323534366
95.85000000000002	1278.7977455778741
96.85000000000002	1290.302399819634
97.85000000000002	1301.8500904781872
98.85000000000002	1313.440812969121
99.85000000000002	1325.0745627240349
100.85000000000002	1336.7513351904174
101.85000000000002	1348.4711258315576
102.85000000000002	1360.2339301264217
103.85000000000002	1372.0397435695488
104.85000000000002	1383.888561670956
105.85000000000002	1395.7803799560218
106.85000000000002	1407.7151939653909
107.85000000000002	1419.692999254869
108.85000000000002	1431.7137913953206
109.85000000000002	1443.7775659725773
110.85000000000002	1455.8843185873222
111.85000000000002	1468.034044855003
112.85000000000002	1480.226740405744

Temperature (degC)	Pressure (MPa)
113.85000000000002	1492.4624008842238
114.85000000000002	1504.7410219496078
115.85000000000002	1517.0625992754308
116.85000000000002	1529.427128549519
117.85000000000002	1541.8346054738972
118.85000000000002	1554.285025764679
119.85000000000002	1566.778385151996
120.85000000000002	1579.3146793799033
121.85000000000002	1591.8939042062866
122.85000000000002	1604.5160554027677
123.85000000000002	1617.1811287546327
124.85000000000002	1629.8891200607277
125.85000000000002	1642.640025133394

Table B86: Melting Points for Carbon Dioxide and 1% Methane

Temperature (degC)	Pressure (MPa)
-58.1499999999998	0.4986838832025536
-57.1499999999998	3.6219930464691577
-56.1499999999998	8.329514356693553
-55.1499999999998	13.082026433636512
-54.1499999999998	17.879648592111383
-53.1499999999998	22.722397375730775
-52.1499999999998	27.610276607450466
-51.1499999999998	32.54328688117721
-50.1499999999998	37.52142766454127
-49.1499999999998	42.54469795268249
-48.1499999999998	47.61309651786408
-47.1499999999998	52.72662201912821
-46.1499999999998	57.88527305567402
-45.1499999999998	63.08904819495775
-44.1499999999998	68.33794598842462
-43.1499999999998	73.63196498076047
-42.1499999999998	78.97110371555185
-41.1499999999998	84.35536073886051
-40.1499999999998	89.78473460153758
-39.1499999999998	95.25922386075013
-38.1499999999998	100.7788270810011
-37.1499999999998	106.34354283481369
-36.1499999999998	111.95336970319005
-35.1499999999998	117.60830627591533
-34.1499999999998	123.30835115175
-33.1499999999998	129.053502938548
-32.1499999999998	134.84376025331736
-31.14999999999977	140.6791217222387
-30.14999999999977	146.55958598065754
-29.14999999999977	152.4851516730512
-28.14999999999977	158.45581745298108
-27.14999999999977	164.47158198303208
-26.14999999999977	170.53244393474364
-25.14999999999977	176.63840198853174
-24.14999999999977	182.78945483360997
-23.14999999999977	188.9856011679028
-22.14999999999977	195.22683969795816
-21.14999999999977	201.51316913885978
-20.14999999999977	207.84458821413398
-19.14999999999977	214.22109565566072
-18.14999999999977	220.64269020358165
-17.14999999999977	227.10937060620842
-16.14999999999977	233.62113561993132

Temperature (degC)	Pressure (MPa)
-15.14999999999977	240.1779840091306
-14.14999999999977	246.7799145460829
-13.14999999999977	253.4269260108761
-12.14999999999977	260.11901719131737
-11.14999999999977	266.8561868828493
-10.14999999999977	273.63843388845874
-9.14999999999977	280.46575701859604
-8.14999999999977	287.33815509108723
-7.14999999999977	294.25562693105104
-6.14999999999977	301.2181713708199
-5.14999999999977	308.22578724985266
-4.14999999999977	315.2784734146593
-3.149999999999773	322.3762287187198
-2.149999999999773	329.5190520224074
-1.149999999999773	336.70694219290954
-0.1499999999997726	343.93989810415326
0.8500000000000227	351.21791863673127
1.8500000000000227	358.5410026778273
2.8500000000000227	365.9091491211418
3.8500000000000227	373.3223568668236
4.850000000000023	380.7806248213973
5.850000000000023	388.2839518976929
6.850000000000023	395.8323370147798
7.850000000000023	403.4257790978975
8.850000000000023	411.06427707838634
9.850000000000023	418.7478298936275
10.850000000000023	426.47643648697425
11.850000000000023	434.25009580768887
12.850000000000023	442.0688068108804
13.850000000000023	449.93256845744014
14.850000000000023	457.8413797139847
15.850000000000023	465.7952395527922
16.850000000000023	473.79414695174495
17.850000000000023	481.8381008942677
18.850000000000023	489.92710036927497
19.850000000000023	498.0611443711102
20.850000000000023	506.24023189948934
21.850000000000023	514.4643619594481
22.850000000000023	522.7335335612845
23.850000000000023	531.0477457205084
24.850000000000023	539.4069974577851
25.850000000000023	547.8112877988846
26.850000000000023	556.2606157746286
27.850000000000023	564.754980420844
28.850000000000023	573.2943807783045

Temperature (degC)	Pressure (MPa)
29.850000000000023	581.8788158926898
30.850000000000023	590.5082848145294
31.850000000000023	599.1827865991631
32.850000000000002	607.9023203066807
33.850000000000002	616.666885001888
34.850000000000002	625.4764797542534
35.850000000000002	634.3311036378622
36.850000000000002	643.2307557313757
37.850000000000002	652.1754351179818
38.850000000000002	661.1651408853559
39.850000000000002	670.1998721256118
40.850000000000002	679.2796279352674
41.850000000000002	688.4044074151925
42.850000000000002	697.5742096705732
43.850000000000002	706.7890338108742
44.850000000000002	716.0488789497873
45.850000000000002	725.3537442052045
46.850000000000002	734.703628699167
47.850000000000002	744.0985315578357
48.850000000000002	753.5384519114428
49.850000000000002	763.0233888942641
50.850000000000002	772.553341644575
51.850000000000002	782.1283093046181
52.850000000000002	791.7482910205582
53.850000000000002	801.4132859424556
54.850000000000002	811.1232932242284
55.850000000000002	820.8783120236104
56.850000000000002	830.6783415021264
57.850000000000002	840.5233808250513
58.850000000000002	850.4134291613785
59.850000000000002	860.348485683785
60.850000000000002	870.3285495686022
61.850000000000002	880.3536199957773
62.850000000000002	890.4236961488451
63.850000000000002	900.5387772148965
64.850000000000002	910.6988623845461
65.850000000000002	920.9039508518971
66.850000000000002	931.1540418145229
67.850000000000002	941.4491344734192
68.850000000000002	951.7892280329878
69.850000000000002	962.1743217010029
70.850000000000002	972.6044146885805
71.850000000000002	983.0795062101498
72.850000000000002	993.5995954834273
73.850000000000002	1004.1646817293837

Temperature (degC)	Pressure (MPa)
74.85000000000002	1014.7747641722228
75.85000000000002	1025.4298420393482
76.85000000000002	1036.1299145613364
77.85000000000002	1046.8749809719166
78.85000000000002	1057.6650405079345
79.85000000000002	1068.500092409332
80.85000000000002	1079.3801359191234
81.85000000000002	1090.3051702833616
82.85000000000002	1101.2751947511185
83.85000000000002	1112.2902085744618
84.85000000000002	1123.3502110084273
85.85000000000002	1134.4552013109897
86.85000000000002	1145.6051787430488
87.85000000000002	1156.8001425683976
88.85000000000002	1168.0400920537013
89.85000000000002	1179.3250264684732
90.85000000000002	1190.6549450850555
91.85000000000002	1202.029847178588
92.85000000000002	1213.449732026992
93.85000000000002	1224.9145989109493
94.85000000000002	1236.424447113877
95.85000000000002	1247.9792759219024
96.85000000000002	1259.5790846238485
97.85000000000002	1271.2238725112081
98.85000000000002	1282.913638878121
99.85000000000002	1294.6483830213617
100.85000000000002	1306.4281042403081
101.85000000000002	1318.252801836927
102.85000000000002	1330.1224751157542
103.85000000000002	1342.0371233838678
104.85000000000002	1353.9967459508844
105.85000000000002	1366.0013421289161
106.85000000000002	1378.050911232575
107.85000000000002	1390.1454525789313
108.85000000000002	1402.2849654875195
109.85000000000002	1414.4694492802948
110.85000000000002	1426.6989032816302
111.85000000000002	1438.9733268182963
112.85000000000002	1451.292719219436
113.85000000000002	1463.6570798165562
114.85000000000002	1476.0664079434996
115.85000000000002	1488.5207029364374
116.85000000000002	1501.0199641338452
117.85000000000002	1513.5641908764874
118.85000000000002	1526.1533825074032

Temperature (degC)	Pressure (MPa)
119.85000000000002	1538.7875383718822
120.85000000000002	1551.4666578174601
121.85000000000002	1564.1907401938872
122.85000000000002	1576.9597848531248
123.85000000000002	1589.773791149315
124.85000000000002	1602.6327584387918
125.85000000000002	1615.536686080028

Table B87: Melting Points for Carbon Dioxide and 2% Methane

Temperature (degC)	Pressure (MPa)
-59.1499999999998	0.48013440557192355
-58.1499999999998	4.806552943463021
-57.1499999999998	9.503961547653258
-56.1499999999998	14.246095316184515
-55.1499999999998	19.03307865631862
-54.1499999999998	23.864933173106643
-53.1499999999998	28.74166384209053
-52.1499999999998	33.66327096236616
-51.1499999999998	38.629753107265564
-50.1499999999998	43.64110810045898
-49.1499999999998	48.69733340425735
-48.1499999999998	53.798426295297375
-47.1499999999998	58.94438395197821
-46.1499999999998	64.13520350128867
-45.1499999999998	69.37088204538522
-44.1499999999998	74.65141667738726
-43.1499999999998	79.97680449112629
-42.1499999999998	85.34704258733888
-41.1499999999998	90.76212807769556
-40.1499999999998	96.22205808746554
-39.1499999999998	101.72682975729437
-38.1499999999998	107.27644024439724
-37.1499999999998	112.87088672335017
-36.1499999999998	118.51016638660796
-35.1499999999998	124.19427644482808
-34.1499999999998	129.9232141270538
-33.1499999999998	135.69697668080138
-32.1499999999998	141.51556137207044
-31.14999999999977	147.37896548530392
-30.14999999999977	153.2871863233077
-29.14999999999977	159.24022120713875
-28.14999999999977	165.2380674759754
-27.14999999999977	171.28072248696688
-26.14999999999977	177.3681836150736
-25.14999999999977	183.50044825289947
-24.14999999999977	189.67751381051417
-23.14999999999977	195.89937771527465
-22.14999999999977	202.16603741164218
-21.14999999999977	208.47749036099643
-20.14999999999977	214.8337340414524
-19.14999999999977	221.23476594767237
-18.14999999999977	227.6805835906815
-17.14999999999977	234.17118449768282

Temperature (degC)	Pressure (MPa)
-16.14999999999977	240.70656621187428
-15.14999999999977	247.2867262922668
-14.14999999999977	253.9116623135029
-13.14999999999977	260.5813718656797
-12.14999999999977	267.2958525541704
-11.14999999999977	274.05510199945013
-10.14999999999977	280.8591178369257
-9.14999999999977	287.7078977167613
-8.14999999999977	294.60143930371373
-7.14999999999977	301.53974027696376
-6.14999999999977	308.522798329954
-5.14999999999977	315.550611170227
-4.14999999999977	322.6231765192657
-3.149999999999773	329.74049211233637
-2.149999999999773	336.90255569833397
-1.149999999999773	344.10936503962904
-0.1499999999997726	351.3609179119178
0.8500000000000227	358.65721210407276
1.8500000000000227	365.99824541799944
2.8500000000000227	373.3840156684864
3.8500000000000227	380.81452068306925
4.850000000000023	388.2897583018889
5.850000000000023	395.80972637754957
6.850000000000023	403.37442277498957
7.850000000000023	410.983845371343
8.850000000000023	418.63799205580693
9.850000000000023	426.33686072951474
10.850000000000023	434.08044930540433
11.850000000000023	441.86875570809474
12.850000000000023	449.70177787375786
13.850000000000023	457.5795137499996
14.850000000000023	465.50196129573624
15.850000000000023	473.46911848107453
16.850000000000023	481.48098328719664
17.850000000000023	489.53755370624106
18.850000000000023	497.6388277411918
19.850000000000023	505.78480340575993
20.850000000000023	513.9754787242799
21.850000000000023	522.2108517315935
22.850000000000023	530.4909204729445
23.850000000000023	538.8156830038729
24.850000000000023	547.1851373901076
25.850000000000023	555.5992817074633
26.850000000000023	564.058114041742
27.850000000000023	572.5616324886249

Temperature (degC)	Pressure (MPa)
28.8500000000000023	581.1098351535802
29.8500000000000023	589.7027201517595
30.8500000000000023	598.3402856079053
31.8500000000000023	607.0225296562537
32.850000000000002	615.7494504404391
33.850000000000002	624.5210461134042
34.850000000000002	633.3373148373063
35.850000000000002	642.1982547834264
36.850000000000002	651.1038641320831
37.850000000000002	660.0541410725403
38.850000000000002	669.0490838029261
39.850000000000002	678.0886905301422
40.850000000000002	687.1729594697795
41.850000000000002	696.3018888460387
42.850000000000002	705.4754768916443
43.850000000000002	714.693721847766
44.850000000000002	723.956621963937
45.850000000000002	733.2641754979724
46.850000000000002	742.6163807158973
47.850000000000002	752.0132358918662
48.850000000000002	761.4547393080838
49.850000000000002	770.940889254738
50.850000000000002	780.4716840299172
51.850000000000002	790.04712193954
52.850000000000002	799.6672012972878
53.850000000000002	809.3319204245279
54.850000000000002	819.0412776502433
55.850000000000002	828.7952713109657
56.850000000000002	838.5938997507039
57.850000000000002	848.4371613208799
58.850000000000002	858.3250543802598
59.850000000000002	868.2575772948851
60.850000000000002	878.2347284380113
61.850000000000002	888.2565061900442
62.850000000000002	898.3229089384687
63.850000000000002	908.4339350777981
64.850000000000002	918.5895830094994
65.850000000000002	928.7898511419393
66.850000000000002	939.0347378903228
67.850000000000002	949.3242416766305
68.850000000000002	959.6583609295641
69.850000000000002	970.037094084481
70.850000000000002	980.4604395833447
71.850000000000002	990.9283958746613
72.850000000000002	1001.4409614134261

Temperature (degC)	Pressure (MPa)
73.85000000000002	1011.9981346610679
74.85000000000002	1022.5999140853895
75.85000000000002	1033.2462981605242
76.85000000000002	1043.9372853668688
77.85000000000002	1054.6728741910397
78.85000000000002	1065.4530631258158
79.85000000000002	1076.277850670089
80.85000000000002	1087.1472353288136
81.85000000000002	1098.0612156129519
82.85000000000002	1109.0197900394255
83.85000000000002	1120.0229571310715
84.85000000000002	1131.0707154165823
85.85000000000002	1142.163063430468
86.85000000000002	1153.299999713004
87.85000000000002	1164.481522810182
88.85000000000002	1175.7076312736658
89.85000000000002	1186.9783236607486
90.85000000000002	1198.2935985342947
91.85000000000002	1209.6534544627127
92.85000000000002	1221.057890019892
93.85000000000002	1232.5069037851767
94.85000000000002	1244.000494343305
95.85000000000002	1255.538660284377
96.85000000000002	1267.12140020381
97.85000000000002	1278.748712702297
98.85000000000002	1290.4205963857594
99.85000000000002	1302.137049865309
100.85000000000002	1313.8980717572147
101.85000000000002	1325.7036606828447
102.85000000000002	1337.553815268647
103.85000000000002	1349.448534146095
104.85000000000002	1361.3878159516544
105.85000000000002	1373.3716593267418
106.85000000000002	1385.4000629176892
107.85000000000002	1397.473025375708
108.85000000000002	1409.5905453568462
109.85000000000002	1421.7526215219532
110.85000000000002	1433.959252536645
111.85000000000002	1446.2104370712689
112.85000000000002	1458.5061738008626
113.85000000000002	1470.8464614051213
114.85000000000002	1483.2312985683714
115.85000000000002	1495.6606839795143
116.85000000000002	1508.1346163320163
117.85000000000002	1520.6530943238588

Temperature (degC)	Pressure (MPa)
118.85000000000002	1533.2161166575142
119.85000000000002	1545.8236820398954
120.85000000000002	1558.4757891823556
121.85000000000002	1571.1724368006169
122.85000000000002	1583.9136236147692
123.85000000000002	1596.6993483492197
124.85000000000002	1609.5296097326648
125.85000000000002	1622.4044064980712

Table B88: Melting Points for Carbon Dioxide and 3% Methane

Temperature (degC)	Pressure (MPa)
-61.14999999999998	0.46227491037697943
-60.14999999999998	1.3383926788129719
-59.14999999999998	5.983404728951474
-58.14999999999998	10.670793108289931
-57.14999999999998	15.40267278606573
-56.14999999999998	20.179151047100355
-55.14999999999998	25.000249358994417
-54.14999999999998	29.865972325657108
-53.14999999999998	34.776319382703946
-52.14999999999998	39.73128796188969
-51.14999999999998	44.730874597288064
-50.14999999999998	49.77507538214491
-49.14999999999998	54.8638861812868
-48.14999999999998	59.99730273904665
-47.14999999999998	65.17532073800668
-46.14999999999998	70.39793583276268
-45.14999999999998	75.66514367019975
-44.14999999999998	80.9769399020977
-43.14999999999998	86.33332019319103
-42.14999999999998	91.734280226428
-41.14999999999998	97.17981570645567
-40.14999999999998	102.66992236194409
-39.14999999999998	108.20459594713714
-38.14999999999998	113.78383224287447
-37.14999999999998	119.40762705724697
-36.14999999999998	125.0759762259948
-35.14999999999998	130.78887561271802
-34.14999999999998	136.54632110895517
-33.14999999999998	142.34830863416377
-32.14999999999998	148.19483413562665
-31.149999999999977	154.08589358831028
-30.149999999999977	160.02148299467754
-29.149999999999977	166.00159838447536
-28.149999999999977	172.02623581449888
-27.149999999999977	178.09539136833982
-26.149999999999977	184.20906115612402
-25.149999999999977	190.3672413142407
-24.149999999999977	196.5699280050638
-23.149999999999977	202.81711741667505
-22.149999999999977	209.1088057625782
-21.149999999999977	215.44498928141743
-20.149999999999977	221.82566423669573
-19.149999999999977	228.2508269164907

Temperature (degC)	Pressure (MPa)
-18.14999999999977	234.720473633175
-17.14999999999977	241.23460072313856
-16.14999999999977	247.793204546511
-15.14999999999977	254.3962814868905
-14.14999999999977	261.04382795107125
-13.14999999999977	267.7358403687759
-12.14999999999977	274.4723151923933
-11.14999999999977	281.2532488967157
-10.14999999999977	288.07863797868123
-9.14999999999977	294.9484789571208
-8.14999999999977	301.8627683725053
-7.14999999999977	308.8215027867001
-6.14999999999977	315.82467878271854
-5.14999999999977	322.87229296448646
-4.14999999999977	329.9643419565987
-3.149999999999773	337.10082240408815
-2.149999999999773	344.28173097219627
-1.149999999999773	351.50706434614506
-0.1499999999997726	358.7768192309132
0.85000000000000227	366.09099235101434
1.85000000000000227	373.44958045028176
2.85000000000000227	380.8525802916531
3.85000000000000227	388.29998865695933
4.8500000000000023	395.7918023467162
5.8500000000000023	403.32801817992026
6.8500000000000023	410.90863299384614
7.8500000000000023	418.53364364384737
8.8500000000000023	426.2030470031613
9.8500000000000023	433.9168399627134
10.8500000000000023	441.6750194309299
11.8500000000000023	449.4775823335459
12.8500000000000023	457.3245256134243
13.8500000000000023	465.2158462303722
14.8500000000000023	473.15154116095806
15.8500000000000023	481.13160739833995
16.8500000000000023	489.15604195208385
17.8500000000000023	497.22484184799947
18.8500000000000023	505.33800412796245
19.8500000000000023	513.4955258497532
20.8500000000000023	521.6974040868893
21.8500000000000023	529.9436359284603
22.8500000000000023	538.2342184789728
23.8500000000000023	546.5691488581879
24.8500000000000023	554.9484242009665
25.8500000000000023	563.3720416571165

Temperature (degC)	Pressure (MPa)
26.8500000000000023	571.8399983912396
27.8500000000000023	580.3522915825805
28.8500000000000023	588.9089184248855
29.8500000000000023	597.5098761262494
30.8500000000000023	606.1551619089751
31.8500000000000023	614.8447730094324
32.850000000000002	623.5787066779204
33.850000000000002	632.356960178525
34.850000000000002	641.1795307889865
35.850000000000002	650.0464158005644
36.850000000000002	658.957612517906
37.850000000000002	667.9131182589122
38.850000000000002	676.9129303546176
39.850000000000002	685.9570461490532
40.850000000000002	695.0454629991252
41.850000000000002	704.1781782744945
42.850000000000002	713.3551893574509
43.850000000000002	722.5764936427925
44.850000000000002	731.8420885377085
45.850000000000002	741.1519714616622
46.850000000000002	750.5061398462711
47.850000000000002	759.9045911352024
48.850000000000002	769.347322784046
49.850000000000002	778.8343322602143
50.850000000000002	788.3656170428281
51.850000000000002	797.9411746226108
52.850000000000002	807.5610025017756
53.850000000000002	817.2250981939238
54.850000000000002	826.933459223943
55.850000000000002	836.6860831278964
56.850000000000002	846.4829674529266
57.850000000000002	856.3241097571585
58.850000000000002	866.2095076095894
59.850000000000002	876.1391585899961
60.850000000000002	886.113060288843
61.850000000000002	896.1312103071816
62.850000000000002	906.1936062565549
63.850000000000002	916.3002457589067
64.850000000000002	926.4511264464902
65.850000000000002	936.6462459617737
66.850000000000002	946.8856019573522
67.850000000000002	957.1691920958584
68.850000000000002	967.4970140498789
69.850000000000002	977.8690655018634
70.850000000000002	988.2853441440357

Temperature (degC)	Pressure (MPa)
71.85000000000002	998.7458476783164
72.85000000000002	1009.2505738162364
73.85000000000002	1019.7995202788537
74.85000000000002	1030.3926847966711
75.85000000000002	1041.0300651095579
76.85000000000002	1051.7116589666682
77.85000000000002	1062.4374641263657
78.85000000000002	1073.2074783561359
79.85000000000002	1084.0216994325237
80.85000000000002	1094.8801251410505
81.85000000000002	1105.7827532761332
82.85000000000002	1116.729581641019
83.85000000000002	1127.7206080477065
84.85000000000002	1138.7558303168803
85.85000000000002	1149.835246277827
86.85000000000002	1160.9588537683796
87.85000000000002	1172.1266506348331
88.85000000000002	1183.3386347318828
89.85000000000002	1194.5948039225577
90.85000000000002	1205.8951560781443
91.85000000000002	1217.2396890781336
92.85000000000002	1228.6284008101381
93.85000000000002	1240.0612891698381
94.85000000000002	1251.5383520609141
95.85000000000002	1263.059587394985
96.85000000000002	1274.6249930915355
97.85000000000002	1286.2345670778648
98.85000000000002	1297.888307289023
99.85000000000002	1309.586211667742
100.85000000000002	1321.3282781643798
101.85000000000002	1333.1145047368666
102.85000000000002	1344.9448893506392
103.85000000000002	1356.819429978575
104.85000000000002	1368.738124600955
105.85000000000002	1380.7009712053843
106.85000000000002	1392.7079677867512
107.85000000000002	1404.7591123471611
108.85000000000002	1416.8544028958913
109.85000000000002	1428.9938374493206
110.85000000000002	1441.1774140308935
111.85000000000002	1453.4051306710537
112.85000000000002	1465.6769854071945
113.85000000000002	1477.9929762836086
114.85000000000002	1490.3531013514344
115.85000000000002	1502.7573586686017

Temperature (degC)	Pressure (MPa)
116.85000000000002	1515.2057462997866
117.85000000000002	1527.6982623163558
118.85000000000002	1540.2349047963178
119.85000000000002	1552.8156718242817
120.85000000000002	1565.4405614913985
121.85000000000002	1578.1095718953088
122.85000000000002	1590.8227011401152
123.85000000000002	1603.579947336314
124.85000000000002	1616.381308600754
125.85000000000002	1629.226783056598

Table B89: Melting Points for Carbon Dioxide and 4% Methane

Temperature (degC)	Pressure (MPa)
-62.1499999999998	0.44507973243344856
-61.1499999999998	2.5185735943615253
-60.1499999999998	7.152661650227116
-59.1499999999998	11.830152005375606
-58.1499999999998	16.551908173279074
-57.1499999999998	21.318017571084802
-56.1499999999998	26.128499189723765
-55.1499999999998	30.98335639262741
-54.1499999999998	35.88258738918972
-53.1499999999998	40.82618830171846
-52.1499999999998	45.81415429190464
-51.1499999999998	50.8464800422938
-50.1499999999998	55.923159985874186
-49.1499999999998	61.04418842501176
-48.1499999999998	66.20955959717143
-47.1499999999998	71.41926771314868
-46.1499999999998	76.67330698024234
-45.1499999999998	81.97167161676776
-44.1499999999998	87.31435586138106
-43.1499999999998	92.70135397918482
-42.1499999999998	98.13266026577423
-41.1499999999998	103.60826904993151
-40.1499999999998	109.12817469541245
-39.1499999999998	114.69237160211016
-38.1499999999998	120.3008542067863
-37.1499999999998	125.95361698349339
-36.1499999999998	131.65065444377893
-35.1499999999998	137.39196113672807
-34.1499999999998	143.17753164889044
-33.1499999999998	149.00736060412126
-32.1499999999998	154.88144266335934
-31.14999999999977	160.7997725243562
-30.14999999999977	166.76234492137246
-29.14999999999977	172.76915462484723
-28.14999999999977	178.8201964410498
-27.14999999999977	184.91546521171668
-26.14999999999977	191.0549558136815
-25.14999999999977	197.23866315849568
-24.14999999999977	203.4665821920484
-23.14999999999977	209.73870789418189
-22.14999999999977	216.0550352783098
-21.14999999999977	222.41555939103336
-20.14999999999977	228.82027531175953

Temperature (degC)	Pressure (MPa)
-19.14999999999977	235.26917815232514
-18.14999999999977	241.76226305661768
-17.14999999999977	248.2995252002064
-16.14999999999977	254.88095978997364
-15.14999999999977	261.5065620637487
-14.14999999999977	268.1763272899503
-13.14999999999977	274.89025076722925
-12.14999999999977	281.6483278241204
-11.14999999999977	288.4505538186929
-10.14999999999977	295.29692413820953
-9.14999999999977	302.18743419879314
-8.14999999999977	309.122079445089
-7.14999999999977	316.10085534994147
-6.14999999999977	323.1237574140688
-5.14999999999977	330.1907811657449
-4.14999999999977	337.3019221604883
-3.149999999999773	344.45717598074935
-2.149999999999773	351.65653823560825
-1.149999999999773	358.90000456047375
-0.1499999999997726	366.1875706167877
0.85000000000000227	373.5192320917326
1.85000000000000227	380.8949846979456
2.85000000000000227	388.31482417323633
3.85000000000000227	395.77874628030565
4.8500000000000023	403.2867468064728
5.8500000000000023	410.83882156340405
6.8500000000000023	418.4349663868473
7.8500000000000023	426.0751771363668
8.8500000000000023	433.75944969508436
9.8500000000000023	441.487779969428
10.8500000000000023	449.26016388887615
11.8500000000000023	457.0765974057107
12.8500000000000023	464.93707649477307
13.8500000000000023	472.8415971532257
14.8500000000000023	480.7901554003109
15.8500000000000023	488.78274727711886
16.8500000000000023	496.8193688463569
17.8500000000000023	504.90001619212427
18.8500000000000023	513.0246854196837
19.8500000000000023	521.1933726552436
20.8500000000000023	529.4060740457405
21.8500000000000023	537.6627857586236
22.8500000000000023	545.9635039816417
23.8500000000000023	554.3082249226385
24.8500000000000023	562.6969448093441

Temperature (degC)	Pressure (MPa)
25.850000000000023	571.1296598891695
26.850000000000023	579.606366429013
27.850000000000023	588.127060715057
28.850000000000023	596.6917390525789
29.850000000000023	605.300397765752
30.850000000000023	613.9530331974645
31.850000000000023	622.6496417091266
32.850000000000002	631.3902196804885
33.850000000000002	640.1747635094605
34.850000000000002	649.003269611929
35.850000000000002	657.8757344215873
36.850000000000002	666.7921543897536
37.850000000000002	675.752525985203
38.850000000000002	684.7568456939994
39.850000000000002	693.805110019322
40.850000000000002	702.8973154813059
41.850000000000002	712.0334586168772
42.850000000000002	721.2135359795918
43.850000000000002	730.4375441394741
44.850000000000002	739.7054796828668
45.850000000000002	749.0173392122716
46.850000000000002	758.3731193461938
47.850000000000002	767.772816718998
48.850000000000002	777.2164279807578
49.850000000000002	786.7039497971039
50.850000000000002	796.235378849087
51.850000000000002	805.8107118330281
52.850000000000002	815.4299454603819
53.850000000000002	825.0930764575942
54.850000000000002	834.8001015659655
55.850000000000002	844.5510175415167
56.850000000000002	854.345821154852
57.850000000000002	864.1845091910276
58.850000000000002	874.067078449423
59.850000000000002	883.9935257436076
60.850000000000002	893.9638479012169
61.850000000000002	903.9780417638244
62.850000000000002	914.036104186817
63.850000000000002	924.1380320392747
64.850000000000002	934.2838222038458
65.850000000000002	944.4734715766284
66.850000000000002	954.7069770670532
67.850000000000002	964.9843355977646
68.850000000000002	975.3055441045054
69.850000000000002	985.6705995360062

Temperature (degC)	Pressure (MPa)
70.85000000000002	996.0794988538646
71.85000000000002	1006.5322390324421
72.85000000000002	1017.0288170587509
73.85000000000002	1027.569229932341
74.85000000000002	1038.1534746652023
75.85000000000002	1048.781548281648
76.85000000000002	1059.4534478182165
77.85000000000002	1070.1691703235617
78.85000000000002	1080.9287128583624
79.85000000000002	1091.7320724952035
80.85000000000002	1102.5792463184919
81.85000000000002	1113.4702314243489
82.85000000000002	1124.4050249205131
83.85000000000002	1135.3836239262473
84.85000000000002	1146.406025572239
85.85000000000002	1157.4722270005097
86.85000000000002	1168.582225364317
87.85000000000002	1179.7360178280705
88.85000000000002	1190.933601567227
89.85000000000002	1202.174973768215
90.85000000000002	1213.4601316283367
91.85000000000002	1224.7890723556825
92.85000000000002	1236.1617931690428
93.85000000000002	1247.5782912978248
94.85000000000002	1259.0385639819613
95.85000000000002	1270.5426084718358
96.85000000000002	1282.090422028185
97.85000000000002	1293.6820019220372
98.85000000000002	1305.3173454346074
99.85000000000002	1316.9964498572351
100.85000000000002	1328.7193124912944
101.85000000000002	1340.485930648122
102.85000000000002	1352.296301648927
103.85000000000002	1364.1504228247395
104.85000000000002	1376.0482915163007
105.85000000000002	1387.98990507401
106.85000000000002	1399.9752608578465
107.85000000000002	1412.004356237296
108.85000000000002	1424.0771885912695
109.85000000000002	1436.1937553080404
110.85000000000002	1448.3540537851704
111.85000000000002	1460.5580814294333
112.85000000000002	1472.805835656757
113.85000000000002	1485.0973138921474
114.85000000000002	1497.4325135696079

Temperature (degC)	Pressure (MPa)
115.85000000000002	1509.811432132098
116.85000000000002	1522.2340670314459
117.85000000000002	1534.700415728293
118.85000000000002	1547.2104756920155
119.85000000000002	1559.7642444006747
120.85000000000002	1572.361719340941
121.85000000000002	1585.0028980080408
122.85000000000002	1597.6877779056863
123.85000000000002	1610.4163565460115
124.85000000000002	1623.1886314495193
125.85000000000002	1636.0046001450066

Table B90: Melting Points for Carbon Dioxide and 5% Methane

Temperature (degC)	Pressure (MPa)
-63.1499999999998	0.4285241612214796
-62.1499999999998	3.690290219570456
-61.1499999999998	8.31445971277797
-60.1499999999998	12.98218480259591
-59.1499999999998	17.693951957229032
-58.1499999999998	22.44983062708132
-57.1499999999998	27.249836343721697
-56.1499999999998	32.09397074378177
-55.1499999999998	36.98223058184763
-54.1499999999998	41.914610558377525
-53.1499999999998	46.89110440580153
-52.1499999999998	51.91170536761457
-51.1499999999998	56.97640643226659
-50.1499999999998	62.08520045653862
-49.1499999999998	67.23808023469532
-48.1499999999998	72.4350385391636
-47.1499999999998	77.67606814540733
-46.1499999999998	82.96116184760623
-45.1499999999998	88.29031246877442
-44.1499999999998	93.66351286740225
-43.1499999999998	99.08075594185485
-42.1499999999998	104.54203463329252
-41.1499999999998	110.04734192759145
-40.1499999999998	115.59667085657496
-39.1499999999998	121.1900144987661
-38.1499999999998	126.82736597979647
-37.1499999999998	132.5087184725692
-36.1499999999998	138.2340651972453
-35.1499999999998	144.00339942109764
-34.1499999999998	149.81671445826996
-33.1499999999998	155.67400366946478
-32.1499999999998	161.57526046157784
-31.14999999999977	167.52047828729587
-30.14999999999977	173.50965064466402
-29.14999999999977	179.5427710766343
-28.14999999999977	185.6198331705987
-27.14999999999977	191.7408305579139
-26.14999999999977	197.90575691341655
-25.14999999999977	204.11460595494074
-24.14999999999977	210.36737144282728
-23.14999999999977	216.66404717943888
-22.14999999999977	223.0046270086758
-21.14999999999977	229.38910481549075

Temperature (degC)	Pressure (MPa)
-20.14999999999977	235.81747452541273
-19.14999999999977	242.28973010407114
-18.14999999999977	248.80586555672662
-17.14999999999977	255.36587492780606
-16.14999999999977	261.9697523004439
-15.14999999999977	268.61749179602526
-14.14999999999977	275.3090875737445
-13.14999999999977	282.0445338301555
-12.14999999999977	288.8238247987407
-11.14999999999977	295.646954749479
-10.14999999999977	302.51391798842155
-9.14999999999977	309.42470885727386
-8.14999999999977	316.37932173298475
-7.14999999999977	323.377751027337
-6.14999999999977	330.4199911865494
-5.14999999999977	337.5060366908836
-4.14999999999977	344.63588205425134
-3.149999999999773	351.8095218238344
-2.149999999999773	359.02695057970794
-1.149999999999773	366.28816293446465
-0.1499999999997726	373.59315353285416
0.8500000000000227	380.94191705141634
1.8500000000000227	388.33444819813053
2.8500000000000227	395.77074171206397
3.8500000000000227	403.2507923630236
4.850000000000023	410.7745949512222
5.850000000000023	418.34214430693584
6.850000000000023	425.95343529018135
7.850000000000023	433.60846279038606
8.850000000000023	441.3072217260691
9.850000000000023	449.0497070445251
10.850000000000023	456.83591372151545
11.850000000000023	464.66583676095684
12.850000000000023	472.53947119462396
13.850000000000023	480.45681208185124
14.850000000000023	488.41785450923305
15.850000000000023	496.42259359034324
16.850000000000023	504.4710244654471
17.850000000000023	512.5631423012152
18.850000000000023	520.6989422904538
19.850000000000023	528.8784196518263
20.850000000000023	537.1015696295889
21.850000000000023	545.3683874933214
22.850000000000023	553.6788685376661
23.850000000000023	562.0330080820698

Temperature (degC)	Pressure (MPa)
24.850000000000023	570.4308014705338
25.850000000000023	578.8722440713561
26.850000000000023	587.3573312768895
27.850000000000023	595.8860585032942
28.850000000000023	604.458421190299
29.850000000000023	613.0744148009667
30.850000000000023	621.7340348214539
31.850000000000023	630.4372767607855
32.850000000000002	639.1841361506263
33.850000000000002	647.9746085450535
34.850000000000002	656.8086895203404
35.850000000000002	665.6863746747359
36.850000000000002	674.6076596282412
37.850000000000002	683.5725400224139
38.850000000000002	692.5810115201424
39.850000000000002	701.633069805448
40.850000000000002	710.7287105832761
41.850000000000002	719.8679295792986
42.850000000000002	729.0507225397107
43.850000000000002	738.277085231041
44.850000000000002	747.5470134399502
45.850000000000002	756.860502973045
46.850000000000002	766.2175496566921
47.850000000000002	775.6181493368201
48.850000000000002	785.062297878752
49.850000000000002	794.5499911670139
50.850000000000002	804.0812251051551
51.850000000000002	813.655995615579
52.850000000000002	823.2742986393578
53.850000000000002	832.9361301360725
54.850000000000002	842.6414860836359
55.850000000000002	852.3903624781208
56.850000000000002	862.1827553336051
57.850000000000002	872.0186606819984
58.850000000000002	881.8980745728867
59.850000000000002	891.8209930733677
60.850000000000002	901.787412267899
61.850000000000002	911.7973282581362
62.850000000000002	921.8507371627842
63.850000000000002	931.9476351174411
64.850000000000002	942.0880182744555
65.850000000000002	952.2718828027691
66.850000000000002	962.4992248877763
67.850000000000002	972.7700407311752
68.850000000000002	983.0843265508372

Temperature (degC)	Pressure (MPa)
69.85000000000002	993.4420785806461
70.85000000000002	1003.843293070377
71.85000000000002	1014.2879662855461
72.85000000000002	1024.776094507281
73.85000000000002	1035.3076740321887
74.85000000000002	1045.8827011722174
75.85000000000002	1056.5011722545219
76.85000000000002	1067.1630836213478
77.85000000000002	1077.868431629893
78.85000000000002	1088.6172126521767
79.85000000000002	1099.4094230749317
80.85000000000002	1110.2450592994594
81.85000000000002	1121.1241177415247
82.85000000000002	1132.046594831227
83.85000000000002	1143.0124870128827
84.85000000000002	1154.021790744908
85.85000000000002	1165.0745024997016
86.85000000000002	1176.1706187635255
87.85000000000002	1187.3101360364024
88.85000000000002	1198.4930508319887
89.85000000000002	1209.7193596774764
90.85000000000002	1220.9890591134704
91.85000000000002	1232.3021456938927
92.85000000000002	1243.658615985863
93.85000000000002	1255.0584665696038
94.85000000000002	1266.5016940383202
95.85000000000002	1277.9882949981127
96.85000000000002	1289.5182660678656
97.85000000000002	1301.0916038791447
98.85000000000002	1312.7083050760943
99.85000000000002	1324.3683663153479
100.85000000000002	1336.0717842659224
101.85000000000002	1347.8185556091225
102.85000000000002	1359.6086770384454
103.85000000000002	1371.442145259476
104.85000000000002	1383.318956989815
105.85000000000002	1395.239108958962
106.85000000000002	1407.2025979082373
107.85000000000002	1419.2094205906903
108.85000000000002	1431.2595737709985
109.85000000000002	1443.3530542253945
110.85000000000002	1455.4898587415682
111.85000000000002	1467.6699841185764
112.85000000000002	1479.8934271667652
113.85000000000002	1492.1601847076815

Temperature (degC)	Pressure (MPa)
114.85000000000002	1504.4702535739839
115.85000000000002	1516.8236306093675
116.85000000000002	1529.2203126684756
117.85000000000002	1541.6602966168164
118.85000000000002	1554.1435793306853
119.85000000000002	1566.6701576970916
120.85000000000002	1579.240028613667
121.85000000000002	1591.8531889885824
122.85000000000002	1604.5096357405043
123.85000000000002	1617.2093657984644
124.85000000000002	1629.952376101837
125.85000000000002	1642.738663600227

Table B91: Melting Points for Carbon Dioxide and 1% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-58.1499999999998	0.5100520267614482
-57.1499999999998	4.679313176216916
-56.1499999999998	9.39427316926171
-55.1499999999998	14.154471891054355
-54.1499999999998	18.959914318212736
-53.1499999999998	23.810600963897613
-52.1499999999998	28.706531616739493
-51.1499999999998	33.647705866554354
-50.1499999999998	38.634123234759635
-49.1499999999998	43.665783217565924
-48.1499999999998	48.74268530310978
-47.1499999999998	53.864828979143915
-46.1499999999998	59.03221373679999
-45.1499999999998	64.2448390725449
-44.1499999999998	69.50270448923585
-43.1499999999998	74.80580949669623
-42.1499999999998	80.1541536120248
-41.1499999999998	85.54773635974746
-40.1499999999998	90.98655727187526
-39.1499999999998	96.4706158879033
-38.1499999999998	101.99991175477302
-37.1499999999998	107.5744444268096
-36.1499999999998	113.1942134656455
-35.1499999999998	118.85921844013077
-34.1499999999998	124.56945892623993
-33.1499999999998	130.3249345069732
-32.1499999999998	136.12564477225624
-31.14999999999977	141.97158931883692
-30.14999999999977	147.86276775018376
-29.14999999999977	153.7991796763831
-28.14999999999977	159.7808247140376
-27.14999999999977	165.80770248616534
-26.14999999999977	171.87981262209954
-25.14999999999977	177.99715475739015
-24.14999999999977	184.15972853370704
-23.14999999999977	190.36753359874382
-22.14999999999977	196.62056960612296
-21.14999999999977	202.91883621530374
-20.14999999999977	209.26233309148947
-19.14999999999977	215.65105990553906
-18.14999999999977	222.08501633387726
-17.14999999999977	228.5642020584102
-16.14999999999977	235.08861676643505

Temperature (degC)	Pressure (MPa)
-15.14999999999977	241.65826015056194
-14.14999999999977	248.27313190862722
-13.14999999999977	254.93323174361413
-12.14999999999977	261.6385593635719
-11.14999999999977	268.3891144815394
-10.14999999999977	275.1848968154675
-9.14999999999977	282.02590608814137
-8.14999999999977	288.91214202711024
-7.14999999999977	295.84360436460906
-6.14999999999977	302.8202928374922
-5.14999999999977	309.8422071871599
-4.14999999999977	316.9093471594906
-3.149999999999773	324.02171250476874
-2.149999999999773	331.1793029776269
-1.149999999999773	338.3821183369692
-0.1499999999997726	345.63015834591425
0.8500000000000227	352.92342277172935
1.8500000000000227	360.26191138576814
2.8500000000000227	367.6456239634089
3.8500000000000227	375.0745602839951
4.850000000000023	382.5487201307757
5.850000000000023	390.0681032908458
6.850000000000023	397.63270955509313
7.850000000000023	405.2425387181375
8.850000000000023	412.89759057827706
9.850000000000023	420.59786493743604
10.850000000000023	428.3433616011063
11.850000000000023	436.1340803783007
12.850000000000023	443.970021081497
13.850000000000023	451.8511835265889
14.850000000000023	459.7775675328358
15.850000000000023	467.7491729228137
16.850000000000023	475.7659995223665
17.850000000000023	483.8280471605582
18.850000000000023	491.9353156696281
19.850000000000023	500.08780488494074
20.850000000000023	508.2855146449459
21.850000000000023	516.5284447911297
22.850000000000023	524.816595167974
23.850000000000023	533.14996562291
24.850000000000023	541.5285560062784
25.850000000000023	549.9523661712881
26.850000000000023	558.4213959739732
27.850000000000023	566.935645273155
28.850000000000023	575.4951139303965

Temperature (degC)	Pressure (MPa)
29.850000000000023	584.0998018099746
30.850000000000023	592.7497087788282
31.850000000000023	601.4448347065327
32.850000000000002	610.1851794652526
33.850000000000002	618.9707429297097
34.850000000000002	627.8015249771498
35.850000000000002	636.6775254873022
36.850000000000002	645.5987443423445
37.850000000000002	654.5651814268743
38.850000000000002	663.576836627868
39.850000000000002	672.6337098346523
40.850000000000002	681.7358009388712
41.850000000000002	690.8831098344508
42.850000000000002	700.0756364175692
43.850000000000002	709.313380586626
44.850000000000002	718.5963422422101
45.850000000000002	727.92452128707
46.850000000000002	737.2979176260848
47.850000000000002	746.7165311662317
48.850000000000002	756.1803618165641
49.850000000000002	765.6894094881716
50.850000000000002	775.2436740941622
51.850000000000002	784.8431555496329
52.850000000000002	794.4878537716368
53.850000000000002	804.177768679161
54.850000000000002	813.9129001931004
55.850000000000002	823.6932482362307
56.850000000000002	833.518812733181
57.850000000000002	843.3895936104093
58.850000000000002	853.3055907961829
59.850000000000002	863.2668042205431
60.850000000000002	873.2732338152942
61.850000000000002	883.324879513968
62.850000000000002	893.4217412518069
63.850000000000002	903.5638189657388
64.850000000000002	913.7511125943572
65.850000000000002	923.9836220778934
66.850000000000002	934.2613473581983
67.850000000000002	944.5842883787212
68.850000000000002	954.9524450844855
69.850000000000002	965.3658174220702
70.850000000000002	975.8244053395861
71.850000000000002	986.32820878666
72.850000000000002	996.8772277144092
73.850000000000002	1007.4714620754248

Temperature (degC)	Pressure (MPa)
74.85000000000002	1018.1109118237534
75.85000000000002	1028.795576914872
76.85000000000002	1039.525457305677
77.85000000000002	1050.300552954455
78.85000000000002	1061.1208638208784
79.85000000000002	1071.9863898659708
80.85000000000002	1082.8971310521056
81.85000000000002	1093.8530873429734
82.85000000000002	1104.8542587035734
83.85000000000002	1115.9006451001935
84.85000000000002	1126.9922465003967
85.85000000000002	1138.1290628729957
86.85000000000002	1149.3110941880461
87.85000000000002	1160.5383404168267
88.85000000000002	1171.8108015318217
89.85000000000002	1183.1284775067024
90.85000000000002	1194.4913683163188
91.85000000000002	1205.899473936682
92.85000000000002	1217.3527943449453
93.85000000000002	1228.851329519392
94.85000000000002	1240.3950794394211
95.85000000000002	1251.9840440855298
96.85000000000002	1263.6182234393023
97.85000000000002	1275.2976174833962
98.85000000000002	1287.0222262015252
99.85000000000002	1298.7920495784463
100.85000000000002	1310.6070875999517
101.85000000000002	1322.4673402528435
102.85000000000002	1334.372807524933
103.85000000000002	1346.3234894050206
104.85000000000002	1358.3193858828877
105.85000000000002	1370.360496949276
106.85000000000002	1382.4468225958833
107.85000000000002	1394.5783628153492
108.85000000000002	1406.7551176012373
109.85000000000002	1418.977086948034
110.85000000000002	1431.2442708511248
111.85000000000002	1443.5566693067906
112.85000000000002	1455.9142823121945
113.85000000000002	1468.3171098653675
114.85000000000002	1480.7651519651997
115.85000000000002	1493.2584086114348
116.85000000000002	1505.796879804641
117.85000000000002	1518.3805655462274
118.85000000000002	1531.009465838411

Temperature (degC)	Pressure (MPa)
119.85000000000002	1543.683580684212
120.85000000000002	1556.402910087449
121.85000000000002	1569.1674540527235
122.85000000000002	1581.9772125854142
123.85000000000002	1594.8321856916612
124.85000000000002	1607.7323733783633
125.85000000000002	1620.6777756531594

Table B92: Melting Points for Carbon Dioxide and 2% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-60.14999999999998	0.5022744859609249
-59.14999999999998	2.2488869216568435
-58.14999999999998	6.916340165878366
-57.14999999999998	11.628852381696253
-56.14999999999998	16.386465246124384
-55.14999999999998	21.189182054645794
-54.14999999999998	26.037002850589
-53.14999999999998	30.929926955086657
-52.14999999999998	35.86795346352567
-51.14999999999998	40.851081389912736
-50.14999999999998	45.87930971952522
-49.14999999999998	50.952637431198205
-48.14999999999998	56.071063507784636
-47.14999999999998	61.23458694143711
-46.14999999999998	66.44320673640492
-45.14999999999998	71.69692191054996
-44.14999999999998	76.99573149616687
-43.14999999999998	82.33963454040422
-42.14999999999998	87.72863010544731
-41.14999999999998	93.16271726855815
-40.14999999999998	98.64189512202451
-39.14999999999998	104.16616277304762
-38.14999999999998	109.73551934359591
-37.14999999999998	115.34996397023437
-36.14999999999998	121.00949580393448
-35.14999999999998	126.71411400987787
-34.14999999999998	132.46381776725318
-33.14999999999998	138.2586062690489
-32.14999999999998	144.09847872184446
-31.149999999999977	149.98343434560425
-30.149999999999977	155.91347237346773
-29.149999999999977	161.88859205154534
-28.149999999999977	167.9087926387156
-27.149999999999977	173.97407340642232
-26.149999999999977	180.084433638477
-25.149999999999977	186.2398726308646
-24.149999999999977	192.44038969154894
-23.149999999999977	198.68598414028347
-22.149999999999977	204.97665530842642
-21.149999999999977	211.31240253875578
-20.149999999999977	217.69322518528875
-19.149999999999977	224.11912261310675
-18.149999999999977	230.590094198178

Temperature (degC)	Pressure (MPa)
-17.14999999999977	237.10613932718982
-16.14999999999977	243.6672573973782
-15.14999999999977	250.27344781636123
-14.14999999999977	256.92471000198134
-13.14999999999977	263.6210433821409
-12.14999999999977	270.36244739464894
-11.14999999999977	277.14892148706616
-10.14999999999977	283.980465116552
-9.14999999999977	290.8570777497192
-8.14999999999977	297.77875886248535
-7.14999999999977	304.74550793993103
-6.14999999999977	311.7573244761578
-5.14999999999977	318.8142079741508
-4.14999999999977	325.9161579456424
-3.149999999999773	333.0631739109763
-2.149999999999773	340.2552553989828
-1.149999999999773	347.4924019468411
-0.1499999999997726	354.7746130999594
0.8500000000000227	362.10188841184635
1.8500000000000227	369.474227443991
2.8500000000000227	376.8916297657409
3.8500000000000227	384.3540949541846
4.850000000000023	391.86162259403494
5.850000000000023	399.41421227751596
6.850000000000023	407.01186360424833
7.850000000000023	414.65457618114255
8.850000000000023	422.3423496222852
9.850000000000023	430.07518354883797
10.850000000000023	437.85307758892895
11.850000000000023	445.6760313775494
12.850000000000023	453.5440445564564
13.850000000000023	461.45711677406825
14.850000000000023	469.41524768536874
15.850000000000023	477.418436951811
16.850000000000023	485.4666842412225
17.850000000000023	493.55998922771096
18.850000000000023	501.69835159157344
19.850000000000023	509.88177101920564
20.850000000000023	518.1102472030141
21.850000000000023	526.3837798413275
22.850000000000023	534.7023686383134
23.850000000000023	543.0660133038912
24.850000000000023	551.4747135536495
25.850000000000023	559.9284691087655
26.850000000000023	568.4272796959252

Temperature (degC)	Pressure (MPa)
27.850000000000023	576.9711450472416
28.850000000000023	585.5600649001776
29.850000000000023	594.194038997475
30.850000000000023	602.873067087069
31.850000000000023	611.597148922024
32.85000000000002	620.3662842604532
33.85000000000002	629.1804728654531
34.85000000000002	638.039714505026
35.85000000000002	646.9440089520177
36.85000000000002	655.8933559840444
37.85000000000002	664.8877553834252
38.85000000000002	673.9272069371204
39.85000000000002	683.0117104366592
40.85000000000002	692.1412656780823
41.85000000000002	701.3158724618746
42.85000000000002	710.5355305929036
43.85000000000002	719.8002398803604
44.85000000000002	729.1100001376969
45.85000000000002	738.4648111825668
46.85000000000002	747.8646728367656
47.85000000000002	757.3095849261807
48.85000000000002	766.7995472807236
49.85000000000002	776.3345597342801
50.85000000000002	785.9146221246583
51.85000000000002	795.539734293527
52.85000000000002	805.2098960863682
53.85000000000002	814.9251073524242
54.85000000000002	824.6853679446394
55.85000000000002	834.4906777196214
56.85000000000002	844.3410365375781
57.85000000000002	854.2364442622772
58.85000000000002	864.1769007609942
59.85000000000002	874.1624059044638
60.85000000000002	884.1929595668341
61.85000000000002	894.2685616256211
62.85000000000002	904.3892119616609
63.85000000000002	914.5549104590614
64.85000000000002	924.7656570051681
65.85000000000002	935.0214514905107
66.85000000000002	945.3222938087633
67.85000000000002	955.6681838567013
68.85000000000002	966.059121534159
69.85000000000002	976.4951067439922
70.85000000000002	986.976139392035
71.85000000000002	997.5022193870545

Temperature (degC)	Pressure (MPa)
72.85000000000002	1008.0733466407202
73.85000000000002	1018.6895210675608
74.85000000000002	1029.3507425849252
75.85000000000002	1040.057011112947
76.85000000000002	1050.808326574502
77.85000000000002	1061.604688895182
78.85000000000002	1072.446098003245
79.85000000000002	1083.332553829593
80.85000000000002	1094.2640563077255
81.85000000000002	1105.2406053737132
82.85000000000002	1116.2622009661563
83.85000000000002	1127.32884302616
84.85000000000002	1138.4405314972953
85.85000000000002	1149.5972663255634
86.85000000000002	1160.7990474593707
87.85000000000002	1172.0458748494934
88.85000000000002	1183.3377484490472
89.85000000000002	1194.674668213454
90.85000000000002	1206.0566341004132
91.85000000000002	1217.4836460698723
92.85000000000002	1228.9557040839964
93.85000000000002	1240.4728081071414
94.85000000000002	1252.0349581058185
95.85000000000002	1263.6421540486704
96.85000000000002	1275.2943959064507
97.85000000000002	1286.9916836519808
98.85000000000002	1298.7340172601346
99.85000000000002	1310.5213967078034
100.85000000000002	1322.3538219738812
101.85000000000002	1334.2312930392227
102.85000000000002	1346.1538098866358
103.85000000000002	1358.1213725008356
104.85000000000002	1370.1339808684386
105.85000000000002	1382.1916349779262
106.85000000000002	1394.2943348196195
107.85000000000002	1406.4420803856713
108.85000000000002	1418.6348716700181
109.85000000000002	1430.872708668377
110.85000000000002	1443.155591378208
111.85000000000002	1455.483519798709
112.85000000000002	1467.8564939307682
113.85000000000002	1480.2745137769703
114.85000000000002	1492.7375793415504
115.85000000000002	1505.2456906303862
116.85000000000002	1517.7988476509727

Temperature (degC)	Pressure (MPa)
117.85000000000002	1530.397050412404
118.85000000000002	1543.040298925346
119.85000000000002	1555.7285932020238
120.85000000000002	1568.4619332561938
121.85000000000002	1581.2403191031374
122.85000000000002	1594.0637507596175
123.85000000000002	1606.9322282438889
124.85000000000002	1619.8457515756525
125.85000000000002	1632.8043207760522

Table B93: Melting Points for Carbon Dioxide and 3% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-61.1499999999998	0.4946155411814547
-60.1499999999998	4.475847667060045
-59.1499999999998	9.141181309067361
-58.1499999999998	13.851466144872578
-57.1499999999998	18.60671729520319
-56.1499999999998	23.40693625917616
-55.1499999999998	28.252122386829807
-54.1499999999998	33.142274446261645
-53.1499999999998	38.07739100757941
-52.1499999999998	43.05747056910807
-51.1499999999998	48.08251160719413
-50.1499999999998	53.15251259845922
-49.1499999999998	58.26747203064528
-48.1499999999998	63.427388408224274
-47.1499999999998	68.63226025540406
-46.1499999999998	73.88208611775521
-45.1499999999998	79.17686456306565
-44.1499999999998	84.51659418174594
-43.1499999999998	89.90127358696674
-42.1499999999998	95.33090141462567
-41.1499999999998	100.80547632320885
-40.1499999999998	106.32499699358576
-39.1499999999998	111.88946212875922
-38.1499999999998	117.49887045358503
-37.1499999999998	123.15322071447773
-36.1499999999998	128.85251167910232
-35.1499999999998	134.59674213605908
-34.1499999999998	140.38591089456895
-33.1499999999998	146.22001678415504
-32.1499999999998	152.09905865432577
-31.14999999999977	158.02303537426278
-30.14999999999977	163.99194583250704
-29.14999999999977	170.00578893665443
-28.14999999999977	176.06456361304916
-27.14999999999977	182.1682688064867
-26.14999999999977	188.31690347991932
-25.14999999999977	194.51046661416424
-24.14999999999977	200.74895720762
-23.14999999999977	207.0323742759859
-22.14999999999977	213.36071685198462
-21.14999999999977	219.733983985093
-20.14999999999977	226.15217474127473
-19.14999999999977	232.6152882027188

Temperature (degC)	Pressure (MPa)
-18.14999999999977	239.12332346758205
-17.14999999999977	245.6762796497377
-16.14999999999977	252.27415587852573
-15.14999999999977	258.91695129851075
-14.14999999999977	265.60466506924075
-13.14999999999977	272.337296365014
-12.14999999999977	279.1148443746475
-11.14999999999977	285.93730830124707
-10.14999999999977	292.8046873619917
-9.14999999999977	299.7169807879058
-8.14999999999977	306.67418782365144
-7.14999999999977	313.6763077273132
-6.14999999999977	320.72333977019184
-5.14999999999977	327.81528323660064
-4.14999999999977	334.9521374236645
-3.149999999999773	342.13390164112474
-2.149999999999773	349.36057521114384
-1.149999999999773	356.6321574681163
-0.1499999999997726	363.94864775848197
0.8500000000000227	371.3100454405437
1.8500000000000227	378.71634988428593
2.8500000000000227	386.16756047119725
3.8500000000000227	393.66367659409724
4.850000000000023	401.20469765696583
5.850000000000023	408.7906230747754
6.850000000000023	416.4214522733218
7.850000000000023	424.0971846890682
8.850000000000023	431.8178197689804
9.850000000000023	439.58335697037154
10.850000000000023	447.3937957607479
11.850000000000023	455.2491356176598
12.850000000000023	463.14937602854627
13.850000000000023	471.0945164905933
14.850000000000023	479.0845565105899
15.850000000000023	487.1194956047837
16.850000000000023	495.19933329874345
17.850000000000023	503.32406912722064
18.850000000000023	511.4937026340152
19.850000000000023	519.7082333718447
20.850000000000023	527.9676609022118
21.850000000000023	536.2719847952749
22.850000000000023	544.6212046297264
23.850000000000023	553.015319992665
24.850000000000023	561.4543304794734
25.850000000000023	569.9382356937018

Temperature (degC)	Pressure (MPa)
26.850000000000023	578.4670352469462
27.850000000000023	587.0407287587349
28.850000000000023	595.6593158564107
29.850000000000023	604.322796175022
30.850000000000023	613.0311693572116
31.850000000000023	621.7844350531066
32.850000000000002	630.5825929202103
33.850000000000002	639.4256426233007
34.850000000000002	648.3135838343228
35.850000000000002	657.2464162322873
36.850000000000002	666.2241395031737
37.850000000000002	675.246753339825
38.850000000000002	684.3142574418572
39.850000000000002	693.4266515155604
40.850000000000002	702.5839352738001
41.850000000000002	711.7861084359339
42.850000000000002	721.0331707277128
43.850000000000002	730.3251218811936
44.850000000000002	739.6619616346499
45.850000000000002	749.0436897324871
46.850000000000002	758.4703059251526
47.850000000000002	767.9418099690569
48.850000000000002	777.4582016264834
49.850000000000002	787.0194806655115
50.850000000000002	796.6256468599374
51.850000000000002	806.2766999891879
52.850000000000002	815.9726398382495
53.850000000000002	825.7134661975862
54.850000000000002	835.4991788630676
55.850000000000002	845.3297776358928
56.850000000000002	855.2052623225119
57.850000000000002	865.125632734566
58.850000000000002	875.0908886888
59.850000000000002	885.101030007007
60.850000000000002	895.1560565159474
61.850000000000002	905.2559680472904
62.850000000000002	915.4007644375378
63.850000000000002	925.5904455279651
64.850000000000002	935.8250111645536
65.850000000000002	946.1044611979253
66.850000000000002	956.4287954832812
67.850000000000002	966.7980138803384
68.850000000000002	977.2121162532678
69.850000000000002	987.6711024706348
70.850000000000002	998.1749724053415

Temperature (degC)	Pressure (MPa)
71.85000000000002	1008.7237259345617
72.85000000000002	1019.3173629396915
73.85000000000002	1029.9558833062868
74.85000000000002	1040.6392869240078
75.85000000000002	1051.3675736865614
76.85000000000002	1062.1407434916557
77.85000000000002	1072.958796240936
78.85000000000002	1083.8217318399368
79.85000000000002	1094.7295501980263
80.85000000000002	1105.6822512283613
81.85000000000002	1116.6798348478308
82.85000000000002	1127.7223009770062
83.85000000000002	1138.8096495400932
84.85000000000002	1149.9418804648872
85.85000000000002	1161.1189936827159
86.85000000000002	1172.3409891284027
87.85000000000002	1183.6078667402157
88.85000000000002	1194.9196264598143
89.85000000000002	1206.2762682322195
90.85000000000002	1217.6777920057584
91.85000000000002	1229.1241977320196
92.85000000000002	1240.6154853658163
93.85000000000002	1252.1516548651366
94.85000000000002	1263.7327061911144
95.85000000000002	1275.3586393079636
96.85000000000002	1287.029454182967
97.85000000000002	1298.7451507864105
98.85000000000002	1310.5057290915588
99.85000000000002	1322.3111890746086
100.85000000000002	1334.1615307146558
101.85000000000002	1346.0567539936494
102.85000000000002	1357.9968588963602
103.85000000000002	1369.9818454103456
104.85000000000002	1382.0117135259018
105.85000000000002	1394.0864632360388
106.85000000000002	1406.2060945364435
107.85000000000002	1418.370607425438
108.85000000000002	1430.5800019039475
109.85000000000002	1442.8342779754744
110.85000000000002	1455.1334356460507
111.85000000000002	1467.4774749242163
112.85000000000002	1479.8663958209827
113.85000000000002	1492.3001983497898
114.85000000000002	1504.7788825264986
115.85000000000002	1517.3024483693305

Temperature (degC)	Pressure (MPa)
116.85000000000002	1529.8708958988607
117.85000000000002	1542.4842251379735
118.85000000000002	1555.1424361118352
119.85000000000002	1567.8455288478663
120.85000000000002	1580.593503375714
121.85000000000002	1593.386359727212
122.85000000000002	1606.2240979363662
123.85000000000002	1619.1067180393188
124.85000000000002	1632.0342200743185
125.85000000000002	1645.0066040816987

Table B94: Melting Points for Carbon Dioxide and 4% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-63.1499999999998	0.4870733840087106
-62.1499999999998	2.07207940764994
-61.1499999999998	6.690794324619183
-60.1499999999998	11.3542491632797
-59.1499999999998	16.0625324378416
-58.1499999999998	20.815650698043186
-57.1499999999998	25.613603994069198
-56.1499999999998	30.456390958669523
-55.1499999999998	35.34400978659445
-54.1499999999998	40.276458516719146
-53.1499999999998	45.25373513429956
-52.1499999999998	50.27583761404866
-51.1499999999998	55.34276394027327
-50.1499999999998	60.45451211699077
-49.1499999999998	65.61108017325803
-48.1499999999998	70.81246616603792
-47.1499999999998	76.05866818172527
-46.1499999999998	81.34968433691093
-45.1499999999998	86.68551277869146
-44.1499999999998	92.06615168470489
-43.1499999999998	97.49159926298978
-42.1499999999998	102.96185375173746
-41.1499999999998	108.476913418973
-40.1499999999998	114.0367765621881
-39.1499999999998	119.64144150794809
-38.1499999999998	125.29090661147987
-37.1499999999998	130.98517025624795
-36.1499999999998	136.7242308535267
-35.1499999999998	142.5080868419712
-34.1499999999998	148.33673668718725
-33.1499999999998	154.21017888130498
-32.1499999999998	160.1284119425557
-31.14999999999977	166.0914344148554
-30.14999999999977	172.09924486738961
-29.14999999999977	178.15184189420847
-28.14999999999977	184.24922411382653
-27.14999999999977	190.3913901688255
-26.14999999999977	196.5783387254691
-25.14999999999977	202.81006847332029
-24.14999999999977	209.08657812486572
-23.14999999999977	215.40786641514865
-22.14999999999977	221.7739321014046
-21.14999999999977	228.18477396270856

Temperature (degC)	Pressure (MPa)
-20.14999999999977	234.6403907996235
-19.14999999999977	241.14078143385584
-18.14999999999977	247.68594470792252
-17.14999999999977	254.27587948481576
-16.14999999999977	260.91058464767883
-15.14999999999977	267.59005909949076
-14.14999999999977	274.31430176274654
-13.14999999999977	281.0833115791528
-12.14999999999977	287.8970875093259
-11.14999999999977	294.7556285324908
-10.14999999999977	301.6589336461956
-9.14999999999977	308.6070018660186
-8.14999999999977	315.5998322252925
-7.14999999999977	322.63742377482373
-6.14999999999977	329.7197755826211
-5.14999999999977	336.84688673363416
-4.14999999999977	344.0187563294845
-3.149999999999773	351.23538348821234
-2.149999999999773	358.4967673440222
-1.149999999999773	365.802907047036
-0.1499999999997726	373.15380176304615
0.8500000000000227	380.5494506732791
1.8500000000000227	387.9898529741572
2.8500000000000227	395.4750078770681
3.8500000000000227	403.004914608136
4.850000000000023	410.57957240800044
5.850000000000023	418.1989805315948
6.850000000000023	425.86313824793
7.850000000000023	433.5720448398832
8.850000000000023	441.3256996039892
9.850000000000023	449.1241018502319
10.850000000000023	456.96725090184935
11.850000000000023	464.85514609513103
12.850000000000023	472.78778677922145
13.850000000000023	480.76517231593226
14.850000000000023	488.78730207955346
15.850000000000023	496.85417545666434
16.850000000000023	504.9657918459574
17.850000000000023	513.1221506580541
18.850000000000023	521.3232513153324
19.850000000000023	529.5690932517489
20.850000000000023	537.8596759126758
21.850000000000023	546.1949987547279
22.850000000000023	554.5750612455964
23.850000000000023	562.9998628638958

Temperature (degC)	Pressure (MPa)
24.850000000000023	571.4694030989907
25.850000000000023	579.9836814508543
26.850000000000023	588.5426974299024
27.850000000000023	597.1464505568488
28.850000000000023	605.7949403625515
29.850000000000023	614.4881663878687
30.850000000000023	623.2261281835139
31.850000000000023	632.0088253099134
32.850000000000002	640.8362573370655
33.850000000000002	649.7084238444062
34.850000000000002	658.6253244206698
35.850000000000002	667.5869586637564
36.850000000000002	676.5933261806069
37.850000000000002	685.6444265870637
38.850000000000002	694.7402595077523
39.850000000000002	703.8808245759526
40.850000000000002	713.0661214334751
41.850000000000002	722.296149730543
42.850000000000002	731.570909125669
43.850000000000002	740.8903992855448
44.850000000000002	750.2546198849162
45.850000000000002	759.663570606478
46.850000000000002	769.117251140755
47.850000000000002	778.6156611860018
48.850000000000002	788.1588004480806
49.850000000000002	797.746686403656
50.850000000000002	807.3792654836345
51.850000000000002	817.0565907059632
52.850000000000002	826.7786440426258
53.850000000000002	836.5454252359951
54.850000000000002	846.356934035439
55.850000000000002	856.2131701972312
56.850000000000002	866.1141334844476
57.850000000000002	876.0598236668756
58.850000000000002	886.050240520923
59.850000000000002	896.08538382952
60.850000000000002	906.1652533820362
61.850000000000002	916.289848974189
62.850000000000002	926.4591704079551
63.850000000000002	936.6732174914835
64.850000000000002	946.9319900390133
65.850000000000002	957.2354878707923
66.850000000000002	967.583710812987
67.850000000000002	977.976658697606
68.850000000000002	988.4143313624214

Temperature (degC)	Pressure (MPa)
69.85000000000002	998.896728650891
70.85000000000002	1009.4238504120756
71.85000000000002	1019.995696500562
72.85000000000002	1030.6122667763957
73.85000000000002	1041.2735611050023
74.85000000000002	1051.9795793571088
75.85000000000002	1062.7303214086794
76.85000000000002	1073.5257871408462
77.85000000000002	1084.3659764398255
78.85000000000002	1095.2508891968653
79.85000000000002	1106.1805253081684
80.85000000000002	1117.1548846748258
81.85000000000002	1128.1739672027504
82.85000000000002	1139.2377728026206
83.85000000000002	1150.3463013898015
84.85000000000002	1161.4995528842892
85.85000000000002	1172.697527210657
86.85000000000002	1183.9402242979754
87.85000000000002	1195.2276440797698
88.85000000000002	1206.5597864939455
89.85000000000002	1217.9366514827443
90.85000000000002	1229.3582389926685
91.85000000000002	1240.8245489744413
92.85000000000002	1252.335581382942
93.85000000000002	1263.8913361771486
94.85000000000002	1275.4918133200827
95.85000000000002	1287.1370127787654
96.85000000000002	1298.8269345241529
97.85000000000002	1310.5615785310886
98.85000000000002	1322.3409447782474
99.85000000000002	1334.1650332480947
100.85000000000002	1346.0338439268264
101.85000000000002	1357.9473768043176
102.85000000000002	1369.9056318740863
103.85000000000002	1381.9086091332297
104.85000000000002	1393.9563085823902
105.85000000000002	1406.0487302256993
106.85000000000002	1418.1858740707316
107.85000000000002	1430.3677401284683
108.85000000000002	1442.5943284132363
109.85000000000002	1454.8656389426867
110.85000000000002	1467.1816717377174
111.85000000000002	1479.542426822472
112.85000000000002	1491.947904224261
113.85000000000002	1504.3981039735352

Temperature (degC)	Pressure (MPa)
114.85000000000002	1516.8930261038488
115.85000000000002	1529.4326706518052
116.85000000000002	1542.0170376570275
117.85000000000002	1554.646127162114
118.85000000000002	1567.319939212603
119.85000000000002	1580.0384738569323
120.85000000000002	1592.8017311463902
121.85000000000002	1605.609711135094
122.85000000000002	1618.46241387995
123.85000000000002	1631.3598394406058
124.85000000000002	1644.3019878794223
125.85000000000002	1657.2888592614431

Table B95: Melting Points for Carbon Dioxide and 5% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-64.1499999999998	0.47964623360401565
-63.1499999999998	4.277024314191109
-62.1499999999998	8.894153471338234
-61.1499999999998	13.555961295535822
-60.1499999999998	18.262473338259326
-59.1499999999998	23.013692031614966
-58.1499999999998	27.809616266621433
-57.1499999999998	32.65024398839296
-56.1499999999998	37.53557282391513
-55.1499999999998	42.46560028683892
-54.1499999999998	47.4403238578667
-53.1499999999998	52.4597410205057
-52.1499999999998	57.52384927842016
-51.1499999999998	62.632646164359606
-50.1499999999998	67.78612924490913
-49.1499999999998	72.98429612303234
-48.1499999999998	78.22714443937983
-47.1499999999998	83.51467187288299
-46.1499999999998	88.84687614091936
-45.1499999999998	94.22375499920948
-44.1499999999998	99.64530624154627
-43.1499999999998	105.11152769941965
-42.1499999999998	110.62241724157033
-41.1499999999998	116.1779727734997
-40.1499999999998	121.7781922369532
-39.1499999999998	127.42307360938783
-38.1499999999998	133.11261490342767
-37.1499999999998	138.84681416632088
-36.1499999999998	144.62566947939237
-35.1499999999998	150.4491789575003
-34.1499999999998	156.3173407484991
-33.1499999999998	162.2301530327052
-32.1499999999998	168.18761402237197
-31.14999999999977	174.1897219611706
-30.14999999999977	180.2364751236782
-29.14999999999977	186.32787181487572
-28.14999999999977	192.46391036965375
-27.14999999999977	198.6445891523233
-26.14999999999977	204.8699065561406
-25.14999999999977	211.1398610028354
-24.14999999999977	217.45445094214972
-23.14999999999977	223.81367485138486
-22.14999999999977	230.21753123495475

Temperature (degC)	Pressure (MPa)
-21.14999999999977	236.66601862394978
-20.14999999999977	243.1591355757078
-19.14999999999977	249.69688067339072
-18.14999999999977	256.27925252557014
-17.14999999999977	262.9062497658238
-16.14999999999977	269.57787105233325
-15.14999999999977	276.29411506749295
-14.14999999999977	283.05498051752545
-13.14999999999977	289.86046613210243
-12.14999999999977	296.7105706639747
-11.14999999999977	303.6052928886081
-10.14999999999977	310.54463160382306
-9.14999999999977	317.5285856294451
-8.14999999999977	324.5571538069609
-7.14999999999977	331.6303349991755
-6.14999999999977	338.74812808988185
-5.14999999999977	345.9105319835336
-4.14999999999977	353.1175456049219
-3.149999999999773	360.3691678988637
-2.149999999999773	367.66539782988747
-1.149999999999773	375.00623438192946
-0.1499999999997726	382.39167655803845
0.8500000000000227	389.8217233800761
1.8500000000000227	397.2963738884306
2.8500000000000227	404.8156271417347
3.8500000000000227	412.3794822165845
4.850000000000023	419.98793820726394
5.850000000000023	427.6409942254813
6.850000000000023	435.3386494000961
7.850000000000023	443.08090287686787
8.850000000000023	450.8677538181937
9.850000000000023	458.69920140286
10.850000000000023	466.5752448257957
11.850000000000023	474.495883297828
12.850000000000023	482.4611160454449
13.850000000000023	490.47094231055985
14.850000000000023	498.52536135028186
15.850000000000023	506.6243724366881
16.850000000000023	514.7679748566005
17.850000000000023	522.9561679113679
18.850000000000023	531.1889509166499
19.850000000000023	539.4663232022035
20.850000000000023	547.7882841116774
21.850000000000023	556.154833002404
22.850000000000023	564.5659692452

Temperature (degC)	Pressure (MPa)
23.8500000000000023	573.0216922241692
24.8500000000000023	581.522001336502
25.8500000000000023	590.0668959922895
26.8500000000000023	598.6563756143338
27.8500000000000023	607.2904396379585
28.8500000000000023	615.9690875108315
29.8500000000000023	624.6923186927803
30.8500000000000023	633.4601326556208
31.8500000000000023	642.2725288829785
32.850000000000002	651.1295068701185
33.850000000000002	660.0310661237819
34.850000000000002	668.9772061620147
35.850000000000002	677.9679265140053
36.850000000000002	687.0032267199272
37.850000000000002	696.0831063307817
38.850000000000002	705.2075649082367
39.850000000000002	714.3766020244799
40.850000000000002	723.5902172620698
41.850000000000002	732.8484102137786
42.850000000000002	742.1511804824554
43.850000000000002	751.4985276808803
44.850000000000002	760.8904514316221
45.850000000000002	770.3269513668997
46.850000000000002	779.8080271284485
47.850000000000002	789.3336783673774
48.850000000000002	798.9039047440491
49.850000000000002	808.5187059279367
50.850000000000002	818.1780815975045
51.850000000000002	827.8820314400772
52.850000000000002	837.6305551517158
53.850000000000002	847.423652437097
54.850000000000002	857.26132300939
55.850000000000002	867.1435665901372
56.850000000000002	877.0703829091416
57.850000000000002	887.0417717043485
58.850000000000002	897.0577327217284
59.850000000000002	907.1182657151712
60.850000000000002	917.2233704463767
61.850000000000002	927.3730466847373
62.850000000000002	937.5672942072414
63.850000000000002	947.806112798362
64.850000000000002	958.0895022499562
65.850000000000002	968.4174623611625
66.850000000000002	978.7899929382958
67.850000000000002	989.2070937947575

Temperature (degC)	Pressure (MPa)
68.85000000000002	999.6687647509273
69.85000000000002	1010.1750056340777
70.85000000000002	1020.7258162782703
71.85000000000002	1031.3211965242667
72.85000000000002	1041.9611462194391
73.85000000000002	1052.645665217672
74.85000000000002	1063.3747533792814
75.85000000000002	1074.1484105709224
76.85000000000002	1084.966636665501
77.85000000000002	1095.8294315420942
78.85000000000002	1106.7367950858625
79.85000000000002	1117.688727187964
80.85000000000002	1128.68522774548
81.85000000000002	1139.7262966613262
82.85000000000002	1150.811933844181
83.85000000000002	1161.9421392084034
84.85000000000002	1173.116912673955
85.85000000000002	1184.3362541663232
86.85000000000002	1195.6001636164565
87.85000000000002	1206.9086409606734
88.85000000000002	1218.2616861406034
89.85000000000002	1229.659299103111
90.85000000000002	1241.101479800226
91.85000000000002	1252.5882281890688
92.85000000000002	1264.1195442317885
93.85000000000002	1275.6954278954884
94.85000000000002	1287.315879152169
95.85000000000002	1298.9808979786512
96.85000000000002	1310.6904843565185
97.85000000000002	1322.444638272057
98.85000000000002	1334.2433597161692
99.85000000000002	1346.0866486843463
100.85000000000002	1357.9745051765829
101.85000000000002	1369.9069291973203
102.85000000000002	1381.883920755396
103.85000000000002	1393.9054798639681
104.85000000000002	1405.97160654048
105.85000000000002	1418.0823008065825
106.85000000000002	1430.2375626880914
107.85000000000002	1442.4373922149164
108.85000000000002	1454.6817894210346
109.85000000000002	1466.9707543443967
110.85000000000002	1479.3042870269092
111.85000000000002	1491.682387514361
112.85000000000002	1504.1050558563834

Temperature (degC)	Pressure (MPa)
113.85000000000002	1516.5722921063866
114.85000000000002	1529.0840963215212
115.85000000000002	1541.6404685626192
116.85000000000002	1554.2414088941546
117.85000000000002	1566.886917384193
118.85000000000002	1579.5769941043188
119.85000000000002	1592.3116391296373
120.85000000000002	1605.0908525386787
121.85000000000002	1617.914634413386
122.85000000000002	1630.7829848390556
123.85000000000002	1643.6959039042888
124.85000000000002	1656.6533917009615
125.85000000000002	1669.6554483241678

Table B96: Melting Points for Carbon Dioxide and 1% Water

Temperature (degC)	Pressure (MPa)
-56.1499999999998	0.5560755731252974
-55.1499999999998	4.690144712403596
-54.1499999999998	9.58843340704485
-53.1499999999998	14.50900824893034
-52.1499999999998	19.460977712688056
-51.1499999999998	24.448544346983823
-50.1499999999998	29.474136905558648
-49.1499999999998	34.53933631562132
-48.1499999999998	39.64525188222983
-47.1499999999998	44.792703639133435
-46.1499999999998	49.98232156071577
-45.1499999999998	55.21460417646894
-44.1499999999998	60.48995541788282
-43.1499999999998	65.80870893457747
-42.1499999999998	71.17114478141997
-41.1499999999998	76.57750124524215
-40.1499999999998	82.0279834564472
-39.1499999999998	87.52276980543625
-38.1499999999998	93.06201681912775
-37.1499999999998	98.64586293166785
-36.1499999999998	104.27443144465802
-35.1499999999998	109.94783288255334
-34.1499999999998	115.66616688941605
-33.1499999999998	121.42952377286586
-32.1499999999998	127.23798577312665
-31.14999999999977	133.0916281153518
-30.14999999999977	138.99051988928616
-29.14999999999977	144.93472479002497
-28.14999999999977	150.92430174603064
-27.14999999999977	156.95930545489992
-26.14999999999977	163.0397868430739
-25.14999999999977	169.16579346240073
-24.14999999999977	175.33736983393263
-23.14999999999977	181.55455774736694
-22.14999999999977	187.81739652298424
-21.14999999999977	194.12592324171283
-20.14999999999977	200.4801729479778
-19.14999999999977	206.8801788291889
-18.14999999999977	213.3259723751
-17.14999999999977	219.81758351975265
-16.14999999999977	226.35504076828533
-15.14999999999977	232.9383713105496
-14.14999999999977	239.56760112317968

Temperature (degC)	Pressure (MPa)
-13.14999999999977	246.24275506153447
-12.14999999999977	252.96385694270703
-11.14999999999977	259.73092962065573
-10.14999999999977	266.5439950543536
-9.14999999999977	273.4030743697357
-8.14999999999977	280.308187916121
-7.14999999999977	287.25935531771154
-6.14999999999977	294.2565955206736
-5.14999999999977	301.29992683626585
-4.14999999999977	308.3893669804134
-3.149999999999773	315.52493311007686
-2.149999999999773	322.70664185673223
-1.149999999999773	329.93450935723786
-0.1499999999997726	337.20855128233393
0.8500000000000227	344.5287828629934
1.8500000000000227	351.8952189148221
2.8500000000000227	359.30787386067584
3.8500000000000227	366.76676175166375
4.850000000000023	374.27189628665815
5.850000000000023	381.8232908304655
6.850000000000023	389.42095843074037
7.850000000000023	397.06491183376926
8.850000000000023	404.7551634992096
9.850000000000023	412.4610759984315
10.850000000000023	420.2035305542674
11.850000000000023	427.99098415702696
12.850000000000023	435.8234436456933
13.850000000000023	443.7009157524087
14.850000000000023	451.623407113672
15.850000000000023	459.5909242809279
16.850000000000023	467.6034737305922
17.850000000000023	475.66106187357457
18.850000000000023	483.76369506429756
19.850000000000023	491.9113796092867
20.850000000000023	500.1041217753289
21.850000000000023	508.3419277972588
22.850000000000023	516.6248038853738
23.850000000000023	524.9527562325127
24.850000000000023	533.3257910208287
25.850000000000023	541.743914428264
26.850000000000023	550.2071326347499
27.850000000000023	558.715451828156
28.850000000000023	567.268878209999
29.850000000000023	575.8674180009217
30.850000000000023	584.5110774459757

Temperature (degC)	Pressure (MPa)
31.850000000000023	593.1998628196981
32.850000000000002	601.933780431002
33.850000000000002	610.7128366279088
34.850000000000002	619.5370378021001
35.850000000000002	628.4063903933379
36.850000000000002	637.3209008937207
37.850000000000002	646.2805758518289
38.850000000000002	655.2854218767216
39.850000000000002	664.3354456418351
40.850000000000002	673.4306538887566
41.850000000000002	682.5710534308982
42.850000000000002	691.7566511570747
43.850000000000002	700.9874540349846
44.850000000000002	710.2634691146048
45.850000000000002	719.5847035315053
46.850000000000002	728.9511645100852
47.850000000000002	738.3628593667362
48.850000000000002	747.8197955129293
49.850000000000002	757.3219804582583
50.850000000000002	766.869421813391
51.850000000000002	776.4621272929951
52.850000000000002	786.1001047185808
53.850000000000002	795.7833620213153
54.850000000000002	805.5119072447708
55.850000000000002	815.2857485476428
56.850000000000002	825.1048942064094
57.850000000000002	834.9693526179617
58.850000000000002	844.8791323021924
59.850000000000002	854.8342419045431
60.850000000000002	864.8346901985225
61.850000000000002	874.8804860881938
62.850000000000002	884.9716386106222
63.850000000000002	895.1081569383052
64.850000000000002	905.2900503815653
65.850000000000002	915.5173283909214
66.850000000000002	925.7900005594383
67.850000000000002	936.1080766250394
68.850000000000002	946.4715664728195
69.850000000000002	956.8804801373143
70.850000000000002	967.3348278047615
71.850000000000002	977.8346198153426
72.850000000000002	988.3798666654036
73.850000000000002	998.9705790096552
74.850000000000002	1009.6067676633653
75.850000000000002	1020.2884436045287

Temperature (degC)	Pressure (MPa)
76.85000000000002	1031.0156179760208
77.85000000000002	1041.78830208774
78.85000000000002	1052.606507418735
79.85000000000002	1063.4702456193204
80.85000000000002	1074.3795285131712
81.85000000000002	1085.334368099413
82.85000000000002	1096.3347765546973
83.85000000000002	1107.3807662352565
84.85000000000002	1118.472349678964
85.85000000000002	1129.6095396073622
86.85000000000002	1140.7923489276864
87.85000000000002	1152.0207907348884
88.85000000000002	1163.2948783136294
89.85000000000002	1174.6146251402652
90.85000000000002	1185.9800448848334
91.85000000000002	1197.3911514130098
92.85000000000002	1208.847958788061
93.85000000000002	1220.3504812727842
94.85000000000002	1231.8987333314324
95.85000000000002	1243.4927296316275
96.85000000000002	1255.1324850462513
97.85000000000002	1266.818014655336
98.85000000000002	1278.549333747929
99.85000000000002	1290.3264578239396
100.85000000000002	1302.1494025959864
101.85000000000002	1314.018183991201
102.85000000000002	1325.9328181530373
103.85000000000002	1337.8933214430524
104.85000000000002	1349.8997104426585
105.85000000000002	1361.952001954872
106.85000000000002	1374.05021300603
107.85000000000002	1386.194360847485
108.85000000000002	1398.3844629572666
109.85000000000002	1410.6205370417401
110.85000000000002	1422.9026010372097
111.85000000000002	1435.2306731115177
112.85000000000002	1447.6047716655974
113.85000000000002	1460.024915334991
114.85000000000002	1472.4911229913619
115.85000000000002	1485.0034137439304
116.85000000000002	1497.5618069409018
117.85000000000002	1510.1663221708402
118.85000000000002	1522.8169792640122
119.85000000000002	1535.5137982936599
120.85000000000002	1548.2567995772833

Temperature (degC)	Pressure (MPa)
121.85000000000002	1561.0460036777836
122.85000000000002	1573.8814314046576
123.85000000000002	1586.7631038150464
124.85000000000002	1599.6910422147841
125.85000000000002	1612.6652681593623

Table B97: Melting Points for Carbon Dioxide and 2% Water

Temperature (degC)	Pressure (MPa)
-56.1499999999998	0.597007516220925
-55.1499999999998	2.0313360856337828
-54.1499999999998	7.120063272107887
-53.1499999999998	12.17992338556784
-52.1499999999998	17.247894527780055
-51.1499999999998	22.336934708109748
-50.1499999999998	27.453756513073742
-49.1499999999998	32.60246594546806
-48.1499999999998	37.78582890854732
-47.1499999999998	43.00583139168054
-46.1499999999998	48.263965980249004
-45.1499999999998	53.56139367620476
-44.1499999999998	58.899042180860214
-43.1499999999998	64.2776690081695
-42.1499999999998	69.69790384510293
-41.1499999999998	75.16027802438974
-40.1499999999998	80.66524565233125
-39.1499999999998	86.21319914130538
-38.1499999999998	91.80448087794075
-37.1499999999998	97.43939215373959
-36.1499999999998	103.11820011306331
-35.1499999999998	108.84114323713067
-34.1499999999998	114.60843572832567
-33.1499999999998	120.4202710557425
-32.1499999999998	126.27682485216995
-31.14999999999977	132.17825730335952
-30.14999999999977	138.12471513535127
-29.14999999999977	144.1163332803453
-28.14999999999977	150.15323628306896
-27.14999999999977	156.23553949586227
-26.14999999999977	162.36335010036967
-25.14999999999977	168.53676798589575
-24.14999999999977	174.75588650846663
-23.14999999999977	181.02079314998448
-22.14999999999977	187.33157009320826
-21.14999999999977	193.68829472544235
-20.14999999999977	200.09104008152153
-19.14999999999977	206.53987523486208
-18.14999999999977	213.03486564388265
-17.14999999999977	219.5760734599043
-16.14999999999977	226.16355780167314
-15.14999999999977	232.79737500084292
-14.14999999999977	239.47757882211317

Temperature (degC)	Pressure (MPa)
-13.14999999999977	246.20422066116558
-12.14999999999977	252.9773497230793
-11.14999999999977	259.7970131835557
-10.14999999999977	266.6632563349264
-9.14999999999977	273.57612271868345
-8.14999999999977	280.53565424602147
-7.14999999999977	287.54189130769817
-6.14999999999977	294.59487287435655
-5.14999999999977	301.6946365882917
-4.14999999999977	308.84121884755893
-3.149999999999773	316.0346548831809
-2.149999999999773	323.27497883013154
-1.149999999999773	330.56222379272225
-0.1499999999997726	337.8964219048884
0.8500000000000227	345.2776043858931
1.8500000000000227	352.7058015918425
2.8500000000000227	360.1810430633909
3.8500000000000227	367.7033575700042
4.850000000000023	375.2727731510423
5.850000000000023	382.88931715396535
6.850000000000023	390.5530162699013
7.850000000000023	398.2638965667755
8.850000000000023	406.0219835202381
9.850000000000023	413.8236983130255
10.850000000000023	421.596224929751
11.850000000000023	429.4133476250228
12.850000000000023	437.2750803933155
13.850000000000023	445.18143699382006
14.850000000000023	453.13243097394565
15.850000000000023	461.1280756915241
16.850000000000023	469.16838433582666
17.850000000000023	477.25336994746556
18.850000000000023	485.3830454372802
19.850000000000023	493.55742360426063
20.850000000000023	501.77651715258986
21.850000000000023	510.0403387078622
22.850000000000023	518.348900832535
23.850000000000023	526.7022160406625
24.850000000000023	535.1002968119676
25.850000000000023	543.5431556052956
26.850000000000023	552.0308048714782
27.850000000000023	560.5632570656644
28.850000000000023	569.1405246591415
29.850000000000023	577.7626201506882
30.850000000000023	586.4295560774711

Temperature (degC)	Pressure (MPa)
31.850000000000023	595.1413450255441
32.850000000000002	603.8979996399437
33.850000000000002	612.6995326344281
34.850000000000002	621.5459568008753
35.850000000000002	630.4372850183532
36.850000000000002	639.3735302618977
37.850000000000002	648.3547056110026
38.850000000000002	657.3808242578444
39.850000000000002	666.4518995152597
40.850000000000002	675.5679448244865
41.850000000000002	684.728973762685
42.850000000000002	693.9350000502536
43.850000000000002	703.1860375579429
44.850000000000002	712.4821003137924
45.850000000000002	721.8232025098936
46.850000000000002	731.2093585089834
47.850000000000002	740.6405828508947
48.850000000000002	750.1168902588477
49.850000000000002	759.6382956456246
50.850000000000002	769.2048141195952
51.850000000000002	778.8164609906322
52.850000000000002	788.4732517759161
53.850000000000002	798.1752022056183
54.850000000000002	807.9223282284992
55.850000000000002	817.7146460173944
56.850000000000002	827.5521719746225
57.850000000000002	837.4349227373008
58.850000000000002	847.3629151825847
59.850000000000002	857.3361664328281
60.850000000000002	867.3546938606681
61.850000000000002	877.4185150940502
62.850000000000002	887.5276480211871
63.850000000000002	897.6821107954489
64.850000000000002	907.8819218402066
65.850000000000002	918.1270998536157
66.850000000000002	928.4176638133483
67.850000000000002	938.7536329812793
68.850000000000002	949.1350269081248
69.850000000000002	959.5618654380369
70.850000000000002	970.0341687131581
71.850000000000002	980.5519571781344
72.850000000000002	991.1152515845972
73.850000000000002	1001.7240729955946
74.850000000000002	1012.3784427900151
75.850000000000002	1023.0783826669497

Temperature (degC)	Pressure (MPa)
76.85000000000002	1033.8239146500405
77.85000000000002	1044.6150610918003
78.85000000000002	1055.451844677892
79.85000000000002	1066.3342884313963
80.85000000000002	1077.2624157170378
81.85000000000002	1088.2362502453916
82.85000000000002	1099.2558160770743
83.85000000000002	1110.3211376268953
84.85000000000002	1121.4322396679906
85.85000000000002	1132.5891473359425
86.85000000000002	1143.791886132855
87.85000000000002	1155.0404819314313
88.85000000000002	1166.3349609790112
89.85000000000002	1177.6753499015879
90.85000000000002	1189.0616757078114
91.85000000000002	1200.493965792963
92.85000000000002	1211.9722479429
93.85000000000002	1223.4965503379856
94.85000000000002	1235.0669015569933
95.85000000000002	1246.6833305809864
96.85000000000002	1258.345866797166
97.85000000000002	1270.054540002697
98.85000000000002	1281.8093804085117
99.85000000000002	1293.610418643066
100.85000000000002	1305.4576857561021
101.85000000000002	1317.3512132223336
102.85000000000002	1329.2910329451329
103.85000000000002	1341.2771772601773
104.85000000000002	1353.3096789390381
105.85000000000002	1365.388571192772
106.85000000000002	1377.5138876754268
107.85000000000002	1389.6856624875427
108.85000000000002	1401.903930179587
109.85000000000002	1414.1687257553574
110.85000000000002	1426.4800846753146
111.85000000000002	1438.8380428598878
112.85000000000002	1451.2426366927125
113.85000000000002	1463.6939030238043
114.85000000000002	1476.1918791726835
115.85000000000002	1488.7366029314253
116.85000000000002	1501.32811256765
117.85000000000002	1513.9664468274332
118.85000000000002	1526.6516449381384
119.85000000000002	1539.3837466111756
120.85000000000002	1552.1627920446576

Temperature (degC)	Pressure (MPa)
121.85000000000002	1564.9888219260044
122.85000000000002	1577.8618774343968
123.85000000000002	1590.782000243166
124.85000000000002	1603.7492325220746
125.85000000000002	1616.7636169394702

Table B98: Melting Points for Carbon Dioxide and 3% Water

Temperature (degC)	Pressure (MPa)
-55.1499999999998	0.640952402244736
-54.1499999999998	4.4637614620653405
-53.1499999999998	9.708147218506918
-52.1499999999998	14.917332424317918
-51.1499999999998	20.1249907648688
-50.1499999999998	25.345816705867797
-49.1499999999998	30.588074904957896
-48.1499999999998	35.85705389807878
-47.1499999999998	41.15641995854491
-46.1499999999998	46.48885854292311
-45.1499999999998	51.856417670188826
-44.1499999999998	57.26070830592926
-43.1499999999998	62.70302910323287
-42.1499999999998	68.18444806392591
-41.1499999999998	73.70585820226312
-40.1499999999998	79.26801676817037
-39.1499999999998	84.87157366417951
-38.1499999999998	90.5170925248376
-37.1499999999998	96.20506667390922
-36.1499999999998	101.93593141924428
-35.1499999999998	107.7100736738515
-34.1499999999998	113.52783958866642
-33.1499999999998	119.38954068243515
-32.1499999999998	125.29545881894616
-31.14999999999977	131.2458502885558
-30.14999999999977	137.2409491853801
-29.14999999999977	143.28097022464303
-28.14999999999977	149.36611111063775
-27.14999999999977	155.49655454069995
-26.14999999999977	161.67246991192155
-25.14999999999977	167.89401478322551
-24.14999999999977	174.16133613469242
-23.14999999999977	180.4745714577423
-22.14999999999977	186.83384970334316
-21.14999999999977	193.23929211037077
-20.14999999999977	199.6910129322589
-19.14999999999977	206.18912007689573
-18.14999999999977	212.73371567217976
-17.14999999999977	219.32489656758935
-16.14999999999977	225.96275478044498
-15.14999999999977	232.6473778941831
-14.14999999999977	239.37884941483068
-13.14999999999977	246.15724909094956

Temperature (degC)	Pressure (MPa)
-12.14999999999977	252.9826532015403
-11.14999999999977	259.85513481576805
-10.14999999999977	266.7747640278065
-9.14999999999977	273.74160816968543
-8.14999999999977	280.7557320045986
-7.14999999999977	287.8171979028417
-6.14999999999977	294.9260660022457
-5.14999999999977	302.0823943547605
-4.14999999999977	309.28623906061597
-3.149999999999773	316.5376543913347
-2.149999999999773	323.8366929027068
-1.149999999999773	331.1834055387152
-0.1499999999997726	338.5778417272811
0.8500000000000227	346.02004946861
1.8500000000000227	353.5100754168234
2.8500000000000227	361.04796495548703
3.8500000000000227	368.6337622675984
4.850000000000023	376.2675104005077
5.850000000000023	383.9492513262269
6.850000000000023	391.67902599751477
7.850000000000023	399.4568744001018
8.850000000000023	407.2828356013648
9.850000000000023	415.1569477957569
10.850000000000023	423.0418963043198
11.850000000000023	430.8895338963727
12.850000000000023	438.78137170228524
13.850000000000023	446.7174308303209
14.850000000000023	454.69773203899484
15.850000000000023	462.72229577202796
16.850000000000023	470.79114219138364
17.850000000000023	478.904291208538
18.850000000000023	487.0617625141068
19.850000000000023	495.26357560595244
20.850000000000023	503.5097498158749
21.850000000000023	511.80030433499036
22.850000000000023	520.1352582378817
23.850000000000023	528.514630505616
24.850000000000023	536.9384400477043
25.850000000000023	545.4067057230607
26.850000000000023	553.9194463600494
27.850000000000023	562.4766807756679
28.850000000000023	571.0784277939231
29.850000000000023	579.7247062634523
30.850000000000023	588.4155350744502
31.850000000000023	597.1509331749253

Temperature (degC)	Pressure (MPa)
32.85000000000002	605.9309195863489
33.85000000000002	614.7555134187181
34.85000000000002	623.6247338850816
35.85000000000002	632.5386003155596
36.85000000000002	641.4971321708787
37.85000000000002	650.5003490554647
38.85000000000002	659.5482707301163
39.85000000000002	668.6409171242792
40.85000000000002	677.7783083479529
41.85000000000002	686.9604647032448
42.85000000000002	696.1874066955978
43.85000000000002	705.4591550447125
44.85000000000002	714.7757306951756
45.85000000000002	724.1371548268072
46.85000000000002	733.5434488647691
47.85000000000002	742.9946344894125
48.85000000000002	752.4907336459055
49.85000000000002	762.0317685536456
50.85000000000002	771.6177617154692
51.85000000000002	781.2487359266637
52.85000000000002	790.9247142838113
53.85000000000002	800.6457201934528
54.85000000000002	810.4117773805907
55.85000000000002	820.2229098970555
56.85000000000002	830.079142129709
57.85000000000002	839.980498808528
58.85000000000002	849.9270050145592
59.85000000000002	859.9186861877444
60.85000000000002	869.9555681346526
61.85000000000002	880.03767703608
62.85000000000002	890.1650394545759
63.85000000000002	900.3376823418494
64.85000000000002	910.5556330461095
65.85000000000002	920.8189193192972
66.85000000000002	931.1275693242629
67.85000000000002	941.4816116418439
68.85000000000002	951.8810752778859
69.85000000000002	962.3259896701942
70.85000000000002	972.8163846954149
71.85000000000002	983.3522906758677
72.85000000000002	993.9337383863049
73.85000000000002	1004.5607590606295
74.85000000000002	1015.2333843985579
75.85000000000002	1025.9516465722256
76.85000000000002	1036.7155782327613

Temperature (degC)	Pressure (MPa)
77.85000000000002	1047.5252125168024
78.85000000000002	1058.3805830529711
79.85000000000002	1069.2817239683184
80.85000000000002	1080.2286698947146
81.85000000000002	1091.2214559752128
82.85000000000002	1102.260117870369
83.85000000000002	1113.3446917645338
84.85000000000002	1124.4752143721037
85.85000000000002	1135.6517229437366
86.85000000000002	1146.8742552725457
87.85000000000002	1158.1428497002457
88.85000000000002	1169.4575451232804
89.85000000000002	1180.8183809989073
90.85000000000002	1192.2253973512616
91.85000000000002	1203.6786347773716
92.85000000000002	1215.17813445316
93.85000000000002	1226.7239381394065
94.85000000000002	1238.3160881876659
95.85000000000002	1249.9546275461644
96.85000000000002	1261.639599765665
97.85000000000002	1273.37104900528
98.85000000000002	1285.1490200382539
99.85000000000002	1296.9735582577227
100.85000000000002	1308.844709682411
101.85000000000002	1320.7625209622893
102.85000000000002	1332.7270393842066
103.85000000000002	1344.7383128774597
104.85000000000002	1356.7963900193154
105.85000000000002	1368.9013200404845
106.85000000000002	1381.0531528305503
107.85000000000002	1393.2519389433269
108.85000000000002	1405.497729602163
109.85000000000002	1417.7905767051939
110.85000000000002	1430.1305328304984
111.85000000000002	1442.5176512412245
112.85000000000002	1454.9519858906015
113.85000000000002	1467.4335914269025
114.85000000000002	1479.9625231983111
115.85000000000002	1492.5388372576979
116.85000000000002	1505.1625903672996
117.85000000000002	1517.8338400033233
118.85000000000002	1530.552644360408
119.85000000000002	1543.3190623560104
120.85000000000002	1556.1331536346509
121.85000000000002	1568.9949785720453

Temperature (degC)	Pressure (MPa)
122.85000000000002	1581.9045982790976
123.85000000000002	1594.8620746057668
124.85000000000002	1607.8674701447692
125.85000000000002	1620.9208482351316

Table B99: Melting Points for Carbon Dioxide and 4% Water

Temperature (degC)	Pressure (MPa)
-55.1499999999998	0.6881320097003144
-54.1499999999998	1.5305543892145979
-53.1499999999998	7.058842207901668
-52.1499999999998	12.448031336105545
-51.1499999999998	17.797765707332374
-50.1499999999998	23.13903136401894
-49.1499999999998	28.48726617016886
-48.1499999999998	33.85170913991508
-47.1499999999998	39.23849380152658
-46.1499999999998	44.651977407234256
-45.1499999999998	50.09540763659902
-44.1499999999998	55.5712937945603
-43.1499999999998	61.081629768928465
-42.1499999999998	66.62803592740404
-41.1499999999998	72.21185365067629
-40.1499999999998	77.83421069167805
-39.1499999999998	83.49606777480992
-38.1499999999998	89.19825269146283
-37.1499999999998	94.9414858050824
-36.1499999999998	100.72639949872449
-35.1499999999998	106.55355325367445
-34.1499999999998	112.42344551405324
-33.1499999999998	118.33652314534493
-32.1499999999998	124.2931890634422
-31.14999999999977	130.293808453101
-30.14999999999977	136.33871388503312
-29.14999999999977	142.42820956323365
-28.14999999999977	148.56257487828265
-27.14999999999977	154.74206740158598
-26.14999999999977	160.9669254253364
-25.14999999999977	167.2373701303756
-24.14999999999977	173.5536074470055
-23.14999999999977	179.9158296606817
-22.14999999999977	186.3242168043848
-21.14999999999977	192.7789378715533
-20.14999999999977	199.28015187724586
-19.14999999999977	205.8280087902566
-18.14999999999977	212.42265035497752
-17.14999999999977	219.06421081862968
-16.14999999999977	225.75281757691843
-15.14999999999977	232.48859174908222
-14.14999999999977	239.2716486915918
-13.14999999999977	246.10209845835783

Temperature (degC)	Pressure (MPa)
-12.14999999999977	252.98004621411553
-11.14999999999977	259.9055926067186
-10.14999999999977	266.8788341032338
-9.14999999999977	273.89986329406923
-8.14999999999977	280.9687691687845
-7.14999999999977	288.0856373667463
-6.14999999999977	295.2505504053968
-5.14999999999977	302.46358788852365
-4.14999999999977	309.7248266966494
-3.149999999999773	317.03434116137527
-2.149999999999773	324.392203225316
-1.149999999999773	331.7984825890494
-0.1499999999997726	339.2532468463534
0.8500000000000227	346.75656160885075
1.8500000000000227	354.30849062106626
2.8500000000000227	361.90909586677515
3.8500000000000227	369.5584376674431
4.850000000000023	377.256574773465
5.850000000000023	385.0035644488379
6.850000000000023	392.799462549829
7.850000000000023	400.64432359817
8.850000000000023	408.538200849218
9.850000000000023	416.48114635551445
10.850000000000023	424.4732110261076
11.850000000000023	432.4204223445227
12.850000000000023	440.3432099616617
13.850000000000023	448.3098022334413
14.850000000000023	456.3202274567226
15.850000000000023	464.37451346631883
16.850000000000023	472.47268768120944
17.850000000000023	480.61477714822047
18.850000000000023	488.80080858338664
19.850000000000023	497.0308084111429
20.850000000000023	505.30480280151227
21.850000000000023	513.6228177054289
22.850000000000023	521.9848788883227
23.850000000000023	530.3910119620983
24.850000000000023	538.8412424156076
25.850000000000023	547.3355956437199
26.850000000000023	555.8740969750929
27.850000000000023	564.4567716987196
28.850000000000023	573.0836450893416
29.850000000000023	581.7547424317953
30.850000000000023	590.4700890443685
31.850000000000023	599.2297103012206

Temperature (degC)	Pressure (MPa)
32.85000000000002	608.0336316539425
33.85000000000002	616.8818786522887
34.85000000000002	625.7744769641538
35.85000000000002	634.711452394832
36.85000000000002	643.6928309055995
37.85000000000002	652.718638631672
38.85000000000002	661.7889018995672
39.85000000000002	670.9036472439122
40.85000000000002	680.062901423727
41.85000000000002	689.2666914382248
42.85000000000002	698.5150445421344
43.85000000000002	707.8079882606075
44.85000000000002	717.1455504037054
45.85000000000002	726.5277590805035
46.85000000000002	735.9546427128413
47.85000000000002	745.4262300487177
48.85000000000002	754.942550175383
49.85000000000002	764.5036325321136
50.85000000000002	774.1095069227126
51.85000000000002	783.7602035277372
52.85000000000002	793.4557529164746
53.85000000000002	803.1961860586844
54.85000000000002	812.9815343361082
55.85000000000002	822.8118295537729
56.85000000000002	832.6871039510978
57.85000000000002	842.607390212805
58.85000000000002	852.5727214796643
59.85000000000002	862.5831313590588
60.85000000000002	872.6386539354028
61.85000000000002	882.7393237804079
62.85000000000002	892.8851759631997
63.85000000000002	903.0762460603269
64.85000000000002	913.3125701656148
65.85000000000002	923.594184899927
66.85000000000002	933.9211274208003
67.85000000000002	944.2934354319821
68.85000000000002	954.7111471928646
69.85000000000002	965.1743015278325
70.85000000000002	975.6829378355167
71.85000000000002	986.237096097965
72.85000000000002	996.83681688973
73.85000000000002	1007.4821413869037
74.85000000000002	1018.1731113760462
75.85000000000002	1028.9097692630799
76.85000000000002	1039.6921580820986

Temperature (degC)	Pressure (MPa)
77.85000000000002	1050.5203215041322
78.85000000000002	1061.394303845835
79.85000000000002	1072.314150078146
80.85000000000002	1083.279905834863
81.85000000000002	1094.2916174211969
82.85000000000002	1105.349331822263
83.85000000000002	1116.4530967115227
84.85000000000002	1127.6029604591931
85.85000000000002	1138.7989721405982
86.85000000000002	1150.041181544489
87.85000000000002	1161.3296391813215
88.85000000000002	1172.6643962914825
89.85000000000002	1184.0455048534877
90.85000000000002	1195.4730175921313
91.85000000000002	1206.946987986608
92.85000000000002	1218.467470278581
93.85000000000002	1230.0345194802073
94.85000000000002	1241.648191382147
95.85000000000002	1253.3085425615022
96.85000000000002	1265.0156303897302
97.85000000000002	1276.7695130405134
98.85000000000002	1288.5702494975653
99.85000000000002	1300.4178995624231
100.85000000000002	1312.3125238621653
101.85000000000002	1324.2541838570846
102.85000000000002	1336.2429418483207
103.85000000000002	1348.2788609854142
104.85000000000002	1360.362005273839
105.85000000000002	1372.4924395824326
106.85000000000002	1384.670229650803
107.85000000000002	1396.8954420966256
108.85000000000002	1409.1681444229052
109.85000000000002	1421.48840502516
110.85000000000002	1433.8562931984848
111.85000000000002	1446.271879144591
112.85000000000002	1458.7352339787078
113.85000000000002	1471.2464297364138
114.85000000000002	1483.8055393803616
115.85000000000002	1496.412636806898
116.85000000000002	1509.0677968525672
117.85000000000002	1521.7710953004973
118.85000000000002	1534.5226088866607
119.85000000000002	1547.322415306002
120.85000000000002	1560.17059321841
121.85000000000002	1573.06722225457

Temperature (degC)	Pressure (MPa)
122.85000000000002	1586.0123830216198
123.85000000000002	1599.0061571086492
124.85000000000002	1612.0486270920428
125.85000000000002	1625.1398765406038

Table B100: Melting Points for Carbon Dioxide and 5% Water

Temperature (degC)	Pressure (MPa)
-54.1499999999998	0.7387844418958688
-53.1499999999998	4.17138327170712
-52.1499999999998	9.809811860018563
-51.1499999999998	15.335751025971279
-50.1499999999998	20.819342547606507
-49.1499999999998	26.289285366199852
-48.1499999999998	31.761251399838574
-47.1499999999998	37.245088987593036
-46.1499999999998	42.74753960305356
-45.1499999999998	48.2734943603183
-44.1499999999998	53.826655344235036
-43.1499999999998	59.40991663873497
-42.1499999999998	65.02559913729175
-41.1499999999998	70.67560299815172
-40.1499999999998	76.36151084845454
-39.1499999999998	82.08466007841662
-38.1499999999998	87.8461949499063
-37.1499999999998	93.64710507595959
-36.1499999999998	99.48825443313552
-35.1499999999998	105.37040363470912
-34.1499999999998	111.29422730316892
-33.1499999999998	117.26032781145186
-32.1499999999998	123.2692462883827
-31.14999999999977	129.3214715321274
-30.14999999999977	135.41744730247478
-29.14999999999977	141.55757834157015
-28.14999999999977	147.7422353863429
-27.14999999999977	153.9717593733607
-26.14999999999977	160.24646499093822
-25.14999999999977	166.56664369919272
-24.14999999999977	172.9325663130506
-23.14999999999977	179.34448522366407
-22.14999999999977	185.80263631866637
-21.14999999999977	192.30724065004074
-20.14999999999977	198.8585058892507
-19.14999999999977	205.45662760209095
-18.14999999999977	212.1017903699654
-17.14999999999977	218.79416877975302
-16.14999999999977	225.5339283006923
-15.14999999999977	232.32122606373355
-14.14999999999977	239.15621155635796
-13.14999999999977	246.03902724385514
-12.14999999999977	252.96980912638318

Temperature (degC)	Pressure (MPa)
-11.14999999999977	259.948687239787
-10.14999999999977	266.9757861069644
-9.14999999999977	274.05122514565977
-8.14999999999977	281.1751190377201
-7.14999999999977	288.3475780641871
-6.14999999999977	295.5687084100251
-5.14999999999977	302.83861244178195
-4.14999999999977	310.1573889610787
-3.149999999999773	317.52513343644284
-2.149999999999773	324.941938215726
-1.149999999999773	332.40789272104325
-0.1499999999997726	339.9230836279736
0.8500000000000227	347.4875950305484
1.8500000000000227	355.10150859337307
2.8500000000000227	362.76490369210865
3.8500000000000227	370.4778575433604
4.850000000000023	378.2404453249599
5.850000000000023	386.05274028747556
6.850000000000023	393.91481385773204
7.850000000000023	401.82673573502774
8.850000000000023	409.7885739806708
9.850000000000023	417.8003951013862
10.850000000000023	425.8622641271105
11.850000000000023	433.9742446836237
12.850000000000023	441.9615194814506
13.850000000000023	449.9594882711292
14.850000000000023	458.00086662300544
15.850000000000023	466.0856900951429
16.850000000000023	474.21399367346726
17.850000000000023	482.38581182902834
18.850000000000023	490.6011785721629
19.850000000000023	498.86012750376193
20.850000000000023	507.1626918638823
21.850000000000023	515.5089045778652
22.850000000000023	523.8987983001567
23.850000000000023	532.3324054559778
24.850000000000023	540.8097582810136
25.850000000000023	549.3308888592247
26.850000000000023	557.8958291589433
27.850000000000023	566.5046110673438
28.850000000000023	575.1572664234118
29.850000000000023	583.853827049498
30.850000000000023	592.5943247815624
31.850000000000023	601.3787914981847
32.85000000000002	610.2072591484218

Temperature (degC)	Pressure (MPa)
33.850000000000002	619.0797597785863
34.850000000000002	627.996325558021
35.850000000000002	636.9569888039183
36.850000000000002	645.9617820052569
37.850000000000002	655.0107378459066
38.850000000000002	664.1038892269472
39.850000000000002	673.2412692882589
40.850000000000002	682.4229114294203
41.850000000000002	691.6488493299606
42.850000000000002	700.9191169690001
43.850000000000002	710.233748644327
44.850000000000002	719.5927789909247
45.850000000000002	728.9962429989987
46.850000000000002	738.4441760315356
47.850000000000002	747.9366138413957
48.850000000000002	757.4735925879988
49.850000000000002	767.0551488536058
50.850000000000002	776.6813196592335
51.850000000000002	786.3521424802011
52.850000000000002	796.0676552613643
53.850000000000002	805.8278964320269
54.850000000000002	815.6329049205544
55.850000000000002	825.4827201687151
56.850000000000002	835.3773821457683
57.850000000000002	845.3169313622826
58.850000000000002	855.3014088837405
59.850000000000002	865.3308563439333
60.850000000000002	875.4053159581132
61.850000000000002	885.5248305359906
62.850000000000002	895.6894434945262
63.850000000000002	905.8991988705554
64.850000000000002	916.1541413332519
65.850000000000002	926.4543161964306
66.850000000000002	936.7997694307218
67.850000000000002	947.1905476755918
68.850000000000002	957.6266982512394
69.850000000000002	968.1082691703807
70.850000000000002	978.6353091499099
71.850000000000002	989.2078676224517
72.850000000000002	999.825994747823
73.850000000000002	1010.489741424382
74.850000000000002	1021.1991593003011
75.850000000000002	1031.9543007847462
76.850000000000002	1042.755219058979
77.850000000000002	1053.6019680873758

Temperature (degC)	Pressure (MPa)
78.85000000000002	1064.4946026283794
79.85000000000002	1075.4331782453849
80.85000000000002	1086.4177513175475
81.85000000000002	1097.448379050538
82.85000000000002	1108.5251194872394
83.85000000000002	1119.6480315183708
84.85000000000002	1130.8171748930756
85.85000000000002	1142.0326102294514
86.85000000000002	1153.294399025008
87.85000000000002	1164.6026036671105
88.85000000000002	1175.957287443351
89.85000000000002	1187.3585145518637
90.85000000000002	1198.80635011162
91.85000000000002	1210.300860172664
92.85000000000002	1221.8421117262908
93.85000000000002	1233.4301727151876
94.85000000000002	1245.0651120435484
95.85000000000002	1256.7469995870922
96.85000000000002	1268.4759062030832
97.85000000000002	1280.2519037402822
98.85000000000002	1292.0750650488321
99.85000000000002	1303.9454639901198
100.85000000000002	1315.863175446566
101.85000000000002	1327.828275331364
102.85000000000002	1339.840840598159
103.85000000000002	1351.9009492506711
104.85000000000002	1364.0086803522486
105.85000000000002	1376.1641140353554
106.85000000000002	1388.367331510993
107.85000000000002	1400.6184150780377
108.85000000000002	1412.9174481324997
109.85000000000002	1425.2645151767167
110.85000000000002	1437.6597018284365
111.85000000000002	1450.103094829806
112.85000000000002	1462.5947820562833
113.85000000000002	1475.1348525254205
114.85000000000002	1487.7233964055465
115.85000000000002	1500.3605050243111
116.85000000000002	1513.0462708771504
117.85000000000002	1525.7807876355464
118.85000000000002	1538.5641501552134
119.85000000000002	1551.3964544840753
120.85000000000002	1564.277797870133
121.85000000000002	1577.208278769117
122.85000000000002	1590.1879968519877

Temperature (degC)	Pressure (MPa)
123.85000000000002	1603.217053012236
124.85000000000002	1616.2955493729596
125.85000000000002	1629.4235892937581

Table B101: Melting Points for Carbon Dioxide and 1% Hydrogen

Temperature (degC)	Pressure (MPa)
-59.1499999999998	0.49637790165679574
-58.1499999999998	2.48824362710009
-57.1499999999998	7.102296521138057
-56.1499999999998	11.760937819520123
-55.1499999999998	16.464242105154124
-54.1499999999998	21.212201797132117
-53.1499999999998	26.004806365557204
-52.1499999999998	30.842046418723623
-51.1499999999998	35.72391387011247
-50.1499999999998	40.65040170595508
-49.1499999999998	45.62150375742951
-48.1499999999998	50.637214523539654
-47.1499999999998	55.697529038547316
-46.1499999999998	60.80244277256097
-45.1499999999998	65.95195155600733
-44.1499999999998	71.14605152134042
-43.1499999999998	76.38473905733997
-42.1499999999998	81.66801077274096
-41.1499999999998	86.99586346690138
-40.1499999999998	92.36829410584441
-39.1499999999998	97.78529980247806
-38.1499999999998	103.24687780009084
-37.1499999999998	108.75302545846083
-36.1499999999998	114.30374024205929
-35.1499999999998	119.89901970996277
-34.1499999999998	125.53886150715974
-33.1499999999998	131.22326335701712
-32.1499999999998	136.95222305470548
-31.14999999999977	142.72573846143905
-30.14999999999977	148.54380749939315
-29.14999999999977	154.40642814720707
-28.14999999999977	160.31359843598494
-27.14999999999977	166.26531644571935
-26.14999999999977	172.2615803020897
-25.14999999999977	178.30238817357832
-24.14999999999977	184.3877382688691
-23.14999999999977	190.5176288344879
-22.14999999999977	196.69205815266338
-21.14999999999977	202.91102453937194
-20.14999999999977	209.17452634255778
-19.14999999999977	215.48256194049782
-18.14999999999977	221.83512974030262
-17.14999999999977	228.2322281765351

Temperature (degC)	Pressure (MPa)
-16.14999999999977	234.67385570993912
-15.14999999999977	241.16001082626002
-14.14999999999977	247.69069203515403
-13.14999999999977	254.26589786918058
-12.14999999999977	260.8856268828554
-11.14999999999977	267.5498776517761
-10.14999999999977	274.2586487718066
-9.14999999999977	281.0119388583086
-8.14999999999977	287.80974654542774
-7.14999999999977	294.65207048542266
-6.14999999999977	301.5389093480335
-5.14999999999977	308.4702618198909
-4.14999999999977	315.4461266039559
-3.149999999999773	322.46650241899533
-2.149999999999773	329.5313879990852
-1.149999999999773	336.6407820931396
-0.1499999999997726	343.7946834644676
0.85000000000000227	350.99309089035245
1.85000000000000227	358.23600316164976
2.85000000000000227	365.5234190824127
3.85000000000000227	372.8553374695264
4.8500000000000023	380.2317571523678
5.8500000000000023	387.65267697248095
6.8500000000000023	395.11809578325943
7.8500000000000023	402.62801244965533
8.8500000000000023	410.1824258478913
9.8500000000000023	417.7813348651914
10.8500000000000023	425.42473839951947
11.8500000000000023	433.112635359333
12.8500000000000023	440.84502466334243
13.8500000000000023	448.62190524028324
14.8500000000000023	456.44327602869777
15.8500000000000023	464.3091359767235
16.8500000000000023	472.21948404188913
17.8500000000000023	480.17431919092184
18.8500000000000023	488.1736403995618
19.8500000000000023	496.2174466523747
20.8500000000000023	504.3057369425857
21.8500000000000023	512.4385102719043
22.8500000000000023	520.6157656503693
23.8500000000000023	528.8375020961861
24.8500000000000023	537.1037186355816
25.8500000000000023	545.414414302651
26.8500000000000023	553.7695881392247
27.8500000000000023	562.1692391947244

Temperature (degC)	Pressure (MPa)
28.8500000000000023	570.6133665260352
29.8500000000000023	579.1019691973767
30.8500000000000023	587.6350462801777
31.8500000000000023	596.2125968529551
32.850000000000002	604.8346200012
33.850000000000002	613.5011148172621
34.850000000000002	622.2120804002396
35.850000000000002	630.967515855872
36.850000000000002	639.7674202964379
37.850000000000002	648.6117928406542
38.850000000000002	657.5006326135734
39.850000000000002	666.4339387464945
40.850000000000002	675.411710376864
41.850000000000002	684.4339466481907
42.850000000000002	693.5006467099528
43.850000000000002	702.6118097175147
44.850000000000002	711.7674348320437
45.850000000000002	720.9675212204254
46.850000000000002	730.2120680551842
47.850000000000002	739.5010745144104
48.850000000000002	748.8345397816814
49.850000000000002	758.2124630459826
50.850000000000002	767.6348435016453
51.850000000000002	777.1016803482665
52.850000000000002	786.6129727906462
53.850000000000002	796.1687200387164
54.850000000000002	805.7689213074763
55.850000000000002	815.4135758169282
56.850000000000002	825.1026827920144
57.850000000000002	834.8362414625561
58.850000000000002	844.6142510631873
59.850000000000002	854.4367108333051
60.850000000000002	864.3036200170071
61.850000000000002	874.2149778630317
62.850000000000002	884.1707836247072
63.850000000000002	894.1710365598957
64.850000000000002	904.2157359309364
65.850000000000002	914.3048810046059
66.850000000000002	924.4384710520438
67.850000000000002	934.6165053487284
68.850000000000002	944.8389831744107
69.850000000000002	955.1059038130676
70.850000000000002	965.4172665528632
71.850000000000002	975.7730706860924
72.850000000000002	986.1733155091393

Temperature (degC)	Pressure (MPa)
73.85000000000002	996.6180003224366
74.85000000000002	1007.1071244304117
75.85000000000002	1017.6406871414525
76.85000000000002	1028.2186877678598
77.85000000000002	1038.841125625807
78.85000000000002	1049.508000353012
79.85000000000002	1060.2193103201362
80.85000000000002	1070.9750558078638
81.85000000000002	1081.7752358297428
82.85000000000002	1092.6198497207095
83.85000000000002	1103.5088968193375
84.85000000000002	1114.4423764677977
85.85000000000002	1125.4202880118244
86.85000000000002	1136.4426308006841
87.85000000000002	1147.5094041871282
88.85000000000002	1158.62060752737
89.85000000000002	1169.7762401810462
90.85000000000002	1180.976301511183
91.85000000000002	1192.2207908841604
92.85000000000002	1203.5097076696875
93.85000000000002	1214.8430512407629
94.85000000000002	1226.2208209736411
95.85000000000002	1237.643016247817
96.85000000000002	1249.109636445974
97.85000000000002	1260.6206809539658
98.85000000000002	1272.176149160791
99.85000000000002	1283.7760404585529
100.85000000000002	1295.420354242437
101.85000000000002	1307.1090899106773
102.85000000000002	1318.8422468645385
103.85000000000002	1330.6198245082792
104.85000000000002	1342.4418222491238
105.85000000000002	1354.3082394972455
106.85000000000002	1366.21907566573
107.85000000000002	1378.1743301705512
108.85000000000002	1390.1740024305536
109.85000000000002	1402.218091867418
110.85000000000002	1414.3065979056305
111.85000000000002	1426.4395199724827
112.85000000000002	1438.616857498016
113.85000000000002	1450.83860991502
114.85000000000002	1463.1047766590045
115.85000000000002	1475.4153571681618
116.85000000000002	1487.7703508833697
117.85000000000002	1500.1697572481378

Temperature (degC)	Pressure (MPa)
118.85000000000002	1512.6135757086122
119.85000000000002	1525.1018057135414
120.85000000000002	1537.6344467142535
121.85000000000002	1550.2114981646284
122.85000000000002	1562.8329595211017
123.85000000000002	1575.4988302426093
124.85000000000002	1588.209109790586
125.85000000000002	1600.9637976289569

Table B102: Melting Points for Carbon Dioxide and 2% Hydrogen

Temperature (degC)	Pressure (MPa)
-61.1499999999998	0.4757042595872256
-60.1499999999998	2.543328510307424
-59.1499999999998	7.056491258297667
-58.1499999999998	11.613487591590069
-57.1499999999998	16.21444107497987
-56.1499999999998	20.859335410381043
-55.1499999999998	25.54814963789882
-54.1499999999998	30.280865222369375
-53.1499999999998	35.0574662391859
-52.1499999999998	39.87793888503028
-51.1499999999998	44.742271021063495
-50.1499999999998	49.65045182199582
-49.1499999999998	54.60247151467292
-48.1499999999998	59.59832118246759
-47.1499999999998	64.63799261683197
-46.1499999999998	69.72147820279419
-45.1499999999998	74.84877082920354
-44.1499999999998	80.01986381731935
-43.1499999999998	85.23475086321145
-42.1499999999998	90.4934259907181
-41.1499999999998	95.79588351259834
-40.1499999999998	101.14211799812368
-39.1499999999998	106.53212424578679
-38.1499999999998	111.9658972601356
-37.1499999999998	117.44343223194781
-36.1499999999998	122.96472452115468
-35.1499999999998	128.5297696420321
-34.1499999999998	134.13856325028388
-33.1499999999998	139.791101131714
-32.1499999999998	145.48737919224013
-31.14999999999977	151.22739344904934
-30.14999999999977	157.01114002273292
-29.14999999999977	162.8386151302565
-28.14999999999977	168.70981507866017
-27.14999999999977	174.62473625938898
-26.14999999999977	180.58337514316958
-25.14999999999977	186.5857282753753
-24.14999999999977	192.6317922718082
-23.14999999999977	198.72156381485897
-22.14999999999977	204.85503964999901
-21.14999999999977	211.03221658256376
-20.14999999999977	217.2530914747994
-19.14999999999977	223.5176612431464

Temperature (degC)	Pressure (MPa)
-18.14999999999977	229.82592285573193
-17.14999999999977	236.17787333004887
-16.14999999999977	242.5735097308117
-15.14999999999977	249.012829167961
-14.14999999999977	255.4958287948067
-13.14999999999977	262.0225058063062
-12.14999999999977	268.5928574374478
-11.14999999999977	275.20688096174547
-10.14999999999977	281.8645736898256
-9.14999999999977	288.56593296810786
-8.14999999999977	295.3109561775593
-7.14999999999977	302.0996407325267
-6.14999999999977	308.9319840796347
-5.14999999999977	315.8079836967515
-4.14999999999977	322.7276370920043
-3.149999999999773	329.6909418028561
-2.149999999999773	336.697895395228
-1.149999999999773	343.7484954626681
-0.1499999999997726	350.84273962556244
0.8500000000000227	357.9806255303886
1.8500000000000227	365.16215084900233
2.8500000000000227	372.38731327795983
3.8500000000000227	379.65611053787416
4.850000000000023	386.9685403727992
5.850000000000023	394.3246005496422
6.850000000000023	401.7242888576044
7.850000000000023	409.1676031076424
8.850000000000023	416.6545411319578
9.850000000000023	424.18510078350454
10.850000000000023	431.75927993551716
11.850000000000023	439.37707648105993
12.850000000000023	447.03848833259457
13.850000000000023	454.74351342155967
14.850000000000023	462.492149697976
15.850000000000023	470.28439513005685
16.850000000000023	478.1202477038381
17.850000000000023	485.999705422822
18.850000000000023	493.9227663076338
19.850000000000023	501.8894283956851
20.850000000000023	509.8996897408607
21.850000000000023	517.9535484132031
22.850000000000023	526.0510024986149
23.850000000000023	534.1920500985741
24.850000000000023	542.3766893298481
25.850000000000023	550.6049183242246

Temperature (degC)	Pressure (MPa)
26.850000000000023	558.8767352282566
27.850000000000023	567.1921382029989
28.850000000000023	575.5511254237708
29.850000000000023	583.9536950799076
30.850000000000023	592.3998453745401
31.850000000000023	600.8895745243649
32.850000000000002	609.4228807594244
33.850000000000002	617.9997623228979
34.850000000000002	626.6202174708989
35.850000000000002	635.2842444722658
36.850000000000002	643.9918416083763
37.850000000000002	652.7430071729555
38.850000000000002	661.5377394718867
39.850000000000002	670.3760368230404
40.850000000000002	679.2578975560931
41.850000000000002	688.1833200123608
42.850000000000002	697.1523025446298
43.850000000000002	706.1648435169946
44.850000000000002	715.2209413047049
45.850000000000002	724.320594294008
46.850000000000002	733.4638008819988
47.850000000000002	742.6505594764709
48.850000000000002	751.8808684957779
49.850000000000002	761.1547263686901
50.850000000000002	770.4721315342584
51.850000000000002	779.8330824416826
52.850000000000002	789.2375775501747
53.850000000000002	798.6856153288381
54.850000000000002	808.1771942565409
55.850000000000002	817.7123128217878
56.850000000000002	827.2909695226081
57.850000000000002	836.9131628664359
58.850000000000002	846.5788913699888
59.850000000000002	856.2881535591688
60.850000000000002	866.0409479689384
61.850000000000002	875.8372731432204
62.850000000000002	885.6771276347931
63.850000000000002	895.5605100051813
64.850000000000002	905.4874188245567
65.850000000000002	915.4578526716433
66.850000000000002	925.4718101336084
67.850000000000002	935.5292898059822
68.850000000000002	945.6302902925466
69.850000000000002	955.7748102052573
70.850000000000002	965.9628481641461

Temperature (degC)	Pressure (MPa)
71.85000000000002	976.1944027972287
72.85000000000002	986.469472740427
73.85000000000002	996.7880566374773
74.85000000000002	1007.150153139842
75.85000000000002	1017.5557609066368
76.85000000000002	1028.0048786045406
77.85000000000002	1038.4975049077227
78.85000000000002	1049.0336384977559
79.85000000000002	1059.6132780635462
80.85000000000002	1070.2364223012542
81.85000000000002	1080.9030699142197
82.85000000000002	1091.6132196128908
83.85000000000002	1102.3668701147508
84.85000000000002	1113.1640201442422
85.85000000000002	1124.004668432706
86.85000000000002	1134.8888137183071
87.85000000000002	1145.8164547459633
88.85000000000002	1156.7875902672888
89.85000000000002	1167.8022190405163
90.85000000000002	1178.8603398304463
91.85000000000002	1189.9619514083702
92.85000000000002	1201.107052552013
93.85000000000002	1212.2956420454793
94.85000000000002	1223.5277186791784
95.85000000000002	1234.803281249772
96.85000000000002	1246.1223285601206
97.85000000000002	1257.484859419214
98.85000000000002	1268.8908726421225
99.85000000000002	1280.3403670499372
100.85000000000002	1291.8333414697145
101.85000000000002	1303.3697947344249
102.85000000000002	1314.9497256828922
103.85000000000002	1326.5731331597467
104.85000000000002	1338.2400160153697
105.85000000000002	1349.9503731058426
106.85000000000002	1361.704203292894
107.85000000000002	1373.5015054438531
108.85000000000002	1385.3422784315992
109.85000000000002	1397.2265211345082
110.85000000000002	1409.1542324364077
111.85000000000002	1421.1254112265335
112.85000000000002	1433.1400563994755
113.85000000000002	1445.1981668551348
114.85000000000002	1457.2997414986799
115.85000000000002	1469.444779240492

Temperature (degC)	Pressure (MPa)
116.85000000000002	1481.6332789961366
117.85000000000002	1493.8652396863051
118.85000000000002	1506.140660236776
119.85000000000002	1518.4595395783826
120.85000000000002	1530.8218766469479
121.85000000000002	1543.227670383262
122.85000000000002	1555.676919733037
123.85000000000002	1568.169623646857
124.85000000000002	1580.7057810801523
125.85000000000002	1593.28539099315

Table B103: Melting Points for Carbon Dioxide and 3% Hydrogen

Temperature (degC)	Pressure (MPa)
-63.1499999999998	0.4558916539880429
-62.1499999999998	2.5951010617707375
-61.1499999999998	7.009982513106324
-60.1499999999998	11.467981059826085
-59.1499999999998	15.969249530592814
-58.1499999999998	20.513762009276917
-57.1499999999998	25.101487235010588
-56.1499999999998	29.73239777698495
-55.1499999999998	34.40647011456537
-54.1499999999998	39.123683871751965
-53.1499999999998	43.884021131383236
-52.1499999999998	48.687465914015085
-51.1499999999998	53.53400379140301
-50.1499999999998	58.42362159786537
-49.1499999999998	63.35630721146024
-48.1499999999998	68.33204938528131
-47.1499999999998	73.35083761525212
-46.1499999999998	78.41266203494953
-45.1499999999998	83.51751333076591
-44.1499999999998	88.66538267262347
-43.1499999999998	93.85626165674948
-42.1499999999998	99.09014225793035
-41.1499999999998	104.36701678930622
-40.1499999999998	109.68687786823101
-39.1499999999998	115.04971838705893
-38.1499999999998	120.4555314879735
-37.1499999999998	125.90431054115912
-36.1499999999998	131.3960491257574
-35.1499999999998	136.9307410131651
-34.1499999999998	142.5083801523076
-33.1499999999998	148.12896065659672
-32.1499999999998	153.79247679232535
-31.14999999999977	159.4989229683015
-30.14999999999977	165.2482937265511
-29.14999999999977	171.04058373395094
-28.14999999999977	176.8757877746725
-27.14999999999977	182.75390074333527
-26.14999999999977	188.67491763878485
-25.14999999999977	194.63883355842324
-24.14999999999977	200.64564369302713
-23.14999999999977	206.69534332199913
-22.14999999999977	212.78792780900983
-21.14999999999977	218.92339259797745

Temperature (degC)	Pressure (MPa)
-20.14999999999977	225.10173320937048
-19.14999999999977	231.32294523677893
-18.14999999999977	237.58702434373933
-17.14999999999977	243.89396626079275
-16.14999999999977	250.2437667827392
-15.14999999999977	256.6364217660884
-14.14999999999977	263.0719271266746
-13.14999999999977	269.55027883742883
-12.14999999999977	276.0714729262914
-11.14999999999977	282.63550547425706
-10.14999999999977	289.24237261353505
-9.14999999999977	295.89207052582117
-8.14999999999977	302.584595440669
-7.14999999999977	309.31994363395535
-6.14999999999977	316.09811142642934
-5.14999999999977	322.91909518234104
-4.14999999999977	329.7828913081438
-3.149999999999773	336.6894962512644
-2.149999999999773	343.63890649893636
-1.149999999999773	350.63111857709055
-0.1499999999997726	357.66612904930037
0.8500000000000227	364.74393451578277
1.8500000000000227	371.8645316124376
2.8500000000000227	379.02791700993845
3.8500000000000227	386.23408741286414
4.850000000000023	393.48303955886433
5.850000000000023	400.774770217869
6.850000000000023	408.10927619132343
7.850000000000023	415.48655431146506
8.850000000000023	422.90660144061957
9.850000000000023	430.36941447053675
10.850000000000023	437.87499032174287
11.850000000000023	445.4233259429268
12.850000000000023	453.0144183103416
13.850000000000023	460.6482644272388
14.850000000000023	468.32486132331394
15.850000000000023	476.0442060541781
16.850000000000023	483.8062957008484
17.850000000000023	491.6111273692525
18.850000000000023	499.45869818975586
19.850000000000023	507.34900531670144
20.850000000000023	515.2820459279661
21.850000000000023	523.2578172245304
22.850000000000023	531.276316430066
23.850000000000023	539.337540790532

Temperature (degC)	Pressure (MPa)
24.850000000000023	547.441487573789
25.850000000000023	555.5881540692162
26.850000000000023	563.7775375873551
27.850000000000023	572.0096354595476
28.850000000000023	580.284445037596
29.850000000000023	588.6019636934293
30.850000000000023	596.9621888187794
31.850000000000023	605.3651178248655
32.850000000000002	613.8107481420886
33.850000000000002	622.2990772197381
34.850000000000002	630.8301025256947
35.850000000000002	639.4038215461557
36.850000000000002	648.0202317853599
37.850000000000002	656.6793307653204
38.850000000000002	665.381116025562
39.850000000000002	674.1255851228747
40.850000000000002	682.9127356310593
41.850000000000002	691.7425651406928
42.850000000000002	700.6150712588902
43.850000000000002	709.5302516090787
44.850000000000002	718.488103830772
45.850000000000002	727.4886255793492
46.850000000000002	736.5318145258498
47.850000000000002	745.6176683567552
48.850000000000002	754.7461847737973
49.850000000000002	763.9173614937463
50.850000000000002	773.1311962482282
51.850000000000002	782.387686783528
52.850000000000002	791.6868308604047
53.850000000000002	801.0286262539088
54.850000000000002	810.4130707532098
55.850000000000002	819.8401621614116
56.850000000000002	829.3098982953927
57.850000000000002	838.8222769856294
58.850000000000002	848.3772960760391
59.850000000000002	857.9749534238188
60.850000000000002	867.6152468992816
61.850000000000002	877.2981743857126
62.850000000000002	887.0237337792066
63.850000000000002	896.7919229885302
64.850000000000002	906.6027399349696
65.850000000000002	916.4561825521902
66.850000000000002	926.3522487860969
67.850000000000002	936.2909365946975
68.850000000000002	946.272243947964

Temperature (degC)	Pressure (MPa)
69.85000000000002	956.2961688277067
70.85000000000002	966.3627092274385
71.85000000000002	976.4718631522488
72.85000000000002	986.6236286186793
73.85000000000002	996.8180036546016
74.85000000000002	1007.0549862990963
75.85000000000002	1017.3345746023258
76.85000000000002	1027.6567666254307
77.85000000000002	1038.021560440407
78.85000000000002	1048.4289541299947
79.85000000000002	1058.878945787565
80.85000000000002	1069.3715335170148
81.85000000000002	1079.9067154326578
82.85000000000002	1090.4844896591146
83.85000000000002	1101.1048543312174
84.85000000000002	1111.7678075938973
85.85000000000002	1122.4733476020936
86.85000000000002	1133.2214725206481
87.85000000000002	1144.0121805242118
88.85000000000002	1154.8454697971426
89.85000000000002	1165.7213385334196
90.85000000000002	1176.6397849365394
91.85000000000002	1187.6008072194386
92.85000000000002	1198.6044036043872
93.85000000000002	1209.6505723229152
94.85000000000002	1220.739311615711
95.85000000000002	1231.8706197325444
96.85000000000002	1243.0444949321784
97.85000000000002	1254.2609354822905
98.85000000000002	1265.5199396593778
99.85000000000002	1276.8215057486866
100.85000000000002	1288.1656320441296
101.85000000000002	1299.5523168482075
102.85000000000002	1310.9815584719258
103.85000000000002	1322.4533552347239
104.85000000000002	1333.9677054643942
105.85000000000002	1345.5246074970164
106.85000000000002	1357.1240596768712
107.85000000000002	1368.766060356377
108.85000000000002	1380.4506078960148
109.85000000000002	1392.1777006642556
110.85000000000002	1403.9473370374963
111.85000000000002	1415.7595153999853
112.85000000000002	1427.6142341437549
113.85000000000002	1439.5114916685595

Temperature (degC)	Pressure (MPa)
114.85000000000002	1451.451286381798
115.85000000000002	1463.4336166984633
116.85000000000002	1475.4584810410697
117.85000000000002	1487.5258778395857
118.85000000000002	1499.6358055313783
119.85000000000002	1511.788262561151
120.85000000000002	1523.9832473808704
121.85000000000002	1536.2207584497282
122.85000000000002	1548.5007942340592
123.85000000000002	1560.8233532072875
124.85000000000002	1573.1884338498796
125.85000000000002	1585.596034649277

Table B104: Melting Points for Carbon Dioxide and 4% Hydrogen

Temperature (degC)	Pressure (MPa)
-65.1499999999998	0.43690422355329833
-64.1499999999998	2.643703660611341
-63.1499999999998	6.962849965976878
-62.1499999999998	11.324430044475816
-61.1499999999998	15.728610830893663
-60.1499999999998	20.17535609182128
-59.1499999999998	24.664624418766536
-58.1499999999998	29.196379731634167
-57.1499999999998	33.7705911492807
-56.1499999999998	38.38723193259394
-55.1499999999998	43.046278570809264
-54.1499999999998	47.74771009404786
-53.1499999999998	52.49150756545149
-52.1499999999998	57.27765370262945
-51.1499999999998	62.10613259093602
-50.1499999999998	66.97692946251792
-49.1499999999998	71.89003052320241
-48.1499999999998	76.84542281478542
-47.1499999999998	81.84309410394943
-46.1499999999998	86.88303279153936
-45.1499999999998	91.96522783762451
-44.1499999999998	97.08966869896507
-43.1499999999998	102.25634527635108
-42.1499999999998	107.46524786987615
-41.1499999999998	112.71636714066457
-40.1499999999998	118.00969407788918
-39.1499999999998	123.34521997016195
-38.1499999999998	128.7229363805771
-37.1499999999998	134.14283512481376
-36.1499999999998	139.60490825183192
-35.1499999999998	145.1091480267702
-34.1499999999998	150.65554691572612
-33.1499999999998	156.2440975721632
-32.1499999999998	161.87479282471313
-31.14999999999977	167.54762566620224
-30.14999999999977	173.2625892437349
-29.14999999999977	179.0196768497106
-28.14999999999977	184.8188819136602
-27.14999999999977	190.6601979948005
-26.14999999999977	196.54361877523587
-25.14999999999977	202.46913805372222
-24.14999999999977	208.4367497399432
-23.14999999999977	214.4464478492375

Temperature (degC)	Pressure (MPa)
-22.14999999999977	220.49822649773327
-21.14999999999977	226.59207989785105
-20.14999999999977	232.72800235413175
-19.14999999999977	238.90598825936794
-18.14999999999977	245.1260320910032
-17.14999999999977	251.3881284077735
-16.14999999999977	257.692271846579
-15.14999999999977	264.0384571195495
-14.14999999999977	270.42667901130795
-13.14999999999977	276.8569323763914
-12.14999999999977	283.3292121368369
-11.14999999999977	289.84351327990885
-10.14999999999977	296.3998308559544
-9.14999999999977	302.99815997638586
-8.14999999999977	309.63849581176964
-7.14999999999977	316.32083359002627
-6.14999999999977	323.0451685947189
-5.14999999999977	329.8114961634349
-4.14999999999977	336.6198116862519
-3.149999999999773	343.470110604275
-2.149999999999773	350.36238840825104
-1.149999999999773	357.29664063724863
-0.1499999999997726	364.2728628773958
0.8500000000000227	371.29105076068555
1.8500000000000227	378.3511999638235
2.8500000000000227	385.4533062071376
3.8500000000000227	392.59736525352986
4.850000000000023	399.7833729074723
5.850000000000023	407.0113250140505
6.850000000000023	414.28121745804117
7.850000000000023	421.59304616302853
8.850000000000023	428.9468070905596
9.850000000000023	436.3424962393263
10.850000000000023	443.7801096443863
11.850000000000023	451.2596433764054
12.850000000000023	458.7810935409333
13.850000000000023	466.3444562777092
14.850000000000023	473.94972775997906
15.850000000000023	481.5969041938553
16.850000000000023	489.28598181768274
17.850000000000023	497.01695690143487
18.850000000000023	504.7898257461286
19.850000000000023	512.604584683258
20.850000000000023	520.4612300742468
21.850000000000023	528.3597583099171

Temperature (degC)	Pressure (MPa)
22.850000000000023	536.3001658099776
23.850000000000023	544.2824490225257
24.850000000000023	552.3066044235644
25.850000000000023	560.3726285165365
26.850000000000023	568.4805178318697
27.850000000000023	576.6302689265362
28.850000000000023	584.8218783836261
29.850000000000023	593.055342811931
30.850000000000023	601.33065884554
31.850000000000023	609.6478231434475
32.850000000000002	618.0068323891733
33.850000000000002	626.4076832903847
34.850000000000002	634.8503725785434
35.850000000000002	643.3348970085469
36.850000000000002	651.8612533583852
37.850000000000002	660.4294384288123
38.850000000000002	669.0394490430127
39.850000000000002	677.6912820462907
40.850000000000002	686.3849343057524
41.850000000000002	695.1204027100083
42.850000000000002	703.8976841688809
43.850000000000002	712.7167756131058
44.850000000000002	721.5776739940635
45.850000000000002	730.4803762834894
46.850000000000002	739.4248794732194
47.850000000000002	748.4111805749186
48.850000000000002	757.4392766198251
49.850000000000002	766.5091646585014
50.850000000000002	775.6208417605831
51.850000000000002	784.7743050145469
52.850000000000002	793.9695515274705
53.850000000000002	803.2065784247958
54.850000000000002	812.4853828501152
55.850000000000002	821.8059619649429
56.850000000000002	831.1683129484995
57.850000000000002	840.5724329975044
58.850000000000002	850.0183193259567
59.850000000000002	859.5059691649444
60.850000000000002	869.0353797624377
61.850000000000002	878.606548383093
62.850000000000002	888.2194723080622
63.850000000000002	897.8741488348021
64.850000000000002	907.5705752768941
65.850000000000002	917.3087489638576
66.850000000000002	927.0886672409721

Temperature (degC)	Pressure (MPa)
67.85000000000002	936.910327469105
68.85000000000002	946.7737270245381
69.85000000000002	956.6788632988014
70.85000000000002	966.6257336985017
71.85000000000002	976.6143356451643
72.85000000000002	986.6446665750713
73.85000000000002	996.7167239391065
74.85000000000002	1006.8305052025989
75.85000000000002	1016.9860078451699
76.85000000000002	1027.1832293605855
77.85000000000002	1037.4221672566098
78.85000000000002	1047.7028190548622
79.85000000000002	1058.0251822906687
80.85000000000002	1068.3892545129263
81.85000000000002	1078.7950332839725
82.85000000000002	1089.2425161794379
83.85000000000002	1099.731700788118
84.85000000000002	1110.2625847118475
85.85000000000002	1120.8351655653635
86.85000000000002	1131.4494409761808
87.85000000000002	1142.1054085844714
88.85000000000002	1152.8030660429365
89.85000000000002	1163.5424110166828
90.85000000000002	1174.323441183117
91.85000000000002	1185.1461542318057
92.85000000000002	1196.0105478643825
93.85000000000002	1206.9166197944219
94.85000000000002	1217.8643677473228
95.85000000000002	1228.8537894602111
96.85000000000002	1239.8848826818187
97.85000000000002	1250.9576451723817
98.85000000000002	1262.0720747035334
99.85000000000002	1273.228169058199
100.85000000000002	1284.4259260304955
101.85000000000002	1295.6653434256211
102.85000000000002	1306.946419059766
103.85000000000002	1318.2691507600096
104.85000000000002	1329.6335363642202
105.85000000000002	1341.039573720963
106.85000000000002	1352.487260689402
107.85000000000002	1363.9765951392092
108.85000000000002	1375.5075749504706
109.85000000000002	1387.0801980135916
110.85000000000002	1398.6944622292167
111.85000000000002	1410.350365508138

Temperature (degC)	Pressure (MPa)
112.85000000000002	1422.047905771192
113.85000000000002	1433.7870809492
114.85000000000002	1445.567888982865
115.85000000000002	1457.3903278226908
116.85000000000002	1469.2543954288935
117.85000000000002	1481.1600897713374
118.85000000000002	1493.1074088294363
119.85000000000002	1505.0963505920822
120.85000000000002	1517.1269130575613
121.85000000000002	1529.1990942334805
122.85000000000002	1541.3128921366867
123.85000000000002	1553.4683047932028
124.85000000000002	1565.6653302381224
125.85000000000002	1577.9039665155751

Table B105: Melting Points for Carbon Dioxide and 5% Hydrogen

Temperature (degC)	Pressure (MPa)
-67.1499999999998	0.41870760056449025
-66.1499999999998	2.6892745803209843
-65.1499999999998	6.915170016871206
-64.1499999999998	11.182844963112137
-63.1499999999998	15.49246885619896
-62.1499999999998	19.84399461848735
-61.1499999999998	24.237370867276937
-60.1499999999998	28.67255311719785
-59.1499999999998	33.14950335542789
-58.1499999999998	37.668188682086445
-57.1499999999998	42.22858017067424
-56.1499999999998	46.83065201832425
-55.1499999999998	51.474380920331086
-54.1499999999998	56.159745604738795
-53.1499999999998	60.88672648012418
-52.1499999999998	65.65530536428501
-51.1499999999998	70.46546527171445
-50.1499999999998	75.31719024453896
-49.1499999999998	80.21046521614886
-48.1499999999998	85.14527589981057
-47.1499999999998	90.12160869665095
-46.1499999999998	95.13945061886692
-45.1499999999998	100.19878922504643
-44.1499999999998	105.299612565232
-43.1499999999998	110.44190913390241
-42.1499999999998	115.62566782944643
-41.1499999999998	120.8508779190104
-40.1499999999998	126.11752900782392
-39.1499999999998	131.42561101228694
-38.1499999999998	136.77511413623807
-37.1499999999998	142.16602884992682
-36.1499999999998	147.59834587130203
-35.1499999999998	153.07205614929106
-34.1499999999998	158.58715084880237
-33.1499999999998	164.14362133722236
-32.1499999999998	169.74145917221824
-31.14999999999977	175.38065609068462
-30.14999999999977	181.06120399869508
-29.14999999999977	186.78309496234382
-28.14999999999977	192.54632119937256
-27.14999999999977	198.3508750714965
-26.14999999999977	204.19674907735632
-25.14999999999977	210.08393584602553

Temperature (degC)	Pressure (MPa)
-24.14999999999977	216.01242813101965
-23.14999999999977	221.98221880475464
-22.14999999999977	227.9933008534108
-21.14999999999977	234.04566737216476
-20.14999999999977	240.13931156075074
-19.14999999999977	246.27422671932715
-18.14999999999977	252.45040624461595
-17.14999999999977	258.66784362629
-16.14999999999977	264.9265324435934
-15.14999999999977	271.2264663621686
-14.14999999999977	277.56763913107534
-13.14999999999977	283.9500445799879
-12.14999999999977	290.3736766165508
-11.14999999999977	296.8385292238904
-10.14999999999977	303.3445964582588
-9.14999999999977	309.8918724468053
-8.14999999999977	316.48035138547436
-7.14999999999977	323.110027537003
-6.14999999999977	329.7808952290244
-5.14999999999977	336.49294885226914
-4.14999999999977	343.2461828588491
-3.149999999999773	350.0405917606289
-2.149999999999773	356.8761701276686
-1.149999999999773	363.7529125867435
-0.1499999999997726	370.6708138199272
0.8500000000000227	377.6298685632397
1.8500000000000227	384.63007160535506
2.8500000000000227	391.6714177863598
3.8500000000000227	398.75390199656994
4.850000000000023	405.8775191753909
5.850000000000023	413.04226431022784
6.850000000000023	420.24813243544014
7.850000000000023	427.4951186313264
8.850000000000023	434.78321802316646
9.850000000000023	442.11242578028236
10.850000000000023	449.4827371151436
11.850000000000023	456.89414728250375
12.850000000000023	464.3466515785646
13.850000000000023	471.84024534017374
14.850000000000023	479.37492394404677
15.850000000000023	486.95068280602123
16.850000000000023	494.5675173803276
17.850000000000023	502.22542315889166
18.850000000000023	509.9243956706553
19.850000000000023	517.6644304809196

Temperature (degC)	Pressure (MPa)
20.850000000000023	525.4455231907128
21.850000000000023	533.2676694361706
22.850000000000023	541.1308648879428
23.850000000000023	549.0351052506106
24.850000000000023	556.9803862621278
25.850000000000023	564.9667036932761
26.850000000000023	572.9940533471317
27.850000000000023	581.0624310585539
28.850000000000023	589.1718326936854
29.850000000000023	597.3222541494625
30.850000000000023	605.5136913531453
31.850000000000023	613.7461402618582
32.850000000000002	622.0195968621363
33.850000000000002	630.3340571694954
34.850000000000002	638.6895172280008
35.850000000000002	647.0859731098595
36.850000000000002	655.5234209150115
37.850000000000002	664.0018567707343
38.850000000000002	672.5212768312649
39.850000000000002	681.0816772774209
40.850000000000002	689.6830543162323
41.850000000000002	698.3254041805889
42.850000000000002	707.0087231288907
43.850000000000002	715.7330074446983
44.850000000000002	724.4982534364137
45.850000000000002	733.3044574369443
46.850000000000002	742.1516158033869
47.850000000000002	751.0397249167182
48.850000000000002	759.9687811814866
49.850000000000002	768.9387810255178
50.850000000000002	777.9497208996187
51.850000000000002	787.0015972772957
52.850000000000002	796.094406654474
53.850000000000002	805.22814554922
54.850000000000002	814.4028105014783
55.850000000000002	823.6183980728025
56.850000000000002	832.8749048461051
57.850000000000002	842.1723274253962
58.850000000000002	851.5106624355459
59.850000000000002	860.889906522028
60.850000000000002	870.3100563506939
61.850000000000002	879.7711086075326
62.850000000000002	889.273059998444
63.850000000000002	898.8159072490106
64.850000000000002	908.3996471042786

Temperature (degC)	Pressure (MPa)
65.85000000000002	918.0242763285419
66.85000000000002	927.6897917051273
67.85000000000002	937.3961900361855
68.85000000000002	947.1434681424843
69.85000000000002	956.9316228632116
70.85000000000002	966.7606510557719
71.85000000000002	976.6305495955932
72.85000000000002	986.5413153759356
73.85000000000002	996.492945307703
74.85000000000002	1006.4854363192576
75.85000000000002	1016.5187853562378
76.85000000000002	1026.5929893813811
77.85000000000002	1036.7080453743451
78.85000000000002	1046.8639503315344
79.85000000000002	1057.060701265932
80.85000000000002	1067.2982952069324
81.85000000000002	1077.5767292001747
82.85000000000002	1087.8960003073796
83.85000000000002	1098.2561056061936
84.85000000000002	1108.6570421900242
85.85000000000002	1119.0988071678917
86.85000000000002	1129.5813976642792
87.85000000000002	1140.10481081897
88.85000000000002	1150.6690437869122
89.85000000000002	1161.274093738069
90.85000000000002	1171.919957857269
91.85000000000002	1182.606633344079
92.85000000000002	1193.3341174126504
93.85000000000002	1204.1024072915845
94.85000000000002	1214.9115002238093
95.85000000000002	1225.7613934664278
96.85000000000002	1236.6520842906036
97.85000000000002	1247.5835699814193
98.85000000000002	1258.5558478377523
99.85000000000002	1269.5689151721558
100.85000000000002	1280.622769310719
101.85000000000002	1291.7174075929681
102.85000000000002	1302.8528273717166
103.85000000000002	1314.029026012972
104.85000000000002	1325.2460008958008
105.85000000000002	1336.5037494122278
106.85000000000002	1347.8022689671045
107.85000000000002	1359.1415569780147
108.85000000000002	1370.521610875145
109.85000000000002	1381.942428101188

Temperature (degC)	Pressure (MPa)
110.85000000000002	1393.4040061112282
111.85000000000002	1404.9063423726457
112.85000000000002	1416.4494343649824
113.85000000000002	1428.0332795798781
114.85000000000002	1439.657875520933
115.85000000000002	1451.3232197036252
116.85000000000002	1463.0293096552011
117.85000000000002	1474.7761429145867
118.85000000000002	1486.5637170322816
119.85000000000002	1498.3920295702571
120.85000000000002	1510.261078101874
121.85000000000002	1522.1708602117897
122.85000000000002	1534.1213734958471
123.85000000000002	1546.112615560996
124.85000000000002	1558.1445840252034
125.85000000000002	1570.2172765173589

Table B106: Melting Points for Carbon Dioxide and 1% Nitrogen

Temperature (degC)	Pressure (MPa)
-58.1499999999998	0.4990247006938487
-57.1499999999998	4.909478055681172
-56.1499999999998	9.62546710860152
-55.1499999999998	14.38655064834356
-54.1499999999998	19.19278737696859
-53.1499999999998	24.04418776015389
-52.1499999999998	28.94075434031917
-51.1499999999998	33.88248741747392
-50.1499999999998	38.86938646113747
-49.1499999999998	43.901450579283875
-48.1499999999998	48.97867870539365
-47.1499999999998	54.10106968324754
-46.1499999999998	59.26862230918791
-45.1499999999998	64.48133535477824
-44.1499999999998	69.73920757967203
-43.1499999999998	75.04223773926877
-42.1499999999998	80.3904245894378
-41.1499999999998	85.7837668895216
-40.1499999999998	91.22226340428811
-39.1499999999998	96.70591290522208
-38.1499999999998	102.23471417138492
-37.1499999999998	107.80866598999248
-36.1499999999998	113.42776715679598
-35.1499999999998	119.09201647633024
-34.1499999999998	124.80141276206892
-33.1499999999998	130.55595483650973
-32.1499999999998	136.35564153121476
-31.14999999999977	142.20047168681145
-30.14999999999977	148.09044415297106
-29.14999999999977	154.0255577883661
-28.14999999999977	160.00581146061438
-27.14999999999977	166.03120404621072
-26.14999999999977	172.10173443045332
-25.14999999999977	178.2174015073617
-24.14999999999977	184.3782041795934
-23.14999999999977	190.58414135835474
-22.14999999999977	196.8352119633104
-21.14999999999977	203.13141492249352
-20.14999999999977	209.47274917221162
-19.14999999999977	215.85921365695438
-18.14999999999977	222.29080732930103
-17.14999999999977	228.76752914982805
-16.14999999999977	235.28937808701656

Temperature (degC)	Pressure (MPa)
-15.14999999999977	241.85635311715987
-14.14999999999977	248.46845322427492
-13.14999999999977	255.1256774000087
-12.14999999999977	261.8280246435538
-11.14999999999977	268.5754939615555
-10.14999999999977	275.3680843680282
-9.14999999999977	282.2057948842671
-8.14999999999977	289.0886245387651
-7.14999999999977	296.01657236712634
-6.14999999999977	302.9896374119859
-5.14999999999977	310.00781872292805
-4.14999999999977	317.0711153564021
-3.149999999999773	324.1795263756489
-2.149999999999773	331.33305085061767
-1.149999999999773	338.5316878578899
-0.1499999999997726	345.7754364806048
0.8500000000000227	353.0642958083826
1.8500000000000227	360.39826493725286
2.8500000000000227	367.77734296957647
3.8500000000000227	375.2015290139817
4.850000000000023	382.670822185285
5.850000000000023	390.18522160442825
6.850000000000023	397.74472639840604
7.850000000000023	405.3493357001985
8.850000000000023	412.9990486487053
9.850000000000023	420.6938643886797
10.850000000000023	428.4337820706617
11.850000000000023	436.21880085092005
12.850000000000023	444.0489198913801
13.850000000000023	451.92413835957126
14.850000000000023	459.84445542855696
15.850000000000023	467.8098702768824
16.850000000000023	475.8203820885095
17.850000000000023	483.8759900527585
18.850000000000023	491.9766933642556
19.850000000000023	500.12249122286977
20.850000000000023	508.31338283365864
21.850000000000023	516.5493674068164
22.850000000000023	524.8304441576114
23.850000000000023	533.156612306342
24.850000000000023	541.5278710782774
25.850000000000023	549.9442197036054
26.850000000000023	558.4056574173841
27.850000000000023	566.9121834594887
28.850000000000023	575.4637970745591

Temperature (degC)	Pressure (MPa)
29.850000000000023	584.0604975119579
30.850000000000023	592.7022840257134
31.850000000000023	601.3891558744762
32.850000000000002	610.1211123214704
33.850000000000002	618.8981526344458
34.850000000000002	627.7202760856333
35.850000000000002	636.5874819517007
36.850000000000002	645.4997695137034
37.850000000000002	654.4571380570434
38.850000000000002	663.4595868714273
39.850000000000002	672.5071152508153
40.850000000000002	681.5997224933892
41.850000000000002	690.7374079015028
42.850000000000002	699.9201707816421
43.850000000000002	709.1480104443883
44.850000000000002	718.4209262043714
45.850000000000002	727.7389173802355
46.850000000000002	737.1019832945943
47.850000000000002	746.510123273999
48.850000000000002	755.9633366488939
49.850000000000002	765.4616227535834
50.850000000000002	775.0049809261901
51.850000000000002	784.5934105086216
52.850000000000002	794.2269108465327
53.850000000000002	803.9054812892898
54.850000000000002	813.6291211899365
55.850000000000002	823.3978299051554
56.850000000000002	833.2116067952376
57.850000000000002	843.0704512240451
58.850000000000002	852.9743625589837
59.850000000000002	862.923340170958
60.850000000000002	872.9173834343518
61.850000000000002	882.9564917269848
62.850000000000002	893.04066443009
63.850000000000002	903.1699009282726
64.850000000000002	913.3442006094876
65.850000000000002	923.5635628650042
66.850000000000002	933.8279870893747
67.850000000000002	944.1374726804089
68.850000000000002	954.4920190391372
69.850000000000002	964.8916255697917
70.850000000000002	975.3362916797677
71.850000000000002	985.8260167795966
72.850000000000002	996.360800282923
73.850000000000002	1006.9406416064743

Temperature (degC)	Pressure (MPa)
74.85000000000002	1017.5655401700291
75.85000000000002	1028.2354953963952
76.85000000000002	1038.9505067113794
77.85000000000002	1049.7105735437626
78.85000000000002	1060.5156953252763
79.85000000000002	1071.3658714905673
80.85000000000002	1082.2611014771837
81.85000000000002	1093.2013847255394
82.85000000000002	1104.186720678899
83.85000000000002	1115.217108783343
84.85000000000002	1126.2925484877499
85.85000000000002	1137.4130392437694
86.85000000000002	1148.5785805058028
87.85000000000002	1159.7891717309703
88.85000000000002	1171.044812379097
89.85000000000002	1182.3455019126834
90.85000000000002	1193.691239796891
91.85000000000002	1205.0820254995067
92.85000000000002	1216.5178584909302
93.85000000000002	1227.998738244154
94.85000000000002	1239.524664234729
95.85000000000002	1251.0956359407587
96.85000000000002	1262.7116528428649
97.85000000000002	1274.372714424177
98.85000000000002	1286.078820170301
99.85000000000002	1297.829969569309
100.85000000000002	1309.6261621117133
101.85000000000002	1321.4673972904409
102.85000000000002	1333.3536746008283
103.85000000000002	1345.284993540587
104.85000000000002	1357.2613536097963
105.85000000000002	1369.2827543108715
106.85000000000002	1381.349195148556
107.85000000000002	1393.460675629895
108.85000000000002	1405.6171952642214
109.85000000000002	1417.8187535631373
110.85000000000002	1430.06535004049
111.85000000000002	1442.356984212364
112.85000000000002	1454.6936555970515
113.85000000000002	1467.0753637150422
114.85000000000002	1479.502108089009
115.85000000000002	1491.9738882437807
116.85000000000002	1504.4907037063356
117.85000000000002	1517.0525540057704
118.85000000000002	1529.6594386733059

Temperature (degC)	Pressure (MPa)
119.85000000000002	1542.3113572422442
120.85000000000002	1555.00830924797
121.85000000000002	1567.7502942279318
122.85000000000002	1580.5373117216266
123.85000000000002	1593.36936127057
124.85000000000002	1606.2464424183008
125.85000000000002	1619.1685547103593

Table B107: Melting Points for Carbon Dioxide and 2% Nitrogen

Temperature (degC)	Pressure (MPa)
-60.1499999999998	0.4807909101314513
-59.1499999999998	2.7055270640122875
-58.1499999999998	7.375416036414785
-57.1499999999998	12.089815097774189
-56.1499999999998	16.849109891742568
-55.1499999999998	21.653342149243723
-54.1499999999998	26.50252133334868
-53.1499999999998	31.39664940783957
-52.1499999999998	36.33572584068433
-51.1499999999998	41.31974908338912
-50.1499999999998	46.348717117705654
-49.1499999999998	51.42262769031711
-48.1499999999998	56.54147842510913
-47.1499999999998	61.70526688147708
-46.1499999999998	66.91399058661132
-45.1499999999998	72.16764705430758
-44.1499999999998	77.46623379638785
-43.1499999999998	82.8097483298597
-42.1499999999998	88.19818818152075
-41.1499999999998	93.63155089097926
-40.1499999999998	99.1098340126559
-39.1499999999998	104.63303511711824
-38.1499999999998	110.2011517919682
-37.1499999999998	115.8141816424197
-36.1499999999998	121.47212229166232
-35.1499999999998	127.17497138107329
-34.1499999999998	132.9227265703202
-33.1499999999998	138.71538553738284
-32.1499999999998	144.55294597852065
-31.14999999999977	150.43540560819406
-30.14999999999977	156.36276215895606
-29.14999999999977	162.33501338131902
-28.14999999999977	168.35215704360664
-27.14999999999977	174.4141909317911
-26.14999999999977	180.52111284931962
-25.14999999999977	186.6729206169388
-24.14999999999977	192.86961207250974
-23.14999999999977	199.11118507082074
-22.14999999999977	205.3976374834028
-21.14999999999977	211.7289671983363
-20.14999999999977	218.10517212006482
-19.14999999999977	224.52625016920422
-18.14999999999977	230.99219928235604

Temperature (degC)	Pressure (MPa)
-17.14999999999977	237.5030174119196
-16.14999999999977	244.05870252590515
-15.14999999999977	250.65925260775407
-14.14999999999977	257.30466565615274
-13.14999999999977	263.9949396848548
-12.14999999999977	270.73007272250373
-11.14999999999977	277.51006281245554
-10.14999999999977	284.33490801260484
-9.14999999999977	291.2046063952168
-8.14999999999977	298.1191560467551
-7.14999999999977	305.0785550677166
-6.14999999999977	312.0828015724674
-5.14999999999977	319.1318936890804
-4.14999999999977	326.2258295591747
-3.149999999999773	333.3646073377594
-2.149999999999773	340.5482251930791
-1.149999999999773	347.7766813064572
-0.1499999999997726	355.0499738721508
0.8500000000000227	362.3681010971977
1.8500000000000227	369.7310612012726
2.8500000000000227	377.1388524165401
3.8500000000000227	384.59147298751697
4.850000000000023	392.088921170927
5.850000000000023	399.6311952355676
6.850000000000023	407.2182934621696
7.850000000000023	414.8502141432692
8.850000000000023	422.526955583068
9.850000000000023	430.24851609730945
10.850000000000023	438.01489401314865
11.850000000000023	445.82608766902507
12.850000000000023	453.68209541453757
13.850000000000023	461.58291561032667
14.850000000000023	469.52854662794385
15.850000000000023	477.5189868497429
16.850000000000023	485.55423466875726
17.850000000000023	493.63428848858393
18.850000000000023	501.75914672327093
19.850000000000023	509.92880779720207
20.850000000000023	518.1432701449908
21.850000000000023	526.4025322113664
22.850000000000023	534.7065924510697
23.850000000000023	543.0554493287442
24.850000000000023	551.4491013188305
25.850000000000023	559.8875469054674
26.850000000000023	568.3707845823862

Temperature (degC)	Pressure (MPa)
27.850000000000023	576.8988128528108
28.850000000000023	585.4716302293613
29.850000000000023	594.0892352339521
30.850000000000023	602.7516263976992
31.850000000000023	611.4588022608223
32.850000000000002	620.2107613725568
33.850000000000002	629.0075022910509
34.850000000000002	637.8490235832849
35.850000000000002	646.7353238249797
36.850000000000002	655.6664016004987
37.850000000000002	664.6422555027743
38.850000000000002	673.66288413321
39.850000000000002	682.7282861016006
40.850000000000002	691.8384600260505
41.850000000000002	700.9934045328849
42.850000000000002	710.1931182565703
43.850000000000002	719.4375998396379
44.850000000000002	728.7268479325974
45.850000000000002	738.0608611938637
46.850000000000002	747.4396382896755
47.850000000000002	756.8631778940213
48.850000000000002	766.3314786885655
49.850000000000002	775.844539362566
50.850000000000002	785.4023586128125
51.850000000000002	795.0049351435423
52.850000000000002	804.6522676663776
53.850000000000002	814.3443549002495
54.850000000000002	824.0811955713297
55.850000000000002	833.8627884129604
56.850000000000002	843.6891321655908
57.850000000000002	853.5602255767039
58.850000000000002	863.4760674007542
59.850000000000002	873.4366563990969
60.850000000000002	883.4419913399339
61.850000000000002	893.4920709982366
62.850000000000002	903.5868941556951
63.850000000000002	913.7264596006434
64.850000000000002	923.9107661280119
65.850000000000002	934.139812539254
66.850000000000002	944.413597642295
67.850000000000002	954.7321202514678
68.850000000000002	965.0953791874547
69.850000000000002	975.5033732772334
70.850000000000002	985.9561013540176
71.850000000000002	996.4535622571981

Temperature (degC)	Pressure (MPa)
72.85000000000002	1006.9957548322906
73.85000000000002	1017.5826779308803
74.85000000000002	1028.2143304105643
75.85000000000002	1038.8907111349022
76.85000000000002	1049.6118189733613
77.85000000000002	1060.3776528012634
78.85000000000002	1071.188211499733
79.85000000000002	1082.0434939556496
80.85000000000002	1092.943499061588
81.85000000000002	1103.888225715781
82.85000000000002	1114.8776728220603
83.85000000000002	1125.911839289813
84.85000000000002	1136.9907240339282
85.85000000000002	1148.1143259747537
86.85000000000002	1159.28264403805
87.85000000000002	1170.4956771549387
88.85000000000002	1181.7534242618597
89.85000000000002	1193.0558843005274
90.85000000000002	1204.4030562178798
91.85000000000002	1215.794938966038
92.85000000000002	1227.2315315022672
93.85000000000002	1238.7128327889216
94.85000000000002	1250.2388417934117
95.85000000000002	1261.8095574881559
96.85000000000002	1273.4249788505454
97.85000000000002	1285.0851048628908
98.85000000000002	1296.7899345123938
99.85000000000002	1308.5394667911005
100.85000000000002	1320.3337006958586
101.85000000000002	1332.1726352282853
102.85000000000002	1344.0562693947218
103.85000000000002	1355.9846022061977
104.85000000000002	1367.9576326783908
105.85000000000002	1379.9753598315885
106.85000000000002	1392.0377826906545
107.85000000000002	1404.1449002849884
108.85000000000002	1416.2967116484888
109.85000000000002	1428.4932158195138
110.85000000000002	1440.73441184086
111.85000000000002	1453.0202987597063
112.85000000000002	1465.3508756275905
113.85000000000002	1477.7261415003761
114.85000000000002	1490.1460954382137
115.85000000000002	1502.6107365055016
116.85000000000002	1515.1200637708714

Temperature (degC)	Pressure (MPa)
117.85000000000002	1527.6740763071286
118.85000000000002	1540.2727731912405
119.85000000000002	1552.9161535042933
120.85000000000002	1565.6042163314635
121.85000000000002	1578.3369607619852
122.85000000000002	1591.11438588912
123.85000000000002	1603.9364908101236
124.85000000000002	1616.8032746262145
125.85000000000002	1629.7147364425432

Table B108: Melting Points for Carbon Dioxide and 3% Nitrogen

Temperature (degC)	Pressure (MPa)
-62.1499999999998	0.4632233613759445
-61.1499999999998	0.5219986265859253
-60.1499999999998	5.1594052327017295
-59.1499999999998	9.82780335066873
-58.1499999999998	14.540760191245447
-57.1499999999998	19.298418913697393
-56.1499999999998	24.100806027231464
-55.1499999999998	28.94792777668896
-54.1499999999998	33.83978453430469
-53.1499999999998	38.77637446908881
-52.1499999999998	43.757694784129086
-51.1499999999998	48.78374221517637
-50.1499999999998	53.85451325831526
-49.1499999999998	58.970004284055356
-48.1499999999998	64.13021159875201
-47.1499999999998	69.33513147959339
-46.1499999999998	74.58476019545344
-45.1499999999998	79.87909401977267
-44.1499999999998	85.21812923874623
-43.1499999999998	90.60186215664217
-42.1499999999998	96.03028909930205
-41.1499999999998	101.50340641646936
-40.1499999999998	107.0212104833301
-39.1499999999998	112.5836977015246
-38.1499999999998	118.19086449978747
-37.1499999999998	123.8427073343311
-36.1499999999998	129.53922268904407
-35.1499999999998	135.2804070755542
-34.1499999999998	141.06625703319824
-33.1499999999998	146.89676912891574
-32.1499999999998	152.77193995709519
-31.14999999999977	158.6917661393781
-30.14999999999977	164.6562443244356
-29.14999999999977	170.6653711877237
-28.14999999999977	176.71914343122344
-27.14999999999977	182.81755778316935
-26.14999999999977	188.9606109977707
-25.14999999999977	195.14829985492727
-24.14999999999977	201.38062115994208
-23.14999999999977	207.657571743232
-22.14999999999977	213.9791484600384
-21.14999999999977	220.34534819013777
-20.14999999999977	226.7561678375527

Temperature (degC)	Pressure (MPa)
-19.14999999999977	233.2116043302692
-18.14999999999977	239.71165461994752
-17.14999999999977	246.25631568164556
-16.14999999999977	252.8455845135373
-15.14999999999977	259.47945813663756
-14.14999999999977	266.15793359453085
-13.14999999999977	272.8810079531018
-12.14999999999977	279.64867830026964
-11.14999999999977	286.4609417457257
-10.14999999999977	293.31779542067557
-9.14999999999977	300.21923647758325
-8.14999999999977	307.16526208992155
-7.14999999999977	314.1558694519217
-6.14999999999977	321.1910557783317
-5.14999999999977	328.2708183041725
-4.14999999999977	335.3951542845028
-3.149999999999773	342.5640609941866
-2.149999999999773	349.777535727659
-1.149999999999773	357.0355757987008
-0.1499999999997726	364.3381785402169
0.8500000000000227	371.6853413040127
1.8500000000000227	379.0770614605791
2.8500000000000227	386.51333639887866
3.8500000000000227	393.99416352613093
4.850000000000023	401.51954026761325
5.850000000000023	409.0894640664457
6.850000000000023	416.70393238339716
7.850000000000023	424.36294269668554
8.850000000000023	432.0664925017768
9.850000000000023	439.8145793112009
10.850000000000023	447.60720065435345
11.850000000000023	455.4443540773142
12.850000000000023	463.32603714265906
13.850000000000023	471.2522474292798
14.850000000000023	479.22298253220737
15.850000000000023	487.2382400624293
16.850000000000023	495.298017646721
17.850000000000023	503.4023129274716
18.850000000000023	511.5511235625167
19.850000000000023	519.7444472249698
20.850000000000023	527.9822816030586
21.850000000000023	536.2646243999664
22.850000000000023	544.5914733336657
23.850000000000023	552.9628261367664
24.850000000000023	561.37868055636

Temperature (degC)	Pressure (MPa)
25.850000000000023	569.8390343538632
26.850000000000023	578.3438853048718
27.850000000000023	586.8932311990095
28.850000000000023	595.4870698397796
29.850000000000023	604.1253990444251
30.850000000000023	612.8082166437804
31.850000000000023	621.5355204821363
32.850000000000002	630.3073084170985
33.850000000000002	639.1235783194475
34.850000000000002	647.984328073012
35.850000000000002	656.8895555745274
36.850000000000002	665.8392587335126
37.850000000000002	674.833435472129
38.850000000000002	683.8720837250678
39.850000000000002	692.9552014394114
40.850000000000002	702.0827865745143
41.850000000000002	711.2548371018811
42.850000000000002	720.4713510050445
43.850000000000002	729.7323262794466
44.850000000000002	739.0377609323164
45.850000000000002	748.3876529825611
46.850000000000002	757.7820004606493
47.850000000000002	767.2208014084893
48.850000000000002	776.7040538793326
49.850000000000002	786.2317559376503
50.850000000000002	795.8039056590309
51.850000000000002	805.42050113007
52.850000000000002	815.0815404482677
53.850000000000002	824.7870217219228
54.850000000000002	834.5369430700214
55.850000000000002	844.331302622152
56.850000000000002	854.1700985183869
57.850000000000002	864.0533289091966
58.850000000000002	873.9809919553418
59.850000000000002	883.953085827782
60.850000000000002	893.9696087075788
61.850000000000002	904.0305587858005
62.850000000000002	914.1359342634286
63.850000000000002	924.2857333512686
64.850000000000002	934.4799542698557
65.850000000000002	944.7185952493637
66.850000000000002	955.0016545295225
67.850000000000002	965.3291303595267
68.850000000000002	975.701020997946
69.850000000000002	986.1173247126433

Temperature (degC)	Pressure (MPa)
70.85000000000002	996.5780397806924
71.85000000000002	1007.0831644882926
72.85000000000002	1017.63269713068
73.85000000000002	1028.2266360120577
74.85000000000002	1038.8649794455055
75.85000000000002	1049.5477257529094
76.85000000000002	1060.274873264873
77.85000000000002	1071.0464203206493
78.85000000000002	1081.8623652680565
79.85000000000002	1092.7227064634078
80.85000000000002	1103.6274422714366
81.85000000000002	1114.576571065216
82.85000000000002	1125.5700912260975
83.85000000000002	1136.6080011436231
84.85000000000002	1147.6902992154698
85.85000000000002	1158.8169838473705
86.85000000000002	1169.9880534530412
87.85000000000002	1181.203506454124
88.85000000000002	1192.4633412801102
89.85000000000002	1203.7675563682692
90.85000000000002	1215.1161501635966
91.85000000000002	1226.5091211187303
92.85000000000002	1237.946467693904
93.85000000000002	1249.4281883568656
94.85000000000002	1260.9542815828283
95.85000000000002	1272.5247458543981
96.85000000000002	1284.1395796615177
97.85000000000002	1295.7987815013983
98.85000000000002	1307.50234987847
99.85000000000002	1319.2502833043088
100.85000000000002	1331.042580297589
101.85000000000002	1342.8792393840165
102.85000000000002	1354.7602590962733
103.85000000000002	1366.6856379739631
104.85000000000002	1378.6553745635515
105.85000000000002	1390.6694674183075
106.85000000000002	1402.7279150982556
107.85000000000002	1414.8307161701143
108.85000000000002	1426.9778692072466
109.85000000000002	1439.1693727896013
110.85000000000002	1451.405225503663
111.85000000000002	1463.685425942398
112.85000000000002	1476.0099727052113
113.85000000000002	1488.3788643978792
114.85000000000002	1500.7920996325154

Temperature (degC)	Pressure (MPa)
115.85000000000002	1513.2496770275027
116.85000000000002	1525.7515952074523
117.85000000000002	1538.2978528031783
118.85000000000002	1550.8884484515968
119.85000000000002	1563.523380795726
120.85000000000002	1576.202648484613
121.85000000000002	1588.9262501732915
122.85000000000002	1601.6941845227477
123.85000000000002	1614.5064501998536
124.85000000000002	1627.3630458773412
125.85000000000002	1640.2639702337349

Table B109: Melting Points for Carbon Dioxide and 4% Nitrogen

Temperature (degC)	Pressure (MPa)
-63.1499999999998	0.4462977107153766
-62.1499999999998	2.9764165901859054
-61.1499999999998	7.599804735561864
-60.1499999999998	12.267045944119738
-59.1499999999998	16.97872409517109
-58.1499999999998	21.7349090166679
-57.1499999999998	26.535616562591542
-56.1499999999998	31.38084961678922
-55.1499999999998	36.27060667312538
-54.1499999999998	41.204884420707394
-53.1499999999998	46.18367871091663
-52.1499999999998	51.20698497605426
-51.1499999999998	56.274798430865054
-50.1499999999998	61.387114177680935
-49.1499999999998	66.54392726483994
-48.1499999999998	71.74523272080695
-47.1499999999998	76.99102557491192
-46.1499999999998	82.28130087035997
-45.1499999999998	87.61605367259018
-44.1499999999998	92.9952790747427
-43.1499999999998	98.4189722012689
-42.1499999999998	103.88712821032068
-41.1499999999998	109.3997422953188
-40.1499999999998	114.95680968595553
-39.1499999999998	120.5583256488056
-38.1499999999998	126.2042854876582
-37.1499999999998	131.89468454364723
-36.1499999999998	137.62951819523923
-35.1499999999998	143.40878185811363
-34.1499999999998	149.2324709849671
-33.1499999999998	155.10058106525875
-32.1499999999998	161.01310762491477
-31.14999999999977	166.9700462260005
-30.14999999999977	172.9713924663708
-29.14999999999977	179.01714197930494
-28.14999999999977	185.10729043312728
-27.14999999999977	191.2418335308232
-26.14999999999977	197.4207670096477
-25.14999999999977	203.64408664073395
-24.14999999999977	209.91178822869787
-23.14999999999977	216.2238676112459
-22.14999999999977	222.58032065878248
-21.14999999999977	228.98114327402078

Temperature (degC)	Pressure (MPa)
-20.14999999999977	235.42633139159577
-19.14999999999977	241.91588097768152
-18.14999999999977	248.44978802961185
-17.14999999999977	255.02804857550427
-16.14999999999977	261.65065867389154
-15.14999999999977	268.3176144133524
-14.14999999999977	275.0289119121535
-13.14999999999977	281.7845473178895
-12.14999999999977	288.58451680713466
-11.14999999999977	295.42881658509344
-10.14999999999977	302.3174428852593
-9.14999999999977	309.25039196907755
-8.14999999999977	316.2276601256136
-7.14999999999977	323.2492436712244
-6.14999999999977	330.315138949237
-5.14999999999977	337.4253423296299
-4.14999999999977	344.57985020872
-3.149999999999773	351.7786590088535
-2.149999999999773	359.021765178105
-1.149999999999773	366.3091651899737
-0.1499999999997726	373.64085554308997
0.8500000000000227	381.0168327609273
1.8500000000000227	388.4370933915135
2.8500000000000227	395.9016340071479
3.8500000000000227	403.410451204127
4.850000000000023	410.9635416024681
5.850000000000023	418.5609018456404
6.850000000000023	426.20252860029984
7.850000000000023	433.88841855602817
8.850000000000023	441.6185684250733
9.850000000000023	449.3929749420962
10.850000000000023	457.2116348639225
11.850000000000023	465.074544969292
12.850000000000023	472.9817020586205
13.850000000000023	480.93310295375636
14.850000000000023	488.9287444977475
15.850000000000023	496.9686235546064
16.850000000000023	505.0527370090841
17.850000000000023	513.1810817664418
18.850000000000023	521.3536547522278
19.850000000000023	529.5704529120635
20.850000000000023	537.8314732114194
21.850000000000023	546.1367126354086
22.850000000000023	554.4861681885711
23.850000000000023	562.8798368946738

Temperature (degC)	Pressure (MPa)
24.850000000000023	571.3177157965
25.850000000000023	579.7998019556495
26.850000000000023	588.3260924523435
27.850000000000023	596.8965843852241
28.850000000000023	605.5112748711656
29.850000000000023	614.1701610450826
30.850000000000023	622.8732400597406
31.850000000000023	631.6205090855746
32.850000000000002	640.4119653105034
33.850000000000002	649.2476059397525
34.850000000000002	658.1274281956748
35.850000000000002	667.0514293175756
36.850000000000002	676.0196065615401
37.850000000000002	685.0319572002641
38.850000000000002	694.0884785228858
39.850000000000002	703.1891678348178
40.850000000000002	712.334022457588
41.850000000000002	721.5230397286748
42.850000000000002	730.7562170013455
43.850000000000002	740.03355164451
44.850000000000002	749.355041042551
45.850000000000002	758.7206825951846
46.850000000000002	768.1304737172999
47.850000000000002	777.5844118388137
48.850000000000002	787.082494404526
49.850000000000002	796.6247188739728
50.850000000000002	806.2110827212814
51.850000000000002	815.8415834350307
52.850000000000002	825.5162185181134
53.850000000000002	835.2349854875948
54.850000000000002	844.9978818745805
55.850000000000002	854.8049052240802
56.850000000000002	864.6560530948755
57.850000000000002	874.5513230593921
58.850000000000002	884.4907127035648
59.850000000000002	894.4742196267166
60.850000000000002	904.5018414414291
61.850000000000002	914.5735757734202
62.850000000000002	924.6894202614169
63.850000000000002	934.8493725570435
64.850000000000002	945.0534303246933
65.850000000000002	955.3015912414131
66.850000000000002	965.5938529967884
67.850000000000002	975.9302132928284
68.850000000000002	986.31066984385

Temperature (degC)	Pressure (MPa)
69.85000000000002	996.7352203763629
70.85000000000002	1007.2038626289687
71.85000000000002	1017.7165943522384
72.85000000000002	1028.273413308617
73.85000000000002	1038.8743172723011
74.85000000000002	1049.5193040291529
75.85000000000002	1060.2083713765785
76.85000000000002	1070.941517123433
77.85000000000002	1081.7187390899148
78.85000000000002	1092.5400351074736
79.85000000000002	1103.4054030186974
80.85000000000002	1114.3148406772275
81.85000000000002	1125.2683459476502
82.85000000000002	1136.2659167054096
83.85000000000002	1147.3075508367106
84.85000000000002	1158.3932462384166
85.85000000000002	1169.523000817975
86.85000000000002	1180.6968124933069
87.85000000000002	1191.914679192725
88.85000000000002	1203.1765988548495
89.85000000000002	1214.4825694285098
90.85000000000002	1225.8325888726613
91.85000000000002	1237.2266551563032
92.85000000000002	1248.6647662583862
93.85000000000002	1260.1469201677312
94.85000000000002	1271.6731148829488
95.85000000000002	1283.2433484123526
96.85000000000002	1294.8576187738784
97.85000000000002	1306.515923995007
98.85000000000002	1318.218262112679
99.85000000000002	1329.9646311732247
100.85000000000002	1341.7550292322746
101.85000000000002	1353.589454354691
102.85000000000002	1365.4679046144954
103.85000000000002	1377.3903780947755
104.85000000000002	1389.3568728876353
105.85000000000002	1401.3673870940968
106.85000000000002	1413.4219188240497
107.85000000000002	1425.5204661961666
108.85000000000002	1437.6630273378296
109.85000000000002	1449.8496003850687
110.85000000000002	1462.08018348249
111.85000000000002	1474.3547747831974
112.85000000000002	1486.6733724487372
113.85000000000002	1499.0359746490346

Temperature (degC)	Pressure (MPa)
114.85000000000002	1511.4425795622972
115.85000000000002	1523.8931853749855
116.85000000000002	1536.3877902817253
117.85000000000002	1548.9263924852619
118.85000000000002	1561.5089901963672
119.85000000000002	1574.1355816338078
120.85000000000002	1586.8061650242566
121.85000000000002	1599.520738602255
122.85000000000002	1612.2793006101278
123.85000000000002	1625.0818492979488
124.85000000000002	1637.9283829234514
125.85000000000002	1650.818899751994

Table B110: Melting Points for Carbon Dioxide and 5% Nitrogen

Temperature (degC)	Pressure (MPa)
-65.1499999999998	0.4299905039291255
-64.1499999999998	0.8198972390508025
-63.1499999999998	5.405058166191963
-62.1499999999998	10.027274489875223
-61.1499999999998	14.69356954288662
-60.1499999999998	19.40413817645362
-59.1499999999998	24.159017611281843
-58.1499999999998	28.958216229581897
-57.1499999999998	33.80173386555823
-56.1499999999998	38.689567106816824
-55.1499999999998	43.6217111084082
-54.1499999999998	48.598160331095414
-53.1499999999998	53.6189088808896
-52.1499999999998	58.683950680097595
-51.1499999999998	63.79327955976884
-50.1499999999998	68.94688931250391
-49.1499999999998	74.14477372398242
-48.1499999999998	79.38692659245505
-47.1499999999998	84.67334174112752
-46.1499999999998	90.00401302618653
-45.1499999999998	95.3789343420684
-44.1499999999998	100.79809962493577
-43.1499999999998	106.26150285495766
-42.1499999999998	111.76913805778105
-41.1499999999998	117.32099930543693
-40.1499999999998	122.91708071685223
-39.1499999999998	128.5573764580795
-38.1499999999998	134.24188074232407
-37.1499999999998	139.97058782982305
-36.1499999999998	145.74349202761724
-35.1499999999998	151.56058768924143
-34.1499999999998	157.42186921435896
-33.1499999999998	163.32733104835316
-32.1499999999998	169.27696768188477
-31.14999999999977	175.27077365042928
-30.14999999999977	181.30874353379906
-29.14999999999977	187.3908719556525
-28.14999999999977	193.51715358299734
-27.14999999999977	199.68758312568983
-26.14999999999977	205.9021553359333
-25.14999999999977	212.16086500777607
-24.14999999999977	218.46370697661143
-23.14999999999977	224.81067611867888

Temperature (degC)	Pressure (MPa)
-22.14999999999977	231.2017673505747
-21.14999999999977	237.63697562875814
-20.14999999999977	244.11629594907043
-19.14999999999977	250.63972334625558
-18.14999999999977	257.2072528934847
-17.14999999999977	263.8188797018936
-16.14999999999977	270.47459892011665
-15.14999999999977	277.1744057338339
-14.14999999999977	283.91829536532424
-13.14999999999977	290.70626307301853
-12.14999999999977	297.53830415106705
-11.14999999999977	304.41441392890704
-10.14999999999977	311.33458777084155
-9.14999999999977	318.29882107561866
-8.14999999999977	325.30710927602416
-7.14999999999977	332.35944783847276
-6.14999999999977	339.4558322626109
-5.14999999999977	346.5962580809235
-4.14999999999977	353.78072085834515
-3.149999999999773	361.0092161918823
-2.149999999999773	368.2817397102333
-1.149999999999773	375.5982870734208
-0.1499999999997726	382.9588539724277
0.8500000000000227	390.36343612883644
1.8500000000000227	397.8120292944764
2.8500000000000227	405.3046292510761
3.8500000000000227	412.84123180991946
4.850000000000023	420.4218328115087
5.850000000000023	428.04642812523116
6.850000000000023	435.71501364903077
7.850000000000023	443.42758530908543
8.850000000000023	451.18413905948995
9.850000000000023	458.98467088194
10.850000000000023	466.8291767854286
11.850000000000023	474.7176528059343
12.850000000000023	482.65009500612786
13.850000000000023	490.62649947507316
14.850000000000023	498.64686232793827
15.850000000000023	506.711179705706
16.850000000000023	514.819447774897
17.850000000000023	522.9716627272813
18.850000000000023	531.1678207796135
19.850000000000023	539.4079181733599
20.850000000000023	547.6919511744246
21.850000000000023	556.0199160728972

Temperature (degC)	Pressure (MPa)
22.850000000000023	564.3918091827874
23.850000000000023	572.8076268417703
24.850000000000023	581.2673654109371
25.850000000000023	589.771021274543
26.850000000000023	598.3185908397655
27.850000000000023	606.9100705364606
28.850000000000023	615.5454568169304
29.850000000000023	624.2247461556807
30.850000000000023	632.9479350491954
31.850000000000023	641.7150200157054
32.850000000000002	650.5259975949663
33.850000000000002	659.380864348034
34.850000000000002	668.2796168570467
35.850000000000002	677.2222517250116
36.850000000000002	686.2087655755865
37.850000000000002	695.2391550528762
38.850000000000002	704.3134168212212
39.850000000000002	713.4315475649931
40.850000000000002	722.5935439883978
41.850000000000002	731.7994028152712
42.850000000000002	741.0491207888855
43.850000000000002	750.3426946717553
44.850000000000002	759.680121245451
45.850000000000002	769.061397310397
46.850000000000002	778.4865196857056
47.850000000000002	787.9554852089752
48.850000000000002	797.4682907361208
49.850000000000002	807.0249331411904
50.850000000000002	816.6254093161887
51.850000000000002	826.2697161709068
52.850000000000002	835.9578506327437
53.850000000000002	845.6898096465449
54.850000000000002	855.465590174429
55.850000000000002	865.2851891956224
56.850000000000002	875.1486037063023
57.850000000000002	885.0558307194292
58.850000000000002	895.0068672645896
59.850000000000002	905.0017103878412
60.850000000000002	915.0403571515543
61.850000000000002	925.1228046342655
62.850000000000002	935.2490499305175
63.850000000000002	945.4190901507164
64.850000000000002	955.6329224209833
65.850000000000002	965.8905438830067
66.850000000000002	976.1919516939022

Temperature (degC)	Pressure (MPa)
67.85000000000002	986.5371430260682
68.85000000000002	996.9261150670454
69.85000000000002	1007.35886501938
70.85000000000002	1017.8353901004862
71.85000000000002	1028.3556875425115
72.85000000000002	1038.9197545922038
73.85000000000002	1049.5275885107799
74.85000000000002	1060.1791865737919
75.85000000000002	1070.8745460710034
76.85000000000002	1081.613664306262
77.85000000000002	1092.3965385973677
78.85000000000002	1103.2231662759582
79.85000000000002	1114.0935446873818
80.85000000000002	1125.0076711905726
81.85000000000002	1135.9655431579383
82.85000000000002	1146.9671579752383
83.85000000000002	1158.0125130414644
84.85000000000002	1169.1016057687316
85.85000000000002	1180.2344335821567
86.85000000000002	1191.4109939197572
87.85000000000002	1202.6312842323246
88.85000000000002	1213.8953019833248
89.85000000000002	1225.20304464879
90.85000000000002	1236.5545097172028
91.85000000000002	1247.9496946893983
92.85000000000002	1259.3885970784552
93.85000000000002	1270.8712144095903
94.85000000000002	1282.397544220066
95.85000000000002	1293.96758405907
96.85000000000002	1305.581331487634
97.85000000000002	1317.2387840785225
98.85000000000002	1328.9399394161428
99.85000000000002	1340.6847950964407
100.85000000000002	1352.473348726807
101.85000000000002	1364.3055979259896
102.85000000000002	1376.1815403239873
103.85000000000002	1388.1011735619716
104.85000000000002	1400.0644952921798
105.85000000000002	1412.0715031778345
106.85000000000002	1424.1221948930533
107.85000000000002	1436.2165681227577
108.85000000000002	1448.3546205625853
109.85000000000002	1460.536349918809
110.85000000000002	1472.7617539082355
111.85000000000002	1485.0308302581452

Temperature (degC)	Pressure (MPa)
112.85000000000002	1497.3435767061787
113.85000000000002	1509.699991000292
114.85000000000002	1522.1000708986267
115.85000000000002	1534.5438141694708
116.85000000000002	1547.0312185911655
117.85000000000002	1559.562281952006
118.85000000000002	1572.1370020501934
119.85000000000002	1584.755376693735
120.85000000000002	1597.417403700383
121.85000000000002	1610.1230808975467
122.85000000000002	1622.8724061222167
123.85000000000002	1635.6653772209052
124.85000000000002	1648.5019920495556
125.85000000000002	1661.3822484734767

Table B111: Melting Points for Carbon Dioxide and 1% Oxygen

Temperature (degC)	Pressure (MPa)
-59.14999999999998	0.4773075375946917
-58.14999999999998	0.6467090924102289
-57.14999999999998	5.350822385058023
-56.14999999999998	10.096465525862797
-55.14999999999998	14.887497172793887
-54.14999999999998	19.723953091279444
-53.14999999999998	24.605836254541977
-52.14999999999998	29.533146002973645
-51.14999999999998	34.50588114561384
-50.14999999999998	39.52404043104559
-49.14999999999998	44.58762261184266
-48.14999999999998	49.696626441368586
-47.14999999999998	54.85105066406341
-46.14999999999998	60.050894009312564
-45.14999999999998	65.29615518912885
-44.14999999999998	70.58683289837067
-43.14999999999998	75.92292581639441
-42.14999999999998	81.30443260940035
-41.14999999999998	86.73135193302147
-40.14999999999998	92.20368243490259
-39.14999999999998	97.72142275713713
-38.14999999999998	103.28457153849268
-37.14999999999998	108.89312741640613
-36.14999999999998	114.54708902874813
-35.14999999999998	120.24645501536855
-34.14999999999998	125.99122401943826
-33.14999999999998	131.78139468861426
-32.14999999999998	137.61696567603977
-31.149999999999977	143.49793564120404
-30.149999999999977	149.42430325067664
-29.149999999999977	155.39606717873573
-28.149999999999977	161.41322610789743
-27.149999999999977	167.47577872936418
-26.149999999999977	173.58372374340374
-25.149999999999977	179.73705985966205
-24.149999999999977	185.93578579742328
-23.149999999999977	192.1799002858237
-22.149999999999977	198.46940206402462
-21.149999999999977	204.80428988134483
-20.149999999999977	211.1845624973718
-19.149999999999977	217.6102186820359
-18.149999999999977	224.08125721566688
-17.149999999999977	230.59767688902917

Temperature (degC)	Pressure (MPa)
-16.14999999999977	237.15947650333703
-15.14999999999977	243.76665487025943
-14.14999999999977	250.41921081190227
-13.14999999999977	257.11714316079366
-12.14999999999977	263.8604507598424
-11.14999999999977	270.6491324623001
-10.14999999999977	277.4831871317092
-9.14999999999977	284.3626136418507
-8.14999999999977	291.2874108766765
-7.14999999999977	298.2575777302475
-6.14999999999977	305.2731131066611
-5.14999999999977	312.3340159199778
-4.14999999999977	319.4402850941431
-3.149999999999773	326.5919195629094
-2.149999999999773	333.7889182697532
-1.149999999999773	341.03128016779317
-0.1499999999997726	348.31900421970454
0.8500000000000227	355.65208939763556
1.8500000000000227	363.0305346831177
2.8500000000000227	370.45433906698304
3.8500000000000227	377.9235015492747
4.850000000000023	385.4380211391595
5.850000000000023	392.9978968548409
6.850000000000023	400.6031277234731
7.850000000000023	408.25371278107116
8.850000000000023	415.9496510724261
9.850000000000023	423.6909416510193
10.850000000000023	431.47758357893474
11.850000000000023	439.3095759267738
12.850000000000023	447.18691777357327
13.850000000000023	455.1096082067178
14.850000000000023	463.077646321858
15.850000000000023	471.0910312228296
16.850000000000023	479.14976202156873
17.850000000000023	487.2538378380317
18.850000000000023	495.4032578001153
19.850000000000023	503.5980210435808
20.850000000000023	511.8381267119674
21.850000000000023	520.1235739565227
22.850000000000023	528.4543619361203
23.850000000000023	536.8304898171889
24.850000000000023	545.2519567736318
25.850000000000023	553.7187619867581
26.850000000000023	562.2309046452045
27.850000000000023	570.7883839448684

Temperature (degC)	Pressure (MPa)
28.850000000000023	579.3911990888321
29.850000000000023	588.039349287294
30.850000000000023	596.7328337574986
31.850000000000023	605.4716517236681
32.850000000000002	614.2558024169354
33.850000000000002	623.0852850752717
34.850000000000002	631.9600989434302
35.850000000000002	640.8802432728709
36.850000000000002	649.8457173217023
37.850000000000002	658.8565203546125
38.850000000000002	667.912651642813
39.850000000000002	677.0141104639717
40.850000000000002	686.16089610215
41.850000000000002	695.3530078477482
42.850000000000002	704.5904449974436
43.850000000000002	713.8732068541262
44.850000000000002	723.2012927268463
45.850000000000002	732.5747019307603
46.850000000000002	741.9934337870612
47.850000000000002	751.457487622937
48.850000000000002	760.9668627715068
49.850000000000002	770.521558571768
50.850000000000002	780.121574368542
51.850000000000002	789.766909512423
52.850000000000002	799.457563359724
53.850000000000002	809.1935352724249
54.850000000000002	818.9748246181209
55.850000000000002	828.8014307699732
56.850000000000002	838.6733531066592
57.850000000000002	848.5905910123194
58.850000000000002	858.5531438765154
59.850000000000002	868.5610110941724
60.850000000000002	878.6141920655435
61.850000000000002	888.7126861961514
62.850000000000002	898.8564928967502
63.850000000000002	909.0456115832767
64.850000000000002	919.2800416768009
65.850000000000002	929.5597826034907
66.850000000000002	939.8848337945582
67.850000000000002	950.2551946862226
68.850000000000002	960.670864719665
69.850000000000002	971.131843340987
70.850000000000002	981.6381300011602
71.850000000000002	992.1897241560017
72.850000000000002	1002.7866252661183

Temperature (degC)	Pressure (MPa)
73.85000000000002	1013.4288327968691
74.85000000000002	1024.11634621833
75.85000000000002	1034.8491650052536
76.85000000000002	1045.6272886370211
77.85000000000002	1056.4507165976133
78.85000000000002	1067.3194483755728
79.85000000000002	1078.2334834639566
80.85000000000002	1089.1928213603103
81.85000000000002	1100.1974615666236
82.85000000000002	1111.2474035892917
83.85000000000002	1122.342646939091
84.85000000000002	1133.4831911311312
85.85000000000002	1144.669035684827
86.85000000000002	1155.900180123856
87.85000000000002	1167.1766239761362
88.85000000000002	1178.4983667737808
89.85000000000002	1189.8654080530694
90.85000000000002	1201.277747354415
91.85000000000002	1212.735384222329
92.85000000000002	1224.2383182053863
93.85000000000002	1235.786548856202
94.85000000000002	1247.3800757313907
95.85000000000002	1259.0188983915414
96.85000000000002	1270.7030164011778
97.85000000000002	1282.432429328735
98.85000000000002	1294.207136746531
99.85000000000002	1306.027138230726
100.85000000000002	1317.892433361302
101.85000000000002	1329.8030217220282
102.85000000000002	1341.7589029004378
103.85000000000002	1353.7600764877943
104.85000000000002	1365.806542079057
105.85000000000002	1377.898299272869
106.85000000000002	1390.0353476715136
107.85000000000002	1402.2176868808936
108.85000000000002	1414.4453165105035
109.85000000000002	1426.7182361734035
110.85000000000002	1439.0364454861888
111.85000000000002	1451.3999440689643
112.85000000000002	1463.8087315453233
113.85000000000002	1476.2628075423147
114.85000000000002	1488.7621716904205
115.85000000000002	1501.3068236235333
116.85000000000002	1513.8967629789197
117.85000000000002	1526.5319893972137

Temperature (degC)	Pressure (MPa)
118.85000000000002	1539.2125025223706
119.85000000000002	1551.9383020016633
120.85000000000002	1564.7093874856482
121.85000000000002	1577.5257586281364
122.85000000000002	1590.3874150861714
123.85000000000002	1603.2943565200214
124.85000000000002	1616.2465825931354
125.85000000000002	1629.244092972129

Table B112: Melting Points for Carbon Dioxide and 2% Oxygen

Temperature (degC)	Pressure (MPa)
-60.1499999999998	0.4398542049323449
-59.1499999999998	3.5611456820887235
-58.1499999999998	8.289817818064964
-57.1499999999998	13.063742990949306
-56.1499999999998	17.883122814913726
-55.1499999999998	22.747972078453973
-54.1499999999998	27.658290557093736
-53.1499999999998	32.61407598107645
-52.1499999999998	37.61532582467402
-51.1499999999998	42.66203756532774
-50.1499999999998	47.754208692787635
-49.1499999999998	52.891836686764684
-48.1499999999998	58.074919000472676
-47.1499999999998	63.30345305313087
-46.1499999999998	68.57743622881132
-45.1499999999998	73.89686587899058
-44.1499999999998	79.26173932697861
-43.1499999999998	84.67205387310636
-42.1499999999998	90.12780680003722
-41.1499999999998	95.62899537784472
-40.1499999999998	101.17561686869303
-39.1499999999998	106.76766853105161
-38.1499999999998	112.4051476234289
-37.1499999999998	118.08805140764623
-36.1499999999998	123.81637715169053
-35.1499999999998	129.59012213218034
-34.1499999999998	135.40928363649053
-33.1499999999998	141.2738589645757
-32.1499999999998	147.18384543052966
-31.14999999999977	153.1392403639096
-30.14999999999977	159.14004111086496
-29.14999999999977	165.18624503508522
-28.14999999999977	171.2778495185978
-27.14999999999977	177.41485196243417
-26.14999999999977	183.59724978718015
-25.14999999999977	189.82504043342573
-24.14999999999977	196.09822136213037
-23.14999999999977	202.41679005491068
-22.14999999999977	208.78074401426622
-21.14999999999977	215.1900807637425
-20.14999999999977	221.64479784805232
-19.14999999999977	228.14489283314757
-18.14999999999977	234.69036330625835

Temperature (degC)	Pressure (MPa)
-17.14999999999977	241.2812068758982
-16.14999999999977	247.91742117183827
-15.14999999999977	254.59900384506443
-14.14999999999977	261.3259525677069
-13.14999999999977	268.09826503295324
-12.14999999999977	274.9159389549459
-11.14999999999977	281.7789720686698
-10.14999999999977	288.68736212982077
-9.14999999999977	295.64110691467204
-8.14999999999977	302.64020421992547
-7.14999999999977	309.68465186256077
-6.14999999999977	316.77444767967546
-5.14999999999977	323.90958952832335
-4.14999999999977	331.0900752853433
-3.149999999999773	338.3159028471882
-2.149999999999773	345.587070129754
-1.149999999999773	352.9035750682009
-0.1499999999997726	360.2654156167748
0.8500000000000227	367.67258974863046
1.8500000000000227	375.1250954556513
2.8500000000000227	382.6229307482684
3.8500000000000227	390.16609365528126
4.850000000000023	397.75458222367894
5.850000000000023	405.3883945184592
6.850000000000023	413.06752862245037
7.850000000000023	420.7919826361347
8.850000000000023	428.5617546774695
9.850000000000023	436.37684288171306
10.850000000000023	444.2372454012528
11.850000000000023	452.142960405427
12.850000000000023	460.0939860803581
13.850000000000023	468.0903206287806
14.850000000000023	476.1319622698751
15.850000000000023	484.2189092390971
16.850000000000023	492.3511597880203
17.850000000000023	500.5287121841663
18.850000000000023	508.7515647108438
19.850000000000023	517.019715666996
20.850000000000023	525.3331633670354
21.850000000000023	533.6919061406936
22.850000000000023	542.0959423328637
23.850000000000023	550.5452703034479
24.850000000000023	559.0398884272118
25.850000000000023	567.5797950936352
26.850000000000023	576.1649887067588

Temperature (degC)	Pressure (MPa)
27.850000000000023	584.7954676850493
28.850000000000023	593.4712304612488
29.850000000000023	602.1922754822386
30.850000000000023	610.9586012088994
31.850000000000023	619.7702061159707
32.850000000000002	628.6270886919181
33.850000000000002	637.5292474387991
34.850000000000002	646.4766808721296
35.850000000000002	655.4693875207565
36.850000000000002	664.5073659267259
37.850000000000002	673.5906146451516
38.850000000000002	682.719132244105
39.850000000000002	691.8929173044723
40.850000000000002	701.1119684198451
41.850000000000002	710.3762841963951
42.850000000000002	719.6858632527546
43.850000000000002	729.0407042199016
44.850000000000002	738.4408057410438
45.850000000000002	747.8861664714971
46.850000000000002	757.3767850785808
47.850000000000002	766.9126602415056
48.850000000000002	776.493790651258
49.850000000000002	786.1201750104949
50.850000000000002	795.7918120334363
51.850000000000002	805.5087004457572
52.850000000000002	815.2708389844894
53.850000000000002	825.078226397908
54.850000000000002	834.9308614454362
55.850000000000002	844.8287428975444
56.850000000000002	854.7718695356496
57.850000000000002	864.7602401520138
58.850000000000002	874.7938535496548
59.850000000000002	884.8727085422414
60.850000000000002	894.9968039540071
61.850000000000002	905.1661386196506
62.850000000000002	915.3807113842472
63.850000000000002	925.6405211031538
64.850000000000002	935.9455666419243
65.850000000000002	946.2958468762155
66.850000000000002	956.6913606917035
67.850000000000002	967.1321069839926
68.850000000000002	977.6180846585332
69.850000000000002	988.1492926305378
70.850000000000002	998.7257298248923
71.850000000000002	1009.3473951760757

Temperature (degC)	Pressure (MPa)
72.85000000000002	1020.0142876280838
73.85000000000002	1030.7264061343403
74.85000000000002	1041.4837496576188
75.85000000000002	1052.2863171699726
76.85000000000002	1063.1341076526442
77.85000000000002	1074.0271200959937
78.85000000000002	1084.9653534994286
79.85000000000002	1095.94880687132
80.85000000000002	1106.9774792289263
81.85000000000002	1118.0513695983382
82.85000000000002	1129.1704770143788
83.85000000000002	1140.334800520556
84.85000000000002	1151.5443391689746
85.85000000000002	1162.7990920202787
86.85000000000002	1174.0990581435738
87.85000000000002	1185.4442366163612
88.85000000000002	1196.8346265244697
89.85000000000002	1208.270226961991
90.85000000000002	1219.7510370312116
91.85000000000002	1231.2770558425439
92.85000000000002	1242.8482825144679
93.85000000000002	1254.4647161734624
94.85000000000002	1266.1263559539466
95.85000000000002	1277.8332009982075
96.85000000000002	1289.5852504563497
97.85000000000002	1301.382503486228
98.85000000000002	1313.2249592533867
99.85000000000002	1325.1126169309955
100.85000000000002	1337.0454756998063
101.85000000000002	1349.0235347480755
102.85000000000002	1361.0467932715144
103.85000000000002	1373.115250473236
104.85000000000002	1385.228905563685
105.85000000000002	1397.3877577605956
106.85000000000002	1409.5918062889286
107.85000000000002	1421.8410503808227
108.85000000000002	1434.1354892755282
109.85000000000002	1446.475122219362
110.85000000000002	1458.8599484656554
111.85000000000002	1471.289967274694
112.85000000000002	1483.7651779136766
113.85000000000002	1496.2855796566482
114.85000000000002	1508.8511717844672
115.85000000000002	1521.461953584738
116.85000000000002	1534.1179243517715

Temperature (degC)	Pressure (MPa)
117.85000000000002	1546.819083386525
118.85000000000002	1559.5654299965697
119.85000000000002	1572.356963496031
120.85000000000002	1585.1936832055342
121.85000000000002	1598.0755884521723
122.85000000000002	1611.0026785694508
123.85000000000002	1623.974952897238
124.85000000000002	1636.9924107817246
125.85000000000002	1650.055051575375

Table B113: Melting Points for Carbon Dioxide and 3% Oxygen

Temperature (degC)	Pressure (MPa)
-62.1499999999998	0.40533975761546165
-61.1499999999998	1.7771497041955506
-60.1499999999998	6.490066201829361
-59.1499999999998	11.247159854257895
-58.1499999999998	16.049713052164602
-57.1499999999998	20.897779067420743
-56.1499999999998	25.791360917210874
-55.1499999999998	30.73045558571283
-54.1499999999998	35.71505926812395
-53.1499999999998	40.745168130855454
-52.1499999999998	45.8207783754763
-51.1499999999998	50.941886203571514
-50.1499999999998	56.10848778481451
-49.1499999999998	61.32057924037067
-48.1499999999998	66.57815663807118
-47.1499999999998	71.88121599469628
-46.1499999999998	77.22975328200751
-45.1499999999998	82.62376443444236
-44.1499999999998	88.06324535725554
-43.1499999999998	93.54819193444241
-42.1499999999998	99.07860003610838
-41.1499999999998	104.65446552513596
-40.1499999999998	110.27578426311453
-39.1499999999998	115.94255211554756
-38.1499999999998	121.65476495639035
-37.1499999999998	127.41241867197857
-36.1499999999998	133.21550916441026
-35.1499999999998	139.06403235444853
-34.1499999999998	144.9579841840007
-33.1499999999998	150.89736061822907
-32.1499999999998	156.88215764734002
-31.14999999999977	162.9123712880937
-30.14999999999977	168.98799758506948
-29.14999999999977	175.10903261172538
-28.14999999999977	181.27547247126853
-27.14999999999977	187.48731329737433
-26.14999999999977	193.74455125476047
-25.14999999999977	200.0471825396496
-24.14999999999977	206.39520338012238
-23.14999999999977	212.78861003638497
-22.14999999999977	219.22739880095568
-21.14999999999977	225.7115659987866
-20.14999999999977	232.241107987324

Temperature (degC)	Pressure (MPa)
-19.14999999999977	238.81602115652032
-18.14999999999977	245.43630192880062
-17.14999999999977	252.10194675899126
-16.14999999999977	258.8129521342157
-15.14999999999977	265.569314573763
-14.14999999999977	272.3710306289275
-13.14999999999977	279.2180968828316
-12.14999999999977	286.110509950232
-11.14999999999977	293.0482664773033
-10.14999999999977	300.0313631414154
-9.14999999999977	307.05979665089495
-8.14999999999977	314.13356374478354
-7.14999999999977	321.2526611925777
-6.14999999999977	328.417085793977
-5.14999999999977	335.62683437861125
-4.14999999999977	342.8819038057758
-3.149999999999773	350.182290964157
-2.149999999999773	357.5279927715596
-1.149999999999773	364.9190061746268
-0.1499999999997726	372.3553281485647
0.85000000000000227	379.8369556968654
1.85000000000000227	387.3638858510226
2.85000000000000227	394.93611567026335
3.85000000000000227	402.5536422412641
4.8500000000000023	410.2164626778779
5.8500000000000023	417.9245741208584
6.8500000000000023	425.67797373758793
7.8500000000000023	433.47665872180767
8.8500000000000023	441.3206262933471
9.8500000000000023	449.209873697859
10.8500000000000023	457.1443982065525
11.8500000000000023	465.12419711593697
12.8500000000000023	473.14926774755554
13.8500000000000023	481.2196074477337
14.8500000000000023	489.3352135873253
15.8500000000000023	497.49608356145797
16.8500000000000023	505.70221478928687
17.8500000000000023	513.9536047137518
18.8500000000000023	522.2502508013296
19.8500000000000023	530.5921505417988
20.8500000000000023	538.9793014480007
21.8500000000000023	547.4117010556051
22.8500000000000023	555.8893469228814
23.8500000000000023	564.4122366304675
24.8500000000000023	572.9803677811484

Temperature (degC)	Pressure (MPa)
25.850000000000023	581.5937379996304
26.850000000000023	590.2523449323218
27.850000000000023	598.9561862471179
28.850000000000023	607.705259633186
29.850000000000023	616.499562800756
30.850000000000023	625.3390934809087
31.850000000000023	634.2238494253722
32.850000000000002	643.1538284063184
33.850000000000002	652.1290282161632
34.850000000000002	661.1494466673687
35.850000000000002	670.2150815922465
36.850000000000002	679.3259308427663
37.850000000000002	688.4819922903678
38.850000000000002	697.6832638257691
39.850000000000002	706.9297433587844
40.850000000000002	716.2214288181397
41.850000000000002	725.5583181512959
42.850000000000002	734.9404093242657
43.850000000000002	744.3677003214402
44.850000000000002	753.8401891454174
45.850000000000002	763.3578738168318
46.850000000000002	772.9207523741788
47.850000000000002	782.528822873657
48.850000000000002	792.1820833889938
49.850000000000002	801.8805320112936
50.850000000000002	811.6241668488714
51.850000000000002	821.4129860270947
52.850000000000002	831.2469876882262
53.850000000000002	841.1261699912733
54.850000000000002	851.050531111837
55.850000000000002	861.0200692419501
56.850000000000002	871.0347825899455
57.850000000000002	881.0946693802963
58.850000000000002	891.1997278534782
59.850000000000002	901.3499562658221
60.850000000000002	911.5453528893764
61.850000000000002	921.7859160117679
62.850000000000002	932.0716439360559
63.850000000000002	942.4025349806135
64.850000000000002	952.77858747897
65.850000000000002	963.1997997797037
66.850000000000002	973.6661702462867
67.850000000000002	984.177697256972
68.850000000000002	994.7343792046573
69.850000000000002	1005.336214496769

Temperature (degC)	Pressure (MPa)
70.85000000000002	1015.9832015551202
71.85000000000002	1026.6753388158045
72.85000000000002	1037.412624729064
73.85000000000002	1048.1950577591708
74.85000000000002	1059.0226363843076
75.85000000000002	1069.8953590964607
76.85000000000002	1080.8132244012795
77.85000000000002	1091.7762308179906
78.85000000000002	1102.784376879266
79.85000000000002	1113.837661131108
80.85000000000002	1124.9360821327602
81.85000000000002	1136.0796384565729
82.85000000000002	1147.2683286879078
83.85000000000002	1158.502151425031
84.85000000000002	1169.7811052790046
85.85000000000002	1181.10518887358
86.85000000000002	1192.4744008450996
87.85000000000002	1203.8887398423892
88.85000000000002	1215.348204526663
89.85000000000002	1226.8527935714214
90.85000000000002	1238.4025056623384
91.85000000000002	1249.997339497196
92.85000000000002	1261.637293785752
93.85000000000002	1273.3223672496715
94.85000000000002	1285.0525586224167
95.85000000000002	1296.8278666491508
96.85000000000002	1308.6482900866695
97.85000000000002	1320.5138277032788
98.85000000000002	1332.4244782787282
99.85000000000002	1344.3802406041016
100.85000000000002	1356.381113481749
101.85000000000002	1368.427095725186
102.85000000000002	1380.5181861590058
103.85000000000002	1392.654383618804
104.85000000000002	1404.835686951089
105.85000000000002	1417.0620950131872
106.85000000000002	1429.33360667318
107.85000000000002	1441.6502208098113
108.85000000000002	1454.0119363123993
109.85000000000002	1466.4187520807711
110.85000000000002	1478.8706670251715
111.85000000000002	1491.3676800661895
112.85000000000002	1503.909790134679
113.85000000000002	1516.496996171685
114.85000000000002	1529.1292971283708

Temperature (degC)	Pressure (MPa)
115.85000000000002	1541.8066919659113
116.85000000000002	1554.5291796554732
117.85000000000002	1567.2967591780957
118.85000000000002	1580.1094295246357
119.85000000000002	1592.9671896956916
120.85000000000002	1605.870038701535
121.85000000000002	1618.8179755620395
122.85000000000002	1631.8109993066007
123.85000000000002	1644.849108974085
124.85000000000002	1657.9323036127348
125.85000000000002	1671.0605822801363

Table B114: Melting Points for Carbon Dioxide and 4% Oxygen

Temperature (degC)	Pressure (MPa)
-63.1499999999998	0.3735335874054742
-62.1499999999998	4.696841928404405
-61.1499999999998	9.43745371992641
-60.1499999999998	14.223435282779116
-59.1499999999998	19.054969329212266
-58.1499999999998	23.932069338305052
-57.1499999999998	28.854732405548233
-56.1499999999998	33.822953499752444
-55.1499999999998	38.83672743443339
-54.1499999999998	43.89604908858233
-53.1499999999998	49.00091336618484
-52.1499999999998	54.15131514313748
-51.1499999999998	59.34724923631849
-50.1499999999998	64.58871039183968
-49.1499999999998	69.87569328533849
-48.1499999999998	75.20819252883058
-47.1499999999998	80.58620268066123
-46.1499999999998	86.00971825651612
-45.1499999999998	91.47873374036493
-44.1499999999998	96.99324359475628
-43.1499999999998	102.55324227018897
-42.1499999999998	108.15872421347864
-41.1499999999998	113.80968387511801
-40.1499999999998	119.50611571570164
-39.1499999999998	125.24801421148366
-38.1499999999998	131.03537385917147
-37.1499999999998	136.8681891800315
-36.1499999999998	142.74645472339978
-35.1499999999998	148.67016506966684
-34.1499999999998	154.63931483280697
-33.1499999999998	160.65389866251186
-32.1499999999998	166.71391124598028
-31.14999999999977	172.8193473094104
-30.14999999999977	178.970201619234
-29.14999999999977	185.16646898312507
-28.14999999999977	191.40814425081805
-27.14999999999977	197.69522231475503
-26.14999999999977	204.02769811059062
-25.14999999999977	210.4055666175659
-24.14999999999977	216.828822858778
-23.14999999999977	223.29746190135236
-22.14999999999977	229.81147885653192
-21.14999999999977	236.37086887969872

Temperature (degC)	Pressure (MPa)
-20.14999999999977	242.97562717032906
-19.14999999999977	249.62574897190078
-18.14999999999977	256.3212295717487
-17.14999999999977	263.0620643008857
-16.14999999999977	269.8482485337868
-15.14999999999977	276.67977768814217
-14.14999999999977	283.5566472245894
-13.14999999999977	290.4788526464215
-12.14999999999977	297.4463894992771
-11.14999999999977	304.45925337081354
-10.14999999999977	311.51743989037425
-9.14999999999977	318.62094472863026
-8.14999999999977	325.76976359723335
-7.14999999999977	332.9638922484436
-6.14999999999977	340.2033264747637
-5.14999999999977	347.48806210856134
-4.14999999999977	354.81809502169165
-3.149999999999773	362.1934211251178
-2.149999999999773	369.6140363685294
-1.149999999999773	377.0799367399603
-0.1499999999997726	384.59111826540544
0.8500000000000227	392.1475770084402
1.8500000000000227	399.7493090698412
2.8500000000000227	407.3963105872051
3.8500000000000227	415.0885777345762
4.850000000000023	422.82610672206675
5.850000000000023	430.60889379548877
6.850000000000023	438.4369352359867
7.850000000000023	446.3102273596662
8.850000000000023	454.2287665172431
9.850000000000023	462.19254909366754
10.850000000000023	470.20157150778505
11.850000000000023	478.2558302119761
12.850000000000023	486.3553216918103
13.850000000000023	494.5000424657043
14.850000000000023	502.68998908457706
15.850000000000023	510.9251581315219
16.850000000000023	519.2055462214646
17.850000000000023	527.5311500008446
18.850000000000023	535.9019661472843
19.850000000000023	544.3179913692703
20.850000000000023	552.7792224058434
21.850000000000023	561.2856560262765
22.850000000000023	569.8372890297752
23.850000000000023	578.4341182451692

Temperature (degC)	Pressure (MPa)
24.850000000000023	587.0761405306138
25.850000000000023	595.763352773294
26.850000000000023	604.4957518891306
27.850000000000023	613.2733348224925
28.850000000000023	622.0960985459154
29.850000000000023	630.9640400598103
30.850000000000023	639.8771563922018
31.850000000000023	648.835444598442
32.850000000000002	657.8389017609452
33.850000000000002	666.8875249889225
34.850000000000002	675.9813114181181
35.850000000000002	685.1202582105441
36.850000000000002	694.3043625542415
37.850000000000002	703.5336216630071
38.850000000000002	712.8080327761556
39.850000000000002	722.1275931582711
40.850000000000002	731.4923000989705
41.850000000000002	740.9021509126532
42.850000000000002	750.3571429382712
43.850000000000002	759.8572735390975
44.850000000000002	769.4025401024904
45.850000000000002	778.9929400396735
46.850000000000002	788.6284707855069
47.850000000000002	798.3091297982626
48.850000000000002	808.0349145594142
49.850000000000002	817.8058225734201
50.850000000000002	827.6218513675017
51.850000000000002	837.482998491443
52.850000000000002	847.3892615173828
53.850000000000002	857.340638039605
54.850000000000002	867.3371256743361
55.850000000000002	877.3787220595575
56.850000000000002	887.465424854788
57.850000000000002	897.5972317409099
58.850000000000002	907.7741404199667
59.850000000000002	917.9961486149685
60.850000000000002	928.2632540697205
61.850000000000002	938.5754545486229
62.850000000000002	948.9327478364964
63.850000000000002	959.3351317383956
64.850000000000002	969.782604079442
65.850000000000002	980.2751627046355
66.850000000000002	990.8128054786876
67.850000000000002	1001.3955302858462
68.850000000000002	1012.0233350297366

Temperature (degC)	Pressure (MPa)
69.85000000000002	1022.6962176331723
70.85000000000002	1033.4141760380123
71.85000000000002	1044.177208204984
72.85000000000002	1054.9853121135257
73.85000000000002	1065.838485761628
74.85000000000002	1076.736727165678
75.85000000000002	1087.6800343602902
76.85000000000002	1098.6684053981746
77.85000000000002	1109.7018383499646
78.85000000000002	1120.780331304081
79.85000000000002	1131.9038823665667
80.85000000000002	1143.0724896609631
81.85000000000002	1154.2861513281412
82.85000000000002	1165.5448655261728
83.85000000000002	1176.848630430186
84.85000000000002	1188.1974442322194
85.85000000000002	1199.5913051410928
86.85000000000002	1211.0302113822595
87.85000000000002	1222.514161197678
88.85000000000002	1234.0431528456766
89.85000000000002	1245.617184600821
90.85000000000002	1257.2362547537791
91.85000000000002	1268.900361611203
92.85000000000002	1280.6095034955804
93.85000000000002	1292.3636787451346
94.85000000000002	1304.1628857136782
95.85000000000002	1316.0071227704923
96.85000000000002	1327.896388300219
97.85000000000002	1339.8306807027166
98.85000000000002	1351.8099983929606
99.85000000000002	1363.834339800916
100.85000000000002	1375.9037033714271
101.85000000000002	1388.0180875640717
102.85000000000002	1400.1774908531015
103.85000000000002	1412.381911727277
104.85000000000002	1424.6313486897866
105.85000000000002	1436.9258002581093
106.85000000000002	1449.2652649639404
107.85000000000002	1461.6497413530483
108.85000000000002	1474.079227985183
109.85000000000002	1486.5537234339715
110.85000000000002	1499.073226286807
111.85000000000002	1511.637735144741
112.85000000000002	1524.2472486223962
113.85000000000002	1536.9017653478454

Temperature (degC)	Pressure (MPa)
114.85000000000002	1549.6012839625196
115.85000000000002	1562.3458031211148
116.85000000000002	1575.1353214914725
117.85000000000002	1587.9698377545035
118.85000000000002	1600.8493506040845
119.85000000000002	1613.7738587469526
120.85000000000002	1626.7433609026218
121.85000000000002	1639.7578558032853
122.85000000000002	1652.8173421937188
123.85000000000002	1665.9218188312038
124.85000000000002	1679.0712844854058
125.85000000000002	1692.2657379383081

Table B115: Melting Points for Carbon Dioxide and 5% Oxygen

Temperature (degC)	Pressure (MPa)
-65.1499999999998	0.34422318141407154
-64.1499999999998	2.909493948856473
-63.1499999999998	7.6343169809639395
-62.1499999999998	12.403996976646006
-61.1499999999998	17.21925190014455
-60.1499999999998	22.0801251299183
-59.1499999999998	26.986615977600376
-58.1499999999998	31.938718386343343
-57.1499999999998	36.93642577762288
-56.1499999999998	41.97973166153344
-55.1499999999998	47.06862961655152
-54.1499999999998	52.203113210243885
-53.1499999999998	57.3831759472503
-52.1499999999998	62.60881124613859
-51.1499999999998	67.88001243522373
-50.1499999999998	73.19677275904134
-49.1499999999998	78.55908539009128
-48.1499999999998	83.96694344265596
-47.1499999999998	89.42033998690547
-46.1499999999998	94.91926806234464
-45.1499999999998	100.46372069015456
-44.1499999999998	106.05369088424972
-43.1499999999998	111.68917166103843
-42.1499999999998	117.37015604794483
-41.1499999999998	123.09663709079292
-40.1499999999998	128.86860786017198
-39.1499999999998	134.68606145688835
-38.1499999999998	140.5489910166259
-37.1499999999998	146.45738971390804
-36.1499999999998	152.41125076544986
-35.1499999999998	158.41056743299143
-34.1499999999998	164.45533302566434
-33.1499999999998	170.54554090197252
-32.1499999999998	176.68118447142356
-31.14999999999977	182.86225719586736
-30.14999999999977	189.0887525905799
-29.14999999999977	195.36066422512002
-28.14999999999977	201.677985723996
-27.14999999999977	208.0407107671701
-26.14999999999977	214.44883309041276
-25.14999999999977	220.90234648553403
-24.14999999999977	227.40124480051202
-23.14999999999977	233.94552193951705

Temperature (degC)	Pressure (MPa)
-22.14999999999977	240.53517186286737
-21.14999999999977	247.1701885869049
-20.14999999999977	253.8505661838188
-19.14999999999977	260.5762987814113
-18.14999999999977	267.3473805628223
-17.14999999999977	274.16380576621054
-16.14999999999977	281.0255686844119
-15.14999999999977	287.93266366455833
-14.14999999999977	294.88508510768355
-13.14999999999977	301.88282746829816
-12.14999999999977	308.92588525395706
-11.14999999999977	316.01425302481
-10.14999999999977	323.14792539313896
-9.14999999999977	330.32689702288764
-8.14999999999977	337.55116262918517
-7.14999999999977	344.82071697786154
-6.14999999999977	352.1355548849593
-5.14999999999977	359.4956712162492
-4.14999999999977	366.90106088672877
-3.149999999999773	374.3517188601406
-2.149999999999773	381.84764014847127
-1.149999999999773	389.3888198114669
-0.1499999999997726	396.9752529561373
0.8500000000000227	404.6069347362755
1.8500000000000227	412.28386035196615
2.8500000000000227	420.00602504910864
3.8500000000000227	427.7734241189388
4.850000000000023	435.58605289755354
5.850000000000023	443.44390676543753
6.850000000000023	451.34698114700643
7.850000000000023	459.2952715101347
8.850000000000023	467.2887733657083
9.850000000000023	475.32748226716836
10.850000000000023	483.4113938100646
11.850000000000023	491.5405036316129
12.850000000000023	499.71480741026505
13.850000000000023	507.9343008652698
14.850000000000023	516.1989797562481
15.850000000000023	524.5088398827759
16.850000000000023	532.8638770839674
17.850000000000023	541.2640872380573
18.850000000000023	549.7094662620102
19.850000000000023	558.2000101111039
20.850000000000023	566.7357147785498
21.850000000000023	575.3165762950877

Temperature (degC)	Pressure (MPa)
22.8500000000000023	583.9425907286163
23.8500000000000023	592.613754183805
24.8500000000000023	601.3300628017183
25.8500000000000023	610.0915127594524
26.8500000000000023	618.8981002697666
27.8500000000000023	627.7498215807216
28.8500000000000023	636.6466729753317
29.8500000000000023	645.588650771207
30.8500000000000023	654.575751320212
31.8500000000000023	663.6079710081227
32.850000000000002	672.6853062542948
33.850000000000002	681.8077535113246
34.850000000000002	690.9753092647304
35.850000000000002	700.1879700326191
36.850000000000002	709.4457323653788
37.850000000000002	718.7485928453583
38.850000000000002	728.0965480865542
39.850000000000002	737.4895947343111
40.850000000000002	746.9277294650229
41.850000000000002	756.4109489858157
42.850000000000002	765.9392500342811
43.850000000000002	775.5126293781615
44.850000000000002	785.1310838150812
45.850000000000002	794.7946101722579
46.850000000000002	804.50320530622
47.850000000000002	814.2568661025324
48.850000000000002	824.0555894755328
49.850000000000002	833.8993723680566
50.850000000000002	843.7882117511737
51.850000000000002	853.7221046239241
52.850000000000002	863.7010480130691
53.850000000000002	873.7250389728274
54.850000000000002	883.7940745846297
55.850000000000002	893.9081519568705
56.850000000000002	904.0672682246559
57.850000000000002	914.2714205495714
58.850000000000002	924.5206061194351
59.850000000000002	934.8148221480774
60.850000000000002	945.1540658750836
61.850000000000002	955.5383345655829
62.850000000000002	965.9676255100152
63.850000000000002	976.4419360239134
64.850000000000002	986.9612634476636
65.850000000000002	997.5256051463134
66.850000000000002	1008.1349585093317

Temperature (degC)	Pressure (MPa)
67.85000000000002	1018.7893209504058
68.85000000000002	1029.4886899072358
69.85000000000002	1040.2330628413185
70.85000000000002	1051.022437237743
71.85000000000002	1061.85681060498
72.85000000000002	1072.7361804747077
73.85000000000002	1083.660544401578
74.85000000000002	1094.6298999630453
75.85000000000002	1105.6442447591683
76.85000000000002	1116.7035764124087
77.85000000000002	1127.8078925674574
78.85000000000002	1138.957190891023
79.85000000000002	1150.1514690716876
80.85000000000002	1161.390724819671
81.85000000000002	1172.674955866706
82.85000000000002	1184.0041599658202
83.85000000000002	1195.3783348911668
84.85000000000002	1206.7974784378675
85.85000000000002	1218.2615884218299
86.85000000000002	1229.7706626795598
87.85000000000002	1241.3246990680304
88.85000000000002	1252.9236954644807
89.85000000000002	1264.5676497662696
90.85000000000002	1276.2565598907104
91.85000000000002	1287.9904237749001
92.85000000000002	1299.7692393755858
93.85000000000002	1311.5930046689657
94.85000000000002	1323.4617176505737
95.85000000000002	1335.3753763351124
96.85000000000002	1347.33397875628
97.85000000000002	1359.337522966658
98.85000000000002	1371.3860070375304
99.85000000000002	1383.4794290587565
100.85000000000002	1395.6177871386005
101.85000000000002	1407.8010794036304
102.85000000000002	1420.029303998524
103.85000000000002	1432.302459085968
104.85000000000002	1444.6205428464948
105.85000000000002	1456.9835534783645
106.85000000000002	1469.3914891974073
107.85000000000002	1481.8443482368955
108.85000000000002	1494.3421288474344
109.85000000000002	1506.8848292967832
110.85000000000002	1519.472447869753
111.85000000000002	1532.1049828680984

Temperature (degC)	Pressure (MPa)
112.85000000000002	1544.7824326103357
113.85000000000002	1557.5047954316587
114.85000000000002	1570.2720696838028
115.85000000000002	1583.0842537349101
116.85000000000002	1595.941345969417
117.85000000000002	1608.8433447879338
118.85000000000002	1621.7902486071227
119.85000000000002	1634.782055859561
120.85000000000002	1647.8187649936644
121.85000000000002	1660.9003744735235
122.85000000000002	1674.0268827788125
123.85000000000002	1687.1982884046854
124.85000000000002	1700.41458986164
125.85000000000002	1713.6757856754052

Table B116: Sublimation Points for Carbon Dioxide and 1% Argon

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.694920792031121e-08
-172.1499999999998	2.3716956670427738e-08
-171.1499999999998	3.2951149057683056e-08
-170.1499999999998	4.546498494128219e-08
-169.1499999999998	6.23114259293002e-08
-168.1499999999998	8.484540879408292e-08
-167.1499999999998	1.1479993781703347e-07
-166.1499999999998	1.5437861972593779e-07
-165.1499999999998	2.0636757020892813e-07
-164.1499999999998	2.7427001980089014e-07
-163.1499999999998	3.624673796663947e-07
-162.1499999999998	4.7641099453023587e-07
-161.1499999999998	6.228493104476748e-07
-160.1499999999998	8.100957185935282e-07
-159.1499999999998	1.0483429017196412e-06
-158.1499999999998	1.3500301059245693e-06
-157.1499999999998	1.7302703850429941e-06
-156.1499999999998	2.207345516060099e-06
-155.1499999999998	2.803276958886861e-06
-154.1499999999998	3.5444819296588172e-06
-153.1499999999998	4.462524370199428e-06
-152.1499999999998	5.5949713239116896e-06
-151.1499999999998	6.986365966397096e-06
-150.1499999999998	8.689329283649604e-06
-149.1499999999998	1.0765803137714587e-05
-148.1499999999998	1.3288448205161835e-05
-147.1499999999998	1.634221101351921e-05
-146.1499999999998	2.0026075030929763e-05
-145.1499999999998	2.4455011480836042e-05
-144.1499999999998	2.976214625274227e-05
-143.1499999999998	3.6101159958583914e-05
-142.1499999999998	4.364893883876057e-05
-141.1499999999998	5.2608494849640873e-05
-140.1499999999998	6.321217386286676e-05
-139.1499999999998	7.572517147410119e-05
-138.1499999999998	9.044937645343565e-05
-137.1499999999998	0.00010772756237049675
-136.1499999999998	0.00012794794839390808
-135.1499999999998	0.00015154915069722882
-134.1499999999998	0.00017902554630249036
-133.1499999999998	0.0002109330715592025
-132.1499999999998	0.00024789547779301895
-131.1499999999998	0.00029061106696656736

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003398599304781411
-129.1499999999998	0.0003965117144856821
-128.1499999999998	0.0004615339353876677
-127.1499999999998	0.0005360008693237821
-126.1499999999998	0.0006211030397818067
-125.1499999999998	0.0007181573276182088
-124.1499999999998	0.0008286177280248269
-123.1499999999998	0.0009540867792088485
-122.1499999999998	0.0010963276878049675
-121.1499999999998	0.001257277176314067
-120.1499999999998	0.0014390590781696135
-119.1499999999998	0.0016439987063786325
-118.1499999999998	0.0018746380220768402
-117.1499999999998	0.0021337516297851573
-116.1499999999998	0.0024243636266660772
-115.1499999999998	0.0027497653336616933
-114.1499999999998	0.0031135339370590947
-113.1499999999998	0.003519552069783187
-112.1499999999998	0.00397202836256956
-111.1499999999998	0.004475518996131807
-110.1499999999998	0.0050349502865163695
-109.1499999999998	0.005655642337045769
-108.1499999999998	0.006343333791595138
-107.1499999999998	0.007104207725440678
-106.1499999999998	0.007944918711570331
-105.1499999999998	0.008872621102169789
-104.1499999999998	0.009894998567000334
-103.1499999999998	0.0110202949325852
-102.1499999999998	0.012257346368526089
-101.1499999999998	0.013615614969899662
-100.1499999999998	0.015105223787549594
-99.1499999999998	0.01673699336120553
-98.1499999999998	0.018522479813751734
-97.1499999999998	0.020474014568645442
-96.1499999999998	0.022604745756480936
-95.1499999999998	0.02492868138102315
-94.1499999999998	0.027460734319732463
-93.1499999999998	0.03021676923889405
-92.1499999999998	0.033213651508992845
-91.1499999999998	0.03646929821197158
-90.1499999999998	0.040002731338540536
-89.1499999999998	0.043834133280802136
-88.1499999999998	0.04798490473321132
-87.1499999999998	0.05247772512336267
-86.1499999999998	0.05733661570339618

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06258700544304666
-84.14999999999998	0.06825579987666873
-83.14999999999998	0.07437145306913757
-82.14999999999998	0.08096404287954667
-81.14999999999998	0.0880653497173938
-80.14999999999998	0.09570893900379669
-79.14999999999998	0.10393024757066066
-78.14999999999998	0.11276667425421959
-77.14999999999998	0.12225767496675748
-76.14999999999998	0.13244486256263932
-75.14999999999998	0.1433721118534603
-74.14999999999998	0.1550856701741636
-73.14999999999998	0.16763427396020483
-72.14999999999998	0.1810692718694124
-71.14999999999998	0.19544475507721867
-70.14999999999998	0.2108176954999229
-69.14999999999998	0.22724809287241673
-68.14999999999998	0.24479913184876925
-67.14999999999998	0.263537350647592
-66.14999999999998	0.28353282330285
-65.14999999999998	0.304859358443015
-64.14999999999998	0.32759471898391296
-63.14999999999998	0.3518208697825828
-62.14999999999998	0.3776242655937864
-61.14999999999998	0.4050962034998087
-60.14999999999998	0.43433329509334706
-59.14999999999998	0.4654382192894273
-58.14999999999998	0.49852152214213274

Table B117: Sublimation Points for Carbon Dioxide and 2% Argon

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.1393831982495305e-08
-172.1499999999998	2.983453355638647e-08
-171.1499999999998	4.131269724289877e-08
-170.1499999999998	5.681635863273155e-08
-169.1499999999998	7.762063285778768e-08
-168.1499999999998	1.0536100978573244e-07
-167.1499999999998	1.421227003597312e-07
-166.1499999999998	1.9054893332100345e-07
-165.1499999999998	2.539715023631405e-07
-164.1499999999998	3.3656729935235173e-07
-163.1499999999998	4.4354503974979894e-07
-162.1499999999998	5.813668915551397e-07
-161.1499999999998	7.580102583205113e-07
-160.1499999999998	9.83275539017418e-07
-159.1499999999998	1.2691462913168396e-06
-158.1499999999998	1.6302088582942173e-06
-157.1499999999998	2.084139179423118e-06
-156.1499999999998	2.652265192319869e-06
-155.1499999999998	3.360213939032324e-06
-154.1499999999998	4.238653216395666e-06
-153.1499999999998	5.324138350486037e-06
-152.1499999999998	6.660075426634389e-06
-151.1499999999998	8.297813064778572e-06
-150.1499999999998	1.029787559095945e-05
-149.1499999999998	1.2731351215273346e-05
-148.1499999999998	1.568144958032563e-05
-147.1499999999998	1.9245243788010767e-05
-146.1499999999998	2.3535612742191866e-05
-145.1499999999998	2.8683400356692032e-05
-144.1499999999998	3.4839808868299065e-05
-143.1499999999998	4.2179044159879066e-05
-142.1499999999998	5.0901231636227986e-05
-141.1499999999998	6.123562180238536e-05
-140.1499999999998	7.344410526866448e-05
-139.1499999999998	8.782505744704561e-05
-138.1499999999998	0.00010471753370865692
-137.1499999999998	0.00012450583624141519
-136.1499999999998	0.00014762447428043308
-135.1499999999998	0.00017456353978226468
-134.1499999999998	0.00020587452097866008
-133.1499999999998	0.00024217657657802248
-132.1499999999998	0.00028416329368579816
-131.1499999999998	0.00033260995279140587

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003883813234229089
-129.1499999999998	0.00045244001430533087
-128.1499999999998	0.0005258554020792659
-127.1499999999998	0.0006098131628483616
-126.1499999999998	0.0007056254310329081
-125.1499999999998	0.0008147416102186693
-124.1499999999998	0.0009387598609112998
-123.1499999999998	0.00107943929034461
-122.1499999999998	0.0012387128697525888
-121.1499999999998	0.0014187011048080154
-120.1499999999998	0.0016217264852630725
-119.1499999999998	0.0018503287402070589
-118.1499999999998	0.0021072809257919596
-117.1499999999998	0.0023956063727770135
-116.1499999999998	0.002718596521816635
-115.1499999999998	0.0030798296750721354
-114.1499999999998	0.0034831906934745427
-113.1499999999998	0.003932891669814389
-112.1499999999998	0.004433493608792489
-111.1499999999998	0.00498992914624464
-110.1499999999998	0.005607526340962169
-109.1499999999998	0.0062920335738794655
-108.1499999999998	0.007049645590900419
-107.1499999999998	0.007887030727298405
-106.1499999999998	0.008811359353459905
-105.1499999999998	0.009830333583764953
-104.1499999999998	0.010952218292615574
-103.1499999999998	0.012185873484056588
-102.1499999999998	0.013540788064089341
-101.1499999999998	0.015027115067677682
-100.1499999999998	0.016655708395603073
-99.1499999999998	0.018438161119757865
-98.1499999999998	0.020386845419197577
-97.1499999999998	0.02251495421332175
-96.1499999999998	0.024836544562946837
-95.1499999999998	0.027366582914804906
-94.1499999999998	0.03012099227017164
-93.1499999999998	0.033116701363949355
-92.1499999999998	0.03637169594662848
-91.1499999999998	0.039905072268195924
-90.1499999999998	0.043737092870291615
-89.1499999999998	0.047889244800815176
-88.1499999999998	0.052384300373836644
-87.1499999999998	0.05724638060715908
-86.1499999999998	0.06250102148035115

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06817524316765106
-84.14999999999998	0.07429762241302897
-83.14999999999998	0.0808983682291159
-82.14999999999998	0.08800940111793634
-81.14999999999998	0.09566443602982358
-80.14999999999998	0.10389906929798132
-79.14999999999998	0.11275086981056594
-78.14999999999998	0.12225947471070302
-77.14999999999998	0.13246668994866212
-76.14999999999998	0.14341659605109336
-75.14999999999998	0.15515565952191637
-74.14999999999998	0.1677328503513712
-73.14999999999998	0.1811997661884527
-72.14999999999998	0.19561076383443418
-71.14999999999998	0.21102309885219953
-70.14999999999998	0.22749707427474541
-69.14999999999998	0.24509619966493099
-68.14999999999998	0.2638873621761804
-67.14999999999998	0.283941011878887
-66.14999999999998	0.3053313646190771
-65.14999999999998	0.3281366274115399
-64.14999999999998	0.3524392546135199
-63.14999999999998	0.3783262498009768
-62.14999999999998	0.4058895438979901
-61.14999999999998	0.43522652417048724
-60.14999999999998	0.46644095775391614

Table B118: Sublimation Points for Carbon Dioxide and 3% Argon

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.696468019662377e-08
-172.1499999999998	3.7476199996935946e-08
-171.1499999999998	5.172266311401885e-08
-170.1499999999998	7.090261900099831e-08
-169.1499999999998	9.655777794832498e-08
-168.1499999999998	1.3065920750411676e-07
-167.1499999999998	1.757120555781897e-07
-166.1499999999998	2.348820713826885e-07
-165.1499999999998	3.121476337397864e-07
-164.1499999999998	4.1248147052747403e-07
-163.1499999999998	5.42066762955812e-07
-162.1499999999998	7.08552873373321e-07
-161.1499999999998	9.213565143751191e-07
-160.1499999999998	1.1920147886665578e-06
-159.1499999999998	1.5345971715431377e-06
-158.1499999999998	1.9661841786721184e-06
-157.1499999999998	2.50742115839298e-06
-156.1499999999998	3.1831563669065325e-06
-155.1499999999998	4.02317322306474e-06
-154.1499999999998	5.063027393275252e-06
-153.1499999999998	6.34500012231007e-06
-152.1499999999998	7.919179998372723e-06
-151.1499999999998	9.844686116307672e-06
-150.1499999999998	1.2191046376920732e-05
-149.1499999999998	1.5039745428604422e-05
-148.1499999999998	1.8485957515459367e-05
-147.1499999999998	2.264048023961964e-05
-146.1499999999998	2.763188597047046e-05
-145.1499999999998	3.36089083360698e-05
-144.1499999999998	4.074308190886177e-05
-143.1499999999998	4.923165384554296e-05
-142.1499999999998	5.9300786857037966e-05
-141.1499999999998	7.12090734666875e-05
-140.1499999999998	8.52513820612302e-05
-139.1499999999998	0.0001017630557488288
-138.1499999999998	0.00012112448551057188
-137.1499999999998	0.00014376607956670412
-136.1499999999998	0.00017017365127674843
-135.1499999999998	0.00020089424825513462
-134.1499999999998	0.0002365424457126199
-133.1499999999998	0.0002778071273313003
-132.1499999999998	0.00032545877725043604
-131.1499999999998	0.00038035730698538997

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00044346044132689507
-129.1499999999998	0.0005158326874776453
-128.1499999999998	0.0005986549118829991
-127.1499999999998	0.0006932345494085383
-126.1499999999998	0.000801016469715212
-125.1499999999998	0.0009235945258902206
-124.1499999999998	0.0010627238106150822
-123.1499999999998	0.0012203336453996331
-122.1499999999998	0.001398541328689265
-121.1499999999998	0.0015996666689712868
-120.1499999999998	0.0018262473293726039
-119.1499999999998	0.002081055010664012
-118.1499999999998	0.0023671125000752444
-117.1499999999998	0.002687711613887901
-116.1499999999998	0.0030464320624204416
-115.1499999999998	0.0034471612667596376
-114.1499999999998	0.003894115157435857
-113.1499999999998	0.0043918599861948885
-112.1499999999998	0.004945335183097178
-111.1499999999998	0.005559877292386305
-110.1499999999998	0.006241245021922058
-109.1499999999998	0.006995645442482556
-108.1499999999998	0.007829761374911752
-107.1499999999998	0.008750780004941346
-106.1499999999998	0.009766422767552584
-105.1499999999998	0.010884976544987938
-104.1499999999998	0.012115326224978008
-103.1499999999998	0.013466988668436928
-102.1499999999998	0.014950148138813936
-101.1499999999998	0.016575693248484895
-100.1499999999998	0.01835525548104756
-99.1499999999998	0.020301249352166133
-98.1499999999998	0.022426914275717864
-97.1499999999998	0.024746358206458555
-96.1499999999998	0.027274603135259666
-95.1499999999998	0.030027632518234534
-94.1499999999998	0.03302244072677538
-93.1499999999998	0.03627708461173848
-92.1499999999998	0.03981073728177072
-91.1499999999998	0.043643744203146616
-90.1499999999998	0.047797681736542454
-89.1499999999998	0.05229541823500079
-88.1499999999998	0.05716117783704933
-87.1499999999998	0.06242060709964661
-86.1499999999998	0.06810084462749899

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07423059386852096
-84.14999999999998	0.08084019926004099
-83.14999999999998	0.08796172592708457
-82.14999999999998	0.09562904315311133
-81.14999999999998	0.10387791186544622
-80.14999999999998	0.1127460764030042
-79.14999999999998	0.12227336086369667
-78.14999999999998	0.1325017703643286
-77.14999999999998	0.14347559758863088
-76.14999999999998	0.15524153505166158
-75.14999999999998	0.16784879357477353
-74.14999999999998	0.18134922754976002
-73.14999999999998	0.19579746768160494
-72.14999999999998	0.2112510620486894
-71.14999999999998	0.22777062652721314
-70.14999999999998	0.24542000592613325
-69.14999999999998	0.264266447628199
-68.14999999999998	0.28438079023854623
-67.14999999999998	0.3058376709137709
-66.14999999999998	0.3287157571205959
-65.14999999999998	0.3530980125663359
-64.14999999999998	0.37907201557572073
-63.14999999999998	0.40673036924128875
-62.14999999999998	0.43617130707200696
-61.14999999999998	0.46749988767829237

Table B119: Sublimation Points for Carbon Dioxide and 4% Argon

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.393682918361682e-08
-172.1499999999998	4.700776847288929e-08
-171.1499999999998	6.466426516154412e-08
-170.1499999999998	8.835792481940736e-08
-169.1499999999998	1.1994986541464788e-07
-168.1499999999998	1.618119043804369e-07
-167.1499999999998	2.1694908736262679e-07
-166.1499999999998	2.8914724081933953e-07
-165.1499999999998	3.8314970857730614e-07
-164.1499999999998	5.048679470981054e-07
-163.1499999999998	6.616312050192193e-07
-162.1499999999998	8.624810985155281e-07
-161.1499999999998	1.118517513730757e-06
-160.1499999999998	1.4433029190573635e-06
-159.1499999999998	1.853332851058387e-06
-158.1499999999998	2.3685810455606107e-06
-157.1499999999998	3.013128416743501e-06
-156.1499999999998	3.815885838376361e-06
-155.1499999999998	4.811421448869995e-06
-154.1499999999998	6.040903981391871e-06
-153.1499999999998	7.5531744076093995e-06
-152.1499999999998	9.405958974186189e-06
-151.1499999999998	1.166723750038352e-05
-150.1499999999998	1.4416781588406031e-05
-149.1499999999998	1.774787817093262e-05
-148.1499999999998	2.176925457814241e-05
-147.1499999999998	2.660722204524013e-05
-146.1499999999998	3.240805529700741e-05
-145.1499999999998	3.934062653457714e-05
-144.1499999999998	4.7599312808161355e-05
-143.1499999999998	5.740719638498574e-05
-142.1499999999998	6.901957831184553e-05
-141.1499999999998	8.272782592463441e-05
-140.1499999999998	9.886357557167212e-05
-139.1499999999998	0.00011780331229296011
-138.1499999999998	0.00013997334863363823
-137.1499999999998	0.00016585522516743409
-136.1499999999998	0.00019599155566610215
-135.1499999999998	0.0002309923401755929
-134.1499999999998	0.0002715417695515702
-133.1499999999998	0.00031840554526902173
-132.1499999999998	0.0003724387385570495
-131.1499999999998	0.0004345942131246222

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0005059316359414483
-129.1499999999998	0.0005876271007253951
-128.1499999999998	0.0006809833889703696
-127.1499999999998	0.0007874408935323921
-126.1499999999998	0.000908589229984292
-125.1499999999998	0.001046179561157861
-124.1499999999998	0.0012021376605242074
-123.1499999999998	0.001378577740327017
-122.1499999999998	0.0015778170706870548
-121.1499999999998	0.0018023914162487683
-120.1499999999998	0.0020550713173497913
-119.1499999999998	0.002338879243170701
-118.1499999999998	0.0026571076448748134
-117.1499999999998	0.0030133379373855234
-116.1499999999998	0.0034114604391814692
-115.1499999999998	0.0038556953003270555
-114.1499999999998	0.004350614449908433
-113.1499999999998	0.0049011645951217726
-112.1499999999998	0.005512691305473725
-111.1499999999998	0.006190964216912239
-110.1499999999998	0.0069422033922221914
-109.1499999999998	0.007773106875704212
-108.1499999999998	0.008690879482020597
-107.1499999999998	0.009703262861149382
-106.1499999999998	0.01081856688365172
-105.1499999999998	0.012045702392941773
-104.1499999999998	0.013394215373966668
-103.1499999999998	0.01487432259067407
-102.1499999999998	0.016496948747883402
-101.1499999999998	0.018273765236703394
-100.1499999999998	0.02021723052647352
-99.1499999999998	0.022340632270376297
-98.1499999999998	0.024658131196395868
-97.1499999999998	0.027184806860216924
-96.1499999999998	0.029936705342001192
-95.1499999999998	0.03293088897478945
-94.1499999999998	0.03618548819859374
-93.1499999999998	0.03971975564113314
-92.1499999999998	0.0435541225336798
-91.1499999999998	0.047710257578702946
-90.1499999999998	0.052211128395015974
-89.1499999999998	0.057081065676058744
-88.1499999999998	0.06234583020790664
-87.1499999999998	0.0680326829057775
-86.1499999999998	0.07417045804139281

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08078963984880169
-84.14999999999998	0.08792244271354568
-83.14999999999998	0.09560289516973282
-82.14999999999998	0.10386692795225429
-81.14999999999998	0.11275246637778881
-80.14999999999998	0.12229952735933962
-79.14999999999998	0.13255032139623785
-78.14999999999998	0.1435493599266892
-77.14999999999998	0.15534356848575348
-76.14999999999998	0.1679824061820144
-75.14999999999998	0.18151799209698605
-74.14999999999998	0.1960052393314047
-73.14999999999998	0.21150199758607
-72.14999999999998	0.22806920539478992
-71.14999999999998	0.2457710534622948
-70.14999999999998	0.26467516107000894
-69.14999999999998	0.28485276832731826
-68.14999999999998	0.3063789484251335
-67.14999999999998	0.3293328465534497
-66.14999999999998	0.3537979571142921
-65.14999999999998	0.3798624619319402
-64.14999999999998	0.40761968116131336
-63.14999999999998	0.4371687864217478
-62.14999999999998	0.4686164781657348

Table B120: Sublimation Points for Carbon Dioxide and 5% Argon

Temperature (degC)	Pressure (MPa)
-173.1499999999998	4.264993334922698e-08
-172.1499999999998	5.887939467032462e-08
-171.1499999999998	8.073015600101192e-08
-170.1499999999998	1.0995751935542904e-07
-169.1499999999998	1.488046644976252e-07
-168.1499999999998	2.0012122106983803e-07
-167.1499999999998	2.6750637630682305e-07
-166.1499999999998	3.5548065342244793e-07
-165.1499999999998	4.696910151098932e-07
-164.1499999999998	6.171545032327074e-07
-163.1499999999998	8.065462187377343e-07
-162.1499999999998	1.0485380736589564e-06
-161.1499999999998	1.3561954078969285e-06
-160.1499999999998	1.7454392548819923e-06
-159.1499999999998	2.235582759442411e-06
-158.1499999999998	2.8499509949639723e-06
-157.1499999999998	3.616594191621621e-06
-156.1499999999998	4.569105169121604e-06
-155.1499999999998	5.747552561758421e-06
-154.1499999999998	7.199542226176378e-06
-153.1499999999998	8.981420028371434e-06
-152.1499999999998	1.115963001141522e-05
-151.1499999999998	1.3812242744336794e-05
-150.1499999999998	1.7030669440810563e-05
-149.1499999999998	2.0921578209132936e-05
-148.1499999999998	2.560902954798458e-05
-147.1499999999998	3.123684893147326e-05
-146.1499999999998	3.797125502808998e-05
-145.1499999999998	4.600376276800393e-05
-144.1499999999998	5.555438110856922e-05
-143.1499999999998	6.68751259464976e-05
-142.1499999999998	8.025386918491433e-05
-141.1499999999998	9.601854548308745e-05
-140.1499999999998	0.00011454173869526578
-139.1499999999998	0.00013624567044266976
-138.1499999999998	0.0001616076136598753
-137.1499999999998	0.00019116575431476883
-136.1499999999998	0.00022552552482199684
-135.1499999999998	0.0002653664329558347
-134.1499999999998	0.00031144941032308177
-133.1499999999998	0.0003646247046837526
-132.1499999999998	0.0004258403406115006
-131.1499999999998	0.0004961511731722191

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0005767285594734114
-129.1499999999998	0.0006688706731054824
-128.1499999999998	0.000774013486665103
-127.1499999999998	0.0008937424477281776
-126.1499999999998	0.0010298048738326003
-125.1499999999998	0.0011841230922472806
-124.1499999999998	0.0013588083505520574
-123.1499999999998	0.001556175524341602
-122.1499999999998	0.0017787586487042588
-121.1499999999998	0.0020293273005228614
-120.1499999999998	0.0023109038591085833
-119.1499999999998	0.0026267816732198717
-118.1499999999998	0.0029805441631465574
-117.1499999999998	0.0033760848872641017
-116.1499999999998	0.0038176286032944396
-115.1499999999998	0.004309753355458575
-114.1499999999998	0.004857413619782459
-113.1499999999998	0.005465964541031526
-112.1499999999998	0.006141187296113058
-111.1499999999998	0.00688931562030918
-110.1499999999998	0.00771706353439846
-109.1499999999998	0.008631654312604894
-108.1499999999998	0.0096408507333885
-107.1499999999998	0.010752986657379135
-106.1499999999998	0.011976999979266207
-105.1499999999998	0.01332246700320788
-104.1499999999998	0.01479963829433021
-103.1499999999998	0.016419476062167638
-102.1499999999998	0.01819369313547204
-101.1499999999998	0.020134793591707504
-100.1499999999998	0.022256115108779586
-99.1499999999998	0.024571873111146742
-98.1499999999998	0.02709720678745913
-97.1499999999998	0.029848227062303844
-96.1499999999998	0.03284206661054454
-95.1499999999998	0.036096932009177574
-94.1499999999998	0.03963215812864268
-93.1499999999998	0.043468264873187744
-92.1499999999998	0.04762701638827856
-91.1499999999998	0.05213148286225815
-90.1499999999998	0.057006105059609666
-89.1499999999998	0.06227676173441197
-88.1499999999998	0.0679708400850643
-87.1499999999998	0.07411730942531847
-86.1499999999998	0.0807467982623743

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08789167499060618
-84.14999999999998	0.0955861324298795
-83.14999999999998	0.1038662764609471
-82.14999999999998	0.11277021903792639
-81.14999999999998	0.1223381758903959
-80.14999999999998	0.13261256926673312
-79.14999999999998	0.14363813611799947
-78.14999999999998	0.1554620421809756
-77.14999999999998	0.16813400249423946
-76.14999999999998	0.18170640897901885
-75.14999999999998	0.19623446584711535
-74.14999999999998	0.21177633377767496
-73.14999999999998	0.22839328405975426
-72.14999999999998	0.24614986427454746
-71.14999999999998	0.26511407767306583
-70.14999999999998	0.2853575793510752
-69.14999999999998	0.3069558939587662
-68.14999999999998	0.3299886627326955
-67.14999999999998	0.3545399338981866
-66.14999999999998	0.3806985250992227
-65.14999999999998	0.4085585275137108
-64.14999999999998	0.4382201774341062

Table B121: Sublimation Points for Carbon Dioxide and 1% Methane

Temperature (degC)	Pressure (MPa)
-173.14999999999998	1.6149787647485816e-08
-172.14999999999998	2.260940348812902e-08
-171.14999999999998	3.142745859953193e-08
-170.14999999999998	4.338306640089441e-08
-169.14999999999998	5.9485543442607694e-08
-168.14999999999998	8.103428531004955e-08
-167.14999999999998	1.0969203693751691e-07
-166.14999999999998	1.4757403989956437e-07
-165.14999999999998	1.9735589466776993e-07
-164.14999999999998	2.6240336410736274e-07
-163.14999999999998	3.4692776610470925e-07
-162.14999999999998	4.561710582948455e-07
-161.14999999999998	5.966252061729399e-07
-160.14999999999998	7.762909468263257e-07
-159.14999999999998	1.0049816131308005e-06
-158.14999999999998	1.2946782661436958e-06
-157.14999999999998	1.659942994837277e-06
-156.14999999999998	2.1183978801138394e-06
-155.14999999999998	2.691277781733436e-06
-154.14999999999998	3.404065789536854e-06
-153.14999999999998	4.287220881026678e-06
-152.14999999999998	5.3770080425795625e-06
-151.14999999999998	6.71644183767926e-06
-150.14999999999998	8.356355138786711e-06
-149.14999999999998	1.0356605475880691e-05
-148.14999999999998	1.278743219032208e-05
-147.14999999999998	1.5730978313523034e-05
-146.14999999999998	1.9282991811993187e-05
-145.14999999999998	2.3554721549850114e-05
-144.14999999999998	2.8675024013160613e-05
-143.14999999999998	3.4792697514068946e-05
-142.14999999999998	4.2079061243429946e-05
-141.14999999999998	5.073079716574366e-05
-140.14999999999998	6.0973073347165886e-05
-139.14999999999998	7.306296787421074e-05
-138.14999999999998	8.729321305589845e-05
-137.14999999999998	0.0001039962801045037
-136.14999999999998	0.00012354882495913065
-135.14999999999998	0.00014637651635216646
-134.14999999999998	0.0001729592676216792
-133.14999999999998	0.0002038368941443156
-132.14999999999998	0.000239615218604769
-131.14999999999998	0.000280972646631784

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003286672356197524
-129.1499999999998	0.000383544279822559
-128.1499999999998	0.00044654443505649555
-127.1499999999998	0.0005187124065859635
-126.1499999999998	0.0006012062239945429
-125.1499999999998	0.0006953071270698649
-124.1499999999998	0.0008024300869596725
-123.1499999999998	0.0009241349870944557
-122.1499999999998	0.0010621384886258611
-121.1499999999998	0.001218326605406508
-120.1499999999998	0.001394768013843173
-119.1499999999998	0.0015937281232990387
-118.1499999999998	0.0018176839331097306
-117.1499999999998	0.00206933970271986
-116.1499999999998	0.0023516434619505885
-115.1499999999998	0.0026678043889821067
-114.1499999999998	0.003021311084287146
-113.1499999999998	0.003415950769490702
-112.1499999999998	0.0038558294409675948
-111.1499999999998	0.004345393008930147
-110.1499999999998	0.0048894494538153244
-109.1499999999998	0.005493192032961318
-108.1499999999998	0.006162223571879814
-107.1499999999998	0.006902581875890282
-106.1499999999998	0.007720766299499147
-105.1499999999998	0.008623765512689301
-104.1499999999998	0.009619086505246097
-103.1499999999998	0.010714784872397166
-102.1499999999998	0.011919496427398259
-101.1499999999998	0.013242470189267976
-100.1499999999998	0.014693602796678093
-99.1499999999998	0.01628347440205891
-98.1499999999998	0.018023386103293897
-97.1499999999998	0.019925398973982916
-96.1499999999998	0.0220023747571609
-95.1499999999998	0.024268018291599313
-94.1499999999998	0.026736921744415783
-93.1499999999998	0.029424610728703122
-92.1499999999998	0.03234759239030158
-91.1499999999998	0.035523405553709836
-90.1499999999998	0.03897067302352195
-89.1499999999998	0.042709156144727055
-88.1499999999998	0.04675981173279742
-87.1499999999998	0.05114485149278357
-86.1499999999998	0.05588780405573317

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.061013579770759566
-84.14999999999998	0.06654853840214668
-83.14999999999998	0.07252055989315362
-82.14999999999998	0.07895911837189186
-81.14999999999998	0.08589535959003514
-80.14999999999998	0.09336218200255174
-79.14999999999998	0.10139432171651727
-78.14999999999998	0.11002844155996568
-77.14999999999998	0.11930322454839422
-76.14999999999998	0.12925947205797114
-75.14999999999998	0.1399402070520605
-74.14999999999998	0.1513907827533179
-73.14999999999998	0.16365899721000243
-72.14999999999998	0.17679521427630085
-71.14999999999998	0.19085249161818238
-70.14999999999998	0.20588671647767504
-69.14999999999998	0.22195675009354507
-68.14999999999998	0.23912458190837302
-67.14999999999998	0.257455495029992
-66.14999999999998	0.277018244928699
-65.14999999999998	0.29788525417026995
-64.14999999999998	0.3201328273671636
-63.14999999999998	0.34384139303277683
-62.14999999999998	0.36909578396640463
-61.14999999999998	0.39598557873817747
-60.14999999999998	0.4246055552339353
-59.14999999999998	0.4550564014404912
-58.14999999999998	0.487446338510628

Table B122: Sublimation Points for Carbon Dioxide and 2% Methane

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.9433353421390348e-08
-172.1499999999998	2.7126989269938503e-08
-171.1499999999998	3.759938582224101e-08
-170.1499999999998	5.1757986747704135e-08
-169.1499999999998	7.077503401106534e-08
-168.1499999999998	9.615550024095312e-08
-167.1499999999998	1.2981998106277294e-07
-166.1499999999998	1.742052682036363e-07
-165.1499999999998	2.3238570394354286e-07
-164.1499999999998	3.082188308108146e-07
-163.1499999999998	4.065192975402221e-07
-162.1499999999998	5.332654631110577e-07
-161.1499999999998	6.958436546644918e-07
-160.1499999999998	9.033355813789812e-07
-159.1499999999998	1.1668549836764575e-06
-158.1499999999998	1.4999402037607077e-06
-157.1499999999998	1.919009997385401e-06
-156.1499999999998	2.4438905654714704e-06
-155.1499999999998	3.09842246495187e-06
-154.1499999999998	3.911156757906179e-06
-153.1499999999998	4.916150473264908e-06
-152.1499999999998	6.153872182480533e-06
-151.1499999999998	7.672229225754841e-06
-150.1499999999998	9.527728864714543e-06
-149.1499999999998	1.1786786376792451e-05
-148.1499999999998	1.4527193841929189e-05
-147.1499999999998	1.783976409952013e-05
-146.1499999999998	2.1830165068861848e-05
-145.1499999999998	2.662096032591739e-05
-144.1499999999998	3.2353872509455304e-05
-143.1499999999998	3.91922867872404e-05
-142.1499999999998	4.7324012244995555e-05
-141.1499999999998	5.696431966474137e-05
-140.1499999999998	6.835927473267658e-05
-139.1499999999998	8.17893862583205e-05
-138.1499999999998	9.757358949496613e-05
-137.1499999999998	0.00011607358512594272
-136.1499999999998	0.00013769855492164567
-135.1499999999998	0.00016291027547916853
-134.1499999999998	0.00019222865183072456
-133.1499999999998	0.00022623769305049808
-132.1499999999998	0.00026559195230419175
-131.1499999999998	0.0003110234540742422

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00036334913155970113
-129.1499999999998	0.0004234787974969057
-128.1499999999998	0.0004924236718798709
-127.1499999999998	0.0005713054902824975
-126.1499999999998	0.0006613662167037183
-125.1499999999998	0.000763978385077286
-124.1499999999998	0.000880656093816379
-123.1499999999998	0.0010130666780059547
-122.1499999999998	0.001163043084120172
-121.1499999999998	0.0013325969724347312
-120.1499999999998	0.001523932572633399
-119.1499999999998	0.0017394613184807414
-118.1499999999998	0.0019818172878584006
-117.1499999999998	0.0022538734749478844
-116.1499999999998	0.0025587589218971233
-115.1499999999998	0.002899876737940263
-114.1499999999998	0.0032809230346587566
-113.1499999999998	0.0037059068068857246
-112.1499999999998	0.004179170789674825
-111.1499999999998	0.0047054133227877925
-110.1499999999998	0.005289711255312343
-109.1499999999998	0.00593754392431362
-108.1499999999998	0.006654818242857379
-107.1499999999998	0.007447894934334636
-106.1499999999998	0.008323615951773332
-105.1499999999998	0.009289333122757976
-104.1499999999998	0.010352938062701286
-103.1499999999998	0.01152289340154053
-102.1499999999998	0.01280826537147415
-101.1499999999998	0.014218757806130963
-100.1499999999998	0.015764747604586918
-99.1499999999998	0.01745732171693424
-98.1499999999998	0.019308315711682164
-97.1499999999998	0.02133035398914854
-96.1499999999998	0.023536891709215038
-95.1499999999998	0.025942258506387112
-94.1499999999998	0.028561704070061124
-93.1499999999998	0.03141144567328354
-92.1499999999998	0.03450871773913993
-91.1499999999998	0.037871823540272964
-90.1499999999998	0.04152018913396262
-89.1499999999998	0.04547441964277165
-88.1499999999998	0.049756357999039935
-87.1499999999998	0.05438914628060433
-86.1499999999998	0.059397289775131215

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06480672392152526
-84.14999999999998	0.0706448842891883
-83.14999999999998	0.0769407797696542
-82.14999999999998	0.08372506917061208
-81.14999999999998	0.09103014141986518
-80.14999999999998	0.0988901996068364
-79.14999999999998	0.10734134911237926
-78.14999999999998	0.1164216901046934
-77.14999999999998	0.12617141471109888
-76.14999999999998	0.13663290921376542
-75.14999999999998	0.1478508616642297
-74.14999999999998	0.1598723753695567
-73.14999999999998	0.172747088776553
-72.14999999999998	0.1865273023758309
-71.14999999999998	0.20126811337449813
-70.14999999999998	0.21702755906034274
-69.14999999999998	0.23386677002697648
-68.14999999999998	0.2518501347922648
-67.14999999999998	0.271045477899841
-66.14999999999998	0.29152425449436714
-65.14999999999998	0.3133617659074431
-64.14999999999998	0.33663740364740635
-63.14999999999998	0.36143493497715257
-62.14999999999998	0.3878428565458071
-61.14999999999998	0.4159548788516789
-60.14999999999998	0.4458707361524749
-59.14999999999998	0.47769844603780853

Table B123: Sublimation Points for Carbon Dioxide and 3% Methane

Temperature (degC)	Pressure (MPa)
-173.14999999999998	2.3362559761138778e-08
-172.14999999999998	3.2517115720945515e-08
-171.14999999999998	4.494239901089673e-08
-170.14999999999998	6.169422303051604e-08
-169.14999999999998	8.413265980929785e-08
-168.14999999999998	1.1399902209137115e-07
-167.14999999999998	1.5350953210840415e-07
-166.14999999999998	2.0546865437137e-07
-165.14999999999998	2.734054747491454e-07
-164.14999999999998	3.617369471512913e-07
-163.14999999999998	4.759623022855308e-07
-162.14999999999998	6.228934198292698e-07
-161.14999999999998	8.109265051552069e-07
-160.14999999999998	1.0503609832950192e-06
-159.14999999999998	1.3537721245171047e-06
-158.14999999999998	1.7364445457398351e-06
-157.14999999999998	2.216874387618375e-06
-156.14999999999998	2.8173486457856975e-06
-155.14999999999998	3.5646108333129363e-06
-154.14999999999998	4.490622866600342e-06
-153.14999999999998	5.6334337949758376e-06
-152.14999999999998	7.038166731414619e-06
-151.14999999999998	8.758136083994071e-06
-150.14999999999998	1.0856107930854555e-05
-149.14999999999998	1.340571712140504e-05
-148.14999999999998	1.649305541916352e-05
-147.14999999999998	2.0218445722915494e-05
-146.14999999999998	2.469841810891798e-05
-145.14999999999998	3.0067904123974403e-05
-144.14999999999998	3.6482666423949154e-05
-143.14999999999998	4.412198149157186e-05
-142.14999999999998	5.319159377847233e-05
-141.14999999999998	6.392696019701445e-05
-140.14999999999998	7.659680443576966e-05
-139.14999999999998	9.150700108712619e-05
-138.14999999999998	0.00010900481005569495
-137.14999999999998	0.00012948348216163018
-136.14999999999998	0.00015338725726410824
-135.14999999999998	0.0001812167766077749
-134.14999999999998	0.00021353493144069641
-133.14999999999998	0.0002509731702680779
-132.14999999999998	0.0002942382873946817
-131.14999999999998	0.0003441197156735332

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00040149734662303925
-129.1499999999998	0.00046734990130348626
-128.1499999999998	0.0005427638755616857
-127.1499999999998	0.000628943083464898
-126.1499999999998	0.0007272188229576743
-125.1499999999998	0.0008390606879941663
-124.1499999999998	0.0009660880516306906
-123.1499999999998	0.0011100822448151591
-122.1499999999998	0.0012729994558897402
-121.1499999999998	0.0014569843761373321
-120.1499999999998	0.0016643846170597155
-119.1499999999998	0.001897765925483703
-118.1499999999998	0.002159928223058809
-117.1499999999998	0.0024539224972458746
-116.1499999999998	0.0027830685715078936
-115.1499999999998	0.0031509737831119495
-114.1499999999998	0.003561552597744201
-113.1499999999998	0.004019047191035496
-112.1499999999998	0.004528049028106451
-111.1499999999998	0.005093521473373135
-110.1499999999998	0.005720823464122942
-109.1499999999998	0.00641573428277959
-108.1499999999998	0.007184479464342447
-107.1499999999998	0.00803375787721614
-106.1499999999998	0.008970770017553786
-105.1499999999998	0.010003247559336655
-104.1499999999998	0.011139484204711562
-103.1499999999998	0.01238836788162529
-102.1499999999998	0.013759414338544202
-101.1499999999998	0.015262802189041186
-100.1499999999998	0.016909409462296573
-99.1499999999998	0.018710851719103843
-98.1499999999998	0.020679521796824796
-97.1499999999998	0.022828631250925754
-96.1499999999998	0.025172253565265198
-95.1499999999998	0.027725369208241753
-94.1499999999998	0.0305039126172658
-93.1499999999998	0.03352482119984783
-92.1499999999998	0.036806086445936484
-91.1499999999998	0.040366807253054124
-90.1499999999998	0.04422724557333244
-89.1499999999998	0.04840888449981724
-88.1499999999998	0.052934488918508
-87.1499999999998	0.057828168862606145
-86.1499999999998	0.06311544571654501

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.0688233214297194
-84.14999999999998	0.07498035091363926
-83.14999999999998	0.0816167178118142
-82.14999999999998	0.08876431384933466
-81.14999999999998	0.0964568219893766
-80.14999999999998	0.1047298036472857
-79.14999999999998	0.1136207902403178
-78.14999999999998	0.12316937938365277
-77.14999999999998	0.1334173360824407
-76.14999999999998	0.1444086993175628
-75.14999999999998	0.156189894482555
-74.14999999999998	0.16880985220527558
-73.14999999999998	0.1823201341872349
-72.14999999999998	0.19677506682661575
-71.14999999999998	0.2122318835748769
-70.14999999999998	0.22875087723962148
-69.14999999999998	0.2463955638369622
-68.14999999999998	0.2652328602038137
-67.14999999999998	0.2853332785756972
-66.14999999999998	0.30677114307334646
-65.14999999999998	0.32962483632118517
-64.14999999999998	0.3539770912597047
-63.14999999999998	0.37991535952014577
-62.14999999999998	0.4075323350186113
-61.14999999999998	0.4369269028051613

Table B124: Sublimation Points for Carbon Dioxide and 4% Methane

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.8059923950883617e-08
-172.1499999999998	3.894233800535059e-08
-171.1499999999998	5.367072091618978e-08
-170.1499999999998	7.347224205987864e-08
-169.1499999999998	9.99232878864556e-08
-168.1499999999998	1.3503659666983713e-07
-167.1499999999998	1.8136698165101438e-07
-166.1499999999998	2.421388955817324e-07
-165.1499999999998	3.2139952054075733e-07
-164.1499999999998	4.2420153227060177e-07
-163.1499999999998	5.568201878924966e-07
-162.1499999999998	7.270099190236596e-07
-161.1499999999998	9.443061779537245e-07
-160.1499999999998	1.2203788811314935e-06
-159.1499999999998	1.5694444198510399e-06
-158.1499999999998	2.0087438603909186e-06
-157.1499999999998	2.5590956322540697e-06
-156.1499999999998	3.2455317005291003e-06
-155.1499999999998	4.098026933378563e-06
-154.1499999999998	5.152332104613695e-06
-153.1499999999998	6.450921710365156e-06
-152.1499999999998	8.044068523961471e-06
-151.1499999999998	9.991057560114577e-06
-150.1499999999998	1.2361552864166241e-05
-149.1499999999998	1.5237131280253888e-05
-148.1499999999998	1.8712998079664644e-05
-147.1499999999998	2.2899900043352655e-05
-146.1499999999998	2.7926252286779477e-05
-145.1499999999998	3.394049578735344e-05
-144.1499999999998	4.111370322153979e-05
-143.1499999999998	4.964245133733745e-05
-142.1499999999998	5.97519786758078e-05
-141.1499999999998	7.169964801072355e-05
-140.1499999999998	8.577873339671431e-05
-139.1499999999998	0.00010232255220252761
-138.1499999999998	0.00012170896295692491
-137.1499999999998	0.0001443652502503553
-136.1499999999998	0.0001707734183168499
-135.1499999999998	0.00020147591526878825
-134.1499999999998	0.0002370818102745281
-133.1499999999998	0.0002782734462576996
-132.1499999999998	0.00032581359096067297
-131.1499999999998	0.0003805531094569437

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00044343918142225624
-129.1499999999998	0.0005155240866870917
-128.1499999999998	0.0005979745827989583
-127.1499999999998	0.0006920818985275964
-126.1499999999998	0.0007992723674558551
-125.1499999999998	0.0009211187260205186
-124.1499999999998	0.0010593521006073598
-123.1499999999998	0.001215874708570967
-122.1499999999998	0.001392773298349782
-121.1499999999998	0.0015923333541881875
-120.1499999999998	0.0018170540913691813
-119.1499999999998	0.002069664268310299
-118.1499999999998	0.0023531388423925414
-117.1499999999998	0.0026707164969837624
-116.1499999999998	0.003025918067795183
-115.1499999999998	0.003422565897480514
-114.1499999999998	0.003864804148261211
-113.1499999999998	0.004357120103348834
-112.1499999999998	0.004904366489044685
-111.1499999999998	0.00551178485064068
-110.1499999999998	0.006185030016630239
-109.1499999999998	0.006930195687278898
-108.1499999999998	0.00775384118530933
-107.1499999999998	0.008663019408337344
-106.1499999999998	0.009665306024767624
-105.1499999999998	0.010768829957130464
-104.1499999999998	0.011982305199332705
-103.1499999999998	0.01331506401701533
-102.1499999999998	0.014777091583180448
-101.1499999999998	0.016379062104484757
-100.1499999999998	0.01813237649711493
-99.1499999999998	0.0200492016749882
-98.1499999999998	0.022142511517178987
-97.1499999999998	0.0244261295859873
-96.1499999999998	0.0269147736719778
-95.1499999999998	0.029624102247646122
-94.1499999999998	0.03257076291717875
-93.1499999999998	0.03577244295609062
-92.1499999999998	0.039247922041421544
-91.1499999999998	0.043017127280713024
-90.1499999999998	0.0471011906562481
-89.1499999999998	0.051522509010126075
-88.1499999999998	0.056304806705766576
-87.1499999999998	0.061473201112556046
-86.1499999999998	0.06705427107272885

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07307612852345735
-84.14999999999998	0.07956849346278584
-83.14999999999998	0.08656277246586289
-82.14999999999998	0.09409214097838245
-81.14999999999998	0.10219162963786273
-80.14999999999998	0.1108982149012504
-79.14999999999998	0.12025091429045924
-78.14999999999998	0.13029088660747665
-77.14999999999998	0.14106153751985112
-76.14999999999998	0.15260863097899896
-75.14999999999998	0.16498040701269637
-74.14999999999998	0.1782277065367053
-73.14999999999998	0.19240410397028065
-72.14999999999998	0.20756604863489223
-71.14999999999998	0.22377301619617754
-70.14999999999998	0.24108767183066912
-69.14999999999998	0.2595760474623898
-68.14999999999998	0.27930773651814844
-67.14999999999998	0.3003561116129264
-66.14999999999998	0.3227985743671236
-65.14999999999998	0.3467168547044248
-64.14999999999998	0.3721973972535872
-63.14999999999998	0.399331935366905
-62.14999999999998	0.42821864491237976

Table B125: Sublimation Points for Carbon Dioxide and 5% Methane

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.367034887065466e-08
-172.1499999999998	4.6594354170967275e-08
-171.1499999999998	6.403626287313896e-08
-170.1499999999998	8.742093784185715e-08
-169.1499999999998	1.1857362342673183e-07
-168.1499999999998	1.5981845596365667e-07
-167.1499999999998	2.1409765401710224e-07
-166.1499999999998	2.8511493705437645e-07
-165.1499999999998	3.7750717870816923e-07
-164.1499999999998	4.970487929858386e-07
-163.1499999999998	6.508938781556125e-07
-162.1499999999998	8.478617025952624e-07
-161.1499999999998	1.098771708216605e-06
-160.1499999999998	1.4168348283456602e-06
-159.1499999999998	1.8181085658948997e-06
-158.1499999999998	2.3220239516681075e-06
-157.1499999999998	2.9519931986773574e-06
-156.1499999999998	3.7361075830772157e-06
-155.1499999999998	4.7079358120915144e-06
-154.1499999999998	5.907433880233356e-06
-153.1499999999998	7.3819781631169984e-06
-152.1499999999998	9.187534249010091e-06
-151.1499999999998	1.1389974757686523e-05
-150.1499999999998	1.4066560139803924e-05
-149.1499999999998	1.7307597183706137e-05
-148.1499999999998	2.1218290676101542e-05
-147.1499999999998	2.592080436456217e-05
-146.1499999999998	3.155654804952495e-05
-145.1499999999998	3.828870828808211e-05
-144.1499999999998	4.630504081830105e-05
-143.1499999999998	5.582094340851783e-05
-142.1499999999998	6.708282839888248e-05
-141.1499999999998	8.037181473075563e-05
-140.1499999999998	9.600775975230454e-05
-139.1499999999998	0.00011435365154526939
-138.1499999999998	0.00013582038293852487
-137.1499999999998	0.0001608719287592986
-136.1499999999998	0.00019003094822417154
-135.1499999999998	0.00022388483469108002
-134.1499999999998	0.0002630922352830197
-133.1499999999998	0.00030839006315715417
-132.1499999999998	0.00036060102543322844
-131.1499999999998	0.00042064169001688177

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004895311147614283
-129.1499999999998	0.0005684000626112144
-128.1499999999998	0.0006585008265666832
-127.1499999999998	0.0007612176885118286
-126.1499999999998	0.0008780780361557274
-125.1499999999998	0.0010107641625680267
-124.1499999999998	0.0011611257730412697
-123.1499999999998	0.0013311932242985388
-122.1499999999998	0.0015231915213904847
-121.1499999999998	0.0017395550980006508
-120.1499999999998	0.001982943406309497
-119.1499999999998	0.0022562573430652713
-118.1499999999998	0.002562656539081954
-117.1499999999998	0.0029055775400408756
-116.1499999999998	0.003288752907221712
-115.1499999999998	0.0037162312676404592
-114.1499999999998	0.004192398344036024
-113.1499999999998	0.0047219989962333725
-112.1499999999998	0.005310160306629444
-111.1499999999998	0.0059624157439100494
-110.1499999999998	0.006684730440619713
-109.1499999999998	0.007483527621887443
-108.1499999999998	0.008365716224466685
-107.1499999999998	0.009338719747293837
-106.1499999999998	0.010410506377016241
-105.1499999999998	0.01158962043440489
-104.1499999999998	0.01288521519026114
-103.1499999999998	0.014307087102369258
-102.1499999999998	0.01586571152825362
-101.1499999999998	0.01757227997199319
-100.1499999999998	0.0194387389271451
-99.1499999999998	0.0214778303819615
-98.1499999999998	0.02370313405757443
-97.1499999999998	0.026129111454709555
-96.1499999999998	0.028771151789796487
-95.1499999999998	0.03164561990712941
-94.1499999999998	0.03476990626003147
-93.1499999999998	0.038162479060856146
-92.1499999999998	0.04184293870718702
-91.1499999999998	0.04583207459985287
-90.1499999999998	0.05015192447746319
-89.1499999999998	0.054825836402205896
-88.1499999999998	0.05987853354278923
-87.1499999999998	0.06533618191283552
-86.1499999999998	0.07122646123698169

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07757863913271297
-84.14999999999998	0.08442364881391712
-83.14999999999998	0.09179417054282911
-82.14999999999998	0.0997247170810668
-81.14999999999998	0.10825172341875809
-80.14999999999998	0.11741364109452648
-79.14999999999998	0.12725103746005004
-78.14999999999998	0.13780670029343628
-77.14999999999998	0.14912574822927607
-76.14999999999998	0.1612557475551641
-75.14999999999998	0.1742468360326836
-74.14999999999998	0.18815185454790553
-73.14999999999998	0.20302648760285102
-72.14999999999998	0.21892941395986643
-71.14999999999998	0.2359224692071865
-70.14999999999998	0.25407082274154186
-69.14999999999998	0.2734431728930561
-68.14999999999998	0.2941119661459908
-67.14999999999998	0.3161536508196224
-66.14999999999998	0.3396489853713033
-65.14999999999998	0.3646834470518361
-64.14999999999998	0.3913478723828668
-63.14999999999998	0.419739938090866

Table B126: Sublimation Points for Carbon Dioxide and 1% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-173.14999999999998	1.9455473275989668e-08
-172.14999999999998	2.7151767266433782e-08
-171.14999999999998	3.762522355454811e-08
-170.14999999999998	5.1781775580171384e-08
-169.14999999999998	7.079136489298327e-08
-168.14999999999998	9.615555840786642e-08
-167.14999999999998	1.2979002361602893e-07
-166.14999999999998	1.741245553888658e-07
-165.14999999999998	2.322237232513659e-07
-164.14999999999998	3.079316104866944e-07
-163.14999999999998	4.0604456431447156e-07
-162.14999999999998	5.325163379479212e-07
-161.14999999999998	6.947005177978565e-07
-160.14999999999998	9.016356599743134e-07
-159.14999999999998	1.1643791261709377e-06
-158.14999999999998	1.4963962014894523e-06
-157.14999999999998	1.9140116951246104e-06
-156.14999999999998	2.436931866421276e-06
-155.14999999999998	3.0888451807792974e-06
-154.14999999999998	3.898111079051598e-06
-153.14999999999998	4.898546637016461e-06
-152.14999999999998	6.130321694536692e-06
-151.14999999999998	7.640973743294013e-06
-150.14999999999998	9.486554573527727e-06
-149.14999999999998	1.1732921389961927e-05
-148.14999999999998	1.4457185811010203e-05
-147.14999999999998	1.7749334859387024e-05
-146.14999999999998	2.171403873251844e-05
-145.14999999999998	2.6472660803900527e-05
-144.14999999999998	3.2165485948277e-05
-143.14999999999998	3.895418390098244e-05
-142.14999999999998	4.702452495211624e-05
-141.14999999999998	5.658936583688355e-05
-140.14999999999998	6.78919242123492e-05
-139.14999999999998	8.120936060643298e-05
-138.14999999999998	9.685668718606646e-05
-137.14999999999998	0.00011519102311746484
-136.14999999999998	0.00013661621668241308
-135.14999999999998	0.00016158785467082078
-134.14999999999998	0.0001906186798926669
-133.14999999999998	0.00022428443794349868
-132.14999999999998	0.0002632301746191114
-131.14999999999998	0.00030817700560964385

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003599293803145605
-129.1499999999998	0.0004193828618115376
-128.1499999999998	0.00048753244518862625
-127.1499999999998	0.0005654814366150747
-126.1499999999998	0.0006544509156870613
-125.1499999999998	0.0007557898037462054
-124.1499999999998	0.0008709855610369152
-123.1499999999998	0.0010016755357503224
-122.1499999999998	0.001149658988204035
-121.1499999999998	0.0013169098136355444
-120.1499999999998	0.0015055899873504092
-119.1499999999998	0.001718063756271306
-118.1499999999998	0.001956912601289231
-117.1499999999998	0.002224950995230666
-116.1499999999998	0.002525242981733505
-115.1499999999998	0.002861119600877502
-114.1499999999998	0.003236197188050462
-113.1499999999998	0.0036543965732589493
-112.1499999999998	0.004119963208918695
-111.1499999999998	0.004637488255096613
-110.1499999999998	0.005211930652229887
-109.1499999999998	0.005848640212529376
-108.1499999999998	0.006553381762592788
-107.1499999999998	0.007332360371218272
-106.1499999999998	0.008192247698030774
-105.1499999999998	0.009140209500323493
-104.1499999999998	0.010183934337484496
-103.1499999999998	0.011331663514537533
-102.1499999999998	0.012592222308687154
-101.1499999999998	0.013975052525336836
-100.1499999999998	0.015490246432856108
-99.1499999999998	0.017148582128429814
-98.1499999999998	0.01896156039063919
-97.1499999999998	0.020941443078028327
-96.1499999999998	0.023101293136815075
-95.1499999999998	0.025455016285138753
-94.1499999999998	0.02801740444582942
-93.1499999999998	0.030804181004655453
-92.1499999999998	0.033832047976408264
-91.1499999999998	0.03711873516703877
-90.1499999999998	0.040683051426435295
-89.1499999999998	0.044544938093365224
-88.1499999999998	0.04872552474167969
-87.1499999999998	0.053247187345157425
-86.1499999999998	0.058133608987457015

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06340984325366315
-84.14999999999998	0.06910238045098535
-83.14999999999998	0.07523921681848778
-82.14999999999998	0.08184992689950456
-81.14999999999998	0.0889657392659002
-80.14999999999998	0.09661961580092575
-79.14999999999998	0.10484633476755793
-78.14999999999998	0.11368257791246547
-77.14999999999998	0.12316702188295647
-76.14999999999998	0.13334043426644387
-75.14999999999998	0.14424577460065377
-74.14999999999998	0.15592830075000066
-73.14999999999998	0.16843568110225968
-72.14999999999998	0.1818181131141639
-71.14999999999998	0.1961284488312878
-70.14999999999998	0.21142232813652495
-69.14999999999998	0.22775832065833285
-68.14999999999998	0.24519807752071884
-67.14999999999998	0.2638064944860072
-66.14999999999998	0.2836518886084669
-65.14999999999998	0.30480619143281523
-64.14999999999998	0.32734516334211883
-63.14999999999998	0.3513486365560781
-62.14999999999998	0.37690080013787003
-61.14999999999998	0.40409055374865244
-60.14999999999998	0.43301199323983597
-59.14999999999998	0.4637652216011129
-58.14999999999998	0.4964585595696791

Table B127: Sublimation Points for Carbon Dioxide and 2% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-173.14999999999998	2.8089980354993158e-08
-172.14999999999998	3.896644875847495e-08
-171.14999999999998	5.3679544316480674e-08
-170.14999999999998	7.345071592863614e-08
-169.14999999999998	9.984805363440653e-08
-168.14999999999998	1.3487248271032135e-07
-167.14999999999998	1.8106226115756605e-07
-166.14999999999998	2.416189623904523e-07
-165.14999999999998	3.205585415841393e-07
-164.14999999999998	4.228915331934608e-07
-163.14999999999998	5.548369081512319e-07
-162.14999999999998	7.240746313329385e-07
-161.14999999999998	9.400425017666817e-07
-160.14999999999998	1.2142834280946784e-06
-159.14999999999998	1.5608498878764502e-06
-158.14999999999998	1.9967729389953945e-06
-157.14999999999998	2.5426037918574103e-06
-156.14999999999998	3.2230366090828504e-06
-155.14999999999998	4.0676218715245294e-06
-154.14999999999998	5.1115803319712616e-06
-153.14999999999998	6.396728266890466e-06
-152.14999999999998	7.972525427943187e-06
-151.14999999999998	9.897257784598525e-06
-150.14999999999998	1.2239367832771292e-05
-149.14999999999998	1.5078945917833843e-05
-148.14999999999998	1.8509396679524794e-05
-147.14999999999998	2.263929536726567e-05
-146.14999999999998	2.7594449393495605e-05
-145.14999999999998	3.3520181086412796e-05
-144.14999999999998	4.0583848168863506e-05
-143.14999999999998	4.897761902434503e-05
-142.14999999999998	5.892152031189612e-05
-141.14999999999998	7.066677495723065e-05
-140.14999999999998	8.449944897652162e-05
-139.14999999999998	0.00010074442598102538
-138.14999999999998	0.00011976972856498903
-137.14999999999998	0.00014199120609644753
-136.14999999999998	0.0001678776087114853
-135.14999999999998	0.00019795606755888622
-134.14999999999998	0.00023281800155592328
-133.14999999999998	0.00027312547110005636
-132.14999999999998	0.0003196179993387822
-131.14999999999998	0.0003731198817345049

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004345480047775802
-129.1499999999998	0.0005049201948031535
-128.1499999999998	0.0005853641179615042
-127.1499999999998	0.0006771267524830009
-126.1499999999998	0.000781584454473195
-125.1499999999998	0.0009002536385780839
-124.1499999999998	0.0010348020949800252
-123.1499999999998	0.0011870609643289834
-122.1499999999998	0.001359037392388464
-121.1499999999998	0.0015529278863882754
-120.1499999999998	0.0017711323953348269
-119.1499999999998	0.0020162691368417794
-118.1499999999998	0.0022911901934175105
-117.1499999999998	0.0025989979015888895
-116.1499999999998	0.0029430620577619087
-115.1499999999998	0.003327037965326667
-114.1499999999998	0.0037548853482151927
-113.1499999999998	0.004230888156925331
-112.1499999999998	0.004759675293939193
-111.1499999999998	0.005346242286500838
-110.1499999999998	0.005995973935883038
-109.1499999999998	0.006714667973576638
-108.1499999999998	0.007508559756287142
-107.1499999999998	0.00838434803323239
-106.1499999999998	0.009349221821011978
-105.1499999999998	0.010410888423273947
-104.1499999999998	0.011577602634549386
-103.1499999999998	0.012858197169973544
-102.1499999999998	0.014262114365171757
-101.1499999999998	0.015799439193381497
-100.1499999999998	0.01748093364991621
-99.1499999999998	0.01931807255737321
-98.1499999999998	0.021323080848565327
-97.1499999999998	0.023508972388035523
-96.1499999999998	0.025889590397216708
-95.1499999999998	0.028479649552857644
-94.1499999999998	0.031294779833277296
-93.1499999999998	0.03435157219237075
-92.1499999999998	0.03766762614711516
-91.1499999999998	0.04126159937065929
-90.1499999999998	0.0451532593899855
-89.1499999999998	0.04936353749467738
-88.1499999999998	0.05391458497158863
-87.1499999999998	0.05882983178930278
-86.1499999999998	0.0641340478662933

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06985340706782713
-84.14999999999998	0.07601555408905503
-83.14999999999998	0.08264967439565145
-82.14999999999998	0.08978656740910072
-81.14999999999998	0.09745872314165685
-80.14999999999998	0.10570040250662363
-79.14999999999998	0.11454772155358384
-78.14999999999998	0.12403873990642299
-77.14999999999998	0.1342135537156464
-76.14999999999998	0.1451143934772613
-75.14999999999998	0.1567857271207452
-74.14999999999998	0.16927436883174693
-73.14999999999998	0.18262959415623473
-72.14999999999998	0.19690326203946687
-71.14999999999998	0.21214994459736042
-70.14999999999998	0.2284270656189169
-69.14999999999998	0.24579504908866334
-68.14999999999998	0.26431747945424605
-67.14999999999998	0.2840612760505566
-66.14999999999998	0.3050968852317716
-65.14999999999998	0.3274984957844876
-64.14999999999998	0.35134428708391896
-63.14999999999998	0.37671672776103987
-62.14999999999998	0.4037029631148309
-61.14999999999998	0.4323953919262608
-60.14999999999998	0.46289281222671697

Table B128: Sublimation Points for Carbon Dioxide and 3% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-173.14999999999998	4.035589084330306e-08
-172.14999999999998	5.564845759029121e-08
-171.14999999999998	7.621341142651701e-08
-170.14999999999998	1.0368855527984719e-07
-169.14999999999998	1.4016418223387076e-07
-168.14999999999998	1.8829225886246143e-07
-167.14999999999998	2.5141799725820587e-07
-166.14999999999998	3.337375420943573e-07
-165.14999999999998	4.4048595755872664e-07
-164.14999999999998	5.781601886713099e-07
-163.14999999999998	7.547821911936346e-07
-162.14999999999998	9.802079724804105e-07
-161.14999999999998	1.2664888602153726e-06
-160.14999999999998	1.6282919146060568e-06
-159.14999999999998	2.083387019489639e-06
-158.14999999999998	2.6532088257662197e-06
-157.14999999999998	3.3635023731438238e-06
-156.14999999999998	4.245061879584661e-06
-155.14999999999998	5.334572858089036e-06
-154.14999999999998	6.675568393364341e-06
-153.14999999999998	8.319511082209315e-06
-152.14999999999998	1.0327012806753106e-05
-151.14999999999998	1.2769205164681423e-05
-150.14999999999998	1.5729274021003802e-05
-149.14999999999998	1.9304172267647406e-05
-148.14999999999998	2.3606525476289032e-05
-147.14999999999998	2.8766745702730588e-05
-146.14999999999998	3.4935369244464015e-05
-145.14999999999998	4.228563466394089e-05
-144.14999999999998	5.101631786597757e-05
-143.14999999999998	6.135484145665886e-05
-142.14999999999998	7.356067601158991e-05
-141.14999999999998	8.792905124241072e-05
-140.14999999999998	0.00010479499537177104
-139.14999999999998	0.00012453772130870908
-138.14999999999998	0.00014758537845932406
-137.14999999999998	0.00017442018921330017
-136.14999999999998	0.00020558398931714292
-135.14999999999998	0.0002416841914826227
-134.14999999999998	0.00028340019168694253
-133.14999999999998	0.0003314902377034392
-132.14999999999998	0.0003867987794622504
-131.14999999999998	0.00045026432088425143

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0005229277928637616
-129.1499999999998	0.0006059414671016855
-128.1499999999998	0.0007005784305170368
-127.1499999999998	0.0008082426399972668
-126.1499999999998	0.0009304795772934736
-125.1499999999998	0.001068987523932133
-124.1499999999998	0.0012256294761076847
-123.1499999999998	0.001402445719647468
-122.1499999999998	0.001601667085309903
-121.1499999999998	0.0018257289048954775
-120.1499999999998	0.002077285688926883
-119.1499999999998	0.002359226546996129
-118.1499999999998	0.002674691372291598
-117.1499999999998	0.003027087812314406
-116.1499999999998	0.0034201090483791468
-115.1499999999998	0.0038577524071769093
-114.1499999999998	0.0043443388284679476
-113.1499999999998	0.004884533213873158
-112.1499999999998	0.005483365682759798
-111.1499999999998	0.006146253762371648
-110.1499999999998	0.00687902554065043
-109.1499999999998	0.007687943811639173
-108.1499999999998	0.008579731244960462
-107.1499999999998	0.009561596612632582
-106.1499999999998	0.010641262108435297
-105.1499999999998	0.01182699179717255
-104.1499999999998	0.01312762123351853
-103.1499999999998	0.014552588292683702
-102.1499999999998	0.016111965257914355
-101.1499999999998	0.01781649221286086
-100.1499999999998	0.01967761179012718
-99.1499999999998	0.021707505330871183
-98.1499999999998	0.02391913051418033
-97.1499999999998	0.026326260519127478
-96.1499999999998	0.028943524786936625
-95.1499999999998	0.03178645145560411
-94.1499999999998	0.034871511544646905
-93.1499999999998	0.03821616497344442
-92.1499999999998	0.04183890850294729
-91.1499999999998	0.04575932569739766
-90.1499999999998	0.04999813901024223
-89.1499999999998	0.05457726410666292
-88.1499999999998	0.05951986654425107
-87.1499999999998	0.06485042094341073
-86.1499999999998	0.07059477279026113

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07678020302733071
-84.14999999999998	0.08343549560142106
-83.14999999999998	0.09059100815402706
-82.14999999999998	0.09827874605801784
-81.14999999999998	0.10653244002547789
-80.14999999999998	0.1153876275364027
-79.14999999999998	0.12488173836733632
-78.14999999999998	0.13505418453437393
-77.14999999999998	0.1459464550081394
-76.14999999999998	0.15760221561212076
-75.14999999999998	0.17006741458403749
-74.14999999999998	0.1833903943687191
-73.14999999999998	0.19762201032940002
-72.14999999999998	0.21281575722693177
-71.14999999999998	0.22902790454701255
-70.14999999999998	0.2463176420949736
-69.14999999999998	0.26474723779897175
-68.14999999999998	0.28438221050402174
-67.14999999999998	0.3052915219805575
-66.14999999999998	0.32754779502459785
-65.14999999999998	0.35122756987797565
-64.14999999999998	0.3764116233745937
-63.14999999999998	0.40318540809783354
-62.14999999999998	0.43163978550207427
-61.14999999999998	0.46187298617862665

Table B129: Sublimation Points for Carbon Dioxide and 4% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-173.14999999999998	5.769130667022314e-08
-172.14999999999998	7.90837213907514e-08
-171.14999999999998	1.0768344341591772e-07
-170.14999999999998	1.4567446380808274e-07
-169.14999999999998	1.9582798513843962e-07
-168.14999999999998	2.616398491673881e-07
-167.14999999999998	3.4749515452379374e-07
-166.14999999999998	4.5886439038147506e-07
-165.14999999999998	6.025359101735673e-07
-164.14999999999998	7.86890096237515e-07
-163.14999999999998	1.0222211200458148e-06
-162.14999999999998	1.3211127810199502e-06
-161.14999999999998	1.6988755071025824e-06
-160.14999999999998	2.1740522191428166e-06
-159.14999999999998	2.7690013952463817e-06
-158.14999999999998	3.510566316759784e-06
-157.14999999999998	4.430840130436853e-06
-156.14999999999998	5.56803701731714e-06
-155.14999999999998	6.967480413517825e-06
-154.14999999999998	8.682719877022475e-06
-153.14999999999998	1.0776788833141389e-05
-152.14999999999998	1.332361605517933e-05
-151.14999999999998	1.6409604341671743e-05
-150.14999999999998	2.0135390433215448e-05
-149.14999999999998	2.4617800766582395e-05
-148.14999999999998	2.9992018187933703e-05
-147.14999999999998	3.641397523739818e-05
-146.14999999999998	4.406299007136211e-05
-145.14999999999998	5.314466150427826e-05
-144.14999999999998	6.389404002700399e-05
-143.14999999999998	7.6579091992431e-05
-142.14999999999998	9.150447445096178e-05
-141.14999999999998	0.00010901563836828447
-140.14999999999998	0.0001295032781665318
-139.14999999999998	0.0001534081456986227
-138.14999999999998	0.00018122624689624636
-137.14999999999998	0.00021351443942710014
-136.14999999999998	0.0002508964497597057
-135.14999999999998	0.000294069328068097
-134.14999999999998	0.00034381035941806606
-133.14999999999998	0.0004009844496662245
-132.14999999999998	0.0004665520044779874
-131.14999999999998	0.0005415773198363744

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0006272375023762994
-129.1499999999998	0.0007248319378448321
-128.1499999999998	0.0008357923259639434
-127.1499999999998	0.0009616932999647594
-126.1499999999998	0.0011042636490788708
-125.1499999999998	0.0012653981623201864
-124.1499999999998	0.0014471701119770164
-123.1499999999998	0.0016518443953668933
-122.1499999999998	0.0018818913535930768
-121.1499999999998	0.0021400012862897175
-120.1499999999998	0.0024290996816601976
-119.1499999999998	0.002752363181507338
-118.1499999999998	0.0031132363014336893
-117.1499999999998	0.003515448926962006
-116.1499999999998	0.003963034606998117
-115.1499999999998	0.00446034966683961
-114.1499999999998	0.005012093163830075
-113.1499999999998	0.005623327709780275
-112.1499999999998	0.006299501185431028
-111.1499999999998	0.007046469373526174
-110.1499999999998	0.007870519538508697
-109.1499999999998	0.008778394982453338
-108.1499999999998	0.009777320608618287
-107.1499999999998	0.010875029525945719
-106.1499999999998	0.01207979072997338
-105.1499999999998	0.013400437897953246
-104.1499999999998	0.014846399338517275
-103.1499999999998	0.016427729138998624
-102.1499999999998	0.018155139556525295
-101.1499999999998	0.02004003470226775
-100.1499999999998	0.022094545571760268
-99.1499999999998	0.02433156647805256
-98.1499999999998	0.026764792948601655
-97.1499999999998	0.029408761151319372
-96.1499999999998	0.03227888892007384
-95.1499999999998	0.03539151845524408
-94.1499999999998	0.0387639607806961
-93.1499999999998	0.04241454204482369
-92.1499999999998	0.04636265176015669
-91.1499999999998	0.05062879308355431
-90.1499999999998	0.05523463524724947
-89.1499999999998	0.060203068260130194
-88.1499999999998	0.06555826000874253
-87.1499999999998	0.07132571589877475
-86.1499999999998	0.0775323411904315

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08420650619541138
-84.14999999999998	0.09137811451951681
-83.14999999999998	0.09907867455369497
-82.14999999999998	0.1073413744381695
-81.14999999999998	0.11620116075005685
-80.14999999999998	0.12569482119559333
-79.14999999999998	0.1358610716253828
-78.14999999999998	0.14674064773705237
-77.14999999999998	0.15837640188756566
-76.14999999999998	0.1708134055117939
-75.14999999999998	0.18409905774187893
-74.14999999999998	0.19828320095442503
-73.14999999999998	0.21341824415741667
-72.14999999999998	0.22955929539570813
-71.14999999999998	0.24676430475500982
-70.14999999999998	0.2650942201750155
-69.14999999999998	0.284613159329158
-68.14999999999998	0.30538860268234225
-67.14999999999998	0.3274916163960945
-66.14999999999998	0.3509971213258687
-65.14999999999998	0.37598424293151944
-64.14999999999998	0.4025368331309273
-63.14999999999998	0.4307445020728952

Table B130: Sublimation Points for Carbon Dioxide and 5% Carbon Monoxide

Temperature (degC)	Pressure (MPa)
-173.1499999999998	8.20661121028366e-08
-172.1499999999998	1.1183940728789703e-07
-171.1499999999998	1.514131408820647e-07
-170.1499999999998	2.036835779213847e-07
-169.1499999999998	2.723045592402582e-07
-168.1499999999998	3.6185937543538017e-07
-167.1499999999998	4.780654222615621e-07
-166.1499999999998	6.280166145132878e-07
-165.1499999999998	8.204690689234302e-07
-164.1499999999998	1.0661761252828897e-06
-163.1499999999998	1.3782793561760879e-06
-162.1499999999998	1.772762816346336e-06
-161.1499999999998	2.2689783992779415e-06
-160.1499999999998	2.890250797293826e-06
-159.1499999999998	3.664571198212133e-06
-158.1499999999998	4.625389492040602e-06
-157.1499999999998	5.812515400799903e-06
-156.1499999999998	7.273139578734291e-06
-155.1499999999998	9.062986354237465e-06
-154.1499999999998	1.1247610394170947e-05
-153.1499999999998	1.3903850161375668e-05
-152.1499999999998	1.7121451602749466e-05
-151.1499999999998	2.1004876044208913e-05
-150.1499999999998	2.5675306776424258e-05
-149.1499999999998	3.127286928803707e-05
-148.1499999999998	3.795908053822407e-05
-147.1499999999998	4.591954305550435e-05
-146.1499999999998	5.536690000271314e-05
-145.1499999999998	6.65440676577505e-05
-144.1499999999998	7.972776202533806e-05
-143.1499999999998	9.523233651643986e-05
-142.1499999999998	0.00011341394780982362
-141.1499999999998	0.00013467506714553965
-140.1499999999998	0.0001594693543947438
-139.1499999999998	0.000188306912306661
-138.1499999999998	0.0002217599383546762
-137.1499999999998	0.00026046879159305757
-136.1499999999998	0.0003051484918979447
-135.1499999999998	0.000356595668905559
-134.1499999999998	0.00041569597788235777
-133.1499999999998	0.00048343199967150046
-132.1499999999998	0.0005608916417637834
-131.1499999999998	0.000649277057445142

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0007499140998838076
-129.1499999999998	0.0008642623279449534
-128.1499999999998	0.0009939255804664537
-127.1499999999998	0.0011406631357032276
-126.1499999999998	0.001306401472657192
-125.1499999999998	0.0014932466510624285
-124.1499999999998	0.0017034973268984267
-123.1499999999998	0.0019396584204654412
-122.1499999999998	0.002204455454283443
-121.1499999999998	0.002500849578376393
-120.1499999999998	0.002832053300884839
-119.1499999999998	0.003201546942419726
-118.1499999999998	0.003613095833135549
-117.1499999999998	0.004070768272170182
-116.1499999999998	0.00457895426987784
-115.1499999999998	0.005142385094180305
-114.1499999999998	0.0057661536433844755
-113.1499999999998	0.006455735668972631
-112.1499999999998	0.007217011873169601
-111.1499999999998	0.008056290907540174
-110.1499999999998	0.008980333300475832
-109.1499999999998	0.009996376343202324
-108.1499999999998	0.011112159965890244
-107.1499999999998	0.012335953637583861
-106.1499999999998	0.013676584325997226
-105.1499999999998	0.015143465555767075
-104.1499999999998	0.016746627606515383
-103.1499999999998	0.01849674889507373
-102.1499999999998	0.020405188589475362
-101.1499999999998	0.022484020505844447
-100.1499999999998	0.024746068343131044
-99.1499999999998	0.02720494231477249
-98.1499999999998	0.029875077240847328
-97.1499999999998	0.03277177216914292
-96.1499999999998	0.03591123159883743
-95.1499999999998	0.039310608386238136
-94.1499999999998	0.04298804841827645
-93.1499999999998	0.04696273714630052
-92.1499999999998	0.05125494808021569
-91.1499999999998	0.05588609335128318
-90.1499999999998	0.06087877646103183
-89.1499999999998	0.06625684734390014
-88.1499999999998	0.07204545988260581
-87.1499999999998	0.07827113202804538
-86.1499999999998	0.08496180869008507

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.09214692758227748
-84.14999999999998	0.09985748822284057
-83.14999999999998	0.1081261243168464
-82.14999999999998	0.11698717977138218
-81.14999999999998	0.126476788627739
-80.14999999999998	0.13663295923418534
-79.14999999999998	0.14749566303211412
-78.14999999999998	0.15910692839097215
-77.14999999999998	0.17151094000886902
-76.14999999999998	0.18475414450452152
-75.14999999999998	0.19888536297563905
-74.14999999999998	0.21395591151086618
-73.14999999999998	0.23001973095451253
-72.14999999999998	0.2471335277025529
-71.14999999999998	0.2653569280815252
-70.14999999999998	0.28475265018451895
-69.14999999999998	0.3053866994689799
-68.14999999999998	0.3273285993102352
-67.14999999999998	0.3506516787874057
-66.14999999999998	0.3754334697214527
-65.14999999999998	0.4017563693863937
-64.14999999999998	0.42970938186017277

Table B131: Sublimation Points for Carbon Dioxide and 1% Water

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.050966543152558e-08
-172.1499999999998	1.479196468261064e-08
-171.1499999999998	2.066882631801074e-08
-170.1499999999998	2.8678270360246243e-08
-169.1499999999998	3.952099388079402e-08
-168.1499999999998	5.4103786127648564e-08
-167.1499999999998	7.359294828047957e-08
-166.1499999999998	9.947964046756835e-08
-165.1499999999998	1.3365936780274744e-07
-164.1499999999998	1.785281354992979e-07
-163.1499999999998	2.3709815141584102e-07
-162.1499999999998	3.13136332539739e-07
-161.1499999999998	4.113292873418659e-07
-160.1499999999998	5.374788664792331e-07
-159.1499999999998	6.987328853402541e-07
-158.1499999999998	9.038560727486876e-07
-157.1499999999998	1.1635468697271948e-06
-156.1499999999998	1.4908062392104003e-06
-155.1499999999998	1.901365235989329e-06
-154.1499999999998	2.4141786917873836e-06
-153.1499999999998	3.051992998011056e-06
-152.1499999999998	3.841996615040761e-06
-151.1499999999998	4.81656259904508e-06
-150.1499999999998	6.014093112108356e-06
-149.1499999999998	7.479976565670564e-06
-148.1499999999998	9.2676687374674e-06
-147.1499999999998	1.1439909894810249e-05
-146.1499999999998	1.407009064860836e-05
-145.1499999999998	1.7243779949460174e-05
-144.1499999999998	2.1060429315948035e-05
-143.1499999999998	2.563526805258837e-05
-142.1499999999998	3.11014048675187e-05
-141.1499999999998	3.761215193494402e-05
-140.1499999999998	4.5343588061918655e-05
-139.1499999999998	5.449737821075064e-05
-138.1499999999998	6.53038671951489e-05
-137.1499999999998	7.802546590849185e-05
-136.1499999999998	9.296034895499862e-05
-135.1499999999998	0.00011044648303834696
-134.1499999999998	0.0001308660059170246
-133.1499999999998	0.00015464997616154884
-132.1499999999998	0.00018228351434635914
-131.1499999999998	0.00021431135667967117

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.000251343842419707
-129.14999999999998	0.0002940633567475071
-128.14999999999998	0.0003432312510677213
-127.14999999999998	0.00039969526299245094
-126.14999999999998	0.00046439745853314756
-125.14999999999998	0.0005383827192856178
-124.14999999999998	0.0006228077976480795
-123.14999999999998	0.000718950963366839
-122.14999999999998	0.0008282222649636947
-121.14999999999998	0.0009521744298696741
-120.14999999999998	0.0010925144273767958
-119.14999999999998	0.001251115718829868
-118.14999999999998	0.0014300312198206068
-117.14999999999998	0.0016315069995231338
-116.14999999999998	0.0018579967427307818
-115.14999999999998	0.0021121770006264575
-114.14999999999998	0.0023969632568497973
-113.14999999999998	0.0027155268360224277
-112.14999999999998	0.0030713126825657536
-111.14999999999998	0.0034680580384011494
-110.14999999999998	0.0039098120489706
-109.14999999999998	0.0044009563279632105
-108.14999999999998	0.004946226512189897
-107.14999999999998	0.0055507348392238
-106.14999999999998	0.006219993781726667
-105.14999999999998	0.006959940773821554
-104.14999999999998	0.00777696406646021
-103.14999999999998	0.008677929750479043
-102.14999999999998	0.009670209987953319
-101.14999999999998	0.010761712494555334
-100.14999999999998	0.011960911317911792
-99.14999999999998	0.01327687895945346
-98.14999999999998	0.014719319889967863
-97.14999999999998	0.016298605512020798
-96.14999999999998	0.018025810625623685
-95.14999999999998	0.019912751457005478
-94.14999999999998	0.021972025314125582
-93.14999999999998	0.024217051936660343
-92.14999999999998	0.026662116612634235
-91.14999999999998	0.029322415138682265
-90.14999999999998	0.03221410070615406
-89.14999999999998	0.03535433280094054
-88.14999999999998	0.03876132821107669
-87.14999999999998	0.04245441424288739
-86.14999999999998	0.04645408425377579

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.05078205561777651
-84.14999999999998	0.05546133024879469
-83.14999999999998	0.06051625781614495
-82.14999999999998	0.06597260179772609
-81.14999999999998	0.07185760852807271
-80.14999999999998	0.07820007941184183
-79.14999999999998	0.0850304464882598
-78.14999999999998	0.09238085154902109
-77.14999999999998	0.10028522903152434
-76.14999999999998	0.10877939293170592
-75.14999999999998	0.11790112800684688
-74.14999999999998	0.12769028556959575
-73.14999999999998	0.1381888842114328
-72.14999999999998	0.1494412158388829
-71.14999999999998	0.1614939574616735
-70.14999999999998	0.17439628924281145
-69.14999999999998	0.1882000194122367
-68.14999999999998	0.20295971676755767
-67.14999999999998	0.21873285165209058
-66.14999999999998	0.235579946536125
-65.14999999999998	0.25356473767315885
-64.14999999999998	0.27275434983245067
-63.14999999999998	0.2932194869617439
-62.14999999999998	0.3150346430899741
-61.14999999999998	0.3382783404526404
-60.14999999999998	0.36303340719684485
-59.14999999999998	0.389387319209087
-58.14999999999998	0.41743266335711793
-57.14999999999998	0.4472678947750703
-56.14999999999998	0.4789992952852328

Table B132: Sublimation Points for Carbon Dioxide and 2% Water

Temperature (degC)	Pressure (MPa)
-173.1499999999998	8.23142660492747e-09
-172.1499999999998	1.1613244599201938e-08
-171.1499999999998	1.6265508964787292e-08
-170.1499999999998	2.2621011136560092e-08
-169.1499999999998	3.124479330126123e-08
-168.1499999999998	4.2869866867015913e-08
-167.1499999999998	5.8441277372014216e-08
-166.1499999999998	7.917014763771784e-08
-165.1499999999998	1.0659958222247232e-07
-164.1499999999998	1.426845939097307e-07
-163.1499999999998	1.898885180037775e-07
-162.1499999999998	2.512987133247455e-07
-161.1499999999998	3.3076471047473504e-07
-160.1499999999998	4.330623584076478e-07
-159.1499999999998	5.640879395156159e-07
-158.1499999999998	7.310866709880126e-07
-157.1499999999998	9.429204854423015e-07
-156.1499999999998	1.2103804857958515e-06
-155.1499999999998	1.5465499967606765e-06
-154.1499999999998	1.96722468660941e-06
-153.1499999999998	2.491396806099483e-06
-152.1499999999998	3.141811184494817e-06
-151.1499999999998	3.945601233077422e-06
-150.1499999999998	4.935013831758242e-06
-149.1499999999998	6.148232611540591e-06
-148.1499999999998	7.63030979167088e-06
-147.1499999999998	9.434217382216926e-06
-146.1499999999998	1.1622029217353236e-05
-145.1499999999998	1.4266245938587157e-05
-144.1499999999998	1.74512756973205e-05
-143.1499999999998	2.1275083989354837e-05
-142.1499999999998	2.5851026667187905e-05
-141.1499999999998	3.1309880796304824e-05
-140.1499999999998	3.780208862647294e-05
-139.1499999999998	4.550023053583439e-05
-138.1499999999998	5.460174337219186e-05
-137.1499999999998	6.533190116045694e-05
-136.1499999999998	7.794707566624511e-05
-135.1499999999998	9.273829480196685e-05
-134.1499999999998	0.00011003511733274176
-133.1499999999998	0.0001302098427847484
-132.1499999999998	0.00015368207587840098
-131.1499999999998	0.00018092366520356193

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00021246403622497098
-129.1499999999998	0.0002488959390547097
-128.1499999999998	0.00029088163175675856
-127.1499999999998	0.00033915952025910306
-126.1499999999998	0.0003945512762441578
-125.1499999999998	0.0004579694546719685
-124.1499999999998	0.0005304256328663998
-123.1499999999998	0.0006130390933664477
-122.1499999999998	0.0007070460730176006
-121.1499999999998	0.0008138096010566323
-120.1499999999998	0.0009348299492325075
-119.1499999999998	0.0010717557173121179
-118.1499999999998	0.001226395577647781
-117.1499999999998	0.0014007307028403812
-116.1499999999998	0.001596927900924025
-115.1499999999998	0.0018173534829314549
-114.1499999999998	0.002064587888181914
-113.1499999999998	0.0023414410931708804
-112.1499999999998	0.002650968830541962
-111.1499999999998	0.0029964896452931472
-110.1499999999998	0.0033816028161188774
-109.1499999999998	0.0038102071706263133
-108.1499999999998	0.004286520824094132
-107.1499999999998	0.004815101872476241
-106.1499999999998	0.005400870071497981
-105.1499999999998	0.006049129534957608
-104.1499999999998	0.006765592486742548
-103.1499999999998	0.007556404102604181
-102.1499999999998	0.008428168479420994
-101.1499999999998	0.009387975771525574
-100.1499999999998	0.010443430535688115
-99.1499999999998	0.011602681328552434
-98.1499999999998	0.012874451602717742
-97.1499999999998	0.014268071950271048
-96.1499999999998	0.01579351374541159
-95.1499999999998	0.01746142424088772
-94.1499999999998	0.019283163176310836
-93.1499999999998	0.02127084096003316
-92.1499999999998	0.023437358490207123
-91.1499999999998	0.025796448684908622
-90.1499999999998	0.028362719795826212
-89.1499999999998	0.031151700585041294
-88.1499999999998	0.03417988744987944
-87.1499999999998	0.037464793586746786
-86.1499999999998	0.04102500029134152

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.044880210499697974
-84.14999999999998	0.04905130468226812
-83.14999999999998	0.053560399211761735
-82.14999999999998	0.0584309073348511
-81.14999999999998	0.06368760288826078
-80.14999999999998	0.06935668691134511
-79.14999999999998	0.07546585732024533
-78.14999999999998	0.08204438182336667
-77.14999999999998	0.0891231742745645
-76.14999999999998	0.09673487467954392
-75.14999999999998	0.10491393309311449
-74.14999999999998	0.11369669767091929
-73.14999999999998	0.12312150717011973
-72.14999999999998	0.13322878823074322
-71.14999999999998	0.14406115781509304
-70.14999999999998	0.1556635312397333
-69.14999999999998	0.16808323630756322
-68.14999999999998	0.181370134143031
-67.14999999999998	0.19557674746201253
-66.14999999999998	0.2107583971860288
-65.14999999999998	0.22697334856617946
-64.14999999999998	0.2442829683639619
-63.14999999999998	0.262751895232902
-62.14999999999998	0.28244822642892475
-61.14999999999998	0.3034437257079256
-60.14999999999998	0.32581406056414125
-59.14999999999998	0.34963908391122067
-58.14999999999998	0.3750031921320255
-57.14999999999998	0.4019958413717902
-56.14999999999998	0.4307125154227883

Table B133: Sublimation Points for Carbon Dioxide and 3% Water

Temperature (degC)	Pressure (MPa)
-173.1499999999998	6.442217835507408e-09
-172.1499999999998	9.11080572754101e-09
-171.1499999999998	1.2790761634267142e-08
-170.1499999999998	1.7829918885621123e-08
-169.1499999999998	2.4683521601336986e-08
-168.1499999999998	3.394357913787777e-08
-167.1499999999998	4.637517488599543e-08
-166.1499999999998	6.296111224190675e-08
-165.1499999999998	8.495649843588588e-08
-164.1499999999998	1.1395510859740834e-07
-163.1499999999998	1.5196963896553536e-07
-162.1499999999998	2.01528250343478e-07
-161.1499999999998	2.657901213756115e-07
-160.1499999999998	3.4868307640106487e-07
-159.1499999999998	4.5506672467746e-07
-158.1499999999998	5.909249465812089e-07
-157.1499999999998	7.635919876172623e-07
-156.1499999999998	9.82016872073779e-07
-155.1499999999998	1.2570713240163439e-06
-154.1499999999998	1.6019068828330989e-06
-153.1499999999998	2.032367422241581e-06
-152.1499999999998	2.5674638238140306e-06
-151.1499999999998	3.2299181166858615e-06
-150.1499999999998	4.0467849719703065e-06
-149.1499999999998	5.050159031100093e-06
-148.1499999999998	6.2779771492692225e-06
-147.1499999999998	7.774925245628417e-06
-146.1499999999998	9.59346006807293e-06
-145.1499999999998	1.1794956799452365e-05
-144.1499999999998	1.4450994050912412e-05
-143.1499999999998	1.7644788403944776e-05
-142.1499999999998	2.1472791272725535e-05
-141.1499999999998	2.604646145972284e-05
-140.1499999999998	3.1494227367736e-05
-139.1499999999998	3.796365340808514e-05
-138.1499999999998	4.56238257053716e-05
-137.1499999999998	5.466797274215062e-05
-136.1499999999998	6.531633711031736e-05
-135.1499999999998	7.781931503867249e-05
-134.1499999999998	9.246088084699996e-05
-133.1499999999998	0.00010956231393542143
-132.1499999999998	0.00012948624635355423
-131.1499999999998	0.00015264104940724245

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0001794855781519
-129.1499999999998	0.00021053429299183908
-128.1499999999998	0.00024636277795571154
-127.1499999999998	0.0002876136755512149
-126.1499999999998	0.0003350030584197868
-125.1499999999998	0.00038932725831674145
-124.1499999999998	0.00045147017323728697
-123.1499999999998	0.0005224110737975779
-122.1499999999998	0.0006032329302660906
-121.1499999999998	0.0006951312819286144
-120.1499999999998	0.0007994236707642494
-119.1499999999998	0.0009175596617150176
-118.1499999999998	0.0010511314721532421
-117.1499999999998	0.0012018852334938818
-116.1499999999998	0.0013717329082697455
-115.1499999999998	0.001562764886391188
-114.1499999999998	0.0017772632847556516
-113.1499999999998	0.0020177159748616617
-112.1499999999998	0.0022868313636242904
-111.1499999999998	0.0025875539531905706
-110.1499999999998	0.0029230807062219353
-109.1499999999998	0.0032968782438527297
-108.1499999999998	0.0037127009043575973
-107.1499999999998	0.004174609691473446
-106.1499999999998	0.004686992142331353
-105.1499999999998	0.005254583146069458
-104.1499999999998	0.005882486745427229
-103.1499999999998	0.006576198954973259
-102.1499999999998	0.007341631631104236
-101.1499999999998	0.0081851374305784
-100.1499999999998	0.00911353589612672
-99.1499999999998	0.01013414070962643
-98.1499999999998	0.01125478815544077
-97.1499999999998	0.012483866838832493
-96.1499999999998	0.013830348706867274
-95.1499999999998	0.015303821421945557
-94.1499999999998	0.01691452214105888
-93.1499999999998	0.01867337275707268
-92.1499999999998	0.020592016661818615
-91.1499999999998	0.022682857094550736
-90.1499999999998	0.024959097143413576
-89.1499999999998	0.027434781472012778
-88.1499999999998	0.030124839848004622
-87.1499999999998	0.03304513255586783
-86.1499999999998	0.036212497781739565

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.0396448010644313
-84.14999999999998	0.043360986913568135
-83.14999999999998	0.04738113270327768
-82.14999999999998	0.051726504958095554
-81.14999999999998	0.05641961815685836
-80.14999999999998	0.06148429619047011
-79.14999999999998	0.06694573662070906
-78.14999999999998	0.07283057789992609
-77.14999999999998	0.07916696972583372
-76.14999999999998	0.08598464672195182
-75.14999999999998	0.09331500565313441
-74.14999999999998	0.10119118640755985
-73.14999999999998	0.1096481570024406
-72.14999999999998	0.11872280290165442
-71.14999999999998	0.1284540209710666
-70.14999999999998	0.1388828184437594
-69.14999999999998	0.15005241732597566
-68.14999999999998	0.16200836475016514
-67.14999999999998	0.17479864988154695
-66.14999999999998	0.188473828120785
-65.14999999999998	0.20308715353689807
-64.14999999999998	0.21869472074388632
-63.14999999999998	0.23535561785956194
-62.14999999999998	0.2531320928640443
-61.14999999999998	0.272089736824669
-60.14999999999998	0.2922976895412071
-59.14999999999998	0.31382887730477305
-58.14999999999998	0.3367603016791802
-57.14999999999998	0.3611734223252957
-56.14999999999998	0.38715475804427135
-55.14999999999998	0.41479728549295225

Table B134: Sublimation Points for Carbon Dioxide and 4% Water

Temperature (degC)	Pressure (MPa)
-173.1499999999998	5.0381432234341e-09
-172.1499999999998	7.142269415211261e-09
-171.1499999999998	1.0050849866260625e-08
-170.1499999999998	1.4043188912270898e-08
-169.1499999999998	1.9485742989944773e-08
-168.1499999999998	2.6856219009368634e-08
-167.1499999999998	3.677345998209915e-08
-166.1499999999998	5.003428794919721e-08
-165.1499999999998	6.765866276081793e-08
-164.1499999999998	9.094472517404942e-08
-163.1499999999998	1.2153552509226334e-07
-162.1499999999998	1.6149949146237955e-07
-161.1499999999998	2.134269801092329e-07
-160.1499999999998	2.805455401675436e-07
-159.1499999999998	3.668568691169313e-07
-158.1499999999998	4.77298780857838e-07
-157.1499999999998	6.179358906746644e-07
-156.1499999999998	7.961831249600158e-07
-155.1499999999998	1.0210665916106158e-06
-154.1499999999998	1.3035267981869922e-06
-153.1499999999998	1.6567696781372474e-06
-152.1499999999998	2.09667137925548e-06
-151.1499999999998	2.642243281476565e-06
-150.1499999999998	3.3161642412785767e-06
-149.1499999999998	4.1453876053476714e-06
-148.1499999999998	5.1618310945532995e-06
-147.1499999999998	6.403158228329687e-06
-146.1499999999998	7.913660536779675e-06
-145.1499999999998	9.745250390644055e-06
-144.1499999999998	1.1958574865083819e-05
-143.1499999999998	1.4624261639358434e-05
-142.1499999999998	1.7824308518327633e-05
-141.1499999999998	2.1653628740672022e-05
-140.1499999999998	2.6221764810353238e-05
-139.1499999999998	3.165478414975096e-05
-138.1499999999998	3.809737042295273e-05
-137.1499999999998	4.571512491382514e-05
-136.1499999999998	5.4697092864040745e-05
-135.1499999999998	6.52585301796395e-05
-134.1499999999998	7.764392639981183e-05
-133.1499999999998	9.213030028747306e-05
-132.1499999999998	0.00010903078484731204
-131.1499999999998	0.00012869851900317099

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00015153086357291888
-129.1499999999998	0.00017797395956608046
-128.1499999999998	0.0002085276471981463
-127.1499999999998	0.00024375076436717596
-126.1499999999998	0.00028426684367454036
-125.1499999999998	0.0003307702273946537
-124.1499999999998	0.00038403262011064336
-123.1499999999998	0.00044491009903698897
-122.1499999999998	0.0005143506023494154
-121.1499999999998	0.000593401916140121
-120.1499999999998	0.0006832201809169356
-119.1499999999998	0.0007850789388719759
-118.1499999999998	0.0009003787434636717
-117.1499999999998	0.0010306573531902318
-116.1499999999998	0.0011776005317877293
-115.1499999999998	0.0013430534774675172
-114.1499999999998	0.001529032904220795
-113.1499999999998	0.00173773979866919
-112.1499999999998	0.001971572876434482
-111.1499999999998	0.0022331427625450814
-110.1499999999998	0.002525286920997212
-109.1499999999998	0.0028510853592525016
-108.1499999999998	0.0032138771341865065
-107.1499999999998	0.00361727768681327
-106.1499999999998	0.004065197034004869
-105.1499999999998	0.0045618588464113406
-104.1499999999998	0.005111820442871759
-103.1499999999998	0.005719993732801131
-102.1499999999998	0.00639166713934734
-101.1499999999998	0.007132528537547859
-100.1499999999998	0.007948689243285937
-99.1499999999998	0.00884670909056057
-98.1499999999998	0.009833622636455009
-97.1499999999998	0.010916966535225227
-96.1499999999998	0.012104808125145902
-95.1499999999998	0.013405775274159946
-94.1499999999998	0.014829087532992625
-93.1499999999998	0.016384588647230778
-92.1499999999998	0.01808278048294566
-91.1499999999998	0.01993485842377842
-90.1499999999998	0.02195274830103179
-89.1499999999998	0.024149144922241263
-88.1499999999998	0.026537552267969947
-87.1499999999998	0.029132325431212185
-86.1499999999998	0.031948714378840136

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.03500290962003544
-84.14999999999998	0.038312089872660646
-83.14999999999998	0.04189447182511638
-82.14999999999998	0.04576936209846494
-81.14999999999998	0.04995721152157946
-80.14999999999998	0.05447967184091846
-79.14999999999998	0.059359654996350014
-78.14999999999998	0.06462139510545856
-77.14999999999998	0.07029051331115606
-76.14999999999998	0.07639408566149976
-75.14999999999998	0.08296071420672282
-74.14999999999998	0.09002060151712783
-73.14999999999998	0.0976056288473058
-72.14999999999998	0.10574943819797757
-71.14999999999998	0.11448751855786371
-70.14999999999998	0.12385729664599028
-69.14999999999998	0.1338982325222434
-68.14999999999998	0.14465192049428477
-67.14999999999998	0.15616219582754629
-66.14999999999998	0.1684752478702663
-65.14999999999998	0.18163974035069297
-64.14999999999998	0.19570693981082427
-63.14999999999998	0.21073085344857245
-62.14999999999998	0.2267683781175544
-61.14999999999998	0.24387946301440647
-60.14999999999998	0.26212728994330586
-59.14999999999998	0.28157847760582366
-58.14999999999998	0.3023033216765118
-57.14999999999998	0.32437609501575587
-56.14999999999998	0.3478754685482898
-55.14999999999998	0.37288525715119925

Table B135: Sublimation Points for Carbon Dioxide and 5% Water

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.937142630196822e-09
-172.1499999999998	5.594903806990042e-09
-171.1499999999998	7.892008043021076e-09
-170.1499999999998	1.1052533591839819e-08
-169.1499999999998	1.5371205142917426e-08
-168.1499999999998	2.1233156128255097e-08
-167.1499999999998	2.9138501138973182e-08
-166.1499999999998	3.9732706972771496e-08
-165.1499999999998	5.3843913605345666e-08
-164.1499999999998	7.252853830534666e-08
-163.1499999999998	9.712669823452032e-08
-162.1499999999998	1.2932921012491372e-07
-161.1499999999998	1.712581708056828e-07
-160.1499999999998	2.2556339011394536e-07
-159.1499999999998	2.955372385473875e-07
-158.1499999999998	3.8525078619305133e-07
-157.1499999999998	4.997144470856731e-07
-156.1499999999998	6.450667040842534e-07
-155.1499999999998	8.28794873256567e-07
-154.1499999999998	1.0599922730490341e-06
-153.1499999999998	1.3496565913830338e-06
-152.1499999999998	1.7110346922190417e-06
-151.1499999999998	2.1600195708058275e-06
-150.1499999999998	2.715605652309163e-06
-149.1499999999998	3.4004091301206064e-06
-148.1499999999998	4.24126055603031e-06
-147.1499999999998	5.269877422594595e-06
-146.1499999999998	6.5236250162930495e-06
-145.1499999999998	8.046374366194978e-06
-144.1499999999998	9.889466664504075e-06
-143.1499999999998	1.2112794090144965e-05
-142.1499999999998	1.4786007522090762e-05
-141.1499999999998	1.7989862183035178e-05
-140.1499999999998	2.1817712803947308e-05
-139.1499999999998	2.6377170443784417e-05
-138.1499999999998	3.179193363403818e-05
-137.1499999999998	3.820380704289581e-05
-136.1499999999998	4.577492136681466e-05
-135.1499999999998	5.4690168656653876e-05
-134.1499999999998	6.515986776985236e-05
-133.1499999999998	7.742267510841e-05
-132.1499999999998	9.174875625379193e-05
-131.1499999999998	0.00010844323454393795

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.0001278499330539982
-129.14999999999998	0.00015035542684156973
-128.14999999999998	0.00017639342269944232
-127.14999999999998	0.00020644948402507129
-126.14999999999998	0.00024106611876744034
-125.14999999999998	0.0002808482487501041
-124.14999999999998	0.000326469078995985
-123.14999999999998	0.00037867638599725737
-122.14999999999998	0.00043829924418473294
-121.14999999999998	0.0005062552101588674
-120.14999999999998	0.0005835579845516847
-119.14999999999998	0.0006713255716994278
-118.14999999999998	0.0007707889576232598
-117.14999999999998	0.0008833013271441066
-116.14999999999998	0.001010347841302004
-115.14999999999998	0.0011535559966151527
-114.14999999999998	0.0013147065881034489
-113.14999999999998	0.00149574529842175
-112.14999999999998	0.0016987949359039416
-111.14999999999998	0.0019261683448162092
-110.14999999999998	0.002180382011662485
-109.14999999999998	0.0024641703919826732
-108.14999999999998	0.002780500982741351
-107.14999999999998	0.003132590166128102
-106.14999999999998	0.0035239198513856776
-105.14999999999998	0.003958254942158106
-104.14999999999998	0.004439661657812675
-103.14999999999998	0.004972526738245653
-102.14999999999998	0.005561577562840619
-101.14999999999998	0.006211903215516275
-100.14999999999998	0.006928976529188139
-99.14999999999998	0.007718677144484412
-98.14999999999998	0.008587315619208098
-97.14999999999998	0.009541658626839202
-96.14999999999998	0.010588955284329913
-95.14999999999998	0.011736964651575792
-94.14999999999998	0.012993984447260637
-93.14999999999998	0.014368881028284687
-92.14999999999998	0.015871120682710897
-91.14999999999998	0.017510802289122742
-90.14999999999998	0.01929869139849265
-89.14999999999998	0.021246255798141683
-88.14999999999998	0.023365702621150036
-87.14999999999998	0.025670017068680336
-86.14999999999998	0.02817300281714197

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.030889324186987754
-84.14999999999998	0.033834550155236134
-83.14999999999998	0.037025200299621794
-82.14999999999998	0.04047879276863339
-81.14999999999998	0.04421389437870551
-80.14999999999998	0.048250172947560926
-79.14999999999998	0.0526084519812793
-78.14999999999998	0.05731076784223643
-77.14999999999998	0.06238042953579582
-76.14999999999998	0.06784208126576045
-75.14999999999998	0.07372176792241737
-74.14999999999998	0.08004700368288663
-73.14999999999998	0.08684684392194772
-72.14999999999998	0.09415196065321997
-71.14999999999998	0.10199472174644539
-70.14999999999998	0.11040927419794981
-69.14999999999998	0.1194316317699618
-68.14999999999998	0.12909976736296908
-67.14999999999998	0.139453710547634
-66.14999999999998	0.15053565076491354
-65.14999999999998	0.1623900468143186
-64.14999999999998	0.17506374340594408
-63.14999999999998	0.1886060957776852
-62.14999999999998	0.20306910372033551
-61.14999999999998	0.21850755689442064
-60.14999999999998	0.23497919423069022
-59.14999999999998	0.2525448818379774
-58.14999999999998	0.27126881703585337
-57.14999999999998	0.29121877311533095
-56.14999999999998	0.31246641725297386
-55.14999999999998	0.33508779153812496
-54.14999999999998	0.35916433857295765

Table B136: Sublimation Points for Carbon Dioxide and 1% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.6197217016287215e-08
-172.1499999999998	2.2653548768845593e-08
-171.1499999999998	3.145851385349252e-08
-170.1499999999998	4.338493581189325e-08
-169.1499999999998	5.9432998817063366e-08
-168.1499999999998	8.08890976849035e-08
-167.1499999999998	1.0939777820535824e-07
-166.1499999999998	1.4704917682970465e-07
-165.1499999999998	1.9648471018181563e-07
-164.1499999999998	2.6102413724809634e-07
-163.1499999999998	3.448175207713153e-07
-162.1499999999998	4.5302604933062146e-07
-161.1499999999998	5.920361474896529e-07
-160.1499999999998	7.697117975315704e-07
-159.1499999999998	9.956905215980926e-07
-158.1499999999998	1.2817290260604404e-06
-157.1499999999998	1.6421050888562486e-06
-156.1499999999998	2.0940828731537505e-06
-155.1499999999998	2.6584494745409313e-06
-154.1499999999998	3.3601311511559704e-06
-153.1499999999998	4.22889834367069e-06
-152.1499999999998	5.300169261457076e-06
-151.1499999999998	6.615922489057228e-06
-150.1499999999998	8.225729749532278e-06
-149.1499999999998	1.0187920644574088e-05
-148.1499999999998	1.2570891871569873e-05
-147.1499999999998	1.5454574091257278e-05
-146.1499999999998	1.8932070282414885e-05
-145.1499999999998	2.3111480068523074e-05
-144.1499999999998	2.8117925132026225e-05
-143.1499999999998	3.409579144145338e-05
-142.1499999999998	4.121120460225117e-05
-141.1499999999998	4.96547552010907e-05
-140.1499999999998	5.9644491543371876e-05
-139.1499999999998	7.142919768279683e-05
-138.1499999999998	8.529197510883608e-05
-137.1499999999998	0.00010155414689171405
-136.1499999999998	0.00012057950348480803
-135.1499999999998	0.00014277890975115248
-134.1499999999998	0.00016861529311474444
-133.1499999999998	0.0001986090330396651
-132.1499999999998	0.0002333437723124893
-131.1499999999998	0.0002734726708481518

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.0003197251229593165
-129.14999999999998	0.00037291395922747414
-128.14999999999998	0.00043394315429443373
-127.14999999999998	0.0005038160620596712
-126.14999999999998	0.0005836441999269452
-125.14999999999998	0.0006746566038977646
-124.14999999999998	0.0007782097764653462
-123.14999999999998	0.0008957982494261492
-122.14999999999998	0.0010290657839036733
-121.14999999999998	0.001179817230076932
-120.14999999999998	0.0013500310693308878
-119.14999999999998	0.001541872661805424
-118.14999999999998	0.00175770822261956
-117.14999999999998	0.0020001195503974037
-116.14999999999998	0.0022719195321274097
-115.14999999999998	0.002576168448857213
-114.14999999999998	0.0029161911072674933
-113.14999999999998	0.0032955948227913557
-112.14999999999998	0.003718288280655393
-111.14999999999998	0.004188501302026496
-110.14999999999998	0.004710805543360247
-109.14999999999998	0.005290136158073304
-108.14999999999998	0.005931814450810596
-107.14999999999998	0.006641571555859025
-106.14999999999998	0.007425573172680761
-105.14999999999998	0.0082904453931121
-104.14999999999998	0.009243301656506601
-103.14999999999998	0.01029177087100779
-102.14999999999998	0.011444026741222128
-101.14999999999998	0.01270881834484892
-100.14999999999998	0.014095502003309971
-99.14999999999998	0.015614074494137785
-98.14999999999998	0.01727520765582447
-97.14999999999998	0.019090284439037986
-96.14999999999998	0.021071436461582067
-95.14999999999998	0.023231583128240727
-94.14999999999998	0.025584472380725226
-93.14999999999998	0.028144723147360388
-92.14999999999998	0.030927869566934045
-91.14999999999998	0.0339504070663245
-90.14999999999998	0.03722984037715556
-89.14999999999998	0.04078473358284874
-88.14999999999998	0.04463476229410707
-87.14999999999998	0.04880076805813088
-86.14999999999998	0.05330481511481527

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.058170249621892836
-84.14999999999998	0.0634217614805865
-83.14999999999998	0.0690854489039407
-82.14999999999998	0.07518888588179111
-81.14999999999998	0.08176119270950137
-80.14999999999998	0.08883310976240928
-79.14999999999998	0.09643707471470682
-78.14999999999998	0.10460730342067207
-77.14999999999998	0.11337987469830063
-76.14999999999998	0.12279281928123446
-75.14999999999998	0.1328862132354116
-74.14999999999998	0.14370227617345363
-73.14999999999998	0.15528547464437184
-72.14999999999998	0.1676826311314164
-71.14999999999998	0.18094303916076399
-70.14999999999998	0.19511858511414662
-69.14999999999998	0.21026387745845507
-68.14999999999998	0.22643638426906426
-67.14999999999998	0.24369658015435547
-66.14999999999998	0.26210810402611434
-65.14999999999998	0.28173792967430794
-64.14999999999998	0.30265655192662044
-63.14999999999998	0.32493819256553835
-62.14999999999998	0.3486610327054952
-61.14999999999998	0.3739074833496354
-60.14999999999998	0.40076451700699917
-59.14999999999998	0.42932411240579244
-58.14999999999998	0.45968396211736773
-57.14999999999998	0.491949135574233

Table B137: Sublimation Points for Carbon Dioxide and 2% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.954803100604531e-08
-172.1499999999998	2.7233433213208674e-08
-171.1499999999998	3.767415976391983e-08
-170.1499999999998	5.176285134541866e-08
-169.1499999999998	7.065035563415895e-08
-168.1499999999998	9.581131779645786e-08
-167.1499999999998	1.291240487244582e-07
-166.1499999999998	1.729672301346178e-07
-165.1499999999998	2.3033636542776154e-07
-164.1499999999998	3.0498326459229594e-07
-163.1499999999998	4.015822604082367e-07
-162.1499999999998	5.259272914230157e-07
-161.1499999999998	6.851644539114823e-07
-160.1499999999998	8.880651192294017e-07
-159.1499999999998	1.1453452331856634e-06
-158.1499999999998	1.4700369584945456e-06
-157.1499999999998	1.8779193878790364e-06
-156.1499999999998	2.3880156415001972e-06
-155.1499999999998	3.023164265300346e-06
-154.1499999999998	3.81067346350902e-06
-153.1499999999998	4.78306732567017e-06
-152.1499999999998	5.978933842610737e-06
-151.1499999999998	7.443885143141294e-06
-150.1499999999998	9.231641020208363e-06
-149.1499999999998	1.1405247447921733e-05
-148.1499999999998	1.4038442415566362e-05
-147.1499999999998	1.721718201766724e-05
-146.1499999999998	2.1041340336803316e-05
-145.1499999999998	2.5626597234741064e-05
-144.1499999999998	3.110652872438842e-05
-143.1499999999998	3.7634915127135114e-05
-142.1499999999998	4.538828272475799e-05
-141.1499999999998	5.456869509001129e-05
-140.1499999999998	6.540681072347433e-05
-139.1499999999998	7.816522403481875e-05
-138.1499999999998	9.314210708348933e-05
-137.1499999999998	0.00011067516983643348
-136.1499999999998	0.00013114595700908138
-135.1499999999998	0.00015498449983087162
-134.1499999999998	0.0001826743413193295
-133.1499999999998	0.00021475795385881698
-132.1499999999998	0.00025184256806354386
-131.1499999999998	0.0002946064320622003

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00034380552047653116
-129.1499999999998	0.00040028071248218234
-128.1499999999998	0.00046496545844118927
-127.1499999999998	0.0005388939546860008
-126.1499999999998	0.0006232098461199794
-125.1499999999998	0.0007191754763840057
-124.1499999999998	0.0008281817054288086
-123.1499999999998	0.000951758314433821
-122.1499999999998	0.0010915850181319137
-121.1499999999998	0.0012495031047415328
-120.1499999999998	0.0014275277238805129
-119.1499999999998	0.0016278608430453404
-118.1499999999998	0.0018529048934938371
-117.1499999999998	0.0021052771266737848
-116.1499999999998	0.0023878247027037864
-115.1499999999998	0.002703640532841446
-114.1499999999998	0.0030560798983761267
-113.1499999999998	0.0034487778689663144
-112.1499999999998	0.0038856675441124615
-111.1499999999998	0.0043709991422225866
-110.1499999999998	0.004909359962598972
-109.1499999999998	0.005505695246655143
-108.1499999999998	0.00616532996577499
-107.1499999999998	0.006893991564454958
-106.1499999999998	0.007697833688736294
-105.1499999999998	0.008583460931446574
-104.1499999999998	0.009557954627435404
-103.1499999999998	0.010628899733820613
-102.1499999999998	0.01180441283226658
-101.1499999999998	0.013093171292507803
-100.1499999999998	0.014504443638720148
-99.1499999999998	0.0160481211629415
-98.1499999999998	0.01773475083256772
-97.1499999999998	0.019575569542015482
-96.1499999999998	0.021582539761962727
-95.1499999999998	0.02376838664317891
-94.1499999999998	0.02614663663585216
-93.1499999999998	0.02873165768954176
-92.1499999999998	0.03153870110345687
-91.1499999999998	0.0345839451017176
-90.1499999999998	0.03788454021363665
-89.1499999999998	0.041458656544902155
-88.1499999999998	0.04532553303191279
-87.1499999999998	0.04950552877846003
-86.1499999999998	0.05402017658155706

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.05889223876156779
-84.14999999999998	0.06414576542098573
-83.14999999999998	0.06980615526641612
-82.14999999999998	0.07590021913965946
-81.14999999999998	0.08245624641650587
-80.14999999999998	0.08950407444619501
-79.14999999999998	0.09707516122079646
-78.14999999999998	0.10520266148246887
-77.14999999999998	0.113921506498242
-76.14999999999998	0.123268487757387
-75.14999999999998	0.13328234487664722
-74.14999999999998	0.14400385803502624
-73.14999999999998	0.15547594530446654
-72.14999999999998	0.16774376529853138
-71.14999999999998	0.18085482563226501
-70.14999999999998	0.19485909777921118
-69.14999999999998	0.20980913903583026
-68.14999999999998	0.22576022247496796
-67.14999999999998	0.2427704760144163
-66.14999999999998	0.26090103208835685
-65.14999999999998	0.2802161899687739
-64.14999999999998	0.30078359369353774
-63.14999999999998	0.3226744301295401
-62.14999999999998	0.34596365462420053
-61.14999999999998	0.3707302576792849
-60.14999999999998	0.3970575999449546
-59.14999999999998	0.4250338813017333
-58.14999999999998	0.45475295300532786
-57.14999999999998	0.48631679362134467

Table B138: Sublimation Points for Carbon Dioxide and 3% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.3570239068130588e-08
-172.1499999999998	3.270931773796668e-08
-171.1499999999998	4.507714401887317e-08
-170.1499999999998	6.170342660151776e-08
-169.1499999999998	8.3910681805566e-08
-168.1499999999998	1.1338721105927824e-07
-167.1499999999998	1.5227561872934785e-07
-166.1499999999998	2.0327958144926606e-07
-165.1499999999998	2.6979193690418683e-07
-164.1499999999998	3.560475448589971e-07
-163.1499999999998	4.6730478569854966e-07
-162.1499999999998	6.100600011736932e-07
-161.1499999999998	7.92299647347546e-07
-160.1499999999998	1.0237954194897342e-06
-159.1499999999998	1.316448121095305e-06
-158.1499999999998	1.6846865821899996e-06
-157.1499999999998	2.1459284831810035e-06
-156.1499999999998	2.72111050697838e-06
-155.1499999999998	3.4352958209325948e-06
-154.1499999999998	4.318367478063187e-06
-153.1499999999998	5.405816920652825e-06
-152.1499999999998	6.739637364967625e-06
-151.1499999999998	8.369332439958478e-06
-150.1499999999998	1.0353051041576609e-05
-149.1499999999998	1.2758859944087467e-05
-148.1499999999998	1.5666166276841246e-05
-147.1499999999998	1.9167302525832644e-05
-146.1499999999998	2.3369287250699026e-05
-145.1499999999998	2.839577521644595e-05
-144.1499999999998	3.4389211122286366e-05
-143.1499999999998	4.151320156502753e-05
-142.1499999999998	4.995512029923999e-05
-141.1499999999998	5.992896224925818e-05
-140.1499999999998	7.167846208753194e-05
-139.1499999999998	8.548049351910988e-05
-138.1499999999998	0.00010164876570267718
-137.1499999999998	0.00012053783349471158
-136.1499999999998	0.00014254743842549692
-135.1499999999998	0.0001681271975051676
-134.1499999999998	0.00019778165711609562
-133.1499999999998	0.00023207572937701464
-132.1499999999998	0.0002716405284668812
-131.1499999999998	0.00031717962447551395

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003694757324072692
-129.1499999999998	0.0004293978540071127
-128.1499999999998	0.0004979088901099468
-127.1499999999998	0.0005760737412384481
-126.1499999999998	0.0006650679141972006
-125.1499999999998	0.0007661866524367283
-124.1499999999998	0.0008808546079959386
-123.1499999999998	0.0010106360728809904
-122.1499999999998	0.0011572457878093014
-121.1499999999998	0.0013225603463449902
-120.1499999999998	0.0015086302125830713
-119.1499999999998	0.001717692370711119
-118.1499999999998	0.0019521836249946959
-117.1499999999998	0.00221475456900402
-116.1499999999998	0.0025082842432304756
-115.1499999999998	0.0028358955006397347
-114.1499999999998	0.00320097110018005
-113.1499999999998	0.0036071705488167753
-112.1499999999998	0.004058447713304541
-111.1499999999998	0.00455906922364325
-110.1499999999998	0.005113633691001003
-109.1499999999998	0.005727091763832866
-108.1499999999998	0.006404767046986072
-107.1499999999998	0.007152377909770249
-106.1499999999998	0.007976060210286656
-105.1499999999998	0.008882390964770963
-104.1499999999998	0.009878412992308535
-103.1499999999998	0.0109716605670461
-102.1499999999998	0.012170186111952447
-101.1499999999998	0.01348258797028925
-100.1499999999998	0.014918039293247648
-99.1499999999998	0.016486318084700573
-98.1499999999998	0.018197838446729474
-97.1499999999998	0.020063683072519323
-96.1499999999998	0.022095637036395516
-95.1499999999998	0.02430622293421776
-94.1499999999998	0.02670873743107166
-93.1499999999998	0.02931728927723206
-92.1499999999998	0.032146838857737475
-91.1499999999998	0.03521323934564973
-90.1499999999998	0.03853327953420984
-89.1499999999998	0.042124728428686226
-88.1499999999998	0.04600638168479235
-87.1499999999998	0.05019810998719707
-86.1499999999998	0.05472090946892668

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.059596954280461356
-84.14999999999998	0.06484965142616098
-83.14999999999998	0.0705036979954566
-82.14999999999998	0.07658514092719115
-81.14999999999998	0.08312143945775938
-80.14999999999998	0.09014153041761463
-79.14999999999998	0.09767589655655415
-78.14999999999998	0.1057566380964682
-77.14999999999998	0.11441754773150412
-76.14999999999998	0.12369418932066228
-75.14999999999998	0.1336239805477993
-74.14999999999998	0.1442462798603419
-73.14999999999998	0.15560247804287336
-72.14999999999998	0.16773609483819243
-71.14999999999998	0.1806928811009865
-70.14999999999998	0.1945209270647902
-69.14999999999998	0.20927077743211614
-68.14999999999998	0.2249955541777811
-67.14999999999998	0.24175108821530894
-66.14999999999998	0.2595960614660988
-65.14999999999998	0.2785921614827606
-64.14999999999998	0.29880425179036285
-63.14999999999998	0.32030056289516035
-62.14999999999998	0.3431529123198569
-61.14999999999998	0.36743696923018293
-60.14999999999998	0.39323259669802857
-59.14999999999998	0.420624356624286
-58.14999999999998	0.44970248264046786

Table B139: Sublimation Points for Carbon Dioxide and 4% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.8393794029979788e-08
-172.1499999999998	3.925035961706307e-08
-171.1499999999998	5.3886102815761354e-08
-170.1499999999998	7.348731071194391e-08
-169.1499999999998	9.957182300288623e-08
-168.1499999999998	1.3407008712043864e-07
-167.1499999999998	1.794230919993248e-07
-166.1499999999998	2.387000446216646e-07
-165.1499999999998	3.1573901584478235e-07
-164.1499999999998	4.153141705769752e-07
-163.1499999999998	5.43333611394262e-07
-162.1499999999998	7.070723031318808e-07
-161.1499999999998	9.154450074285985e-07
-160.1499999999998	1.1793246388954518e-06
-159.1499999999998	1.5119119564327492e-06
-158.1499999999998	1.9291630218221764e-06
-157.1499999999998	2.4502813903732448e-06
-156.1499999999998	3.0982825421385518e-06
-155.1499999999998	3.90063861383917e-06
-154.1499999999998	4.890012047778178e-06
-153.1499999999998	6.105087331148589e-06
-152.1499999999998	7.591510553646234e-06
-151.1499999999998	9.402947059526494e-06
-150.1499999999998	1.1602268008554983e-05
-149.1499999999998	1.426287718511931e-05
-148.1499999999998	1.7470189902642785e-05
-147.1499999999998	2.1323276338083386e-05
-146.1499999999998	2.593668209566581e-05
-145.1499999999998	3.1442439237284065e-05
-144.1499999999998	3.799228142677115e-05
-143.1499999999998	4.576007721434713e-05
-142.1499999999998	5.494449583429724e-05
-141.1499999999998	6.577192020203242e-05
-140.1499999999998	7.849962207526276e-05
-139.1499999999998	9.34192145877326e-05
-138.1499999999998	0.00011086039757288837
-137.1499999999998	0.0001311950112695997
-136.1499999999998	0.00015484141414371844
-135.1499999999998	0.00018226920066936541
-134.1499999999998	0.00021400427499450856
-133.1499999999998	0.0002506342964690867
-132.1499999999998	0.0002928145130436575
-131.1499999999998	0.0003412739985556744

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00039682230991281114
-129.1499999999998	0.00046035658016250043
-128.1499999999998	0.0005328690634083884
-127.1499999999998	0.0006154551475027762
-126.1499999999998	0.0007093218504142299
-125.1499999999998	0.0008157968161467805
-124.1499999999998	0.0009363378260772883
-123.1499999999998	0.0010725428415859892
-122.1499999999998	0.0012261605938881153
-121.1499999999998	0.0013991017370378568
-120.1499999999998	0.0015934505801757032
-119.1499999999998	0.001811477415232736
-118.1499999999998	0.00205565145649684
-117.1499999999998	0.0023286544086926044
-116.1499999999998	0.0026333946805346424
-115.1499999999998	0.002973022261090427
-114.1499999999998	0.0033509442767383187
-113.1499999999998	0.0037708412470377367
-112.1499999999998	0.0042366840584456365
-111.1499999999998	0.0047527516755237545
-110.1499999999998	0.00532364961009244
-109.1499999999998	0.005954329169702638
-108.1499999999998	0.0066501075078279175
-107.1499999999998	0.00741668849932715
-106.1499999999998	0.008260184466005006
-105.1499999999998	0.009187138778507558
-104.1499999999998	0.010204549362341992
-103.1499999999998	0.011319893137511972
-102.1499999999998	0.012541151423120187
-101.1499999999998	0.013876836340318917
-100.1499999999998	0.015336018249195282
-99.1499999999998	0.016928354257574926
-98.1499999999998	0.01866411784232528
-97.1499999999998	0.020554229626552324
-96.1499999999998	0.022610289359130623
-95.1499999999998	0.02484460914629725
-94.1499999999998	0.027270247988603873
-93.1499999999998	0.02990104768037269
-92.1499999999998	0.03275167013297479
-91.1499999999998	0.03583763618776863
-90.1499999999998	0.039175365989444155
-89.1499999999998	0.042782220995852015
-88.1499999999998	0.04667654770621057
-87.1499999999998	0.05087772319593953
-86.1499999999998	0.05540620255333643

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06028356832098074
-84.14999999999998	0.06553258205324197
-83.14999999999998	0.07117723811068795
-82.14999999999998	0.07724281982275864
-81.14999999999998	0.08375595816193018
-80.14999999999998	0.09074469308610347
-79.14999999999998	0.09823853772138451
-78.14999999999998	0.10626854557529447
-77.14999999999998	0.11486738099135625
-76.14999999999998	0.12406939308076169
-75.14999999999998	0.1339106933966
-74.14999999999998	0.1444292376524657
-73.14999999999998	0.1556649118324482
-72.14999999999998	0.16765962309679405
-71.14999999999998	0.18045739596178842
-70.14999999999998	0.19410447433108957
-69.14999999999998	0.20864943009055642
-68.14999999999998	0.22414327916863347
-67.14999999999998	0.2406396062417847
-66.14999999999998	0.25819469968637093
-65.14999999999998	0.27686769905076725
-64.14999999999998	0.2967207584547391
-63.14999999999998	0.3178192313664034
-62.14999999999998	0.34023188621635597
-61.14999999999998	0.3640311710917567
-60.14999999999998	0.3892935681671629
-59.14999999999998	0.41610015075809614
-58.14999999999998	0.4445378189201498

Table B140: Sublimation Points for Carbon Dioxide and 5% Hydrogen Sulphide

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.417287056510995e-08
-172.1499999999998	4.705643051828478e-08
-171.1499999999998	6.435834186498273e-08
-170.1499999999998	8.74434994105332e-08
-169.1499999999998	1.1805166042494306e-07
-168.1499999999998	1.5838731273179302e-07
-167.1499999999998	2.1122783523601692e-07
-166.1499999999998	2.800529678770779e-07
-165.1499999999998	3.6919897429688847e-07
-164.1499999999998	4.840412709188245e-07
-163.1499999999998	6.312097095960131e-07
-162.1499999999998	8.188411361114929e-07
-161.1499999999998	1.0568743018684e-06
-160.1499999999998	1.3573926790345765e-06
-159.1499999999998	1.7350212178313788e-06
-158.1499999999998	2.207383585921824e-06
-157.1499999999998	2.795626941041037e-06
-156.1499999999998	3.525021805983058e-06
-155.1499999999998	4.4256451364921455e-06
-154.1499999999998	5.533155194043557e-06
-153.1499999999998	6.889667353395662e-06
-152.1499999999998	8.544740485563949e-06
-151.1499999999998	1.0556484056940552e-05
-150.1499999999998	1.2992796571161478e-05
-149.1499999999998	1.5932746448621175e-05
-148.1499999999998	1.946810688604965e-05
-147.1499999999998	2.3705056662314436e-05
-146.1499999999998	2.8766059253868998e-05
-145.1499999999998	3.479193299164568e-05
-144.1499999999998	4.194412532863229e-05
-143.1499999999998	5.0407204592209155e-05
-142.1499999999998	6.039158286632003e-05
-141.1499999999998	7.213648388489675e-05
-140.1499999999998	8.591317001928397e-05
-139.1499999999998	0.00010202844260888965
-138.1499999999998	0.00012082843001643117
-137.1499999999998	0.00014270267788814466
-136.1499999999998	0.00016808855616660246
-135.1499999999998	0.000197475997441431
-134.1499999999998	0.0002314125812337275
-133.1499999999998	0.00027050897879606816
-132.1499999999998	0.0003154447729752034
-131.1499999999998	0.00036697466763236915

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004259351010506229
-129.1499999999998	0.0004932512776842849
-128.1499999999998	0.0005699446325267901
-127.1499999999998	0.0006571407422951704
-126.1499999999998	0.0007560776975569784
-125.1499999999998	0.0008681149498641438
-124.1499999999998	0.000994742647913278
-123.1499999999998	0.001137591476729246
-122.1499999999998	0.001298443013873719
-121.1499999999998	0.0014792406167190005
-120.1499999999998	0.001682100854905212
-119.1499999999998	0.0019093255022217637
-118.1499999999998	0.0021634141023283665
-117.1499999999998	0.00244707712296112
-116.1499999999998	0.002763249713563001
-115.1499999999998	0.003115106081639652
-114.1499999999998	0.003506074503577346
-113.1499999999998	0.003939852986175927
-112.1499999999998	0.004420425595751104
-111.1499999999998	0.004952079472353306
-110.1499999999998	0.005539422547440652
-109.1499999999998	0.006187401984237196
-108.1499999999998	0.006901323361009322
-107.1499999999998	0.007686870618611766
-106.1499999999998	0.008550126794893122
-105.1499999999998	0.009497595569918844
-104.1499999999998	0.010536223647472014
-103.1499999999998	0.011673423999936657
-102.1499999999998	0.012917100005466075
-101.1499999999998	0.014275670508290591
-100.1499999999998	0.015758095835145255
-99.1499999999998	0.017373904803098857
-98.1499999999998	0.019133222756559272
-97.1499999999998	0.021046800673926724
-96.1499999999998	0.023126045387282194
-95.1499999999998	0.025383050961648074
-94.1499999999998	0.027830631283762883
-93.1499999999998	0.030482353913995647
-92.1499999999998	0.033352575259005986
-91.1499999999998	0.03645647712707738
-90.1499999999998	0.039810104732734906
-89.1499999999998	0.04343040622235314
-88.1499999999998	0.04733527379802388
-87.1499999999998	0.051543586523022426
-86.1499999999998	0.056075254898897794

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06095126731155677
-84.14999999999998	0.06619373845187602
-83.14999999999998	0.07182595982545237
-82.14999999999998	0.07787245247629224
-81.14999999999998	0.08435902206074475
-80.14999999999998	0.09131281642109434
-79.14999999999998	0.09876238582329269
-78.14999999999998	0.10673774604082044
-77.14999999999998	0.11527044448725866
-76.14999999999998	0.12439362962466081
-75.14999999999998	0.1341421239044807
-74.14999999999998	0.14455250053425267
-73.14999999999998	0.15566316440885228
-72.14999999999998	0.16751443760349852
-71.14999999999998	0.1801486499018886
-70.14999999999998	0.19361023493516405
-69.14999999999998	0.20794583264852237
-68.14999999999998	0.22320439901350578
-67.14999999999998	0.23943732420142183
-66.14999999999998	0.2566985608920414
-65.14999999999998	0.27504476513469656
-64.14999999999998	0.29453545345515986
-63.14999999999998	0.3152331822568895
-62.14999999999998	0.3372037603243659
-61.14999999999998	0.36051651608014673
-60.14999999999998	0.38524467054157024
-59.14999999999998	0.41146597078471303
-58.14999999999998	0.43926440988506715

Table B141: Sublimation Points for Carbon Dioxide and 1% Hydrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.909541385283761e-08
-172.1499999999998	2.6669300808739443e-08
-171.1499999999998	3.6983903881085876e-08
-170.1499999999998	5.093599721273648e-08
-169.1499999999998	6.968457194565008e-08
-168.1499999999998	9.471824973303396e-08
-167.1499999999998	1.2793757563769774e-07
-166.1499999999998	1.717549032904212e-07
-165.1499999999998	2.2921496493357735e-07
-164.1499999999998	3.0413963241793374e-07
-163.1499999999998	4.0130082260709524e-07
-162.1499999999998	5.266259818676041e-07
-161.1499999999998	6.874410988968627e-07
-160.1499999999998	8.927567421855349e-07
-159.1499999999998	1.153603196645399e-06
-158.1499999999998	1.4834213816766578e-06
-157.1499999999998	1.8985168681277301e-06
-156.1499999999998	2.4185849717643607e-06
-155.1499999999998	3.0673155832112082e-06
-154.1499999999998	3.87308709572803e-06
-153.1499999999998	4.869759509221808e-06
-152.1499999999998	6.097577517915411e-06
-151.1499999999998	7.604195126240013e-06
-150.1499999999998	9.44583407879717e-06
-149.1499999999998	1.1688589131563162e-05
-148.1499999999998	1.4409893928781029e-05
-147.1499999999998	1.7700161979124514e-05
-146.1499999999998	2.166461794175715e-05
-145.1499999999998	2.642533513402496e-05
-144.1499999999998	3.2123495854115726e-05
-143.1499999999998	3.892189177077313e-05
-142.1499999999998	4.700768226508254e-05
-141.1499999999998	5.6595429213811746e-05
-140.1499999999998	6.793042727766301e-05
-139.1499999999998	8.129234929930548e-05
-138.1499999999998	9.699922692403238e-05
-137.1499999999998	0.00011541178702964631
-136.1499999999998	0.00013693816499158192
-135.1499999999998	0.0001620390162148185
-134.1499999999998	0.00019123304773678958
-133.1499999999998	0.0002251029920469727
-132.1499999999998	0.00026430204558127406
-131.1499999999998	0.0003095607946355714

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003616946517061231
-129.1499999999998	0.00042161182550902
-128.1499999999998	0.0004903218481607836
-127.1499999999998	0.0005689446832225953
-126.1499999999998	0.000658720438526984
-125.1499999999998	0.000761019707923778
-124.1499999999998	0.0008773545663083715
-123.1499999999998	0.0010093902425361836
-122.1499999999998	0.001158957495090004
-121.1499999999998	0.0013280657156589182
-120.1499999999998	0.0015189167861162636
-119.1499999999998	0.0017339197147580112
-118.1499999999998	0.001975706078089634
-117.1499999999998	0.0022471462949380737
-116.1499999999998	0.0025513667602238706
-115.1499999999998	0.002891767866366205
-114.1499999999998	0.003272042941019592
-113.1499999999998	0.0036961981306640156
-112.1499999999998	0.004168573260500627
-111.1499999999998	0.004693863702152162
-110.1499999999998	0.005277143281840675
-109.1499999999998	0.005923888263025881
-108.1499999999998	0.006640002438945639
-107.1499999999998	0.00743184337211759
-106.1499999999998	0.00830624981964727
-105.1499999999998	0.009270570385159077
-104.1499999999998	0.010332693440330712
-103.1499999999998	0.011501078361386346
-102.1499999999998	0.01278478812850157
-101.1499999999998	0.014193523338910687
-100.1499999999998	0.015737657687602442
-99.1499999999998	0.01742827497285955
-98.1499999999998	0.019277207687568323
-97.1499999999998	0.0212970772612105
-96.1499999999998	0.02350133602179174
-95.1499999999998	0.025904310951670964
-94.1499999999998	0.028521249316388095
-93.1499999999998	0.0313683662511656
-92.1499999999998	0.034462894395843706
-91.1499999999998	0.03782313567564117
-90.1499999999998	0.04146851533239083
-89.1499999999998	0.045419638318848383
-88.1499999999998	0.04969834817741248
-87.1499999999998	0.05432778853423341
-86.1499999999998	0.05933246735036887

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06473832408352635
-84.14999999999998	0.07057279992724524
-83.14999999999998	0.07686491130936131
-82.14999999999998	0.08364532684862261
-81.14999999999998	0.09094644798782658
-80.14999999999998	0.09880249354439208
-79.14999999999998	0.10724958844565696
-78.14999999999998	0.11632585694743093
-77.14999999999998	0.12607152067185493
-76.14999999999998	0.13652900184643957
-75.14999999999998	0.14774303218309506
-74.14999999999998	0.1597607679081716
-73.14999999999998	0.17263191154815838
-72.14999999999998	0.1864088412001437
-71.14999999999998	0.20114674818625053
-70.14999999999998	0.21690378423102294
-69.14999999999998	0.23374121965072547
-68.14999999999998	0.2517236145748344
-67.14999999999998	0.2709190060638514
-66.14999999999998	0.2913991153999722
-65.14999999999998	0.3132395823427334
-64.14999999999998	0.33652023797403013
-63.14999999999998	0.36132543796252764
-62.14999999999998	0.3877445024814302
-61.14999999999998	0.4158723783872655
-60.14999999999998	0.4458108967800781
-59.14999999999998	0.47767260292269126

Table B142: Sublimation Points for Carbon Dioxide and 2% Hydrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.7096661069324027e-08
-172.1499999999998	3.764459196324173e-08
-171.1499999999998	5.193449431621898e-08
-170.1499999999998	7.116504416610171e-08
-169.1499999999998	9.687741669398283e-08
-168.1499999999998	1.3104111002260293e-07
-167.1499999999998	1.761581611481936e-07
-166.1499999999998	2.3538898875588717e-07
-165.1499999999998	3.127035286203791e-07
-164.1499999999998	4.1306179305545304e-07
-163.1499999999998	5.426284861943308e-07
-162.1499999999998	7.090268410973303e-07
-161.1499999999998	9.216374117153482e-07
-160.1499999999998	1.1919481510859533e-06
-159.1499999999998	1.5339627348817642e-06
-158.1499999999998	1.964674744239097e-06
-157.1499999999998	2.5046160009500645e-06
-156.1499999999998	3.1784880485243553e-06
-155.1499999999998	4.015886490912096e-06
-154.1499999999998	5.052128633138181e-06
-153.1499999999998	6.329195610805214e-06
-152.1499999999998	7.896800944271998e-06
-151.1499999999998	9.813598204076766e-06
-150.1499999999998	1.2148541222558518e-05
-149.1499999999998	1.498241102834976e-05
-148.1499999999998	1.8409524411245927e-05
-147.1499999999998	2.2539639740821613e-05
-146.1499999999998	2.750007635916848e-05
-145.1499999999998	3.3438064542658104e-05
-144.1499999999998	4.052334367636785e-05
-143.1499999999998	4.895102690484242e-05
-142.1499999999998	5.894475111168517e-05
-141.1499999999998	7.076013163605638e-05
-140.1499999999998	8.468854165502673e-05
-139.1499999999998	0.00010106123664586247
-138.1499999999998	0.00012025384479143065
-137.1499999999998	0.00014269124460507948
-136.1499999999998	0.00016885285142955226
-135.1499999999998	0.000199278334809031
-134.1499999999998	0.0002345737890464312
-133.1499999999998	0.0002754183795422311
-132.1499999999998	0.00032257148776964343
-131.1499999999998	0.0003768803779778003

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004392884089340915
-129.1499999999998	0.0005108438142239842
-128.1499999999998	0.0005927090748269646
-127.1499999999998	0.0006861709078866624
-126.1499999999998	0.0007926508957981349
-125.1499999999998	0.0009137167799525904
-124.1499999999998	0.0010510944437167225
-123.1499999999998	0.001206680609487788
-122.1499999999998	0.0013825562749647312
-121.1499999999998	0.0015810009141179052
-120.1499999999998	0.001804507468734075
-119.1499999999998	0.0020557981568676558
-118.1499999999998	0.0023378411250535316
-117.1499999999998	0.002653867971738524
-116.1499999999998	0.003007392170079617
-115.1499999999998	0.0034022284190447973
-114.1499999999998	0.0038425129526477235
-113.1499999999998	0.004332724838160569
-112.1499999999998	0.0048777082952903995
-111.1499999999998	0.005482696069583627
-110.1499999999998	0.006153333894753089
-109.1499999999998	0.006895706080212425
-108.1499999999998	0.007716362261866873
-107.1499999999998	0.008622345356160114
-106.1499999999998	0.009621220759526436
-105.1499999999998	0.010721106837762081
-104.1499999999998	0.011930706752424703
-103.1499999999998	0.013259341674208693
-102.1499999999998	0.014716985436353257
-101.1499999999998	0.016314300684530728
-100.1499999999998	0.01806267658336549
-99.1499999999998	0.019974268143768938
-98.1499999999998	0.022062037239678253
-97.1499999999998	0.0243397953875839
-96.1499999999998	0.026822248367465346
-95.1499999999998	0.02952504276947344
-94.1499999999998	0.032464814556944235
-93.1499999999998	0.035659239743179534
-92.1499999999998	0.03912708728694609
-91.1499999999998	0.042888274319923446
-90.1499999999998	0.04696392382847721
-89.1499999999998	0.0513764249222826
-88.1499999999998	0.056149495833635654
-87.1499999999998	0.061308249803973286
-86.1499999999998	0.0668792640284307

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07289065184553345
-84.14999999999998	0.07937213837777136
-83.14999999999998	0.08635513985037878
-82.14999999999998	0.09387284684091542
-81.14999999999998	0.10196031174215309
-80.14999999999998	0.11065454075671119
-79.14999999999998	0.1199945907857153
-78.14999999999998	0.13002167162811992
-77.14999999999998	0.1407792539760932
-76.14999999999998	0.1523131837806267
-75.14999999999998	0.16467180367885456
-74.14999999999998	0.17790608233362096
-73.14999999999998	0.19206975275771268
-72.14999999999998	0.20721946101455985
-71.14999999999998	0.22341492716355374
-70.14999999999998	0.24071912105740534
-69.14999999999998	0.25919845680001535
-68.14999999999998	0.2789230117309414
-67.14999999999998	0.2999667795572182
-66.14999999999998	0.3224079746512127
-65.14999999999998	0.34632942058634564
-64.14999999999998	0.371819095519103
-63.14999999999998	0.3989710232309174
-62.14999999999998	0.42788714784322457
-61.14999999999998	0.4586838055362484

Table B143: Sublimation Points for Carbon Dioxide and 3% Hydrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.8312408111930147e-08
-172.1499999999998	5.294795569105294e-08
-171.1499999999998	7.267299621960093e-08
-170.1499999999998	9.90833552020489e-08
-169.1499999999998	1.3422033357099236e-07
-168.1499999999998	1.806794730854046e-07
-167.1499999999998	2.4174194080364997e-07
-166.1499999999998	3.215323664526162e-07
-165.1499999999998	4.2520745149671097e-07
-164.1499999999998	5.591801889549928e-07
-163.1499999999998	7.313850876705399e-07
-162.1499999999998	9.51590382508205e-07
-161.1499999999998	1.231763831104217e-06
-160.1499999999998	1.586499346133088e-06
-159.1499999999998	2.0335123869896736e-06
-158.1499999999998	2.594212733303217e-06
-157.1499999999998	3.2943639814339293e-06
-156.1499999999998	4.1648398403551575e-06
-155.1499999999998	5.242488051117188e-06
-154.1499999999998	6.571113510223571e-06
-153.1499999999998	8.202592937360366e-06
-152.1499999999998	1.0198134187537975e-05
-151.1499999999998	1.2629694062332378e-05
-150.1499999999998	1.5581569220086636e-05
-149.1499999999998	1.915217551629042e-05
-148.1499999999998	2.3456031818718972e-05
-147.1499999999998	2.8625965033336246e-05
-146.1499999999998	3.4815553742817595e-05
-145.1499999999998	4.2201828496582806e-05
-144.1499999999998	5.0988247396574e-05
-143.1499999999998	6.140796619436496e-05
-142.1499999999998	7.372742265066747e-05
-141.1499999999998	8.82502554066729e-05
-140.1499999999998	0.00010532157807723116
-139.1499999999998	0.00012533262969860665
-138.1499999999998	0.00014872582304900606
-137.1499999999998	0.00017600021270951065
-136.1499999999998	0.00020771740504832044
-135.1499999999998	0.00024450793259490824
-134.1499999999998	0.00028707811552585447
-133.1499999999998	0.0003362174332147454
-132.1499999999998	0.00039280642900877625
-131.1499999999998	0.0004578251715897011

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.000532362296462035
-129.1499999999998	0.0006176246512928574
-128.1499999999998	0.0007149475690119046
-127.1499999999998	0.0008258057927746323
-126.1499999999998	0.0009518250771021605
-125.1499999999998	0.0010947944897480987
-124.1499999999998	0.0012566794391114435
-123.1499999999998	0.0014396354523252802
-122.1499999999998	0.0016460227295119708
-121.1499999999998	0.0018784215001154015
-120.1499999999998	0.0021396482077094396
-119.1499999999998	0.0024327725502481285
-118.1499999999998	0.0027611354033771325
-117.1499999999998	0.0031283676551778373
-116.1499999999998	0.0035384099815746754
-115.1499999999998	0.0039955335926145225
-114.1499999999998	0.004504361980933435
-113.1499999999998	0.005069893704973588
-112.1499999999998	0.005697526240911841
-111.1499999999998	0.006393080938824674
-110.1499999999998	0.007162829120352577
-109.1499999999998	0.008013519357057455
-108.1499999999998	0.008952405970798067
-107.1499999999998	0.009987278799802365
-106.1499999999998	0.011126494276702939
-105.1499999999998	0.012379007867643113
-104.1499999999998	0.013754407924678308
-103.1499999999998	0.015262951007105825
-102.1499999999998	0.016915598731089054
-101.1499999999998	0.018724056211020502
-100.1499999999998	0.02070081216052682
-99.1499999999998	0.022859180725894764
-98.1499999999998	0.025213345130031237
-97.1499999999998	0.027778403210913113
-96.1499999999998	0.030570414944893216
-95.1499999999998	0.03360645205227429
-94.1499999999998	0.03690464979033086
-93.1499999999998	0.04048426104754641
-92.1499999999998	0.04436571286236717
-91.1499999999998	0.048570665500401386
-90.1499999999998	0.05312207423590943
-89.1499999999998	0.058044253996871485
-88.1499999999998	0.06336294704817536
-87.1499999999998	0.06910539390495335
-86.1499999999998	0.07530040768827999

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08197845215902227
-84.14999999999998	0.08917172369346747
-83.14999999999998	0.09691423749765757
-82.14999999999998	0.10524191839777475
-81.14999999999998	0.11419269659376056
-80.14999999999998	0.12380660882589531
-79.14999999999998	0.13412590548410544
-78.14999999999998	0.14519516429437115
-77.14999999999998	0.15706141135661725
-76.14999999999998	0.16977425050066983
-75.14999999999998	0.18338600219843648
-74.14999999999998	0.19795185366635293
-73.14999999999998	0.2135300223901106
-72.14999999999998	0.23018193624353403
-71.14999999999998	0.24797243491973434
-70.14999999999998	0.2669700000757753
-69.14999999999998	0.28724702655183876
-68.14999999999998	0.30888015693008897
-67.14999999999998	0.33195072349579935
-66.14999999999998	0.356545396179364
-65.14999999999998	0.38275729814165543
-64.14999999999998	0.4106884953606717
-63.14999999999998	0.44045920534645433

Table B144: Sublimation Points for Carbon Dioxide and 4% Hydrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	5.397635434363098e-08
-172.1499999999998	7.420872331301004e-08
-171.1499999999998	1.0133694639623987e-07
-170.1499999999998	1.3747711394629332e-07
-169.1499999999998	1.8532228406854772e-07
-168.1499999999998	2.482796937280178e-07
-167.1499999999998	3.306356454118558e-07
-166.1499999999998	4.3775258539346567e-07
-165.1499999999998	5.763034306853016e-07
-164.1499999999998	7.545487776982234e-07
-163.1499999999998	9.826632349149296e-07
-162.1499999999998	1.2731177625333756e-06
-161.1499999999998	1.6411255715828463e-06
-160.1499999999998	2.1051598305624463e-06
-159.1499999999998	2.6875521458902992e-06
-158.1499999999998	3.415181519702075e-06
-157.1499999999998	4.3202642407948284e-06
-156.1499999999998	5.4412559275008775e-06
-155.1499999999998	6.82387771051038e-06
-154.1499999999998	8.522279314509661e-06
-153.1499999999998	1.0600352565259234e-05
-152.1499999999998	1.3133209608694174e-05
-151.1499999999998	1.620884087615372e-05
-150.1499999999998	1.9929968560451052e-05
-149.1499999999998	2.4416112076907716e-05
-148.1499999999998	2.9805882667727717e-05
-147.1499999999998	3.625952496355462e-05
-146.1499999999998	4.3961723939552905e-05
-145.1499999999998	5.3124696292157485e-05
-144.1499999999998	6.399158581458174e-05
-143.1499999999998	7.684018286262969e-05
-142.1499999999998	9.198698847636785e-05
-141.1499999999998	0.00010979164415739003
-140.1499999999998	0.00013066174869609553
-139.1499999999998	0.0001550580837995947
-138.1499999999998	0.00018350027059020615
-137.1499999999998	0.00021657287932942622
-136.1499999999998	0.0002549320149757384
-135.1499999999998	0.0002993124014104016
-134.1499999999998	0.0003505349873677673
-133.1499999999998	0.00040951509729067795
-132.1499999999998	0.00047727115050263534
-131.1499999999998	0.0005549339722528294

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0006437567203543651
-129.1499999999998	0.0007451254513072773
-128.1499999999998	0.0008605703499837047
-127.1499999999998	0.0009917776471608766
-126.1499999999998	0.001140602249426664
-125.1499999999998	0.001309081106261151
-124.1499999999998	0.0014994473394248007
-123.1499999999998	0.0017141451601687938
-122.1499999999998	0.001955845600235501
-121.1499999999998	0.0022274630831464275
-120.1499999999998	0.0025321728628919194
-119.1499999999998	0.0028734293578510273
-118.1499999999998	0.003254985408592265
-117.1499999999998	0.0036809124891477437
-116.1499999999998	0.004155621902424055
-115.1499999999998	0.0046838869916271475
-114.1499999999998	0.005270866400945178
-113.1499999999998	0.005922128420266264
-112.1499999999998	0.006643676450421359
-111.1499999999998	0.00744197562734765
-110.1499999999998	0.008323980645682624
-109.1499999999998	0.009297164824637015
-108.1499999999998	0.0103695504615741
-107.1499999999998	0.011549740521563788
-106.1499999999998	0.012846951714299889
-105.1499999999998	0.014271049013196391
-104.1499999999998	0.01583258167523426
-103.1499999999998	0.017542820824248875
-102.1499999999998	0.01941379866485888
-101.1499999999998	0.021458349399186755
-100.1499999999998	0.02369015192394555
-99.1499999999998	0.026123774391429357
-98.1499999999998	0.02877472072450572
-97.1499999999998	0.03165947918293973
-96.1499999999998	0.03479557308638693
-95.1499999999998	0.038201613808268566
-94.1499999999998	0.04189735616464572
-93.1499999999998	0.045903756333292335
-92.1499999999998	0.05024303245065628
-91.1499999999998	0.05493872804855296
-90.1499999999998	0.06001577850860618
-89.1499999999998	0.06550058073107778
-88.1499999999998	0.07142106623638843
-87.1499999999998	0.07780677794309805
-86.1499999999998	0.08468895089640871

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.09210059725777571
-84.14999999999998	0.10007659591090418
-83.14999999999998	0.10865378709497937
-82.14999999999998	0.11787107254633007
-81.14999999999998	0.12776952172054365
-80.14999999999998	0.1383924847868183
-79.14999999999998	0.1497857132480495
-78.14999999999998	0.1619974892641424
-77.14999999999998	0.17507876507527584
-76.14999999999998	0.18908331439126705
-75.14999999999998	0.2040678983282289
-74.14999999999998	0.22009244960700064
-73.14999999999998	0.23722028060789058
-72.14999999999998	0.2555183241657337
-71.14999999999998	0.27505742212152196
-70.14999999999998	0.2959126890002359
-69.14999999999998	0.3181640056274348
-68.14999999999998	0.3418967668505895
-67.14999999999998	0.36720321758049157
-66.14999999999998	0.3941855556800127
-65.14999999999998	0.42296798486876563

Table B145: Sublimation Points for Carbon Dioxide and 5% Hydrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	7.577250975455944e-08
-172.1499999999998	1.0363907989440098e-07
-171.1499999999998	1.4081336619212498e-07
-170.1499999999998	1.9009015599040882e-07
-169.1499999999998	2.5500835296742736e-07
-168.1499999999998	3.4002328156992854e-07
-167.1499999999998	4.507126797497136e-07
-166.1499999999998	5.940216665543213e-07
-165.1499999999998	7.785525691958727e-07
-164.1499999999998	1.0149061258324766e-06
-163.1499999999998	1.3160812431637143e-06
-162.1499999999998	1.6979411793042988e-06
-161.1499999999998	2.179754739044574e-06
-160.1499999999998	2.7848218069013304e-06
-159.1499999999998	3.541193299299604e-06
-158.1499999999998	4.482496386480613e-06
-157.1499999999998	5.648876612713676e-06
-156.1499999999998	7.088069325320052e-06
-155.1499999999998	8.856613603995405e-06
-154.1499999999998	1.1021222656993901e-05
-153.1499999999998	1.3660325415006261e-05
-152.1499999999998	1.6865794802221364e-05
-151.1499999999998	2.0744878892505676e-05
-150.1499999999998	2.542235186253366e-05
-149.1499999999998	3.1042902329058754e-05
-148.1499999999998	3.7773777300764416e-05
-147.1499999999998	4.580770058316982e-05
-146.1499999999998	5.536608504533385e-05
-145.1499999999998	6.670255868762966e-05
-144.1499999999998	8.010682493931339e-05
-143.1499999999998	9.59088780622949e-05
-142.1499999999998	0.00011448359494348828
-141.1499999999998	0.00013625572492305036
-140.1499999999998	0.00016170529963122028
-139.1499999999998	0.00019137348509446793
-138.1499999999998	0.00022586889862517498
-137.1499999999998	0.00026587441323166154
-136.1499999999998	0.00031215447248136266
-135.1499999999998	0.0003655629389242477
-134.1499999999998	0.00042705149934170683
-133.1499999999998	0.0004976786502343933
-132.1499999999998	0.0005786192871073978
-131.1499999999998	0.0006711749212601542

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0007767845479491228
-129.1499999999998	0.0008970361899718789
-128.1499999999998	0.0010336791409302887
-127.1499999999998	0.0011886369326768618
-126.1499999999998	0.001364021051741436
-125.1499999999998	0.0015621454298847869
-124.1499999999998	0.001785541734341063
-123.1499999999998	0.0020369754838029173
-122.1499999999998	0.002319463016781316
-121.1499999999998	0.0026362893396479877
-120.1499999999998	0.0029910268824524153
-119.1499999999998	0.003387555191508761
-118.1499999999998	0.003830081588782948
-117.1499999999998	0.004323162829288073
-116.1499999999998	0.00487172778902926
-115.1499999999998	0.00548110121754168
-114.1499999999998	0.006157028590749142
-113.1499999999998	0.006905702101752143
-112.1499999999998	0.0077337878292467474
-111.1499999999998	0.00864845412559835
-110.1499999999998	0.009657401269162825
-109.1499999999998	0.010768892428283534
-108.1499999999998	0.011991785987516934
-107.1499999999998	0.01333556929007816
-106.1499999999998	0.014810393854275888
-105.1499999999998	0.016427112125859535
-104.1499999999998	0.01819731583276126
-103.1499999999998	0.02013337601372938
-102.1499999999998	0.022248484797862983
-101.1499999999998	0.02455669901812908
-100.1499999999998	0.027072985748646427
-99.1499999999998	0.02981326986293109
-98.1499999999998	0.03279448371852395
-97.1499999999998	0.03603461908258038
-96.1499999999998	0.03955278142324512
-95.1499999999998	0.04336924670316107
-94.1499999999998	0.04750552082448203
-93.1499999999998	0.05198440188960602
-92.1499999999998	0.056830045458872255
-91.1499999999998	0.062068033006186185
-90.1499999999998	0.06772544379659788
-89.1499999999998	0.07383093043712245
-88.1499999999998	0.08041479838472952
-87.1499999999998	0.08750908973502113
-86.1499999999998	0.09514767166388073

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.10336632995542458
-84.14999999999998	0.11220286812738288
-83.14999999999998	0.12169721276616663
-82.14999999999998	0.13189152581813407
-81.14999999999998	0.14283032476606672
-80.14999999999998	0.15456061187432454
-79.14999999999998	0.16713201405111897
-78.14999999999998	0.1805969354164425
-77.14999999999998	0.19501072549193935
-76.14999999999998	0.21043186724887544
-75.14999999999998	0.22692219145319875
-74.14999999999998	0.24454712762414552
-73.14999999999998	0.26337600919625986
-72.14999999999998	0.28348246522231035
-71.14999999999998	0.3049449639490857
-70.14999999999998	0.32784765765778906
-69.14999999999998	0.35228193530290836
-68.14999999999998	0.37835013786304594
-67.14999999999998	0.40618057619323095

Table B146: Sublimation Points for Carbon Dioxide and 1% Nitrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.6831069738146315e-08
-172.1499999999998	2.35526084897755e-08
-171.1499999999998	3.27241245327163e-08
-170.1499999999998	4.515352280642452e-08
-169.1499999999998	6.188695284703597e-08
-168.1499999999998	8.427064167032801e-08
-167.1499999999998	1.1402652424710812e-07
-166.1499999999998	1.5334422107730555e-07
-165.1499999999998	2.0499227586387385e-07
-164.1499999999998	2.724519631445353e-07
-163.1499999999998	3.600774063911789e-07
-162.1499999999998	4.732862116239632e-07
-161.1499999999998	6.187853197375577e-07
-160.1499999999998	8.048373118460947e-07
-159.1499999999998	1.0415729649759328e-06
-158.1499999999998	1.3413564489307894e-06
-157.1499999999998	1.7192101772903273e-06
-156.1499999999998	2.1933069740684186e-06
-155.1499999999998	2.7855378899776416e-06
-154.1499999999998	3.5221646956122963e-06
-153.1499999999998	4.434566789959089e-06
-152.1499999999998	5.560092987996579e-06
-151.1499999999998	6.943029387050803e-06
-150.1499999999998	8.635695254170871e-06
-149.1499999999998	1.069967962208357e-05
-148.1499999999998	1.3207232025241797e-05
-147.1499999999998	1.6242821546047264e-05
-146.1499999999998	1.9904879070515387e-05
-145.1499999999998	2.4307738368599562e-05
-144.1499999999998	2.9583792313409293e-05
-143.1499999999998	3.5885881232191656e-05
-142.1499999999998	4.338993103705244e-05
-141.1499999999998	5.229785941214617e-05
-140.1499999999998	6.284076893406022e-05
-139.1499999999998	7.528244657136058e-05
-138.1499999999998	8.992318954627212e-05
-137.1499999999998	0.00010710397804521102
-136.1499999999998	0.00012721101573490856
-135.1499999999998	0.00015068065947729963
-134.1499999999998	0.00017800476003975796
-133.1499999999998	0.00020973643596898192
-132.1499999999998	0.0002464963031386239
-131.1499999999998	0.0002889791827949759

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003379613112147624
-129.1499999999998	0.0003943080743576351
-128.1499999999998	0.00045898229114762877
-127.1499999999998	0.0005330530692569283
-126.1499999999998	0.0006177052574971484
-125.1499999999998	0.000714249519153032
-124.1499999999998	0.0008241330508276175
-123.1499999999998	0.0009489509716121659
-122.1499999999998	0.0010904584076557226
-121.1499999999998	0.0012505832974949692
-120.1499999999998	0.0014314399438224669
-119.1499999999998	0.0016353433377279745
-118.1499999999998	0.001864824281851687
-117.1499999999998	0.002122645339347437
-116.1499999999998	0.002411817636077197
-115.1499999999998	0.002735618544053757
-114.1499999999998	0.0030976102748254725
-113.1499999999998	0.0035016594122638596
-112.1499999999998	0.0039519574150811395
-111.1499999999998	0.004453042120380749
-110.1499999999998	0.00500982028063651
-109.1499999999998	0.00562759116771876
-108.1499999999998	0.006312071278946122
-107.1499999999998	0.007069420181650238
-106.1499999999998	0.007906267534410061
-105.1499999999998	0.008829741324952674
-104.1499999999998	0.009847497366740057
-103.1499999999998	0.010967750098479286
-102.1499999999998	0.012199304733222364
-101.1499999999998	0.013551590806370117
-100.1499999999998	0.015034697174784494
-99.1499999999998	0.016659408522357044
-98.1499999999998	0.018437243430797237
-97.1499999999998	0.02038049407811631
-96.1499999999998	0.022502267631306517
-95.1499999999998	0.024816529404084492
-94.1499999999998	0.02733814785530194
-93.1499999999998	0.03008294150876609
-92.1499999999998	0.03306772788078744
-91.1499999999998	0.03631037450782809
-90.1499999999998	0.03982985217321413
-89.1499999999998	0.043646290439047414
-88.1499999999998	0.04778103559728612
-87.1499999999998	0.05225671116253753
-86.1499999999998	0.05709728103850659

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06232811550041509
-84.14999999999998	0.06797606014716515
-83.14999999999998	0.07406950798976225
-82.14999999999998	0.08063847485676426
-81.14999999999998	0.08771467831355126
-80.14999999999998	0.09533162031038983
-79.14999999999998	0.10352467379505374
-78.14999999999998	0.11233117354978027
-77.14999999999998	0.12179051154037769
-76.14999999999998	0.1319442370984886
-75.14999999999998	0.14283616229782717
-74.14999999999998	0.15451247293378245
-73.14999999999998	0.16702184557613248
-72.14999999999998	0.18041557124114735
-71.14999999999998	0.1947476863287345
-70.14999999999998	0.2100751116026146
-69.14999999999998	0.22645780017314865
-68.14999999999998	0.24395889569995036
-67.14999999999998	0.26264490241067456
-66.14999999999998	0.28258586911567324
-65.14999999999998	0.30385559034196286
-64.14999999999998	0.32653182933187275
-63.14999999999998	0.3506965706527913
-62.14999999999998	0.3764363162605405
-61.14999999999998	0.40384245287694565
-60.14999999999998	0.4330117570109942
-59.14999999999998	0.46404724453336454
-58.14999999999998	0.49706058671002484

Table B147: Sublimation Points for Carbon Dioxide and 2% Nitrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.1103714567971686e-08
-172.1499999999998	2.9432273589053766e-08
-171.1499999999998	4.0758832609340183e-08
-170.1499999999998	5.605890738279047e-08
-169.1499999999998	7.659155816844979e-08
-168.1499999999998	1.0397181271535025e-07
-167.1499999999998	1.4025895750219894e-07
-166.1499999999998	1.8806356539571613e-07
-165.1499999999998	2.506765248353693e-07
-164.1499999999998	3.322237671212137e-07
-163.1499999999998	4.3785085453602653e-07
-162.1499999999998	5.739420926598723e-07
-161.1499999999998	7.483793647288395e-07
-160.1499999999998	9.70846453239577e-07
-159.1499999999998	1.2531852127877168e-06
-158.1499999999998	1.6098105865233722e-06
-157.1499999999998	2.058192114387934e-06
-156.1499999999998	2.619410261859828e-06
-155.1499999999998	3.3187966003279426e-06
-154.1499999999998	4.186667591154897e-06
-153.1499999999998	5.259162461431995e-06
-152.1499999999998	6.579196406573155e-06
-151.1499999999998	8.197541109274361e-06
-150.1499999999998	1.0174045321872174e-05
-149.1499999999998	1.257900901560353e-05
-148.1499999999998	1.5494725351515628e-05
-147.1499999999998	1.9017205469677396e-05
-146.1499999999998	2.325810182189561e-05
-145.1499999999998	2.8346846484514027e-05
-144.1499999999998	3.4433021578482484e-05
-143.1499999999998	4.168897959045117e-05
-142.1499999999998	5.03127320282187e-05
-141.1499999999998	6.053112545393501e-05
-140.1499999999998	7.260332451694325e-05
-139.1499999999998	8.682462215342744e-05
-138.1499999999998	0.00010353059763108859
-137.1499999999998	0.0001231016435933482
-136.1499999999998	0.00014596788369913475
-135.1499999999998	0.00017261450286181455
-134.1499999999998	0.00020358751246549569
-133.1499999999998	0.00023949997328059176
-132.1499999999998	0.00028103869911567806
-131.1499999999998	0.0003289714645322203

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00038415474021641556
-129.1499999999998	0.0004475419798522231
-128.1499999999998	0.0005201924825763488
-127.1499999999998	0.0006032808553248164
-126.1499999999998	0.0006981070996071832
-125.1499999999998	0.0008061073474749516
-124.1499999999998	0.0009288652716913461
-123.1499999999998	0.0010681241953678221
-122.1499999999998	0.0012257999266150764
-121.1499999999998	0.0014039943440713031
-120.1499999999998	0.0016050097595249621
-119.1499999999998	0.0018313640842524857
-118.1499999999998	0.002085806826150757
-117.1499999999998	0.002371335945268846
-116.1499999999998	0.0026912155959423786
-115.1499999999998	0.00304899478441558
-114.1499999999998	0.0034485269716098416
-113.1499999999998	0.0038939906515739467
-112.1499999999998	0.004389910937137372
-111.1499999999998	0.004941182185396875
-110.1499999999998	0.005553091696905914
-109.1499999999998	0.006231344523817294
-108.1499999999998	0.006982089423763514
-107.1499999999998	0.007811945997956713
-106.1499999999998	0.008728033053861514
-105.1499999999998	0.009737998234855692
-104.1499999999998	0.0108500489615525
-103.1499999999998	0.012072984731933762
-102.1499999999998	0.013416230830146068
-101.1499999999998	0.014889873496760077
-100.1499999999998	0.01650469661650325
-99.1499999999998	0.018272219982968078
-98.1499999999998	0.020204739203589117
-97.1499999999998	0.02231536731230285
-96.1499999999998	0.024618078161773384
-95.1499999999998	0.027127751671917937
-94.1499999999998	0.02986022101673521
-93.1499999999998	0.03283232183715741
-92.1499999999998	0.03606194357387258
-91.1499999999998	0.03956808302083026
-90.1499999999998	0.04337090020753562
-89.1499999999998	0.04749177672631025
-88.1499999999998	0.05195337662954597
-87.1499999999998	0.05677971003170921
-86.1499999999998	0.061996199561597874

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06762974982225681
-84.14999999999998	0.07370882002923501
-83.14999999999998	0.08026350001275348
-82.14999999999998	0.08732558978615859
-81.14999999999998	0.09492868290217447
-80.14999999999998	0.10310825384045066
-79.14999999999998	0.11190174969542092
-78.14999999999998	0.1213486864634864
-77.14999999999998	0.1314907502642459
-76.14999999999998	0.14237190387369253
-75.14999999999998	0.15403849900046193
-74.14999999999998	0.16653939480289906
-73.14999999999998	0.17992608323026607
-72.14999999999998	0.1942528218838904
-71.14999999999998	0.2095767752460351
-70.14999999999998	0.22595816533629956
-69.14999999999998	0.2434604331616874
-68.14999999999998	0.26215041278752454
-67.14999999999998	0.2820985205837664
-66.14999999999998	0.30337896341420645
-65.14999999999998	0.326069971699171
-64.14999999999998	0.35025406747480214
-63.14999999999998	0.3760183866240532
-62.14999999999998	0.4034550971217619
-61.14999999999998	0.43266202613289206
-60.14999999999998	0.4637439448651487

Table B148: Sublimation Points for Carbon Dioxide and 3% Nitrogen

Temperature (degC)	Pressure (MPa)
-173.14999999999998	2.643136985373375e-08
-172.14999999999998	3.673917833232184e-08
-171.14999999999998	5.071114266407186e-08
-170.14999999999998	6.952365555307272e-08
-169.14999999999998	9.469010615753437e-08
-168.14999999999998	1.281455805423331e-07
-167.14999999999998	1.723497811616051e-07
-166.14999999999998	2.3041138552427772e-07
-165.14999999999998	3.062374964578124e-07
-164.14999999999998	4.047123041558618e-07
-163.14999999999998	5.319095833247898e-07
-162.14999999999998	6.953441866790116e-07
-161.14999999999998	9.042682678040792e-07
-160.14999999999998	1.170018570613381e-06
-159.14999999999998	1.50642175744884e-06
-158.14999999999998	1.9302654110848943e-06
-157.14999999999998	2.4618430348577593e-06
-156.14999999999998	3.1255820868576228e-06
-155.14999999999998	3.95076481525214e-06
-154.14999999999998	4.97235240871953e-06
-153.14999999999998	6.231923734773759e-06
-152.14999999999998	7.77874070537888e-06
-151.14999999999998	9.670953079453495e-06
-150.14999999999998	1.1976956281352968e-05
-149.14999999999998	1.4776916578872685e-05
-148.14999999999998	1.8164478719470604e-05
-147.14999999999998	2.2248671865105886e-05
-146.14999999999998	2.715603039036494e-05
-145.14999999999998	3.3032946811668494e-05
-144.14999999999998	4.004827479389007e-05
-143.14999999999998	4.839620083162386e-05
-142.14999999999998	5.829940382295426e-05
-141.14999999999998	7.001252234172245e-05
-140.14999999999998	8.38259499682796e-05
-139.14999999999998	0.00010006997955741246
-138.14999999999998	0.00011911931780495696
-137.14999999999998	0.00014139799192160502
-136.14999999999998	0.0001673846706341701
-135.14999999999998	0.0001976184221123616
-134.14999999999998	0.00023270493176480726
-133.14999999999998	0.00027332320316408507
-132.14999999999998	0.00032023276565003154
-131.14999999999998	0.00037428141242721284

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00043641349322045544
-129.1499999999998	0.0005076787857865357
-128.1499999999998	0.0005892419708057723
-127.1499999999998	0.0006823927349004118
-126.1499999999998	0.0007885565267531601
-125.1499999999998	0.0009093059915363651
-124.1499999999998	0.00104637310911649
-123.1499999999998	0.0012016620617780033
-122.1499999999998	0.0013772628575225826
-121.1499999999998	0.0015754657353522336
-120.1499999999998	0.0017987763793469228
-119.1499999999998	0.002049931968806792
-118.1499999999998	0.002331918092255378
-117.1499999999998	0.0026479865537020254
-116.1499999999998	0.0030016741002487093
-115.1499999999998	0.003396822100907586
-114.1499999999998	0.0038375972073809825
-113.1499999999998	0.004328513028554731
-112.1499999999998	0.004874452851579183
-111.1499999999998	0.005480693443669939
-110.1499999999998	0.006152929970163301
-109.1499999999998	0.006897302065920489
-108.1499999999998	0.007720421098901191
-107.1499999999998	0.00862939866663446
-106.1499999999998	0.00963187636841162
-105.1499999999998	0.010736056898331946
-104.1499999999998	0.011950736506854647
-103.1499999999998	0.013285338881269357
-102.1499999999998	0.014749950498508446
-101.1499999999998	0.016355357507002836
-100.1499999999998	0.01811308419785296
-99.1499999999998	0.02003543312946461
-98.1499999999998	0.02213552697401729
-97.1499999999998	0.02442735215870818
-96.1499999999998	0.026925804379689295
-95.1499999999998	0.0296467360720188
-94.1499999999998	0.03260700592481948
-93.1499999999998	0.035824530537234396
-92.1499999999998	0.039318338317735346
-91.1499999999998	0.04310862573695317
-90.1499999999998	0.04721681605253159
-89.1499999999998	0.051665620633647456
-88.1499999999998	0.05647910302292452
-87.1499999999998	0.06168274588460852
-86.1499999999998	0.06730352100026475

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07336996248710496
-84.14999999999998	0.07991224342963492
-83.14999999999998	0.08696225613296676
-82.14999999999998	0.09455369622633376
-81.14999999999998	0.10272215086864867
-80.14999999999998	0.11150519133515398
-79.14999999999998	0.12094247029639105
-78.14999999999998	0.13107582413929939
-77.14999999999998	0.1419493807273288
-76.14999999999998	0.15360967305488654
-75.14999999999998	0.16610575932557878
-74.14999999999998	0.179489350079906
-73.14999999999998	0.19381494312630262
-72.14999999999998	0.20913996720541522
-71.14999999999998	0.22552493556732633
-70.14999999999998	0.24303361100986207
-69.14999999999998	0.26173318449377886
-68.14999999999998	0.28169447037153794
-67.14999999999998	0.3029921228545154
-66.14999999999998	0.32570488129583525
-65.14999999999998	0.34991585790214724
-64.14999999999998	0.3757128954967103
-63.14999999999998	0.4031890619557914
-62.14999999999998	0.43244349426610246

Table B149: Sublimation Points for Carbon Dioxide and 4% Nitrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.306710521932149e-08
-172.1499999999998	4.580976566299413e-08
-171.1499999999998	6.30253420811264e-08
-170.1499999999998	8.613065806720358e-08
-169.1499999999998	1.169425153170585e-07
-168.1499999999998	1.5777660525113129e-07
-167.1499999999998	2.1156730347136676e-07
-166.1499999999998	2.8201195505023675e-07
-165.1499999999998	3.7374372802972126e-07
-164.1499999999998	4.92537618161504e-07
-163.1499999999998	6.455547293498143e-07
-162.1499999999998	8.41630530536441e-07
-161.1499999999998	1.0916133995244553e-06
-160.1499999999998	1.4087604056629267e-06
-159.1499999999998	1.809197954168187e-06
-158.1499999999998	2.3124556124803446e-06
-157.1499999999998	2.942082160401975e-06
-156.1499999999998	3.726353647435199e-06
-155.1499999999998	4.699083999009131e-06
-154.1499999999998	5.900549484186096e-06
-153.1499999999998	7.3785391367589985e-06
-152.1499999999998	9.189544005051185e-06
-151.1499999999998	1.1400098888768962e-05
-150.1499999999998	1.4088290999467596e-05
-149.1499999999998	1.734545075016073e-05
-148.1499999999998	2.1278040635020944e-05
-147.1499999999998	2.6009758897859892e-05
-146.1499999999998	3.168387540426685e-05
-145.1499999999998	3.84658178233481e-05
-144.1499999999998	4.654602688775993e-05
-143.1499999999998	5.61431001323808e-05
-142.1499999999998	6.750724411024358e-05
-141.1499999999998	8.092405564744752e-05
-140.1499999999998	9.671865322550219e-05
-139.1499999999998	0.00011526018006925754
-138.1499999999998	0.00013696670097125769
-137.1499999999998	0.00016231051529960782
-136.1499999999998	0.00019182390901750993
-135.1499999999998	0.0002261053688904301
-134.1499999999998	0.00026582628237385974
-133.1499999999998	0.00031173814696407463
-132.1499999999998	0.0003646803130598639
-131.1499999999998	0.0004255882846292787

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004955026022070509
-129.1499999999998	0.0005755783329707201
-128.1499999999998	0.0006670951928629482
-127.1499999999998	0.0007714683259501358
-126.1499999999998	0.0008902597664404623
-125.1499999999998	0.0010251906090349516
-124.1499999999998	0.0011781539135608935
-123.1499999999998	0.0013512283701458913
-122.1499999999998	0.001546692751541376
-121.1499999999998	0.0017670411796050515
-120.1499999999998	0.0020149992334114633
-119.1499999999998	0.002293540926987632
-118.1499999999998	0.0026059065852759274
-117.1499999999998	0.0029556216476184314
-116.1499999999998	0.003346516428845793
-115.1499999999998	0.00378274686894892
-114.1499999999998	0.0042688163033236005
-113.1499999999998	0.004809598286717666
-112.1499999999998	0.005410360505286607
-111.1499999999998	0.006076789812589569
-110.1499999999998	0.006815018426942771
-109.1499999999998	0.007631651329305463
-108.1499999999998	0.008533794902814648
-107.1499999999998	0.00952908685722414
-106.1499999999998	0.010625727483853126
-105.1499999999998	0.011832512289224453
-104.1499999999998	0.013158866058390431
-103.1499999999998	0.014614878402017886
-102.1499999999998	0.016211340844658
-101.1499999999998	0.017959785515274464
-100.1499999999998	0.01987252550507609
-99.1499999999998	0.021962696962015662
-98.1499999999998	0.024244302996008726
-97.1499999999998	0.026732259474027305
-96.1499999999998	0.029442442789767632
-95.1499999999998	0.032391739698629136
-94.1499999999998	0.03559809931531737
-93.1499999999998	0.039080587378559094
-92.1499999999998	0.04285944289527037
-91.1499999999998	0.046956137285119395
-90.1499999999998	0.05139343615589335
-89.1499999999998	0.05619546385052221
-88.1499999999998	0.06138777091819983
-87.1499999999998	0.06699740467494547
-86.1499999999998	0.0730529830334267

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07958477179819914
-84.14999999999998	0.08662476564110833
-83.14999999999998	0.09420677299295206
-82.14999999999998	0.1023665051122735
-81.14999999999998	0.11114166962125094
-80.14999999999998	0.12057206883328934
-79.14999999999998	0.13069970323878158
-78.14999999999998	0.14156888056702097
-77.14999999999998	0.15322633090684765
-76.14999999999998	0.1657213284514796
-75.14999999999998	0.17910582054191684
-74.14999999999998	0.1934345648306281
-73.14999999999998	0.20876527559280772
-72.14999999999998	0.22515878050990937
-71.14999999999998	0.24267918969849459
-70.14999999999998	0.2613940794662824
-69.14999999999998	0.2813746944630286
-68.14999999999998	0.3026961740169295
-67.14999999999998	0.3254378125850413
-66.14999999999998	0.34968337324981136
-65.14999999999998	0.3755214960009791
-64.14999999999998	0.40304631536270774
-63.14999999999998	0.43235876201248763

Table B150: Sublimation Points for Carbon Dioxide and 5% Nitrogen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	4.132288432619479e-08
-172.1499999999998	5.7057393998184225e-08
-171.1499999999998	7.824551066139304e-08
-170.1499999999998	1.0659145614013938e-07
-169.1499999999998	1.442735357160711e-07
-168.1499999999998	1.940594731304168e-07
-167.1499999999998	2.594456412776337e-07
-166.1499999999998	3.4482422286490307e-07
-165.1499999999998	4.556828435069676e-07
-164.1499999999998	5.988417647016696e-07
-163.1499999999998	7.827343050068495e-07
-162.1499999999998	1.017736773175279e-06
-161.1499999999998	1.3165548452049922e-06
-160.1499999999998	1.694673995979333e-06
-159.1499999999998	2.1708823027232228e-06
-158.1499999999998	2.7678746687971954e-06
-157.1499999999998	3.5129482689228352e-06
-156.1499999999998	4.438799786982315e-06
-155.1499999999998	5.584435800975061e-06
-154.1499999999998	6.9962084622364395e-06
-153.1499999999998	8.72898941314272e-06
-152.1499999999998	1.084749568466669e-05
-151.1499999999998	1.3427782107688853e-05
-150.1499999999998	1.655891555534207e-05
-149.1499999999998	2.0344847103395307e-05
-148.1499999999998	2.490649894748986e-05
-147.1499999999998	3.038408364588393e-05
-146.1499999999998	3.693967396052432e-05
-145.1499999999998	4.476004224440265e-05
-144.1499999999998	5.405978896637312e-05
-143.1499999999998	6.508478057347814e-05
-142.1499999999998	7.81159174634959e-05
-141.1499999999998	9.347325337556148e-05
-140.1499999999998	0.00011152048800364622
-139.1499999999998	0.0001326698550963252
-138.1499999999998	0.00015738742872725461
-137.1499999999998	0.00018619887080528955
-136.1499999999998	0.00021969564324321404
-135.1499999999998	0.00025854170852209797
-134.1499999999998	0.0003034807426776897
-133.1499999999998	0.00035534388499967797
-132.1499999999998	0.00041505804897882777
-131.1499999999998	0.0004836548192657237

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0005622799596239508
-129.1499999999998	0.0006522035570760371
-128.1499999999998	0.0007548308276590775
-127.1499999999998	0.0008717136094357392
-126.1499999999998	0.0010045625686527014
-125.1499999999998	0.0011552601452106705
-124.1499999999998	0.0013258742639159573
-123.1499999999998	0.001518672838331579
-122.1499999999998	0.0017361390944455736
-121.1499999999998	0.001980987741833658
-120.1499999999998	0.002256182020522749
-119.1499999999998	0.0025649516523706764
-118.1499999999998	0.0029108117264745248
-117.1499999999998	0.0032975825489169946
-116.1499999999998	0.0037294104880654737
-115.1499999999998	0.004210789847663945
-114.1499999999998	0.00474658580111309
-113.1499999999998	0.005342058421630876
-112.1499999999998	0.006002887844434676
-111.1499999999998	0.0067352005986995155
-110.1499999999998	0.0075455971488362856
-109.1499999999998	0.00844118068661282
-108.1499999999998	0.009429587217820792
-107.1499999999998	0.01051901698958977
-106.1499999999998	0.01171826730707826
-105.1499999999998	0.01303676679114937
-104.1499999999998	0.014484611131781185
-103.1499999999998	0.016072600395390872
-102.1499999999998	0.017812277947986448
-101.1499999999998	0.01971597106012553
-100.1499999999998	0.02179683326408416
-99.1499999999998	0.02406888853845052
-98.1499999999998	0.026547077400591132
-97.1499999999998	0.029247304993135784
-96.1499999999998	0.03218649125683255
-95.1499999999998	0.03538262328889484
-94.1499999999998	0.03885480999335903
-93.1499999999998	0.042623339138073944
-92.1499999999998	0.0467097369418397
-91.1499999999998	0.05113683032501595
-90.1499999999998	0.055928811967764516
-89.1499999999998	0.061111308332146334
-88.1499999999998	0.06671145081775715
-87.1499999999998	0.07275795023574448
-86.1499999999998	0.07928117480320537

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08631323187958846
-84.14999999999998	0.09388805368935142
-83.14999999999998	0.10204148730154582
-82.14999999999998	0.11081138916820618
-81.14999999999998	0.12023772456085954
-80.14999999999998	0.13036267229008278
-79.14999999999998	0.14123073514967685
-78.14999999999998	0.15288885659884824
-77.14999999999998	0.16538654428899854
-76.14999999999998	0.17877600116598016
-75.14999999999998	0.19311226504931864
-74.14999999999998	0.20845335783235175
-73.14999999999998	0.22486044580521447
-72.14999999999998	0.24239801315530693
-71.14999999999998	0.2611340515987705
-70.14999999999998	0.2811402706522115
-69.14999999999998	0.302492335959721
-68.14999999999998	0.3252701490705002
-67.14999999999998	0.3495581960740083
-66.14999999999998	0.37544603208892857
-65.14999999999998	0.40302912132536534

Table B151: Sublimation Points for Carbon Dioxide and 1% Oxygen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.5085276656384222e-08
-172.1499999999998	2.1139587893129523e-08
-171.1499999999998	2.9412297153110236e-08
-170.1499999999998	4.0639071428053464e-08
-169.1499999999998	5.577385194796694e-08
-168.1499999999998	7.604589109876272e-08
-167.1499999999998	1.0302961686797834e-07
-166.1499999999998	1.3872971781923246e-07
-165.1499999999998	1.8568418724678535e-07
-164.1499999999998	2.4708844329515947e-07
-163.1499999999998	3.2694405299028413e-07
-162.1499999999998	4.3023603254129754e-07
-161.1499999999998	5.631431738142651e-07
-160.1499999999998	7.332863570641976e-07
-159.1499999999998	9.50020351977367e-07
-158.1499999999998	1.224775181576638e-06
-157.1499999999998	1.5714537249508563e-06
-156.1499999999998	2.0068928630849403e-06
-155.1499999999998	2.551396124930189e-06
-154.1499999999998	3.2293464655685696e-06
-153.1499999999998	4.069908501887434e-06
-152.1499999999998	5.107830240315909e-06
-151.1499999999998	6.384355052373401e-06
-150.1499999999998	7.948255383354594e-06
-149.1499999999998	9.85700041359146e-06
-148.1499999999998	1.2178070626490258e-05
-147.1499999999998	1.4990432968997996e-05
-146.1499999999998	1.838619101441497e-05
-145.1499999999998	2.2472425250729776e-05
-144.1499999999998	2.7373239316239623e-05
-143.1499999999998	3.32320286846991e-05
-142.1499999999998	4.021398896140863e-05
-141.1499999999998	4.8508881586625746e-05
-140.1499999999998	5.833407535097702e-05
-139.1499999999998	6.993788270699892e-05
-138.1499999999998	8.360321040992933e-05
-137.1499999999998	9.965154453817957e-05
-136.1499999999998	0.00011844729042887676
-135.1499999999998	0.00014040248851632456
-134.1499999999998	0.00016598192748155024
-133.1499999999998	0.00019570867651026163
-132.1499999999998	0.00023017005881605514
-131.1499999999998	0.0002700240889175407

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.0003160063964650192
-129.14999999999998	0.000368937659697348
-128.14999999999998	0.0004297315718766168
-127.14999999999998	0.0004994033643011787
-126.14999999999998	0.0005790789097413959
-125.14999999999998	0.0006700044303819084
-124.14999999999998	0.000773556834595457
-123.14999999999998	0.000891254707121527
-122.14999999999998	0.0010247699774855463
-121.14999999999998	0.0011759402917768374
-120.14999999999998	0.0013467821132137768
-119.14999999999998	0.00153950457726948
-118.14999999999998	0.0017565241275184621
-117.14999999999998	0.002000479958801972
-116.14999999999998	0.0022742502948050313
-115.14999999999998	0.0025809695276995184
-114.14999999999998	0.0029240462481439885
-113.14999999999998	0.0033071821946499846
-112.14999999999998	0.0037343921521352415
-111.14999999999998	0.004210024830396517
-110.14999999999998	0.0047387847542551265
-109.14999999999998	0.0053257551982692445
-108.14999999999998	0.0059764222001746645
-107.14999999999998	0.006696699688622409
-106.14999999999998	0.007492955762335742
-105.14999999999998	0.008372040159521145
-104.14999999999998	0.009341312958248589
-103.14999999999998	0.010408674550577878
-102.14999999999998	0.011582596935458671
-101.14999999999998	0.012872156377889132
-100.14999999999998	0.0142870674844891
-99.14999999999998	0.01583771874854776
-98.14999999999998	0.017535209620753615
-97.14999999999998	0.01939138916522555
-96.14999999999998	0.021418896364152628
-95.14999999999998	0.023631202138340038
-94.14999999999998	0.02604265315526423
-93.14999999999998	0.02866851750089793
-92.14999999999998	0.03152503229658355
-91.14999999999998	0.034629453347659614
-90.14999999999998	0.03800010691640334
-89.14999999999998	0.04165644371818009
-88.14999999999998	0.045619095246540065
-87.14999999999998	0.049909932540415564
-86.14999999999998	0.05455212751460858

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.05957021698349542
-84.14999999999998	0.06499016951737607
-83.14999999999998	0.07083945528125814
-82.14999999999998	0.0771471190172175
-81.14999999999998	0.0839438563439014
-80.14999999999998	0.09126209356044615
-79.14999999999998	0.09913607115718649
-78.14999999999998	0.10760193125230384
-77.14999999999998	0.11669780919219959
-76.14999999999998	0.12646392957419272
-75.14999999999998	0.1369427069734347
-74.14999999999998	0.14817885168205516
-73.14999999999998	0.16021948079777554
-72.14999999999998	0.1731142350317582
-71.14999999999998	0.18691540164105838
-70.14999999999998	0.20167804392862929
-69.14999999999998	0.2174601377902604
-68.14999999999998	0.23432271581530592
-67.14999999999998	0.2523300194480959
-66.14999999999998	0.27154965964557165
-65.14999999999998	0.29205278621613506
-64.14999999999998	0.3139142653166387
-63.14999999999998	0.3372128626411288
-62.14999999999998	0.36203142423453116
-61.14999999999998	0.3884570287983096
-60.14999999999998	0.4165810143762862
-59.14999999999998	0.4464983799597446

Table B152: Sublimation Points for Carbon Dioxide and 2% Oxygen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.6992280409472046e-08
-172.1499999999998	2.3764999346496378e-08
-171.1499999999998	3.300137879309911e-08
-170.1499999999998	4.551213116967889e-08
-169.1499999999998	6.234651443878151e-08
-168.1499999999998	8.485409811517718e-08
-167.1499999999998	1.1476027707851697e-07
-166.1499999999998	1.542580663587101e-07
-165.1499999999998	2.0611907004066675e-07
-164.1499999999998	2.7382691030242414e-07
-163.1499999999998	3.617368287730003e-07
-162.1499999999998	4.7526563195307737e-07
-161.1499999999998	6.211166451054249e-07
-160.1499999999998	8.075448641422473e-07
-159.1499999999998	1.0446680515809087e-06
-158.1499999999998	1.344830109188896e-06
-157.1499999999998	1.723023674693524e-06
-156.1499999999998	2.197379530722471e-06
-155.1499999999998	2.789731078445542e-06
-154.1499999999998	3.5262628133595012e-06
-153.1499999999998	4.438252443155767e-06
-152.1499999999998	5.562917004237726e-06
-151.1499999999998	6.9443740606041e-06
-150.1499999999998	8.634729802715092e-06
-149.1499999999998	1.0695306600728464e-05
-148.1499999999998	1.3198023302194792e-05
-147.1499999999998	1.622694229500589e-05
-146.1499999999998	1.987999807821695e-05
-145.1499999999998	2.4270922792569595e-05
-144.1499999999998	2.9531384855543276e-05
-143.1499999999998	3.581335751922961e-05
-142.1499999999998	4.329173482019213e-05
-141.1499999999998	5.216721301604203e-05
-140.1499999999998	6.266945620139253e-05
-139.1499999999998	7.506056536424801e-05
-138.1499999999998	8.963887068130816e-05
-137.1499999999998	0.0001067430673561505
-136.1499999999998	0.00012675671577742724
-135.1499999999998	0.00015011312721509575
-134.1499999999998	0.00017730065668204612
-133.1499999999998	0.0002088684249674871
-132.1499999999998	0.0002454324921988196
-131.1499999999998	0.00028768250561294636

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003363888445187611
-129.1499999999998	0.00039241028571345153
-128.1499999999998	0.0004567022128801844
-127.1499999999998	0.0005303253937480211
-126.1499999999998	0.0006144553490416279
-125.1499999999998	0.000710392337493617
-124.1499999999998	0.000819571981442144
-123.1499999999998	0.000943576557796671
-122.1499999999998	0.0010841469794320546
-121.1499999999998	0.001243195492372419
-120.1499999999998	0.0014228191144580974
-119.1499999999998	0.001625313841559451
-118.1499999999998	0.0018531896478174172
-117.1499999999998	0.002109186306860075
-116.1499999999998	0.0023962900614765592
-115.1499999999998	0.002717751169829431
-114.1499999999998	0.0030771023569666125
-113.1499999999998	0.0034781782011583445
-112.1499999999998	0.00392513548544501
-111.1499999999998	0.004422474545745069
-110.1499999999998	0.004975061647947907
-109.1499999999998	0.005588152427613428
-108.1499999999998	0.006267416427227207
-107.1499999999998	0.007018962767426343
-106.1499999999998	0.007849366990226312
-105.1499999999998	0.008765699114053309
-104.1499999999998	0.009775552942327825
-103.1499999999998	0.01088707666946672
-102.1499999999998	0.012109004830479981
-101.1499999999998	0.013450691642848931
-100.1499999999998	0.014922145792094308
-99.1499999999998	0.016534066715387874
-98.1499999999998	0.01829788244074295
-97.1499999999998	0.0202257890427511
-96.1499999999998	0.022330791779530082
-95.1499999999998	0.0246267479795186
-94.1499999999998	0.027128411751029938
-93.1499999999998	0.0298514805920547
-92.1499999999998	0.0328126439827174
-91.1499999999998	0.03602963404805502
-90.1499999999998	0.03952127838441408
-89.1499999999998	0.04330755514878516
-88.1499999999998	0.04740965051682141
-87.1499999999998	0.05185001862214305
-86.1499999999998	0.056652444096833406

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06184210734078713
-84.14999999999998	0.0674456526557829
-83.14999999999998	0.07349125938882389
-82.14999999999998	0.08000871623835301
-81.14999999999998	0.08702949888636552
-80.14999999999998	0.09458685112905639
-79.14999999999998	0.10271586968821474
-78.14999999999998	0.11145359289472898
-77.14999999999998	0.12083909344361965
-76.14999999999998	0.1309135754259035
-75.14999999999998	0.141720475844416
-74.14999999999998	0.15330557081550614
-73.14999999999998	0.16571708664083287
-72.14999999999998	0.1790058158941861
-71.14999999999998	0.19322523859056587
-70.14999999999998	0.20843164835775038
-69.14999999999998	0.22468428325455342
-68.14999999999998	0.24204546035424956
-67.14999999999998	0.26058071217867146
-66.14999999999998	0.2803589209395911
-65.14999999999998	0.3014524418550861
-64.14999999999998	0.3239371955027069
-63.14999999999998	0.3478926782671847
-62.14999999999998	0.3734017385210429
-61.14999999999998	0.40054951842378345
-60.14999999999998	0.429417188682159

Table B153: Sublimation Points for Carbon Dioxide and 3% Oxygen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.9163400576994102e-08
-172.1499999999998	2.6748424117856222e-08
-171.1499999999998	3.707242480413353e-08
-170.1499999999998	5.1029707942385256e-08
-169.1499999999998	6.977551612168191e-08
-168.1499999999998	9.479297057016972e-08
-167.1499999999998	1.2797475661937243e-07
-166.1499999999998	1.717222361507556e-07
-165.1499999999998	2.2906504485628204e-07
-164.1499999999998	3.038046403760364e-07
-163.1499999999998	4.006857091567593e-07
-162.1499999999998	5.255998151324234e-07
-161.1499999999998	6.858261816216028e-07
-160.1499999999998	8.903150383450841e-07
-159.1499999999998	1.150019536981971e-06
-158.1499999999998	1.478282839607128e-06
-157.1499999999998	1.8912876127113878e-06
-156.1499999999998	2.408575812956499e-06
-155.1499999999998	3.0536473266771285e-06
-154.1499999999998	3.854646720412059e-06
-153.1499999999998	4.845148071152398e-06
-152.1499999999998	6.065048569020985e-06
-151.1499999999998	7.56158231804068e-06
-150.1499999999998	9.390466498668628e-06
-149.1499999999998	1.1617192794937034e-05
-148.1499999999998	1.4318477725395086e-05
-147.1499999999998	1.7583886246668626e-05
-146.1499999999998	2.1517643717497997e-05
-145.1499999999998	2.6240652015913275e-05
-144.1499999999998	3.189272628925901e-05
-143.1499999999998	3.863506948288732e-05
-142.1499999999998	4.665300243558915e-05
-141.1499999999998	5.615896794569273e-05
-140.1499999999998	6.739582779908374e-05
-139.1499999999998	8.064047230753777e-05
-138.1499999999998	9.620776243144663e-05
-137.1499999999998	0.00011445482505463927
-136.1499999999998	0.0001357857224403106
-135.1499999999998	0.00016065651732649172
-134.1499999999998	0.00018958075551801283
-133.1499999999998	0.0002231353882008517
-132.1499999999998	0.0002619671565464649
-131.1499999999998	0.00030679946149045123

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003584397418651046
-129.1499999999998	0.00041778738434262666
-128.1499999999998	0.00048584218890915405
-127.1499999999998	0.0005637134138440074
-126.1499999999998	0.0006526294244287894
-125.1499999999998	0.0007539479698626029
-124.1499999999998	0.0008691671131186677
-123.1499999999998	0.000999936838750424
-122.1499999999998	0.0011480713639478702
-121.1499999999998	0.0013155621784651907
-120.1499999999998	0.0015045918393946577
-119.1499999999998	0.001717548547157857
-118.1499999999998	0.001957041529530094
-117.1499999999998	0.002225917261015688
-116.1499999999998	0.0025272765454585097
-115.1499999999998	0.002864492490411173
-114.1499999999998	0.003241229402506441
-113.1499999999998	0.0036614626338835254
-112.1499999999998	0.004129499410627646
-111.1499999999998	0.004650000675193536
-110.1499999999998	0.005228003975908425
-109.1499999999998	0.005868947437898122
-108.1499999999998	0.006578694851158376
-107.1499999999998	0.007363561913010535
-106.1499999999998	0.008230343663847272
-105.1499999999998	0.0091863431568947
-104.1499999999998	0.010239401404704815
-103.1499999999998	0.011397928647253202
-102.1499999999998	0.012670936988859885
-101.1499999999998	0.014068074453687258
-100.1499999999998	0.01559966051230357
-99.1499999999998	0.01727672313474609
-98.1499999999998	0.019111037428681206
-97.1499999999998	0.02111516592464678
-96.1499999999998	0.023302500573987417
-95.1499999999998	0.025687306528957787
-94.1499999999998	0.028284767778581996
-93.1499999999998	0.03111103471822274
-92.1499999999998	0.034183273735432555
-91.1499999999998	0.03751971889952722
-90.1499999999998	0.04113972584743729
-89.1499999999998	0.0450638279637305
-88.1499999999998	0.04931379495823657
-87.1499999999998	0.05391269395039676
-86.1499999999998	0.05888495317522971

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06425642843155278
-84.14999999999998	0.070054472398647
-83.14999999999998	0.07630800695267824
-82.14999999999998	0.08304759861850548
-81.14999999999998	0.09030553729547339
-80.14999999999998	0.09811591839659217
-79.14999999999998	0.10651472853783084
-78.14999999999998	0.1155399349061856
-77.14999999999998	0.12523157841858615
-76.14999999999998	0.1356318707536129
-75.14999999999998	0.14678529528633202
-74.14999999999998	0.1587387118696087
-73.14999999999998	0.17154146525953576
-72.14999999999998	0.18524549673606144
-71.14999999999998	0.19990545804447374
-70.14999999999998	0.21557882602771763
-69.14999999999998	0.23232601492330035
-68.14999999999998	0.25021048058408346
-67.14999999999998	0.26929880524714306
-66.14999999999998	0.28966073873542186
-65.14999999999998	0.3113691397032647
-64.14999999999998	0.33449966463198394
-63.14999999999998	0.35912968859248356
-62.14999999999998	0.38533377791930146

Table B154: Sublimation Points for Carbon Dioxide and 4% Oxygen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.163801631200967e-08
-172.1499999999998	3.01424907397511e-08
-171.1499999999998	4.1695301048921695e-08
-170.1499999999998	5.728395031966729e-08
-169.1499999999998	7.818163267976225e-08
-168.1499999999998	1.0601984219492425e-07
-167.1499999999998	1.4287680503041224e-07
-166.1499999999998	1.9138457768402714e-07
-165.1499999999998	2.5485804470635093e-07
-164.1499999999998	3.3744947356838345e-07
-163.1499999999998	4.4433274233696035e-07
-162.1499999999998	5.819218473413007e-07
-161.1499999999998	7.581288224489128e-07
-160.1499999999998	9.826667579167954e-07
-159.1499999999998	1.2674041936538635e-06
-158.1499999999998	1.6267777773437586e-06
-157.1499999999998	2.0782707200782868e-06
-156.1499999999998	2.642965248426091e-06
-155.1499999999998	3.346177939362019e-06
-154.1499999999998	4.218187530062877e-06
-153.1499999999998	5.2950655148246945e-06
-152.1499999999998	6.619620572650581e-06
-151.1499999999998	8.242468607601548e-06
-150.1499999999998	1.022324092588571e-05
-149.1499999999998	1.26319438149195e-05
-148.1499999999998	1.555048352625725e-05
-147.1499999999998	1.907437139244963e-05
-146.1499999999998	2.3314624523767774e-05
-145.1499999999998	2.8399878230709076e-05
-144.1499999999998	3.4478726998910634e-05
-143.1499999999998	4.172231150145642e-05
-142.1499999999998	5.0327169766827184e-05
-141.1499999999998	6.051837122655873e-05
-140.1499999999998	7.255295294311108e-05
-139.1499999999998	8.672367786407751e-05
-138.1499999999998	0.00010336313546264889
-137.1499999999998	0.00012284820560587258
-136.1499999999998	0.00014560490694165245
-135.1499999999998	0.00017211365151344462
-134.1499999999998	0.00020291492769928745
-133.1499999999998	0.00023861543393103064
-132.1499999999998	0.00027989468598269
-131.1499999999998	0.0003275121209266044

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003823147211459754
-129.1499999999998	0.0004452451820662692
-128.1499999999998	0.0005173506475303014
-127.1499999999998	0.000599792036997451
-126.1499999999998	0.0006938539890015993
-125.1499999999998	0.0008009554455608829
-124.1499999999998	0.0009226609025009709
-123.1499999999998	0.0010606923509389973
-122.1499999999998	0.0012169419354839679
-121.1499999999998	0.0013934853550482205
-120.1499999999998	0.0015925960325410325
-119.1499999999998	0.0018167600801359926
-118.1499999999998	0.0020686920872773347
-117.1499999999998	0.002351351759122692
-116.1499999999998	0.0026679614337204688
-115.1499999999998	0.0030220245068951572
-114.1499999999998	0.0034173447945723967
-113.1499999999998	0.0038580468631248363
-112.1499999999998	0.0043485973592674474
-111.1499999999998	0.004893827372085315
-110.1499999999998	0.005498955860944627
-109.1499999999998	0.006169614184327983
-108.1499999999998	0.006911871766053791
-107.1499999999998	0.007732262936895505
-106.1499999999998	0.00863781499131606
-105.1499999999998	0.009636077500883383
-104.1499999999998	0.010735152927941504
-103.1499999999998	0.011943728585283794
-102.1499999999998	0.013271109989917528
-101.1499999999998	0.014727255661527782
-100.1499999999998	0.016322813418944843
-99.1499999999998	0.018069158230802386
-98.1499999999998	0.019978431679639076
-97.1499999999998	0.022063583101948423
-96.1499999999998	0.024338412470115253
-95.1499999999998	0.026817615085787505
-94.1499999999998	0.029516828158005465
-93.1499999999998	0.032452679343330695
-92.1499999999998	0.035642837329252545
-91.1499999999998	0.039106064546264106
-90.1499999999998	0.042862272098127936
-89.1499999999998	0.04693257700391097
-88.1499999999998	0.0513393618492367
-87.1499999999998	0.056106336947706656
-86.1499999999998	0.061258605116336656

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.0668227291707766
-84.14999999999998	0.07282680224654439
-83.14999999999998	0.07930052105072363
-82.14999999999998	0.08627526214351929
-81.14999999999998	0.09378416133903349
-80.14999999999998	0.1018621962972357
-79.14999999999998	0.11054627235050847
-78.14999999999998	0.11987531156247913
-77.14999999999998	0.12989034494457594
-76.14999999999998	0.14063460764133293
-75.14999999999998	0.15215363671256146
-74.14999999999998	0.16449537084327354
-73.14999999999998	0.17771025081756617
-72.14999999999998	0.19185131874353034
-71.14999999999998	0.2069743125002514
-70.14999999999998	0.22313774903501948
-69.14999999999998	0.24040298446799938
-68.14999999999998	0.2588342267242613
-67.14999999999998	0.27849844714633243
-66.14999999999998	0.2994650570076005
-65.14999999999998	0.32180494273761584
-64.14999999999998	0.3455871561776098
-63.14999999999998	0.37085612060543643

Table B155: Sublimation Points for Carbon Dioxide and 5% Oxygen

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.4461761000448286e-08
-172.1499999999998	3.400807698106129e-08
-171.1499999999998	4.695068327216637e-08
-170.1499999999998	6.438108308181435e-08
-169.1499999999998	8.77038575283524e-08
-168.1499999999998	1.1871548524128632e-07
-167.1499999999998	1.5970015473259298e-07
-166.1499999999998	2.1354558322113129e-07
-165.1499999999998	2.8388226256760395e-07
-164.1499999999998	3.7524999390137985e-07
-163.1499999999998	4.932960473635814e-07
-162.1499999999998	6.450097917513821e-07
-161.1499999999998	8.389991799368059e-07
-160.1499999999998	1.0858150485660338e-06
-159.1499999999998	1.398329793144076e-06
-158.1499999999998	1.7921776102086344e-06
-157.1499999999998	2.2862641545576236e-06
-156.1499999999998	2.9033541387290695e-06
-155.1499999999998	3.6707461011277805e-06
-154.1499999999998	4.621044285057965e-06
-153.1499999999998	5.793038299912427e-06
-152.1499999999998	7.232701974155492e-06
-151.1499999999998	8.994323553638633e-06
-150.1499999999998	1.114178014423661e-05
-149.1499999999998	1.3749970040791348e-05
-148.1499999999998	1.6906417320934964e-05
-147.1499999999998	2.0713063808645165e-05
-146.1499999999998	2.5288264224651425e-05
-145.1499999999998	3.0769001035524195e-05
-144.1499999999998	3.731333618719008e-05
-143.1499999999998	4.510311755880059e-05
-142.1499999999998	5.434695859673834e-05
-141.1499999999998	6.528351018394182e-05
-140.1499999999998	7.818504436495165e-05
-139.1499999999998	9.336137008088074e-05
-138.1499999999998	0.00011116410157022198
-137.1499999999998	0.00013199130056079427
-136.1499999999998	0.00015629251381560865
-135.1499999999998	0.0001845742280019185
-134.1499999999998	0.00021740576422970005
-133.1499999999998	0.0002554256349552908
-132.1499999999998	0.00029934838627062406
-131.1499999999998	0.0003499719489013568

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004081855215220683
-129.1499999999998	0.00047497801026760434
-128.1499999999998	0.0005514470485811496
-127.1499999999998	0.0006388086217969422
-126.1499999999998	0.0007384073211138956
-125.1499999999998	0.0008517272518818126
-124.1499999999998	0.0009804036214002842
-123.1499999999998	0.0011262350317284156
-122.1499999999998	0.0012911965033277103
-121.1499999999998	0.0014774532557178127
-120.1499999999998	0.0016873752717222028
-119.1499999999998	0.0019235526723261054
-118.1499999999998	0.0021888119296682674
-117.1499999999998	0.0024862329462501482
-116.1499999999998	0.00281916702907725
-115.1499999999998	0.003191255788155474
-114.1499999999998	0.0036064509895576604
-113.1499999999998	0.004069035394159418
-112.1499999999998	0.0045836446141255555
-111.1499999999998	0.00515529002031702
-110.1499999999998	0.005789382734987962
-109.1499999999998	0.006491758745462335
-108.1499999999998	0.007268705175923709
-107.1499999999998	0.008126987756026403
-106.1499999999998	0.009073879526748133
-105.1499999999998	0.01011719082575488
-104.1499999999998	0.011265300596544901
-103.1499999999998	0.01252718906778235
-102.1499999999998	0.013912471851521236
-101.1499999999998	0.015431435511460746
-100.1499999999998	0.017095074654958
-99.1499999999998	0.018915130605248534
-98.1499999999998	0.02090413171318195
-97.1499999999998	0.0230754353707528
-96.1499999999998	0.025443271791772432
-95.1499999999998	0.028022789628164856
-94.1499999999998	0.03083010349352269
-93.1499999999998	0.033882343468682054
-92.1499999999998	0.03719770666708246
-91.1499999999998	0.04079551094044947
-90.1499999999998	0.044696250807738015
-89.1499999999998	0.04892165569206812
-88.1499999999998	0.05349475055128706
-87.1499999999998	0.05843991898737817
-86.1499999999998	0.06378296891761163

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06955120088524963
-84.14999999999998	0.07577347907854098
-83.14999999999998	0.0824803051118673
-82.14999999999998	0.0897038945995487
-81.14999999999998	0.09747825651690081
-80.14999999999998	0.1058392752883812
-79.14999999999998	0.11482479545916019
-78.14999999999998	0.12447470867818258
-77.14999999999998	0.1348310425211681
-76.14999999999998	0.1459380503654934
-75.14999999999998	0.15784230101465946
-74.14999999999998	0.17059276590859473
-73.14999999999998	0.18424090025719758
-72.14999999999998	0.1988407117024563
-71.14999999999998	0.21444880483884265
-70.14999999999998	0.23112437896927013
-69.14999999999998	0.2489291315163961
-68.14999999999998	0.2679269551049535
-67.14999999999998	0.2881831181274754
-66.14999999999998	0.30976181421620724
-65.14999999999998	0.3327152639977065

Table B156: Density with Increasing Levels of Argon at 10MPa

Mole Percentage	Property
Temperature	0.0
1	967.5327632392623
2	960.8304618652362
3	953.9324178604602
4	946.8261323940396
5	939.4977475559863
Temperature	10.0
1	912.5497286888879
2	904.3578504917061
3	895.8562876539163
4	887.0176214399122
5	877.8101944036912
Temperature	20.0
1	846.046888094195
2	835.2504277622274
3	823.8548855970498
4	811.7829973361736
5	798.9431099268446
Temperature	30.0
1	756.1256769926248
2	739.4104882629484
3	721.0660675187798
4	700.7123232746468
5	677.8586557542358
Temperature	40.0
1	595.383493148698
2	557.4895815350186
3	516.4460437143188
4	476.35847501710407
5	440.85250569629414
Temperature	50.0
1	363.99270306792965
2	347.3543043878629
3	333.4623891511431
4	321.6489074857104
5	311.4411929396197

Table B157: Density with Increasing Levels of Argon at 15MPa

Mole Percentage	Property
Temperature	0.0
1	994.0714053391009
2	988.4960709101598
3	982.8042654130998
4	976.9915819188288
5	971.0533593391698
Temperature	10.0
1	947.9555983105477
2	941.5862687655608
3	935.0670593419493
4	928.3914575950579
5	921.5524640877736
Temperature	20.0
1	896.7328607207423
2	889.3167917932644
3	881.6982474027348
4	873.8665430634006
5	865.8103306336952
Temperature	30.0
1	838.3732676735397
2	829.4957939827148
3	820.3358250010856
4	810.8800433049191
5	801.1150759720573
Temperature	40.0
1	769.6863432219877
2	758.7779008102323
3	747.4942919953875
4	735.8243949798261
5	723.7611443098909
Temperature	50.0
1	686.710430038159
2	673.2946659272782
3	659.5370028385017
4	645.4780443759174
5	631.1686264801542

Table B158: Density with Increasing Levels of Argon at 3MPa

Mole Percentage	Property
Temperature	0.0
1	76.7123433355144
2	76.11707078199449
3	75.54714822979567
4	75.00050786106385
5	74.47533171687842
Temperature	10.0
1	70.57724656834954
2	70.15738749391554
3	69.75077679621641
4	69.35662171729396
5	68.97419945485268
Temperature	20.0
1	65.82721007974357
2	65.50716249085121
3	65.19518915070464
4	64.89090552938609
5	64.59395396343538
Temperature	30.0
1	61.94921157699882
2	61.69334290333039
3	61.442864207928075
4	61.19756046577453
5	60.957229009857166
Temperature	40.0
1	58.67629897758003
2	58.46490896736652
3	58.25733886677471
4	58.05345653569096
5	57.85313636876329
Temperature	50.0
1	55.84983078420748
2	55.67087707239796
3	55.49474900924454
4	55.3213599791138
5	55.15062712783631

Table B159: Density with Increasing Levels of Argon at 0.1MPa

Mole Percentage	Property
Temperature	-50.0
1	698.6800317305768
2	364.74948072481783
3	246.6470478078652
4	186.23216828382897
5	1142.0374010877204
Temperature	-55.0
Temperature	-55.0
1	952.3224510995084
2	510.45802678412036
3	348.46672812779633
4	264.40629847710784
5	212.94186196499675

Table B160: Density with Increasing Levels of Argon at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	1158.2930311554749
2	1154.3340648062428
3	1150.3067055002298
4	1146.2086400773217
5	1142.0374010877204
Temperature	-55.0

Table B161: Density with Increasing Levels of Argon at 0.7MPa

Mole Percentage	Property
Temperature	-50.0
1	1164.9983570814302
2	1161.223390122346
3	1157.3880654920652
4	1153.4905915993786
5	1149.5290684564309

Table B162: Joule-Thomson Coefficient with Increasing Levels of Argon at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.20784100155801297
2	0.22914531200793004
3	0.25197119040219457
4	0.27646756104783526
5	0.30280342820423944
Temperature	10.0
1	0.39540024715611166
2	0.4302983203594524
3	0.46822467047281924
4	0.5095638102333715
5	0.5547653546141978
Temperature	20.0
1	0.70848370341522
2	0.7730651034211795
3	0.8449281163740939
4	0.9252260934940185
5	1.0153680612723701
Temperature	30.0
1	1.3292596894678255
2	1.4768480614949093
3	1.6497881461324024
4	1.854663353173513
5	2.0992654673920668
Temperature	40.0
1	3.070222683896416
2	3.549046951304419
3	4.061331588435596
4	4.541502623501239
5	4.953281083552475
Temperature	50.0
1	5.80017259029921
2	5.933781311958798
3	6.027866795434456
4	6.091911745239404
5	6.1328446705774375

Table B163: Joule-Thomson Coefficient with Increasing Levels of Argon at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.10287805928304833
2	0.1163304957668975
3	0.13051661258025637
4	0.14548337034454323
5	0.1612814208878546
Temperature	10.0
1	0.22032252352905599
2	0.2396437303362418
3	0.26009162704512234
4	0.2817494819043119
5	0.30470910802352946
Temperature	20.0
1	0.38406168616064096
2	0.4126459453484351
3	0.4430887227986983
4	0.47553834088289376
5	0.510150839185206
Temperature	30.0
1	0.6234415864686974
2	0.6673342219456228
3	0.7142223960892546
4	0.764310057489562
5	0.817817365181993
Temperature	40.0
1	0.9869017000951867
2	1.0552927189716872
3	1.128391159189956
4	1.2063929271077765
5	1.2893937818288772
Temperature	50.0
1	1.5455704953308926
2	1.6475504663481884
3	1.7539653928079355
4	1.8645130696819492
5	1.9787474137305567

Table B164: Joule-Thomson Coefficient with Increasing Levels of Argon at 3MPa

Mole Percentage	Property
Temperature	0.0
1	13.947009603641822
2	13.744861625744065
3	13.547935330278856
4	13.355919270024351
5	13.168535388711902
Temperature	10.0
1	12.575646286103462
2	12.40716851340981
3	12.242229872568547
4	12.080669876850202
5	11.922341701868937
Temperature	20.0
1	11.42069998944697
2	11.276486942027587
3	11.134919430847395
4	10.995913255214411
5	10.859390111758094
Temperature	30.0
1	10.429334322779939
2	10.304113884615695
3	10.181003751034126
4	10.059940589108454
5	9.940861900980188
Temperature	40.0
1	9.568937026933659
2	9.459022997455536
3	9.3507904633828
4	9.244189671920582
5	9.139173637708637
Temperature	50.0
1	8.814746876185357
2	8.717258760856472
3	8.621145379369516
4	8.526374389863879
5	8.432915187947568

Table B165: Joule-Thomson Coefficient with Increasing Levels of Argon at 0.1MPa

1	28.912472694892777
2	28.468222905534805
3	28.031695589060757
4	27.602751081551276
5	27.181251916421672
Temperature	-70.0
1	31.096878112988747
2	30.606143475658687
3	30.12413787251986
4	29.650701001198232
5	29.185675125244437
Temperature	-75.0
1	33.541186541319
2	32.997192495039855
3	32.46310334413127
4	31.93873431146115
5	31.42390362801756

Table B166: Joule-Thomson Coefficient with Increasing Levels of Argon at 0.4MPa

1	28.912472694892777
2	28.468222905534805
3	28.031695589060757
4	27.602751081551276
5	27.181251916421672
Temperature	-70.0
1	31.096878112988747
2	30.606143475658687
3	30.12413787251986
4	29.650701001198232
5	29.185675125244437
Temperature	-75.0
1	33.541186541319
2	32.997192495039855
3	32.46310334413127
4	31.93873431146115
5	31.42390362801756

Table B167: Joule-Thomson Coefficient with Increasing Levels of Argon at 0.7MPa

1	28.912472694892777
2	28.468222905534805
3	28.031695589060757
4	27.602751081551276
5	27.181251916421672
Temperature	-70.0
1	31.096878112988747
2	30.606143475658687
3	30.12413787251986
4	29.650701001198232
5	29.185675125244437
Temperature	-75.0
1	33.541186541319
2	32.997192495039855
3	32.46310334413127
4	31.93873431146115
5	31.42390362801756

Table B168: Speed of Sound with Increasing Levels of Argon at 10MPa

Mole Percentage	Property
Temperature	0.0
1	629.5910499756792
2	618.1754350935578
3	606.6511164788521
4	595.0104791709435
5	583.245080708097
Temperature	10.0
1	551.4841685001438
2	539.1086854285122
3	526.5540507127293
4	513.8082053889186
5	500.8592243175541
Temperature	20.0
1	465.19795149397936
2	451.3106000469341
3	437.1688093995976
4	422.76812405136627
5	408.10545694869967
Temperature	30.0
1	366.84269296003913
2	350.8964328694776
3	334.5803011980468
4	317.90190639126536
5	300.96129435889424
Temperature	40.0
1	253.63968377397825
2	239.6141565422585
3	229.22844453865991
4	223.22858303651492
5	220.53136705271837
Temperature	50.0
1	219.73691256731442
2	221.55218490427006
3	223.5206323012811
4	225.55527231631888
5	227.60687233993895

Table B169: Speed of Sound with Increasing Levels of Argon at 15MPa

Mole Percentage	Property
Temperature	0.0
1	685.4395490877192
2	675.6503112597283
3	665.8402783620561
4	656.0083844214048
5	646.1535518472723
Temperature	10.0
1	620.4277151923523
2	610.4353290164249
3	600.4138258868794
4	590.3627891666501
5	580.2822555568503
Temperature	20.0
1	553.7368768511751
2	543.5028667685887
3	533.2466939120256
4	522.9734736789293
5	512.6896735606955
Temperature	30.0
1	485.4392660168501
2	475.11137223349806
3	464.8174445757781
4	454.57219600982546
5	444.3912198954736
Temperature	40.0
1	417.3480114673827
2	407.42964888974336
3	397.64807597655187
4	388.02458846772925
5	378.5867935685392
Temperature	50.0
1	353.55794113602917
2	344.99312053512045
3	336.830565855387
4	329.1264626209993
5	321.93276111537733

Table B170: Speed of Sound with Increasing Levels of Argon at 3MPa

Mole Percentage	Property
Temperature	0.0
1	222.77346192628517
2	223.98275552257158
3	225.16243454567092
4	226.3147314847569
5	227.4416339139729
Temperature	10.0
1	232.5093961676987
2	233.51752624037246
3	234.50876796419016
4	235.48407190634344
5	236.44432706196062
Temperature	20.0
1	240.8211443835757
2	241.7052001906745
3	242.57855126830103
4	243.44181123945012
5	244.29556604599173
Temperature	30.0
1	248.20772366040453
2	249.00865551155331
3	249.80262777029222
4	250.58999119055937
5	251.37106580553942
Temperature	40.0
1	254.94439777687094
2	255.68532626914833
3	256.42129556705794
4	257.15251998471433
5	257.8792109681716
Temperature	50.0
1	261.1868433641819
2	261.8810899091304
3	262.57177450176687
4	263.2590916200395
5	263.94323438853917

Table B171: Speed of Sound with Increasing Levels of Argon at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	937.7434157889143
2	927.0915667508574
3	916.423928404677
4	905.7375921970123
5	895.0294499526206
Temperature	-55.0

Table B172: Speed of Sound with Increasing Levels of Argon at 0.7MPa

Mole Percentage	Property
Temperature	-50.0
1	955.3113062744079
2	944.9860662806711
3	934.6576416314683
4	924.324006214461
5	913.9830128491164

Table B173: Speed of Sound with Increasing Levels of Carbon Monoxide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	223.12390806135045
2	224.67382401933114
3	226.18576052406664
4	227.66317202547884
5	229.10905203687201
Temperature	10.0
1	232.84019985681473
2	234.17408591149655
3	235.4866439008788
4	236.77937895381191
5	238.05370346456647
Temperature	20.0
1	241.14412715932048
2	242.34844649718227
3	243.53977520411718
4	244.71913071204804
5	245.88745996333006
Temperature	30.0
1	248.52904827628348
2	249.65006325620126
3	250.76309455636866
4	251.86866299770534
5	252.96722110903815
Temperature	40.0
1	255.26720137654954
2	256.33034098172436
3	257.38803058903017
4	258.4405867415105
5	259.4883284100095
Temperature	50.0
1	261.51241983704415
2	262.5320867150619
3	263.5481446061097
4	264.56089669306124
5	265.5706410061811

Table B174: Thermal Conductivity with Increasing Levels of Carbon Monoxide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.118774844167063
2	0.11653483830257878
3	0.11427679291197092
4	0.11199967110075491
5	0.1097023874086532
Temperature	10.0
1	0.1071385086784465
2	0.10478103238207175
3	0.102396687026015
4	0.0999835152474593
5	0.09753933736563279
Temperature	20.0
1	0.09504404835121885
2	0.09249735387357053
3	0.08990684344689186
4	0.0872705195174715
5	0.0845883948883312
Temperature	30.0
1	0.08196780291150244
2	0.07916457428586174
3	0.07635445383073958
4	0.07356979324154604
5	0.07083330192905465
Temperature	40.0
1	0.06890292750425135
2	0.06607916887354127
3	0.0621419162761101
4	0.05747584150927739
5	0.0531111333043227
Temperature	50.0
1	0.04859361745905282
2	0.045583843043456175
3	0.04322441192618931
4	0.04134314429881
5	0.03981804698833932

Table B175: Thermal Conductivity with Increasing Levels of Carbon Monoxide
at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.1255587918930205
2	0.1237373962467464
3	0.12190909733599678
4	0.12007391674555702
5	0.11823194024514518
Temperature	10.0
1	0.1150857705781887
2	0.11322330438438971
3	0.11135380272421712
4	0.10947748407035841
5	0.10759461799606464
Temperature	20.0
1	0.10473011955315614
2	0.10282296653799089
3	0.1009087707201936
4	0.0989878191519978
5	0.09706054728141428
Temperature	30.0
1	0.09441218279276854
2	0.09245445909658907
3	0.09049154815598108
4	0.0885253450509072
5	0.08655828592019606
Temperature	40.0
1	0.08406436079971362
2	0.08207495155637137
3	0.08009260823493632
4	0.07812139191277884
5	0.07616582800222667
Temperature	50.0
1	0.0738288425964371
2	0.07188780053481184
3	0.06998140996262087
4	0.06811550917357294
5	0.0662929468497991

Table B176: Thermal Conductivity with Increasing Levels of Carbon Monoxide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.017909389832525605
2	0.0179160965386479
3	0.01793171215574528
4	0.01795498573096595
5	0.017984919924799905
Temperature	10.0
1	0.0181463718450957
2	0.018188695718171628
3	0.01823573838780605
4	0.018286952815322426
5	0.018341892004875446
Temperature	20.0
1	0.018600374905891042
2	0.01865824348759342
3	0.018719449715822307
4	0.018783627853093187
5	0.018850478726324064
Temperature	30.0
1	0.01916849624169999
2	0.019234326807892037
3	0.019302893157098728
4	0.0193739000190913
5	0.019447105299080752
Temperature	40.0
1	0.019806055570977494
2	0.019876301678722962
3	0.01994896251232223
4	0.020023777783056335
5	0.02010053298544198
Temperature	50.0
1	0.020489752164612438
2	0.02056249138929532
3	0.02063744131375717
4	0.020714363408054725
5	0.020793060221721983

Table B177: Viscosity with Increasing Levels of Carbon Monoxide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	110.34260184503626
2	106.84749615917114
3	103.43423469906693
4	100.09761951386903
5	96.83239640808996
Temperature	10.0
1	93.78304473267069
2	90.59186695577007
3	87.45341208761626
4	84.36074465466717
5	81.30629489729576
Temperature	20.0
1	78.39489467537689
2	75.3178551018159
3	72.24516743911028
4	69.164648152829
5	66.0626377651039
Temperature	30.0
1	62.81952553475081
2	59.47718252237326
3	56.01499934684863
4	52.38885783238609
5	48.56555840116107
Temperature	40.0
1	43.421527396089964
2	38.939967542293914
3	34.89593268455762
4	31.806695146213443
5	29.544734021399428
Temperature	50.0
1	26.98428275548548
2	25.980784459658572
3	25.222794153142218
4	24.631275391142445
5	24.15769016831466

Table B178: Viscosity with Increasing Levels of Carbon Monoxide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	119.54253187721388
2	116.11067565299172
3	112.77525968111361
4	109.53232801806408
5	106.37807371497681
Temperature	10.0
1	103.7017637194198
2	100.67193071179942
3	97.72081654057439
4	94.84494993794472
5	92.04092539051054
Temperature	20.0
1	89.70450597077911
2	86.98888050666437
3	84.3352798677376
4	81.74047163031355
5	79.20146748434968
Temperature	30.0
1	77.07660260820514
2	74.58992202485358
3	72.15157922746394
4	69.7600896572309
5	67.4142176109069
Temperature	40.0
1	65.37864147978547
2	63.06057905823573
3	60.78530989028505
4	58.55433685645191
5	56.370787426885784
Temperature	50.0
1	54.329214154991504
2	52.18596504335928
3	50.110742146421785
4	48.11267391296191
5	46.20130083636172

Table B179: Viscosity with Increasing Levels of Carbon Monoxide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.469312566149663
2	14.49234225937383
3	14.516632559716347
4	14.542076782729534
5	14.56858539860334
Temperature	10.0
1	14.870535223620152
2	14.896709669861663
3	14.9237858652924
4	14.951699362756065
5	14.980395586601206
Temperature	20.0
1	15.292732830352895
2	15.320554096167106
3	15.349100409656376
4	15.378323052108284
5	15.408180873047431
Temperature	30.0
1	15.72633668090208
2	15.755117224009945
3	15.78451571694174
4	15.814491292531047
5	15.845009553405893
Temperature	40.0
1	16.166454150238906
2	16.19581870540268
3	16.22572774034432
4	16.256145098359564
5	16.287040431231553
Temperature	50.0
1	16.610221669649114
2	16.63994107249272
3	16.67015038083747
4	16.700816625986548
5	16.73191218359245

Table B180: Density with Increasing Levels of Water at 10MPa

Mole Percentage	Property
Temperature	0.0
1	967.642702589175
2	961.6202144590908
3	955.9625206984136
4	950.650144807894
5	945.6647183104428
Temperature	10.0
1	915.4468463056809
2	910.7873722282923
3	906.4567859805094
4	902.4357768027118
5	898.706250504886
Temperature	20.0
1	853.3761782039619
2	850.7118493768188
3	848.2987587061076
4	846.1202495106517
5	844.1609667126535
Temperature	30.0
1	772.4522394346528
2	773.424708372857
3	774.4150053604541
4	775.4238718225328
5	776.4516910022049
Temperature	40.0
1	641.5722147324137
2	652.9360380232271
3	662.9602560728811
4	671.870207136233
5	679.8581591441464
Temperature	50.0
1	399.91709355015485
2	418.5398831183239
3	440.3894113673005
4	465.0194501846705
5	491.3628879143421

Table B181: Density with Increasing Levels of Water at 15MPa

Mole Percentage	Property
Temperature	0.0
1	992.4440000921105
2	985.741570172698
3	979.4081329193306
4	973.4257063349226
5	967.7772763422779
Temperature	10.0
1	948.0848655084975
2	942.3545012305018
3	936.9713900576942
4	931.9179150940149
5	927.1774236725972
Temperature	20.0
1	899.0692847027949
2	894.5164893677571
3	890.2802462729924
4	886.34376548549
5	882.6911895550502
Temperature	30.0
1	843.6504870066145
2	840.6031723798476
3	837.823482422354
4	835.2963593252064
5	833.0076771815033
Temperature	40.0
1	779.0012448573195
2	777.9748767589929
3	777.1411956488336
4	776.4881009793503
5	776.0040441619905
Temperature	50.0
1	701.3525901184105
2	703.0454345614753
3	704.8235146303753
4	706.6792128965051
5	708.605508735925

Table B182: Density with Increasing Levels of Water at 3MPa

Mole Percentage	Property
Temperature	0.0
1	77.62261522051008
2	77.92355294435845
3	78.23048988894249
4	78.5436131214451
5	78.8631107951725
Temperature	10.0
1	71.2610813254224
2	71.5392846954033
3	71.82305411204946
4	72.11255830407842
5	72.40797288956873
Temperature	20.0
1	66.36373761367257
2	66.62419106801187
3	66.88986647451142
4	67.1609224694712
5	67.43752418048753
Temperature	30.0
1	62.36513534544076
2	62.61093554941109
3	62.86167232748725
4	63.11749590496121
5	63.37856266512818
Temperature	40.0
1	58.97299071993769
2	59.20624863256065
3	59.44419793949463
4	59.686981611831754
5	59.93474848970522
Temperature	50.0
1	56.011055743812186
2	56.23328022081057
3	56.459979736598626
4	56.69129084001706
5	56.92735569237405

Table B183: Density with Increasing Levels of Water at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	1145.2361520438146
2	1135.623324095521
3	1126.451120746745
4	1117.6992242396057
5	1109.348350288521

Table B184: Density with Increasing Levels of Water at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	1152.0002166795607
2	1142.2738977239717
3	1132.985760097337
4	1124.115837475333
5	1115.6451880790858

Table B185: Density with Increasing Levels of Water at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	1158.426601591336
2	1148.5953455294384
3	1139.2001339785563
4	1130.2212984098207
5	1121.640187644394

Table B186: Joule-Thomson Coefficient with Increasing Levels of Water at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.17732025860599207
2	0.1664652473658601
3	0.15540270665212402
4	0.1441725171107037
5	0.13281298789034138
Temperature	10.0
1	0.34657835887870875
2	0.32974059814831114
3	0.31274968828500144
4	0.2956637375890671
5	0.2785369876846625
Temperature	20.0
1	0.6202213869103333
2	0.5904340874435599
3	0.5609404029079436
4	0.5318119709550525
5	0.503110056456061
Temperature	30.0
1	1.1349513329972036
2	1.0707801483509272
3	1.0091864095089795
4	0.950079174444947
5	0.8933885541615348
Temperature	40.0
1	2.4290026258748743
2	2.2222737098909744
3	2.0368948666762066
4	1.8704039715099274
5	1.720495557166992
Temperature	50.0
1	5.415746847440674
2	5.167191032091766
3	4.860713854784545
4	4.504430154227273
5	4.111445696895222

Table B187: Joule-Thomson Coefficient with Increasing Levels of Water at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.08234930845100512
2	0.07440371775923124
3	0.06630281046554293
4	0.05807011193238518
5	0.049728678937076186
Temperature	10.0
1	0.1914684620340818
2	0.18067457396842018
3	0.1697033297052624
4	0.158586544740376
5	0.14735514571992878
Temperature	20.0
1	0.34197412014416684
2	0.32656094230062743
3	0.3109998080660558
4	0.29533144645846704
5	0.2795946651232726
Temperature	30.0
1	0.5589388953261515
2	0.5354637512421208
3	0.5119893661317105
4	0.48857355623181814
5	0.46526962729411714
Temperature	40.0
1	0.8853516235481926
2	0.8480160694027776
3	0.811011464668859
4	0.7743966271215988
5	0.738231136369387
Temperature	50.0
1	1.3869648925238385
2	1.3264111043119255
3	1.2667677646060522
4	1.2081590909718187
5	1.1506928009701358

Table B188: Joule-Thomson Coefficient with Increasing Levels of Water at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.379915225794981
2	14.608609821449784
3	14.840227646496079
4	15.07384640437469
5	15.308015735563444
Temperature	10.0
1	12.950523088736045
2	13.157687472822266
3	13.369412917375856
4	13.585806551791725
5	13.806930364483291
Temperature	20.0
1	11.749450665693805
2	11.935422455201676
3	12.12569117422911
4	12.320420136272162
5	12.519768268725954
Temperature	30.0
1	10.72037533115378
2	10.887795433192354
3	11.059171696863675
4	11.234664029295672
5	11.414430012968065
Temperature	40.0
1	9.828522697101976
2	9.979753072127583
3	10.13458098825639
4	10.293160459803952
5	10.455645319183196
Temperature	50.0
1	9.048177955776481
2	9.185448052629136
3	9.32597582513037
4	9.469901921120625
5	9.617367657968597

Table B189: Joule-Thomson Coefficient with Increasing Levels of Water at 0.1MPa

Mole Percentage	Property
Temperature	-60.0
1	27.9220545307265
2	28.498977231914246
3	29.094862183067956
4	29.710810178685094
5	30.347977443345346
Mole Percentage	Property
Temperature	-65.0
1	29.980595097426328
2	30.616811726608674
3	31.274443415829925
4	31.954758083942473
5	32.65908982266988
Temperature	-70.0
1	32.278757572793744
2	32.983945968402594
3	33.713467126188306
4	34.468791795217314
5	35.2514701966635
Temperature	-75.0
1	34.8550763783144
2	35.641078498735766
3	36.45490967356724
4	37.2982886702198
5	38.17303030132035

Table B190: Joule-Thomson Coefficient with Increasing Levels of Water at 0.4MPa

Mole Percentage	Property
Temperature	-60.0
1	27.9220545307265
2	28.498977231914246
3	29.094862183067956
4	29.710810178685094
5	30.347977443345346
Mole Percentage	Property
Temperature	-65.0
1	29.980595097426328
2	30.616811726608674
3	31.274443415829925
4	31.954758083942473
5	32.65908982266988
Temperature	-70.0
1	32.278757572793744
2	32.983945968402594
3	33.713467126188306
4	34.468791795217314
5	35.2514701966635
Temperature	-75.0
1	34.8550763783144
2	35.641078498735766
3	36.45490967356724
4	37.2982886702198
5	38.17303030132035

Table B191: Joule-Thomson Coefficient with Increasing Levels of Water at 0.7MPa

Mole Percentage	Property
Temperature	-60.0
1	27.9220545307265
2	28.498977231914246
3	29.094862183067956
4	29.710810178685094
5	30.347977443345346
Mole Percentage	Property
Temperature	-65.0
1	29.980595097426328
2	30.616811726608674
3	31.274443415829925
4	31.954758083942473
5	32.65908982266988
Temperature	-70.0
1	32.278757572793744
2	32.983945968402594
3	33.713467126188306
4	34.468791795217314
5	35.2514701966635
Temperature	-75.0
1	34.8550763783144
2	35.641078498735766
3	36.45490967356724
4	37.2982886702198
5	38.17303030132035

Table B192: Speed of Sound with Increasing Levels of Water at 15MPa

Mole Percentage	Property
Temperature	0.0
1	701.322365319442
2	707.6821560336732
3	714.2858207334283
4	721.1308075652831
5	728.2145852026634
Temperature	10.0
1	636.9334189837526
2	643.712999551664
3	650.7284092985818
4	657.977660453397
5	665.4588065863938
Temperature	20.0
1	570.9788795008668
2	578.2391129354575
3	585.7239864252181
4	593.432004364546
5	601.3617381823522
Temperature	30.0
1	503.3171299124786
2	511.0669963191832
3	519.0361837768925
4	527.2234455967271
5	535.6274210451794
Temperature	40.0
1	435.19040510052247
2	443.2249394083778
3	451.4914131216998
4	459.9910494335475
5	468.72398154011876
Temperature	50.0
1	370.07919067986927
2	377.94033453048786
3	386.0533078647321
4	394.42149602686266
5	403.04865464067586

Table B193: Speed of Sound with Increasing Levels of Water at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	934.8599042940756
2	939.5948073896249
3	944.6387031213197
4	949.9858356355056
5	955.630326260312

Table B194: Speed of Sound with Increasing Levels of Water at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	952.7927714547393
2	957.5037931872606
3	962.5100974017469
4	967.8064154191821
5	973.3873737130201

Table B195: Speed of Sound with Increasing Levels of Water at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	970.0409899231385
2	974.7343001912317
3	979.7104218930644
4	984.9644889765791
5	990.4915461125084

Table B196: Density with Increasing Levels of Hydrogen Sulphide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	969.2054382730946
2	964.5906588716038
3	960.1977017367643
4	956.0183269623192
5	952.0446289718622
Temperature	10.0
1	916.0205730028687
2	911.8144433775503
3	907.8289122455587
4	904.0558065733155
5	900.4872750020476
Temperature	20.0
1	852.4359922209674
2	848.7914341314173
3	845.3675520662023
4	842.1560530628102
5	839.1489565125114
Temperature	30.0
1	768.5888693034635
2	765.912011421636
3	763.4561890407224
4	761.2124742987285
5	759.1722681151083
Temperature	40.0
1	628.5898660226333
2	628.7468642117559
3	629.0745195995484
4	629.5648308979758
5	630.209979270595
Temperature	50.0
1	386.63733984935885
2	389.08546483024185
3	391.6836638856592
4	394.4445966920414
5	397.38142408686303

Table B197: Density with Increasing Levels of Hydrogen Sulphide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	994.5923981531594
2	989.873258190226
3	985.3686216040136
4	981.0704571291793
5	976.9710737991741
Temperature	10.0
1	949.5809331085165
2	945.1989238033524
3	941.0269428222351
4	937.0571850850547
5	933.2821746165245
Temperature	20.0
1	899.7623267338588
2	895.7808382450244
3	892.0040708859916
4	888.4244766215114
5	885.0348248307106
Temperature	30.0
1	843.2977868722832
2	839.819247384199
3	836.5383171270744
4	833.4477718809586
5	830.540691520249
Temperature	40.0
1	777.2357942027843
2	774.4315274366372
3	771.8131935000052
4	769.3741578110142
5	767.1080674091593
Temperature	50.0
1	697.719152697711
2	695.8538173600655
3	694.1517215360352
4	692.6076547340824
5	691.2166171217477

Table B198: Density with Increasing Levels of Hydrogen Sulphide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	77.26166859873925
2	77.18779170369667
3	77.11383039298187
4	77.03990926824186
5	76.9661504798133
Temperature	10.0
1	70.92054446945475
2	70.82954136824733
3	70.73830084132533
4	70.6469042978806
5	70.55543077645622
Temperature	20.0
1	66.05819937770488
2	65.96035061561538
3	65.86226106011567
4	65.76398979639053
5	65.66559390989579
Temperature	30.0
1	62.11054493725762
2	62.010133072964564
3	61.90951004036694
4	61.808721057484966
5	61.707809677777036
Temperature	40.0
1	58.790977635502806
2	58.690093925823575
3	58.58903410856322
4	58.48783392990545
5	58.38652774313166
Temperature	50.0
1	55.93163153902964
2	55.831389108999815
3	55.73100358997723
4	55.63050386990837
5	55.52991766056045

Table B199: Density with Increasing Levels of Hydrogen Sulphide at 0.1MPa

Mole Percentage	Property
Temperature	-50.0
1	1149.1491979237633
2	1143.2371883416426
3	1137.5654525629789
4	1132.12486211482
5	1133.7296341377998
Temperature	-55.0
Temperature	-55.0
1	1167.5435304370426
2	1161.5224459756478
3	1155.7427230514584
4	1150.1951543758776
5	1144.870922601968
Temperature	20.0
1	1185.4268108176584
2	1179.2997710052584
3	1173.4153034354438
4	1167.7641196030922
5	1162.3373263095618
Temperature	30.0
1	1202.867167039579
2	1196.636828138449
3	1190.6503716843156
4	1184.898426192617
5	1179.372020648849
Temperature	40.0
1	1219.9223515644317
2	1213.590992198016
3	1207.5049073150637
4	1201.654641149115
5	1196.031143404584
Temperature	50.0
1	1236.6420893758352
2	1230.2116782199112
3	1224.0280019283462
4	1218.0815194885076
5	1212.3631002254995

Table B200: Density with Increasing Levels of Hydrogen Sulphide at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	1156.0171524984823
2	1150.096537933736
3	1144.4144164597965
4	1138.961686803954
5	1133.7296341377998
Temperature	-55.0
Temperature	-55.0
1	1173.8252719184475
2	1167.796905496636
3	1162.0083594555058
4	1156.4504493236536
5	1151.114382299768
Temperature	20.0
1	1191.1957360115698
2	1185.0625081661517
3	1179.1705072777575
4	1173.5104642114068
5	1168.0735065653926
Temperature	30.0
1	1208.18333961441
2	1201.9477295334268
3	1195.9548188159627
4	1190.1952525936538
5	1184.6600776594744
Temperature	40.0
1	1224.8354793995904
2	1218.4996267286408
3	1212.4080012723357
4	1206.5511616504143
5	1200.9200729581569
Temperature	50.0
1	1241.193698451698
2	1234.759461340514
3	1228.571026657219
4	1222.6188659484324
5	1216.8938619534476

Table B201: Density with Increasing Levels of Hydrogen Sulphide at 0.7MPa

Mole Percentage	Property
Temperature	-50.0
1	1162.5382425248201
2	1156.6082711470146
3	1150.9152505107409
4	1145.4501038842598
5	1140.2041425644973
Temperature	-55.0
Temperature	-55.0
1	1179.820980760707
2	1173.7846472971382
3	1167.9867811988165
4	1162.418218832517
5	1157.0701895595719
Temperature	20.0
1	1196.7268271338235
2	1190.5867914137211
3	1184.6867876989047
4	1179.017564726165
5	1173.5702690834141
Temperature	30.0
1	1213.300386183187
2	1207.0589463528968
3	1201.059144190316
4	1195.291640292365
5	1189.747497868906
Temperature	40.0
1	1229.5809419071675
2	1223.2400937108039
3	1217.1425243546994
4	1211.2788059501354
5	1205.6399179002833
Temperature	50.0
1	1245.6034883738523
2	1239.1649743285282
3	1232.971411458316
4	1227.013283166797
5	1221.2814847555208

Table B202: Joule-Thomson Coefficient with Increasing Levels of Hydrogen Sulphide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.18733411973850764
2	0.1865491588432878
3	0.18557393942754155
4	0.1844111641025735
5	0.18306383570591392
Temperature	10.0
1	0.3624403703967398
2	0.36137735981558333
3	0.3600170156706035
4	0.35836488435198754
5	0.35642696949141145
Temperature	20.0
1	0.6484678305544374
2	0.6462150316472504
3	0.6434730977453966
4	0.6402548166079511
5	0.6365736817932599
Temperature	30.0
1	1.1956141988328148
2	1.1885229726163016
3	1.1805797212875504
4	1.1718178432548552
5	1.1622714819649693
Temperature	40.0
1	2.6246101403757502
2	2.58843283291821
3	2.551165743363346
4	2.512876007669578
5	2.4736335506000273
Temperature	50.0
1	5.577037288537065
2	5.538565204459732
3	5.4981401206156955
4	5.455545918268913
5	5.410550150716603

Table B203: Joule-Thomson Coefficient with Increasing Levels of Hydrogen Sulphide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.08918019798853451
2	0.08813182845010037
3	0.086971967428133
4	0.0857021421095391
5	0.08432400488896379
Temperature	10.0
1	0.20102320740172303
2	0.19983305276353108
3	0.19848435394239572
4	0.19697970766567768
5	0.19532186359776477
Temperature	20.0
1	0.3558254979172319
2	0.3542279885450497
3	0.35240825825090477
4	0.3503706531192163
5	0.34811969622758177
Temperature	30.0
1	0.5800407900271353
2	0.5774135947489808
3	0.5744781865458845
4	0.5712416540161909
5	0.567711270882944
Temperature	40.0
1	0.918439210646056
2	0.9135035759829375
3	0.9081627194764655
4	0.902426494923189
5	0.896304880579804
Temperature	50.0
1	1.4390948731242663
2	1.429425360392575
3	1.4192952070330092
4	1.4087114246582637
5	1.3976813383503377

Table B204: Joule-Thomson Coefficient with Increasing Levels of Hydrogen Sulphide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.2037939419469
2	14.2528528327872
3	14.30196693190034
4	14.351190143216142
5	14.40057495586854
Temperature	10.0
1	12.792213688821992
2	12.836507916059526
3	12.880768165652908
4	12.925040488726642
5	12.969369565077415
Temperature	20.0
1	11.60847786762458
2	11.649189232718465
3	11.689826146030986
4	11.730429218462543
5	11.771037791182058
Temperature	30.0
1	10.594655342602916
2	10.632449308556845
3	10.670148930213081
4	10.707790767159675
5	10.745410232549157
Temperature	40.0
1	9.716029033728233
2	9.751333843653699
3	9.786533586712972
4	9.821661468947212
5	9.856749657139344
Temperature	50.0
1	8.94691888504771
2	8.980054477335255
3	9.013082160261165
4	9.046032241628819
5	9.078934072549123

Table B205: Joule-Thomson Coefficient with Increasing Levels of Hydrogen Sulphide at 0.1MPa

Mole Percentage	Property
Temperature	-50.0
1	-0.1213820261996008
2	-0.12222603281710086
3	-0.1231071607832892
4	-0.12402573411730765
5	-0.12498196471197583
Temperature	-55.0
Temperature	-55.0
1	-0.14138554861462363
2	-0.14230558547017838
3	-0.14325174451951744
4	-0.14422442625659182
5	-0.1452239394883316
Temperature	20.0
1	-0.15853746660682622
2	-0.1595249288224066
3	-0.16052934119620488
4	-0.16155116480090123
5	-0.16259078532426535
Temperature	30.0
1	-0.17326763010781224
2	-0.17431483147630236
3	-0.17537127719773035
4	-0.1764374764719695
5	-0.17751387630464674
Temperature	40.0
1	-0.1859179831040622
2	-0.18701799790763204
3	-0.18812074630330222
4	-0.1892267756559707
5	-0.1903365819375906
Temperature	50.0
1	-0.1967645302308182
2	-0.19791106385319554
3	-0.19905480747712304
4	-0.20019633853812027
5	-0.20133619201196506

Table B206: Joule-Thomson Coefficient with Increasing Levels of Hydrogen Sulphide at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	-0.13476725755494104
2	-0.13571608563896656
3	-0.13669239651882137
4	-0.13769649756224145
5	-0.13872860908148482
Temperature	-55.0
Temperature	-55.0
1	-0.1525868554864267
2	-0.15359628480277354
3	-0.15462407299395617
4	-0.15567060457981613
5	-0.15673619182536683
Temperature	20.0
1	-0.1679737577758037
2	-0.169037794666291
3	-0.17011246759791845
4	-0.17119822285588598
5	-0.1722954466050904
Temperature	30.0
1	-0.1812626248093808
2	-0.18237567195322515
3	-0.18349278524327087
4	-0.1846144604599342
5	-0.18574114331555575
Temperature	40.0
1	-0.19272554947027032
2	-0.19388236837602185
3	-0.19503764376205585
4	-0.196191910961037
5	-0.1973456636375106
Temperature	50.0
1	-0.20258629345270018
2	-0.2037819645934369
3	-0.2049712908061735
4	-0.20615483882302046
5	-0.20733314077850426

Table B207: Joule-Thomson Coefficient with Increasing Levels of Hydrogen Sulphide at 0.7MPa

Mole Percentage	Property
Temperature	-50.0
1	-0.1467491996063102
2	-0.14778691034260327
3	-0.14884393379293787
4	-0.14992057738206668
5	-0.15101708087112622
Temperature	-55.0
Temperature	-55.0
1	-0.1627091060060157
2	-0.1637953666842042
3	-0.16489330319526024
4	-0.16600329727441962
5	-0.16712567380083895
Temperature	20.0
1	-0.1765707150967482
2	-0.17770133960766052
3	-0.1788370924744033
4	-0.17997841563384984
5	-0.18112570324992416
Temperature	30.0
1	-0.18859822348563265
2	-0.18976911275375016
3	-0.1909394995755838
4	-0.19210987460856355
5	-0.19328068842521262
Temperature	40.0
1	-0.19901056391986108
2	-0.2002177269219612
3	-0.2014195351509882
4	-0.20261651853267099
5	-0.2038091734538988
Temperature	50.0
1	-0.2079907740866419
2	-0.2092303350265652
3	-0.21046035548377368
4	-0.21168139680441164
5	-0.21289399239734386

Table B208: Speed of Sound with Increasing Levels of Hydrogen Sulphide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	641.7718374650651
2	642.7373900041166
3	643.8004661000011
4	644.9600776130718
5	646.2152359937628
Temperature	10.0
1	564.756007092988
2	565.9211688800291
3	567.186727831234
4	568.5515765761853
5	570.0146110181997
Temperature	20.0
1	480.19413385935917
2	481.65546507518314
3	483.22019877997235
4	484.8870951383652
5	486.6549288778457
Temperature	30.0
1	384.26446326643685
2	386.18444460889475
3	388.204779129796
4	390.324547754673
5	392.5428830110496
Temperature	40.0
1	272.50048872422644
2	275.17711652947725
3	277.9234144191485
4	280.74223324782355
5	283.6362350211542
Temperature	50.0
1	218.75193795127652
2	219.27310252482556
3	219.80861268638992
4	220.3620551767477
5	220.9376098044134

Table B209: Speed of Sound with Increasing Levels of Hydrogen Sulphide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	696.1750220100658
2	697.2208572555876
3	698.3459006522688
4	699.5495222632097
5	700.8311021286231
Temperature	10.0
1	631.5065434657326
2	632.6992284008084
3	633.9691852134503
4	635.3158421272542
5	636.7386420344588
Temperature	20.0
1	565.2381651513942
2	566.6058253827342
3	568.0473610374811
4	569.5623179182278
5	571.1502629200642
Temperature	30.0
1	497.29205304304907
2	498.8639590612004
3	500.5032240481993
4	502.20969405285706
5	503.98324326985824
Temperature	40.0
1	429.10088621797604
2	430.87165784250266
3	432.6982465712091
4	434.58112203901965
5	436.5207815241723
Temperature	50.0
1	364.3248881933695
2	366.22020376097475
3	368.15405853357106
4	370.12787133915015
5	372.1430746631622

Table B210: Speed of Sound with Increasing Levels of Hydrogen Sulphide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	221.64879912616664
2	221.7649599924037
3	221.88032919580368
4	221.9947033321062
5	222.10788267559397
Temperature	10.0
1	231.6516822102222
2	231.81996486185977
3	231.9880474942471
4	232.15578328518214
5	232.32302932155133
Temperature	20.0
1	240.13012357989902
2	240.3347207968374
3	240.5394171293072
4	240.74409671814675
5	240.9486473118454
Temperature	30.0
1	247.6317112628098
2	247.86434355981777
3	248.09724749982234
4	248.33032878130084
5	248.56349649397336
Temperature	40.0
1	254.45338369163616
2	254.70893110919454
3	254.96484992381556
4	255.22106129151504
5	255.47748951336337
Temperature	50.0
1	260.7634101532292
2	261.03849938133317
3	261.3140373608989
4	261.58995680258545
5	261.8661932583975

Table B211: Speed of Sound with Increasing Levels of Hydrogen Sulphide at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	948.5312137620514
2	948.7815689211462
3	949.1322883049073
4	949.5823854611814
5	950.1308619530985
Temperature	-55.0

Table B212: Speed of Sound with Increasing Levels of Hydrogen Sulphide at 0.7MPa

Mole Percentage	Property
Temperature	-50.0
1	965.8598013465106
2	966.1802923015084
3	966.5958260150953
4	967.1054770265039
5	967.7083130417516

Table B213: Speed of Sound with Increasing Levels of Hydrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	223.86151564586237
2	226.18142355068028
3	228.49425684425034
4	230.80226948769362
5	233.10745819314835
Temperature	10.0
1	233.58192293558884
2	235.68817508105587
3	237.80275191617451
4	239.92635366300414
5	242.05977538791797
Temperature	20.0
1	241.895510980315
2	243.88029483977826
3	245.88063490212804
4	247.89714108346288
5	249.93044869113112
Temperature	30.0
1	249.29255353749843
2	251.20503779356181
3	253.1371639657905
4	255.0891615536801
5	257.0612375659032
Temperature	40.0
1	256.0438538669497
2	257.9105622974599
3	259.79851474412595
4	261.70786742671635
5	263.63884661184323
Temperature	50.0
1	262.3024124713685
2	264.13815243132586
3	265.9962907578757
4	267.8771128896798
5	269.7809507367321

Table B214: Thermal Conductivity with Increasing Levels of Hydrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.12009424048898905
2	0.11924126172220591
3	0.11843273262772991
4	0.11766254863968892
5	0.11692461527644221
Temperature	10.0
1	0.10874953471222329
2	0.10806004006773516
3	0.10739541582301605
4	0.10674853869097359
5	0.10611214973054191
Temperature	20.0
1	0.09693917387630131
2	0.09633448460169568
3	0.09572867191163066
4	0.0951171843177128
5	0.09450099064745247
Temperature	30.0
1	0.08415737321780639
2	0.08360146082806079
3	0.08311311668244327
4	0.08274320415865667
5	0.0824977008494651
Temperature	40.0
1	0.07151396313862063
2	0.07119433248210696
3	0.06955362633577199
4	0.06731559660550672
5	0.0655007563913281
Temperature	50.0
1	0.05139740139864368
2	0.051184009159977784
3	0.05159873232160307
4	0.05246288436030919
5	0.05365183351236718

Table B215: Thermal Conductivity with Increasing Levels of Hydrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.12661919455812168
2	0.1259293788926981
3	0.12529924016524338
4	0.12472438044649191
5	0.12420063609038524
Temperature	10.0
1	0.1164416676517996
2	0.11599658943112923
3	0.11560151600876478
4	0.11525236055979454
5	0.11494521400593595
Temperature	20.0
1	0.10637063562202466
2	0.1061555117444641
3	0.105980466091351
4	0.10584151762915922
5	0.10573501040677172
Temperature	30.0
1	0.09632694678518999
2	0.09632537941970497
3	0.09635602550939606
4	0.096417212376435
5	0.09650818709233888
Temperature	40.0
1	0.0862460540486814
2	0.08647127092015093
3	0.08673294286195478
4	0.08703158817744533
5	0.0873682575762806
Temperature	50.0
1	0.07627303212968323
2	0.07679865521129882
3	0.07737679322662903
4	0.07800714834753435
5	0.07868473715633884

Table B216: Thermal Conductivity with Increasing Levels of Hydrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.020406698903565574
2	0.02287685576242166
3	0.025323294288785256
4	0.02774583533420704
5	0.03014443950201715
Temperature	10.0
1	0.020715631815127953
2	0.023292922537891454
3	0.02584170843807308
4	0.02836240524964039
5	0.030855448544533013
Temperature	20.0
1	0.021240717156405946
2	0.02390399074256366
3	0.026536658196417616
4	0.029139263401555773
5	0.03171235212514364
Temperature	30.0
1	0.02187918951478276
2	0.024619988324917026
3	0.027328758814096667
4	0.030006094042440107
5	0.03265258280514028
Temperature	40.0
1	0.022586286816124318
2	0.02540017444730476
3	0.028180835139880876
4	0.03092889035471602
5	0.03364495384790656
Temperature	50.0
1	0.023338645828048392
2	0.026222782981994857
3	0.029072580272262498
4	0.03188868225962274
5	0.03467172374425289

Table B217: Viscosity with Increasing Levels of Hydrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	108.15836783917602
2	102.64961409619694
3	97.38308741688147
4	92.34390205055469
5	87.51753818831486
Temperature	10.0
1	91.94670063086767
2	87.06780072643653
3	82.38081923976814
4	77.86953702724868
5	73.5171201848139
Temperature	20.0
1	76.87561707551099
2	72.40764773867181
3	68.06309089996128
4	63.82034667138091
5	59.65539909866164
Temperature	30.0
1	61.59859731934651
2	57.143189867581285
3	52.661578825035505
4	48.099241808674705
5	43.436913532215264
Temperature	40.0
1	42.52699537585201
2	37.35214251703547
3	32.943841806252465
4	29.666550176867478
5	27.38454110815752
Temperature	50.0
1	26.696232055084934
2	25.467920475469317
3	24.52212700877596
4	23.766518937758164
5	23.145204201902477

Table B218: Viscosity with Increasing Levels of Hydrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	117.28513232715743
2	111.76582623915387
3	106.50298019519929
4	101.48333884578886
5	96.69437367093535
Temperature	10.0
1	101.77798976439863
2	96.97298285600931
3	92.38662626178785
4	88.00726351208696
5	83.82373571515794
Temperature	20.0
1	88.08059202348723
2	83.87090004596945
3	79.845391698996
4	75.99363200130061
5	72.30594808649668
Temperature	30.0
1	75.72570731279367
2	72.00198637128707
3	68.43414918777326
4	65.01454919934213
5	61.73630770392783
Temperature	40.0
1	64.28284515364864
2	60.96979974576954
3	57.79483703662071
4	54.75480949816953
5	51.84922355755448
Temperature	50.0
1	53.4800785583129
2	50.57865990171422
3	47.83207363161297
4	45.245628217793545
5	42.825560733196625

Table B219: Viscosity with Increasing Levels of Hydrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.424740768906931
2	14.402844132043644
3	14.38189103132887
4	14.361801898473512
5	14.342506591728766
Temperature	10.0
1	14.827093967647608
2	14.809425381560894
3	14.79229515800612
4	14.775668170391526
5	14.759512149129613
Temperature	20.0
1	15.249874365491818
2	15.234435345721433
3	15.219354015090506
4	15.204608449248544
5	15.190178276054535
Temperature	30.0
1	15.683782245695237
2	15.669618490129974
3	15.655713358723128
4	15.642049871839173
5	15.628612270638868
Temperature	40.0
1	16.124045782692626
2	16.110626462676546
3	16.09740335329334
4	16.084361627391775
5	16.071487587985455
Temperature	50.0
1	16.567864149484787
2	16.554864312813756
3	16.542017197616918
4	16.529309016640067
5	16.516727079346033

Table B220: Density with Increasing Levels of Methane at 10MPa

Mole Percentage	Property
Temperature	0.0
1	960.587178102611
2	947.1134103313001
3	933.6261794103583
4	920.122067719974
5	906.5973689129411
Temperature	10.0
1	906.2285018664818
2	891.9382493008072
3	877.576995488363
4	863.1357564669332
5	848.6045031618012
Temperature	20.0
1	840.5885825284143
2	824.6681223170353
3	808.5240920964079
4	792.1295925854696
5	775.4550827999665
Temperature	30.0
1	752.2008172392511
2	732.2710514402946
3	711.6066846417648
4	690.0883467313957
5	667.583141081724
Temperature	40.0
1	596.6426716777613
2	562.8565757229809
3	528.1250124759284
4	494.14722719168356
5	462.66266003613106
Temperature	50.0
1	366.6260432284591
2	351.47358158887215
3	338.27931607834506
4	326.6215392763892
5	316.19320104927345

Table B221: Density with Increasing Levels of Carbon Monoxide at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	1152.2753904263866
2	1142.3084197542958
3	1029.9892394943797
4	918.8915038934737
5	828.82978811486
Temperature	-55.0

Table B222: Speed of Sound with Increasing Levels of Carbon Monoxide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	683.3999918691554
2	671.5601488472522
3	659.68975267688
4	647.7892360617129
5	635.8593021791127
Temperature	10.0
1	618.2451741735603
2	606.0633421210885
3	593.8485005308991
4	581.604279473169
5	569.3361256096887
Temperature	20.0
1	551.4256000168958
2	538.8903981592911
3	526.3528445037047
4	513.8298423778606
5	501.3416741835586
Temperature	30.0
1	483.070735690619
2	470.4331559007114
3	457.90736552118943
4	445.5277204797681
5	433.32903044833915
Temperature	40.0
1	415.093270248367
2	403.05414038270106
3	391.30874389458853
4	379.9101318495071
5	368.9305656159201
Temperature	50.0
1	351.69566842923285
2	341.5658353404482
3	332.18751185769435
4	323.6553145018828
5	316.0436989343929

Table B223: Density with Increasing Levels of Hydrogen at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	1118.8971320134508
2	974.3180027683086
3	860.8902147281095
4	769.5287830280363
Temperature	-55.0
1	1124.2162239862068
2	985.6246289101399
3	875.5559872733149
4	786.0510449145844

Table B224: Speed of Sound with Increasing Levels of Hydrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	682.4645980180304
2	669.6040694956698
3	656.6252126039782
4	643.5254856198982
5	630.3021894868008
Temperature	10.0
1	617.4672776879702
2	604.4101480923052
3	591.2195521216195
4	577.8965632065966
5	564.4451970726877
Temperature	20.0
1	550.7987456209444
2	537.5311570503748
3	524.1566307934156
4	510.6951561410188
5	497.1725991789119
Temperature	30.0
1	482.612199663046
2	469.4172236197369
3	456.2427660228273
4	443.132639784846
5	430.13273907536393
Temperature	40.0
1	414.8492554338057
2	402.48359230027904
3	390.3453483011137
4	378.51743798608294
5	367.1209590440668
Temperature	50.0
1	351.73339157402745
2	341.6308779492984
3	332.318685454169
4	323.93955663975134
5	316.6099433582373

Table B225: Speed of Sound with Increasing Levels of Nitrogen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	950.56763830441
2	935.5676498968506
3	920.6307580240672
4	905.7521443636945
5	890.9267052092758

Table B226: Speed of Sound with Increasing Levels of Oxygen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	954.7709169605826
2	943.9146945096446
3	933.0637306716262
4	922.2150081204089
5	911.3653600471225

Table B227: Density with Increasing Levels of Nitrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	962.2747483889679
2	950.2335325360211
3	937.9064167519958
4	925.2700541898578
5	912.2978345551015
Temperature	10.0
1	907.018129368511
2	893.1505093052051
3	878.8068533882599
4	863.9327364994515
5	848.463589682582
Temperature	20.0
1	839.9401980166174
2	822.7363506246295
3	804.5713699247018
4	785.2951026160189
5	764.7318727067911
Temperature	30.0
1	748.6480514857736
2	723.7102962893206
3	696.229017076796
4	665.7096703174543
5	631.8515646317569
Temperature	40.0
1	584.7942246742496
2	537.592641875393
3	491.8625187050717
4	452.0448481527406
5	419.11235478494797
Temperature	50.0
1	362.0632574329499
2	344.22624843304914
3	329.4473036658349
4	316.8826768845403
5	305.98333469803003

Table B228: Density with Increasing Levels of Nitrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	989.1208912038409
2	978.561877105303
3	967.8519990885595
4	956.9855761506258
5	945.9566478473818
Temperature	10.0
1	942.935158226368
2	931.4994654440875
3	919.8661072285104
4	908.0267338391474
5	895.9725859345343
Temperature	20.0
1	891.5814307093018
2	878.9503233612392
3	866.05083959966
4	852.8705512978107
5	839.3973487016449
Temperature	30.0
1	833.0087668405155
2	818.6845130710925
3	803.9985020685491
4	788.944330568789
5	773.5204883560838
Temperature	40.0
1	764.041526716641
2	747.4246274220053
3	730.3973085654894
4	712.989428842413
5	695.2504142737371
Temperature	50.0
1	680.9169711133653
2	661.8323282580977
3	642.6293675993469
4	623.4515891290727
5	604.4482910803063

Table B229: Density with Increasing Levels of Nitrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	76.59952149138996
2	75.88095697158899
3	75.17857984358145
4	74.49145085084683
5	73.81873254495171
Temperature	10.0
1	70.44669439261679
2	69.89045170192315
3	69.34222516423607
4	68.80176188729602
5	68.26882674347223
Temperature	20.0
1	65.68986626752415
2	65.22882885112391
3	64.7725569038933
4	64.32097630270285
5	63.87401539013296
Temperature	30.0
1	61.80996543224664
2	61.41242231432036
3	61.01805310384433
4	60.62684047953774
5	60.2387660112675
Temperature	40.0
1	58.53761720073113
2	58.18586371874191
3	57.83639158416386
4	57.48920303837991
5	57.14429864729826
Temperature	50.0
1	55.7130298404848
2	55.39608065661202
3	55.08086385019226
4	54.76738837082105
5	54.45566153685335

Table B230: Density with Increasing Levels of Nitrogen at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	610.2923042949461
2	335.06037366966706
3	230.39316557730595
4	175.2454986093222
5	1079.8777590988482
Temperature	-55.0
Temperature	-55.0
1	802.5361967007552
2	459.1679465853984
3	320.87300557645653
4	246.1799199091581
5	199.4156508625209

Table B231: Density with Increasing Levels of Nitrogen at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	1153.0468298907647
2	1143.8217325528037
3	1134.5074447598572
4	1125.1006390276134
5	1079.8777590988482
Temperature	-55.0

Table B232: Density with Increasing Levels of Nitrogen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	1159.8020722839044
2	1150.815411883526
3	1141.7526063996143
4	1132.6114051016602
5	1123.3893601448221

Table B233: Joule-Thomson Coefficient with Increasing Levels of Nitrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.21406528271776193
2	0.24258983634999928
3	0.2737910857231539
4	0.30800826455093233
5	0.3456389667593689
Temperature	10.0
1	0.40577017771840385
2	0.4530242420022669
3	0.5056984714271208
4	0.5646785649855076
5	0.6310296365868538
Temperature	20.0
1	0.7276809443856055
2	0.8161228250522198
3	0.9176124382220264
4	1.0346251480355992
5	1.1701589401947383
Temperature	30.0
1	1.370910206414552
2	1.5732267019866382
3	1.8171224514020128
4	2.1098617305814598
5	2.4524587244703935
Temperature	40.0
1	3.160344324687747
2	3.701374745732694
3	4.201557597093827
4	4.615172603801601
5	4.94089567351459
Temperature	50.0
1	5.77272681027156
2	5.876929672261973
3	5.943541847350744
4	5.983021197074928
5	6.002237665064007

Table B234: Joule-Thomson Coefficient with Increasing Levels of Nitrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.10653187411639783
2	0.12406494872741608
3	0.14279636479286056
4	0.16281407849944454
5	0.1842130181436886
Temperature	10.0
1	0.2256469116698386
2	0.25092965271101
3	0.27803696208466533
4	0.3071179531561702
5	0.3383353114910936
Temperature	20.0
1	0.39189916021922044
2	0.42930581335859874
3	0.46964781134761313
4	0.5131621572765803
5	0.5600824903461553
Temperature	30.0
1	0.6351478078654307
2	0.6921682565727492
3	0.7536391847836982
4	0.8197527683813192
5	0.8906619240805125
Temperature	40.0
1	1.0038773184376744
2	1.090716699583894
3	1.1834250962560928
4	1.2816515837568707
5	1.3846623653461694
Temperature	50.0
1	1.5665366521211987
2	1.6883130116598863
3	1.8121213002871077
4	1.936467733167089
5	2.0597499284945546

Table B235: Joule-Thomson Coefficient with Increasing Levels of Nitrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	13.963513804231283
2	13.775455123791184
3	13.590334995246163
4	13.407963038014293
5	13.228171658007263
Temperature	10.0
1	12.589748779238166
2	12.433279477897672
3	12.278347142053677
4	12.1248781532091
5	11.972808673000022
Temperature	20.0
1	11.43278153287266
2	11.29877782474779
3	11.165625763353933
4	11.03331668034432
5	10.90184474463321
Temperature	30.0
1	10.439619033480254
2	10.322999159440412
3	10.206870696178196
4	10.091232203043283
5	9.976079996749446
Temperature	40.0
1	9.577582050745107
2	9.474780583398337
3	9.372183590946635
4	9.269795273183991
5	9.167621394245753
Temperature	50.0
1	8.82186927166833
2	8.730108527967749
3	8.63837870998715
4	8.546697605115884
5	8.45508361512126

Table B236: Joule-Thomson Coefficient with Increasing Levels of Nitrogen at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	29.1135815600953
2	28.8586142832372
3	28.599714877992213
4	28.336927312592998
5	28.070308830921498
Temperature	-70.0
1	31.31301337271213
2	31.026176205582033
3	30.735964529348543
4	30.442368223134853
5	30.145394669938426
Temperature	-75.0
1	33.77248650838272
2	33.447286257662796
3	33.119563268297455
4	32.78923250521848
5	32.4562319009569

Table B237: Joule-Thomson Coefficient with Increasing Levels of Nitrogen at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	29.1135815600953
2	28.8586142832372
3	28.599714877992213
4	28.336927312592998
5	28.070308830921498
Temperature	-70.0
1	31.31301337271213
2	31.026176205582033
3	30.735964529348543
4	30.442368223134853
5	30.145394669938426
Temperature	-75.0
1	33.77248650838272
2	33.447286257662796
3	33.119563268297455
4	32.78923250521848
5	32.4562319009569

Table B238: Joule-Thomson Coefficient with Increasing Levels of Nitrogen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	29.1135815600953
2	28.8586142832372
3	28.599714877992213
4	28.336927312592998
5	28.070308830921498
Temperature	-70.0
1	31.31301337271213
2	31.026176205582033
3	30.735964529348543
4	30.442368223134853
5	30.145394669938426
Temperature	-75.0
1	33.77248650838272
2	33.447286257662796
3	33.119563268297455
4	32.78923250521848
5	32.4562319009569

Table B239: Speed of Sound with Increasing Levels of Nitrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	624.7706765361997
2	608.50562888334
3	592.0944433216007
4	575.52091007974
5	558.7680113954259
Temperature	10.0
1	546.3220573633479
2	528.7088526664587
3	510.83251716541463
4	492.67527753649506
5	474.2241671284642
Temperature	20.0
1	459.5375881735188
2	439.88702757557854
3	419.8997050031653
4	399.6112235763761
5	379.08332562921163
Temperature	30.0
1	360.68991271639476
2	338.64656251517033
3	316.4967315764043
4	294.73142248895016
5	274.3613969113616
Temperature	40.0
1	249.51782854010105
2	234.58978673474653
3	226.1745436553561
4	222.67761945996372
5	221.78679798511206
Temperature	50.0
1	220.2046917927031
2	222.4467045055842
3	224.797699451344
4	227.182410373517
5	229.56237872090517

Table B240: Speed of Sound with Increasing Levels of Nitrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	681.4460578794719
2	667.7092059477014
3	653.9978035297786
4	640.3116621302834
5	626.6512102844601
Temperature	10.0
1	616.3770385321312
2	602.3797868017606
3	588.4027203340369
4	574.4503139477673
5	560.5292225904266
Temperature	20.0
1	549.6371505430641
2	535.3669704947393
3	521.1504234771902
4	507.0083461309405
5	492.9670856606223
Temperature	30.0
1	481.3752101920236
2	467.11355542341767
3	453.0497634591599
4	439.2381268188949
5	425.73867851179966
Temperature	40.0
1	413.5983800113765
2	400.21866312466796
3	387.3183581409794
4	374.9768793646524
5	363.28337511272946
Temperature	50.0
1	350.677538410273
2	339.77138923602996
3	329.85546593787086
4	321.0062680830375
5	313.2644010369858

Table B241: Speed of Sound with Increasing Levels of Nitrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	222.8698184988309
2	224.19202890380043
3	225.4998007488673
4	226.79416453817421
5	228.0760482744131
Temperature	10.0
1	232.6531622963457
2	233.8166014859965
3	234.9739899908736
4	236.12563784907925
5	237.27185414500337
Temperature	20.0
1	240.99897690534
2	242.06977577573542
3	243.13836919520514
4	244.20499157397145
5	245.26987557846678
Temperature	30.0
1	248.41238602158197
2	249.42529445317786
3	250.43826334724426
4	251.45135851150638
5	252.4646238949595
Temperature	40.0
1	255.1711590287125
2	256.1449903946633
3	257.11977408153336
4	258.0955062095578
5	259.0721925703973
Temperature	50.0
1	261.43221774730773
2	262.37712683525945
3	263.32359458277693
4	264.27165671885234
5	265.2213553506801

Table B242: Thermal Conductivity with Increasing Levels of Nitrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.11872830071387026
2	0.11643479865631311
3	0.11411617504083409
4	0.11177121619981852
5	0.10939858713929261
Temperature	10.0
1	0.10709601437811352
2	0.1046861034024562
3	0.10223907844441522
4	0.09975272793805776
5	0.09722471193661926
Temperature	20.0
1	0.09499194787662915
2	0.09237983894989377
3	0.08971086207155428
4	0.08698387290220766
5	0.08420073932485338
Temperature	30.0
1	0.08189361273587119
2	0.0790051370285898
3	0.07610454077754497
4	0.07322775135352041
5	0.07039026757051507
Temperature	40.0
1	0.06876912647737188
2	0.06588587563746337
3	0.062330295238832135
4	0.05894995816143968
5	0.05543535847245312
Temperature	50.0
1	0.04914363348670119
2	0.04653546504414954
3	0.044451653970306565
4	0.04275425833493808
5	0.041349611819276544

Table B243: Thermal Conductivity with Increasing Levels of Nitrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.1253188859501367
2	0.1232548034474483
3	0.12118130430830473
4	0.11909867150827463
5	0.11700722789421568
Temperature	10.0
1	0.11486950815875815
2	0.11278703696296262
3	0.11069409694799608
4	0.10859125985912314
5	0.10647918503501716
Temperature	20.0
1	0.10453027357325004
2	0.10241889996176431
3	0.10029675886838402
4	0.09816491479067052
5	0.09602467460391416
Temperature	30.0
1	0.09422340540276665
2	0.09207310983377422
3	0.08991508110924756
4	0.08775283578844115
5	0.08559077734298963
Temperature	40.0
1	0.08388565060197298
2	0.0817182575790537
3	0.07956174109165744
4	0.07742366792900689
5	0.0753122197463029
Temperature	50.0
1	0.07367169138219194
2	0.07158471889282672
3	0.06954810078967885
4	0.06757266317170028
5	0.0656662337103557

Table B244: Thermal Conductivity with Increasing Levels of Nitrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.017943430698105292
2	0.01798063653718778
3	0.018023817774235153
4	0.018072164611001505
5	0.018124961450899438
Temperature	10.0
1	0.01816825108467215
2	0.01823120762897669
3	0.018297708736197463
4	0.018367251306905908
5	0.018439383515388732
Temperature	20.0
1	0.018616853217016272
2	0.018690619388414896
3	0.018767091099463527
4	0.018845848528909786
5	0.018926517226024987
Temperature	30.0
1	0.019182088076678698
2	0.019261170260964112
3	0.01934255655866968
4	0.01942586555391831
5	0.01951075956975735
Temperature	40.0
1	0.01981791064648836
2	0.01989977044624639
3	0.019983697148179887
4	0.020069332778331648
5	0.020156362106658512
Temperature	50.0
1	0.020500472292086493
2	0.020583735993296534
3	0.020668902399695786
4	0.020755631026428405
5	0.020843623311847675

Table B245: Viscosity with Increasing Levels of Nitrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	110.43116161195718
2	106.99216867186853
3	103.6046792795413
4	100.26543370442839
5	96.97094515374052
Temperature	10.0
1	93.81446606400412
2	90.62613837378294
3	87.46345946038375
4	84.32089228779634
5	81.19219737851755
Temperature	20.0
1	78.37209504296649
2	75.24559099270431
3	72.09796784769176
4	68.91864545580908
5	65.69686223424844
Temperature	30.0
1	62.74273435948089
2	59.305693628243326
3	55.745781690381065
4	52.048728839727545
5	48.23671527940271
Temperature	40.0
1	43.44119832409349
2	39.1676520954925
3	35.43786961313674
4	32.54194254757937
5	30.34291518734478
Temperature	50.0
1	27.114583174091017
2	26.17581336839025
3	25.44412353335656
4	24.856385105090144
5	24.37317099250535

Table B246: Viscosity with Increasing Levels of Nitrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	119.69543655334083
2	116.38314994152128
3	113.13648904866714
4	109.95388619650397
5	106.83379648864859
Temperature	10.0
1	103.79765049630235
2	100.83629417715335
3	97.92836344776947
4	95.07244013122016
5	92.2671226996682
Temperature	20.0
1	89.75324134230176
2	87.06391551268887
3	84.41618038274164
4	81.80878069712287
5	79.24066952000076
Temperature	30.0
1	77.08654988511744
2	74.5917350221448
3	72.12921628119587
4	69.69981782060673
5	67.30510189882888
Temperature	40.0
1	65.35721526181051
2	63.00732267074612
3	60.693489134895
4	58.421172636823485
5	56.197550892481445
Temperature	50.0
1	54.30057071007397
2	52.13200344459227
3	50.039050918277404
4	48.03410535391769
5	46.12809649232125

Table B247: Viscosity with Increasing Levels of Nitrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.471341977889207
2	14.49585838019605
3	14.521111642236297
4	14.547007463500998
5	14.573463842740303
Temperature	10.0
1	14.871973077258138
2	14.899255067083544
3	14.927098020483555
4	14.955426669009372
5	14.984175421245554
Temperature	20.0
1	15.29396182589332
2	15.322786133551219
3	15.352089781113992
4	15.381805595722886
5	15.41187506006149
Temperature	30.0
1	15.727517123650411
2	15.7573136059559
3	15.787540272649485
4	15.818134895909212
5	15.849043267398574
Temperature	40.0
1	16.167663864279994
2	16.198113702121475
3	16.228958994572395
4	16.260141142535485
5	16.291609090078108
Temperature	50.0
1	16.611501722562064
2	16.642404620247994
3	16.673675898916514
4	16.70525988133857
5	16.73710804207269

Table B248: Density with Increasing Levels of Oxygen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	965.5024076339824
2	956.7574332810299
3	947.8022351041844
4	938.6217849363976
5	929.1992484524238
Temperature	10.0
1	910.4144972688958
2	900.0565836442839
3	889.3521021860394
4	878.2661183438296
5	866.7576306353739
Temperature	20.0
1	843.6948985998932
2	830.4620983952026
3	816.5251377258253
4	801.7805672270556
5	786.1030709286699
Temperature	30.0
1	753.2152736841949
2	733.3003188682803
3	711.351179573795
4	686.8195444737553
5	658.9981980841083
Temperature	40.0
1	590.2275882108923
2	546.2419342706984
3	499.52328400791544
4	455.98074502985304
5	419.3612554066708
Temperature	50.0
1	361.14316032691346
2	342.5521393661128
3	327.2582122230149
4	314.3895239057161
5	303.3523308823299

Table B249: Density with Increasing Levels of Oxygen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	992.1119084418813
2	984.575259704297
3	976.9199114867813
4	969.1410184346786
5	961.2334510166877
Temperature	10.0
1	945.9530150965165
2	937.5751696718407
3	929.0406839858159
4	920.3421180396356
5	911.4714221644276
Temperature	20.0
1	894.6613736155325
2	885.1600684976562
3	875.4406700566267
4	865.4904748086851
5	855.2960344739666
Temperature	30.0
1	836.1884149942887
2	825.0986364212686
3	813.6965377218933
4	801.9666119246265
5	789.8934623402437
Temperature	40.0
1	767.3227880498736
2	754.00656458712
3	740.269413575949
4	726.1006131424615
5	711.4968907118024
Temperature	50.0
1	684.1033314179535
2	668.0462580899411
3	651.6313392200092
4	634.9224716597312
5	617.9998747180238

Table B250: Density with Increasing Levels of Oxygen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	76.51123887200914
2	75.7243935712668
3	74.97126709065628
4	74.24881967028006
5	73.5544131702477
Temperature	10.0
1	70.4070493789279
2	69.82248057313922
3	69.25615184713921
4	68.70683468144118
5	68.17342148323097
Temperature	20.0
1	65.67671189668899
2	65.20978598941927
3	64.7542916911731
4	64.30960730865561
5	63.875160259200285
Temperature	30.0
1	61.81278472696701
2	61.42307496935963
3	61.041182746730364
4	60.66674749151056
5	60.29943237524928
Temperature	40.0
1	58.550637169349486
2	58.21553057485183
3	57.88608521485881
4	57.56207220827229
5	57.24327574487265
Temperature	50.0
1	55.732787557087136
2	55.438308285869574
3	55.14809990817852
4	54.86200776572419
5	54.57988500080736

Table B251: Density with Increasing Levels of Oxygen at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	591.5818657703846
2	333.1314325058085
3	231.45683892394842
4	177.10384629739744
5	1004.8092641529347
Temperature	-55.0
Temperature	-55.0
1	765.0356201921961
2	451.08032476826975
3	319.3217912620951
4	246.82543989698144
5	200.95259395805013

Table B252: Density with Increasing Levels of Oxygen at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	1156.3699692432697
2	1150.4898785949608
3	1144.5432450112457
4	1137.3228374697123
5	1004.8092641529347
Temperature	-55.0

Table B253: Density with Increasing Levels of Oxygen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	1163.0803635902253
2	1157.3896581891506
3	1151.6408030538269
4	1145.8319602803858
5	1139.9611841078474

Table B254: Joule-Thomson Coefficient with Increasing Levels of Oxygen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.2099150394824881
2	0.2335057396488146
3	0.25886325544486366
4	0.28617584955818975
5	0.3156599042990081
Temperature	10.0
1	0.39869048534793666
2	0.43736619589079806
3	0.4796577716693459
4	0.5260744091210895
5	0.5772204535385052
Temperature	20.0
1	0.7146445170848944
2	0.7867245107197162
3	0.8677615429156033
4	0.9593481653093765
5	1.063491088837513
Temperature	30.0
1	1.3438985975388509
2	1.5112241704796074
3	1.7111729853027502
4	1.9531480864747106
5	2.248127976887115
Temperature	40.0
1	3.122133038907637
2	3.6665145589195856
3	4.232516746806609
4	4.737515438724307
5	5.139462215230115
Temperature	50.0
1	5.815775776040195
2	5.95217390146012
3	6.041002824581122
4	6.094717520240594
5	6.122117622097701

Table B255: Joule-Thomson Coefficient with Increasing Levels of Oxygen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.10434776265868827
2	0.11935794892346854
3	0.135197612508057
4	0.15192232238821868
5	0.1695923495812353
Temperature	10.0
1	0.22228580878952237
2	0.24372255150725916
3	0.26645522157191365
4	0.2905867605687036
5	0.316231679008041
Temperature	20.0
1	0.3868697349043301
2	0.4185490242483375
3	0.45240981322818774
4	0.48863848965235157
5	0.5274302143405201
Temperature	30.0
1	0.6277648258558194
2	0.676497017752802
3	0.7287922368161813
4	0.7849113149932009
5	0.8451391053857313
Temperature	40.0
1	0.9938308140416375
2	1.0700455069713157
3	1.1519202225922176
4	1.2396584743051382
5	1.3332914984591042
Temperature	50.0
1	1.556412796431561
2	1.6700626722192764
3	1.788819683454854
4	1.912176475729823
5	2.0393255177834

Table B256: Joule-Thomson Coefficient with Increasing Levels of Oxygen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	13.90099456524989
2	13.654391371757562
3	13.414480829058013
4	13.180877898811582
5	12.953240854398963
Temperature	10.0
1	12.533096924829687
2	12.323411714531558
3	12.11855358128002
4	11.918313837610006
5	11.722502787196586
Temperature	20.0
1	11.381310647491052
2	11.198904755836423
3	11.020304299925138
4	10.845390931920537
5	10.674053744405846
Temperature	30.0
1	10.392862245312328
2	10.232249591907287
3	10.074793568866392
4	9.92039791215517
5	9.768968053711449
Temperature	40.0
1	9.535118381570358
2	9.392348806492627
3	9.252194491120408
4	9.11457827408406
5	8.979427694935733
Temperature	50.0
1	8.783307688092965
2	8.655245907875877
3	8.529401898689105
4	8.405722073958305
5	8.28415559866035

Table B257: Joule-Thomson Coefficient with Increasing Levels of Oxygen at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	28.778598184431576
2	28.20689947015661
3	27.649062844878546
4	27.104675187688574
5	26.57333759339812
Temperature	-70.0
1	30.949434605237602
2	30.318625392169984
3	29.70357661337752
4	29.103805366404917
5	28.51884565554523
Temperature	-75.0
1	33.377853268795945
2	32.6790302692381
3	31.998216090757897
4	31.334843453863773
5	30.688365268772376

Table B258: Joule-Thomson Coefficient with Increasing Levels of Oxygen at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	28.778598184431576
2	28.20689947015661
3	27.649062844878546
4	27.104675187688574
5	26.57333759339812
Temperature	-70.0
1	30.949434605237602
2	30.318625392169984
3	29.70357661337752
4	29.103805366404917
5	28.51884565554523
Temperature	-75.0
1	33.377853268795945
2	32.6790302692381
3	31.998216090757897
4	31.334843453863773
5	30.688365268772376

Table B259: Joule-Thomson Coefficient with Increasing Levels of Oxygen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	28.778598184431576
2	28.20689947015661
3	27.649062844878546
4	27.104675187688574
5	26.57333759339812
Temperature	-70.0
1	30.949434605237602
2	30.318625392169984
3	29.70357661337752
4	29.103805366404917
5	28.51884565554523
Temperature	-75.0
1	33.377853268795945
2	32.6790302692381
3	31.998216090757897
4	31.334843453863773
5	30.688365268772376

Table B260: Speed of Sound with Increasing Levels of Oxygen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	628.5952349476963
2	616.163051377445
3	603.5986956918772
4	590.891548355456
5	578.0299013774951
Temperature	10.0
1	550.2937207742948
2	536.6892334323626
3	522.8631146606325
4	508.7996205329823
5	494.48363447585245
Temperature	20.0
1	463.7363708225192
2	448.3295914642672
3	432.60977596734307
4	416.5728977282673
5	400.2164073203087
Temperature	30.0
1	365.03242862798976
2	347.1925798011929
3	328.8957810383438
4	310.181780974049
5	291.2665716018084
Temperature	40.0
1	251.76299997184952
2	236.62562264868546
3	226.42043684195042
4	221.4102480132406
5	219.77793318266708
Temperature	50.0
1	219.92401313820233
2	221.98455273294624
3	224.20655685088272
4	226.48455078995326
5	228.76241514320338

Table B261: Speed of Sound with Increasing Levels of Oxygen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	684.6292107514744
2	674.0272815472752
3	663.4015204660262
4	652.7501959719523
5	642.0716010678676
Temperature	10.0
1	619.5178815391141
2	608.6100394034747
3	597.6670886266842
4	586.6884949312373
5	575.6745160549639
Temperature	20.0
1	552.7171744584022
2	541.4581294166122
3	530.1731944171487
4	518.8697174804986
5	507.55706812982993
Temperature	30.0
1	484.3197869095854
2	472.87905223470506
3	461.4843026001082
4	450.15621770586563
5	438.9166260982274
Temperature	40.0
1	416.1859306855406
2	405.1390639354652
3	394.2705382745727
4	383.61249367657456
5	373.2079929339682
Temperature	50.0
1	352.4752071532772
2	342.93017881477755
3	333.9126651824912
4	325.49826610638064
5	317.7544043311453

Table B262: Speed of Sound with Increasing Levels of Oxygen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	222.96514906829083
2	224.3574993851804
3	225.7125988647052
4	227.0335254083448
5	228.32298353530948
Temperature	10.0
1	232.68708509676043
2	233.8676721851484
3	235.02659468014653
4	236.16521249796273
5	237.28478688609334
Temperature	20.0
1	240.99319299308462
2	242.04577837997215
3	243.0844206291055
4	244.10998781192023
5	245.1232925931536
Temperature	30.0
1	248.37835706043103
2	249.3474163969486
3	250.30715913739198
4	251.25806272231165
5	252.20055543023997
Temperature	40.0
1	255.11573862475103
2	256.02603159908057
3	256.92947180946726
4	257.826351710467
5	258.7169576831182
Temperature	50.0
1	261.35988205394136
2	262.22554939715815
3	263.0861033198548
4	263.941800636607
5	264.79289195935047

Table B263: Thermal Conductivity with Increasing Levels of Oxygen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.11896351651958208
2	0.1169205025350456
3	0.114868885510245
4	0.1128086635084107
5	0.11073967486150388
Temperature	10.0
1	0.10738371238453258
2	0.1052802146572738
3	0.10316026778023035
4	0.10102349165828436
5	0.09886924887985117
Temperature	20.0
1	0.09535243008102284
2	0.093124975533948
3	0.09086697851355667
4	0.08857819832131567
5	0.08625924500291277
Temperature	30.0
1	0.08235030030728832
2	0.07993527319111485
3	0.07751404507892527
4	0.07511365533880117
5	0.07276235517515273
Temperature	40.0
1	0.06929902006166419
2	0.06700364467322548
3	0.06381027485323393
4	0.059831428218746555
5	0.05544139839220822
Temperature	50.0
1	0.04890818802172637
2	0.04609507218397687
3	0.04385802765522834
4	0.04205299071690764
5	0.04057546194708996

Table B264: Thermal Conductivity with Increasing Levels of Oxygen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.12549159318595723
2	0.12360969682584641
3	0.12172826194158352
4	0.11984785708427258
5	0.11796899043406456
Temperature	10.0
1	0.1150709260216312
2	0.11319904878926554
3	0.11132632820975215
4	0.10945358986151481
5	0.10758156652813
Temperature	20.0
1	0.10476514814945785
2	0.10289677498539689
3	0.10102609007209823
4	0.09915414203323382
5	0.09728188469315836
Temperature	30.0
1	0.09449470343391986
2	0.09262093490466979
3	0.090744251454074
4	0.0888670114130864
5	0.08699173104034423
Temperature	40.0
1	0.08418924791919334
2	0.08232177538730331
3	0.08045925967381673
4	0.07860612672042665
5	0.07676673908045009
Temperature	50.0
1	0.07398457651939226
2	0.07218913051043714
3	0.07041858472848748
4	0.06867964152199334
5	0.06697658887067884

Table B265: Thermal Conductivity with Increasing Levels of Oxygen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.01791997651136146
2	0.017934252218257986
3	0.017955571025165373
4	0.017983477275895957
5	0.018017485837477448
Temperature	10.0
1	0.018148539267913006
2	0.018192812914832546
3	0.018241793903672202
4	0.01829510220195469
5	0.0183523867550275
Temperature	20.0
1	0.018597962947189094
2	0.018654648005032803
3	0.01871565998427155
4	0.018780482387392636
5	0.018848689837746832
Temperature	30.0
1	0.019163536927153772
2	0.019226445303477217
3	0.019293656032705015
4	0.019364548341907657
5	0.019438626919109605
Temperature	40.0
1	0.01979974881942887
2	0.019866191542155444
3	0.01993695750232004
4	0.020011362047052828
5	0.0200888631531953
Temperature	50.0
1	0.020482852381077103
2	0.020551464971784672
3	0.02062439958453551
4	0.020700936918297445
5	0.02078050821244605

Table B266: Viscosity with Increasing Levels of Oxygen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	110.79190153457218
2	107.72060409069553
3	104.70783893839446
4	101.7505698514611
5	98.84569495764839
Temperature	10.0
1	94.18090149816143
2	91.37028765557046
3	88.5975673585674
4	85.85844757313505
5	83.14822559076323
Temperature	20.0
1	78.76761074857438
2	76.05720790739991
3	73.34872292700943
4	70.63383496611672
5	67.90319556660054
Temperature	30.0
1	63.2085578182037
2	60.27055779360829
3	57.23858440734625
4	54.07809682028485
5	50.75166572989216
Temperature	40.0
1	43.90613892743793
2	39.84496561441961
3	35.97103798381242
4	32.72856904686515
5	30.224474463607315
Temperature	50.0
1	27.035208381194693
2	26.03826587589351
3	25.26896886688987
4	24.65944736227739
5	24.16594349203263

Table B267: Viscosity with Increasing Levels of Oxygen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	120.009447686312
2	117.01370100235044
3	114.08546492999685
4	111.22256698759313
5	108.42288966151546
Temperature	10.0
1	104.09862771847706
2	101.44094636478582
3	98.8388254031914
4	96.29028883693455
5	93.79337052875452
Temperature	20.0
1	90.047406291914
2	87.65514472001335
3	85.30671630135366
4	83.00012679228367
5	80.73346051180592
Temperature	30.0
1	77.37919203866875
2	75.17947596142923
3	73.01309692988913
4	70.8789218414278
5	68.77599684219194
Temperature	40.0
1	65.65128139829493
2	63.589812657043204
3	61.55539610148496
4	59.54889540534374
5	57.57189049138479
Temperature	50.0
1	54.56684444376925
2	52.639453295111224
3	50.75622221180023
4	48.92405021079251
5	47.1501617361516

Table B268: Viscosity with Increasing Levels of Oxygen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.475814992319012
2	14.506271411816432
3	14.538688358578463
4	14.572786441278753
5	14.608339307289606
Temperature	10.0
1	14.878975704602611
2	14.914449894635778
3	14.951482341184084
4	14.989852322506952
5	15.029381200787927
Temperature	20.0
1	15.3027933599986
2	15.341490726877218
3	15.381541271316939
4	15.422751782420942
5	15.464966343077721
Temperature	30.0
1	15.737803056216276
2	15.778833637400304
3	15.82109007891257
4	15.864396098175247
5	15.908609776587577
Temperature	40.0
1	16.179173662114952
2	16.222016545639317
3	16.26599643125757
4	16.310949123934844
5	16.35674268215997
Temperature	50.0
1	16.624080549638215
2	16.668397396205695
3	16.71378438551634
4	16.760086740040357
5	16.807180268965986

Table B269: Density with Increasing Levels of Carbon Monoxide at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	1159.009536082719
2	1149.2584452911592
3	1139.459103307836
4	1129.609082562909
5	1066.2981419817593

Table B270: Joule-Thomson Coefficient with Increasing Levels of Carbon Monoxide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.2140252494081499
2	0.2423534222958506
3	0.2731704630165857
4	0.30677744359350406
5	0.34352624053989994
Temperature	10.0
1	0.4051946976311228
2	0.4515566943814947
3	0.5029527903846448
4	0.560186234844103
5	0.6242253468251642
Temperature	20.0
1	0.7260043410525362
2	0.8121037553379612
3	0.9104775208073891
4	1.0235796732773725
5	1.1546194226220179
Temperature	30.0
1	1.3675019562581232
2	1.566678807288463
3	1.8100230492723979
4	2.11046161080794
5	2.481011122237018
Temperature	40.0
1	3.186038626316114
2	3.798385995314074
3	4.39752216366953
4	4.895686382264677
5	5.259765161310179
Temperature	50.0
1	5.823182661820956
2	5.956297683332939
3	6.036727608102239
4	6.079756765428199
5	6.095601734546764

Table B271: Joule-Thomson Coefficient with Increasing Levels of Carbon Monoxide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.10687955714477973
2	0.12471205222976071
3	0.14368990608424906
4	0.16389619062824584
5	0.18542115596868655
Temperature	10.0
1	0.22584477367562855
2	0.2512600510505408
3	0.27843255316812576
4	0.3075124542992056
5	0.3386674191954894
Temperature	20.0
1	0.39193444266327454
2	0.42932097000416986
3	0.4695990179468223
4	0.513021742462179
5	0.5598463913762941
Temperature	30.0
1	0.635114079341728
2	0.6921269617912114
3	0.753693318331891
4	0.8201323409042217
5	0.8917858422864302
Temperature	40.0
1	1.0044041847454608
2	1.0924144617908604
3	1.1872664769558259
4	1.2889911628654662
5	1.3973009505878837
Temperature	50.0
1	1.5704750985514648
2	1.6986525003464452
3	1.832010759380417
4	1.9695449945550547
5	2.1096876613232682

Table B272: Joule-Thomson Coefficient with Increasing Levels of Carbon Monoxide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	13.88935406051255
2	13.632110112595988
3	13.382435822933441
4	13.139846065904743
5	12.903912934474103
Temperature	10.0
1	12.524242401513712
2	12.306314139779007
3	12.09376499243629
4	11.88633634195261
5	11.683798172225648
Temperature	20.0
1	11.374273781869467
2	11.185261194593924
3	11.000461303590074
4	10.819736427141526
5	10.64295750481973
Temperature	30.0
1	10.387195702476157
2	10.221259659100618
3	10.05880309216316
4	9.899707721456078
5	9.743855985939728
Temperature	40.0
1	9.530534748682749
2	9.383438841638139
3	9.239195844436578
4	9.097710921545623
5	8.958896270096409
Temperature	50.0
1	8.779557428251662
2	8.647939407910107
3	8.518721870736265
4	8.391841246764354
5	8.267237605680407

Table B273: Joule-Thomson Coefficient with Increasing Levels of Carbon Monoxide at 0.1MPa

Mole Percentage	Property
Temperature	-50.0
1	28.764142602670663
2	28.178111320482515
3	27.606109113669973
4	27.047762916300876
5	26.502710167293355
Temperature	-70.0
1	30.935006666096356
2	30.28973356851141
3	29.660245071888266
4	29.046113475569697
5	28.446923328063754
Temperature	-75.0
1	33.36393585617372
2	32.65093612160982
3	31.955766885774423
4	31.27793570986371
5	30.616964495199614

Table B274: Joule-Thomson Coefficient with Increasing Levels of Carbon Monoxide at 0.4MPa

Mole Percentage	Property
Temperature	-50.0
1	28.764142602670663
2	28.178111320482515
3	27.606109113669973
4	27.047762916300876
5	26.502710167293355
Temperature	-70.0
1	30.935006666096356
2	30.28973356851141
3	29.660245071888266
4	29.046113475569697
5	28.446923328063754
Temperature	-75.0
1	33.36393585617372
2	32.65093612160982
3	31.955766885774423
4	31.27793570986371
5	30.616964495199614

Table B275: Joule-Thomson Coefficient with Increasing Levels of Carbon Monoxide at 0.7MPa

Mole Percentage	Property
Temperature	-50.0
1	28.764142602670663
2	28.178111320482515
3	27.606109113669973
4	27.047762916300876
5	26.502710167293355
Temperature	-70.0
1	30.935006666096356
2	30.28973356851141
3	29.660245071888266
4	29.046113475569697
5	28.446923328063754
Temperature	-75.0
1	33.36393585617372
2	32.65093612160982
3	31.955766885774423
4	31.27793570986371
5	30.616964495199614

Table B276: Speed of Sound with Increasing Levels of Carbon Monoxide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	626.984738349406
2	612.9007104354397
3	598.6410490517692
4	584.1925445416937
5	569.5405865202449
Temperature	10.0
1	548.5202217665935
2	533.0864940181393
3	517.3727627872192
4	501.36201430548294
5	485.0401519830992
Temperature	20.0
1	461.751887876703
2	444.30062161346933
3	426.48554824418227
4	408.3163847517747
5	389.806347156027
Temperature	30.0
1	362.84374684647025
2	342.780940366804
3	322.2703378740113
4	301.504974811173
5	281.0556233798174
Temperature	40.0
1	250.14531126917808
2	234.70805670691396
3	225.69592672977507
4	222.1287981109009
5	221.71207432205654
Temperature	50.0
1	220.43107574590968
2	222.99027229417047
3	225.6846975079248
4	228.40688123379613
5	231.1019594165022

Table B277: Viscosity with Increasing Levels of Methane at 10MPa

Mole Percentage	Property
Temperature	0.0
1	110.68759524810689
2	107.53267062753369
3	104.457375890002
4	101.45917849759766
5	98.5355849253118
Temperature	10.0
1	94.16021474299234
2	91.35257929654847
3	88.607896446084
4	85.92358210880187
5	83.2970250873378
Temperature	20.0
1	78.85282864401465
2	76.26270981282246
3	73.71389225858806
4	71.20318786541043
5	68.72745859325146
Temperature	30.0
1	63.4750005660176
2	60.87935753645449
3	58.286055502621885
4	55.687807045111
5	53.07795995434698
Temperature	40.0
1	44.698181112703914
2	41.594585538417604
3	38.61120586680594
4	35.889459696697365
5	33.536291258260505
Temperature	50.0
1	27.377396817024714
2	26.56574315878367
3	25.886224197975384
4	25.30678731827103
5	24.804985505037173

Table B278: Viscosity with Increasing Levels of Methane at 15MPa

Mole Percentage	Property
Temperature	0.0
1	119.85731683650917
2	116.72640086677191
3	113.67984857448639
4	110.71538072354186
5	107.8307774916621
Temperature	10.0
1	104.01161514178399
2	101.28299903119584
3	98.62605891510965
4	96.0388815577038
5	93.51959662272405
Temperature	20.0
1	90.0252804791361
2	87.62735001654976
3	85.29005554844962
4	83.0117597034625
5	80.79088668557581
Temperature	30.0
1	77.42786863677154
2	75.29504636747849
3	73.21387424026145
4	71.18344631413382
5	69.20292046332567
Temperature	40.0
1	65.7772809173948
2	63.86377663379051
3	61.998344634582146
4	60.18082362372556
5	58.41122929815309
Temperature	50.0
1	54.784171514175654
2	53.09078482400935
3	51.45312970566307
4	49.872672749348794
5	48.35064850669549

Table B279: Viscosity with Increasing Levels of Methane at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.421055475281685
2	14.394805927093117
3	14.368898401058955
4	14.343306121171517
5	14.318001245432491
Temperature	10.0
1	14.821928590143552
2	14.79867288591967
3	14.775555250822144
4	14.752557940211442
5	14.729662747455489
Temperature	20.0
1	15.243876012976447
2	15.222112568947063
3	15.20038924211366
4	15.178690710110523
5	15.157001672757842
Temperature	30.0
1	15.677234281896686
2	15.65624219438687
3	15.635232116463712
4	15.614189677198922
5	15.593100817167159
Temperature	40.0
1	16.117098216530685
2	16.096476257335
3	16.07579720973602
4	16.05504719865382
5	16.034212830434882
Temperature	50.0
1	16.56060818586157
2	16.540112996051505
3	16.519532021110997
4	16.49885170160043
5	16.478059057292

Table B280: Density with Increasing Levels of Carbon Monoxide at 10MPa

Mole Percentage	Property
Temperature	0.0
1	961.4292410306897
2	948.5947235971341
3	935.5294485256012
4	922.2135497434936
5	908.6245121494768
Temperature	10.0
1	906.2441701215321
2	891.6739843305575
3	876.7052913725169
4	861.2906506330327
5	845.3733626495373
Temperature	20.0
1	839.3087718663373
2	821.5794455201199
3	803.0059604950311
4	783.447997001447
5	762.7328757957227
Temperature	30.0
1	748.2677964081817
2	723.059596515635
3	695.3273937966034
4	664.3399192461144
5	629.2629154220119
Temperature	40.0
1	583.3749998623008
2	532.4438794578741
3	481.1301699577413
4	436.4311266803244
5	400.8118422264683
Temperature	50.0
1	358.8043818699361
2	338.81115022154455
3	322.615996482266
4	309.1268464319029
5	297.63414903553155

Table B281: Density with Increasing Levels of Carbon Monoxide at 15MPa

Mole Percentage	Property
Temperature	0.0
1	988.1953400991621
2	976.7502156097801
3	965.1942297952377
4	953.5223364297104
5	941.7292729983773
Temperature	10.0
1	942.0346168101619
2	929.7441376540378
3	917.302628381341
4	904.7025353905303
5	891.9357262501696
Temperature	20.0
1	890.7292440285908
2	877.2984645635379
3	863.6520758065536
4	849.7775784774849
5	835.6624240253478
Temperature	30.0
1	832.2263381444872
2	817.1761759707263
3	801.818830119928
4	786.1439609257034
5	770.1431534698283
Temperature	40.0
1	763.3321253852904
2	746.044486305957
3	728.3684815834706
4	710.3129362466024
5	691.9025981400156
Temperature	50.0
1	680.1694916131896
2	660.2882563182101
3	640.2055807366427
4	620.0364996589279
5	599.9171180631766

Table B282: Density with Increasing Levels of Carbon Monoxide at 3MPa

Mole Percentage	Property
Temperature	0.0
1	76.41725288518114
2	75.5404772589423
3	74.700908468977
4	73.89504659555448
5	73.11987509803419
Temperature	10.0
1	70.32710660667276
2	69.66476148499481
3	69.0226024965286
4	68.39921031292323
5	67.79331115921696
Temperature	20.0
1	65.60554722563828
2	65.06880736073009
3	64.54473926419716
4	64.0326223412662
5	63.531795165116854
Temperature	30.0
1	61.747834546161926
2	61.29409223555693
3	60.84902085349565
4	60.412201128238294
5	59.98324246778347
Temperature	40.0
1	58.490418457656986
2	58.09575104130207
3	57.70736188849911
4	57.324984377148844
5	56.94836780697376
Temperature	50.0
1	55.67634845374624
2	55.32592035900241
3	54.980226036462156
4	54.63908532081181
5	54.302327580063455

Table B283: Density with Increasing Levels of Carbon Monoxide at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	529.2824699823407
2	312.14452204237233
3	220.86552444545617
4	170.61449351199676
5	828.82978811486
Temperature	-55.0
Temperature	-55.0
1	665.7398756939448
2	414.1989681141001
3	300.0342539468869
4	234.82312092129774
5	192.64367807800048

Table B284: Speed of Sound with Increasing Levels of Methane at 10MPa

Mole Percentage	Property
Temperature	0.0
1	631.140071201212
2	621.2779938507672
3	611.3191333340707
4	601.2641437086176
5	591.1137410538031
Temperature	10.0
1	552.9494847218003
2	542.0814565156608
3	531.0880829165192
4	519.9698321404103
5	508.72805353427947
Temperature	20.0
1	466.74238625722853
2	454.4990163955752
3	442.1168697892278
4	429.6085647731367
5	416.9898217028858
Temperature	30.0
1	368.7370355170244
2	354.90818205105813
3	340.9813939021643
4	327.00491411679434
5	313.07840329158597
Temperature	40.0
1	256.3825089990808
2	244.77953214094563
3	235.684403148525
4	229.47280450915798
5	225.8816942876488
Temperature	50.0
1	219.79173016755863
2	221.544027127542
3	223.41676024965406
4	225.36337230103635
5	227.35525527805495

Table B285: Speed of Sound with Increasing Levels of Methane at 15MPa

Mole Percentage	Property
Temperature	0.0
1	687.20445705054
2	679.186426684384
3	671.158301888161
4	663.123540654113
5	655.0856994830631
Temperature	10.0
1	622.097019288238
2	613.799059272607
3	605.501908372734
4	597.2099489057556
5	588.9279262380155
Temperature	20.0
1	555.3872598093269
2	546.847734429034
3	538.334152015159
4	529.8551628611444
5	521.4202042649773
Temperature	30.0
1	487.1416737152195
2	478.5735094561943
3	470.09790625652334
4	461.73004822897593
5	453.485263830578
Temperature	40.0
1	419.1530525668925
2	411.1000841291292
3	403.2415161996248
4	395.59265837104357
5	388.1701269529072
Temperature	50.0
1	355.4603623576826
2	348.803501568227
3	342.5255181707093
4	336.6517680136949
5	331.2023020655982

Table B286: Speed of Sound with Increasing Levels of Methane at 3MPa

Mole Percentage	Property
Temperature	0.0
1	222.82548236975884
2	224.12151908010387
3	225.42030640292444
4	226.72200677652884
5	228.0267922166488
Temperature	10.0
1	232.68052358528362
2	233.88348701854764
3	235.0922714880607
4	236.30692062475362
5	237.527492629697
Temperature	20.0
1	241.07107885515188
2	242.22345039737021
3	243.38294234959932
4	244.5496509554536
5	245.72368405063511
Temperature	30.0
1	248.51503772999834
2	249.63852795671855
3	250.7699994104263
4	251.909532264284
5	253.05720660981532
Temperature	40.0
1	255.2962452768386
2	256.40241958298174
3	257.5168773371529
4	258.63969004478
5	259.7709371401274
Temperature	50.0
1	261.57509075244013
2	262.66975687610324
3	263.77293562678324
4	264.8847318585386
5	266.0052575754938

Table B287: Speed of Sound with Increasing Levels of Methane at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	941.3648751941394
2	934.1830894801913
3	926.8393781621622
4	919.3363963260446
5	911.6768877883613
Temperature	-55.0

Table B288: Speed of Sound with Increasing Levels of Methane at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	958.990823332655
2	952.1999110358165
3	945.2660749092395
4	938.1930293369179
5	930.9846396694804

Table B289: Thermal Conductivity with Increasing Levels of Methane at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.11944863412588788
2	0.11789879420860759
3	0.1163481153324078
4	0.11479643163698701
5	0.11324355842439383
Temperature	10.0
1	0.10788637863736922
2	0.10629706460322604
3	0.10470258929175377
4	0.10310259697164613
5	0.10149670431908121
Temperature	20.0
1	0.09588510417863991
2	0.0942083835776652
3	0.09251916925467055
4	0.0908171693461762
5	0.08910240095376788
Temperature	30.0
1	0.08293362726509809
2	0.08111973134517073
3	0.07930535414906713
4	0.07749988668595953
5	0.07571370320019047
Temperature	40.0
1	0.06981511150848937
2	0.06821046643771167
3	0.06639358248606239
4	0.06417453630619699
5	0.06168435344798745
Temperature	50.0
1	0.0502097587113958
2	0.04831234682733146
3	0.04671728144566252
4	0.04536534165153126
5	0.04421088274880944

Table B290: Thermal Conductivity with Increasing Levels of Methane at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.1259737477188931
2	0.12457960292609735
3	0.12319104244409983
4	0.12180823806265154
5	0.12043136213991872
Temperature	10.0
1	0.11556167596594984
2	0.1141873903591786
3	0.11281841595997312
4	0.11145500679640571
5	0.11009741823171781
Temperature	20.0
1	0.1052666716358457
2	0.10390824913125876
3	0.1025550576980864
4	0.10120742768632204
5	0.09986569738056617
Temperature	30.0
1	0.09501079752846332
2	0.09366354799905913
3	0.09232223447111353
4	0.09098771414701601
5	0.0896609423390976
Temperature	40.0
1	0.08472267881367045
2	0.08339880566229627
3	0.08208699583705502
4	0.08078884752613893
5	0.079505947116388
Temperature	50.0
1	0.07452946818742942
2	0.07328347125658807
3	0.0720615473912158
4	0.07086611079279093
5	0.06969916924727076

Table B291: Thermal Conductivity with Increasing Levels of Methane at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.01802332110205556
2	0.018134664082717678
3	0.01824720546484151
4	0.01836096927543841
5	0.018475966007505205
Temperature	10.0
1	0.018235509667211307
2	0.018362441409621625
3	0.018490242130440412
4	0.018618935661817222
5	0.018748535810697072
Temperature	20.0
1	0.018679546005097542
2	0.018813803798202723
3	0.018949039269100583
4	0.01908523938345098
5	0.019222384839514
Temperature	30.0
1	0.019243274475400623
2	0.019381205921275305
3	0.01952103382849185
4	0.019662241524619477
5	0.01980480864504101
Temperature	40.0
1	0.019881220220178252
2	0.0200254245455495
3	0.020171113788077216
4	0.020318256220810856
5	0.020466818792633575
Temperature	50.0
1	0.020567374434087016
2	0.02071685479438258
3	0.02086790351143627
4	0.021020478316298347
5	0.02117453754947992

Table B292: Density with Increasing Levels of Methane at 15MPa

Mole Percentage	Property
Temperature	0.0
1	986.8909510712442
2	974.2804935038546
3	961.703019887242
4	949.1584989931284
5	936.6469164515274
Temperature	10.0
1	941.2773546269627
2	928.3972703556507
3	915.540690834288
4	902.7074447602014
5	889.8973714788509
Temperature	20.0
1	890.6488302897172
2	877.3497988519763
3	864.0586660413529
4	850.7748348973504
5	837.4978318648053
Temperature	30.0
1	833.0331204540342
2	819.0711427758137
3	805.0964422730158
4	791.1105846364592
5	777.1158301464119
Temperature	40.0
1	765.3374189089446
2	750.4198396406556
3	735.4864347153804
4	720.5450052964065
5	705.6053763196994
Temperature	50.0
1	683.7326331005539
2	667.7687415550378
3	651.89287533215
4	636.137905108473
5	620.537304244602

Table B293: Density with Increasing Levels of Methane at 3MPa

Mole Percentage	Property
Temperature	0.0
1	76.5119895922478
2	75.69971531777324
3	74.89820264563778
4	74.10715743738706
5	73.32629806565669
Temperature	10.0
1	70.33580602929091
2	69.66639447666617
3	69.00292937366073
4	68.345344867807
5	67.69357186045156
Temperature	20.0
1	65.57079491704485
2	64.98974814139781
3	64.41259356532663
4	63.83931489365057
5	63.26989212153945
Temperature	30.0
1	61.68862298159195
2	61.16933727674698
3	60.65284112708838
4	60.13913105138308
5	59.62820072509749
Temperature	40.0
1	58.41663250696979
2	57.94372385296919
3	57.47292419481803
4	57.00423352171504
5	56.53764982398833
Temperature	50.0
1	55.593646034585504
2	55.15723994001571
3	54.72248499000427
4	54.28938219515078
5	53.857931146955146

Table B294: Density with Increasing Levels of Methane at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	1142.4303102922795
2	506.90111310745124
3	300.8686260565369
4	213.1106876703595
5	1098.8799006198446
Temperature	-55.0
Temperature	-55.0
1	1161.000392041436
2	847.9283511216594
3	473.43269368163016
4	327.07189613797476
5	249.0800210412882

Table B295: Density with Increasing Levels of Methane at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	1149.454968692381
2	1136.7590682347707
3	1124.0980017543984
4	1111.4716612820382
5	1098.8799006198446
Temperature	-55.0

Table B296: Density with Increasing Levels of Methane at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	1156.1147046074025
2	1143.554251757947
3	1131.0334473782302
4	1118.552419884575
5	1106.1112760150743

Table B297: Joule-Thomson Coefficient with Increasing Levels of Methane at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.20586236883271433
2	0.22490675504425142
3	0.2451423509245942
4	0.26665990125041455
5	0.28955910420278497
Temperature	10.0
1	0.3922665934070538
2	0.4234347536146174
3	0.4569056119032351
4	0.49290365234470945
5	0.5316804190585196
Temperature	20.0
1	0.7024568655303176
2	0.7594262967937423
3	0.8216661987183588
4	0.8897793232943538
5	0.9644469590268406
Temperature	30.0
1	1.3135415967267767
2	1.4391022037893892
3	1.5809673179204637
4	1.7418998776399983
5	1.92466162082202
Temperature	40.0
1	2.994840079645036
2	3.363716060055759
3	3.7495106804299914
4	4.120429719187764
5	4.452762758441121
Temperature	50.0
1	5.740496821606241
2	5.834552553545198
3	5.903565201176271
4	5.952967050942415
5	5.986759127443186

Table B298: Joule-Thomson Coefficient with Increasing Levels of Methane at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.10108701484577906
2	0.11256678834037205
3	0.12457649102858825
4	0.13713840693234466
5	0.15027563258877707
Temperature	10.0
1	0.21786150994784284
2	0.23442041039827125
3	0.2517641248420958
4	0.26992963614268806
5	0.2889559992624187
Temperature	20.0
1	0.3803960269297902
2	0.40477096583854233
3	0.4303811644347894
4	0.4572864958899329
5	0.4855457400823047
Temperature	30.0
1	0.6174551203521765
2	0.6543545049675601
3	0.6931046689203532
4	0.7337554864479774
5	0.7763543294325002
Temperature	40.0
1	0.9763900144915861
2	1.0323661252129812
3	1.0909131850920548
4	1.1520147602661888
5	1.2155985133612663
Temperature	50.0
1	1.526590120524484
2	1.606748243001326
3	1.6884228165648079
4	1.7712844260924607
5	1.8550054034707453

Table B299: Joule-Thomson Coefficient with Increasing Levels of Methane at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.008295078613557
2	13.863366972013344
3	13.719869556252059
4	13.577735178826613
5	13.436906318038
Temperature	10.0
1	12.624996877477024
2	12.502759824693234
3	12.381124115803605
4	12.260089471062171
5	12.139658116058902
Temperature	20.0
1	11.460689512515057
2	11.35398477084295
3	11.247564406605182
4	11.141457618429708
5	11.0356939045565
Temperature	30.0
1	10.461749934166887
2	10.366924019230144
3	10.272283637429949
4	10.17785909397363
5	10.083678898212046
Temperature	40.0
1	9.595200323985516
2	9.50991062176079
3	9.424743382330588
4	9.339725510651803
5	9.254883333081917
Temperature	50.0
1	8.83604255152279
2	8.758514509488965
3	8.681088181242444
4	8.603791247716233
5	8.526650771514984

Table B300: Joule-Thomson Coefficient with Increasing Levels of Methane at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	28.94359471306107
2	28.529119550241273
3	28.121089352768525
4	27.71943136229465
5	27.32407215301492
Temperature	-70.0
1	31.130529620988266
2	30.671969469719865
3	30.220739028768246
4	29.77675230759093
5	29.33992262600411
Temperature	-75.0
1	33.57771592655138
2	33.068623438564494
3	32.56789483074783
4	32.075428272897256
5	31.59112122880449

Table B301: Joule-Thomson Coefficient with Increasing Levels of Methane at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	28.94359471306107
2	28.529119550241273
3	28.121089352768525
4	27.71943136229465
5	27.32407215301492
Temperature	-70.0
1	31.130529620988266
2	30.671969469719865
3	30.220739028768246
4	29.77675230759093
5	29.33992262600411
Temperature	-75.0
1	33.57771592655138
2	33.068623438564494
3	32.56789483074783
4	32.075428272897256
5	31.59112122880449

Table B302: Joule-Thomson Coefficient with Increasing Levels of Methane at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	28.94359471306107
2	28.529119550241273
3	28.121089352768525
4	27.71943136229465
5	27.32407215301492
Temperature	-70.0
1	31.130529620988266
2	30.671969469719865
3	30.220739028768246
4	29.77675230759093
5	29.33992262600411
Temperature	-75.0
1	33.57771592655138
2	33.068623438564494
3	32.56789483074783
4	32.075428272897256
5	31.59112122880449

Table B303: Thermal Conductivity with Increasing Levels of Argon at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.12584666647915085
2	0.12657213381610768
3	0.12599200793765578
4	0.12483214234995126
5	0.12336375153226425
Temperature	10.0
1	0.11452920036260267
2	0.11531893229971618
3	0.11475583686143503
4	0.11358914495170222
5	0.11209823984594491
Temperature	20.0
1	0.1027659080270268
2	0.10356475548976447
3	0.10295923869434617
4	0.10172197975104727
5	0.10014141063423976
Temperature	30.0
1	0.09004088473285467
2	0.09079220768008842
3	0.0901176059722762
4	0.08883332561904664
5	0.08726106944528605
Temperature	40.0
1	0.07724423589131099
2	0.0783549382704404
3	0.07741249797639954
4	0.07503949040056483
5	0.0718158483829352
Temperature	50.0
1	0.05727789652189995
2	0.05786489442874618
3	0.05741975593136914
4	0.05667984479433233
5	0.05587816396162478

Table B304: Thermal Conductivity with Increasing Levels of Argon at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.1323492654870823
2	0.13320817859592218
3	0.13276826824125787
4	0.1317558353560892
5	0.13044259162154076
Temperature	10.0
1	0.1221816845173507
2	0.12316466958905205
3	0.12280656730217003
4	0.1218575148355475
5	0.12059790225543811
Temperature	20.0
1	0.11212786166229934
2	0.11322849147684498
3	0.11294606926994778
4	0.11205425942404347
5	0.11084198071347987
Temperature	30.0
1	0.10210818547398796
2	0.10331750196594681
3	0.10310272502608572
4	0.10226149110764236
5	0.10109202925008984
Temperature	40.0
1	0.09205024166900912
2	0.0933763398405536
3	0.0932442712112854
4	0.09247602433222156
5	0.09137935250619404
Temperature	50.0
1	0.08208375994149866
2	0.08358189813239789
3	0.08359761582356465
4	0.0829773530875852
5	0.08203751833348455

Table B305: Thermal Conductivity with Increasing Levels of Argon at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.02481470349761133
2	0.027601146869124595
3	0.02908967729787063
4	0.03000567501119318
5	0.030620009851103882
Temperature	10.0
1	0.025270771857620836
2	0.028174579513293486
3	0.029736508902638164
4	0.030705877162523876
5	0.03136233160921369
Temperature	20.0
1	0.02594654582339576
2	0.028950099133816475
3	0.030570082274508432
4	0.03157926848434115
5	0.03226577921771478
Temperature	30.0
1	0.026736329591491997
2	0.029832663823943114
3	0.03150460269082961
4	0.03254811234170149
5	0.033259668124060074
Temperature	40.0
1	0.027594419338705083
2	0.030779892360861105
3	0.03250071120911377
4	0.033575794389768744
5	0.03430987574386052
Temperature	50.0
1	0.02849705134357525
2	0.031769319943679236
3	0.03353715671442351
4	0.034642193311566837
5	0.03539733113427084

Table B306: Viscosity with Increasing Levels of Argon at 10MPa

Mole Percentage	Property
Temperature	0.0
1	111.16982444226136
2	108.45818484261433
3	105.78783286956399
4	103.15672028611169
5	100.56270914342045
Temperature	10.0
1	94.52888178723921
2	92.0517802779304
3	89.59922332634554
4	87.16810821845039
5	84.75502167888888
Temperature	20.0
1	79.09984136973722
2	76.71318017647631
3	74.32194887107414
4	71.92008801033681
5	69.50091640224366
Temperature	30.0
1	63.55539603424704
2	60.97196472982586
3	58.31081741470519
4	55.548505614361055
5	52.6583611988129
Temperature	40.0
1	44.375056815985
2	40.79134590367046
3	37.27565527783236
4	34.169906598849416
5	31.65668261935044
Temperature	50.0
1	27.213894675623138
2	26.334506948005632
3	25.648934910421694
4	25.10384295249388
5	24.663407927266704

Table B307: Viscosity with Increasing Levels of Argon at 15MPa

Mole Percentage	Property
Temperature	0.0
1	120.38793429303284
2	117.7512697222764
3	115.16363754481293
4	112.62373519378016
5	110.1302604857191
Temperature	10.0
1	104.4408817751564
2	102.10879692746998
3	99.81634379033693
4	97.5622379980467
5	95.34517253074225
Temperature	20.0
1	90.36036084383001
2	88.26666388752501
3	86.20304956485583
4	84.16812385298498
5	82.16052010106183
Temperature	30.0
1	77.6692528045816
2	75.7471908682069
3	73.84648808420842
4	71.9663839275247
5	70.1062683752405
Temperature	40.0
1	65.92310296110468
2	64.12329956160914
3	62.340203859105706
4	60.57456426403
5	58.82764396012213
Temperature	50.0
1	54.825162026575185
2	53.14449797128914
3	51.49472503263985
4	49.8810988998965
5	48.309052051831976

Table B308: Viscosity with Increasing Levels of Argon at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.504558114235424
2	14.563008165338791
3	14.622819486076386
4	14.683825292564107
5	14.74588626144177
Temperature	10.0
1	14.907931877044204
2	14.971751441624594
3	15.036640096424122
4	15.10246787514859
5	15.169126129270165
Temperature	20.0
1	15.332528207010338
2	15.40042022950648
3	15.469232571010746
4	15.538851604231725
5	15.60918244907118
Temperature	30.0
1	15.768712990373016
2	15.84015296331692
3	15.91241648596738
4	15.985399711943094
5	16.05901596602885
Temperature	40.0
1	16.211573531947007
2	16.28633770865585
3	16.361851899892223
4	16.438019125528868
5	16.514758429220112
Temperature	50.0
1	16.658237386119744
2	16.736242742401256
3	16.814936225812033
4	16.89422612714679
5	16.974035847900833

Table B309: Density with Increasing Levels of Hydrogen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	1149.0734607451243
2	1095.6749934130391
3	1015.1768850242547
4	944.4150734728671
5	881.7214236521768

Table B310: Joule-Thomson Coefficient with Increasing Levels of Hydrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.21701767004748898
2	0.24941628372570188
3	0.28561480058218464
4	0.3262083258269555
5	0.3719241983691186
Temperature	10.0
1	0.41051975055782175
2	0.46411235487057984
3	0.5251719610330235
4	0.5952020435441711
5	0.6760986675021521
Temperature	20.0
1	0.7358357458487722
2	0.8357181812965316
3	0.9531854128018331
4	1.092629895531155
5	1.2602099644131457
Temperature	30.0
1	1.3879772554761978
2	1.6185727069730922
3	1.9099339812035212
4	2.2818139617298385
5	2.752300536494244
Temperature	40.0
1	3.2379209976841103
2	3.912819735154511
3	4.5524539091049565
4	5.061244468286052
5	5.412292349391728
Temperature	50.0
1	5.835940264803323
2	5.97532813333516
3	6.057200479342662
4	6.097701996041132
5	6.107539254276322

Table B311: Joule-Thomson Coefficient with Increasing Levels of Hydrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.1079726386732402
2	0.1274333661785295
3	0.14865355669829586
4	0.17180753099461085
5	0.19709168287687492
Temperature	10.0
1	0.22787748696340188
2	0.2560784391216848
3	0.28691623428244406
4	0.3206930700235739
5	0.35775861789576713
Temperature	20.0
1	0.39527976594229947
2	0.4371323387747243
3	0.4832056812115663
4	0.5339889783096168
5	0.5900003221293044
Temperature	30.0
1	0.6403586867558831
2	0.7042635008118014
3	0.7746530341546841
4	0.8521741186840313
5	0.9375402435432286
Temperature	40.0
1	1.0121878154177966
2	1.1103157099240244
3	1.2179074323286094
4	1.3351455743576346
5	1.461716463936128
Temperature	50.0
1	1.5807455828118866
2	1.7214621654169877
3	1.8695723972993246
4	2.023794816298741
5	2.181833673614281

Table B312: Joule-Thomson Coefficient with Increasing Levels of Hydrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	13.866489035043918
2	13.582244278693004
3	13.301811286007899
4	13.025050947437384
5	12.751849605096277
Temperature	10.0
1	12.504854196467482
2	12.263691935366053
3	12.024384720349538
4	11.786975903046573
5	11.551523105320532
Temperature	20.0
1	11.357444643039067
2	11.14807569369974
3	10.939683986077831
4	10.73240898220868
5	10.526382127044158
Temperature	30.0
1	10.372434152860604
2	10.18852236156652
3	10.005124328027112
4	9.822352784380424
5	9.640305197736643
Temperature	40.0
1	9.51750035880207
2	9.354408252610238
3	9.191419573661431
4	9.028641935355173
5	8.866181666795846
Temperature	50.0
1	8.767968483053277
2	8.622024039761634
3	8.475934932151377
4	8.329822322261402
5	8.183803358357379

Table B313: Joule-Thomson Coefficient with Increasing Levels of Hydrogen at 0.1MPa

Mole Percentage	Property
Temperature	0.0
1	28.698803968459814
2	28.03945727099336
3	27.3870187604348
4	26.741922257214146
5	26.104564605127962
Temperature	-70.0
1	30.863403562712534
2	30.137928846834505
3	29.420589075116478
4	28.71185009496961
5	28.012136448798874
Temperature	-75.0
1	33.285308428550415
2	32.48437310792284
3	31.693016344023974
4	30.91173925845023
5	30.1409966860612

Table B314: Joule-Thomson Coefficient with Increasing Levels of Hydrogen at 0.4MPa

Mole Percentage	Property
Temperature	0.0
1	28.698803968459814
2	28.03945727099336
3	27.3870187604348
4	26.741922257214146
5	26.104564605127962
Temperature	-70.0
1	30.863403562712534
2	30.137928846834505
3	29.420589075116478
4	28.71185009496961
5	28.012136448798874
Temperature	-75.0
1	33.285308428550415
2	32.48437310792284
3	31.693016344023974
4	30.91173925845023
5	30.1409966860612

Table B315: Joule-Thomson Coefficient with Increasing Levels of Hydrogen at 0.7MPa

Mole Percentage	Property
Temperature	0.0
1	28.698803968459814
2	28.03945727099336
3	27.3870187604348
4	26.741922257214146
5	26.104564605127962
Temperature	-70.0
1	30.863403562712534
2	30.137928846834505
3	29.420589075116478
4	28.71185009496961
5	28.012136448798874
Temperature	-75.0
1	33.285308428550415
2	32.48437310792284
3	31.693016344023974
4	30.91173925845023
5	30.1409966860612

Table B316: Speed of Sound with Increasing Levels of Hydrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	625.580597921466
2	609.9428111203486
3	593.9678940809185
4	577.6278509704345
5	560.8901415159934
Temperature	10.0
1	547.1607666561202
2	530.177702845409
3	512.705756488302
4	494.70815006505467
5	476.152275489352
Temperature	20.0
1	460.3917935905709
2	441.350806368612
3	421.7057049693899
4	401.45941099903064
5	380.6169090036639
Temperature	30.0
1	361.5002150724729
2	339.8444516036772
3	317.5212507820128
4	294.92236180466534
5	273.1540451456957
Temperature	40.0
1	249.4473468167844
2	234.18631505310051
3	226.40144388482491
4	224.2291415388859
5	225.17630971211184
Temperature	50.0
1	221.18855497910988
2	224.54312051953303
3	228.07111590463145
4	231.66236814104795
5	235.2578050038146

Table B317: Thermal Conductivity with Increasing Levels of Water at 10MPa

Mole Percentage	Property
Temperature	0.0
1	0.12199913506798182
2	0.12303564310295977
3	0.1241110862822097
4	0.12522802324419327
5	0.1263884433452563
Temperature	10.0
1	0.11069771543473587
2	0.11194506233377453
3	0.11321867047502263
4	0.11452266062648322
5	0.11586033928777671
Temperature	20.0
1	0.0990445686038112
2	0.10053880064582317
3	0.10204151020995497
4	0.10355932812288234
5	0.1050976163919898
Temperature	30.0
1	0.08659806867557607
2	0.08842010934490818
3	0.09022151178262344
4	0.09201370273329733
5	0.09380576246849276
Temperature	40.0
1	0.07350219808203462
2	0.07556313420892778
3	0.07760688406807863
4	0.07964515771388135
5	0.08168713439502363
Temperature	50.0
1	0.05604662923310266
2	0.059898676224735825
3	0.06391362215245734
4	0.06789819293648786
5	0.07000541105829708

Table B318: Thermal Conductivity with Increasing Levels of Water at 15MPa

Mole Percentage	Property
Temperature	0.0
1	0.12823512444568708
2	0.12913776927264786
3	0.13008429097822508
4	0.13107671975201104
5	0.13211661574170078
Temperature	10.0
1	0.11797224849533137
2	0.11903372040459129
3	0.12012995019805386
4	0.12126412328436263
5	0.12243878169857175
Temperature	20.0
1	0.10782861924691985
2	0.10904570203632004
3	0.1102875367431974
4	0.11155869707713538
5	0.1128628879955361
Temperature	30.0
1	0.09773373867547416
2	0.09910854470398371
3	0.10049629785909557
4	0.10190337496291023
5	0.10333498072834184
Temperature	40.0
1	0.08760558446570157
2	0.0891413718396631
3	0.09067739204124688
4	0.09222205168522864
5	0.09378224162718779
Temperature	50.0
1	0.07750656821983651
2	0.07918515592498464
3	0.08084991038021005
4	0.08251357287752276
5	0.08418617810010001

Table B319: Thermal Conductivity with Increasing Levels of Water at 3MPa

Mole Percentage	Property
Temperature	0.0
1	0.0183175596347955
2	0.018728827942270192
3	0.019153477653046494
4	0.019598346481512964
5	0.020070966301465425
Temperature	10.0
1	0.01843434282771315
2	0.01876667942260048
3	0.019110242467919862
4	0.01946957110253449
5	0.019849179026233045
Temperature	20.0
1	0.018825399586301986
2	0.019113833132714805
3	0.019414144048436614
4	0.019730395210375867
5	0.020066335203529198
Temperature	30.0
1	0.019355081548046115
2	0.019615866771893024
3	0.019889341253202797
4	0.020179504555073214
5	0.0204898016759187
Temperature	40.0
1	0.019967013518820267
2	0.020209470544130578
3	0.020465320756617285
4	0.02073869413265389
5	0.021032893424985988
Temperature	50.0
1	0.020632392901067904
2	0.020862607174533004
3	0.02110676678904094
4	0.021369213320497578
5	0.021653233505914016

Table B320: Viscosity with Increasing Levels of Water at 10MPa

Mole Percentage	Property
Temperature	0.0
1	113.16339551301336
2	112.50439371629754
3	111.94257197955812
4	111.47323617874586
5	111.09210356447517
Temperature	10.0
1	96.60040030063465
2	96.24792055364128
3	95.97194347918746
4	95.76885614542631
5	95.63538063251293
Temperature	20.0
1	81.41177096909084
2	81.39161034863326
3	81.42448015785314
4	81.50817168203422
5	81.6407234514237
Temperature	30.0
1	66.49597689805177
2	66.92821829174841
3	67.37701142466102
4	67.84286090142587
5	68.32623385663776
Temperature	40.0
1	49.307489755750936
2	50.67555303273013
3	51.94498564643695
4	53.13167546299348
5	54.25053355526006
Temperature	50.0
1	29.35495307709902
2	30.580162890286125
3	32.08795304406864
4	33.88326176645366
5	35.78359517124896

Table B321: Viscosity with Increasing Levels of Water at 15MPa

Mole Percentage	Property
Temperature	0.0
1	122.08903688426594
2	121.21204029992873
3	120.43862821968293
4	119.76394167301888
5	119.18352769617616
Temperature	10.0
1	106.1096926436268
2	105.49521869348918
3	104.96618967842136
4	104.5187236587022
5	104.14926655010981
Temperature	20.0
1	92.04059601606447
2	91.6675863989879
3	91.36329750291125
4	91.12480775863526
5	90.94944821183792
Temperature	30.0
1	79.42226325802356
2	79.28515692597826
3	79.20009196736555
4	79.16511509562628
5	79.17846810144397
Temperature	40.0
1	67.80686833230001
2	67.91449329039291
3	68.05652508584828
4	68.23288580634076
5	68.44291195207299
Temperature	50.0
1	56.86320130057867
2	57.21552820087439
3	57.58829449262247
4	57.981072685350846
5	58.39355278528592

Table B322: Viscosity with Increasing Levels of Water at 3MPa

Mole Percentage	Property
Temperature	0.0
1	14.436233123270835
2	14.424832043115794
3	14.413339464539275
4	14.401745314693358
5	14.390039310629149
Temperature	10.0
1	14.833418228342154
2	14.821726253283694
3	14.809925617014002
4	14.79800647522984
5	14.78595886494041
Temperature	20.0
1	15.253222265266723
2	15.241279490323171
3	15.229212683092522
4	15.217012188311594
5	15.20466822738771
Temperature	30.0
1	15.686538344379699
2	15.673576356533244
3	15.660641157847595
4	15.64820694697312
5	15.635615378144456
Temperature	40.0
1	16.12771167213574
2	16.117697334001363
3	16.10655520115694
4	16.094878532982463
5	16.082976967049117
Temperature	50.0
1	16.571687553329685
2	16.563931495708367
3	16.555376233130037
4	16.54645484942375
5	16.53741378221689

Table B323: Density with Increasing Levels of Hydrogen at 10MPa

Mole Percentage	Property
Temperature	0.0
1	952.9915035283717
2	931.9358142686277
3	910.8431120047072
4	889.668608444158
5	868.3619227193496
Temperature	10.0
1	898.1352898976556
2	875.6370531537697
3	852.8865137275351
4	829.7945320701193
5	806.252878483365
Temperature	20.0
1	831.5116821099691
2	806.083651180374
3	779.8398334580019
4	752.5482303375412
5	723.9096473216771
Temperature	30.0
1	740.6623407805737
2	707.6927406986908
3	671.7956715923754
4	631.9068694110507
5	586.9407576562261
Temperature	40.0
1	575.4370757165128
2	516.6654205738257
3	459.6450308345375
4	411.9577935188208
5	374.9650184066862
Temperature	50.0
1	355.35836267655117
2	332.5265298063294
3	313.86208780816276
4	298.1487172436133
5	284.60722939103033

Table B324: Density with Increasing Levels of Hydrogen at 15MPa

Mole Percentage	Property
Temperature	0.0
1	979.8088172085988
2	960.2201850040145
3	940.7481745784745
4	921.3722415430899
5	902.0715539694856
Temperature	10.0
1	934.0065874749463
2	913.9192880789722
3	893.8951620573456
4	873.9092307107518
5	853.9352763749862
Temperature	20.0
1	883.0900653176121
2	862.235381048357
3	841.3603785899379
4	820.4319052301137
5	799.4163250076533
Temperature	30.0
1	825.0146137538188
2	802.9481649752926
3	780.7485576688479
4	758.3839748033218
5	735.8244444332627
Temperature	40.0
1	756.6165743147892
2	732.7928125590388
3	708.740183476115
4	684.4529924830446
5	659.9510131941398
Temperature	50.0
1	674.094905862798
2	648.3401890594088
3	622.589103928616
4	596.9709546837558
5	571.6505503362918

Table B325: Density with Increasing Levels of Hydrogen at 3MPa

Mole Percentage	Property
Temperature	0.0
1	75.91596983035062
2	74.54063392027355
3	73.20590400499978
4	71.90879547892361
5	70.64668177211556
Temperature	10.0
1	69.88019883293363
2	68.77136350913051
3	67.68377255253506
4	66.61653856722066
5	65.56882869907503
Temperature	20.0
1	65.1963876737966
2	64.25018727648467
3	63.316866521234445
4	62.39614405051047
5	61.48773674767356
Temperature	30.0
1	61.36746245843639
2	60.532808761478876
3	59.706685664616515
4	58.889026049449974
5	58.07974948519968
Temperature	40.0
1	58.133234764116494
2	57.380779757409805
3	56.63431575507738
4	55.89385997937221
5	55.15941567404287
Temperature	50.0
1	55.33852197445953
2	54.64966834339226
3	53.96520503104114
4	53.285183541117206
5	52.60964278009713

Table B326: Density with Increasing Levels of Hydrogen at 0.1MPa

Mole Percentage	Property
Temperature	-50.0
1	478.421196032357
2	289.493033157306
3	206.3891599348351
4	159.6504028462036
5	694.3621723521403
Temperature	-55.0
Temperature	-55.0
1	592.668173806947
2	379.5567626948093
3	277.7290595685501
4	218.06650423840094
5	0.0

Table B327: Bubble Points for Scenario 1

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.3408370807742133e-08
-172.1499999999998	1.8826644301228272e-08
-171.1499999999998	2.6244611716676495e-08
-170.1499999999998	3.6330507542497955e-08
-169.1499999999998	4.995247417717693e-08
-168.1499999999998	6.823127460802054e-08
-167.1499999999998	9.260498213778479e-08
-166.1499999999998	1.249079088853964e-07
-165.1499999999998	1.674663667434938e-07
-164.1499999999998	2.2321421848653194e-07
-163.1499999999998	2.958315734564595e-07
-162.1499999999998	3.8991041206820917e-07
-161.1499999999998	5.111513863006838e-07
-160.1499999999998	6.665965390419633e-07
-159.1499999999998	8.649032129417279e-07
-158.1499999999998	1.1166649782122248e-06
-157.1499999999998	1.4347859971535477e-06
-156.1499999999998	1.8349158592248907e-06
-155.1499999999998	2.335952562042211e-06
-154.1499999999998	2.9606219782098325e-06
-153.1499999999998	3.736142832524401e-06
-152.1499999999998	4.694986915672233e-06
-151.1499999999998	5.875744975673338e-06
-150.1499999999998	7.324109453398612e-06
-149.1499999999998	9.093985959735448e-06
-148.1499999999998	1.1248746125526863e-05
-147.1499999999998	1.3862635187337915e-05
-146.1499999999998	1.7022348398490966e-05
-145.1499999999998	2.0828791071802476e-05
-144.1499999999998	2.539903776431793e-05
-143.1499999999998	3.0868506801518974e-05
-142.1499999999998	3.7393367005652796e-05
-141.1499999999998	4.515319413697313e-05
-140.1499999999998	5.43538951750848e-05
-139.1499999999998	6.523091915795958e-05
-138.1499999999998	7.805277385661055e-05
-137.1499999999998	9.3124868092509e-05
-136.1499999999998	0.00011079370000160431
-135.1499999999998	0.00013145141201289915
-134.1499999999998	0.00015554073374103103
-133.1499999999998	0.000183560334391894
-132.1499999999998	0.00021607060664921603
-131.1499999999998	0.0002536999043500486

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.0002971512565705032
-129.14999999999998	0.0003472095810329409
-128.14999999999998	0.00040474942001533147
-127.14999999999998	0.0004707432221968141
-126.14999999999998	0.0005462701941150097
-125.14999999999998	0.0006325257451451515
-124.14999999999998	0.0007308315501442632
-123.14999999999998	0.0008426462541409116
-122.14999999999998	0.0009695768436989189
-121.14999999999998	0.0011133907098483475
-120.14999999999998	0.0012760284277658085
-119.14999999999998	0.0014596172787061162
-118.14999999999998	0.001666485540045923
-117.14999999999998	0.001899177569704719
-116.14999999999998	0.0021604697116679975
-115.14999999999998	0.002453387049858922
-114.14999999999998	0.002781221038197588
-113.14999999999998	0.0031475480353589866
-112.14999999999998	0.003556248773501146
-111.14999999999998	0.004011528791092484
-110.14999999999998	0.0045179398609314055
-109.14999999999998	0.005080402445530556
-108.14999999999998	0.005704229213243733
-107.14999999999998	0.0063951496498530136
-106.14999999999998	0.007159335801820076
-105.14999999999998	0.008003429189047192
-104.14999999999998	0.008934568926801936
-103.14999999999998	0.00996042109844763
-102.14999999999998	0.011089209422799541
-101.14999999999998	0.01232974726230816
-100.14999999999998	0.01369147102087149
-99.14999999999998	0.015184474982908164
-98.14999999999998	0.01681954764840487
-97.14999999999998	0.018608209621996382
-96.14999999999998	0.02056275311776767
-95.14999999999998	0.02269628314540679
-94.14999999999998	0.025022760447603782
-93.14999999999998	0.027557046263219205
-92.14999999999998	0.030314948995759334
-91.14999999999998	0.03331327287213305
-90.14999999999998	0.03656986868256719
-89.14999999999998	0.04010368669896863
-88.14999999999998	0.043934831875995596
-87.14999999999998	0.04808462144670899
-86.14999999999998	0.05257564503297888

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.05743182739993065
-84.14999999999998	0.06267849399372272
-83.14999999999998	0.06834243941299586
-82.14999999999998	0.07445199897658925
-81.14999999999998	0.08103712356377044
-80.14999999999998	0.0881294579185519
-79.14999999999998	0.09576242262696759
-78.14999999999998	0.10397129999588998
-77.14999999999998	0.11279332408462513
-76.14999999999998	0.12226777516682437
-75.14999999999998	0.1324360789311904
-74.14999999999998	0.1433419107663018
-73.14999999999998	0.15503130551946964
-72.14999999999998	0.16755277317443404
-71.14999999999998	0.18095742096158793
-70.14999999999998	0.19529908250277903
-69.14999999999998	0.21063445470889505
-68.14999999999998	0.2270232433053459
-67.14999999999998	0.24452831807925965
-66.14999999999998	0.2632158792578553
-65.14999999999998	0.2831556369017429
-64.14999999999998	0.3044210059434957
-63.14999999999998	0.32708932074315217
-62.14999999999998	0.35124207523710543
-61.14999999999998	0.37696519900695635
-60.14999999999998	0.4043493887019292
-59.14999999999998	0.43349053679906746
-58.14999999999998	0.46449036902512325
-57.14999999999998	0.49745771699997016

Table B328: Bubble Points for Scenario 10

Temperature (degC)	Pressure (MPa)
-86.1499999999998	41.155356203527845
-85.1499999999998	33.34889098353553
-84.1499999999998	29.094468230705637
-83.1499999999998	26.072562243916558
-82.1499999999998	23.725659965696273
-81.1499999999998	21.814455571593506
-80.1499999999998	20.21074257368931
-79.1499999999998	18.836725901265403
-78.1499999999998	17.64121945623005
-77.1499999999998	16.588563119571297
-76.1499999999998	15.652830687249928
-75.1499999999998	14.814538508621764
-74.1499999999998	14.058651950354779
-73.1499999999998	13.373315583713586
-72.1499999999998	12.749010661070372
-71.1499999999998	12.177976885043176
-70.1499999999998	11.653804106338015
-69.1499999999998	11.171136915094051
-68.1499999999998	10.72545637210013
-67.1499999999998	10.312915747168526
-66.1499999999998	9.930214885919247
-65.1499999999998	9.574502730709408
-64.1499999999998	9.24330070894712
-63.1499999999998	8.934441822312888
-62.1499999999998	8.646021710789391
-61.1499999999998	8.376358962477498
-60.1499999999998	8.123962642404662
-59.1499999999998	7.8875055156977325
-58.1499999999998	7.665801804860215
-57.1499999999998	7.457788588565292
-56.1499999999998	7.262510148566696
-55.1499999999998	7.079104721069783
-54.1499999999998	6.906793222634977
-53.1499999999998	6.74486960800588
-52.1499999999998	6.592692584674936
-51.1499999999998	6.4496784618253615
-50.1499999999998	6.315294952526481
-49.1499999999998	6.1890557809957345
-48.1499999999998	6.070515972796981
-47.1499999999998	5.959267726898182
-46.1499999999998	5.854936785378077
-45.1499999999998	5.757179230390317
-44.1499999999998	5.665678649182219

Temperature (degC)	Pressure (MPa)
-43.1499999999998	5.58014361720617
-42.1499999999998	5.500305456970531
-41.1499999999998	5.425916236576751
-40.1499999999998	5.356746977184994
-39.1499999999998	5.292586043026128
-38.1499999999998	5.233237691324055
-37.1499999999998	5.178520762611673
-36.1499999999998	5.128267494602788
-35.1499999999998	5.082322445045177
-34.1499999999998	5.040541510920631
-33.1499999999998	5.0027910330253995
-32.1499999999998	4.9689469763880725
-31.14999999999977	4.938894178216289
-30.14999999999977	4.912525656165674
-29.14999999999977	4.889741970588435
-28.14999999999977	4.870450635394553
-27.14999999999977	4.854565572755747
-26.14999999999977	4.8420066076626185
-25.14999999999977	4.832698998931961
-24.14999999999977	4.826573003803013
-23.14999999999977	4.823563473815045
-22.14999999999977	4.823609480055163
-21.14999999999977	4.826653966286593
-20.14999999999977	4.832643428743815
-19.14999999999977	4.841527621656346
-18.14999999999977	4.853259287651736
-17.14999999999977	4.8677939122939895
-16.14999999999977	4.885089502004716
-15.14999999999977	4.9051063844795095
-14.14999999999977	4.927807030612865
-13.14999999999977	4.953155896760421
-12.14999999999977	4.981119285933314
-11.14999999999977	5.0116652263487556
-10.14999999999977	5.044763365582018
-9.14999999999977	5.080384878355531
-8.14999999999977	5.118502385871983
-7.14999999999977	5.159089884324685
-6.14999999999977	5.20212267990937
-5.14999999999977	5.2475773272010136
-4.14999999999977	5.295431567159004
-3.149999999999773	5.3456642603777
-2.149999999999773	5.3982553104954185
-1.149999999999773	5.453185572107472
-0.1499999999997726	5.510436737194503
0.85000000000000227	5.5699911940460245

Temperature (degC)	Pressure (MPa)
1.8500000000000227	5.631831853207971
2.8500000000000227	5.695941936094423
3.8500000000000227	5.762304723877941
4.850000000000023	5.8309032670956995
5.850000000000023	5.901720060098433
6.850000000000023	5.974736688885502
7.850000000000023	6.049933465491826
8.850000000000023	6.127289065977123
9.850000000000023	6.206780190792621
10.850000000000023	6.2883812634156495
11.850000000000023	6.372064172313203
12.850000000000023	6.457798037631151
13.850000000000023	6.545548941244955
14.850000000000023	6.6352794892571785
15.850000000000023	6.726947971950159
16.850000000000023	6.820506742489225
17.850000000000023	6.915899255023803
18.850000000000023	7.01305500104352
19.850000000000023	7.111881392685097
20.850000000000023	7.212251500834175
21.850000000000023	7.3139864645783
22.850000000000023	7.416831187709179
23.850000000000023	7.520421150603348
24.850000000000023	7.624232823622228
25.850000000000023	7.727505532275142
26.850000000000023	7.829073324155413
27.850000000000023	7.927014517676798
28.850000000000023	8.017921273924479
29.850000000000023	8.093826242365806
30.850000000000023	8.026656039920976
31.850000000000023	7.7023515630201995
32.85000000000002	8.829184520512392
33.85000000000002	8.788968011328622

Table B329: Bubble Points for Scenario 11

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.6945694180403303
-89.14999999999998	0.6957860286816403
-88.14999999999998	0.6975438410230844
-87.14999999999998	0.6998398469336072
-86.14999999999998	0.7026722617477287
-85.14999999999998	0.7060404300815952
-84.14999999999998	0.7099447412204092
-83.14999999999998	0.7143865528194943
-82.14999999999998	0.7193681220479868
-81.14999999999998	0.7248925432224373
-80.14999999999998	0.7309636911878039
-79.14999999999998	0.737586169817192
-78.14999999999998	0.7447652650665518
-77.14999999999998	0.7525069020200104
-76.14999999999998	0.7608176055701146
-75.14999999999998	0.7697044642393034
-74.14999999999998	0.7791750969154438
-73.14999999999998	0.7892376221082174
-72.14999999999998	0.799900629496602
-71.14999999999998	0.8111731535297407
-70.14999999999998	0.8230646488805387
-69.14999999999998	0.8355849675423734
-68.14999999999998	0.8487443374402985
-67.14999999999998	0.8625533423918558
-66.14999999999998	0.8770229033159118
-65.14999999999998	0.8921642605490291
-64.14999999999998	0.9079889572061983
-63.14999999999998	0.9245088235158924
-62.14999999999998	0.9417359619854043
-61.14999999999998	0.9596827334429502
-60.14999999999998	0.9783617438211669
-59.14999999999998	0.997785831683358
-58.14999999999998	1.0179680564180815
-57.14999999999998	1.038921687127366
-56.14999999999998	1.0606601921076744
-55.14999999999998	1.083197228958532
-54.14999999999998	1.1065466352766928
-53.14999999999998	1.1307224199122548
-52.14999999999998	1.1557387547663263
-51.14999999999998	1.1816099671313975
-50.14999999999998	1.2083505325470945
-49.14999999999998	1.235975068142389
-48.14999999999998	1.2644983264782734

Temperature (degC)	Pressure (MPa)
-47.1499999999998	1.2939351898469778
-46.1499999999998	1.3243006650047542
-45.1499999999998	1.3556098783540167
-44.1499999999998	1.3878780715157795
-43.1499999999998	1.421120597288059
-42.1499999999998	1.455352915975448
-41.1499999999998	1.4905905920492353
-40.1499999999998	1.5268492911463305
-39.1499999999998	1.5641447773645796
-38.1499999999998	1.6024929108673696
-37.1499999999998	1.6419096457917364
-36.1499999999998	1.6824110284428744
-35.1499999999998	1.7240131958228793
-34.1499999999998	1.7667323744779408
-33.1499999999998	1.8105848797250266
-32.1499999999998	1.8555871152694696
-31.14999999999977	1.9017555732450868
-30.14999999999977	1.94910683472533
-29.14999999999977	1.9976575707057127
-28.14999999999977	2.047424543597449
-27.14999999999977	2.0984246091903915
-26.14999999999977	2.1506747191054325
-25.14999999999977	2.204191923666575
-24.14999999999977	2.2589933751271727
-23.14999999999977	2.3150963312067065
-22.14999999999977	2.372518158809961
-21.14999999999977	2.4312763378649347
-20.14999999999977	2.491388465162538
-19.14999999999977	2.552872258143076
-18.14999999999977	2.615745558528453
-17.14999999999977	2.68002633578712
-16.14999999999977	2.74573269039042
-15.14999999999977	2.8128828568899
-14.14999999999977	2.8814952068444866
-13.14999999999977	2.9515882516913496
-12.14999999999977	3.023180645640371
-11.14999999999977	3.0962911887261866
-10.14999999999977	3.170938830161942
-9.14999999999977	3.2471426721177425
-8.14999999999977	3.324921974089948
-7.14999999999977	3.4042961579314106
-6.14999999999977	3.4852848136584087
-5.14999999999977	3.5679077059816757
-4.14999999999977	3.65218478150214
-3.149999999999773	3.738136176296461

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.8257822234835537
-1.149999999999773	3.915143460122148
-0.1499999999997726	4.0062406325268975
0.8500000000000227	4.099094698817539
1.8500000000000227	4.193726827197454
2.8500000000000227	4.290158388242563
3.8500000000000227	4.388410939263823
4.850000000000023	4.488506198833687
5.850000000000023	4.590466009716542
6.850000000000023	4.694312288968163
7.850000000000023	4.800066964684249
8.850000000000023	4.907751899992449
9.850000000000023	5.0173888058592215
10.850000000000023	5.12899914521921
11.850000000000023	5.24260403032261
12.850000000000023	5.358224112538503
13.850000000000023	5.475879456227296
14.850000000000023	5.595589373075327
15.850000000000023	5.717372165537953
16.850000000000023	5.841244682114632
17.850000000000023	5.967221516165504
18.850000000000023	6.095313577039666
19.850000000000023	6.225525621290037
20.850000000000023	6.357852144875874
21.850000000000023	6.492270779288684
22.850000000000023	6.628731903510434
23.850000000000023	6.7671421118337625
24.850000000000023	6.907335985176969
25.850000000000023	7.049018564145034
26.850000000000023	7.191626822878565
27.850000000000023	7.333934535394141
28.850000000000023	7.472755687819284
29.850000000000023	7.679952263513501
30.850000000000023	7.744219919477117
31.850000000000023	7.932399171037475

Table B330: Bubble Points for Scenario 12

Temperature (degC)	Pressure (MPa)
-95.1499999999998	53.44851298942561
-94.1499999999998	45.075098927846085
-93.1499999999998	38.62403016073186
-92.1499999999998	33.516135839722445
-91.1499999999998	29.398041799046098
-90.1499999999998	26.0367749191604
-89.1499999999998	23.269769206811965
-88.1499999999998	20.978401351251243
-87.1499999999998	19.072805798917116
-86.1499999999998	17.48265020526423
-85.1499999999998	16.151353057739588
-84.1499999999998	15.032438859298177
-83.1499999999998	14.08727367798187
-82.1499999999998	13.283687163161023
-81.1499999999998	12.595101272753597
-80.1499999999998	11.999858757410275
-79.1499999999998	11.48056736964794
-78.1499999999998	11.023416260406249
-77.1499999999998	10.617504733288744
-76.1499999999998	10.254236666021557
-75.1499999999998	9.926811151403719
-74.1499999999998	9.629814425116068
-73.1499999999998	9.358902718861728
-72.1499999999998	9.110559892808059
-71.1499999999998	8.881913586953047
-70.1499999999998	8.670595922758768
-69.1499999999998	8.474637650179954
-68.1499999999998	8.292387268093258
-67.1499999999998	8.122448791161387
-66.1499999999998	7.963633486851975
-65.1499999999998	7.81492213677461
-64.1499999999998	7.675435280421079
-63.1499999999998	7.544409558930817
-62.1499999999998	7.421178756785767
-61.1499999999998	7.305158490846518
-60.1499999999998	7.195833752847282
-59.1499999999998	7.09274870195219
-58.1499999999998	6.9954982445436436
-57.1499999999998	6.903721044003486
-56.1499999999998	6.817093682480724
-55.1499999999998	6.735325756862036
-54.1499999999998	6.658155737089442
-53.1499999999998	6.585347450351496

Temperature (degC)	Pressure (MPa)
-52.1499999999998	6.5166870819983265
-51.1499999999998	6.451980605467704
-50.1499999999998	6.391051570179258
-49.1499999999998	6.3337391895776065
-48.1499999999998	6.279896682115855
-47.1499999999998	6.229389826247482
-46.1499999999998	6.182095697302279
-45.1499999999998	6.137901559614409
-44.1499999999998	6.096703891622996
-43.1499999999998	6.058407525376905
-42.1499999999998	6.022924884791344
-41.1499999999998	5.99017530950968
-40.1499999999998	5.960084453225421
-39.1499999999998	5.9325837470018525
-38.1499999999998	5.907609919566034
-37.1499999999998	5.8851045676520455
-36.1499999999998	5.865013770447963
-35.1499999999998	5.847287743041383
-34.1499999999998	5.831880524200155
-33.1499999999998	5.818749694645709
-32.1499999999998	5.807856122123512
-31.14999999999977	5.799163730045226
-30.14999999999977	5.792639286816303
-29.14999999999977	5.788252213136349
-28.14999999999977	5.785974404880054
-27.14999999999977	5.78578006939125
-26.14999999999977	5.7876455732587395
-25.14999999999977	5.7915492999413996
-24.14999999999977	5.797471515808702
-23.14999999999977	5.805394243488266
-22.14999999999977	5.815301141633724
-21.14999999999977	5.827177390433404
-20.14999999999977	5.841009582463596
-19.14999999999977	5.856785618586761
-18.14999999999977	5.874494608779115
-17.14999999999977	5.894126777836837
-16.14999999999977	5.915673375972501
-15.14999999999977	5.939126594279709
-14.14999999999977	5.964479485010596
-13.14999999999977	5.991725886477181
-12.14999999999977	6.0208603521986515
-11.14999999999977	6.051878083684771
-10.14999999999977	6.084774865824943
-9.14999999999977	6.119547003436954
-8.14999999999977	6.156191256881726

Temperature (degC)	Pressure (MPa)
-7.14999999999977	6.19470477389862
-6.14999999999977	6.235085013991172
-5.14999999999977	6.277329660665786
-4.14999999999977	6.32143651591423
-3.149999999999773	6.367403370436914
-2.149999999999773	6.415227842568639
-1.149999999999773	6.464907178776269
-0.1499999999997726	6.516438009355712
0.8500000000000227	6.569816054671041
1.8500000000000227	6.625035780335261
2.8500000000000227	6.682090004160127
3.8500000000000227	6.74096946347749
4.850000000000023	6.801662358340056
5.850000000000023	6.864153893241747
6.850000000000023	6.92842584637972
7.850000000000023	6.994456199066449
8.850000000000023	7.062218856130625
9.850000000000023	7.1316834773236115
10.850000000000023	7.202815415149603
11.850000000000023	7.27557571005546
12.850000000000023	7.349921022917472
13.850000000000023	7.425803280711456
14.850000000000023	7.503168671202738
15.850000000000023	7.581955451489871
16.850000000000023	7.662089853363422
17.850000000000023	7.743479215644654
18.850000000000023	7.826001406813298
19.850000000000023	7.909489670328892
20.850000000000023	7.993712230288996
21.850000000000023	8.07834612048764
22.850000000000023	8.162944153330363
23.850000000000023	8.246891621874584
24.850000000000023	8.329340968414057
25.850000000000023	8.409096944405363
26.850000000000023	8.484404363208991
27.850000000000023	8.552561285281943
28.850000000000023	8.608606146218314
29.850000000000023	8.634400172936699
30.850000000000023	8.242419073250883
31.850000000000023	9.389010059852385
32.85000000000002	9.508341171993179

Table B331: Bubble Points for Scenario 2

Temperature (degC)	Pressure (MPa)
-100.1499999999998	12.2813394360693
-99.1499999999998	11.491712098431586
-98.1499999999998	10.84539651455287
-97.1499999999998	10.30774932586678
-96.1499999999998	9.853105302435846
-95.1499999999998	9.46273535455963
-94.1499999999998	9.122979933340268
-93.1499999999998	8.823788579298023
-92.1499999999998	8.557662882435308
-91.1499999999998	8.318917796612379
-90.1499999999998	8.103171307987754
-89.1499999999998	7.906991273281212
-88.1499999999998	7.72764884465803
-87.1499999999998	7.562944126922037
-86.1499999999998	7.4110811291562975
-85.1499999999998	7.270576732310835
-84.1499999999998	7.140193439952228
-83.1499999999998	7.018888991160896
-82.1499999999998	6.905778097619881
-81.1499999999998	6.800103018823408
-80.1499999999998	6.701210665557147
-79.1499999999998	6.608534586362315
-78.1499999999998	6.521580649976275
-77.1499999999998	6.439915556574782
-76.1499999999998	6.363157536977147
-75.1499999999998	6.2909687608165425
-74.1499999999998	6.223049091849653
-73.1499999999998	6.159130914460334
-72.1499999999998	6.098974818763145
-71.1499999999998	6.042365979229094
-70.1499999999998	5.989111097455685
-69.1499999999998	5.939035806942616
-68.1499999999998	5.891982458636996
-67.1499999999998	5.847808222126856
-66.1499999999998	5.80638345001256
-65.1499999999998	5.7675902628552
-64.1499999999998	5.731321319914326
-63.1499999999998	5.697478747115048
-62.1499999999998	5.665973198697641
-61.1499999999998	5.636723032946952
-60.1499999999998	5.609653585741203
-59.1499999999998	5.584696528196168
-58.1499999999998	5.561789296954952

Temperature (degC)	Pressure (MPa)
-57.1499999999998	5.540874587359874
-56.1499999999998	5.521899901261598
-55.1499999999998	5.5048171424167895
-54.1499999999998	5.489582253456334
-53.1499999999998	5.476154889217906
-52.1499999999998	5.464498121985005
-51.1499999999998	5.454578174750801
-50.1499999999998	5.446364179144734
-49.1499999999998	5.439827955079846
-48.1499999999998	5.43494380959987
-47.1499999999998	5.431688352656002
-46.1499999999998	5.430040327934824
-45.1499999999998	5.429980457016632
-44.1499999999998	5.431491295447326
-43.1499999999998	5.434557099470148
-42.1499999999998	5.439163702332646
-41.1499999999998	5.445298399278106
-40.1499999999998	5.4529498403845755
-39.1499999999998	5.462107930538167
-38.1499999999998	5.47276373588771
-37.1499999999998	5.484909396116877
-36.1499999999998	5.498538041908077
-35.1499999999998	5.5136437169004004
-34.1499999999998	5.530221303492059
-33.1499999999998	5.548266451689384
-32.1499999999998	5.5677755103171105
-31.14999999999977	5.588745459772256
-30.14999999999977	5.611173845635194
-29.14999999999977	5.635058712443902
-28.14999999999977	5.660398537047919
-27.14999999999977	5.687192161087686
-26.14999999999977	5.7154387222668355
-25.14999999999977	5.745137584251129
-24.14999999999977	5.776288265174971
-23.14999999999977	5.8088903648685335
-22.14999999999977	5.842943491061293
-21.14999999999977	5.8784471848688336
-20.14999999999977	5.915400845958369
-19.14999999999977	5.953803657742489
-18.14999999999977	5.993654512913837
-17.14999999999977	6.034951939513463
-16.14999999999977	6.077694027488209
-15.14999999999977	6.121878355382895
-14.14999999999977	6.167501916369989
-13.14999999999977	6.214561042157666

Temperature (degC)	Pressure (MPa)
-12.14999999999977	6.2630513224996776
-11.14999999999977	6.3129675169353
-10.14999999999977	6.364303454031197
-9.14999999999977	6.4170519118066345
-8.14999999999977	6.47120447124474
-7.14999999999977	6.526751332895261
-6.14999999999977	6.5836810850407845
-5.14999999999977	6.641980410501778
-4.14999999999977	6.701633719039626
-3.149999999999773	6.762622693353464
-2.149999999999773	6.824925739727813
-1.149999999999773	6.888517339872036
-0.1499999999997726	6.953367308632245
0.8500000000000227	7.019439972984501
1.8500000000000227	7.086693300141845
2.8500000000000227	7.155078014933648
3.8500000000000227	7.224536755206041
4.850000000000023	7.295003313263524
5.850000000000023	7.366401991981022
6.850000000000023	7.438647053389715
7.850000000000023	7.5116421369632285
8.850000000000023	7.585279352713278
9.850000000000023	7.659437489969784
10.850000000000023	7.733978272875652
11.850000000000023	7.808740281905983
12.850000000000023	7.883525860790188
13.850000000000023	7.958083550084505
14.850000000000023	8.032079793460934
15.850000000000023	8.105060882077364
16.850000000000023	8.176405395647905
17.850000000000023	8.245265146705423
18.850000000000023	8.310496834195067
19.850000000000023	8.37056005697674
20.850000000000023	8.423355534378942
21.850000000000023	8.466061154891399
22.850000000000023	8.495087534940485
23.850000000000023	8.503094558271355

Table B332: Bubble Points for Scenario 3

Temperature (degC)	Pressure (MPa)
-96.1499999999998	3.9938268322590784
-95.1499999999998	3.9390897369526368
-94.1499999999998	3.8873587580224203
-93.1499999999998	3.8384073793348583
-92.1499999999998	3.7920391625082823
-91.1499999999998	3.74808272010203
-90.1499999999998	3.7063877265593796
-89.1499999999998	3.6668217153207046
-88.1499999999998	3.629267479820056
-87.1499999999998	3.593620944178741
-86.1499999999998	3.55978940345663
-85.1499999999998	3.5276900576229573
-84.1499999999998	3.497248781295005
-83.1499999999998	3.4683990843109926
-82.1499999999998	3.4410812280641068
-81.1499999999998	3.4152414698564892
-80.1499999999998	3.3908314133087147
-79.1499999999998	3.3678074470712844
-78.1499999999998	3.3461302576266134
-77.1499999999998	3.3257644044938126
-76.1499999999998	3.306677948373741
-75.1499999999998	3.2888421243285078
-74.1499999999998	3.2722310535681842
-73.1499999999998	3.2568214883801576
-72.1499999999998	3.2425925856721984
-71.1499999999998	3.2295257053342787
-70.1499999999998	3.217604230186344
-69.1499999999998	3.206813404780905
-68.1499999999998	3.197140190699522
-67.1499999999998	3.18857313638821
-66.1499999999998	3.1811022598031156
-65.1499999999998	3.1747189423645708
-64.1499999999998	3.169415832969506
-63.1499999999998	3.1651867609540534
-62.1499999999998	3.1620266570019573
-61.1499999999998	3.159931481207287
-60.1499999999998	3.1588981575047677
-59.1499999999998	3.158924513839327
-58.1499999999998	3.160009227492583
-57.1499999999998	3.1621517750672252
-56.1499999999998	3.165352386663745
-55.1499999999998	3.1696120038447964
-54.1499999999998	3.174932241062902

Temperature (degC)	Pressure (MPa)
-53.1499999999998	3.1813153501534908
-52.1499999999998	3.1887641876813975
-51.1499999999998	3.1972821848392154
-50.1499999999998	3.206873319614011
-49.1499999999998	3.2175420910896912
-48.1499999999998	3.229293495605513
-47.1499999999998	3.2421330045980543
-46.1499999999998	3.2560665439709426
-45.1499999999998	3.271100474806761
-44.1499999999998	3.287241575307989
-43.1499999999998	3.3044970237729347
-42.1499999999998	3.3228743825870057
-41.1499999999998	3.342381583069533
-40.1499999999998	3.3630269111372098
-39.1499999999998	3.3848189937540694
-38.1499999999998	3.407766786144592
-37.1499999999998	3.431879559772936
-36.1499999999998	3.4571668911169926
-35.1499999999998	3.4836386512725745
-34.1499999999998	3.511304996390266
-33.1499999999998	3.5401763589780746
-32.1499999999998	3.5702634400220017
-31.14999999999977	3.601577201873419
-30.14999999999977	3.6341288617607304
-29.14999999999977	3.6679298857742397
-28.14999999999977	3.702991983076738
-27.14999999999977	3.739327100055802
-26.14999999999977	3.776947414132765
-25.14999999999977	3.8158653268907354
-24.14999999999977	3.856093456219915
-23.14999999999977	3.897644627215005
-22.14999999999977	3.940531861621726
-21.14999999999977	3.984768365677236
-20.14999999999977	4.03036751634546
-19.14999999999977	4.077342845969581
-18.14999999999977	4.1257080255062135
-17.14999999999977	4.175476846588407
-16.14999999999977	4.226663202690953
-15.14999999999977	4.279281069755994
-14.14999999999977	4.333344486640801
-13.14999999999977	4.388867535694445
-12.14999999999977	4.445864323794336
-11.14999999999977	4.504348964009626
-10.14999999999977	4.564335557979625
-9.14999999999977	4.625838178894007

Temperature (degC)	Pressure (MPa)
-8.14999999999977	4.688870854739735
-7.14999999999977	4.753447551174268
-6.14999999999977	4.819582153003308
-5.14999999999977	4.887288442794743
-4.14999999999977	4.956580074638617
-3.149999999999773	5.027470540422679
-2.149999999999773	5.099973125433713
-1.149999999999773	5.174100849447146
-0.1499999999997726	5.249866389048616
0.8500000000000227	5.327281976685895
1.8500000000000227	5.406359272113173
2.8500000000000227	5.48710920266259
3.8500000000000227	5.569541770056107
4.850000000000023	5.653665823859908
5.850000000000023	5.739488804486767
6.850000000000023	5.827016462358059
7.850000000000023	5.916252563558647
8.850000000000023	6.007198595463094
9.850000000000023	6.099853486985441
10.850000000000023	6.19421335531906
11.850000000000023	6.290271281339868
12.850000000000023	6.388017095369105
13.850000000000023	6.487437118371366
14.850000000000023	6.588513745099941
15.850000000000023	6.691224669375441
16.850000000000023	6.7955414341809215
17.850000000000023	6.901426844712843
18.850000000000023	7.008830624139259
19.850000000000023	7.11768254611723
20.850000000000023	7.227882142089511
21.850000000000023	7.339284376757863
22.850000000000023	7.451678580673062
23.850000000000023	7.5647625768245
24.850000000000023	7.678101335116774
25.850000000000023	7.7910614869988635
26.850000000000023	7.9026828906665685
27.850000000000023	8.011410603033909
28.850000000000023	8.11455739599462
29.850000000000023	8.206381089216638
30.850000000000023	8.244885437485308
31.850000000000023	8.502602727351425
32.85000000000002	8.76414114806512
33.85000000000002	8.906038127848936

Table B333: Bubble Points for Scenario 4

Temperature (degC)	Pressure (MPa)
-108.1499999999998	139.1880243055868
-107.1499999999998	107.44219010087917
-106.1499999999998	85.8471302206642
-105.1499999999998	70.16749180078274
-104.1499999999998	58.32798182588544
-103.1499999999998	49.14885150235954
-102.1499999999998	41.89730853726297
-101.1499999999998	36.089852642071534
-100.1499999999998	31.392812968119156
-99.1499999999998	27.567522115235025
-98.1499999999998	24.43800101041965
-97.1499999999998	21.870898157219457
-96.1499999999998	19.762510284552267
-95.1499999999998	18.030113264310735
-94.1499999999998	16.606084123870087
-93.1499999999998	15.43401108190618
-92.1499999999998	14.466330862253436
-91.1499999999998	13.663034951446177
-90.1499999999998	12.990925291099225
-89.1499999999998	12.42302148573331
-88.1499999999998	11.937889333987957
-87.1499999999998	11.518817270852654
-86.1499999999998	11.152919001579383
-85.1499999999998	10.830287931398
-84.1499999999998	10.543283223087451
-83.1499999999998	10.285967774652464
-82.1499999999998	10.053683116746553
-81.1499999999998	9.842734193734215
-80.1499999999998	9.650157308273224
-79.1499999999998	9.47354921145695
-78.1499999999998	9.31094059293641
-77.1499999999998	9.160701715720135
-76.1499999999998	9.02147138382671
-75.1499999999998	8.892102946762147
-74.1499999999998	8.771622841230313
-73.1499999999998	8.659198440828105
-72.1499999999998	8.554112881200798
-71.1499999999998	8.455745162381149
-70.1499999999998	8.363554281310753
-69.1499999999998	8.27706647062957
-68.1499999999998	8.19586485290612
-67.1499999999998	8.119580989361346
-66.1499999999998	8.04788792649654

Temperature (degC)	Pressure (MPa)
-65.1499999999998	7.980494436437205
-64.1499999999998	7.9171402155650945
-63.1499999999998	7.8575918578427855
-62.1499999999998	7.801639458652942
-61.1499999999998	7.749093735003678
-60.1499999999998	7.699783571159437
-59.1499999999998	7.653553916768599
-58.1499999999998	7.610263978639911
-57.1499999999998	7.569785658334741
-56.1499999999998	7.532002196587234
-55.1499999999998	7.496806992479163
-54.1499999999998	7.4641025709349735
-53.1499999999998	7.433799676619436
-52.1499999999998	7.4058164759410055
-51.1499999999998	7.380077851928453
-50.1499999999998	7.356514779153015
-49.1499999999998	7.33506376788022
-48.1499999999998	7.315666368390787
-47.1499999999998	7.298268727722873
-46.1499999999998	7.282821192292273
-45.1499999999998	7.269277950801149
-44.1499999999998	7.257596712602285
-43.1499999999998	7.24773841737013
-42.1499999999998	7.239666972390639
-41.1499999999998	7.233349014219798
-40.1499999999998	7.228753691748831
-39.1499999999998	7.225852467978312
-38.1499999999998	7.224618937975108
-37.1499999999998	7.22502866067466
-36.1499999999998	7.227059002341021
-35.1499999999998	7.230688989660199
-34.1499999999998	7.235899170614639
-33.1499999999998	7.242671481523044
-32.1499999999998	7.2509891187921
-31.14999999999977	7.26083641425027
-30.14999999999977	7.272198713099611
-29.14999999999977	7.285062253846943
-28.14999999999977	7.299414049744325
-27.14999999999977	7.315241771512132
-26.14999999999977	7.332533631272086
-25.14999999999977	7.351278267743682
-24.14999999999977	7.371464632806541
-23.14999999999977	7.393081879587656
-22.14999999999977	7.4161192521295085
-21.14999999999977	7.44056597656853

Temperature (degC)	Pressure (MPa)
-20.14999999999977	7.466411153523505
-19.14999999999977	7.493643650977236
-18.14999999999977	7.522251996361928
-17.14999999999977	7.5522242657545275
-16.14999999999977	7.583547966950167
-15.14999999999977	7.61620991179259
-14.14999999999977	7.6501960713143395
-13.14999999999977	7.685491405193378
-12.14999999999977	7.72207965479463
-11.14999999999977	7.759943086838182
-10.14999999999977	7.799062172929425
-9.14999999999977	7.839415189266869
-8.14999999999977	7.880977721310911
-7.14999999999977	7.923722060889434
-6.14999999999977	7.9676164886543805
-5.14999999999977	8.0126244436232
-4.14999999999977	8.058703593940232
-3.149999999999773	8.105804838700712
-2.149999999999773	8.153871288538078
-1.149999999999773	8.202837290298188
-0.1499999999997726	8.252627574796023
0.8500000000000227	8.303156609806901
1.8500000000000227	8.354328224500348
2.8500000000000227	8.406035523475639
3.8500000000000227	8.458161012157738
4.850000000000023	8.510576690858452
5.850000000000023	8.563143625083313
6.850000000000023	8.615710159095185
7.850000000000023	8.668107535576535
8.850000000000023	8.720141300944672
9.850000000000023	8.771576679409137
10.850000000000023	8.822116328684057
11.850000000000023	8.871369789541125
12.850000000000023	8.918815615472564
13.850000000000023	8.963759306603095
14.850000000000023	9.005291683744742
15.850000000000023	9.042251249943732
16.850000000000023	9.073189447593986
17.850000000000023	9.09634564012623
18.850000000000023	9.109710868132051
19.850000000000023	9.104887570618224
20.850000000000023	9.096347211017973
21.850000000000023	9.054422807197572
22.850000000000023	9.194597318841554
23.850000000000023	9.053965235743457

Temperature (degC)	Pressure (MPa)
24.850000000000023	8.590931082296192
25.850000000000023	10.92529139434565

Table B334: Bubble Points for Scenario 5

Temperature (degC)	Pressure (MPa)
-96.1499999999998	6.5549810730654805
-95.1499999999998	6.38149208757774
-94.1499999999998	6.222658114119615
-93.1499999999998	6.076581323174115
-92.1499999999998	5.941714741108492
-91.1499999999998	5.816781320185623
-90.1499999999998	5.700714988420793
-89.1499999999998	5.592616932551997
-88.1499999999998	5.491722645568928
-87.1499999999998	5.397376718134502
-86.1499999999998	5.309013292787353
-85.1499999999998	5.226140721650844
-84.1499999999998	5.148329387878404
-83.1499999999998	5.075201938440976
-82.1499999999998	5.0064253764818725
-81.1499999999998	4.94170460326173
-80.1499999999998	4.88077710131229
-79.1499999999998	4.823408524518413
-78.1499999999998	4.76938901501098
-77.1499999999998	4.718530107296318
-76.1499999999998	4.67066211037982
-75.1499999999998	4.625631881635297
-74.1499999999998	4.5833009238859175
-73.1499999999998	4.5435437508006205
-72.1499999999998	4.506246476244833
-71.1499999999998	4.471305591650158
-70.1499999999998	4.438626901991794
-69.1499999999998	4.408124596210469
-68.1499999999998	4.379720432123882
-67.1499999999998	4.353343019247586
-66.1499999999998	4.328927185673881
-65.1499999999998	4.306413417388134
-64.1499999999998	4.28574736024503
-63.1499999999998	4.266879376317206
-62.1499999999998	4.2497641475498575
-61.1499999999998	4.234360320753261
-60.1499999999998	4.22063018873567
-59.1499999999998	4.2085394031715735
-58.1499999999998	4.198056715372501
-57.1499999999998	4.189153741652102
-56.1499999999998	4.181804750365393
-55.1499999999998	4.175986468186917
-54.1499999999998	4.171677903310371

Temperature (degC)	Pressure (MPa)
-53.1499999999998	4.1688601837522565
-52.1499999999998	4.167516408967663
-51.1499999999998	4.16763151329833
-50.1499999999998	4.169192139949273
-49.1499999999998	4.1721865242374205
-48.1499999999998	4.1766043851354695
-47.1499999999998	4.182436824123808
-46.1499999999998	4.189676230561136
-45.1499999999998	4.198316192825887
-44.1499999999998	4.208351414632475
-43.1499999999998	4.219777635978559
-42.1499999999998	4.232591558284482
-41.1499999999998	4.246790773375804
-40.1499999999998	4.26237369604109
-39.1499999999998	4.279339499948365
-38.1499999999998	4.297688056787919
-37.1499999999998	4.317419878526092
-36.1499999999998	4.3385360626963125
-35.1499999999998	4.361038240635769
-34.1499999999998	4.38492852857978
-33.1499999999998	4.410209481444216
-32.1499999999998	4.436884049138212
-31.14999999999977	4.464955535131037
-30.14999999999977	4.4944275569636964
-29.14999999999977	4.525304008340866
-28.14999999999977	4.557589022410611
-27.14999999999977	4.591286935797254
-26.14999999999977	4.626402253013212
-25.14999999999977	4.662939610870549
-24.14999999999977	4.700903742585447
-23.14999999999977	4.740299441359352
-22.14999999999977	4.781131523335363
-21.14999999999977	4.823404789837375
-20.14999999999977	4.867123988992105
-19.14999999999977	4.9122937768377195
-18.14999999999977	4.958918678080701
-17.14999999999977	5.007003046726013
-16.14999999999977	5.056551026710204
-15.14999999999977	5.107566512692723
-14.14999999999977	5.160053110987155
-13.14999999999977	5.214014100463548
-12.14999999999977	5.2694523929990655
-11.14999999999977	5.326370492686587
-10.14999999999977	5.384770452531846
-9.14999999999977	5.444653826706501

Temperature (degC)	Pressure (MPa)
-8.14999999999977	5.506021615637251
-7.14999999999977	5.5688742001524725
-6.14999999999977	5.633211259759414
-5.14999999999977	5.699031668739814
-4.14999999999977	5.766333362451443
-3.149999999999773	5.835113164904396
-2.149999999999773	5.90536656786299
-1.149999999999773	5.977087451375641
-0.1499999999997726	6.050267736582094
0.8500000000000227	6.124896963574916
1.8500000000000227	6.200961791135235
2.8500000000000227	6.27844542069265
3.8500000000000227	6.357326954199952
4.850000000000023	6.437580703609229
5.850000000000023	6.519175476720596
6.850000000000023	6.6020738670356085
7.850000000000023	6.686231568654976
8.850000000000023	6.7715967130446675
9.850000000000023	6.8581091706081185
10.850000000000023	6.945699660781802
11.850000000000023	7.034288349753431
12.850000000000023	7.123782356435178
13.850000000000023	7.214071273914644
14.850000000000023	7.305019625776216
15.850000000000023	7.396453519418756
16.850000000000023	7.488141456145808
17.850000000000023	7.579764940179282
18.850000000000023	7.670878825671832
19.850000000000023	7.760857958004882
20.850000000000023	7.848825573348843
21.850000000000023	7.933544104092666
22.850000000000023	8.01321417241731
23.850000000000023	8.08509612870882
24.850000000000023	8.145064913882463

Table B335: Bubble Points for Scenario 6

Temperature (degC)	Pressure (MPa)
-97.1499999999998	5.307152168037503
-96.1499999999998	5.209726710373387
-95.1499999999998	5.119343247302874
-94.1499999999998	5.035238112539667
-93.1499999999998	4.956773341589676
-92.1499999999998	4.88341030297749
-91.1499999999998	4.814690020291665
-90.1499999999998	4.750218223143512
-89.1499999999998	4.689653810035466
-88.1499999999998	4.632699818387433
-87.1499999999998	4.579096267261776
-86.1499999999998	4.5286144196349385
-85.1499999999998	4.481052135098402
-84.1499999999998	4.436230070351173
-83.1499999999998	4.3939885461588455
-82.1499999999998	4.354184943509631
-81.1499999999998	4.316691523913803
-80.1499999999998	4.281393592537794
-79.1499999999998	4.24818794068628
-78.1499999999998	4.216981517538801
-77.1499999999998	4.18769029136364
-76.1499999999998	4.160238268267534
-75.1499999999998	4.134556642811741
-74.1499999999998	4.110583059472678
-73.1499999999998	4.088260967948813
-72.1499999999998	4.0675390581318664
-71.1499999999998	4.048370763160645
-70.1499999999998	4.030713820844721
-69.1499999999998	4.014529885321048
-68.1499999999998	3.9997841821966102
-67.1499999999998	3.98644520133675
-66.1499999999998	3.9744844225375533
-65.1499999999998	3.963876069832396
-64.1499999999998	3.954596890937617
-63.1499999999998	3.9466259587886525
-62.1499999999998	3.939944492534218
-61.1499999999998	3.934535695734967
-60.1499999999998	3.9303846097909068
-59.1499999999998	3.9274779809027573
-58.1499999999998	3.925804139055213
-57.1499999999998	3.9253528877400843
-56.1499999999998	3.926115403248426
-55.1499999999998	3.928084142524147

Temperature (degC)	Pressure (MPa)
-54.1499999999998	3.9312527586817927
-53.1499999999998	3.935616023400915
-52.1499999999998	3.94116975546399
-51.1499999999998	3.9479107548185906
-50.1499999999998	3.9558367415865097
-49.1499999999998	3.9649462994974045
-48.1499999999998	3.975238823291799
-47.1499999999998	3.9867144696682533
-46.1499999999998	3.999374111415082
-45.1499999999998	4.013219294382505
-44.1499999999998	4.0282521970367124
-43.1499999999998	4.04447559234041
-42.1499999999998	4.061892811775342
-41.1499999999998	4.080507711385613
-40.1499999999998	4.100324639692758
-39.1499999999998	4.121348407482909
-38.1499999999998	4.143584259354569
-37.1499999999998	4.167037847059518
-36.1499999999998	4.1917152045549555
-35.1499999999998	4.217622724743029
-34.1499999999998	4.244767137781816
-33.1499999999998	4.273155490822988
-32.1499999999998	4.302795128953827
-31.14999999999977	4.333693677071179
-30.14999999999977	4.3658590223258225
-29.14999999999977	4.399299296769648
-28.14999999999977	4.434022859733561
-27.14999999999977	4.470038279586474
-26.14999999999977	4.507354314421266
-25.14999999999977	4.545979891379357
-24.14999999999977	4.585924084321552
-23.14999999999977	4.627196089752982
-22.14999999999977	4.669805200921864
-21.14999999999977	4.713760780219477
-20.14999999999977	4.759072230054088
-19.14999999999977	4.805748962479713
-18.14999999999977	4.8538003679337685
-17.14999999999977	4.903235783458217
-16.14999999999977	4.954064460768631
-15.14999999999977	5.006295534492031
-14.14999999999977	5.059937990800983
-13.14999999999977	5.115000636529545
-12.14999999999977	5.171492068630635
-11.14999999999977	5.229420643537439
-10.14999999999977	5.28879444565371

Temperature (degC)	Pressure (MPa)
-9.14999999999977	5.349621253651024
-8.14999999999977	5.411908502667943
-7.14999999999977	5.475663239750051
-6.14999999999977	5.540892069010761
-5.14999999999977	5.607601082017874
-4.14999999999977	5.67579576801587
-3.149999999999773	5.745480897654972
-2.149999999999773	5.816660373417401
-1.149999999999773	5.8893370397589
-0.1499999999997726	5.963512446687512
0.8500000000000227	6.0391865620930725
1.8500000000000227	6.1163574309896305
2.8500000000000227	6.195020783957262
3.8500000000000227	6.275169602409059
4.850000000000023	6.356793654373265
5.850000000000023	6.4398790203917535
6.850000000000023	6.524407633233284
7.850000000000023	6.610356854767688
8.850000000000023	6.697699104756339
9.850000000000023	6.786401534006428
10.850000000000023	6.876425691026087
11.850000000000023	6.9677270582761395
12.850000000000023	7.060254222352188
13.850000000000023	7.153947286014866
14.850000000000023	7.248734914273594
15.850000000000023	7.3445293313430655
16.850000000000023	7.441217847672577
17.850000000000023	7.538650484419917
18.850000000000023	7.636622837975261
19.850000000000023	7.7348499326643605
20.850000000000023	7.832936978658071
21.850000000000023	7.930336973912093
22.850000000000023	8.026291736724085
23.850000000000023	8.119732180788807
24.850000000000023	8.20909052548041
25.850000000000023	8.291985523005918
26.850000000000023	8.364681659169452
27.850000000000023	8.416609581992269
28.850000000000023	8.373425350510647

Table B336: Bubble Points for Scenario 7

Temperature (degC)	Pressure (MPa)
-96.1499999999998	84.86465950038614
-95.1499999999998	61.57998869826388
-94.1499999999998	47.893316601030165
-93.1499999999998	38.584325120846756
-92.1499999999998	31.823121262311282
-91.1499999999998	26.7333462068845
-90.1499999999998	22.823686243995873
-89.1499999999998	19.7902827928406
-88.1499999999998	17.43157782557038
-87.1499999999998	15.605720437233401
-86.1499999999998	14.206062790818985
-85.1499999999998	13.14487621212237
-84.1499999999998	12.343573619196821
-83.1499999999998	11.731950274146868
-82.1499999999998	11.253296470259482
-81.1499999999998	10.866992182882122
-80.1499999999998	10.546071444179375
-79.1499999999998	10.2729986450788
-78.1499999999998	10.036187166246007
-77.1499999999998	9.827737953095003
-76.1499999999998	9.642079016438618
-75.1499999999998	9.475152601259586
-74.1499999999998	9.323919302223954
-73.1499999999998	9.1860463021192
-72.1499999999998	9.059705091663856
-71.1499999999998	8.943436230006615
-70.1499999999998	8.83605641085242
-69.1499999999998	8.736593000512382
-68.1499999999998	8.644236893202693
-67.1499999999998	8.558307877254657
-66.1499999999998	8.478228734860311
-65.1499999999998	8.40350556062426
-64.1499999999998	8.333712587719258
-63.1499999999998	8.268480335358912
-62.1499999999998	8.207486239740144
-61.1499999999998	8.150447167329908
-60.1499999999998	8.097113372617805
-59.1499999999998	8.047263576963896
-58.1499999999998	8.00070092669806
-57.1499999999998	7.957249647526072
-56.1499999999998	7.916752255238032
-55.1499999999998	7.879067214599457
-54.1499999999998	7.844066962105016

Temperature (degC)	Pressure (MPa)
-53.1499999999998	7.811636226244258
-52.1499999999998	7.781670592705771
-51.1499999999998	7.754075272486604
-50.1499999999998	7.728764039146352
-49.1499999999998	7.705658307872247
-48.1499999999998	7.684686334080063
-47.1499999999998	7.665782513323753
-46.1499999999998	7.648886767633546
-45.1499999999998	7.633944005661502
-44.1499999999998	7.620903646534186
-43.1499999999998	7.60971919843733
-42.1499999999998	7.600347884767444
-41.1499999999998	7.592750311388444
-40.1499999999998	7.586890169505877
-39.1499999999998	7.582733969405261
-38.1499999999998	7.58025080070023
-37.1499999999998	7.579412115381089
-36.1499999999998	7.580191530272112
-35.1499999999998	7.5825646459495255
-34.1499999999998	7.586508879536102
-33.1499999999998	7.592003309167852
-32.1499999999998	7.599028528321443
-31.14999999999977	7.6075665085200415
-30.14999999999977	7.617600469302807
-29.14999999999977	7.629114754661126
-28.14999999999977	7.6420947153903915
-27.14999999999977	7.656526597056563
-26.14999999999977	7.672397433430888
-25.14999999999977	7.689694945343068
-24.14999999999977	7.708407444980685
-23.14999999999977	7.728523745603123
-22.14999999999977	7.750033076643843
-21.14999999999977	7.772925003969323
-20.14999999999977	7.797189354872764
-19.14999999999977	7.822816147174853
-18.14999999999977	7.849795521220779
-17.14999999999977	7.878117673102871
-16.14999999999977	7.907772786645957
-15.14999999999977	7.938750960688434
-14.14999999999977	7.971042127006535
-13.14999999999977	8.004635952881463
-12.14999999999977	8.039521720820352
-11.14999999999977	8.075688176505087
-10.14999999999977	8.113123335061768
-9.14999999999977	8.151814235113266

Temperature (degC)	Pressure (MPa)
-8.14999999999977	8.191746630542879
-7.14999999999977	8.23290461188786
-6.14999999999977	8.27527015264526
-5.14999999999977	8.318822581478205
-4.14999999999977	8.363537988871627
-3.149999999999773	8.409388586282027
-2.149999999999773	8.456342046378456
-1.149999999999773	8.504360863575352
-0.1499999999997726	8.553401782693982
0.8500000000000227	8.603415347943319
1.8500000000000227	8.654345621118392
2.8500000000000227	8.706130103021971
3.8500000000000227	8.758699860923313
4.850000000000023	8.811979812161852
5.850000000000023	8.865889034309188
6.850000000000023	8.920340863060394
7.850000000000023	8.975242400023323
8.850000000000023	9.0304928953241
9.850000000000023	9.085980319038027
10.850000000000023	9.141575336174782
11.850000000000023	9.19712191506286
12.850000000000023	9.252423995027792
13.850000000000023	9.307228066986921
14.850000000000023	9.36120210815302
15.850000000000023	9.413912211160575
16.850000000000023	9.464797930937241
17.850000000000023	9.513148435127514
18.850000000000023	9.558077337229738
19.850000000000023	9.598492306652258
20.850000000000023	9.633045888613456
21.850000000000023	9.660034920752809
22.850000000000023	9.677059360354821
23.850000000000023	9.679719531929688
24.850000000000023	9.650532741611194
25.850000000000023	9.578653260905096

Table B337: Bubble Points for Scenario 8

Temperature (degC)	Pressure (MPa)
-94.1499999999998	4.034150386823054
-93.1499999999998	3.9669508587461264
-92.1499999999998	3.9038027768718284
-91.1499999999998	3.84440344284024
-90.1499999999998	3.7884860374995464
-89.1499999999998	3.7358143607849414
-88.1499999999998	3.6861785153320343
-87.1499999999998	3.639391335485071
-86.1499999999998	3.5952854108653223
-85.1499999999998	3.5537105883086495
-84.1499999999998	3.5145318619079986
-83.1499999999998	3.4776275802479124
-82.1499999999998	3.4428879147655125
-81.1499999999998	3.4102135444642414
-80.1499999999998	3.379514520998561
-79.1499999999998	3.3507092850003706
-78.1499999999998	3.32372380985892
-77.1499999999998	3.298490853552386
-76.1499999999998	3.2749493024016636
-75.1499999999998	3.2530435934537865
-74.1499999999998	3.232723204348929
-73.1499999999998	3.213942201461125
-72.1499999999998	3.196658838320843
-71.1499999999998	3.1808351978376166
-70.1499999999998	3.166436872601566
-69.1499999999998	3.1534326785039197
-68.1499999999998	3.1417943975539333
-67.1499999999998	3.131496546353606
-66.1499999999998	3.122516167208081
-65.1499999999998	3.114832639199471
-64.1499999999998	3.1084275069398006
-63.1499999999998	3.103284325058976
-62.1499999999998	3.099388516575402
-61.1499999999998	3.0967272437293927
-60.1499999999998	3.095289289864167
-59.1499999999998	3.095064951185438
-58.1499999999998	3.096045937360506
-57.1499999999998	3.0982252800078913
-56.1499999999998	3.1015972482731944
-55.1499999999998	3.1061572707352547
-54.1499999999998	3.1119018630084834
-53.1499999999998	3.1188285604355133
-52.1499999999998	3.126935855375113

Temperature (degC)	Pressure (MPa)
-51.14999999999998	3.1362231385814017
-50.14999999999998	3.1466906443081393
-49.14999999999998	3.1583393986985966
-48.14999999999998	3.171171171186447
-47.14999999999998	3.1851884285677388
-46.14999999999998	3.2003942915034163
-45.14999999999998	3.216792493196451
-44.14999999999998	3.234387340072408
-43.14999999999998	3.2531836742657703
-42.14999999999998	3.2731868378089866
-41.14999999999998	3.2944026383921
-40.14999999999998	3.316837316670407
-39.14999999999998	3.3404975150587632
-38.14999999999998	3.365390248039046
-37.14999999999998	3.3915228740068137
-36.14999999999998	3.4189030687105246
-35.14999999999998	3.4475388003395118
-34.14999999999998	3.477438306338821
-33.14999999999998	3.5086100719307587
-32.14999999999998	3.541062810418781
-31.149999999999977	3.574805445163564
-30.149999999999977	3.6098470931589883
-29.149999999999977	3.646197050020694
-28.149999999999977	3.683864776176641
-27.149999999999977	3.7228598839497313
-26.149999999999977	3.7631921252492635
-25.149999999999977	3.8048713794796116
-24.149999999999977	3.8479076413723505
-23.149999999999977	3.8923110083941768
-22.149999999999977	3.938091667479734
-21.149999999999977	3.9852598808708155
-20.149999999999977	4.03382597095289
-19.149999999999977	4.083800304022865
-18.149999999999977	4.135193273040529
-17.149999999999977	4.18801527945612
-16.149999999999977	4.2422767142868745
-15.149999999999977	4.297987938626443
-14.149999999999977	4.355159263797966
-13.149999999999977	4.413800931330306
-12.149999999999977	4.473923092878916
-11.149999999999977	4.535535790070194
-10.149999999999977	4.5986489342097565
-9.149999999999977	4.663272285374265
-8.149999999999977	4.72941543029017
-7.149999999999977	4.797087757858716

Temperature (degC)	Pressure (MPa)
-6.14999999999977	4.866298430755223
-5.14999999999977	4.937056350833319
-4.14999999999977	5.009370115338561
-3.149999999999773	5.083247960086941
-2.149999999999773	5.158697684880191
-1.149999999999773	5.235726555615235
-0.1499999999997726	5.314341176936695
0.8500000000000227	5.39454732898851
1.8500000000000227	5.47634976223132
2.8500000000000227	5.559751945368401
3.8500000000000227	5.644755763624455
4.850000000000023	5.7313611678181635
5.850000000000023	5.819565778916901
6.850000000000023	5.909364457382283
7.850000000000023	6.000748850936537
8.850000000000023	6.093706936058769
9.850000000000023	6.188222565074247
10.850000000000023	6.284275017003509
11.850000000000023	6.381838519763272
12.850000000000023	6.480881654424925
13.850000000000023	6.581366457407614
14.850000000000023	6.683246891661932
15.850000000000023	6.786466154818547
16.850000000000023	6.890952033431809
17.850000000000023	6.996609223942045
18.850000000000023	7.103307242701854
19.850000000000023	7.21086242732635
20.850000000000023	7.319012247450127
21.850000000000023	7.427378953656236
22.850000000000023	7.535419256685439
23.850000000000023	7.6423434925084335
24.850000000000023	7.746964491139539
25.850000000000023	7.8473725441034965
26.850000000000023	7.940297604069151
27.850000000000023	8.019626090884689
28.850000000000023	8.050197832515893
29.850000000000023	8.445641454296828
30.850000000000023	8.620979479417569

Table B338: Bubble Points for Scenario 9

Temperature (degC)	Pressure (MPa)
-73.1499999999998	36.53688490189757
-72.1499999999998	31.415920288041676
-71.1499999999998	28.066120179080755
-70.1499999999998	25.537146689926
-69.1499999999998	23.502901677438132
-68.1499999999998	21.805414813356137
-67.1499999999998	20.35422524067084
-66.1499999999998	19.091984115269675
-65.1499999999998	17.979736761748534
-64.1499999999998	16.989664080794473
-63.1499999999998	16.101128596252455
-62.1499999999998	15.298355311615419
-61.1499999999998	14.568991122255682
-60.1499999999998	13.90316792553558
-59.1499999999998	13.292869966601536
-58.1499999999998	12.73149299425204
-57.1499999999998	12.21352878665317
-56.1499999999998	11.734334170722324
-55.1499999999998	11.289958513207194
-54.1499999999998	10.877012619148507
-53.1499999999998	10.492567554160633
-52.1499999999998	10.13407548375435
-51.1499999999998	9.799306974222342
-50.1499999999998	9.486300780004898
-49.1499999999998	9.193323226344638
-48.1499999999998	8.918835053120699
-47.1499999999998	8.661464123149718
-46.1499999999998	8.419982785562892
-45.1499999999998	8.193288967847337
-44.1499999999998	7.9803902795510515
-43.1499999999998	7.780390567231142
-42.1499999999998	7.5924784789641
-41.1499999999998	7.415917687154332
-40.1499999999998	7.250038488344767
-39.1499999999998	7.094230553038379
-38.1499999999998	6.94793664116094
-37.1499999999998	6.8106471324263245
-36.1499999999998	6.681895247621415
-35.1499999999998	6.56125285826305
-34.1499999999998	6.44832679924704
-33.1499999999998	6.342755613064144
-32.1499999999998	6.244206665440448
-31.14999999999977	6.152373581479596

Temperature (degC)	Pressure (MPa)
-30.14999999999977	6.066973958932401
-29.14999999999977	5.987747321441857
-28.14999999999977	5.914453279739677
-27.14999999999977	5.8468698730775595
-26.14999999999977	5.784792066807562
-25.14999999999977	5.728030385104996
-24.14999999999977	5.676409660510929
-23.14999999999977	5.62976788438923
-22.14999999999977	5.587955144474904
-21.14999999999977	5.550832637668477
-20.14999999999977	5.518271748193878
-19.14999999999977	5.49015318280257
-18.14999999999977	5.466366156545836
-17.14999999999977	5.446807624206589
-16.14999999999977	5.431381554056103
-15.14999999999977	5.419998242040962
-14.14999999999977	5.412573665918029
-13.14999999999977	5.409028879969502
-12.14999999999977	5.40928945192007
-11.14999999999977	5.413284944313165
-10.14999999999977	5.4209484428848755
-9.14999999999977	5.432216134310326
-8.14999999999977	5.447026935150156
-7.14999999999977	5.465322172700786
-6.14999999999977	5.487045317020533
-5.14999999999977	5.51214176154923
-4.14999999999977	5.540558647724246
-3.149999999999773	5.572244727026476
-2.149999999999773	5.607150252149513
-1.149999999999773	5.645226887838957
-0.1499999999997726	5.686427631319395
0.8500000000000227	5.730706732170238
1.8500000000000227	5.7780196018304455
2.8500000000000227	5.8283227035693175
3.8500000000000227	5.881573415128012
4.850000000000023	5.93772985853707
5.850000000000023	5.99675069559826
6.850000000000023	6.0585948926056234
7.850000000000023	6.123221464110866
8.850000000000023	6.19058921139548
9.850000000000023	6.260656475441202
10.850000000000023	6.3333809244846035
11.850000000000023	6.4087193900970805
12.850000000000023	6.486627749780448
13.850000000000023	6.567060823640071

Temperature (degC)	Pressure (MPa)
14.8500000000000023	6.64997220242834
15.8500000000000023	6.735313847839362
16.8500000000000023	6.823035198610586
17.8500000000000023	6.913081377274168
18.8500000000000023	7.005389931167405
19.8500000000000023	7.099885380266352
20.8500000000000023	7.196470716781756
21.8500000000000023	7.295014932987899
22.8500000000000023	7.395335602985223
23.8500000000000023	7.497175259436299
24.8500000000000023	7.600168950070355
25.8500000000000023	7.703795474027035
26.8500000000000023	7.807290962736712
27.8500000000000023	7.909466972806213
28.8500000000000023	8.008314996471572
29.8500000000000023	8.100128405627135
30.8500000000000023	8.173189943453085
32.850000000000002	7.891397666795385
33.850000000000002	8.797387928079207
34.850000000000002	8.921598294564754
35.850000000000002	8.862785417412173

Table B339: Bubble Points for Scenario 1

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.3408370807742133e-08
-172.1499999999998	1.8826644301228272e-08
-171.1499999999998	2.6244611716676495e-08
-170.1499999999998	3.6330507542497955e-08
-169.1499999999998	4.995247417717693e-08
-168.1499999999998	6.823127460802054e-08
-167.1499999999998	9.260498213778479e-08
-166.1499999999998	1.249079088853964e-07
-165.1499999999998	1.674663667434938e-07
-164.1499999999998	2.2321421848653194e-07
-163.1499999999998	2.958315734564595e-07
-162.1499999999998	3.8991041206820917e-07
-161.1499999999998	5.111513863006838e-07
-160.1499999999998	6.665965390419633e-07
-159.1499999999998	8.649032129417279e-07
-158.1499999999998	1.1166649782122248e-06
-157.1499999999998	1.4347859971535477e-06
-156.1499999999998	1.8349158592248907e-06
-155.1499999999998	2.335952562042211e-06
-154.1499999999998	2.9606219782098325e-06
-153.1499999999998	3.736142832524401e-06
-152.1499999999998	4.694986915672233e-06
-151.1499999999998	5.875744975673338e-06
-150.1499999999998	7.324109453398612e-06
-149.1499999999998	9.093985959735448e-06
-148.1499999999998	1.1248746125526863e-05
-147.1499999999998	1.3862635187337915e-05
-146.1499999999998	1.7022348398490966e-05
-145.1499999999998	2.0828791071802476e-05
-144.1499999999998	2.539903776431793e-05
-143.1499999999998	3.0868506801518974e-05
-142.1499999999998	3.7393367005652796e-05
-141.1499999999998	4.515319413697313e-05
-140.1499999999998	5.43538951750848e-05
-139.1499999999998	6.523091915795958e-05
-138.1499999999998	7.805277385661055e-05
-137.1499999999998	9.3124868092509e-05
-136.1499999999998	0.00011079370000160431
-135.1499999999998	0.00013145141201289915
-134.1499999999998	0.00015554073374103103
-133.1499999999998	0.000183560334391894
-132.1499999999998	0.00021607060664921603
-131.1499999999998	0.0002536999043500486

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0002971512565705032
-129.1499999999998	0.0003472095810329409
-128.1499999999998	0.00040474942001533147
-127.1499999999998	0.0004707432221968141
-126.1499999999998	0.0005462701941150097
-125.1499999999998	0.0006325257451451515
-124.1499999999998	0.0007308315501442632
-123.1499999999998	0.0008426462541409116
-122.1499999999998	0.0009695768436989189
-121.1499999999998	0.0011133907098483475
-120.1499999999998	0.0012760284277658085
-119.1499999999998	0.0014596172787061162
-118.1499999999998	0.001666485540045923
-117.1499999999998	0.001899177569704719
-116.1499999999998	0.0021604697116679975
-115.1499999999998	0.002453387049858922
-114.1499999999998	0.002781221038197588
-113.1499999999998	0.0031475480353589866
-112.1499999999998	0.003556248773501146
-111.1499999999998	0.004011528791092484
-110.1499999999998	0.0045179398609314055
-109.1499999999998	0.005080402445530556
-108.1499999999998	0.005704229213243733
-107.1499999999998	0.0063951496498530136
-106.1499999999998	0.007159335801820076
-105.1499999999998	0.008003429189047192
-104.1499999999998	0.008934568926801936
-103.1499999999998	0.00996042109844763
-102.1499999999998	0.011089209422799541
-101.1499999999998	0.01232974726230816
-100.1499999999998	0.01369147102087149
-99.1499999999998	0.015184474982908164
-98.1499999999998	0.01681954764840487
-97.1499999999998	0.018608209621996382
-96.1499999999998	0.02056275311776767
-95.1499999999998	0.02269628314540679
-94.1499999999998	0.025022760447603782
-93.1499999999998	0.027557046263219205
-92.1499999999998	0.030314948995759334
-91.1499999999998	0.03331327287213305
-90.1499999999998	0.03656986868256719
-89.1499999999998	0.04010368669896863
-88.1499999999998	0.043934831875995596
-87.1499999999998	0.04808462144670899
-86.1499999999998	0.05257564503297888

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.05743182739993065
-84.14999999999998	0.06267849399372272
-83.14999999999998	0.06834243941299586
-82.14999999999998	0.07445199897658925
-81.14999999999998	0.08103712356377044
-80.14999999999998	0.0881294579185519
-79.14999999999998	0.09576242262696759
-78.14999999999998	0.10397129999588998
-77.14999999999998	0.11279332408462513
-76.14999999999998	0.12226777516682437
-75.14999999999998	0.1324360789311904
-74.14999999999998	0.1433419107663018
-73.14999999999998	0.15503130551946964
-72.14999999999998	0.16755277317443404
-71.14999999999998	0.18095742096158793
-70.14999999999998	0.19529908250277903
-69.14999999999998	0.21063445470889505
-68.14999999999998	0.2270232433053459
-67.14999999999998	0.24452831807925965
-66.14999999999998	0.2632158792578553
-65.14999999999998	0.2831556369017429
-64.14999999999998	0.3044210059434957
-63.14999999999998	0.32708932074315217
-62.14999999999998	0.35124207523710543
-61.14999999999998	0.37696519900695635
-60.14999999999998	0.4043493887019292
-59.14999999999998	0.43349053679906746
-58.14999999999998	0.46449036902512325
-57.14999999999998	0.49745771699997016

Table B340: Bubble Points for Scenario 10

Temperature (degC)	Pressure (MPa)
-93.14999999999998	0.07350300876822272
-92.14999999999998	0.0785789925139379
-91.14999999999998	0.08393157759925467
-90.14999999999998	0.0895713912516497
-89.14999999999998	0.09550926404812886
-88.14999999999998	0.1017562274320684
-87.14999999999998	0.1083235111250559
-86.14999999999998	0.11522254049148477
-85.14999999999998	0.12246493381241949
-84.14999999999998	0.13006249951545723
-83.14999999999998	0.13802723335590028
-82.14999999999998	0.1463713155494812
-81.14999999999998	0.15510710789139592
-80.14999999999998	0.16424715083136748
-79.14999999999998	0.17380416055864661
-78.14999999999998	0.18379102606481196
-77.14999999999998	0.1942208062265176
-76.14999999999998	0.20510672687449708
-75.14999999999998	0.2164621779132785
-74.14999999999998	0.2283007104391349
-73.14999999999998	0.24063603391936478
-72.14999999999998	0.25348201337915016
-71.14999999999998	0.2668526666749952
-70.14999999999998	0.2807621617929579
-69.14999999999998	0.29522481422988595
-68.14999999999998	0.3102550844266645
-67.14999999999998	0.3258675752876959
-66.14999999999998	0.3420770297811472
-65.14999999999998	0.3588983286224476
-64.14999999999998	0.376346488057317
-63.14999999999998	0.39443665773321507
-62.14999999999998	0.4131841186974024
-61.14999999999998	0.4326042814836823
-60.14999999999998	0.45271268433810835
-59.14999999999998	0.47352499154676414
-58.14999999999998	0.4950569919209993
-57.14999999999998	0.5173245973845785
-56.14999999999998	0.5403438417391384
-55.14999999999998	0.5641308795516659
-54.14999999999998	0.5887019852083172
-53.14999999999998	0.6140735521287473
-52.14999999999998	0.6402620921615887
-51.14999999999998	0.6672842351373558

Temperature (degC)	Pressure (MPa)
-50.14999999999998	0.6951567286316344
-49.14999999999998	0.7238964379080565
-48.14999999999998	0.7535203460794635
-47.14999999999998	0.7840455544875068
-46.14999999999998	0.8154892832903914
-45.14999999999998	0.84786887230724
-44.14999999999998	0.8812017820984392
-43.14999999999998	0.9155055952946112
-42.14999999999998	0.9507980181780594
-41.14999999999998	0.9870968825394273
-40.14999999999998	1.0244201477869734
-39.14999999999998	1.062785903326716
-38.14999999999998	1.1022123712234528
-37.14999999999998	1.1427179091441628
-36.14999999999998	1.1843210136042708
-35.14999999999998	1.22704032351399
-34.14999999999998	1.2708946240982586
-33.14999999999998	1.3159028511730244
-32.14999999999998	1.3620840958478606
-31.149999999999977	1.4094576097040559
-30.149999999999977	1.4580428104844425
-29.149999999999977	1.5078592883986066
-28.149999999999977	1.5589268130258322
-27.149999999999977	1.6112653409933595
-26.149999999999977	1.6648950244001837
-25.149999999999977	1.7198362200967423
-24.149999999999977	1.776109499896782
-23.149999999999977	1.8337356617612586
-22.149999999999977	1.8927357420491446
-21.149999999999977	1.953131028907834
-20.149999999999977	2.014943076855664
-19.149999999999977	2.078193722687477
-18.149999999999977	2.1429051027691663
-17.149999999999977	2.2090996718408307
-16.149999999999977	2.2768002234785927
-15.149999999999977	2.3460299123257085
-14.149999999999977	2.4168122783041204
-13.149999999999977	2.489171272987806
-12.149999999999977	2.5631312883645516
-11.149999999999977	2.6387171883050717
-10.149999999999977	2.71595434299902
-9.149999999999977	2.79486866679453
-8.149999999999977	2.8754866598651283
-7.149999999999977	2.9578354542416974
-6.149999999999977	3.0419428648455304

Temperature (degC)	Pressure (MPa)
-5.149999999999977	3.127837446274247
-4.149999999999977	3.2155485562342214
-3.149999999999973	3.305106426690594
-2.149999999999973	3.3965422440211217
-1.149999999999973	3.489888239654832
-0.1499999999999726	3.5851777930346294
0.8500000000000227	3.682445549041396
1.8500000000000227	3.7817275524372733
2.8500000000000227	3.883061402390592
3.8500000000000227	3.986486430767172
4.850000000000023	4.092043908609242
5.850000000000023	4.199777286259459
6.850000000000023	4.309732473829094
7.850000000000023	4.421958170537186
8.850000000000023	4.536506253828699
9.850000000000023	4.653432242643014
10.850000000000023	4.772795854083996
11.850000000000023	4.894661679730963
12.850000000000023	5.019100017969713
13.850000000000023	5.146187913288085
14.850000000000023	5.276010474754115
15.850000000000023	5.408662576866302
16.850000000000023	5.544251091719612
17.850000000000023	5.682897870249693
18.850000000000023	5.824743795990202
19.850000000000023	5.969954404351544
20.850000000000023	6.118727844427025
21.850000000000023	6.271306443875121
22.850000000000023	6.427994206291432
23.850000000000023	6.589184466501716
24.850000000000023	6.755405412854553
25.850000000000023	6.9274035784837515
26.850000000000023	7.106307046042466
27.850000000000023	7.293986669624879
28.850000000000023	7.493988775379231
29.850000000000023	7.714707379468984
30.850000000000023	8.093655977620497

Table B341: Bubble Points for Scenario 11

Temperature (degC)	Pressure (MPa)
-90.14999999999998	0.08909059615911546
-89.14999999999998	0.0950070455439322
-88.14999999999998	0.10123209337823787
-87.14999999999998	0.10777697474296624
-86.14999999999998	0.11465312022858758
-85.14999999999998	0.12187215311447065
-84.14999999999998	0.12944588646073382
-83.14999999999998	0.1373863201291254
-82.14999999999998	0.14570563779861267
-81.14999999999998	0.15441620389926583
-80.14999999999998	0.16353056054316506
-79.14999999999998	0.17306142442045358
-78.14999999999998	0.1830216836765627
-77.14999999999998	0.19342439480168439
-76.14999999999998	0.20428277950295792
-75.14999999999998	0.21561022160265056
-74.14999999999998	0.22742026393391893
-73.14999999999998	0.23972660528178383
-72.14999999999998	0.25254309733655556
-71.14999999999998	0.26588374168877454
-70.14999999999998	0.2797626868869116
-69.14999999999998	0.29419422551772373
-68.14999999999998	0.3091927913542601
-67.14999999999998	0.32477295657668237
-66.14999999999998	0.3409494290482595
-65.14999999999998	0.35773704967262693
-64.14999999999998	0.3751507898237364
-63.14999999999998	0.39320574887394794
-62.14999999999998	0.41191715179738525
-61.14999999999998	0.4313003468804936
-60.14999999999998	0.4513708035278578
-59.14999999999998	0.47214411017893565
-58.14999999999998	0.4936359723254801
-57.14999999999998	0.5158622106638393
-56.14999999999998	0.5388387593488708
-55.14999999999998	0.5625816643891227
-54.14999999999998	0.5871070821608727
-53.14999999999998	0.6124312780811321
-52.14999999999998	0.6385706253937008
-51.14999999999998	0.6655416041433336
-50.14999999999998	0.6933608002640164
-49.14999999999998	0.7220449048651801
-48.14999999999998	0.7516107136778313

Temperature (degC)	Pressure (MPa)
-47.14999999999998	0.7820751266726664
-46.14999999999998	0.8134551478677141
-45.14999999999998	0.8457678853374695
-44.14999999999998	0.8790305514076306
-43.14999999999998	0.9132604630618689
-42.14999999999998	0.9484750425713199
-41.14999999999998	0.9846918183049086
-40.14999999999998	1.0219284257893253
-39.14999999999998	1.0602026089595211
-38.14999999999998	1.099532221645016
-37.14999999999998	1.1399352292548588
-36.14999999999998	1.1814297107091214
-35.14999999999998	1.2240338605795205
-34.14999999999998	1.267765991490236
-33.14999999999998	1.3126445367774395
-32.14999999999998	1.358688053426599
-31.149999999999977	1.4059152253455653
-30.149999999999977	1.4543448669866736
-29.149999999999977	1.5039959273819323
-28.149999999999977	1.554887494632574
-27.149999999999977	1.6070388009068854
-26.149999999999977	1.6604692280131823
-25.149999999999977	1.7151983135857058
-24.149999999999977	1.771245757964168
-23.149999999999977	1.8286314318001797
-22.149999999999977	1.8873753844531995
-21.149999999999977	1.9474978532173157
-20.149999999999977	2.009019273442447
-19.149999999999977	2.071960289592705
-18.149999999999977	2.136341767280672
-17.149999999999977	2.202184806346274
-16.149999999999977	2.2695107550610047
-15.149999999999977	2.338341225477792
-14.149999999999977	2.4086981100711804
-13.149999999999977	2.480603599732052
-12.149999999999977	2.554080203254371
-11.149999999999977	2.629150768469711
-10.149999999999977	2.705838505198476
-9.149999999999977	2.7841670102401297
-8.149999999999977	2.864160294680921
-7.149999999999977	2.945842813810474
-6.149999999999977	3.029239500056447
-5.149999999999977	3.1143757993668006
-4.149999999999977	3.2012777116076454
-3.1499999999999773	3.289971835605353

Temperature (degC)	Pressure (MPa)
-2.149999999999773	3.380485419608758
-1.149999999999773	3.47284641806305
-0.1499999999997726	3.567083555756916
0.8500000000000227	3.663226400577616
1.8500000000000227	3.761305446295925
2.8500000000000227	3.861352207061513
3.8500000000000227	3.9633993255461935
4.850000000000023	4.067480697039043
5.850000000000023	4.17363161223192
6.850000000000023	4.2818889220802925
7.850000000000023	4.392291229009696
8.850000000000023	4.504879110035593
9.850000000000023	4.61969537934396
10.850000000000023	4.7367854007553145
11.850000000000023	4.856197464812008
12.850000000000023	4.977983251532012
13.850000000000023	5.102198409090366
14.850000000000023	5.228903291935818
15.850000000000023	5.358163921057101
16.850000000000023	5.490053256730952
17.850000000000023	5.624652914943351
18.850000000000023	5.7620555207457285
19.850000000000023	5.9023679922073615
20.850000000000023	6.04571622357428
21.850000000000023	6.19225196969841
22.850000000000023	6.342163426898668
23.850000000000023	6.495692567066362
24.850000000000023	6.653166090625623
25.850000000000023	6.815057045120685
26.850000000000023	6.982125042313826
27.850000000000023	7.1557978371575786
28.850000000000023	7.339581253150158
29.850000000000023	7.606401734076035

Table B342: Bubble Points for Scenario 12

Temperature (degC)	Pressure (MPa)
-95.14999999999998	0.06511208088424648
-94.14999999999998	0.0697448887202678
-93.14999999999998	0.07463885854759794
-92.14999999999998	0.07980445979317259
-91.14999999999998	0.08525237783297435
-90.14999999999998	0.09099351175765905
-89.14999999999998	0.09703897207740048
-88.14999999999998	0.10340007827831031
-87.14999999999998	0.11008835634288412
-86.14999999999998	0.11711553617059296
-85.14999999999998	0.12449354893774682
-84.14999999999998	0.13223452439458536
-83.14999999999998	0.14035078813676394
-82.14999999999998	0.14885485882389288
-81.14999999999998	0.15775944537447323
-80.14999999999998	0.16707744414128892
-79.14999999999998	0.17682193607920701
-78.14999999999998	0.18700618392808696
-77.14999999999998	0.19764362937599167
-76.14999999999998	0.20874789025748652
-75.14999999999998	0.2203327577829419
-74.14999999999998	0.23241219378788916
-73.14999999999998	0.24500032802755445
-72.14999999999998	0.2581114555308729
-71.14999999999998	0.2717600340043077
-70.14999999999998	0.2859606813050253
-69.14999999999998	0.3007281729737098
-68.14999999999998	0.31607743986882214
-67.14999999999998	0.33202356587643367
-66.14999999999998	0.34858178571506054
-65.14999999999998	0.3657674828397624
-64.14999999999998	0.3835961874661343
-63.14999999999998	0.40208357469594047
-62.14999999999998	0.42124546277778774
-61.14999999999998	0.44109781148998023
-60.14999999999998	0.4616567206659045
-59.14999999999998	0.48293842885456145
-58.14999999999998	0.5049593121478312
-57.14999999999998	0.5277358831558245
-56.14999999999998	0.5512847901475073
-55.14999999999998	0.5756228163826055
-54.14999999999998	0.6007668796008298
-53.14999999999998	0.6267340317448585

Temperature (degC)	Pressure (MPa)
-52.14999999999998	0.6535414588471221
-51.14999999999998	0.6812064811624198
-50.14999999999998	0.7097465535087973
-49.14999999999998	0.7391792658631344
-48.14999999999998	0.7695223441914923
-47.14999999999998	0.8007936515588592
-46.14999999999998	0.833011189489221
-45.14999999999998	0.8661930996289717
-44.14999999999998	0.9003576656861286
-43.14999999999998	0.9355233156668369
-42.14999999999998	0.9717086244177157
-41.14999999999998	1.0089323164811657
-40.14999999999998	1.0472132692606924
-39.14999999999998	1.086570516525457
-38.14999999999998	1.1270232522683008
-37.14999999999998	1.1685908349228877
-36.14999999999998	1.2112927920050591
-35.14999999999998	1.2551488251850933
-34.14999999999998	1.3001788158583403
-33.14999999999998	1.3464028312547551
-32.14999999999998	1.393841131159971
-31.149999999999977	1.442514175295712
-30.149999999999977	1.4924426314363832
-29.149999999999977	1.5436473843295568
-28.149999999999977	1.596149545474758
-27.149999999999977	1.6499704638639392
-26.149999999999977	1.705131737706697
-25.149999999999977	1.7616552272644352
-24.149999999999977	1.8195630688352025
-23.149999999999977	1.8788776900170592
-22.149999999999977	1.939621826293062
-21.149999999999977	2.0018185391116523
-20.149999999999977	2.0654912355369426
-19.149999999999977	2.130663689641176
-18.149999999999977	2.197360065784329
-17.149999999999977	2.2656049439879764
-16.149999999999977	2.335423347593238
-15.149999999999977	2.4068407734485002
-14.149999999999977	2.4798832249137632
-13.149999999999977	2.554577247975854
-12.149999999999977	2.6309499708462325
-11.149999999999977	2.709029147449033
-10.149999999999977	2.7888432052929084
-9.149999999999977	2.870421298275544
-8.149999999999977	2.9537933651006942

Temperature (degC)	Pressure (MPa)
-7.149999999999977	3.038990194088279
-6.149999999999977	3.1260434952977767
-5.149999999999977	3.2149859811007375
-4.149999999999977	3.3058514564966
-3.149999999999973	3.3986749207760356
-2.149999999999973	3.493492682409724
-1.149999999999973	3.590342489437989
-0.1499999999999726	3.689263678058223
0.8500000000000227	3.790297342661501
1.8500000000000227	3.893486531206012
2.8500000000000227	3.998876470623649
3.8500000000000227	4.106514827894657
4.850000000000023	4.216452013698918
5.850000000000023	4.3287415371075175
6.850000000000023	4.443440421869143
7.850000000000023	4.560609697632469
8.850000000000023	4.680314983329704
9.850000000000023	4.802627185286575
10.850000000000023	4.92762334028037
11.850000000000023	5.055387644653976
12.850000000000023	5.186012726306719
13.850000000000023	5.319601239176477
14.850000000000023	5.456267893077278
15.850000000000023	5.596142080786118
16.850000000000023	5.739371337422534
17.850000000000023	5.88612597828235
18.850000000000023	6.036605434911558
19.850000000000023	6.191047090001458
20.850000000000023	6.349738887949894
21.850000000000023	6.513037851188453
22.850000000000023	6.6813982568796035
23.850000000000023	6.855416523719853
24.850000000000023	7.035906996031644
25.850000000000023	7.224039413653362
26.850000000000023	7.421610865808129
27.850000000000023	7.631644205072817
28.850000000000023	7.859937503917507
29.850000000000023	8.121239823099794

Table B343: Bubble Points for Scenario 2

Temperature (degC)	Pressure (MPa)
-100.1499999999998	0.04700881695649854
-99.1499999999998	0.05060093339069247
-98.1499999999998	0.05441245368004581
-97.1499999999998	0.05845308523977305
-96.1499999999998	0.06273277153115756
-95.1499999999998	0.06726169068580735
-94.1499999999998	0.07205025397214279
-93.1499999999998	0.07710910415948885
-92.1499999999998	0.08244911371630274
-91.1499999999998	0.08808138289236683
-90.1499999999998	0.09401723773782836
-89.1499999999998	0.10026822794048809
-88.1499999999998	0.10684612466886706
-87.1499999999998	0.11376291826270946
-86.1499999999998	0.12103081590681712
-85.1499999999998	0.12866223921887132
-84.1499999999998	0.1366698218033044
-83.1499999999998	0.14506640677438168
-82.1499999999998	0.15386504424103958
-81.1499999999998	0.1630789887809094
-80.1499999999998	0.1727216969193945
-79.1499999999998	0.18280682459310277
-78.1499999999998	0.19334822465220122
-77.1499999999998	0.20435994436528993
-76.1499999999998	0.21585622296817605
-75.1499999999998	0.22785148926050394
-74.1499999999998	0.2403603592251514
-73.1499999999998	0.2533976337633015
-72.1499999999998	0.2669782964406457
-71.1499999999998	0.28111751136174
-70.1499999999998	0.29583062109748665
-69.1499999999998	0.31113314473052606
-68.1499999999998	0.3270407759996426
-67.1499999999998	0.34356938156420813
-66.1499999999998	0.3607349993854945
-65.1499999999998	0.37855383724869907
-64.1499999999998	0.3970422714249404
-63.1499999999998	0.41621684548022747
-62.1499999999998	0.4360942692540059
-61.1499999999998	0.4566914180018719
-60.1499999999998	0.47802533172320066
-59.1499999999998	0.5001132146729397
-58.1499999999998	0.5229724350842185

Temperature (degC)	Pressure (MPa)
-57.1499999999998	0.5466205250945667
-56.1499999999998	0.5710751809092516
-55.1499999999998	0.5963542631953941
-54.1499999999998	0.6224757977305058
-53.1499999999998	0.6494579763215468
-52.1499999999998	0.6773191580157053
-51.1499999999998	0.7060778705901448
-50.1499999999998	0.7357528123867677
-49.1499999999998	0.7663628544485511
-48.1499999999998	0.7979270430262768
-47.1499999999998	0.8304646024352533
-46.1499999999998	0.8639949382719164
-45.1499999999998	0.8985376410498315
-44.1499999999998	0.9341124901899002
-43.1499999999998	0.9707394584732764
-42.1499999999998	1.0084387169007458
-41.1499999999998	1.0472306400265152
-40.1499999999998	1.0871358117964582
-39.1499999999998	1.1281750319239374
-38.1499999999998	1.1703693228531025
-37.1499999999998	1.2137399373873219
-36.1499999999998	1.2583083670247754
-35.1499999999998	1.3040963510935693
-34.1499999999998	1.3511258867595215
-33.1499999999998	1.39941923997865
-32.1499999999998	1.4489989574985875
-31.14999999999977	1.4998878799752424
-30.14999999999977	1.5521091563128058
-29.14999999999977	1.6056862593026562
-28.14999999999977	1.6606430027067767
-27.14999999999977	1.7170035598289004
-26.14999999999977	1.7747924837888824
-25.14999999999977	1.8340347295826922
-24.14999999999977	1.8947556781308759
-23.14999999999977	1.9569811625089115
-22.14999999999977	2.020737496594543
-21.14999999999977	2.0860515063694733
-20.14999999999977	2.152950564219543
-19.14999999999977	2.2214626265303297
-18.14999999999977	2.2916162750004236
-17.14999999999977	2.363440762084706
-16.14999999999977	2.436966061109343
-15.14999999999977	2.512222921572036
-14.14999999999977	2.5892429303457924
-13.14999999999977	2.6680585795051446

Temperature (degC)	Pressure (MPa)
-12.14999999999977	2.748703341673511
-11.14999999999977	2.831211753926619
-10.14999999999977	2.9156195114730155
-9.14999999999977	3.0019635725670213
-8.14999999999977	3.0902822764010867
-7.14999999999977	3.180615476059251
-6.14999999999977	3.273004689064659
-5.14999999999977	3.367493268594344
-4.14999999999977	3.4641265990967502
-3.149999999999773	3.562952320879667
-2.149999999999773	3.664020589311633
-1.149999999999773	3.767384375516214
-0.1499999999997726	3.8730998171990474
0.8500000000000227	3.9812266302360784
1.8500000000000227	4.091828594421422
2.8500000000000227	4.204974130285585
3.8500000000000227	4.320736988478266
4.850000000000023	4.439197079451911
5.850000000000023	4.56044147961936
6.850000000000023	4.684565661882833
7.850000000000023	4.811675015017375
8.850000000000023	4.941886740322376
9.850000000000023	5.075332249068692
10.850000000000023	5.212160236967048
11.850000000000023	5.352540692499287
12.850000000000023	5.496670222123554
13.850000000000023	5.644779277996054
14.850000000000023	5.797142208709678
15.850000000000023	5.954091626683104
16.850000000000023	6.1160396076933
17.850000000000023	6.28351015375804
18.850000000000023	6.457191166778058
19.850000000000023	6.638022373368626
20.850000000000023	6.827354945814192
21.850000000000023	7.0272697902194485
22.850000000000023	7.24130084956882
23.850000000000023	7.476434761517825
24.850000000000023	7.750932866673393
25.850000000000023	8.983676616767204

Table B344: Bubble Points for Scenario 3

Temperature (degC)	Pressure (MPa)
-96.1499999999998	0.060092859073668736
-95.1499999999998	0.0644281033030842
-94.1499999999998	0.06901150090995806
-93.1499999999998	0.07385318077900555
-92.1499999999998	0.07896348623104449
-91.1499999999998	0.08435297282633296
-90.1499999999998	0.09003240611490884
-89.1499999999998	0.09601275921965996
-88.1499999999998	0.1023052103565454
-87.1499999999998	0.10892114026219658
-86.1499999999998	0.11587212952705742
-85.1499999999998	0.12316995586752519
-84.1499999999998	0.13082659134939092
-83.1499999999998	0.13885419955304837
-82.1499999999998	0.14726513268642977
-81.1499999999998	0.1560719286744553
-80.1499999999998	0.16528730823635063
-79.1499999999998	0.1749241719309223
-78.1499999999998	0.1849955972064016
-77.1499999999998	0.19551483544136292
-76.1499999999998	0.20649530900961316
-75.1499999999998	0.21795060835827187
-74.1499999999998	0.22989448910729446
-73.1499999999998	0.24234086917982384
-72.1499999999998	0.2553038260035774
-71.1499999999998	0.2687975937098228
-70.1499999999998	0.2828365604358049
-69.1499999999998	0.2974352656620966
-68.1499999999998	0.31260839762292447
-67.1499999999998	0.32837079080833176
-66.1499999999998	0.34473742352721026
-65.1499999999998	0.36172341557222
-64.1499999999998	0.3793440259789508
-63.1499999999998	0.39761465088316195
-62.1499999999998	0.41655082149031103
-61.1499999999998	0.43616820215275737
-60.1499999999998	0.4564825885696942
-59.1499999999998	0.47750990612242256
-58.1499999999998	0.49926620832520296
-57.1499999999998	0.521767675422177
-56.1499999999998	0.5450306131446052
-55.1499999999998	0.5690714515937165
-54.1499999999998	0.5939067442993192

Temperature (degC)	Pressure (MPa)
-53.1499999999998	0.6195531674463594
-52.1499999999998	0.6460275192690538
-51.1499999999998	0.6733467196244939
-50.1499999999998	0.7015278097816039
-49.1499999999998	0.7305879523786968
-48.1499999999998	0.7605444316209234
-47.1499999999998	0.7914146536871761
-46.1499999999998	0.8232161473714215
-45.1499999999998	0.8559665649543536
-44.1499999999998	0.8896836833507437
-43.1499999999998	0.924385405485911
-42.1499999999998	0.9600897619412687
-41.1499999999998	0.9968149128736863
-40.1499999999998	1.0345791501993908
-39.1499999999998	1.0734009000503628
-38.1499999999998	1.1132987255202091
-37.1499999999998	1.1542913296933421
-36.1499999999998	1.196397558999857
-35.1499999999998	1.2396364068695098
-34.1499999999998	1.284027017777392
-33.1499999999998	1.3295886916537085
-32.1499999999998	1.3763408887500803
-31.14999999999977	1.4243032349867504
-30.14999999999977	1.4734955278381512
-29.14999999999977	1.5239377428406062
-28.14999999999977	1.5756500407482275
-27.14999999999977	1.6286527754465714
-26.14999999999977	1.6829665026493468
-25.14999999999977	1.7386119894840393
-24.14999999999977	1.795610224998624
-23.14999999999977	1.8539824316857856
-22.14999999999977	1.9137500780826717
-21.14999999999977	1.9749348925126822
-20.14999999999977	2.0375588780793468
-19.14999999999977	2.101644328961753
-18.14999999999977	2.167213848152626
-17.14999999999977	2.234290366723329
-16.14999999999977	2.3028971647525407
-15.14999999999977	2.3730578940978257
-14.14999999999977	2.44479660313438
-13.14999999999977	2.5181377637234834
-12.14999999999977	2.5931063005922925
-11.14999999999977	2.669727623444855
-10.14999999999977	2.7480276621120994
-9.14999999999977	2.8280329051231794

Temperature (degC)	Pressure (MPa)
-8.14999999999977	2.9097704421500126
-7.14999999999977	2.9932680108716903
-6.14999999999977	3.0785540488774723
-5.14999999999977	3.1656577513701825
-4.14999999999977	3.2546091355756848
-3.14999999999973	3.345439112896006
-2.14999999999973	3.438179570117308
-1.14999999999973	3.5328634611292844
-0.149999999999726	3.629524910974237
0.8500000000000227	3.7281993343317374
1.8500000000000227	3.8289235709324343
2.8500000000000227	3.931736040895112
3.8500000000000227	4.036676923531488
4.850000000000023	4.143788363877089
5.850000000000023	4.253114712135245
6.850000000000023	4.3647028024380505
7.850000000000023	4.478602278953271
8.850000000000023	4.594865979697016
9.850000000000023	4.713550391613831
10.850000000000023	4.834716195176624
11.850000000000023	4.958428923389594
12.850000000000023	5.084759769690963
13.850000000000023	5.213786593090643
14.850000000000023	5.345595188762405
15.850000000000023	5.4802809210834456
16.850000000000023	5.617950857909679
17.850000000000023	5.758726606494932
18.850000000000023	5.90274814471392
19.850000000000023	6.0501790874723715
20.850000000000023	6.201214070146317
21.850000000000023	6.356089356733949
22.850000000000023	6.515098582207881
23.850000000000023	6.678617150407068
24.850000000000023	6.847142258290824
25.850000000000023	7.021363386545683
26.850000000000023	7.202297428570062
27.850000000000023	7.391575176878184
28.850000000000023	7.592133451353384
29.850000000000023	7.810327272206404
30.850000000000023	8.072352216972408

Table B345: Bubble Points for Scenario 4

Temperature (degC)	Pressure (MPa)
-108.14999999999998	0.025928478087528663
-107.14999999999998	0.02815940870192827
-106.14999999999998	0.030545882533256272
-105.14999999999998	0.03309597184151713
-104.14999999999998	0.03581799959142609
-103.14999999999998	0.03872053977994359
-102.14999999999998	0.04181241752272613
-101.14999999999998	0.04510270895307051
-100.14999999999998	0.048600740918591456
-99.14999999999998	0.0523160904778651
-98.14999999999998	0.05625858420887281
-97.14999999999998	0.060438297364323955
-96.14999999999998	0.0648655528359395
-95.14999999999998	0.06955091999378081
-94.14999999999998	0.07450521335486628
-93.14999999999998	0.07973949114043721
-92.14999999999998	0.08526505367905546
-91.14999999999998	0.09109344174949494
-90.14999999999998	0.0972364347732713
-89.14999999999998	0.10370604893752822
-88.14999999999998	0.11051453525004187
-87.14999999999998	0.11767437750859348
-86.14999999999998	0.12519829022670573
-85.14999999999998	0.1330992164940086
-84.14999999999998	0.141390325851551
-83.14999999999998	0.15008501208124625
-82.14999999999998	0.15919689102787749
-81.14999999999998	0.16873979840647052
-80.14999999999998	0.17872778761968988
-79.14999999999998	0.18917512759911756
-78.14999999999998	0.20009630067834933
-77.14999999999998	0.2115060005079018
-76.14999999999998	0.2234191300190797
-75.14999999999998	0.23585079946901527
-74.14999999999998	0.2488163245355975
-73.14999999999998	0.26233122452194585
-72.14999999999998	0.27641122063981394
-71.14999999999998	0.29107223441165025
-70.14999999999998	0.30633038617634867
-69.14999999999998	0.3222019937412955
-68.14999999999998	0.33870357115669797
-67.14999999999998	0.355851827648295
-66.14999999999998	0.3736636667084481

Temperature (degC)	Pressure (MPa)
-65.14999999999998	0.39215618536338165
-64.14999999999998	0.41134667361431193
-63.14999999999998	0.43125261408439214
-62.14999999999998	0.45189168187067924
-61.14999999999998	0.4732817446253491
-60.14999999999998	0.4954408628430638
-59.14999999999998	0.5183872904421072
-58.14999999999998	0.542139475582976
-57.14999999999998	0.5667160617726851
-56.14999999999998	0.592135889279272
-55.14999999999998	0.6184179968534463
-54.14999999999998	0.6455816237995144
-53.14999999999998	0.6736462123904227
-52.14999999999998	0.7026314106506496
-51.14999999999998	0.7325570755442103
-50.14999999999998	0.7634432765625907
-49.14999999999998	0.7953102997276802
-48.14999999999998	0.8281786520478676
-47.14999999999998	0.8620690664436288
-46.14999999999998	0.8970025071470532
-45.14999999999998	0.933000175644941
-44.14999999999998	0.9700835171699412
-43.14999999999998	1.0082742278013384
-42.14999999999998	1.0475942622333492
-41.14999999999998	1.0880658422562064
-40.14999999999998	1.129711466044511
-39.14999999999998	1.1725539182919364
-38.14999999999998	1.2166162813076615
-37.14999999999998	1.2619219471214822
-36.14999999999998	1.3084946307113239
-35.14999999999998	1.3563583844137157
-34.14999999999998	1.4055376136295825
-33.14999999999998	1.456057093902914
-32.14999999999998	1.5079419894924118
-31.149999999999977	1.5612178735419922
-30.149999999999977	1.6159107499876093
-29.149999999999977	1.672047077362906
-28.149999999999977	1.729653794658255
-27.149999999999977	1.7887583494709338
-26.149999999999977	1.8493887286649418
-25.149999999999977	1.9115734918263858
-24.149999999999977	1.975341807830666
-23.149999999999977	2.0407234948924318
-22.149999999999977	2.1077490644776677
-21.149999999999977	2.1764497695971645

Temperature (degC)	Pressure (MPa)
-20.14999999999977	2.2468576579347617
-19.14999999999977	2.319005630467729
-18.14999999999977	2.392927506201407
-17.14999999999977	2.4686580938109266
-16.14999999999977	2.546233271044154
-15.14999999999977	2.625690072903322
-14.14999999999977	2.7070667897805003
-13.14999999999977	2.7904030768926105
-12.14999999999977	2.8757400766739676
-11.14999999999977	2.9631205559908422
-10.14999999999977	3.0525890605207104
-9.14999999999977	3.144192089015094
-8.14999999999977	3.2379782907927877
-7.14999999999977	3.3339986904973524
-6.14999999999977	3.4323069450542905
-5.14999999999977	3.5329596388574256
-4.14999999999977	3.6360166246306345
-3.149999999999773	3.7415414191369036
-2.149999999999773	3.8496016651670173
-1.149999999999773	3.9602696740509473
-0.1499999999997726	4.073623066643843
0.8500000000000227	4.189745535476354
1.8500000000000227	4.308727757078133
2.8500000000000227	4.430668491878927
3.8500000000000227	4.555675920488891
4.850000000000023	4.6838692808657
5.850000000000023	4.815380892935075
6.850000000000023	4.950358688807913
7.850000000000023	5.088969412808439
8.850000000000023	5.231402724366447
9.850000000000023	5.3778765418294965
10.850000000000023	5.528644129644333
11.850000000000023	5.684003695554581
12.850000000000023	5.844311702491358
13.850000000000023	6.010001851442109
14.850000000000023	6.181613035360843
15.850000000000023	6.3598320854676
16.850000000000023	6.545562147618836
17.850000000000023	6.740038251171548
18.850000000000023	6.945036734050576
19.850000000000023	7.163291225968803
20.850000000000023	7.3994314375352745
21.850000000000023	7.662552798244111
22.850000000000023	8.949444910239809
23.850000000000023	8.6038175408575

Table B346: Bubble Points for Scenario 5

Temperature (degC)	Pressure (MPa)
-96.14999999999998	0.06138568861288504
-95.14999999999998	0.06581580626857558
-94.14999999999998	0.07049970855127678
-93.14999999999998	0.07544777632953462
-92.14999999999998	0.08067061238240919
-91.14999999999998	0.0861790393677798
-90.14999999999998	0.0919840976589578
-89.14999999999998	0.09809704309473621
-88.14999999999998	0.10452934462822308
-87.14999999999998	0.11129268188269478
-86.14999999999998	0.11839894265939864
-85.14999999999998	0.1258602203642597
-84.14999999999998	0.1336888113798957
-83.14999999999998	0.14189721240061942
-82.14999999999998	0.1504981177412055
-81.14999999999998	0.1595044166002872
-80.14999999999998	0.16892919032810486
-79.14999999999998	0.17878570968642984
-78.14999999999998	0.189087432100046
-77.14999999999998	0.1998479989282138
-76.14999999999998	0.21108123277121416
-75.14999999999998	0.22280113477670616
-74.14999999999998	0.2350218820124346
-73.14999999999998	0.24775782487499973
-72.14999999999998	0.2610234845508634
-71.14999999999998	0.27483355054737324
-70.14999999999998	0.2892028782909508
-69.14999999999998	0.3041464868108895
-68.14999999999998	0.31967955650049695
-67.14999999999998	0.3358174269799334
-66.14999999999998	0.3525755950616298
-65.14999999999998	0.3699697128256448
-64.14999999999998	0.3880155858120375
-63.14999999999998	0.40672917133917885
-62.14999999999998	0.42612657695658496
-61.14999999999998	0.44622405903596546
-60.14999999999998	0.4670380215202495
-59.14999999999998	0.4885850148162339
-58.14999999999998	0.5108817348674394
-57.14999999999998	0.5339450223868302
-56.14999999999998	0.557791862290744
-55.14999999999998	0.5824393833039967
-54.14999999999998	0.6079048577949965

Temperature (degC)	Pressure (MPa)
-53.1499999999998	0.6342057018022275
-52.1499999999998	0.6613594753001051
-51.1499999999998	0.6893838827061961
-50.1499999999998	0.7182967736310661
-49.1499999999998	0.748116143916486
-48.1499999999998	0.7788601369235004
-47.1499999999998	0.8105470451419294
-46.1499999999998	0.8431953120942598
-45.1499999999998	0.8768235345553759
-44.1499999999998	0.9114504650944572
-43.1499999999998	0.9470950149705547
-42.1499999999998	0.9837762573545111
-41.1499999999998	1.0215134309111733
-40.1499999999998	1.0603259437635353
-39.1499999999998	1.100233377824291
-38.1499999999998	1.1412554935658763
-37.1499999999998	1.1834122352114527
-36.1499999999998	1.226723736424856
-35.1499999999998	1.2712103265336814
-34.1499999999998	1.3168925373480855
-33.1499999999998	1.363791110624712
-32.1499999999998	1.4119270062800702
-31.14999999999977	1.4613214113936603
-30.14999999999977	1.5119957501007508
-29.14999999999977	1.5639716944552025
-28.14999999999977	1.6172711763434877
-27.14999999999977	1.6719164005351608
-26.14999999999977	1.727929858966118
-25.14999999999977	1.7853343463608053
-24.14999999999977	1.8441529772768723
-23.14999999999977	1.9044092047230774
-22.14999999999977	1.9661268404655439
-21.14999999999977	2.0293300771801808
-20.14999999999977	2.094043512639616
-19.14999999999977	2.1602921761161835
-18.14999999999977	2.2281015572589307
-17.14999999999977	2.2974976376863343
-16.14999999999977	2.368506925627602
-15.14999999999977	2.441156493917258
-14.14999999999977	2.5154740218048
-13.14999999999977	2.591487840977586
-12.14999999999977	2.6692269863897797
-11.14999999999977	2.7487212524791627
-10.14999999999977	2.8300012555286793
-9.14999999999977	2.9130985030390564

Temperature (degC)	Pressure (MPa)
-8.149999999999977	2.9980454711152884
-7.149999999999977	3.084875691130047
-6.149999999999977	3.1736238470969664
-5.149999999999977	3.2643258855419583
-4.149999999999977	3.357019140003045
-3.149999999999973	3.4517424727373656
-2.149999999999973	3.548536436787536
-1.149999999999973	3.6474434622215615
-0.1499999999999726	3.7485080712364574
0.8500000000000227	3.851777127858822
1.8500000000000227	3.9573001293193752
2.8500000000000227	4.065129547876318
3.8500000000000227	4.175321234055833
4.850000000000023	4.287934895151761
5.850000000000023	4.403034666661833
6.850000000000023	4.520689799568549
7.850000000000023	4.640975493597665
8.850000000000023	4.763973916809513
9.850000000000023	4.889775466583851
10.850000000000023	5.018480348475664
11.850000000000023	5.150200581270217
12.850000000000023	5.285062584595699
13.850000000000023	5.423210579221324
14.850000000000023	5.5648111460451
15.850000000000023	5.710059475975994
16.850000000000023	5.859188152296677
17.850000000000023	6.012479839879452
18.850000000000023	6.170286218155302
19.850000000000023	6.3330573346373
20.850000000000023	6.5013893234192714
21.850000000000023	6.676106814151338
22.850000000000023	6.858416988739988
23.850000000000023	7.050230025876262
24.850000000000023	7.2549335090805664
25.850000000000023	7.479749888344092
26.850000000000023	7.7470445314675676

Table B347: Bubble Points for Scenario 6

Temperature (degC)	Pressure (MPa)
-97.14999999999998	0.05719551713363673
-96.14999999999998	0.06138151220579513
-95.14999999999998	0.06581107791135474
-94.14999999999998	0.07049436585390174
-93.14999999999998	0.07544175105251825
-92.14999999999998	0.08066383001397322
-91.14999999999998	0.08617141867352708
-90.14999999999998	0.09197555019597065
-89.14999999999998	0.09808747271502812
-88.14999999999998	0.10451864694422915
-87.14999999999998	0.11128074372099317
-86.14999999999998	0.11838564147504249
-85.14999999999998	0.12584542362254045
-84.14999999999998	0.13367237592551098
-83.14999999999998	0.14187898378577957
-82.14999999999998	0.15047792951769823
-81.14999999999998	0.15948208958049373
-80.14999999999998	0.1689045318247647
-79.14999999999998	0.1787585126898707
-78.14999999999998	0.18905747444551751
-77.14999999999998	0.1998150424045721
-76.14999999999998	0.21104502219068058
-75.14999999999998	0.2227613970115953
-74.14999999999998	0.23497832497803745
-73.14999999999998	0.24771013646419773
-72.14999999999998	0.26097133152772695
-71.14999999999998	0.2747765773726588
-70.14999999999998	0.28914070591052016
-69.14999999999998	0.30407871136841735
-68.14999999999998	0.3196057480012678
-67.14999999999998	0.3357371278874523
-66.14999999999998	0.35248831882314097
-65.14999999999998	0.3698749423215267
-64.14999999999998	0.3879127717410407
-63.14999999999998	0.406617730509535
-62.14999999999998	0.42600589049168996
-61.14999999999998	0.4460934705023743
-60.14999999999998	0.46689683494321355
-59.14999999999998	0.4884324926006318
-58.14999999999998	0.5107170956047863
-57.14999999999998	0.5337674385496886
-56.14999999999998	0.5576004577988003
-55.14999999999998	0.582233230960994

Temperature (degC)	Pressure (MPa)
-54.1499999999998	0.6076829765788128
-53.1499999999998	0.6339670540094118
-52.1499999999998	0.6611029635221604
-51.1499999999998	0.68910834663639
-50.1499999999998	0.7180009866820796
-49.1499999999998	0.7477988096320966
-48.1499999999998	0.7785198851869904
-47.1499999999998	0.8101824281416197
-46.1499999999998	0.8428048000445197
-45.1499999999998	0.876405511159553
-44.1499999999998	0.9110032227074485
-43.1499999999998	0.9466167494712552
-42.1499999999998	0.9832650626782893
-41.1499999999998	1.0209672932457523
-40.1499999999998	1.0597427353531952
-39.1499999999998	1.0996108503831385
-38.1499999999998	1.1405912712335327
-37.1499999999998	1.182703807051526
-36.1499999999998	1.2259684483909057
-35.1499999999998	1.2704053728829712
-34.1499999999998	1.3160349514230034
-33.1499999999998	1.3628777549713307
-32.1499999999998	1.4109545620146604
-31.14999999999977	1.4602863667605501
-30.14999999999977	1.5108943881380597
-29.14999999999977	1.5628000796714399
-28.14999999999977	1.6160251403251342
-27.14999999999977	1.6705915263670834
-26.14999999999977	1.7265214643546498
-25.14999999999977	1.78383746532341
-24.14999999999977	1.8425623402600246
-23.14999999999977	1.9027192169790588
-22.14999999999977	1.9643315585048824
-21.14999999999977	2.0274231830871225
-20.14999999999977	2.092018286018226
-19.14999999999977	2.1581414633845917
-18.14999999999977	2.2258177379829385
-17.14999999999977	2.295072587596418
-16.14999999999977	2.3659319758830573
-15.14999999999977	2.4384223861750645
-14.14999999999977	2.5125708584975395
-13.14999999999977	2.5884050301940813
-12.14999999999977	2.6659531805892933
-11.14999999999977	2.745244280167944
-10.14999999999977	2.826308044901933

Temperature (degC)	Pressure (MPa)
-9.149999999999977	2.9091749963616667
-8.149999999999977	2.9938765284581406
-7.149999999999977	3.0804449817628696
-6.149999999999977	3.168913726565976
-5.149999999999977	3.2593172560411916
-4.149999999999977	3.35169129117541
-3.149999999999973	3.446072899429598
-2.149999999999973	3.5425006295454087
-1.149999999999973	3.6410146653396467
-0.1499999999999726	3.741657001991358
0.8500000000000227	3.8444716489968354
1.8500000000000227	3.949504864889098
2.8500000000000227	4.056805429942314
3.8500000000000227	4.16642496441949
4.850000000000023	4.278418301816114
5.850000000000023	4.392843928798528
6.850000000000023	4.5097645067727266
7.850000000000023	4.629247494269737
8.850000000000023	4.751365895376677
9.850000000000023	4.876199167908901
10.850000000000023	5.00383433728837
11.850000000000023	5.134367379809045
12.850000000000023	5.2679049651030825
13.850000000000023	5.404566686377851
14.850000000000023	5.544487965264851
15.850000000000023	5.6878239072205
16.850000000000023	5.83475452222746
17.850000000000023	5.9854919482995275
18.850000000000023	6.140290685260833
19.850000000000023	6.299462490241239
20.850000000000023	6.463398771071344
21.850000000000023	6.632605639906818
22.850000000000023	6.807761702382779
23.850000000000023	6.9898199271925
24.850000000000023	7.180203426176414
25.850000000000023	7.381226362621271
26.850000000000023	7.597147586667893
27.850000000000023	7.837547559792992
28.850000000000023	8.14210915858045

Table B348: Bubble Points for Scenario 7

Temperature (degC)	Pressure (MPa)
-113.1499999999998	0.01684028192342008
-112.1499999999998	0.018405574660291787
-111.1499999999998	0.020089740304966994
-110.1499999999998	0.021899604963365706
-109.1499999999998	0.023842239838646945
-108.1499999999998	0.025924962666544496
-107.1499999999998	0.028155338951085435
-106.1499999999998	0.03054118288142797
-105.1499999999998	0.03309055807860799
-104.1499999999998	0.035811778091101434
-103.1499999999998	0.038713406635325194
-102.1499999999998	0.04180425767772116
-101.1499999999998	0.045093395247433526
-100.1499999999998	0.04859013307572044
-99.1499999999998	0.05230403404391939
-98.1499999999998	0.05624490943455084
-97.1499999999998	0.06042281801158803
-96.1499999999998	0.06484806492542829
-95.1499999999998	0.06953120048870762
-94.1499999999998	0.07448301877683378
-93.1499999999998	0.07971455609379063
-92.1499999999998	0.08523708935689317
-91.1499999999998	0.0910621343037565
-90.1499999999998	0.0972014436447763
-89.1499999999998	0.10366700510902223
-88.1499999999998	0.11047103939690879
-87.1499999999998	0.11762599809610476
-86.1499999999998	0.12514456149364167
-85.1499999999998	0.1330396363904312
-84.1499999999998	0.14132435383736122
-83.1499999999998	0.15001206687758037
-82.1499999999998	0.15911634824552484
-81.1499999999998	0.16865098810014406
-80.1499999999998	0.1786299917232482
-79.1499999999998	0.18906757727485776
-78.1499999999998	0.19997817354230019
-77.1499999999998	0.21137641775637844
-76.1499999999998	0.22327715344536178
-75.1499999999998	0.23569542834998453
-74.1499999999998	0.24864649239968128
-73.1499999999998	0.26214579579541475
-72.1499999999998	0.27620898714876313
-71.1499999999998	0.2908519117540197

Temperature (degC)	Pressure (MPa)
-70.14999999999998	0.3060906099374889
-69.14999999999998	0.3219413155665363
-68.14999999999998	0.3384204546607631
-67.14999999999998	0.3555446441496868
-66.14999999999998	0.3733306907925771
-65.14999999999998	0.39179559026008015
-64.14999999999998	0.4109565263685674
-63.14999999999998	0.43083087052775443
-62.14999999999998	0.45143618136137786
-61.14999999999998	0.4727902045549505
-60.14999999999998	0.49491087290245594
-59.14999999999998	0.5178163066068305
-58.14999999999998	0.5415248138169481
-57.14999999999998	0.5660548914338623
-56.14999999999998	0.5914252261871936
-55.14999999999998	0.6176546960203261
-54.14999999999998	0.6447623717698111
-53.14999999999998	0.6727675191857044
-52.14999999999998	0.7016896012862632
-51.14999999999998	0.7315482810665156
-50.14999999999998	0.7623634245887888
-49.14999999999998	0.7941551044448523
-48.14999999999998	0.8269436036400194
-47.14999999999998	0.8607494198723422
-46.14999999999998	0.8955932702820399
-45.14999999999998	0.9314960966423851
-44.14999999999998	0.9684790710770794
-43.14999999999998	1.0065636023012565
-42.14999999999998	1.0457713424530155
-41.14999999999998	1.0861241945672593
-40.14999999999998	1.1276443207483178
-39.14999999999998	1.1703541511008533
-38.14999999999998	1.2142763934762797
-37.14999999999998	1.2594340441327694
-36.14999999999998	1.3058503993345403
-35.14999999999998	1.3535490680087408
-34.14999999999998	1.4025539854763793
-33.14999999999998	1.4528894283956908
-32.14999999999998	1.504580030937763
-31.149999999999977	1.5576508023440212
-30.149999999999977	1.612127145918586
-29.149999999999977	1.6680348796127116
-28.149999999999977	1.7254002583189612
-27.149999999999977	1.7842499980445903
-26.149999999999977	1.844611302155238

Temperature (degC)	Pressure (MPa)
-25.14999999999977	1.9065118898914355
-24.14999999999977	1.9699800274274886
-23.14999999999977	2.0350445617155772
-22.14999999999977	2.1017349574676323
-21.14999999999977	2.170081337594106
-20.14999999999977	2.240114527501534
-19.14999999999977	2.311866103686827
-18.14999999999977	2.3853684471043968
-17.14999999999977	2.460654801862074
-16.14999999999977	2.537759339850878
-15.14999999999977	2.616717232021629
-14.14999999999977	2.6975647271014385
-13.14999999999977	2.7803392386797734
-12.14999999999977	2.865079441758864
-11.14999999999977	2.9518253800138057
-10.14999999999977	3.040618585313278
-9.14999999999977	3.131502211227156
-8.14999999999977	3.224521182715471
-7.14999999999977	3.3197223645320872
-6.14999999999977	3.4171547514303926
-5.14999999999977	3.5168696839132036
-4.14999999999977	3.6189210940208714
-3.149999999999773	3.7233657866330314
-2.149999999999773	3.8302637629515464
-1.149999999999773	3.939678594258318
-0.1499999999997726	4.0516778559160835
0.8500000000000227	4.166333633797041
1.8500000000000227	4.283723118261413
2.8500000000000227	4.403929304466723
3.8500000000000227	4.527041822589092
4.850000000000023	4.653157927909419
5.850000000000023	4.782383689222535
6.850000000000023	4.914835425765789
7.850000000000023	5.0506414592282844
8.850000000000023	5.189944270770149
9.850000000000023	5.332903186773603
10.850000000000023	5.479697767074263
11.850000000000023	5.63053214439728
12.850000000000023	5.785640678481794
13.850000000000023	5.9452954672546845
14.850000000000023	6.109816542694687
15.850000000000023	6.279586045893501
16.850000000000023	6.455068464555123
17.850000000000023	6.6368404014947915
18.850000000000023	6.825635894690122

Temperature (degC)	Pressure (MPa)
19.8500000000000023	7.022418296083234
20.8500000000000023	7.228500178042218
21.8500000000000023	7.4457566664428665
22.8500000000000023	7.677038553927372
23.8500000000000023	7.927070738001568
24.8500000000000023	8.204779669740065
25.8500000000000023	8.531628019991262
26.8500000000000023	9.03499233910126

Table B349: Bubble Points for Scenario 8

Temperature (degC)	Pressure (MPa)
-94.1499999999998	0.06937886549514648
-93.1499999999998	0.07424685397014655
-92.1499999999998	0.07938499155080249
-91.1499999999998	0.084803900373258
-90.1499999999998	0.09051441448185144
-89.1499999999998	0.09652757746774564
-88.1499999999998	0.10285464003613254
-87.1499999999998	0.10950705743164216
-86.1499999999998	0.11649648683755967
-85.1499999999998	0.12383478468330057
-84.1499999999998	0.13153400389397926
-83.1499999999998	0.13960639109149292
-82.1499999999998	0.14806438376535758
-81.1499999999998	0.15692060740154057
-80.1499999999998	0.16618787259960763
-79.1499999999998	0.17587917216379054
-78.1499999999998	0.18600767819973243
-77.1499999999998	0.196586739230974
-76.1499999999998	0.20762987728561094
-75.1499999999998	0.21915078504493737
-74.1499999999998	0.2311633230122116
-73.1499999999998	0.24368151669650143
-72.1499999999998	0.2567195538690424
-71.1499999999998	0.27029178185746755
-70.1499999999998	0.28441270489329024
-69.1499999999998	0.2990969815471654
-68.1499999999998	0.3143594222143299
-67.1499999999998	0.33021498669414895
-66.1499999999998	0.3466787818548555
-65.1499999999998	0.36376605938782675
-64.1499999999998	0.38149221366747
-63.1499999999998	0.39987277972041235
-62.1499999999998	0.41892343129642606
-61.1499999999998	0.4386599790765469
-60.1499999999998	0.4590983689940295
-59.1499999999998	0.4802546807001861
-58.1499999999998	0.5021451261643085
-57.1499999999998	0.5247860484182895
-56.1499999999998	0.5481939204611046
-55.1499999999998	0.5723853443369383
-54.1499999999998	0.5973770503429104
-53.1499999999998	0.6231858964758286
-52.1499999999998	0.6498288680004322

Temperature (degC)	Pressure (MPa)
-51.1499999999998	0.677323077276285
-50.1499999999998	0.7056857637443069
-49.1499999999998	0.7349342941529383
-48.1499999999998	0.7650861630227277
-47.1499999999998	0.7961589933177589
-46.1499999999998	0.8281705374134478
-45.1499999999998	0.8611386782846642
-44.1499999999998	0.8950814309813767
-43.1499999999998	0.9300169443978822
-42.1499999999998	0.9659635032899019
-41.1499999999998	1.0029395306147568
-40.1499999999998	1.0409635901490522
-39.1499999999998	1.0800543894146082
-38.1499999999998	1.1202307829243139
-37.1499999999998	1.1615117757395033
-36.1499999999998	1.2039165273947685
-35.1499999999998	1.2474643561770522
-34.1499999999998	1.2921747438344588
-33.1499999999998	1.3380673407265493
-32.1499999999998	1.3851619714846908
-31.14999999999977	1.4334786412367453
-30.14999999999977	1.4830375424596556
-29.14999999999977	1.5338590625309234
-28.14999999999977	1.5859637920482181
-27.14999999999977	1.6393725339953957
-26.14999999999977	1.6941063138244337
-25.14999999999977	1.750186390535656
-24.14999999999977	1.807634268829626
-23.14999999999977	1.866471712417828
-22.14999999999977	1.926720758571599
-21.14999999999977	1.9884037340114944
-20.14999999999977	2.0515432722292735
-19.14999999999977	2.116162332381876
-18.14999999999977	2.182284219857971
-17.14999999999977	2.249932608698685
-16.14999999999977	2.319131566032081
-15.14999999999977	2.389905578731988
-14.14999999999977	2.4622795825226
-13.14999999999977	2.536278993818307
-12.14999999999977	2.6119297446020955
-11.14999999999977	2.689258320720956
-10.14999999999977	2.7682918040255133
-9.14999999999977	2.84905791887672
-8.14999999999977	2.931585083608509
-7.14999999999977	3.015902467683281

Temperature (degC)	Pressure (MPa)
-6.149999999999977	3.102040055384095
-5.149999999999977	3.1900287170723756
-4.149999999999977	3.2799002892301288
-3.149999999999973	3.37168766475622
-2.149999999999973	3.465424895283187
-1.149999999999973	3.5611473076093865
-0.1499999999999726	3.6588916368234647
0.8500000000000227	3.7586961791452853
1.8500000000000227	3.8606009682213167
2.8500000000000227	3.964647979329818
3.8500000000000227	4.07088136700566
4.850000000000023	4.179347742797796
5.850000000000023	4.290096501588235
6.850000000000023	4.4031802070819435
7.850000000000023	4.518655050138378
8.850000000000023	4.636581397862335
9.850000000000023	4.757024457390386
10.850000000000023	4.88005508698668
11.850000000000023	5.005750799631573
12.850000000000023	5.134197022785363
13.850000000000023	5.265488705256841
14.850000000000023	5.399732403030921
15.850000000000023	5.537049037830132
16.850000000000023	5.677577618157436
17.850000000000023	5.8214803650355895
18.850000000000023	5.9689499358299605
19.850000000000023	6.120219872977601
20.850000000000023	6.27558019561976
21.850000000000023	6.435401594920344
22.850000000000023	6.600174933151542
23.850000000000023	6.770580139848455
24.850000000000023	6.947617207087649
25.850000000000023	7.132884995427562
26.850000000000023	7.329272832951309
27.850000000000023	7.543131794236394
28.850000000000023	7.796054131823001

Table B350: Bubble Points for Scenario 9

Temperature (degC)	Pressure (MPa)
-92.1499999999998	0.07814308260950163
-91.1499999999998	0.08347579811261276
-90.1499999999998	0.0890953154296042
-89.1499999999998	0.09501247935841149
-88.1499999999998	0.10123833656208786
-87.1499999999998	0.10778413294209627
-86.1499999999998	0.11466131096755455
-85.1499999999998	0.12188150690111046
-84.1499999999998	0.1294565479870478
-83.1499999999998	0.1373984495767831
-82.1499999999998	0.14571941220999268
-81.1499999999998	0.15443181867446068
-80.1499999999998	0.16354823102629676
-79.1499999999998	0.17308138759405853
-78.1499999999998	0.18304419999864363
-77.1499999999998	0.19344975013129923
-76.1499999999998	0.2043112871835959
-75.1499999999998	0.2156422246579025
-74.1499999999998	0.22745613743419407
-73.1499999999998	0.23976675882407675
-72.1499999999998	0.2525879777225305
-71.1499999999998	0.2659338357364228
-70.1499999999998	0.27981852443223965
-69.1499999999998	0.2942563825877429
-68.1499999999998	0.3092618935523028
-67.1499999999998	0.3248496826337261
-66.1499999999998	0.34103451462166623
-65.1499999999998	0.3578312913294
-64.1499999999998	0.37525504928651804
-63.1499999999998	0.39332095748485363
-62.1499999999998	0.41204431524847457
-61.1499999999998	0.4314405502009575
-60.1499999999998	0.4515252163617554
-59.1499999999998	0.4723139923373373
-58.1499999999998	0.49382267966891696
-57.1499999999998	0.5160672012768442
-56.1499999999998	0.539063600079637
-55.1499999999998	0.5628280377188417
-54.1499999999998	0.5873767934673103
-53.1499999999998	0.6127262632703844
-52.1499999999998	0.6388929589657373
-51.1499999999998	0.6658935076661894
-50.1499999999998	0.693744651327661

Temperature (degC)	Pressure (MPa)
-49.1499999999998	0.7224632465026155
-48.1499999999998	0.7520662643000848
-47.1499999999998	0.7825707905334309
-46.1499999999998	0.8139940261112352
-45.1499999999998	0.8463532876276052
-44.1499999999998	0.8796660082030449
-43.1499999999998	0.9139497385507744
-42.1499999999998	0.9492221483029881
-41.1499999999998	0.9855010275658916
-40.1499999999998	1.0228042887410953
-39.1499999999998	1.0611499685999202
-38.1499999999998	1.1005562306105963
-37.1499999999998	1.1410413675408235
-36.1499999999998	1.1826238043311033
-35.1499999999998	1.2253221012658462
-34.1499999999998	1.2691549574683638
-33.1499999999998	1.3141412147345761
-32.1499999999998	1.3602998617545523
-31.14999999999977	1.4076500387765698
-30.14999999999977	1.4562110427379786
-29.14999999999977	1.5060023329464898
-28.14999999999977	1.557043537356795
-27.14999999999977	1.6093544595139073
-26.14999999999977	1.6629550862080158
-25.14999999999977	1.7178655959368365
-24.14999999999977	1.7741063681985
-23.14999999999977	1.8316979937186642
-22.14999999999977	1.8906612856399405
-21.14999999999977	1.9510172917600264
-20.14999999999977	2.012787307886319
-19.14999999999977	2.0759928923732858
-18.14999999999977	2.1406558819414814
-17.14999999999977	2.2067984088606525
-16.14999999999977	2.274442919608583
-15.14999999999977	2.343612195154862
-14.14999999999977	2.4143293729676327
-13.14999999999977	2.486617970979558
-12.14999999999977	2.560501913664299
-11.14999999999977	2.636005560484875
-10.14999999999977	2.71315373698756
-9.14999999999977	2.7919717688733905
-8.14999999999977	2.8724855194325083
-7.14999999999977	2.9547214308067384
-6.14999999999977	3.0387065696187254
-5.14999999999977	3.1244686776381556

Temperature (degC)	Pressure (MPa)
-4.14999999999977	3.212036228226153
-3.149999999999773	3.3014384895058706
-2.149999999999773	3.3927055953307024
-1.149999999999773	3.4858686253416384
-0.1499999999997726	3.5809596956437804
0.8500000000000227	3.678012061921928
1.8500000000000227	3.7770602371092066
2.8500000000000227	3.8781401261511186
3.8500000000000227	3.9812891808831257
4.850000000000023	4.086546578587382
5.850000000000023	4.193953428622138
6.850000000000023	4.303553012430403
7.850000000000023	4.415391063642037
8.850000000000023	4.529516096821798
9.850000000000023	4.645979796062532
10.850000000000023	4.764837478378026
11.850000000000023	4.88614865227866
12.850000000000023	5.0099776996674565
13.850000000000023	5.136394720339826
14.850000000000023	5.265476594365042
15.850000000000023	5.397308340593221
16.850000000000023	5.531984882651101
17.850000000000023	5.6696133820818275
18.850000000000023	5.810316370423708
19.850000000000023	5.954236023210919
20.850000000000023	6.101540099124844
21.850000000000023	6.252430377807711
22.850000000000023	6.407155000396728
23.850000000000023	6.5660272366543335
24.850000000000023	6.729455537706337
25.850000000000023	6.897994899133741
26.850000000000023	7.072441747360145
27.850000000000023	7.25402580389324
28.850000000000023	7.444843097541794
29.850000000000023	7.649004740763328
30.850000000000023	7.8774832013036

Table B351: Bubble Points for Scenario 1

Temperature (degC)	Pressure (MPa)
-57.1499999999998	0.0
-56.1499999999998	2.429700064542332
-55.1499999999998	7.147315201648601
-54.1499999999998	11.91031842711882
-53.1499999999998	16.71870974095276
-52.1499999999998	21.572489143150875
-51.1499999999998	26.471656633712946
-50.1499999999998	31.41621221263897
-49.1499999999998	36.40615587992894
-48.1499999999998	41.44148763558262
-47.1499999999998	46.52220747960049
-46.1499999999998	51.64831541198231
-45.1499999999998	56.81981143272809
-44.1499999999998	62.036695541837815
-43.1499999999998	67.29896773931124
-42.1499999999998	72.60662802514885
-41.1499999999998	77.95967639935041
-40.1499999999998	83.35811286191594
-39.1499999999998	88.80193741284542
-38.1499999999998	94.29115005213859
-37.1499999999998	99.82575077979597
-36.1499999999998	105.4057395958173
-35.1499999999998	111.03111650020256
-34.1499999999998	116.70188149295178
-33.1499999999998	122.41803457406496
-32.1499999999998	128.17957574354182
-31.14999999999977	133.9865050013829
-30.14999999999977	139.83882234758795
-29.14999999999977	145.7365277821569
-28.14999999999977	151.67962130508982
-27.14999999999977	157.66810291638643
-26.14999999999977	163.70197261604724
-25.14999999999977	169.78123040407203
-24.14999999999977	175.90587628046077
-23.14999999999977	182.07591024521346
-22.14999999999977	188.2913322983298
-21.14999999999977	194.55214243981038
-20.14999999999977	200.85834066965492
-19.14999999999977	207.20992698786338
-18.14999999999977	213.60690139443582
-17.14999999999977	220.04926388937187
-16.14999999999977	226.53701447267224
-15.14999999999977	233.0701531443365

Temperature (degC)	Pressure (MPa)
-14.14999999999977	239.64867990436474
-13.14999999999977	246.27259475275693
-12.14999999999977	252.94189768951276
-11.14999999999977	259.65658871463285
-10.14999999999977	266.41666782811683
-9.14999999999977	273.2221350299649
-8.14999999999977	280.07299032017676
-7.14999999999977	286.96923369875236
-6.14999999999977	293.91086516569214
-5.14999999999977	300.897884720996
-4.14999999999977	307.9302923646637
-3.149999999999773	315.0080880966954
-2.149999999999773	322.13127191709106
-1.149999999999773	329.2998438258503
-0.1499999999997726	336.5138038229738
0.8500000000000227	343.7731519084613
1.8500000000000227	351.0778880823127
2.8500000000000227	358.4280123445281
3.8500000000000227	365.8235246951072
4.850000000000023	373.26442513405044
5.850000000000023	380.7507136613576
6.850000000000023	388.28239027702887
7.850000000000023	395.85945498106395
8.850000000000023	403.48190777346275
9.850000000000023	411.1497486542258
10.850000000000023	418.8629776233528
11.850000000000023	426.62159468084377
12.850000000000023	434.4255998266986
13.850000000000023	442.27499306091715
14.850000000000023	450.16977438349994
15.850000000000023	458.1099437944466
16.850000000000023	466.09550129375737
17.850000000000023	474.12644688143195
18.850000000000023	482.20278055747025
19.850000000000023	490.3245023218727
20.850000000000023	498.49161217463933
21.850000000000023	506.7041101157697
22.850000000000023	514.961996145264
23.850000000000023	523.265270263122
24.850000000000023	531.6139324693444
25.850000000000023	540.0079827639306
26.850000000000023	548.4474211468809
27.850000000000023	556.9322476181949
28.850000000000023	565.462462177873
29.850000000000023	574.0380648259146

Temperature (degC)	Pressure (MPa)
30.850000000000023	582.6590555623206
31.850000000000023	591.3254343870906
32.850000000000002	600.0372013002245
33.850000000000002	608.7943563017225
34.850000000000002	617.5968993915837
35.850000000000002	626.4448305698094
36.850000000000002	635.3381498363992
37.850000000000002	644.2768571913529
38.850000000000002	653.2609526346704
39.850000000000002	662.2904361663516
40.850000000000002	671.365307786397
41.850000000000002	680.4855674948064
42.850000000000002	689.65121529158
43.850000000000002	698.8622511767173
44.850000000000002	708.1186751502182
45.850000000000002	717.4204872120835
46.850000000000002	726.7676873623127
47.850000000000002	736.1602756009058
48.850000000000002	745.598251927863
49.850000000000002	755.0816163431834
50.850000000000002	764.6103688468685
51.850000000000002	774.1845094389175
52.850000000000002	783.8040381193305
53.850000000000002	793.4689548881073
54.850000000000002	803.1792597452476
55.850000000000002	812.9349526907524
56.850000000000002	822.7360337246212
57.850000000000002	832.5825028468537
58.850000000000002	842.4743600574502
59.850000000000002	852.411605356411
60.850000000000002	862.3942387437351
61.850000000000002	872.4222602194235
62.850000000000002	882.4956697834758
63.850000000000002	892.614467435892
64.850000000000002	902.7786531766725
65.850000000000002	912.9882270058162
66.850000000000002	923.2431889233246
67.850000000000002	933.5435389291966
68.850000000000002	943.8892770234329
69.850000000000002	954.2804032060328
70.850000000000002	964.7169174769965
71.850000000000002	975.1988198363243
72.850000000000002	985.7261102840164
73.850000000000002	996.2987888200721
74.850000000000002	1006.9168554444921

Temperature (degC)	Pressure (MPa)
75.85000000000002	1017.5803101572752
76.85000000000002	1028.289152958423
77.85000000000002	1039.0433838479346
78.85000000000002	1049.8430028258103
79.85000000000002	1060.6880098920496
80.85000000000002	1071.5784050466527
81.85000000000002	1082.5141882896205
82.85000000000002	1093.4953596209518
83.85000000000002	1104.5219190406472
84.85000000000002	1115.5938665487065
85.85000000000002	1126.711202145129
86.85000000000002	1137.8739258299165
87.85000000000002	1149.0820376030674
88.85000000000002	1160.3355374645828
89.85000000000002	1171.634425414462
90.85000000000002	1182.9787014527049
91.85000000000002	1194.368365579311
92.85000000000002	1205.803417794282
93.85000000000002	1217.2838580976168
94.85000000000002	1228.8096864893157
95.85000000000002	1240.3809029693787
96.85000000000002	1251.9975075378047
97.85000000000002	1263.6595001945955
98.85000000000002	1275.36688093975
99.85000000000002	1287.1196497732687
100.85000000000002	1298.917806695151
101.85000000000002	1310.761351705397
102.85000000000002	1322.6502848040075
103.85000000000002	1334.5846059909816
104.85000000000002	1346.5643152663201
105.85000000000002	1358.5894126300225
106.85000000000002	1370.659898082088
107.85000000000002	1382.7757716225183
108.85000000000002	1394.9370332513124
109.85000000000002	1407.1436829684708
110.85000000000002	1419.3957207739927
111.85000000000002	1431.6931466678782
112.85000000000002	1444.035960650128
113.85000000000002	1456.4241627207416
114.85000000000002	1468.8577528797196
115.85000000000002	1481.3367311270615
116.85000000000002	1493.8610974627668
117.85000000000002	1506.430851886836
118.85000000000002	1519.04599439927
119.85000000000002	1531.7065250000674

Temperature (degC)	Pressure (MPa)
120.85000000000002	1544.412443689229
121.85000000000002	1557.1637504667538
122.85000000000002	1569.9604453326433
123.85000000000002	1582.8025282868966
124.85000000000002	1595.689993295142
125.85000000000002	1608.6228584604953

Table B352: Bubble Points for Scenario 10

Temperature (degC)	Pressure (MPa)

Table B353: Bubble Points for Scenario 11

Temperature (degC)	Pressure (MPa)
-59.14999999999998	0.48013440557192355
-58.14999999999998	4.806552943463021
-57.14999999999998	9.503961547653258
-56.14999999999998	14.246095316184515
-55.14999999999998	19.03307865631862
-54.14999999999998	23.864933173106643
-53.14999999999998	28.74166384209053
-52.14999999999998	33.66327096236616
-51.14999999999998	38.629753107265564
-50.14999999999998	43.64110810045898
-49.14999999999998	48.69733340425735
-48.14999999999998	53.798426295297375
-47.14999999999998	58.94438395197821
-46.14999999999998	64.13520350128867
-45.14999999999998	69.37088204538522
-44.14999999999998	74.65141667738726
-43.14999999999998	79.97680449112629
-42.14999999999998	85.34704258733888
-41.14999999999998	90.76212807769556
-40.14999999999998	96.22205808746554
-39.14999999999998	101.72682975729437
-38.14999999999998	107.27644024439724
-37.14999999999998	112.87088672335017
-36.14999999999998	118.51016638660796
-35.14999999999998	124.19427644482808
-34.14999999999998	129.9232141270538
-33.14999999999998	135.69697668080138
-32.14999999999998	141.51556137207044
-31.14999999999997	147.37896548530392
-30.14999999999997	153.2871863233077
-29.14999999999997	159.24022120713875
-28.14999999999997	165.2380674759754
-27.14999999999997	171.28072248696688
-26.14999999999997	177.3681836150736
-25.14999999999997	183.50044825289947
-24.14999999999997	189.67751381051417
-23.14999999999997	195.89937771527465
-22.14999999999997	202.16603741164218
-21.14999999999997	208.47749036099643
-20.14999999999997	214.8337340414524
-19.14999999999997	221.23476594767237
-18.14999999999997	227.6805835906815
-17.14999999999997	234.17118449768282

Temperature (degC)	Pressure (MPa)
-16.14999999999977	240.70656621187428
-15.14999999999977	247.2867262922668
-14.14999999999977	253.9116623135029
-13.14999999999977	260.5813718656797
-12.14999999999977	267.2958525541704
-11.14999999999977	274.05510199945013
-10.14999999999977	280.8591178369257
-9.14999999999977	287.7078977167613
-8.14999999999977	294.60143930371373
-7.14999999999977	301.53974027696376
-6.14999999999977	308.522798329954
-5.14999999999977	315.550611170227
-4.14999999999977	322.6231765192657
-3.149999999999773	329.74049211233637
-2.149999999999773	336.90255569833397
-1.149999999999773	344.10936503962904
-0.1499999999997726	351.3609179119178
0.85000000000000227	358.65721210407276
1.85000000000000227	365.99824541799944
2.85000000000000227	373.3840156684864
3.85000000000000227	380.81452068306925
4.8500000000000023	388.2897583018889
5.8500000000000023	395.80972637754957
6.8500000000000023	403.37442277498957
7.8500000000000023	410.983845371343
8.8500000000000023	418.63799205580693
9.8500000000000023	426.33686072951474
10.8500000000000023	434.08044930540433
11.8500000000000023	441.86875570809474
12.8500000000000023	449.70177787375786
13.8500000000000023	457.5795137499996
14.8500000000000023	465.50196129573624
15.8500000000000023	473.46911848107453
16.8500000000000023	481.48098328719664
17.8500000000000023	489.53755370624106
18.8500000000000023	497.6388277411918
19.8500000000000023	505.78480340575993
20.8500000000000023	513.9754787242799
21.8500000000000023	522.2108517315935
22.8500000000000023	530.4909204729445
23.8500000000000023	538.8156830038729
24.8500000000000023	547.1851373901076
25.8500000000000023	555.5992817074633
26.8500000000000023	564.058114041742
27.8500000000000023	572.5616324886249

Temperature (degC)	Pressure (MPa)
28.8500000000000023	581.1098351535802
29.8500000000000023	589.7027201517595
30.8500000000000023	598.3402856079053
31.8500000000000023	607.0225296562537
32.850000000000002	615.7494504404391
33.850000000000002	624.5210461134042
34.850000000000002	633.3373148373063
35.850000000000002	642.1982547834264
36.850000000000002	651.1038641320831
37.850000000000002	660.0541410725403
38.850000000000002	669.0490838029261
39.850000000000002	678.0886905301422
40.850000000000002	687.1729594697795
41.850000000000002	696.3018888460387
42.850000000000002	705.4754768916443
43.850000000000002	714.693721847766
44.850000000000002	723.956621963937
45.850000000000002	733.2641754979724
46.850000000000002	742.6163807158973
47.850000000000002	752.0132358918662
48.850000000000002	761.4547393080838
49.850000000000002	770.940889254738
50.850000000000002	780.4716840299172
51.850000000000002	790.04712193954
52.850000000000002	799.6672012972878
53.850000000000002	809.3319204245279
54.850000000000002	819.0412776502433
55.850000000000002	828.7952713109657
56.850000000000002	838.5938997507039
57.850000000000002	848.4371613208799
58.850000000000002	858.3250543802598
59.850000000000002	868.2575772948851
60.850000000000002	878.2347284380113
61.850000000000002	888.2565061900442
62.850000000000002	898.3229089384687
63.850000000000002	908.4339350777981
64.850000000000002	918.5895830094994
65.850000000000002	928.7898511419393
66.850000000000002	939.0347378903228
67.850000000000002	949.3242416766305
68.850000000000002	959.6583609295641
69.850000000000002	970.037094084481
70.850000000000002	980.4604395833447
71.850000000000002	990.9283958746613
72.850000000000002	1001.4409614134261

Temperature (degC)	Pressure (MPa)
73.85000000000002	1011.9981346610679
74.85000000000002	1022.5999140853895
75.85000000000002	1033.2462981605242
76.85000000000002	1043.9372853668688
77.85000000000002	1054.6728741910397
78.85000000000002	1065.4530631258158
79.85000000000002	1076.277850670089
80.85000000000002	1087.1472353288136
81.85000000000002	1098.0612156129519
82.85000000000002	1109.0197900394255
83.85000000000002	1120.0229571310715
84.85000000000002	1131.0707154165823
85.85000000000002	1142.163063430468
86.85000000000002	1153.299999713004
87.85000000000002	1164.481522810182
88.85000000000002	1175.7076312736658
89.85000000000002	1186.9783236607486
90.85000000000002	1198.2935985342947
91.85000000000002	1209.6534544627127
92.85000000000002	1221.057890019892
93.85000000000002	1232.5069037851767
94.85000000000002	1244.000494343305
95.85000000000002	1255.538660284377
96.85000000000002	1267.12140020381
97.85000000000002	1278.748712702297
98.85000000000002	1290.4205963857594
99.85000000000002	1302.137049865309
100.85000000000002	1313.8980717572147
101.85000000000002	1325.7036606828447
102.85000000000002	1337.553815268647
103.85000000000002	1349.448534146095
104.85000000000002	1361.3878159516544
105.85000000000002	1373.3716593267418
106.85000000000002	1385.4000629176892
107.85000000000002	1397.473025375708
108.85000000000002	1409.5905453568462
109.85000000000002	1421.7526215219532
110.85000000000002	1433.959252536645
111.85000000000002	1446.2104370712689
112.85000000000002	1458.5061738008626
113.85000000000002	1470.8464614051213
114.85000000000002	1483.2312985683714
115.85000000000002	1495.6606839795143
116.85000000000002	1508.1346163320163
117.85000000000002	1520.6530943238588

Temperature (degC)	Pressure (MPa)
118.85000000000002	1533.2161166575142
119.85000000000002	1545.8236820398954
120.85000000000002	1558.4757891823556
121.85000000000002	1571.1724368006169
122.85000000000002	1583.9136236147692
123.85000000000002	1596.6993483492197
124.85000000000002	1609.5296097326648
125.85000000000002	1622.4044064980712

Table B354: Bubble Points for Scenario 12

Temperature (degC)	Pressure (MPa)
-63.1499999999998	0.48177934951662615
-62.1499999999998	2.185053804317141
-61.1499999999998	6.804423795608724
-60.1499999999998	11.468363115960726
-59.1499999999998	16.177078133467912
-58.1499999999998	20.93058627105575
-57.1499999999998	25.728890130441883
-56.1499999999998	30.571989051461504
-55.1499999999998	35.459881334478
-54.1499999999998	40.39256488034563
-53.1499999999998	45.37003742272526
-52.1499999999998	50.39229662636968
-51.1499999999998	55.459340133475905
-50.1499999999998	60.571165587357875
-49.1499999999998	65.72777064526545
-48.1499999999998	70.92915298562724
-47.1499999999998	76.17531031224493
-46.1499999999998	81.4662403567476
-45.1499999999998	86.80194088000998
-44.1499999999998	92.18240967292893
-43.1499999999998	97.607644556795
-42.1499999999998	103.07764338340449
-41.1499999999998	108.59240403499322
-40.1499999999998	114.15192442405824
-39.1499999999998	119.75620249309972
-38.1499999999998	125.40523621430668
-37.1499999999998	131.0990235892124
-36.1499999999998	136.83756264832027
-35.1499999999998	142.6208514507164
-34.1499999999998	148.44888808367259
-33.1499999999998	154.32167066224343
-32.1499999999998	160.2391973288595
-31.14999999999977	166.20146625292412
-30.14999999999977	172.2084756304093
-29.14999999999977	178.26022368345272
-28.14999999999977	184.35670865996306
-27.14999999999977	190.4979288332272
-26.14999999999977	196.68388250152032
-25.14999999999977	202.9145679877264
-24.14999999999977	209.1899836389578
-23.14999999999977	215.51012782618787
-22.14999999999977	221.87499894388253
-21.14999999999977	228.28459540964104

Temperature (degC)	Pressure (MPa)
-20.149999999999977	234.73891566384376
-19.149999999999977	241.23795816930198
-18.149999999999977	247.78172141091764
-17.149999999999977	254.37020389534638
-16.149999999999977	261.0034041506655
-15.149999999999977	267.6813207260511
-14.149999999999977	274.40395219145836
-13.149999999999977	281.17129713730714
-12.149999999999977	287.98335417417155
-11.149999999999977	294.840121932481
-10.149999999999977	301.7415990622195
-9.149999999999977	308.68778423263325
-8.149999999999977	315.678676131945
-7.149999999999977	322.7142734670671
-6.149999999999977	329.7945749633276
-5.149999999999977	336.9195793641978
-4.149999999999977	344.0892854310188
-3.149999999999973	351.30369194274505
-2.149999999999973	358.5627976956785
-1.149999999999973	365.8666015032181
-0.1499999999999726	373.2151021956074
0.85000000000000227	380.6082986196911
1.85000000000000227	388.0461896386702
2.85000000000000227	395.5287741318641
3.85000000000000227	403.05605099448167
4.8500000000000023	410.628019137384
5.8500000000000023	418.24467748686675
6.8500000000000023	425.90602498442956
7.8500000000000023	433.6120605865653
8.8500000000000023	441.3627832645405
9.8500000000000023	449.158192004186
10.8500000000000023	456.99828580568806
11.8500000000000023	464.8830636833894
12.8500000000000023	472.81252466557817
13.8500000000000023	480.7866677943011
14.8500000000000023	488.80549212516394
15.8500000000000023	496.8689967271401
16.8500000000000023	504.9771806823849
17.8500000000000023	513.1300430860508
18.8500000000000023	521.3275830461017
19.8500000000000023	529.5697996831411
20.8500000000000023	537.8566921302311
21.8500000000000023	546.1882595327158
22.8500000000000023	554.5645010480628
23.8500000000000023	562.985415845684

Temperature (degC)	Pressure (MPa)
24.850000000000023	571.4510031067766
25.850000000000023	579.961262024158
26.850000000000023	588.5161918021123
27.850000000000023	597.1157916562213
28.850000000000023	605.7600608132249
29.850000000000023	614.4489985108544
30.850000000000023	623.1826039976953
31.850000000000023	631.9608765330319
32.850000000000002	640.7838153867042
33.850000000000002	649.6514198389671
34.850000000000002	658.5636891803458
35.850000000000002	667.5206227115029
36.850000000000002	676.5222197430979
37.850000000000002	685.5684795956541
38.850000000000002	694.6594015994287
39.850000000000002	703.7949850942789
40.850000000000002	712.9752294295374
41.850000000000002	722.2001339638849
42.850000000000002	731.4696980652275
43.850000000000002	740.7839211105717
44.850000000000002	750.1428024859053
45.850000000000002	759.546341586082
46.850000000000002	768.9945378146996
47.850000000000002	778.4873905839883
48.850000000000002	788.0248993146979
49.850000000000002	797.6070634359843
50.850000000000002	807.2338823852989
51.850000000000002	816.9053556082863
52.850000000000002	826.6214825586671
53.850000000000002	836.3822626981492
54.850000000000002	846.187695496306
55.850000000000002	856.0377804304861
56.850000000000002	865.9325169857119
57.850000000000002	875.8719046545751
58.850000000000002	885.855942937149
59.850000000000002	895.8846313408806
60.850000000000002	905.957969380509
61.850000000000002	916.0759565779573
62.850000000000002	926.2385924622542
63.850000000000002	936.4458765694371
64.850000000000002	946.6978084424642
65.850000000000002	956.9943876311282
66.850000000000002	967.3356136919642
67.850000000000002	977.7214861881704
68.850000000000002	988.1520046895232

Temperature (degC)	Pressure (MPa)
69.85000000000002	998.6271687722882
70.85000000000002	1009.1469780191513
71.85000000000002	1019.7114320191206
72.85000000000002	1030.3205303674608
73.85000000000002	1040.9742726656154
74.85000000000002	1051.6726585211154
75.85000000000002	1062.415687547518
76.85000000000002	1073.2033593643278
77.85000000000002	1084.0356735969174
78.85000000000002	1094.9126298764584
79.85000000000002	1105.8342278398547
80.85000000000002	1116.8004671296596
81.85000000000002	1127.8113473940173
82.85000000000002	1138.8668682865882
83.85000000000002	1149.9670294664818
84.85000000000002	1161.1118305981931
85.85000000000002	1172.301271351532
86.85000000000002	1183.5353514015562
87.85000000000002	1194.8140704285177
88.85000000000002	1206.1374281177882
89.85000000000002	1217.5054241597993
90.85000000000002	1228.9180582499862
91.85000000000002	1240.3753300887226
92.85000000000002	1251.8772393812596
93.85000000000002	1263.4237858376682
94.85000000000002	1275.0149691727836
95.85000000000002	1286.650789106142
96.85000000000002	1298.3312453619321
97.85000000000002	1310.0563376689254
98.85000000000002	1321.8260657604383
99.85000000000002	1333.6404293742676
100.85000000000002	1345.4994282526325
101.85000000000002	1357.4030621421298
102.85000000000002	1369.3513307936846
103.85000000000002	1381.3442339624864
104.85000000000002	1393.3817714079464
105.85000000000002	1405.4639428936468
106.85000000000002	1417.5907481872875
107.85000000000002	1429.7621870606474
108.85000000000002	1441.978259289519
109.85000000000002	1454.238964653674
110.85000000000002	1466.5443029368143
111.85000000000002	1478.894273926525
112.85000000000002	1491.2888774142225
113.85000000000002	1503.7281131951177

Temperature (degC)	Pressure (MPa)
114.85000000000002	1516.211981068164
115.85000000000002	1528.7404808360288
116.85000000000002	1541.3136123050265
117.85000000000002	1553.9313752850912
118.85000000000002	1566.5937695897333
119.85000000000002	1579.300795035989
120.85000000000002	1592.0524514443996
121.85000000000002	1604.848738638943
122.85000000000002	1617.6896564470112
123.85000000000002	1630.5752046993618
124.85000000000002	1643.5053832301026
125.85000000000002	1656.4801918766082

Table B355: Bubble Points for Scenario 2

Temperature (degC)	Pressure (MPa)
-68.1499999999998	0.3991418587353329
-67.1499999999998	1.1077052675808166
-66.1499999999998	5.6466901289675135
-65.1499999999998	10.224142701573633
-64.1499999999998	14.845238320007198
-63.1499999999998	19.51020059490524
-62.1499999999998	24.21907328786956
-61.1499999999998	28.971865637394718
-60.1499999999998	33.768576426869465
-59.1499999999998	38.60920042222944
-58.1499999999998	43.49373060637151
-57.1499999999998	48.42215909733378
-56.1499999999998	53.39447757352049
-55.1499999999998	58.410677489023705
-54.1499999999998	63.47075019043575
-53.1499999999998	68.57468698375524
-52.1499999999998	73.7224791743916
-51.1499999999998	78.91411809190892
-50.1499999999998	84.14959510573277
-49.1499999999998	89.4289016353036
-48.1499999999998	94.75202915671255
-47.1499999999998	100.11896920704466
-46.1499999999998	105.5297133871945
-45.1499999999998	110.98425336364096
-44.1499999999998	116.4825808695032
-43.1499999999998	122.02468770508881
-42.1499999999998	127.61056573808261
-41.1499999999998	133.24020690347584
-40.1499999999998	138.91360320330512
-39.1499999999998	144.63074670625704
-38.1499999999998	150.3916295471708
-37.1499999999998	156.19624392646693
-36.1499999999998	162.04458210952365
-35.1499999999998	167.93663642601453
-34.1499999999998	173.87239926921714
-33.1499999999998	179.85186309530613
-32.1499999999998	185.87502042263193
-31.14999999999977	191.94186383099117
-30.14999999999977	198.05238596089725
-29.14999999999977	204.20657951284792
-28.14999999999977	210.40443724659514
-27.14999999999977	216.64595198042008
-26.14999999999977	222.93111659041125

Temperature (degC)	Pressure (MPa)
-25.14999999999977	229.2599240097518
-24.14999999999977	235.63236722801022
-23.14999999999977	242.0484392904447
-22.14999999999977	248.50813329730727
-21.14999999999977	255.01144240316583
-20.14999999999977	261.558359816229
-19.14999999999977	268.1488787976811
-18.14999999999977	274.78299266102806
-17.14999999999977	281.4606947714524
-16.14999999999977	288.18197854517626
-15.14999999999977	294.9468374488345
-14.14999999999977	301.75526499885706
-13.14999999999977	308.6072547608599
-12.14999999999977	315.50280034904756
-11.14999999999977	322.44189542562145
-10.14999999999977	329.42453370019956
-9.14999999999977	336.4507089292427
-8.14999999999977	343.52041491549414
-7.14999999999977	350.63364550742267
-6.14999999999977	357.7903945986754
-5.14999999999977	364.9906561275422
-4.14999999999977	372.2344240764238
-3.149999999999773	379.5216924713122
-2.149999999999773	386.85245538127555
-1.149999999999773	394.22670691795474
-0.1499999999997726	401.6444412350626
0.8500000000000227	409.1056525278956
1.8500000000000227	416.61033503285
2.8500000000000227	424.15848302694843
3.8500000000000227	431.75009082736744
4.850000000000023	439.3851527909816
5.850000000000023	447.06366331390495
6.850000000000023	454.7856168310452
7.850000000000023	462.55100781566557
8.850000000000023	470.3598307789449
9.850000000000023	478.21208026955634
10.850000000000023	486.1077508732414
11.850000000000023	494.0468372123988
12.850000000000023	502.02933394567293
13.850000000000023	510.05523576755286
14.850000000000023	518.124537407974
15.850000000000023	526.2372336319283
16.850000000000023	534.393319239078
17.850000000000023	542.5927890633786
18.850000000000023	550.8356379727

Temperature (degC)	Pressure (MPa)
19.850000000000023	559.1218608684627
20.850000000000023	567.451452685271
21.850000000000023	575.8244083905576
22.850000000000023	584.2407229842271
23.850000000000023	592.7003914983104
24.850000000000023	601.203408996625
25.850000000000023	609.7497705744279
26.850000000000023	618.3394713580919
27.850000000000023	626.9725065047706
28.850000000000023	635.6488712020775
29.850000000000023	644.3685606677656
30.850000000000023	653.1315701494126
31.850000000000023	661.9378949241091
32.850000000000002	670.7875302981569
33.850000000000002	679.6804716067592
34.850000000000002	688.6167142137305
35.850000000000002	697.5962535111997
36.850000000000002	706.6190849193168
37.850000000000002	715.6852038859743
38.850000000000002	724.7946058865195
39.850000000000002	733.9472864234805
40.850000000000002	743.1432410262883
41.850000000000002	752.3824652510106
42.850000000000002	761.66495468008
43.850000000000002	770.9907049220342
44.850000000000002	780.3597116112535
45.850000000000002	789.7719704077107
46.850000000000002	799.2274769967064
47.850000000000002	808.7262270886324
48.850000000000002	818.2682164187179
49.850000000000002	827.8534407467873
50.850000000000002	837.4818958570235
51.850000000000002	847.1535775577249
52.850000000000002	856.8684816810788
53.850000000000002	866.6266040829281
54.850000000000002	876.4279406425425
55.850000000000002	886.2724872623934
56.850000000000002	896.160239867936
57.850000000000002	906.0911944073872
58.850000000000002	916.0653468515097
59.850000000000002	926.0826931933974
60.850000000000002	936.1432294482701
61.850000000000002	946.2469516532603
62.850000000000002	956.393855867208
63.850000000000002	966.583938170463

Temperature (degC)	Pressure (MPa)
64.85000000000002	976.8171946646775
65.85000000000002	987.0936214726142
66.85000000000002	997.413214737948
67.85000000000002	1007.7759706250758
68.85000000000002	1018.1818853189216
69.85000000000002	1028.6309550247538
70.85000000000002	1039.1231759679968
71.85000000000002	1049.658544394046
72.85000000000002	1060.2370565680917
73.85000000000002	1070.8587087749322
74.85000000000002	1081.523497318808
75.85000000000002	1092.2314185232158
76.85000000000002	1102.9824687307419
77.85000000000002	1113.7766443028925
78.85000000000002	1124.6139416199217
79.85000000000002	1135.4943570806695
80.85000000000002	1146.4178871023948
81.85000000000002	1157.384528120611
82.85000000000002	1168.394276588931
83.85000000000002	1179.447128978905
84.85000000000002	1190.543081779861
85.85000000000002	1201.6821314987585
86.85000000000002	1212.8642746600256
87.85000000000002	1224.089507805415
88.85000000000002	1235.3578274938548
89.85000000000002	1246.669230301296
90.85000000000002	1258.023712820564
91.85000000000002	1269.4212716612246
92.85000000000002	1280.8619034494384
93.85000000000002	1292.3456048278072
94.85000000000002	1303.8723724552567
95.85000000000002	1315.4422030068777
96.85000000000002	1327.0550931738019
97.85000000000002	1338.7110396630685
98.85000000000002	1350.4100391974798
99.85000000000002	1362.1520885154846
100.85000000000002	1373.9371843710364
101.85000000000002	1385.7653235334642
102.85000000000002	1397.6365027873599
103.85000000000002	1409.550718932438
104.85000000000002	1421.5079687834116
105.85000000000002	1433.5082491698827
106.85000000000002	1445.5515569362046
107.85000000000002	1457.6378889413743
108.85000000000002	1469.7672420589004

Temperature (degC)	Pressure (MPa)
109.85000000000002	1481.9396131767003
110.85000000000002	1494.154999196978
111.85000000000002	1506.4133970361024
112.85000000000002	1518.7148036245044
113.85000000000002	1531.0592159065527
114.85000000000002	1543.4466308404526
115.85000000000002	1555.8770453981397
116.85000000000002	1568.3504565651538
117.85000000000002	1580.8668613405391
118.85000000000002	1593.4262567367475
119.85000000000002	1606.0286397795273
120.85000000000002	1618.6740075078087
121.85000000000002	1631.3623569736135
122.85000000000002	1644.0936852419493
123.85000000000002	1656.8679893907033
124.85000000000002	1669.6852665105516
125.85000000000002	1682.5455137048564

Table B356: Bubble Points for Scenario 3

Temperature (degC)	Pressure (MPa)
-62.14999999999998	0.40533975761546165
-61.14999999999998	1.7771497041955506
-60.14999999999998	6.490066201829361
-59.14999999999998	11.247159854257895
-58.14999999999998	16.049713052164602
-57.14999999999998	20.897779067420743
-56.14999999999998	25.791360917210874
-55.14999999999998	30.73045558571283
-54.14999999999998	35.71505926812395
-53.14999999999998	40.745168130855454
-52.14999999999998	45.8207783754763
-51.14999999999998	50.941886203571514
-50.14999999999998	56.10848778481451
-49.14999999999998	61.32057924037067
-48.14999999999998	66.57815663807118
-47.14999999999998	71.88121599469628
-46.14999999999998	77.22975328200751
-45.14999999999998	82.62376443444236
-44.14999999999998	88.06324535725554
-43.14999999999998	93.54819193444241
-42.14999999999998	99.07860003610838
-41.14999999999998	104.65446552513596
-40.14999999999998	110.27578426311453
-39.14999999999998	115.94255211554756
-38.14999999999998	121.65476495639035
-37.14999999999998	127.41241867197857
-36.14999999999998	133.21550916441026
-35.14999999999998	139.06403235444853
-34.14999999999998	144.9579841840007
-33.14999999999998	150.89736061822907
-32.14999999999998	156.88215764734002
-31.14999999999997	162.9123712880937
-30.14999999999997	168.98799758506948
-29.14999999999997	175.10903261172538
-28.14999999999997	181.27547247126853
-27.14999999999997	187.48731329737433
-26.14999999999997	193.74455125476047
-25.14999999999997	200.0471825396496
-24.14999999999997	206.39520338012238
-23.14999999999997	212.78861003638497
-22.14999999999997	219.22739880095568
-21.14999999999997	225.7115659987866
-20.14999999999997	232.241107987324

Temperature (degC)	Pressure (MPa)
-19.14999999999977	238.81602115652032
-18.14999999999977	245.43630192880062
-17.14999999999977	252.10194675899126
-16.14999999999977	258.8129521342157
-15.14999999999977	265.569314573763
-14.14999999999977	272.3710306289275
-13.14999999999977	279.2180968828316
-12.14999999999977	286.110509950232
-11.14999999999977	293.0482664773033
-10.14999999999977	300.0313631414154
-9.14999999999977	307.05979665089495
-8.14999999999977	314.13356374478354
-7.14999999999977	321.2526611925777
-6.14999999999977	328.417085793977
-5.14999999999977	335.62683437861125
-4.14999999999977	342.8819038057758
-3.149999999999773	350.182290964157
-2.149999999999773	357.5279927715596
-1.149999999999773	364.9190061746268
-0.1499999999997726	372.3553281485647
0.85000000000000227	379.8369556968654
1.85000000000000227	387.3638858510226
2.85000000000000227	394.93611567026335
3.85000000000000227	402.5536422412641
4.8500000000000023	410.2164626778779
5.8500000000000023	417.9245741208584
6.8500000000000023	425.67797373758793
7.8500000000000023	433.47665872180767
8.8500000000000023	441.3206262933471
9.8500000000000023	449.209873697859
10.8500000000000023	457.1443982065525
11.8500000000000023	465.12419711593697
12.8500000000000023	473.14926774755554
13.8500000000000023	481.2196074477337
14.8500000000000023	489.3352135873253
15.8500000000000023	497.49608356145797
16.8500000000000023	505.70221478928687
17.8500000000000023	513.9536047137518
18.8500000000000023	522.2502508013296
19.8500000000000023	530.5921505417988
20.8500000000000023	538.9793014480007
21.8500000000000023	547.4117010556051
22.8500000000000023	555.8893469228814
23.8500000000000023	564.4122366304675
24.8500000000000023	572.9803677811484

Temperature (degC)	Pressure (MPa)
25.850000000000023	581.5937379996304
26.850000000000023	590.2523449323218
27.850000000000023	598.9561862471179
28.850000000000023	607.705259633186
29.850000000000023	616.499562800756
30.850000000000023	625.3390934809087
31.850000000000023	634.2238494253722
32.850000000000002	643.1538284063184
33.850000000000002	652.1290282161632
34.850000000000002	661.1494466673687
35.850000000000002	670.2150815922465
36.850000000000002	679.3259308427663
37.850000000000002	688.4819922903678
38.850000000000002	697.6832638257691
39.850000000000002	706.9297433587844
40.850000000000002	716.2214288181397
41.850000000000002	725.5583181512959
42.850000000000002	734.9404093242657
43.850000000000002	744.3677003214402
44.850000000000002	753.8401891454174
45.850000000000002	763.3578738168318
46.850000000000002	772.9207523741788
47.850000000000002	782.528822873657
48.850000000000002	792.1820833889938
49.850000000000002	801.8805320112936
50.850000000000002	811.6241668488714
51.850000000000002	821.4129860270947
52.850000000000002	831.2469876882262
53.850000000000002	841.1261699912733
54.850000000000002	851.050531111837
55.850000000000002	861.0200692419501
56.850000000000002	871.0347825899455
57.850000000000002	881.0946693802963
58.850000000000002	891.1997278534782
59.850000000000002	901.3499562658221
60.850000000000002	911.5453528893764
61.850000000000002	921.7859160117679
62.850000000000002	932.0716439360559
63.850000000000002	942.4025349806135
64.850000000000002	952.77858747897
65.850000000000002	963.1997997797037
66.850000000000002	973.6661702462867
67.850000000000002	984.177697256972
68.850000000000002	994.7343792046573
69.850000000000002	1005.336214496769

Temperature (degC)	Pressure (MPa)
70.85000000000002	1015.9832015551202
71.85000000000002	1026.6753388158045
72.85000000000002	1037.412624729064
73.85000000000002	1048.1950577591708
74.85000000000002	1059.0226363843076
75.85000000000002	1069.8953590964607
76.85000000000002	1080.8132244012795
77.85000000000002	1091.7762308179906
78.85000000000002	1102.784376879266
79.85000000000002	1113.837661131108
80.85000000000002	1124.9360821327602
81.85000000000002	1136.0796384565729
82.85000000000002	1147.2683286879078
83.85000000000002	1158.502151425031
84.85000000000002	1169.7811052790046
85.85000000000002	1181.10518887358
86.85000000000002	1192.4744008450996
87.85000000000002	1203.8887398423892
88.85000000000002	1215.348204526663
89.85000000000002	1226.8527935714214
90.85000000000002	1238.4025056623384
91.85000000000002	1249.997339497196
92.85000000000002	1261.637293785752
93.85000000000002	1273.3223672496715
94.85000000000002	1285.0525586224167
95.85000000000002	1296.8278666491508
96.85000000000002	1308.6482900866695
97.85000000000002	1320.5138277032788
98.85000000000002	1332.4244782787282
99.85000000000002	1344.3802406041016
100.85000000000002	1356.381113481749
101.85000000000002	1368.427095725186
102.85000000000002	1380.5181861590058
103.85000000000002	1392.654383618804
104.85000000000002	1404.835686951089
105.85000000000002	1417.0620950131872
106.85000000000002	1429.33360667318
107.85000000000002	1441.6502208098113
108.85000000000002	1454.0119363123993
109.85000000000002	1466.4187520807711
110.85000000000002	1478.8706670251715
111.85000000000002	1491.3676800661895
112.85000000000002	1503.909790134679
113.85000000000002	1516.496996171685
114.85000000000002	1529.1292971283708

Temperature (degC)	Pressure (MPa)
115.85000000000002	1541.8066919659113
116.85000000000002	1554.5291796554732
117.85000000000002	1567.2967591780957
118.85000000000002	1580.1094295246357
119.85000000000002	1592.9671896956916
120.85000000000002	1605.870038701535
121.85000000000002	1618.8179755620395
122.85000000000002	1631.8109993066007
123.85000000000002	1644.849108974085
124.85000000000002	1657.9323036127348
125.85000000000002	1671.0605822801363

Table B357: Bubble Points for Scenario 4

Temperature (degC)	Pressure (MPa)
-72.1499999999998	0.3414335091588825
-71.1499999999998	4.177029467725765
-70.1499999999998	8.697180021737234
-69.1499999999998	13.260287576446089
-68.1499999999998	17.866896693348597
-67.1499999999998	22.51709008532738
-66.1499999999998	27.210883934723764
-65.1499999999998	31.948276904314728
-64.1499999999998	36.72926146927897
-63.1499999999998	41.55382749277099
-62.1499999999998	46.42196360115801
-61.1499999999998	51.33365779329075
-60.1499999999998	56.28889774115851
-59.1499999999998	61.28767095149091
-58.1499999999998	66.32996485883956
-57.1499999999998	71.41576688229986
-56.1499999999998	76.54506446169812
-55.1499999999998	81.71784508154093
-54.1499999999998	86.93409628732721
-53.1499999999998	92.19380569690028
-52.1499999999998	97.49696100846411
-51.1499999999998	102.8435500062878
-50.1499999999998	108.23356056476632
-49.1499999999998	113.66698065128683
-48.1499999999998	119.14379832820708
-47.1499999999998	124.66400175416926
-46.1499999999998	130.22757918490205
-45.1499999999998	135.83451897362957
-44.1499999999998	141.4848095711743
-43.1499999999998	147.17843952581796
-42.1499999999998	152.91539748297154
-41.1499999999998	158.69567218469658
-40.1499999999998	164.51925246910167
-39.1499999999998	170.3861272696479
-38.1499999999998	176.2962856143759
-37.1499999999998	182.24971662507343
-36.1499999999998	188.24640951639404
-35.1499999999998	194.28635359494177
-34.1499999999998	200.3695382583249
-33.1499999999998	206.4959529941905
-32.1499999999998	212.66558737924126
-31.14999999999977	218.87843107824415
-30.14999999999977	225.13447384303072

Temperature (degC)	Pressure (MPa)
-29.14999999999977	231.4337055114956
-28.14999999999977	237.7761160065925
-27.14999999999977	244.1616953353364
-26.14999999999977	250.59043358780355
-25.14999999999977	257.0623209361409
-24.14999999999977	263.57734763358275
-23.14999999999977	270.13550401347214
-22.14999999999977	276.7367804882941
-21.14999999999977	283.38116754871646
-20.14999999999977	290.0686557626411
-19.14999999999977	296.7992357742679
-18.14999999999977	303.57289830316677
-17.14999999999977	310.38963414336195
-16.14999999999977	317.24943416243025
-15.14999999999977	324.1522893006067
-14.14999999999977	331.0981905699073
-13.14999999999977	338.0871290532584
-12.14999999999977	345.11909590364144
-11.14999999999977	352.19408234325033
-10.14999999999977	359.31207966265714
-9.14999999999977	366.473079219994
-8.14999999999977	373.6770724401432
-7.14999999999977	380.92405081394134
-6.14999999999977	388.2140058973967
-5.14999999999977	395.546929310911
-4.14999999999977	402.922812738524
-3.149999999999773	410.34164792715586
-2.149999999999773	417.80342668587514
-1.149999999999773	425.3081408851658
-0.1499999999997726	432.85578245621247
0.8500000000000227	440.4463433901906
1.8500000000000227	448.0798157375741
2.8500000000000227	455.7561916074481
3.8500000000000227	463.4754631668338
4.850000000000023	471.23762264002244
5.850000000000023	479.04266230792194
6.850000000000023	486.89057450740984
7.850000000000023	494.7813516306981
8.850000000000023	502.71498612470685
9.850000000000023	510.6914704904475
10.850000000000023	518.7107972824131
11.850000000000023	526.7729591079832
12.850000000000023	534.8779486268303
13.850000000000023	543.0257585503407
14.850000000000023	551.2163816410399

Temperature (degC)	Pressure (MPa)
15.850000000000023	559.4498107120305
16.850000000000023	567.7260386264358
17.850000000000023	576.0450582968489
18.850000000000023	584.406862684797
19.850000000000023	592.8114448002066
20.850000000000023	601.2587977008819
21.850000000000023	609.7489144919833
22.850000000000023	618.2817883255232
23.850000000000023	626.8574123998613
24.850000000000023	635.4757799592091
25.850000000000023	644.1368842931449
26.850000000000023	652.8407187361299
27.850000000000023	661.587276667039
28.850000000000023	670.3765515086853
29.850000000000023	679.20853672737
30.850000000000023	688.0832258324181
31.850000000000023	697.0006123757389
32.85000000000002	705.960689951376
33.85000000000002	714.9634521950837
34.85000000000002	724.008892783885
35.85000000000002	733.0970054356563
36.85000000000002	742.2277839087064
37.85000000000002	751.4012220013666
38.85000000000002	760.6173135515825
39.85000000000002	769.8760524365181
40.85000000000002	779.1774325721491
41.85000000000002	788.5214479128904
42.85000000000002	797.9080924511953
43.85000000000002	807.3373602171862
44.85000000000002	816.8092452782804
45.85000000000002	826.3237417388087
46.85000000000002	835.88084373967
47.85000000000002	845.4805454579554
48.85000000000002	855.1228411066044
49.85000000000002	864.8077249340475
50.85000000000002	874.5351912238646
51.85000000000002	884.3052342944467
52.85000000000002	894.1178484986508
53.85000000000002	903.9730282234784
54.85000000000002	913.870767889744
55.85000000000002	923.8110619517447
56.85000000000002	933.7939048969507
57.85000000000002	943.8192912456885
58.85000000000002	953.8872155508245
59.85000000000002	963.9976723974619

Temperature (degC)	Pressure (MPa)
60.85000000000002	974.150656402639
61.85000000000002	984.3461622150261
62.85000000000002	994.5841845146309
63.85000000000002	1004.8647180125116
64.85000000000002	1015.1877574504805
65.85000000000002	1025.5532976008235
66.85000000000002	1035.9613332660253
67.85000000000002	1046.4118592784796
68.85000000000002	1056.9048705002278
69.85000000000002	1067.4403618226756
70.85000000000002	1078.01832816634
71.85000000000002	1088.6387644805754
72.85000000000002	1099.3016657433125
73.85000000000002	1110.0070269608088
74.85000000000002	1120.7548431673843
75.85000000000002	1131.5451094251832
76.85000000000002	1142.3778208239128
77.85000000000002	1153.2529724806
78.85000000000002	1164.1705595393598
79.85000000000002	1175.1305771711466
80.85000000000002	1186.1330205735171
81.85000000000002	1197.1778849704065
82.85000000000002	1208.2651656118828
83.85000000000002	1219.3948577739318
84.85000000000002	1230.5669567582247
85.85000000000002	1241.7814578918972
86.85000000000002	1253.0383565273312
87.85000000000002	1264.3376480419395
88.85000000000002	1275.6793278379364
89.85000000000002	1287.0633913421445
90.85000000000002	1298.4898340057787
91.85000000000002	1309.9586513042236
92.85000000000002	1321.4698387368571
93.85000000000002	1333.0233918268157
94.85000000000002	1344.6193061208248
95.85000000000002	1356.2575771889728
96.85000000000002	1367.9382006245376
97.85000000000002	1379.6611720437772
98.85000000000002	1391.42648708575
99.85000000000002	1403.2341414121115
100.85000000000002	1415.0841307069486
101.85000000000002	1426.9764506765719
102.85000000000002	1438.9110970493398
103.85000000000002	1450.888065575494
104.85000000000002	1462.9073520269535

Temperature (degC)	Pressure (MPa)
105.85000000000002	1474.9689521971588
106.85000000000002	1487.0728619008883
107.85000000000002	1499.219076974083
108.85000000000002	1511.4075932736841
109.85000000000002	1523.6384066774551
110.85000000000002	1535.9115130838202
111.85000000000002	1548.2269084116974
112.85000000000002	1560.5845886003235
113.85000000000002	1572.9845496091264
114.85000000000002	1585.4267874175148
115.85000000000002	1597.9112980247667
116.85000000000002	1610.4380774498377
117.85000000000002	1623.0071217312332
118.85000000000002	1635.6184269268326
119.85000000000002	1648.2719891137574
120.85000000000002	1660.9678043881956
121.85000000000002	1673.7058688652871
122.85000000000002	1686.4861786789547
123.85000000000002	1699.3087299817514
124.85000000000002	1712.1735189447388
125.85000000000002	1725.0805417573317

Table B358: Bubble Points for Scenario 5

Temperature (degC)	Pressure (MPa)
-65.1499999999998	0.4299905039291255
-64.1499999999998	0.8198972390508025
-63.1499999999998	5.405058166191963
-62.1499999999998	10.027274489875223
-61.1499999999998	14.69356954288662
-60.1499999999998	19.40413817645362
-59.1499999999998	24.159017611281843
-58.1499999999998	28.958216229581897
-57.1499999999998	33.80173386555823
-56.1499999999998	38.689567106816824
-55.1499999999998	43.6217111084082
-54.1499999999998	48.598160331095414
-53.1499999999998	53.6189088808896
-52.1499999999998	58.683950680097595
-51.1499999999998	63.79327955976884
-50.1499999999998	68.94688931250391
-49.1499999999998	74.14477372398242
-48.1499999999998	79.38692659245505
-47.1499999999998	84.67334174112752
-46.1499999999998	90.00401302618653
-45.1499999999998	95.3789343420684
-44.1499999999998	100.79809962493577
-43.1499999999998	106.26150285495766
-42.1499999999998	111.76913805778105
-41.1499999999998	117.32099930543693
-40.1499999999998	122.91708071685223
-39.1499999999998	128.5573764580795
-38.1499999999998	134.24188074232407
-37.1499999999998	139.97058782982305
-36.1499999999998	145.74349202761724
-35.1499999999998	151.56058768924143
-34.1499999999998	157.42186921435896
-33.1499999999998	163.32733104835316
-32.1499999999998	169.27696768188477
-31.14999999999977	175.27077365042928
-30.14999999999977	181.30874353379906
-29.14999999999977	187.3908719556525
-28.14999999999977	193.51715358299734
-27.14999999999977	199.68758312568983
-26.14999999999977	205.9021553359333
-25.14999999999977	212.16086500777607
-24.14999999999977	218.46370697661143
-23.14999999999977	224.81067611867888

Temperature (degC)	Pressure (MPa)
-22.14999999999977	231.2017673505747
-21.14999999999977	237.63697562875814
-20.14999999999977	244.11629594907043
-19.14999999999977	250.63972334625558
-18.14999999999977	257.2072528934847
-17.14999999999977	263.8188797018936
-16.14999999999977	270.47459892011665
-15.14999999999977	277.1744057338339
-14.14999999999977	283.91829536532424
-13.14999999999977	290.70626307301853
-12.14999999999977	297.53830415106705
-11.14999999999977	304.41441392890704
-10.14999999999977	311.33458777084155
-9.14999999999977	318.29882107561866
-8.14999999999977	325.30710927602416
-7.14999999999977	332.35944783847276
-6.14999999999977	339.4558322626109
-5.14999999999977	346.5962580809235
-4.14999999999977	353.78072085834515
-3.149999999999773	361.0092161918823
-2.149999999999773	368.2817397102333
-1.149999999999773	375.5982870734208
-0.1499999999997726	382.9588539724277
0.8500000000000227	390.36343612883644
1.8500000000000227	397.8120292944764
2.8500000000000227	405.3046292510761
3.8500000000000227	412.84123180991946
4.850000000000023	420.4218328115087
5.850000000000023	428.04642812523116
6.850000000000023	435.71501364903077
7.850000000000023	443.42758530908543
8.850000000000023	451.18413905948995
9.850000000000023	458.98467088194
10.850000000000023	466.8291767854286
11.850000000000023	474.7176528059343
12.850000000000023	482.65009500612786
13.850000000000023	490.62649947507316
14.850000000000023	498.64686232793827
15.850000000000023	506.711179705706
16.850000000000023	514.819447774897
17.850000000000023	522.9716627272813
18.850000000000023	531.1678207796135
19.850000000000023	539.4079181733599
20.850000000000023	547.6919511744246
21.850000000000023	556.0199160728972

Temperature (degC)	Pressure (MPa)
22.850000000000023	564.3918091827874
23.850000000000023	572.8076268417703
24.850000000000023	581.2673654109371
25.850000000000023	589.771021274543
26.850000000000023	598.3185908397655
27.850000000000023	606.9100705364606
28.850000000000023	615.5454568169304
29.850000000000023	624.2247461556807
30.850000000000023	632.9479350491954
31.850000000000023	641.7150200157054
32.850000000000002	650.5259975949663
33.850000000000002	659.380864348034
34.850000000000002	668.2796168570467
35.850000000000002	677.2222517250116
36.850000000000002	686.2087655755865
37.850000000000002	695.2391550528762
38.850000000000002	704.3134168212212
39.850000000000002	713.4315475649931
40.850000000000002	722.5935439883978
41.850000000000002	731.7994028152712
42.850000000000002	741.0491207888855
43.850000000000002	750.3426946717553
44.850000000000002	759.680121245451
45.850000000000002	769.061397310397
46.850000000000002	778.4865196857056
47.850000000000002	787.9554852089752
48.850000000000002	797.4682907361208
49.850000000000002	807.0249331411904
50.850000000000002	816.6254093161887
51.850000000000002	826.2697161709068
52.850000000000002	835.9578506327437
53.850000000000002	845.6898096465449
54.850000000000002	855.465590174429
55.850000000000002	865.2851891956224
56.850000000000002	875.1486037063023
57.850000000000002	885.0558307194292
58.850000000000002	895.0068672645896
59.850000000000002	905.0017103878412
60.850000000000002	915.0403571515543
61.850000000000002	925.1228046342655
62.850000000000002	935.2490499305175
63.850000000000002	945.4190901507164
64.850000000000002	955.6329224209833
65.850000000000002	965.8905438830067
66.850000000000002	976.1919516939022

Temperature (degC)	Pressure (MPa)
67.85000000000002	986.5371430260682
68.85000000000002	996.9261150670454
69.85000000000002	1007.35886501938
70.85000000000002	1017.8353901004862
71.85000000000002	1028.3556875425115
72.85000000000002	1038.9197545922038
73.85000000000002	1049.5275885107799
74.85000000000002	1060.1791865737919
75.85000000000002	1070.8745460710034
76.85000000000002	1081.613664306262
77.85000000000002	1092.3965385973677
78.85000000000002	1103.2231662759582
79.85000000000002	1114.0935446873818
80.85000000000002	1125.0076711905726
81.85000000000002	1135.9655431579383
82.85000000000002	1146.9671579752383
83.85000000000002	1158.0125130414644
84.85000000000002	1169.1016057687316
85.85000000000002	1180.2344335821567
86.85000000000002	1191.4109939197572
87.85000000000002	1202.6312842323246
88.85000000000002	1213.8953019833248
89.85000000000002	1225.20304464879
90.85000000000002	1236.5545097172028
91.85000000000002	1247.9496946893983
92.85000000000002	1259.3885970784552
93.85000000000002	1270.8712144095903
94.85000000000002	1282.397544220066
95.85000000000002	1293.96758405907
96.85000000000002	1305.581331487634
97.85000000000002	1317.2387840785225
98.85000000000002	1328.9399394161428
99.85000000000002	1340.6847950964407
100.85000000000002	1352.473348726807
101.85000000000002	1364.3055979259896
102.85000000000002	1376.1815403239873
103.85000000000002	1388.1011735619716
104.85000000000002	1400.0644952921798
105.85000000000002	1412.0715031778345
106.85000000000002	1424.1221948930533
107.85000000000002	1436.2165681227577
108.85000000000002	1448.3546205625853
109.85000000000002	1460.536349918809
110.85000000000002	1472.7617539082355
111.85000000000002	1485.0308302581452

Temperature (degC)	Pressure (MPa)
112.85000000000002	1497.3435767061787
113.85000000000002	1509.699991000292
114.85000000000002	1522.1000708986267
115.85000000000002	1534.5438141694708
116.85000000000002	1547.0312185911655
117.85000000000002	1559.562281952006
118.85000000000002	1572.1370020501934
119.85000000000002	1584.755376693735
120.85000000000002	1597.417403700383
121.85000000000002	1610.1230808975467
122.85000000000002	1622.8724061222167
123.85000000000002	1635.6653772209052
124.85000000000002	1648.5019920495556
125.85000000000002	1661.3822484734767

Table B359: Bubble Points for Scenario 6

Temperature (degC)	Pressure (MPa)
-64.14999999999998	0.4255437306719519
-63.14999999999998	3.940757412867987
-62.14999999999998	8.578555741634236
-61.14999999999998	13.260489619646739
-60.14999999999998	17.986849327288294
-59.14999999999998	22.757671355607897
-58.14999999999998	27.57296035716843
-57.14999999999998	32.43271331317042
-56.14999999999998	37.33692466927758
-55.14999999999998	42.28558784680947
-54.14999999999998	47.27869579180605
-53.14999999999998	52.31624120858506
-52.14999999999998	57.398216672637325
-51.14999999999998	62.52461469138594
-50.14999999999998	67.69542773997561
-49.14999999999998	72.9106482839787
-48.14999999999998	78.17026879468216
-47.14999999999998	83.4742817598591
-46.14999999999998	88.8226796916252
-45.14999999999998	94.21545513231511
-44.14999999999998	99.65260065895244
-43.14999999999998	105.13410888669353
-42.14999999999998	110.65997247149333
-41.14999999999998	116.2301841121755
-40.14999999999998	121.84473655203303
-39.14999999999998	127.5036225800596
-38.14999999999998	133.20683503187985
-37.14999999999998	138.954366790437
-36.14999999999998	144.74621078648607
-35.14999999999998	150.58235999891974
-34.14999999999998	156.46280745496344
-33.14999999999998	162.38754623025693
-32.14999999999998	168.35656944884568
-31.149999999999977	174.36987028309193
-30.149999999999977	180.4274419535253
-29.149999999999977	186.52927772863657
-28.149999999999977	192.67537092462874
-27.149999999999977	198.86571490513134
-26.149999999999977	205.10030308087985
-25.149999999999977	211.37912890937557
-24.149999999999977	217.70218589452153
-23.149999999999977	224.0694675862369
-22.149999999999977	230.48096758006693

Temperature (degC)	Pressure (MPa)
-21.14999999999977	236.9366795167717
-20.14999999999977	243.43659708191495
-19.14999999999977	249.98071400543654
-18.14999999999977	256.5690240612299
-17.14999999999977	263.20152106670827
-16.14999999999977	269.87819888237334
-15.14999999999977	276.59905141137835
-14.14999999999977	283.36407259909686
-13.14999999999977	290.1732564326849
-12.14999999999977	297.026596940652
-11.14999999999977	303.92408819242615
-10.14999999999977	310.8657242979285
-9.14999999999977	317.85149940714746
-8.14999999999977	324.88140770971347
-7.14999999999977	331.9554434344803
-6.14999999999977	339.07360084911363
-5.14999999999977	346.2358742596748
-4.14999999999977	353.4422580102145
-3.149999999999773	360.69274648237007
-2.149999999999773	367.9873340949691
-1.149999999999773	375.32601530363087
-0.1499999999997726	382.70878460037846
0.85000000000000227	390.1356365132557
1.85000000000000227	397.60656560594396
2.85000000000000227	405.1215664773872
3.85000000000000227	412.6806337614224
4.8500000000000023	420.28376212641064
5.8500000000000023	427.93094627487835
6.8500000000000023	435.622180943157
7.8500000000000023	443.3574609010352
8.8500000000000023	451.13678095140637
9.8500000000000023	458.96013592992847
10.8500000000000023	466.82752070468604
11.8500000000000023	474.73893017585374
12.8500000000000023	482.69435927536983
13.8500000000000023	490.6938029666063
14.8500000000000023	498.73725624405495
15.8500000000000023	506.8247141330057
16.8500000000000023	514.9561716892362
17.8500000000000023	523.1316239987046
18.8500000000000023	531.3510661772452
19.8500000000000023	539.6144933702684
20.8500000000000023	547.9219007524667
21.8500000000000023	556.2732835275195
22.8500000000000023	564.6686369278121

Temperature (degC)	Pressure (MPa)
23.850000000000023	573.1079562141447
24.850000000000023	581.5912366754584
25.850000000000023	590.118473628556
26.850000000000023	598.6896624178266
27.850000000000023	607.3047984149852
28.850000000000023	615.9638770187992
29.850000000000023	624.6668936548323
30.850000000000023	633.4138437751834
31.850000000000023	642.2047228582346
32.850000000000002	651.0395264083933
33.850000000000002	659.9182499558548
34.850000000000002	668.8408890563469
35.850000000000002	677.8074392908972
36.850000000000002	686.8178962655867
37.850000000000002	695.8722556113227
38.850000000000002	704.9705129836019
39.850000000000002	714.1126640622799
40.850000000000002	723.2987045513488
41.850000000000002	732.5286301787115
42.850000000000002	741.8024366959635
43.850000000000002	751.1201198781731
44.850000000000002	760.481675523668
45.850000000000002	769.8870994538246
46.850000000000002	779.3363875128546
47.850000000000002	788.8295355676021
48.850000000000002	798.3665395073405
49.850000000000002	807.9473952435653
50.850000000000002	817.5720987098016
51.850000000000002	827.2406458614047
52.850000000000002	836.9530326753662
53.850000000000002	846.7092551501242
54.850000000000002	856.509309305369
55.850000000000002	866.3531911818649
56.850000000000002	876.2408968412584
57.850000000000002	886.1724223658988
58.850000000000002	896.1477638586562
59.850000000000002	906.1669174427495
60.850000000000002	916.229879261561
61.850000000000002	926.3366454784749
62.850000000000002	936.4872122766936
63.850000000000002	946.6815758590783
64.850000000000002	956.9197324479743
65.850000000000002	967.2016782850528
66.850000000000002	977.5274096311409
67.850000000000002	987.8969227660624

Temperature (degC)	Pressure (MPa)
68.85000000000002	998.3102139884815
69.85000000000002	1008.7672796157458
70.85000000000002	1019.268115983717
71.85000000000002	1029.8127194466358
72.85000000000002	1040.401086376963
73.85000000000002	1051.0332131652192
74.85000000000002	1061.709096219852
75.85000000000002	1072.4287319670766
76.85000000000002	1083.192116850739
77.85000000000002	1093.9992473321686
78.85000000000002	1104.8501198900376
79.85000000000002	1115.7447310202153
80.85000000000002	1126.683077235644
81.85000000000002	1137.6651550661802
82.85000000000002	1148.6909610584798
83.85000000000002	1159.7604917758508
84.85000000000002	1170.8737437981274
85.85000000000002	1182.0307137215389
86.85000000000002	1193.231398158572
87.85000000000002	1204.475793737854
88.85000000000002	1215.76389710402
89.85000000000002	1227.0957049175893
90.85000000000002	1238.4712138548373
91.85000000000002	1249.8904206076816
92.85000000000002	1261.3533218835535
93.85000000000002	1272.8599144052782
94.85000000000002	1284.410194910961
95.85000000000002	1296.0041601538696
96.85000000000002	1307.6418069023075
97.85000000000002	1319.3231319395209
98.85000000000002	1331.0481320635597
99.85000000000002	1342.8168040871858
100.85000000000002	1354.629144837747
101.85000000000002	1366.4851511570798
102.85000000000002	1378.3848199013933
103.85000000000002	1390.3281479411567
104.85000000000002	1402.3151321610123
105.85000000000002	1414.3457694596443
106.85000000000002	1426.4200567496937
107.85000000000002	1438.537990957647
108.85000000000002	1450.699569023738
109.85000000000002	1462.9047879018415
110.85000000000002	1475.1536445593765
111.85000000000002	1487.446135977213
112.85000000000002	1499.7822591495599

Temperature (degC)	Pressure (MPa)
113.85000000000002	1512.1620110838883
114.85000000000002	1524.5853888008107
115.85000000000002	1537.052389334011
116.85000000000002	1549.563009730129
117.85000000000002	1562.1172470486815
118.85000000000002	1574.7150983619738
119.85000000000002	1587.3565607549895
120.85000000000002	1600.0416313253174
121.85000000000002	1612.7703071830501
122.85000000000002	1625.5425854507175
123.85000000000002	1638.3584632631603
124.85000000000002	1651.2179377674922
125.85000000000002	1664.1210061229694

Table B360: Bubble Points for Scenario 7

Temperature (degC)	Pressure (MPa)
-73.14999999999998	0.27803017453199586
-72.14999999999998	0.7472459543826697
-71.14999999999998	5.373846578674836
-70.14999999999998	10.031354448227564
-69.14999999999998	14.733415339921349
-68.14999999999998	19.480276193441025
-67.14999999999998	24.271961881366398
-66.14999999999998	29.10846794639692
-65.14999999999998	33.98978384502726
-64.14999999999998	38.91589734063258
-63.14999999999998	43.886795543163004
-62.14999999999998	48.90246520349889
-61.14999999999998	53.96289282154167
-60.14999999999998	59.06806470434276
-59.14999999999998	64.21796700929565
-58.14999999999998	69.4125857812219
-57.14999999999998	74.65190698535119
-56.14999999999998	79.93591653657646
-55.14999999999998	85.26460032511861
-54.14999999999998	90.63794423879762
-53.14999999999998	96.05593418217826
-52.14999999999998	101.51855609291194
-51.14999999999998	107.02579595560813
-50.14999999999998	112.57763981354286
-49.14999999999998	118.17407377850759
-48.14999999999998	123.81508403905111
-47.14999999999998	129.50065686734962
-46.14999999999998	135.2307786249002
-45.14999999999998	141.0054357672115
-44.14999999999998	146.8246148476387
-43.14999999999998	152.6883025204886
-42.14999999999998	158.59648554349792
-41.14999999999998	164.54915077978188
-40.14999999999998	170.54628519933064
-39.14999999999998	176.58787588011018
-38.14999999999998	182.67391000883785
-37.14999999999998	188.80437488147172
-36.14999999999998	194.97925790345604
-35.14999999999998	201.19854658976294
-34.14999999999998	207.46222856475646
-33.14999999999998	213.7702915619011
-32.14999999999998	220.12272342334853
-31.149999999999977	226.51951209940958

Temperature (degC)	Pressure (MPa)
-30.14999999999977	232.96064564793878
-29.14999999999977	239.44611223363313
-28.14999999999977	245.9759001272718
-27.14999999999977	252.54999770489465
-26.14999999999977	259.16839344693796
-25.14999999999977	265.8310759373337
-24.14999999999977	272.53803386256664
-23.14999999999977	279.28925601072365
-22.14999999999977	286.0847312705022
-21.14999999999977	292.9244486302247
-20.14999999999977	299.8083971768231
-19.14999999999977	306.73656609482185
-18.14999999999977	313.7089446653203
-17.14999999999977	320.72552226496674
-16.14999999999977	327.7862883649307
-15.14999999999977	334.8912325298765
-14.14999999999977	342.04034441695234
-13.14999999999977	349.23361377475965
-12.14999999999977	356.4710304423542
-11.14999999999977	363.7525843482316
-10.14999999999977	371.0782655093366
-9.14999999999977	378.448064030073
-8.14999999999977	385.86197010132327
-7.14999999999977	393.3199739994802
-6.14999999999977	400.8220660854823
-5.14999999999977	408.36823680387016
-4.14999999999977	415.9584766818432
-3.149999999999773	423.5927763283389
-2.149999999999773	431.2711264331012
-1.149999999999773	438.99351776579095
-0.1499999999997726	446.759941175086
0.8500000000000227	454.5703875877946
1.8500000000000227	462.4248480079886
2.8500000000000227	470.3233135161447
3.8500000000000227	478.26577526829334
4.850000000000023	486.25222449518463
5.850000000000023	494.28265250146086
6.850000000000023	502.35705066484707
7.850000000000023	510.47541043534295
8.850000000000023	518.6377233344366
9.850000000000023	526.8439809543239
10.850000000000023	535.0941749571326
11.850000000000023	543.3882970741782
12.850000000000023	551.7263391051976
13.850000000000023	560.1082929176279

Temperature (degC)	Pressure (MPa)
14.850000000000023	568.534150445876
15.850000000000023	577.0039036905965
16.850000000000023	585.5175447179885
17.850000000000023	594.0750656591066
18.850000000000023	602.6764587091644
19.850000000000023	611.3217161268701
20.850000000000023	620.0108302337436
21.850000000000023	628.7437934134733
22.850000000000023	637.5205981112632
23.850000000000023	646.3412368331985
24.850000000000023	655.2057021456008
25.850000000000023	664.1139866744317
26.850000000000023	673.0660831046562
27.850000000000023	682.0619841796562
28.850000000000023	691.1016827006281
29.850000000000023	700.1851715259976
30.850000000000023	709.3124435708407
31.850000000000023	718.4834918063095
32.850000000000002	727.6983092590856
33.850000000000002	736.9568890107947
34.850000000000002	746.2592241974957
35.850000000000002	755.6053080091118
36.850000000000002	764.9951336889126
37.850000000000002	774.4286945329816
38.850000000000002	783.9059838897173
39.850000000000002	793.426995159288
40.850000000000002	802.9917217931568
41.850000000000002	812.6001572935763
42.850000000000002	822.2522952130927
43.850000000000002	831.9481291540677
44.850000000000002	841.6876527681998
45.850000000000002	851.4708597560485
46.850000000000002	861.2977438665768
47.850000000000002	871.1682988966896
48.850000000000002	881.0825186907733
49.850000000000002	891.040397140262
50.850000000000002	901.0419281831869
51.850000000000002	911.0871058037453
52.850000000000002	921.175924031872
53.850000000000002	931.3083769428102
54.850000000000002	941.4844586566895
55.850000000000002	951.7041633381283
56.850000000000002	961.967485195816
57.850000000000002	972.2744184821
58.850000000000002	982.6249574926098

Temperature (degC)	Pressure (MPa)
59.850000000000002	993.0190965658459
60.850000000000002	1003.4568300827993
61.850000000000002	1013.938152466567
62.850000000000002	1024.463058181993
63.850000000000002	1035.0315417352388
64.850000000000002	1045.6435976734865
65.850000000000002	1056.2992205845292
66.850000000000002	1066.9984050964206
67.850000000000002	1077.741145877127
68.850000000000002	1088.5274376341615
69.850000000000002	1099.3572751142567
70.850000000000002	1110.2306531030133
71.850000000000002	1121.1475664245484
72.850000000000002	1132.1080099411904
73.850000000000002	1143.1119785531214
74.850000000000002	1154.159467198063
75.850000000000002	1165.2504708509541
76.850000000000002	1176.3849845236305
77.850000000000002	1187.5630032645063
78.850000000000002	1198.7845221582736
79.850000000000002	1210.049536325584
80.850000000000002	1221.358040922749
81.850000000000002	1232.7100311414497
82.850000000000002	1244.1055022083976
83.850000000000002	1255.5444493851255
84.850000000000002	1267.0268679676
85.850000000000002	1278.552753286006
86.850000000000002	1290.1221007044167
87.850000000000002	1301.7349056205646
88.850000000000002	1313.391163465514
89.850000000000002	1325.090869703408
90.850000000000002	1336.8340198312037
91.850000000000002	1348.6206093784012
92.850000000000002	1360.4506339067707
93.850000000000002	1372.3240890100988
94.850000000000002	1384.240970313938
95.850000000000002	1396.2012734753241
96.850000000000002	1408.2049941825508
97.850000000000002	1420.252128154906
98.850000000000002	1432.3426711424347
99.850000000000002	1444.476618925657
100.850000000000002	1456.6539673154095
101.850000000000002	1468.874712152505
102.850000000000002	1481.138849307566
103.850000000000002	1493.4463746807571

Temperature (degC)	Pressure (MPa)
104.85000000000002	1505.797284201575
105.85000000000002	1518.1915738286004
106.85000000000002	1530.6292395492887
107.85000000000002	1543.1102773797174
108.85000000000002	1555.6346833644143
109.85000000000002	1568.202453576075
110.85000000000002	1580.8135841153958
111.85000000000002	1593.468071110843
112.85000000000002	1606.1659107184246
113.85000000000002	1618.9070991215085
114.85000000000002	1631.6916325305942
115.85000000000002	1644.519507183109
116.85000000000002	1657.3907193432092
117.85000000000002	1670.3052653015834
118.85000000000002	1683.2631413752326
119.85000000000002	1696.2643439073056
120.85000000000002	1709.3088692668605
121.85000000000002	1722.3967138487214
122.85000000000002	1735.5278740732392
123.85000000000002	1748.7023463861337
124.85000000000002	1761.9201272582943
125.85000000000002	1775.1812131855881

Table B361: Bubble Points for Scenario 8

Temperature (degC)	Pressure (MPa)
-62.14999999999998	0.44848503064950684
-61.14999999999998	3.801912901293375
-60.14999999999998	8.458847778867995
-59.14999999999998	13.16018061236414
-58.14999999999998	17.90619789918998
-57.14999999999998	22.696938359195627
-56.14999999999998	27.532409670556998
-55.14999999999998	32.412611837088974
-54.14999999999998	37.337542256824314
-53.14999999999998	42.3071972538968
-52.14999999999998	47.32157264884402
-51.14999999999998	52.38066400504601
-50.14999999999998	57.484466748166604
-49.14999999999998	62.63297622963998
-48.14999999999998	67.82618776308317
-47.14999999999998	73.06409664653101
-46.14999999999998	78.34669817674133
-45.14999999999998	83.67398765879483
-44.14999999999998	89.04596041275724
-43.14999999999998	94.4626117784319
-42.14999999999998	99.92393711881473
-41.14999999999998	105.42993182264343
-40.14999999999998	110.9805913062963
-39.14999999999998	116.57591101520555
-38.14999999999998	122.21588642491623
-37.14999999999998	127.9005130418604
-36.14999999999998	133.6297864039223
-35.14999999999998	139.40370208083135
-34.14999999999998	145.22225567442126
-33.14999999999998	151.0854428187829
-32.14999999999998	156.99325918032815
-31.149999999999977	162.9457004577846
-30.149999999999977	168.94276238213385
-29.149999999999977	174.98444071650042
-28.149999999999977	181.07073125600334
-27.149999999999977	187.20162982757873
-26.149999999999977	193.37713228977026
-25.149999999999977	199.59723453250794
-24.149999999999977	205.8619324768585
-23.149999999999977	212.17122207477067
-22.149999999999977	218.52509930880777
-21.149999999999977	224.92356019186488
-20.149999999999977	231.36660076688983

Temperature (degC)	Pressure (MPa)
-19.14999999999977	237.85421710658593
-18.14999999999977	244.386405313124
-17.14999999999977	250.96316151784183
-16.14999999999977	257.58448188094377
-15.14999999999977	264.25036259120463
-14.14999999999977	270.9607998656647
-13.14999999999977	277.71578994933196
-12.14999999999977	284.5153291148831
-11.14999999999977	291.3594136623645
-10.14999999999977	298.2480399188956
-9.14999999999977	305.18120423837377
-8.14999999999977	312.1589030011833
-7.14999999999977	319.1811326139055
-6.14999999999977	326.2478895090295
-5.14999999999977	333.35917014467117
-4.14999999999977	340.5149710042867
-3.149999999999773	347.71528859639716
-2.149999999999773	354.9601194543156
-1.149999999999773	362.2494601358672
-0.1499999999997726	369.58330722312604
0.85000000000000227	376.9616573221494
1.85000000000000227	384.3845070627101
2.85000000000000227	391.85185309804353
3.85000000000000227	399.36369210458787
4.8500000000000023	406.92002078173016
5.8500000000000023	414.5208358515615
6.8500000000000023	422.1661340586259
7.8500000000000023	429.8559121696811
8.8500000000000023	437.5901669734569
9.8500000000000023	445.36889528042127
10.8500000000000023	453.19209392254214
11.8500000000000023	461.0597597530645
12.8500000000000023	468.9718896462747
13.8500000000000023	476.92848049728667
14.8500000000000023	484.9295292218129
15.8500000000000023	492.9750327559524
16.8500000000000023	501.06498805596937
17.8500000000000023	509.19939209809087
18.8500000000000023	517.3782418782887
19.8500000000000023	525.601534412078
20.8500000000000023	533.8692667343169
21.8500000000000023	542.181435898998
22.8500000000000023	550.5380389790594
23.8500000000000023	558.9390730661855
24.8500000000000023	567.3845352706106

Temperature (degC)	Pressure (MPa)
25.8500000000000023	575.8744227209422
26.8500000000000023	584.4087325639587
27.8500000000000023	592.9874619644356
28.8500000000000023	601.6106081049608
29.8500000000000023	610.2781681857513
30.8500000000000023	618.9901394244821
31.8500000000000023	627.746519056107
32.850000000000002	636.5473043326892
33.850000000000002	645.3924925232302
34.850000000000002	654.2820809135022
35.850000000000002	663.2160668058801
36.850000000000002	672.1944475191848
37.850000000000002	681.2172203885175
38.850000000000002	690.2843827651008
39.850000000000002	699.395932016121
40.850000000000002	708.5518655245766
41.850000000000002	717.7521806891258
42.850000000000002	726.9968749239325
43.850000000000002	736.2859456585172
44.850000000000002	745.6193903376167
45.850000000000002	754.9972064210334
46.850000000000002	764.4193913834893
47.850000000000002	773.8859427144973
48.850000000000002	783.3968579182099
49.850000000000002	792.952134513282
50.850000000000002	802.5517700327464
51.850000000000002	812.1957620238717
52.850000000000002	821.8841080480238
53.850000000000002	831.6168056805492
54.850000000000002	841.393852510637
55.850000000000002	851.2152461411935
56.850000000000002	861.080984188718
57.850000000000002	870.991064283176
58.850000000000002	880.9454840678796
59.850000000000002	890.944241199364
60.850000000000002	900.9873333472694
61.850000000000002	911.0747581942226
62.850000000000002	921.2065134357196
63.850000000000002	931.3825967800118
64.850000000000002	941.6030059479903
65.850000000000002	951.8677386730784
66.850000000000002	962.1767927011165
67.850000000000002	972.5301657902471
68.850000000000002	982.9278557108202
69.850000000000002	993.3698602452731

Temperature (degC)	Pressure (MPa)
70.85000000000002	1003.8561771880354
71.85000000000002	1014.3868043454145
72.85000000000002	1024.9617395354992
73.85000000000002	1035.5809805880567
74.85000000000002	1046.2445253444307
75.85000000000002	1056.9523716574415
76.85000000000002	1067.7045173912895
77.85000000000002	1078.5009604214538
78.85000000000002	1089.3416986346056
79.85000000000002	1100.2267299285018
80.85000000000002	1111.156052211897
81.85000000000002	1122.129663404448
82.85000000000002	1133.1475614366288
83.85000000000002	1144.2097442496363
84.85000000000002	1155.3162097952936
85.85000000000002	1166.4669560359719
86.85000000000002	1177.661980944499
87.85000000000002	1188.901282504069
88.85000000000002	1200.1848587081672
89.85000000000002	1211.5127075604712
90.85000000000002	1222.884827074785
91.85000000000002	1234.301215274932
92.85000000000002	1245.7618701946992
93.85000000000002	1257.2667898777438
94.85000000000002	1268.8159723775082
95.85000000000002	1280.409415757153
96.85000000000002	1292.0471180894697
97.85000000000002	1303.7290774568073
98.85000000000002	1315.4552919509997
99.85000000000002	1327.2257596732763
100.85000000000002	1339.0404787342113
101.85000000000002	1350.8994472536185
102.85000000000002	1362.8026633605086
103.85000000000002	1374.7501251929962
104.85000000000002	1386.7418308982367
105.85000000000002	1398.7777786323618
106.85000000000002	1410.857966560383
107.85000000000002	1422.982392856165
108.85000000000002	1435.1510557023175
109.85000000000002	1447.3639532901502
110.85000000000002	1459.6210838195973
111.85000000000002	1471.9224454991577
112.85000000000002	1484.268036545811
113.85000000000002	1496.6578551849889
114.85000000000002	1509.09189965047

Temperature (degC)	Pressure (MPa)
115.85000000000002	1521.5701681843366
116.85000000000002	1534.0926590369208
117.85000000000002	1546.659370466725
118.85000000000002	1559.2703007403607
119.85000000000002	1571.925448132505
120.85000000000002	1584.624810925826
121.85000000000002	1597.3683874109174
122.85000000000002	1610.156175886263
123.85000000000002	1622.9881746581525
124.85000000000002	1635.8643820406296
125.85000000000002	1648.7847963554605

Table B362: Bubble Points for Scenario 9

Temperature (degC)	Pressure (MPa)
-61.14999999999998	0.4757042595872256
-60.14999999999998	2.543328510307424
-59.14999999999998	7.056491258297667
-58.14999999999998	11.613487591590069
-57.14999999999998	16.21444107497987
-56.14999999999998	20.859335410381043
-55.14999999999998	25.54814963789882
-54.14999999999998	30.280865222369375
-53.14999999999998	35.0574662391859
-52.14999999999998	39.87793888503028
-51.14999999999998	44.742271021063495
-50.14999999999998	49.65045182199582
-49.14999999999998	54.60247151467292
-48.14999999999998	59.59832118246759
-47.14999999999998	64.63799261683197
-46.14999999999998	69.72147820279419
-45.14999999999998	74.84877082920354
-44.14999999999998	80.01986381731935
-43.14999999999998	85.23475086321145
-42.14999999999998	90.4934259907181
-41.14999999999998	95.79588351259834
-40.14999999999998	101.14211799812368
-39.14999999999998	106.53212424578679
-38.14999999999998	111.9658972601356
-37.14999999999998	117.44343223194781
-36.14999999999998	122.96472452115468
-35.14999999999998	128.5297696420321
-34.14999999999998	134.13856325028388
-33.14999999999998	139.791101131714
-32.14999999999998	145.48737919224013
-31.149999999999977	151.22739344904934
-30.149999999999977	157.01114002273292
-29.149999999999977	162.8386151302565
-28.149999999999977	168.70981507866017
-27.149999999999977	174.62473625938898
-26.149999999999977	180.58337514316958
-25.149999999999977	186.5857282753753
-24.149999999999977	192.6317922718082
-23.149999999999977	198.72156381485897
-22.149999999999977	204.85503964999901
-21.149999999999977	211.03221658256376
-20.149999999999977	217.2530914747994
-19.149999999999977	223.5176612431464

Temperature (degC)	Pressure (MPa)
-18.14999999999977	229.82592285573193
-17.14999999999977	236.17787333004887
-16.14999999999977	242.5735097308117
-15.14999999999977	249.012829167961
-14.14999999999977	255.4958287948067
-13.14999999999977	262.0225058063062
-12.14999999999977	268.5928574374478
-11.14999999999977	275.20688096174547
-10.14999999999977	281.8645736898256
-9.14999999999977	288.56593296810786
-8.14999999999977	295.3109561775593
-7.14999999999977	302.0996407325267
-6.14999999999977	308.9319840796347
-5.14999999999977	315.8079836967515
-4.14999999999977	322.7276370920043
-3.149999999999773	329.6909418028561
-2.149999999999773	336.697895395228
-1.149999999999773	343.7484954626681
-0.1499999999997726	350.84273962556244
0.8500000000000227	357.9806255303886
1.8500000000000227	365.16215084900233
2.8500000000000227	372.38731327795983
3.8500000000000227	379.65611053787416
4.850000000000023	386.9685403727992
5.850000000000023	394.3246005496422
6.850000000000023	401.7242888576044
7.850000000000023	409.1676031076424
8.850000000000023	416.6545411319578
9.850000000000023	424.18510078350454
10.850000000000023	431.75927993551716
11.850000000000023	439.37707648105993
12.850000000000023	447.03848833259457
13.850000000000023	454.74351342155967
14.850000000000023	462.492149697976
15.850000000000023	470.28439513005685
16.850000000000023	478.1202477038381
17.850000000000023	485.999705422822
18.850000000000023	493.9227663076338
19.850000000000023	501.8894283956851
20.850000000000023	509.8996897408607
21.850000000000023	517.9535484132031
22.850000000000023	526.0510024986149
23.850000000000023	534.1920500985741
24.850000000000023	542.3766893298481
25.850000000000023	550.6049183242246

Temperature (degC)	Pressure (MPa)
26.850000000000023	558.8767352282566
27.850000000000023	567.1921382029989
28.850000000000023	575.5511254237708
29.850000000000023	583.9536950799076
30.850000000000023	592.3998453745401
31.850000000000023	600.8895745243649
32.850000000000002	609.4228807594244
33.850000000000002	617.9997623228979
34.850000000000002	626.6202174708989
35.850000000000002	635.2842444722658
36.850000000000002	643.9918416083763
37.850000000000002	652.7430071729555
38.850000000000002	661.5377394718867
39.850000000000002	670.3760368230404
40.850000000000002	679.2578975560931
41.850000000000002	688.1833200123608
42.850000000000002	697.1523025446298
43.850000000000002	706.1648435169946
44.850000000000002	715.2209413047049
45.850000000000002	724.320594294008
46.850000000000002	733.4638008819988
47.850000000000002	742.6505594764709
48.850000000000002	751.8808684957779
49.850000000000002	761.1547263686901
50.850000000000002	770.4721315342584
51.850000000000002	779.8330824416826
52.850000000000002	789.2375775501747
53.850000000000002	798.6856153288381
54.850000000000002	808.1771942565409
55.850000000000002	817.7123128217878
56.850000000000002	827.2909695226081
57.850000000000002	836.9131628664359
58.850000000000002	846.5788913699888
59.850000000000002	856.2881535591688
60.850000000000002	866.0409479689384
61.850000000000002	875.8372731432204
62.850000000000002	885.6771276347931
63.850000000000002	895.5605100051813
64.850000000000002	905.4874188245567
65.850000000000002	915.4578526716433
66.850000000000002	925.4718101336084
67.850000000000002	935.5292898059822
68.850000000000002	945.6302902925466
69.850000000000002	955.7748102052573
70.850000000000002	965.9628481641461

Temperature (degC)	Pressure (MPa)
71.85000000000002	976.1944027972287
72.85000000000002	986.469472740427
73.85000000000002	996.7880566374773
74.85000000000002	1007.150153139842
75.85000000000002	1017.5557609066368
76.85000000000002	1028.0048786045406
77.85000000000002	1038.4975049077227
78.85000000000002	1049.0336384977559
79.85000000000002	1059.6132780635462
80.85000000000002	1070.2364223012542
81.85000000000002	1080.9030699142197
82.85000000000002	1091.6132196128908
83.85000000000002	1102.3668701147508
84.85000000000002	1113.1640201442422
85.85000000000002	1124.004668432706
86.85000000000002	1134.8888137183071
87.85000000000002	1145.8164547459633
88.85000000000002	1156.7875902672888
89.85000000000002	1167.8022190405163
90.85000000000002	1178.8603398304463
91.85000000000002	1189.9619514083702
92.85000000000002	1201.107052552013
93.85000000000002	1212.2956420454793
94.85000000000002	1223.5277186791784
95.85000000000002	1234.803281249772
96.85000000000002	1246.1223285601206
97.85000000000002	1257.484859419214
98.85000000000002	1268.8908726421225
99.85000000000002	1280.3403670499372
100.85000000000002	1291.8333414697145
101.85000000000002	1303.3697947344249
102.85000000000002	1314.9497256828922
103.85000000000002	1326.5731331597467
104.85000000000002	1338.2400160153697
105.85000000000002	1349.9503731058426
106.85000000000002	1361.704203292894
107.85000000000002	1373.5015054438531
108.85000000000002	1385.3422784315992
109.85000000000002	1397.2265211345082
110.85000000000002	1409.1542324364077
111.85000000000002	1421.1254112265335
112.85000000000002	1433.1400563994755
113.85000000000002	1445.1981668551348
114.85000000000002	1457.2997414986799
115.85000000000002	1469.444779240492

Temperature (degC)	Pressure (MPa)
116.85000000000002	1481.6332789961366
117.85000000000002	1493.8652396863051
118.85000000000002	1506.140660236776
119.85000000000002	1518.4595395783826
120.85000000000002	1530.8218766469479
121.85000000000002	1543.227670383262
122.85000000000002	1555.676919733037
123.85000000000002	1568.169623646857
124.85000000000002	1580.7057810801523
125.85000000000002	1593.28539099315

Table B363: Bubble Points for Scenario 1

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.3408370807742133e-08
-172.1499999999998	1.8826644301228272e-08
-171.1499999999998	2.6244611716676495e-08
-170.1499999999998	3.6330507542497955e-08
-169.1499999999998	4.995247417717693e-08
-168.1499999999998	6.823127460802054e-08
-167.1499999999998	9.260498213778479e-08
-166.1499999999998	1.249079088853964e-07
-165.1499999999998	1.674663667434938e-07
-164.1499999999998	2.2321421848653194e-07
-163.1499999999998	2.958315734564595e-07
-162.1499999999998	3.8991041206820917e-07
-161.1499999999998	5.111513863006838e-07
-160.1499999999998	6.665965390419633e-07
-159.1499999999998	8.649032129417279e-07
-158.1499999999998	1.1166649782122248e-06
-157.1499999999998	1.4347859971535477e-06
-156.1499999999998	1.8349158592248907e-06
-155.1499999999998	2.335952562042211e-06
-154.1499999999998	2.9606219782098325e-06
-153.1499999999998	3.736142832524401e-06
-152.1499999999998	4.694986915672233e-06
-151.1499999999998	5.875744975673338e-06
-150.1499999999998	7.324109453398612e-06
-149.1499999999998	9.093985959735448e-06
-148.1499999999998	1.1248746125526863e-05
-147.1499999999998	1.3862635187337915e-05
-146.1499999999998	1.7022348398490966e-05
-145.1499999999998	2.0828791071802476e-05
-144.1499999999998	2.539903776431793e-05
-143.1499999999998	3.0868506801518974e-05
-142.1499999999998	3.7393367005652796e-05
-141.1499999999998	4.515319413697313e-05
-140.1499999999998	5.43538951750848e-05
-139.1499999999998	6.523091915795958e-05
-138.1499999999998	7.805277385661055e-05
-137.1499999999998	9.3124868092509e-05
-136.1499999999998	0.00011079370000160431
-135.1499999999998	0.00013145141201289915
-134.1499999999998	0.00015554073374103103
-133.1499999999998	0.000183560334391894
-132.1499999999998	0.00021607060664921603
-131.1499999999998	0.0002536999043500486

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.0002971512565705032
-129.14999999999998	0.0003472095810329409
-128.14999999999998	0.00040474942001533147
-127.14999999999998	0.0004707432221968141
-126.14999999999998	0.0005462701941150097
-125.14999999999998	0.0006325257451451515
-124.14999999999998	0.0007308315501442632
-123.14999999999998	0.0008426462541409116
-122.14999999999998	0.0009695768436989189
-121.14999999999998	0.0011133907098483475
-120.14999999999998	0.0012760284277658085
-119.14999999999998	0.0014596172787061162
-118.14999999999998	0.001666485540045923
-117.14999999999998	0.001899177569704719
-116.14999999999998	0.0021604697116679975
-115.14999999999998	0.002453387049858922
-114.14999999999998	0.002781221038197588
-113.14999999999998	0.0031475480353589866
-112.14999999999998	0.003556248773501146
-111.14999999999998	0.004011528791092484
-110.14999999999998	0.0045179398609314055
-109.14999999999998	0.005080402445530556
-108.14999999999998	0.005704229213243733
-107.14999999999998	0.0063951496498530136
-106.14999999999998	0.007159335801820076
-105.14999999999998	0.008003429189047192
-104.14999999999998	0.008934568926801936
-103.14999999999998	0.00996042109844763
-102.14999999999998	0.011089209422799541
-101.14999999999998	0.01232974726230816
-100.14999999999998	0.01369147102087149
-99.14999999999998	0.015184474982908164
-98.14999999999998	0.01681954764840487
-97.14999999999998	0.018608209621996382
-96.14999999999998	0.02056275311776767
-95.14999999999998	0.02269628314540679
-94.14999999999998	0.025022760447603782
-93.14999999999998	0.027557046263219205
-92.14999999999998	0.030314948995759334
-91.14999999999998	0.03331327287213305
-90.14999999999998	0.03656986868256719
-89.14999999999998	0.04010368669896863
-88.14999999999998	0.043934831875995596
-87.14999999999998	0.04808462144670899
-86.14999999999998	0.05257564503297888

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.05743182739993065
-84.14999999999998	0.06267849399372272
-83.14999999999998	0.06834243941299586
-82.14999999999998	0.07445199897658925
-81.14999999999998	0.08103712356377044
-80.14999999999998	0.0881294579185519
-79.14999999999998	0.09576242262696759
-78.14999999999998	0.10397129999588998
-77.14999999999998	0.11279332408462513
-76.14999999999998	0.12226777516682437
-75.14999999999998	0.1324360789311904
-74.14999999999998	0.1433419107663018
-73.14999999999998	0.15503130551946964
-72.14999999999998	0.16755277317443404
-71.14999999999998	0.18095742096158793
-70.14999999999998	0.19529908250277903
-69.14999999999998	0.21063445470889505
-68.14999999999998	0.2270232433053459
-67.14999999999998	0.24452831807925965
-66.14999999999998	0.2632158792578553
-65.14999999999998	0.2831556369017429
-64.14999999999998	0.3044210059434957
-63.14999999999998	0.32708932074315217
-62.14999999999998	0.35124207523710543
-61.14999999999998	0.37696519900695635
-60.14999999999998	0.4043493887019292
-59.14999999999998	0.43349053679906746
-58.14999999999998	0.46449036902512325
-57.14999999999998	0.49745771699997016

Table B364: Bubble Points for Scenario 10

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.7689995804132856e-08
-172.1499999999998	5.200596124135323e-08
-171.1499999999998	7.127043113439846e-08
-170.1499999999998	9.70250784620856e-08
-169.1499999999998	1.3123893338406792e-07
-168.1499999999998	1.7641191175125223e-07
-167.1499999999998	2.3569967797331e-07
-166.1499999999998	3.130634170036678e-07
-165.1499999999998	4.1344853481647837e-07
-164.1499999999998	5.429967824457394e-07
-163.1499999999998	7.092968044560717e-07
-162.1499999999998	9.21678647229756e-07
-161.1499999999998	1.1915583238885906e-06
-160.1499999999998	1.5328391188244165e-06
-159.1499999999998	1.962376923107732e-06
-158.1499999999998	2.5005175195415405e-06
-157.1499999999998	3.171714379560457e-06
-156.1499999999998	4.0052361899938205e-06
-155.1499999999998	5.035973992122438e-06
-154.1499999999998	6.305358484480474e-06
-153.1499999999998	7.8623987103759e-06
-152.1499999999998	9.764854016932195e-06
-151.1499999999998	1.2080551830400109e-05
-150.1499999999998	1.4888864438401183e-05
-149.1499999999998	1.8282358599616712e-05
-148.1499999999998	2.236863241138581e-05
-147.1499999999998	2.727235445210701e-05
-146.1499999999998	3.313752077495257e-05
-145.1499999999998	4.0129945859252875e-05
-144.1499999999998	4.8440004123424235e-05
-143.1499999999998	5.828563906643438e-05
-142.1499999999998	6.99156575318739e-05
-141.1499999999998	8.361332697868042e-05
-140.1499999999998	9.970029399487381e-05
-139.1499999999998	0.00011854084260534787
-138.1499999999998	0.0001405465112024242
-137.1499999999998	0.00016618108716969532
-136.1499999999998	0.00019596599847743654
-135.1499999999998	0.00023048612170391134
-134.1499999999998	0.0002703960260841349
-133.1499999999998	0.0003164266733095517
-132.1499999999998	0.0003693925929026311
-131.1499999999998	0.0004301995530740418

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004998527470418541
-129.1499999999998	0.0005794655148573672
-128.1499999999998	0.0006702686208466954
-127.1499999999998	0.0007736201068470599
-126.1499999999998	0.0008910157414985149
-125.1499999999998	0.0010241000859522837
-124.1499999999998	0.0011746781964829278
-123.1499999999998	0.0013447279846507184
-122.1499999999998	0.001536413255860066
-121.1499999999998	0.0017520974474073223
-120.1499999999998	0.001994358087414847
-119.1499999999998	0.0022660019964149797
-118.1499999999998	0.0025700812537868423
-117.1499999999998	0.0029099099517671803
-116.1499999999998	0.003289081760363462
-115.1499999999998	0.003711488327200879
-114.1499999999998	0.0041813385371425905
-113.1499999999998	0.004703178657444781
-112.1499999999998	0.005281913395251942
-111.1499999999998	0.005922827895412811
-110.1499999999998	0.0066316107079143925
-109.1499999999998	0.0074143777556968165
-108.1499999999998	0.008277697335239245
-107.1499999999998	0.009228616184104687
-106.1499999999998	0.010274686651611225
-105.1499999999998	0.011423995010971943
-104.1499999999998	0.012685190953626883
-103.1499999999998	0.014067518309094494
-102.1499999999998	0.015580847036508033
-101.1499999999998	0.01723570653710027
-100.1499999999998	0.019043320340264118
-99.1499999999998	0.02101564221948411
-98.1499999999998	0.023165393798416343
-97.1499999999998	0.02550610371172662
-96.1499999999998	0.02805214839001582
-95.1499999999998	0.030818794543292043
-94.1499999999998	0.033822243423054336
-93.1499999999998	0.03707967694917219
-92.1499999999998	0.04060930579444627
-91.1499999999998	0.04443041952710211
-90.1499999999998	0.048563438919579746
-89.1499999999998	0.05302997054096679
-88.1499999999998	0.05785286376041096
-87.1499999999998	0.06305627030001754
-86.1499999999998	0.06866570648831792

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07470811837965353
-84.14999999999998	0.0812119499211394
-83.14999999999998	0.08820721436771296
-82.14999999999998	0.0957255691677792
-81.14999999999998	0.10380039456798468
-80.14999999999998	0.11246687621684162
-79.14999999999998	0.12176209208491967
-78.14999999999998	0.13172510406639815
-77.14999999999998	0.14239705468626934
-76.14999999999998	0.15382126941431415
-75.14999999999998	0.1660433651885919
-74.14999999999998	0.17911136588928175
-73.14999999999998	0.19307582569700274
-72.14999999999998	0.20798996154955013
-71.14999999999998	0.2239097963316141
-70.14999999999998	0.2408943150922002
-69.14999999999998	0.2590056376736969
-68.14999999999998	0.2783092130425948
-67.14999999999998	0.2988740441931681
-66.14999999999998	0.3207729598458904
-65.14999999999998	0.344082966073499
-64.14999999999998	0.368885756456795
-63.14999999999998	0.39526861353168347
-62.14999999999998	0.4233267215988112

Table B365: Bubble Points for Scenario 11

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.9433353421390348e-08
-172.1499999999998	2.7126989269938503e-08
-171.1499999999998	3.759938582224101e-08
-170.1499999999998	5.1757986747704135e-08
-169.1499999999998	7.077503401106534e-08
-168.1499999999998	9.615550024095312e-08
-167.1499999999998	1.2981998106277294e-07
-166.1499999999998	1.742052682036363e-07
-165.1499999999998	2.3238570394354286e-07
-164.1499999999998	3.082188308108146e-07
-163.1499999999998	4.065192975402221e-07
-162.1499999999998	5.332654631110577e-07
-161.1499999999998	6.958436546644918e-07
-160.1499999999998	9.033355813789812e-07
-159.1499999999998	1.1668549836764575e-06
-158.1499999999998	1.4999402037607077e-06
-157.1499999999998	1.919009997385401e-06
-156.1499999999998	2.4438905654714704e-06
-155.1499999999998	3.09842246495187e-06
-154.1499999999998	3.911156757906179e-06
-153.1499999999998	4.916150473264908e-06
-152.1499999999998	6.153872182480533e-06
-151.1499999999998	7.672229225754841e-06
-150.1499999999998	9.527728864714543e-06
-149.1499999999998	1.1786786376792451e-05
-148.1499999999998	1.4527193841929189e-05
-147.1499999999998	1.783976409952013e-05
-146.1499999999998	2.1830165068861848e-05
-145.1499999999998	2.662096032591739e-05
-144.1499999999998	3.2353872509455304e-05
-143.1499999999998	3.91922867872404e-05
-142.1499999999998	4.7324012244995555e-05
-141.1499999999998	5.696431966474137e-05
-140.1499999999998	6.835927473267658e-05
-139.1499999999998	8.17893862583205e-05
-138.1499999999998	9.757358949496613e-05
-137.1499999999998	0.00011607358512594272
-136.1499999999998	0.00013769855492164567
-135.1499999999998	0.00016291027547916853
-134.1499999999998	0.00019222865183072456
-133.1499999999998	0.00022623769305049808
-132.1499999999998	0.00026559195230419175
-131.1499999999998	0.0003110234540742422

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.00036334913155970113
-129.1499999999998	0.0004234787974969057
-128.1499999999998	0.0004924236718798709
-127.1499999999998	0.0005713054902824975
-126.1499999999998	0.0006613662167037183
-125.1499999999998	0.000763978385077286
-124.1499999999998	0.000880656093816379
-123.1499999999998	0.0010130666780059547
-122.1499999999998	0.001163043084120172
-121.1499999999998	0.0013325969724347312
-120.1499999999998	0.001523932572633399
-119.1499999999998	0.0017394613184807414
-118.1499999999998	0.0019818172878584006
-117.1499999999998	0.0022538734749478844
-116.1499999999998	0.0025587589218971233
-115.1499999999998	0.002899876737940263
-114.1499999999998	0.0032809230346587566
-113.1499999999998	0.0037059068068857246
-112.1499999999998	0.004179170789674825
-111.1499999999998	0.0047054133227877925
-110.1499999999998	0.005289711255312343
-109.1499999999998	0.00593754392431362
-108.1499999999998	0.006654818242857379
-107.1499999999998	0.007447894934334636
-106.1499999999998	0.008323615951773332
-105.1499999999998	0.009289333122757976
-104.1499999999998	0.010352938062701286
-103.1499999999998	0.01152289340154053
-102.1499999999998	0.01280826537147415
-101.1499999999998	0.014218757806130963
-100.1499999999998	0.015764747604586918
-99.1499999999998	0.01745732171693424
-98.1499999999998	0.019308315711682164
-97.1499999999998	0.02133035398914854
-96.1499999999998	0.023536891709215038
-95.1499999999998	0.025942258506387112
-94.1499999999998	0.028561704070061124
-93.1499999999998	0.03141144567328354
-92.1499999999998	0.03450871773913993
-91.1499999999998	0.037871823540272964
-90.1499999999998	0.04152018913396262
-89.1499999999998	0.04547441964277165
-88.1499999999998	0.049756357999039935
-87.1499999999998	0.05438914628060433
-86.1499999999998	0.059397289775131215

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06480672392152526
-84.14999999999998	0.0706448842891883
-83.14999999999998	0.0769407797696542
-82.14999999999998	0.08372506917061208
-81.14999999999998	0.09103014141986518
-80.14999999999998	0.0988901996068364
-79.14999999999998	0.10734134911237926
-78.14999999999998	0.1164216901046934
-77.14999999999998	0.12617141471109888
-76.14999999999998	0.13663290921376542
-75.14999999999998	0.1478508616642297
-74.14999999999998	0.1598723753695567
-73.14999999999998	0.172747088776553
-72.14999999999998	0.1865273023758309
-71.14999999999998	0.20126811337449813
-70.14999999999998	0.21702755906034274
-69.14999999999998	0.23386677002697648
-68.14999999999998	0.2518501347922648
-67.14999999999998	0.271045477899841
-66.14999999999998	0.29152425449436714
-65.14999999999998	0.3133617659074431
-64.14999999999998	0.33663740364740635
-63.14999999999998	0.36143493497715257
-62.14999999999998	0.3878428565458071
-61.14999999999998	0.4159548788516789
-60.14999999999998	0.4458707361524749
-59.14999999999998	0.47769844603780853

Table B366: Bubble Points for Scenario 12

Temperature (degC)	Pressure (MPa)
-173.1499999999998	5.3807943038765065e-08
-172.1499999999998	7.385786537918307e-08
-171.1499999999998	1.006980325406192e-07
-170.1499999999998	1.3639767278662055e-07
-169.1499999999998	1.8358583531885036e-07
-168.1499999999998	2.455833338544911e-07
-167.1499999999998	3.2656101421199017e-07
-166.1499999999998	4.317285793091579e-07
-165.1499999999998	5.675587004007175e-07
-164.1499999999998	7.42051668728733e-07
-163.1499999999998	9.650463953045186e-07
-162.1499999999998	1.2485841461244015e-06
-161.1499999999998	1.6073320031622087e-06
-160.1499999999998	2.059073664997858e-06
-159.1499999999998	2.625275841587033e-06
-158.1499999999998	3.331739151774571e-06
-157.1499999999998	4.209343095748507e-06
-156.1499999999998	5.294895343537965e-06
-155.1499999999998	6.632096250523126e-06
-154.1499999999998	8.27263017729186e-06
-153.1499999999998	1.0277395849547435e-05
-152.1499999999998	1.2717888639680572e-05
-151.1499999999998	1.5677748280697183e-05
-150.1499999999998	1.925448613124311e-05
-149.1499999999998	2.3561406693529907e-05
-148.1499999999998	2.872973864036964e-05
-147.1499999999998	3.49109911299832e-05
-146.1499999999998	4.227955167485536e-05
-145.1499999999998	5.103554228126928e-05
-144.1499999999998	6.140795098733817e-05
-143.1499999999998	7.36580562980097e-05
-142.1499999999998	8.80831623448661e-05
-141.1499999999998	0.0001050206628863903
-140.1499999999998	0.00012485245251113585
-139.1499999999998	0.0001480097036129777
-138.1499999999998	0.00017497802787602536
-137.1499999999998	0.0002063030411390428
-136.1499999999998	0.00024259635060835458
-135.1499999999998	0.000284541983457527
-134.1499999999998	0.00033290327589575287
-133.1499999999998	0.00038853024180921555
-132.1499999999998	0.0004523674400859821
-131.1499999999998	0.0005254623597304159

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0006089743418638484
-129.1499999999998	0.0007041840577002763
-128.1499999999998	0.0008125035615861291
-127.1499999999998	0.00093548693820814
-126.1499999999998	0.0010748415631104565
-125.1499999999998	0.0012324399957287008
-124.1499999999998	0.0014103325242520483
-123.1499999999998	0.0016107603817723246
-122.1499999999998	0.0018361696533793646
-121.1499999999998	0.002089225894122399
-120.1499999999998	0.002372829478085546
-119.1499999999998	0.0026901316992300724
-118.1499999999998	0.0030445516451446304
-117.1499999999998	0.0034397938654252076
-116.1499999999998	0.003879866857087028
-115.1499999999998	0.004369102390199977
-114.1499999999998	0.004912175697844049
-113.1499999999998	0.005514126555511843
-112.1499999999998	0.006180381276248129
-111.1499999999998	0.006916775649121966
-110.1499999999998	0.007729578850082984
-109.1499999999998	0.008625518355868727
-108.1499999999998	0.00961180589341646
-107.1499999999998	0.010696164459197846
-106.1499999999998	0.011886856445051285
-105.1499999999998	0.01319271290944475
-104.1499999999998	0.014623164035677247
-103.1499999999998	0.016188270821326994
-102.1499999999998	0.017898758046303663
-101.1499999999998	0.019766048570168303
-100.1499999999998	0.021802299012974403
-99.1499999999998	0.024020436877771813
-98.1499999999998	0.026434199177136183
-97.1499999999998	0.029058172630655462
-96.1499999999998	0.031907835505269794
-95.1499999999998	0.03499960117574522
-94.1499999999998	0.03835086348842576
-93.1499999999998	0.04198004401778952
-92.1499999999998	0.04590664131231151
-91.1499999999998	0.05015128223377289
-90.1499999999998	0.05473577550255823
-89.1499999999998	0.05968316757074517
-88.1499999999998	0.06501780095507467
-87.1499999999998	0.07076537517335367
-86.1499999999998	0.07695301044070121

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08360931429659972
-84.14999999999998	0.09076445135029043
-83.14999999999998	0.09845021635113177
-82.14999999999998	0.10670011081273496
-81.14999999999998	0.11554942344582765
-80.14999999999998	0.12503531468598936
-79.14999999999998	0.1351969056402219
-78.14999999999998	0.146075371822954
-77.14999999999998	0.15771404211073603
-76.14999999999998	0.17015850342024436
-75.14999999999998	0.18345671171344666
-74.14999999999998	0.1976591100680437
-73.14999999999998	0.2128187547386265
-72.14999999999998	0.22899145040453683
-71.14999999999998	0.2462358962070974
-70.14999999999998	0.2646138448188288
-69.14999999999998	0.2841902778504082
-68.14999999999998	0.30503360278644326
-67.14999999999998	0.3272158802663238
-66.14999999999998	0.35081309826496143
-65.14999999999998	0.37590552877919603
-64.14999999999998	0.4025782606397525
-63.14999999999998	0.43092226038527626

Table B367: Bubble Points for Scenario 2

Temperature (degC)	Pressure (MPa)
-173.1499999999998	6.43194696779618e-08
-172.1499999999998	8.822761196924758e-08
-171.1499999999998	1.2021380172777186e-07
-170.1499999999998	1.627344077184912e-07
-169.1499999999998	2.1890911240343698e-07
-168.1499999999998	2.9267702715427923e-07
-167.1499999999998	3.8898393673971834e-07
-166.1499999999998	5.140056856493707e-07
-165.1499999999998	6.754133091393193e-07
-164.1499999999998	8.826861390637818e-07
-163.1499999999998	1.1474797768321573e-06
-162.1499999999998	1.484056520949784e-06
-161.1499999999998	1.909786561836285e-06
-160.1499999999998	2.445729008787129e-06
-159.1499999999998	3.1173025894549073e-06
-158.1499999999998	3.955056657104244e-06
-157.1499999999998	4.99555395084369e-06
-156.1499999999998	6.282377374501301e-06
-155.1499999999998	7.867273886029519e-06
-154.1499999999998	9.811449416418739e-06
-153.1499999999998	1.2187029560124837e-05
-152.1499999999998	1.5078701593065373e-05
-151.1499999999998	1.85855541744969e-05
-150.1499999999998	2.2823131870919422e-05
-149.1499999999998	2.7925722399187762e-05
-148.1499999999998	3.4048895218192473e-05
-147.1499999999998	4.137231080015792e-05
-146.1499999999998	5.010282058059602e-05
-145.1499999999998	6.0477878217588214e-05
-144.1499999999998	7.276928338425105e-05
-143.1499999999998	8.728727987145871e-05
-142.1499999999998	0.00010438503029037402
-141.1499999999998	0.00012446349013584744
-140.1499999999998	0.00014797670440289728
-139.1499999999998	0.00017543755034047444
-138.1499999999998	0.00020742395028157357
-137.1499999999998	0.00024458557880906347
-136.1499999999998	0.0002876510888058793
-135.1499999999998	0.0003374358812003449
-134.1499999999998	0.0003948504434572524
-133.1499999999998	0.000460909282088113
-132.1499999999998	0.0005367404746657906
-131.1499999999998	0.0006235958670359138

Temperature (degC)	Pressure (MPa)
-130.14999999999998	0.0007228619416271287
-129.14999999999998	0.0008360713829819931
-128.14999999999998	0.0009649153668678189
-127.14999999999998	0.001111256599590779
-126.14999999999998	0.0012771431344354765
-125.14999999999998	0.0014648229924952504
-124.14999999999998	0.0016767596155549199
-123.14999999999998	0.001915648179147382
-122.14999999999998	0.002184432794437727
-121.14999999999998	0.0024863246282043282
-120.14999999999998	0.0028248209708953537
-119.14999999999998	0.0032037252835515847
-118.14999999999998	0.0036271682553146905
-117.14999999999998	0.0040996299042925744
-116.14999999999998	0.004625962755744312
-115.14999999999998	0.005211416132885397
-114.14999999999998	0.00586166159711366
-113.14999999999998	0.006582819576128015
-112.14999999999998	0.007381487220270291
-111.14999999999998	0.008264767529477307
-110.14999999999998	0.009240299795500758
-109.14999999999998	0.010316291406552406
-108.14999999999998	0.011501551064275452
-107.14999999999998	0.012805523465950448
-106.14999999999998	0.014238325508131873
-105.14999999999998	0.015810784071503946
-104.14999999999998	0.017534475450660905
-103.14999999999998	0.019421766496788114
-102.14999999999998	0.02148585754587277
-101.14999999999998	0.02374082721014202
-100.14999999999998	0.026201679115949637
-99.14999999999998	0.0288843906773584
-98.14999999999998	0.0318059640012381
-97.14999999999998	0.03498447902689589
-96.14999999999998	0.038439149011131234
-95.14999999999998	0.04219037847826741
-94.14999999999998	0.04625982376425124
-93.14999999999998	0.050670456294469444
-92.14999999999998	0.05544662874666121
-91.14999999999998	0.06061414426341639
-90.14999999999998	0.06620032889348955
-89.14999999999998	0.07223410745785601
-88.14999999999998	0.0787460830555114
-87.14999999999998	0.0857686204460083
-86.14999999999998	0.09333593357138367

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.10148417751043733
-84.14999999999998	0.11025154519463233
-83.14999999999998	0.11967836925914394
-82.14999999999998	0.12980722945749348
-81.14999999999998	0.14068306613782175
-80.14999999999998	0.15235330036920655
-79.14999999999998	0.1648679614268916
-78.14999999999998	0.17827982251081084
-77.14999999999998	0.19264454580715196
-76.14999999999998	0.20802083835070495
-75.14999999999998	0.22447062068402315
-74.14999999999998	0.24205921118719673
-73.14999999999998	0.26085553047656057
-72.14999999999998	0.2809323331320736
-71.14999999999998	0.3023664799415625
-70.14999999999998	0.32523927787599355
-69.14999999999998	0.349636955252287
-68.14999999999998	0.37565149940880926

Table B368: Bubble Points for Scenario 3

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.9163400576994102e-08
-172.1499999999998	2.6748424117856222e-08
-171.1499999999998	3.707242480413353e-08
-170.1499999999998	5.1029707942385256e-08
-169.1499999999998	6.977551612168191e-08
-168.1499999999998	9.479297057016972e-08
-167.1499999999998	1.2797475661937243e-07
-166.1499999999998	1.717222361507556e-07
-165.1499999999998	2.2906504485628204e-07
-164.1499999999998	3.038046403760364e-07
-163.1499999999998	4.006857091567593e-07
-162.1499999999998	5.255998151324234e-07
-161.1499999999998	6.858261816216028e-07
-160.1499999999998	8.903150383450841e-07
-159.1499999999998	1.150019536981971e-06
-158.1499999999998	1.478282839607128e-06
-157.1499999999998	1.8912876127113878e-06
-156.1499999999998	2.408575812956499e-06
-155.1499999999998	3.0536473266771285e-06
-154.1499999999998	3.854646720412059e-06
-153.1499999999998	4.845148071152398e-06
-152.1499999999998	6.065048569020985e-06
-151.1499999999998	7.56158231804068e-06
-150.1499999999998	9.390466498668628e-06
-149.1499999999998	1.1617192794937034e-05
-148.1499999999998	1.4318477725395086e-05
-147.1499999999998	1.7583886246668626e-05
-146.1499999999998	2.1517643717497997e-05
-145.1499999999998	2.6240652015913275e-05
-144.1499999999998	3.189272628925901e-05
-143.1499999999998	3.863506948288732e-05
-142.1499999999998	4.665300243558915e-05
-141.1499999999998	5.615896794569273e-05
-140.1499999999998	6.739582779908374e-05
-139.1499999999998	8.064047230753777e-05
-138.1499999999998	9.620776243144663e-05
-137.1499999999998	0.00011445482505463927
-136.1499999999998	0.0001357857224403106
-135.1499999999998	0.00016065651732649172
-134.1499999999998	0.00018958075551801283
-133.1499999999998	0.0002231353882008517
-132.1499999999998	0.0002619671565464649
-131.1499999999998	0.00030679946149045123

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0003584397418651046
-129.1499999999998	0.00041778738434262666
-128.1499999999998	0.00048584218890915405
-127.1499999999998	0.0005637134138440074
-126.1499999999998	0.0006526294244287894
-125.1499999999998	0.0007539479698626029
-124.1499999999998	0.0008691671131186677
-123.1499999999998	0.000999936838750424
-122.1499999999998	0.0011480713639478702
-121.1499999999998	0.0013155621784651907
-120.1499999999998	0.0015045918393946577
-119.1499999999998	0.001717548547157857
-118.1499999999998	0.001957041529530094
-117.1499999999998	0.002225917261015688
-116.1499999999998	0.0025272765454585097
-115.1499999999998	0.002864492490411173
-114.1499999999998	0.003241229402506441
-113.1499999999998	0.0036614626338835254
-112.1499999999998	0.004129499410627646
-111.1499999999998	0.004650000675193536
-110.1499999999998	0.005228003975908425
-109.1499999999998	0.005868947437898122
-108.1499999999998	0.006578694851158376
-107.1499999999998	0.007363561913010535
-106.1499999999998	0.008230343663847272
-105.1499999999998	0.0091863431568947
-104.1499999999998	0.010239401404704815
-103.1499999999998	0.011397928647253202
-102.1499999999998	0.012670936988859885
-101.1499999999998	0.014068074453687258
-100.1499999999998	0.01559966051230357
-99.1499999999998	0.01727672313474609
-98.1499999999998	0.019111037428681206
-97.1499999999998	0.02111516592464678
-96.1499999999998	0.023302500573987417
-95.1499999999998	0.025687306528957787
-94.1499999999998	0.028284767778581996
-93.1499999999998	0.03111103471822274
-92.1499999999998	0.034183273735432555
-91.1499999999998	0.03751971889952722
-90.1499999999998	0.04113972584743729
-89.1499999999998	0.0450638279637305
-88.1499999999998	0.04931379495823657
-87.1499999999998	0.05391269395039676
-86.1499999999998	0.05888495317522971

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.06425642843155278
-84.14999999999998	0.070054472398647
-83.14999999999998	0.07630800695267824
-82.14999999999998	0.08304759861850548
-81.14999999999998	0.09030553729547339
-80.14999999999998	0.09811591839659217
-79.14999999999998	0.10651472853783084
-78.14999999999998	0.1155399349061856
-77.14999999999998	0.12523157841858615
-76.14999999999998	0.1356318707536129
-75.14999999999998	0.14678529528633202
-74.14999999999998	0.1587387118696087
-73.14999999999998	0.17154146525953576
-72.14999999999998	0.18524549673606144
-71.14999999999998	0.19990545804447374
-70.14999999999998	0.21557882602771763
-69.14999999999998	0.23232601492330035
-68.14999999999998	0.25021048058408346
-67.14999999999998	0.26929880524714306
-66.14999999999998	0.28966073873542186
-65.14999999999998	0.3113691397032647
-64.14999999999998	0.33449966463198394
-63.14999999999998	0.35912968859248356
-62.14999999999998	0.38533377791930146

Table B369: Bubble Points for Scenario 4

Temperature (degC)	Pressure (MPa)
-173.1499999999998	1.1213401746649232e-07
-172.1499999999998	1.5252335091922246e-07
-171.1499999999998	2.0611177155896769e-07
-170.1499999999998	2.767718920886474e-07
-169.1499999999998	3.693821033482955e-07
-168.1499999999998	4.900532022457739e-07
-167.1499999999998	6.463979782875587e-07
-166.1499999999998	8.478502524000931e-07
-165.1499999999998	1.1060405589566232e-06
-164.1499999999998	1.4352363936463251e-06
-163.1499999999998	1.8528557130197666e-06
-162.1499999999998	2.380063162703947e-06
-161.1499999999998	3.0424593264395797e-06
-160.1499999999998	3.870874122887839e-06
-159.1499999999998	4.9022763268797025e-06
-158.1499999999998	6.180812051458413e-06
-157.1499999999998	7.758985891514915e-06
-156.1499999999998	9.698999293737787e-06
-155.1499999999998	1.2074261575653378e-05
-154.1499999999998	1.4971089863433268e-05
-153.1499999999998	1.8490615048733217e-05
-152.1499999999998	2.2750911674173045e-05
-151.1499999999998	2.788937044053185e-05
-150.1499999999998	3.4065332782072766e-05
-149.1499999999998	4.14630076758369e-05
-148.1499999999998	5.0294691532976414e-05
-147.1499999999998	6.080431266258601e-05
-146.1499999999998	7.327132239893765e-05
-145.1499999999998	8.801495554026332e-05
-144.1499999999998	0.00010539888326051578
-143.1499999999998	0.00012583628212508536
-142.1499999999998	0.00014979534326804494
-141.1499999999998	0.00017780524617386293
-140.1499999999998	0.000210462621852989
-139.1499999999998	0.0002484385305115651
-138.1499999999998	0.0002924859790945459
-137.1499999999998	0.0003434480043335093
-136.1499999999998	0.00040226634716060216
-135.1499999999998	0.0004699907445644809
-134.1499999999998	0.0005477888651694034
-133.1499999999998	0.0006369569150218607
-132.1499999999998	0.0007389309402782127
-131.1499999999998	0.0008552988537097585

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0009878132121873106
-129.1499999999998	0.0011384047725844805
-128.1499999999998	0.0013091968538572923
-127.1499999999998	0.0015025205334265883
-126.1499999999998	0.001720930706419569
-125.1499999999998	0.001967223036827324
-124.1499999999998	0.0022444518302172905
-123.1499999999998	0.0025559488583137336
-122.1499999999998	0.0029053431665360245
-121.1499999999998	0.0032965818964753296
-120.1499999999998	0.003733952156306076
-119.1499999999998	0.004222103973280859
-118.1499999999998	0.004766074363757389
-117.1499999999998	0.005371312557666758
-116.1499999999998	0.006043706415964316
-115.1499999999998	0.0067896100814218855
-114.1499999999998	0.007615872905134882
-113.1499999999998	0.008529869693344697
-112.1499999999998	0.009539532321628708
-111.1499999999998	0.01065338276620406
-110.1499999999998	0.01188056760504151
-109.1499999999998	0.013230894044711195
-108.1499999999998	0.014714867532400254
-107.1499999999998	0.016343731016375006
-106.1499999999998	0.01812950592232968
-105.1499999999998	0.02008503491759441
-104.1499999999998	0.022224026540095664
-103.1499999999998	0.02456110177430478
-102.1499999999998	0.027111842662209448
-101.1499999999998	0.02989284304363821
-100.1499999999998	0.03292176152711182
-99.1499999999998	0.036217376799830725
-98.1499999999998	0.03979964539351093
-97.1499999999998	0.0436897620316083
-96.1499999999998	0.04791022269312242
-95.1499999999998	0.05248489053873424
-94.1499999999998	0.05743906485662594
-93.1499999999998	0.06279955319809896
-92.1499999999998	0.06859474688719142
-91.1499999999998	0.07485470010410483
-90.1499999999998	0.0816112127595668
-89.1499999999998	0.0888979173965451
-88.1499999999998	0.09675037037720012
-87.1499999999998	0.10520614763685468
-86.1499999999998	0.11430494531317328

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.12408868558750887
-84.14999999999998	0.13460162810566628
-83.14999999999998	0.14589048737487914
-82.14999999999998	0.15800455655699186
-81.14999999999998	0.17099583808171795
-80.14999999999998	0.18491918145793126
-79.14999999999998	0.1998324284919517
-78.14999999999998	0.21579656564413108
-77.14999999999998	0.23287588196255266
-76.14999999999998	0.2511381273950403
-75.14999999999998	0.2706546549485416
-74.14999999999998	0.29150048796686684
-73.14999999999998	0.3137540371915753
-72.14999999999998	0.33749362046575704

Table B370: Bubble Points for Scenario 5

Temperature (degC)	Pressure (MPa)
-173.1499999999998	4.132288432619479e-08
-172.1499999999998	5.7057393998184225e-08
-171.1499999999998	7.824551066139304e-08
-170.1499999999998	1.0659145614013938e-07
-169.1499999999998	1.442735357160711e-07
-168.1499999999998	1.940594731304168e-07
-167.1499999999998	2.594456412776337e-07
-166.1499999999998	3.4482422286490307e-07
-165.1499999999998	4.556828435069676e-07
-164.1499999999998	5.988417647016696e-07
-163.1499999999998	7.827343050068495e-07
-162.1499999999998	1.017736773175279e-06
-161.1499999999998	1.3165548452049922e-06
-160.1499999999998	1.694673995979333e-06
-159.1499999999998	2.1708823027232228e-06
-158.1499999999998	2.7678746687971954e-06
-157.1499999999998	3.5129482689228352e-06
-156.1499999999998	4.438799786982315e-06
-155.1499999999998	5.584435800975061e-06
-154.1499999999998	6.9962084622364395e-06
-153.1499999999998	8.72898941314272e-06
-152.1499999999998	1.084749568466669e-05
-151.1499999999998	1.3427782107688853e-05
-150.1499999999998	1.655891555534207e-05
-149.1499999999998	2.0344847103395307e-05
-148.1499999999998	2.490649894748986e-05
-147.1499999999998	3.038408364588393e-05
-146.1499999999998	3.693967396052432e-05
-145.1499999999998	4.476004224440265e-05
-144.1499999999998	5.405978896637312e-05
-143.1499999999998	6.508478057347814e-05
-142.1499999999998	7.81159174634959e-05
-141.1499999999998	9.347325337556148e-05
-140.1499999999998	0.00011152048800364622
-139.1499999999998	0.0001326698550963252
-138.1499999999998	0.00015738742872725461
-137.1499999999998	0.00018619887080528955
-136.1499999999998	0.00021969564324321404
-135.1499999999998	0.00025854170852209797
-134.1499999999998	0.0003034807426776897
-133.1499999999998	0.00035534388499967797
-132.1499999999998	0.00041505804897882777
-131.1499999999998	0.0004836548192657237

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0005622799596239508
-129.1499999999998	0.0006522035570760371
-128.1499999999998	0.0007548308276590775
-127.1499999999998	0.0008717136094357392
-126.1499999999998	0.0010045625686527014
-125.1499999999998	0.0011552601452106705
-124.1499999999998	0.0013258742639159573
-123.1499999999998	0.001518672838331579
-122.1499999999998	0.0017361390944455736
-121.1499999999998	0.001980987741833658
-120.1499999999998	0.002256182020522749
-119.1499999999998	0.0025649516523706764
-118.1499999999998	0.0029108117264745248
-117.1499999999998	0.0032975825489169946
-116.1499999999998	0.0037294104880654737
-115.1499999999998	0.004210789847663945
-114.1499999999998	0.00474658580111309
-113.1499999999998	0.005342058421630876
-112.1499999999998	0.006002887844434676
-111.1499999999998	0.0067352005986995155
-110.1499999999998	0.0075455971488362856
-109.1499999999998	0.00844118068661282
-108.1499999999998	0.009429587217820792
-107.1499999999998	0.01051901698958977
-106.1499999999998	0.01171826730707826
-105.1499999999998	0.01303676679114937
-104.1499999999998	0.014484611131781185
-103.1499999999998	0.016072600395390872
-102.1499999999998	0.017812277947986448
-101.1499999999998	0.01971597106012553
-100.1499999999998	0.02179683326408416
-99.1499999999998	0.02406888853845052
-98.1499999999998	0.026547077400591132
-97.1499999999998	0.029247304993135784
-96.1499999999998	0.03218649125683255
-95.1499999999998	0.03538262328889484
-94.1499999999998	0.03885480999335903
-93.1499999999998	0.042623339138073944
-92.1499999999998	0.0467097369418397
-91.1499999999998	0.05113683032501595
-90.1499999999998	0.055928811967764516
-89.1499999999998	0.061111308332146334
-88.1499999999998	0.06671145081775715
-87.1499999999998	0.07275795023574448
-86.1499999999998	0.07928117480320537

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08631323187958846
-84.14999999999998	0.09388805368935142
-83.14999999999998	0.10204148730154582
-82.14999999999998	0.11081138916820618
-81.14999999999998	0.12023772456085954
-80.14999999999998	0.13036267229008278
-79.14999999999998	0.14123073514967685
-78.14999999999998	0.15288885659884824
-77.14999999999998	0.16538654428899854
-76.14999999999998	0.17877600116598016
-75.14999999999998	0.19311226504931864
-74.14999999999998	0.20845335783235175
-73.14999999999998	0.22486044580521447
-72.14999999999998	0.24239801315530693
-71.14999999999998	0.2611340515987705
-70.14999999999998	0.2811402706522115
-69.14999999999998	0.302492335959721
-68.14999999999998	0.3252701490705002
-67.14999999999998	0.3495581960740083
-66.14999999999998	0.37544603208892857
-65.14999999999998	0.40302912132536534

Table B371: Bubble Points for Scenario 6

Temperature (degC)	Pressure (MPa)
-173.1499999999998	3.765169466829182e-08
-172.1499999999998	5.2056349153748896e-08
-171.1499999999998	7.147882024459533e-08
-170.1499999999998	9.749562768438489e-08
-169.1499999999998	1.3212443967937572e-07
-168.1499999999998	1.7793210389756409e-07
-167.1499999999998	2.381652322721152e-07
-166.1499999999998	3.169071834094022e-07
-165.1499999999998	4.192657770916929e-07
-164.1499999999998	5.515966025660174e-07
-163.1499999999998	7.217673453090302e-07
-162.1499999999998	9.394691545922501e-07
-161.1499999999998	1.2165817048313337e-06
-160.1499999999998	1.567599265329786e-06
-159.1499999999998	2.0101257831303567e-06
-158.1499999999998	2.5654476993630806e-06
-157.1499999999998	3.2591939574436005e-06
-156.1499999999998	4.12209341809878e-06
-155.1499999999998	5.1908406675545785e-06
-154.1499999999998	6.509081987138424e-06
-153.1499999999998	8.128534040668112e-06
-152.1499999999998	1.0110248625831287e-05
-151.1499999999998	1.2526037622766139e-05
-150.1499999999998	1.5460073052691708e-05
-149.1499999999998	1.9010677927258024e-05
-148.1499999999998	2.3292324320979415e-05
-147.1499999999998	2.8437855830592767e-05
-146.1499999999998	3.460095229264233e-05
-145.1499999999998	4.195885531057046e-05
-144.1499999999998	5.0715373792047544e-05
-143.1499999999998	6.110418931359417e-05
-142.1499999999998	7.33924817106632e-05
-141.1499999999998	8.788489583570634e-05
-140.1499999999998	0.00010492787093340223
-139.1499999999998	0.0001249143545508019
-138.1499999999998	0.00014828892333097274
-137.1499999999998	0.00017555333343266037
-136.1499999999998	0.00020727252367715832
-135.1499999999998	0.00024408109484919246
-134.1499999999998	0.0002866902888739896
-133.1499999999998	0.00033589549186137575
-132.1499999999998	0.00039258428525376936
-131.1499999999998	0.00045774506954296445

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0005324762852359243
-129.1499999999998	0.000617996255958102
-128.1499999999998	0.0007156536787903539
-127.1499999999998	0.0008269387871489613
-126.1499999999998	0.0009534952117448646
-125.1499999999998	0.001097132565405147
-124.1499999999998	0.0012598397778152682
-123.1499999999998	0.0014437992065523633
-122.1499999999998	0.0016514015511366945
-121.1499999999998	0.0018852615972386206
-120.1499999999998	0.0021482348186511067
-119.1499999999998	0.0024434348651820917
-118.1499999999998	0.0027742519652455932
-117.1499999999998	0.003144372272645821
-116.1499999999998	0.0035577981878627146
-115.1499999999998	0.00401886968507173
-114.1499999999998	0.00453228667717378
-113.1499999999998	0.005103132452283734
-112.1499999999998	0.005736898216438531
-111.1499999999998	0.0064395087787477824
-110.1499999999998	0.007217349416833756
-109.1499999999998	0.008077293962202395
-108.1499999999998	0.009026734147167304
-107.1499999999998	0.010073610257122431
-106.1499999999998	0.011226443134344432
-105.1499999999998	0.012494367582109702
-104.1499999999998	0.013887167220754735
-103.1499999999998	0.015415310850400803
-102.1499999999998	0.017089990378426703
-101.1499999999998	0.018923160373422215
-100.1499999999998	0.020927579311307534
-99.1499999999998	0.023116852583589066
-98.1499999999998	0.025505477342354966
-97.1499999999998	0.02810888926162912
-96.1499999999998	0.030943511300126455
-95.1499999999998	0.03402680455632204
-94.1499999999998	0.037377321313098996
-93.1499999999998	0.04101476037612376
-92.1499999999998	0.04496002481756102
-91.1499999999998	0.04923528224484306
-90.1499999999998	0.053864027723029236
-89.1499999999998	0.05887114948889438
-88.1499999999998	0.06428299760538503
-87.1499999999998	0.07012745571657705
-86.1499999999998	0.07643401607589698

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.08323385803428636
-84.14999999999998	0.09055993019037202
-83.14999999999998	0.09844703642178135
-82.14999999999998	0.10693192603572958
-81.14999999999998	0.11605338829822119
-80.14999999999998	0.12585235162489045
-79.14999999999998	0.13637198774297157
-78.14999999999998	0.14765782116327164
-77.14999999999998	0.15975784433321602
-76.14999999999998	0.1727226388762251
-75.14999999999998	0.18660550335648465
-74.14999999999998	0.20146258803569778
-73.14999999999998	0.21735303709568468
-72.14999999999998	0.23433913875505083
-71.14999999999998	0.25248648353054315
-70.14999999999998	0.2718641303845829
-69.14999999999998	0.29254477911745896
-68.14999999999998	0.3146049434778055
-67.14999999999998	0.3381251074536467
-66.14999999999998	0.36318980317496774
-65.14999999999998	0.3898873302342381
-64.14999999999998	0.4183065670526601

Table B372: Bubble Points for Scenario 7

Temperature (degC)	Pressure (MPa)
-173.1499999999998	6.854745473166088e-08
-172.1499999999998	9.384865290533392e-08
-171.1499999999998	1.2763623852353403e-07
-170.1499999999998	1.7247100716541657e-07
-169.1499999999998	2.3159965930679786e-07
-168.1499999999998	3.09114823434924e-07
-167.1499999999998	4.101466807119205e-07
-166.1499999999998	5.410912235183172e-07
-165.1499999999998	7.098807645783351e-07
-164.1499999999998	9.263029333142499e-07
-163.1499999999998	1.2023750498112409e-06
-162.1499999999998	1.552781452045113e-06
-161.1499999999998	1.9953820661325365e-06
-160.1499999999998	2.5518012491841336e-06
-159.1499999999998	3.2481066963657844e-06
-158.1499999999998	4.1155889841494605e-06
-157.1499999999998	5.191653116316354e-06
-156.1499999999998	6.520834243684277e-06
-155.1499999999998	8.15595053821573e-06
-154.1499999999998	1.0159407012472935e-05
-153.1499999999998	1.2604664881634488e-05
-152.1499999999998	1.5577891862834897e-05
-151.1499999999998	1.917980959090008e-05
-150.1499999999998	2.3527755096296928e-05
-149.1499999999998	2.8757974036195145e-05
-148.1499999999998	3.502816408921814e-05
-147.1499999999998	4.2520287615340594e-05
-146.1499999999998	5.1443673341585555e-05
-145.1499999999998	6.20384274592089e-05
-144.1499999999998	7.457917510711711e-05
-143.1499999999998	8.937915376796897e-05
-142.1499999999998	0.00010679468061714689
-141.1499999999998	0.0001272300163404159
-140.1499999999998	0.00015114264837429037
-139.1499999999998	0.00017904901692503616
-138.1499999999998	0.00021153070748988433
-137.1499999999998	0.0002492411339397652
-136.1499999999998	0.00029291273653008686
-135.1499999999998	0.0003433647194883052
-134.1499999999998	0.0004015113530888063
-133.1499999999998	0.0004683708653717168
-132.1499999999998	0.000545074948898057
-131.1499999999998	0.0006328789081651465

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0007331724735394478
-129.1499999999998	0.0008474913078057594
-128.1499999999998	0.0009775292316890967
-127.1499999999998	0.0011251511949853651
-126.1499999999998	0.0012924070202470583
-125.1499999999998	0.0014815459463179987
-124.1499999999998	0.0016950319994041578
-123.1499999999998	0.0019355602198141604
-122.1499999999998	0.002206073773009791
-121.1499999999998	0.002509781974182987
-120.1499999999998	0.002850179256227274
-119.1499999999998	0.0032310651117067775
-118.1499999999998	0.003656565040251652
-117.1499999999998	0.0041311525337314825
-116.1499999999998	0.004659672132584477
-115.1499999999998	0.005247363587815898
-114.1499999999998	0.005899887164428516
-113.1499999999998	0.006623350123416722
-112.1499999999998	0.007424334420945297
-111.1499999999998	0.008309925664948117
-110.1499999999998	0.009287743371119216
-109.1499999999998	0.010365972562129176
-108.1499999999998	0.01155339675587809
-107.1499999999998	0.012859432390685151
-106.1499999999998	0.014294164737503575
-105.1499999999998	0.0158683853515203
-104.1499999999998	0.017593631117827788
-103.1499999999998	0.019482224948209663
-102.1499999999998	0.02154731818841335
-101.1499999999998	0.023802934797532135
-100.1499999999998	0.026264017363200925
-99.1499999999998	0.028946475018106856
-98.1499999999998	0.03186723332467718
-97.1499999999998	0.035044286195513155
-96.1499999999998	0.03849674991689956
-95.1499999999998	0.042244919341128756
-94.1499999999998	0.04631032630986095
-93.1499999999998	0.05071580036450583
-92.1499999999998	0.055485531789493045
-91.1499999999998	0.060645137018645934
-90.1499999999998	0.06622172641123607
-89.1499999999998	0.07224397436902419
-88.1499999999998	0.0787421917131196
-87.1499999999998	0.0857484001611747
-86.1499999999998	0.09329640862754547

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.10142189088911992
-84.14999999999998	0.11016246387985287
-83.14999999999998	0.11955776543200548
-82.14999999999998	0.1296495295530456
-81.14999999999998	0.14048165608980837
-80.14999999999998	0.1521002694387821
-79.14999999999998	0.16455375686432167
-78.14999999999998	0.17789276881153684
-77.14999999999998	0.19217014587165013
-76.14999999999998	0.2074406941835763
-75.14999999999998	0.2237606106479778
-74.14999999999998	0.24118593704345476
-73.14999999999998	0.2597672419542572

Table B373: Bubble Points for Scenario 8

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.8119822177209026e-08
-172.1499999999998	3.904735392142169e-08
-171.1499999999998	5.384487323460717e-08
-170.1499999999998	7.374992803378285e-08
-169.1499999999998	1.003530617540111e-07
-168.1499999999998	1.3568611509961447e-07
-167.1499999999998	1.8232941891475064e-07
-166.1499999999998	2.4354119534834904e-07
-165.1499999999998	3.234129258368891e-07
-164.1499999999998	4.270549214282742e-07
-163.1499999999998	5.608168433811758e-07
-162.1499999999998	7.325484691454479e-07
-161.1499999999998	9.519065796866758e-07
-160.1499999999998	1.2307144571590082e-06
-159.1499999999998	1.583381125228246e-06
-158.1499999999998	2.0273881355615796e-06
-157.1499999999998	2.583852400396794e-06
-156.1499999999998	3.278174289583198e-06
-155.1499999999998	4.140780947617538e-06
-154.1499999999998	5.207975538262786e-06
-153.1499999999998	6.5229038873766765e-06
-152.1499999999998	8.136650764446489e-06
-151.1499999999998	1.0109478815757659e-05
-150.1499999999998	1.251222393277701e-05
-149.1499999999998	1.542786160387964e-05
-148.1499999999998	1.8953259551711032e-05
-147.1499999999998	2.3201132698130415e-05
-146.1499999999998	2.830221721987495e-05
-145.1499999999998	3.440768115714386e-05
-144.1499999999998	4.169178971088365e-05
-143.1499999999998	5.0354844009631064e-05
-142.1499999999998	6.062641274087143e-05
-141.1499999999998	7.276887662282058e-05
-140.1499999999998	8.708130623886027e-05
-139.1499999999998	0.00010390369426749875
-138.1499999999998	0.00012362156361525427
-137.1499999999998	0.0001466709733984733
-136.1499999999998	0.00017354394512350028
-135.1499999999998	0.00020479433178433243
-134.1499999999998	0.0002410441529347984
-133.1499999999998	0.0002829904191011202
-132.1499999999998	0.00033141246918370236
-131.1499999999998	0.00038717984475789794

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004512607254267801
-129.1499999999998	0.000524730949609522
-128.1499999999998	0.0006087836453723308
-127.1499999999998	0.0007047394961308983
-126.1499999999998	0.0008140576662803476
-125.1499999999998	0.000938347412047801
-124.1499999999998	0.0010793804031205196
-123.1499999999998	0.001239103780887403
-122.1499999999998	0.001419653979450639
-121.1499999999998	0.001623371335926041
-120.1499999999998	0.0018528155169633906
-119.1499999999998	0.0021107817888903046
-118.1499999999998	0.002400318159424111
-117.1499999999998	0.0027247434195146053
-116.1499999999998	0.0030876661145853206
-115.1499999999998	0.003493004475242772
-114.1499999999998	0.003945007338429547
-113.1499999999998	0.004448276091020162
-112.1499999999998	0.00500778766900632
-111.1499999999998	0.005628918646702485
-110.1499999999998	0.006317470451833011
-109.1499999999998	0.007079695743948774
-108.1499999999998	0.00792232599537846
-107.1499999999998	0.008852600315854465
-106.1499999999998	0.009878295564083353
-105.1499999999998	0.011007757791863047
-104.1499999999998	0.012249935068904204
-103.1499999999998	0.013614411739298657
-102.1499999999998	0.015111444163615652
-101.1499999999998	0.01675199800391069
-100.1499999999998	0.018547787112521197
-99.1499999999998	0.020511314089420616
-98.1499999999998	0.0226559125771298
-97.1499999999998	0.02499579136676538
-96.1499999999998	0.027546080393776647
-95.1499999999998	0.030322878707304782
-94.1499999999998	0.03334330450294649
-93.1499999999998	0.036625547315043694
-92.1499999999998	0.04018892247152231
-91.1499999999998	0.044053927921807914
-90.1499999999998	0.04824230355653692
-89.1499999999998	0.05277709314674104
-88.1499999999998	0.057682709040004394
-87.1499999999998	0.06298499976190572
-86.1499999999998	0.0687113206830042

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.0748906079248978
-84.14999999999998	0.08155345569368785
-83.14999999999998	0.08873219724582494
-82.14999999999998	0.09646098971013933
-81.14999999999998	0.10477590301132741
-80.14999999999998	0.11371501316490071
-79.14999999999998	0.12331850024236082
-78.14999999999998	0.13362875133922478
-77.14999999999998	0.14469046891890192
-76.14999999999998	0.15655078495426214
-75.14999999999998	0.16925938134877827
-74.14999999999998	0.18286861719420722
-73.14999999999998	0.19743366351737499
-72.14999999999998	0.21301264629277777
-71.14999999999998	0.22966679866183856
-70.14999999999998	0.24746062352031975
-69.14999999999998	0.266462067934513
-68.14999999999998	0.2867427112475215
-67.14999999999998	0.30837796923391037
-66.14999999999998	0.3314473170770932
-65.14999999999998	0.3560345332121961
-64.14999999999998	0.3822279580493801
-63.14999999999998	0.4101207013368016
-62.14999999999998	0.4398099397385501

Table B374: Bubble Points for Scenario 9

Temperature (degC)	Pressure (MPa)
-173.1499999999998	2.7096661069324027e-08
-172.1499999999998	3.764459196324173e-08
-171.1499999999998	5.193449431621898e-08
-170.1499999999998	7.116504416610171e-08
-169.1499999999998	9.687741669398283e-08
-168.1499999999998	1.3104111002260293e-07
-167.1499999999998	1.761581611481936e-07
-166.1499999999998	2.3538898875588717e-07
-165.1499999999998	3.127035286203791e-07
-164.1499999999998	4.1306179305545304e-07
-163.1499999999998	5.426284861943308e-07
-162.1499999999998	7.090268410973303e-07
-161.1499999999998	9.216374117153482e-07
-160.1499999999998	1.1919481510859533e-06
-159.1499999999998	1.5339627348817642e-06
-158.1499999999998	1.964674744239097e-06
-157.1499999999998	2.5046160009500645e-06
-156.1499999999998	3.1784880485243553e-06
-155.1499999999998	4.015886490912096e-06
-154.1499999999998	5.052128633138181e-06
-153.1499999999998	6.329195610805214e-06
-152.1499999999998	7.896800944271998e-06
-151.1499999999998	9.813598204076766e-06
-150.1499999999998	1.2148541222558518e-05
-149.1499999999998	1.498241102834976e-05
-148.1499999999998	1.8409524411245927e-05
-147.1499999999998	2.2539639740821613e-05
-146.1499999999998	2.750007635916848e-05
-145.1499999999998	3.3438064542658104e-05
-144.1499999999998	4.052334367636785e-05
-143.1499999999998	4.895102690484242e-05
-142.1499999999998	5.894475111168517e-05
-141.1499999999998	7.076013163605638e-05
-140.1499999999998	8.468854165502673e-05
-139.1499999999998	0.00010106123664586247
-138.1499999999998	0.00012025384479143065
-137.1499999999998	0.00014269124460507948
-136.1499999999998	0.00016885285142955226
-135.1499999999998	0.000199278334809031
-134.1499999999998	0.0002345737890464312
-133.1499999999998	0.0002754183795422311
-132.1499999999998	0.00032257148776964343
-131.1499999999998	0.0003768803779778003

Temperature (degC)	Pressure (MPa)
-130.1499999999998	0.0004392884089340915
-129.1499999999998	0.0005108438142239842
-128.1499999999998	0.0005927090748269646
-127.1499999999998	0.0006861709078866624
-126.1499999999998	0.0007926508957981349
-125.1499999999998	0.0009137167799525904
-124.1499999999998	0.0010510944437167225
-123.1499999999998	0.001206680609487788
-122.1499999999998	0.0013825562749647312
-121.1499999999998	0.0015810009141179052
-120.1499999999998	0.001804507468734075
-119.1499999999998	0.0020557981568676558
-118.1499999999998	0.0023378411250535316
-117.1499999999998	0.002653867971738524
-116.1499999999998	0.003007392170079617
-115.1499999999998	0.0034022284190447973
-114.1499999999998	0.0038425129526477235
-113.1499999999998	0.004332724838160569
-112.1499999999998	0.0048777082952903995
-111.1499999999998	0.005482696069583627
-110.1499999999998	0.006153333894753089
-109.1499999999998	0.006895706080212425
-108.1499999999998	0.007716362261866873
-107.1499999999998	0.008622345356160114
-106.1499999999998	0.009621220759526436
-105.1499999999998	0.010721106837762081
-104.1499999999998	0.011930706752424703
-103.1499999999998	0.013259341674208693
-102.1499999999998	0.014716985436353257
-101.1499999999998	0.016314300684530728
-100.1499999999998	0.01806267658336549
-99.1499999999998	0.019974268143768938
-98.1499999999998	0.022062037239678253
-97.1499999999998	0.0243397953875839
-96.1499999999998	0.026822248367465346
-95.1499999999998	0.02952504276947344
-94.1499999999998	0.032464814556944235
-93.1499999999998	0.035659239743179534
-92.1499999999998	0.03912708728694609
-91.1499999999998	0.042888274319923446
-90.1499999999998	0.04696392382847721
-89.1499999999998	0.0513764249222826
-88.1499999999998	0.056149495833635654
-87.1499999999998	0.061308249803973286
-86.1499999999998	0.0668792640284307

Temperature (degC)	Pressure (MPa)
-85.14999999999998	0.07289065184553345
-84.14999999999998	0.07937213837777136
-83.14999999999998	0.08635513985037878
-82.14999999999998	0.09387284684091542
-81.14999999999998	0.10196031174215309
-80.14999999999998	0.11065454075671119
-79.14999999999998	0.1199945907857153
-78.14999999999998	0.13002167162811992
-77.14999999999998	0.1407792539760932
-76.14999999999998	0.1523131837806267
-75.14999999999998	0.16467180367885456
-74.14999999999998	0.17790608233362096
-73.14999999999998	0.19206975275771268
-72.14999999999998	0.20721946101455985
-71.14999999999998	0.22341492716355374
-70.14999999999998	0.24071912105740534
-69.14999999999998	0.25919845680001535
-68.14999999999998	0.2789230117309414
-67.14999999999998	0.2999667795572182
-66.14999999999998	0.3224079746512127
-65.14999999999998	0.34632942058634564
-64.14999999999998	0.371819095519103
-63.14999999999998	0.3989710232309174
-62.14999999999998	0.42788714784322457
-61.14999999999998	0.4586838055362484

Table B375: Compressibilities at 10MPa

Temperature	Property
Scenario	1
0.0	0.19905158095835734
10.0	0.20320241164173108
20.0	0.2109733173087269
30.0	0.22644206008906265
40.0	0.2690379061236064
50.0	0.426425476714764
Scenario	2
0.0	0.21345362337562
10.0	0.22354145722083357
20.0	0.2449062489206867
30.0	0.30601056508929586
40.0	0.44482849172031813
50.0	0.5549698879938427
Scenario	3
0.0	0.20288924107801887
10.0	0.20858719748144558
20.0	0.21944136341038295
30.0	0.24357702536386602
40.0	0.33579157723974457
50.0	0.49668750781444704
Scenario	4
0.0	0.2213510194836472
10.0	0.23634705116347343
20.0	0.27226989382281513
30.0	0.37366026770150235
40.0	0.5043918252354603
50.0	0.5935647690315285
Scenario	5
0.0	0.20866289708277375
10.0	0.21643789709123373
20.0	0.2319444536654798
30.0	0.2714628747467651
40.0	0.3961869829412349
50.0	0.52587333268038
Scenario	6
0.0	0.2067624983138424
10.0	0.21392489577897503
20.0	0.22802469218661753
30.0	0.26321311829817967
40.0	0.3909897555021603
50.0	0.5264393206842264
Scenario	7

Temperature	Property
0.0	0.21680634075871322
10.0	0.22977120730562695
20.0	0.26035001767040705
30.0	0.3662551032914279
40.0	0.5092833181805929
50.0	0.5983091148996872
Scenario	8
0.0	0.20488521170271037
10.0	0.21115786446626422
20.0	0.22323762279998982
30.0	0.2510361142464992
40.0	0.35201399450912985
50.0	0.5015105784079643
Scenario	9
0.0	0.20407651503761512
10.0	0.2095267803077156
20.0	0.21984177640926988
30.0	0.24214634762618265
40.0	0.3210838221257553
50.0	0.48344800874031507
Scenario	10
0.0	0.20515090233288963
10.0	0.21084708896808096
20.0	0.22165620210434514
30.0	0.2452998677725602
40.0	0.3283680942786801
50.0	0.4856772580085621
Scenario	11
0.0	0.20211109920895573
10.0	0.2070341561327191
20.0	0.21628392839055063
30.0	0.2355395909668859
40.0	0.2966492089287504
50.0	0.4603588617414386
Scenario	12
0.0	0.20709336341768447
10.0	0.21391588548659599
20.0	0.22716455399246474
30.0	0.2590534864999885
40.0	0.3800933565553598
50.0	0.5208798719659244

Table B376: Compressibilities at 15MPa

Temperature	Property
Scenario	1
0.0	0.290964941513922
10.0	0.294030404468358
20.0	0.2997797105360008
30.0	0.3093913305255571
40.0	0.3251344115881824
50.0	0.351310067883695
Scenario	2
0.0	0.30694624641898793
10.0	0.3138491087130567
20.0	0.32542619052073524
30.0	0.3443706189227841
40.0	0.37510219954617147
50.0	0.4221181951731725
Scenario	3
0.0	0.29526301067967325
10.0	0.2995145408057023
20.0	0.30701005038379564
30.0	0.31941048587000825
40.0	0.3398810790953725
50.0	0.37416493665442213
Scenario	4
0.0	0.3147323172161305
10.0	0.3239423186780656
20.0	0.33917463636247197
30.0	0.3639172507934026
40.0	0.40279724765490044
50.0	0.45729832076558213
Scenario	5
0.0	0.30185745233747935
10.0	0.30744189832186786
20.0	0.31696904336768783
30.0	0.3326173864755185
40.0	0.3582454377875457
50.0	0.39931077232774675
Scenario	6
0.0	0.2996465183290323
10.0	0.30487511955807
20.0	0.31385638494453044
30.0	0.32866148093161524
40.0	0.3531113814818942
50.0	0.39323993456501555
Scenario	7

Temperature	Property
0.0	0.30983747736666345
10.0	0.31824568818127846
20.0	0.33227250049874246
30.0	0.3554519877349339
40.0	0.39340697783616696
50.0	0.44965782153207434
Scenario	8
0.0	0.29763854299949477
10.0	0.30226450053236714
20.0	0.31032832481675143
30.0	0.3236260923579513
40.0	0.3454938273274523
50.0	0.3815544588068243
Scenario	9
0.0	0.29709781597731444
10.0	0.3011251893771035
20.0	0.3082873871305888
30.0	0.3201300280828667
40.0	0.33957669580313193
50.0	0.37193272467365035
Scenario	10
0.0	0.2984382861006696
10.0	0.30263430267375535
20.0	0.31004555886012936
30.0	0.32226824604281623
40.0	0.34228828412618495
50.0	0.37537739432821543
Scenario	11
0.0	0.29471307346385534
10.0	0.2983555994769576
20.0	0.30494529322268693
30.0	0.3158678439371181
40.0	0.33375508437088275
50.0	0.3634581133035198
Scenario	12
0.0	0.3004295831782342
10.0	0.30545632072157414
20.0	0.31410617587430895
30.0	0.32833215451447756
40.0	0.3517676141798471
50.0	0.39042578612630524

Table B377: Compressibilities at 3MPa

Temperature	Property
Scenario	1
0.0	0.7521257483876631
10.0	0.7901800265760281
20.0	0.8192418983556758
30.0	0.8424555089105711
40.0	0.8615163064475302
50.0	0.8774687541768252
Scenario	2
0.0	0.7817289700505695
10.0	0.8134513196509396
20.0	0.8384747876061225
30.0	0.8588297725765432
40.0	0.8757361725785621
50.0	0.88999591799582
Scenario	3
0.0	0.7694903006233345
10.0	0.80357105161719
20.0	0.8301197563983105
30.0	0.8515667448413423
40.0	0.8693058657312965
50.0	0.8842284654131213
Scenario	4
0.0	0.7944215662027664
10.0	0.8236819531749608
20.0	0.8470188992755888
30.0	0.8661316354670485
40.0	0.8820795208800608
50.0	0.8955751060193236
Scenario	5
0.0	0.773635780232427
10.0	0.8069847565980184
20.0	0.8330867348741453
30.0	0.854221891511332
40.0	0.8717240212212956
50.0	0.8864559060773485
Scenario	6
0.0	0.7764334276307442
10.0	0.8090788498055875
20.0	0.8346971795233483
30.0	0.8554793908199836
40.0	0.8727144145241759
50.0	0.8872391418753957
Scenario	7

Temperature	Property
0.0	0.7999881159487529
10.0	0.8279795496859177
20.0	0.8504135185627603
30.0	0.8688526927629003
40.0	0.884282384378412
50.0	0.8973704954934983
Scenario	8
0.0	0.7684918977638592
10.0	0.8028690779155865
20.0	0.8296290490858188
30.0	0.8512319008377465
40.0	0.8690886495504122
50.0	0.8841013957108957
Scenario	9
0.0	0.7654330391854512
10.0	0.8003450990516723
20.0	0.8274413008979145
30.0	0.8492842934663346
40.0	0.8673265265794808
50.0	0.8824900144575236
Scenario	10
0.0	0.764914324263808
10.0	0.7999683807955945
20.0	0.8271681714466556
30.0	0.8490892093105197
40.0	0.8671915104428893
50.0	0.8824019411853952
Scenario	11
0.0	0.758611039555621
10.0	0.7951969560948247
20.0	0.8233412171030055
30.0	0.8459082521335646
40.0	0.8644816737301128
50.0	0.8800511671454407
Scenario	12
0.0	0.7749368123623063
10.0	0.8078465008025131
20.0	0.8336385658051683
30.0	0.8545487368427656
40.0	0.8718847778725981
50.0	0.886492868551843

Table B378: Compressibilities at 0.1MPa

Temperature	Property
Scenario	1
-50.0	0
-55.0	0
-60.0	0
-65.0	0
-70.0	0
Scenario	2
-50.0	0.2281692974921225
-55.0	0.1642211739362572
-60.0	0.13330505043060575
-65.0	0.11565524841881038
Scenario	3
-50.0	0.10169767922529253
-55.0	0.07540396390556466
-60.0	0.06291674429093394
Scenario	4
-50.0	0.32233086563502134
-55.0	0.23095025132090144
-60.0	0.18663470591631212
-65.0	0.16117880850353403
-70.0	0.14517947366554146
Scenario	5
-50.0	0.1650283899972539
-55.0	0.11952771688728331
-60.0	0.09764651007471178
Scenario	6
-50.0	0.16190402076625696
-55.0	0.11706685301801384
-60.0	0.09554761056246133
Scenario	7
-50.0	0.31871603164152745
-55.0	0.2288061763130497
-60.0	0.18534679548572955
Scenario	8
-50.0	0.11671830483681228
-55.0	0.08528316281535435
-60.0	0.07030126129760407
Scenario	9
-50.0	0.08041651132786817
-55.0	0.06274054472894611
-60.0	0.05446978383202497
Scenario	10
-50.0	0.09110645338256278

Temperature	Property
-55.0	0.06929242312181572
-60.0	0.0589750868442229
-65.0	0.05325730665341798
-70.0	0.04983360188172065
-75.0	0.04771679438639489
Scenario	11
-50.0	0.04622460606751659
-55.0	0.028266951972446493
-60.0	0
-65.0	0
-70.0	0
Scenario	12
-50.0	0.13666041359970516
-55.0	0.10132784128604068
-60.0	0.08446266679793304

Table B379: Densities at 10MPa

Temperature	Property
Scenario	1
0.0	0.0
10.0	0.0
20.0	0.0
30.0	0.0
40.0	0.0
50.0	0.0
Scenario	2
0.0	885.2192906841059
10.0	815.4192541623415
20.0	718.8956250345658
30.0	556.3673198210832
40.0	370.5190937908677
50.0	287.79419254800246
Scenario	3
0.0	947.8022351041844
10.0	889.3521021860394
20.0	816.5251377258253
30.0	711.351179573795
40.0	499.52328400791544
50.0	327.2582122230149
Scenario	4
0.0	844.8783009968458
10.0	763.326137595292
20.0	640.0108951065436
30.0	450.9645405163481
40.0	323.4122251047602
50.0	266.32050881916444
Scenario	5
0.0	912.2978345551015
10.0	848.463589682582
20.0	764.7318727067911
30.0	631.8515646317569
40.0	419.11235478494797
50.0	305.98333469803003
Scenario	6
0.0	926.6179399196216
10.0	863.96427570847
20.0	782.8920869485381
30.0	655.8561227307327
40.0	427.4210291664813
50.0	307.6246976289339
Scenario	7

Temperature	Property
0.0	869.0627891239371
10.0	791.0649950443755
20.0	674.336751365136
30.0	463.53558726241454
40.0	322.71003649977325
50.0	266.1917307639815
Scenario	8
0.0	935.989801195635
10.0	876.1109475575983
20.0	800.4342187484204
30.0	688.3180490702462
40.0	475.1936064854231
50.0	323.22033490632776
Scenario	9
0.0	931.9358142686277
10.0	875.6370531537697
20.0	806.083651180374
30.0	707.6927406986908
40.0	516.6654205738257
50.0	332.5265298063294
Scenario	10
0.0	927.7218617064387
10.0	870.7796114632839
20.0	800.0601531406512
30.0	699.0971642762001
40.0	505.5673961182659
50.0	331.23826331096495
Scenario	11
0.0	947.1134103313001
10.0	891.9382493008072
20.0	824.6681223170353
30.0	732.2710514402946
40.0	562.8565757229809
50.0	351.47358158887215
Scenario	12
0.0	922.6124240522548
10.0	861.6424409840093
20.0	783.711500897062
30.0	664.568375367298
40.0	438.4741451931879
50.0	310.0594334696765

Table B380: Densities at 15MPa

Temperature	Property
Scenario	1
0.0	0.0
10.0	0.0
20.0	0.0
30.0	0.0
40.0	0.0
50.0	0.0
Scenario	2
0.0	923.386100740552
10.0	871.1830140388982
20.0	811.5297847308166
30.0	741.5888663857309
40.0	659.0901753334695
50.0	567.5558858749976
Scenario	3
0.0	976.9199114867813
10.0	929.0406839858159
20.0	875.4406700566267
30.0	813.6965377218933
40.0	740.269413575949
50.0	651.6313392200092
Scenario	4
0.0	891.3034809363334
10.0	835.3796553944962
20.0	770.6459141149273
30.0	694.5570616638042
40.0	607.4761563309318
50.0	518.5186478739766
Scenario	5
0.0	945.9566478473818
10.0	895.9725859345343
20.0	839.3973487016449
30.0	773.5204883560838
40.0	695.2504142737371
50.0	604.4482910803063
Scenario	6
0.0	959.0792576629984
10.0	909.3401975812353
20.0	853.1866916137277
30.0	787.8772471126408
40.0	709.9059352984344
50.0	617.7363586862192
Scenario	7

Temperature	Property
0.0	912.1797892280803
10.0	856.7152630125971
20.0	792.5584491804002
30.0	716.4354691356383
40.0	626.644343356925
50.0	531.2871183393387
Scenario	8
0.0	966.4598541419634
10.0	918.0587683764459
20.0	863.6999167253532
30.0	800.8904063267212
40.0	726.2422061694037
50.0	637.2553643547769
Scenario	9
0.0	960.2201850040145
10.0	913.9192880789722
20.0	862.235381048357
30.0	802.9481649752926
40.0	732.7928125590388
50.0	648.3401890594088
Scenario	10
0.0	956.594642378546
10.0	910.0158735527507
20.0	857.962434547466
30.0	798.1942561648157
40.0	727.5104499264236
50.0	642.8526087470979
Scenario	11
0.0	974.2804935038546
10.0	928.3972703556507
20.0	877.3497988519763
30.0	819.0711427758137
40.0	750.4198396406556
50.0	667.7687415550378
Scenario	12
0.0	953.9685207094162
10.0	905.1327140678221
20.0	850.1813426518858
30.0	786.5149009443439
40.0	710.6727690003294
50.0	620.4907196700809

Table B381: Densities at 3MPa

Temperature	Property
Scenario	1
0.0	0.0
10.0	0.0
20.0	0.0
30.0	0.0
40.0	0.0
50.0	0.0
Scenario	2
0.0	72.51359703336644
10.0	67.22467734132879
20.0	62.993676194619454
30.0	59.471952430652166
40.0	56.461336692056676
50.0	53.83747528751929
Scenario	3
0.0	74.97126709065628
10.0	69.25615184713921
20.0	64.7542916911731
30.0	61.041182746730364
40.0	57.88608521485881
50.0	55.14809990817852
Scenario	4
0.0	70.62295935362246
10.0	65.70857149458377
20.0	61.718468834096385
30.0	58.365561549668534
40.0	55.480196058048726
50.0	52.95317061957137
Scenario	5
0.0	73.81873254495171
10.0	68.26882674347223
20.0	63.87401539013296
30.0	60.2387660112675
40.0	57.14429864729826
50.0	54.45566153685335
Scenario	6
0.0	74.0268901706753
10.0	68.5310712356786
20.0	64.1617336877986
30.0	60.537964001719324
40.0	57.44739891161318
50.0	54.758315724153526
Scenario	7

Temperature	Property
0.0	70.65792082776095
10.0	65.85813346628508
20.0	61.93348810955956
30.0	58.619467651823406
40.0	55.75736023995721
50.0	53.24387406099007
Scenario	8
0.0	74.86239053172389
10.0	69.1262330847527
20.0	64.61455239473442
30.0	60.897396432489366
40.0	57.74145123308175
50.0	55.00446596911439
Scenario	9
0.0	74.54063392027355
10.0	68.77136350913051
20.0	64.25018727648467
30.0	60.532808761478876
40.0	57.380779757409805
50.0	54.64966834339226
Scenario	10
0.0	74.6448213894545
10.0	68.85322618396211
20.0	64.31762045075769
30.0	60.59025603318277
40.0	57.4309827968695
50.0	54.694425736282675
Scenario	11
0.0	75.69971531777324
10.0	69.66639447666617
20.0	64.98974814139781
30.0	61.16933727674698
40.0	57.94372385296919
50.0	55.15723994001571
Scenario	12
0.0	73.96741527047041
10.0	68.44827781744091
20.0	64.06786377070794
30.0	60.4384795977558
40.0	57.34511503316114
50.0	54.65482816731783

Table B382: Joule-Thomson Coefficients at 10MPa

Temperature	Property
Scenario	1
0.0	0.18792643616569943
10.0	0.3632009893902004
20.0	0.6502194798582043
30.0	1.2018208776690442
40.0	2.659633347579183
50.0	5.613756155664721
Scenario	2
0.0	0.4331015142912953
10.0	0.7911630483413726
20.0	1.5124261886962334
30.0	3.236216444499005
40.0	5.36110604700338
50.0	5.997407170617628
Scenario	3
0.0	0.25886325544486366
10.0	0.4796577716693459
20.0	0.8677615429156033
30.0	1.7111729853027502
40.0	4.232516746806609
50.0	6.041002824581122
Scenario	4
0.0	0.5937010862351119
10.0	1.1044338945231338
20.0	2.2278891094649835
30.0	4.334013364508756
40.0	5.680940313772313
50.0	5.933283735765448
Scenario	5
0.0	0.3456389667593689
10.0	0.6310296365868538
20.0	1.1701589401947383
30.0	2.4524587244703935
40.0	4.94089567351459
50.0	6.002237665064007
Scenario	6
0.0	0.3218445739758592
10.0	0.5883622525963154
20.0	1.0837632350643827
30.0	2.269055562155053
40.0	4.990621752341519
50.0	6.07909047171452
Scenario	7

Temperature	Property
0.0	0.5290609101463084
10.0	0.9782477382242574
20.0	1.9890888876322728
30.0	4.433304879083489
40.0	5.845134005855569
50.0	6.012594582113155
Scenario	8
0.0	0.2838880215565188
10.0	0.5227607144577462
20.0	0.9513065612137058
30.0	1.9069677160758423
40.0	4.418225271443683
50.0	5.995393256599288
Scenario	9
0.0	0.24941628372570188
10.0	0.46411235487057984
20.0	0.8357181812965316
30.0	1.6185727069730922
40.0	3.912819735154511
50.0	5.97532813333516
Scenario	10
0.0	0.2604326889531999
10.0	0.4825400598140188
20.0	0.8699311859768051
30.0	1.6940808270546812
40.0	4.017885404237316
50.0	5.95587502474176
Scenario	11
0.0	0.22490675504425142
10.0	0.4234347536146174
20.0	0.7594262967937423
30.0	1.4391022037893892
40.0	3.363716060055759
50.0	5.834552553545198
Scenario	12
0.0	0.30687183939400986
10.0	0.5606258340280146
20.0	1.0246839997149866
30.0	2.1097883482841215
40.0	4.859891967738231
50.0	6.068802577154737

Table B383: Joule-Thomson Coefficients at 15MPa

Temperature	Property
Scenario	1
0.0	0.09011568050006766
10.0	0.2020523824742882
20.0	0.3571966285757966
30.0	0.5823528781529944
40.0	0.9229598875440235
50.0	1.448296992714468
Scenario	2
0.0	0.2315724938386626
10.0	0.40789721201382273
20.0	0.664989063518004
30.0	1.0471840817921543
40.0	1.6004308816020474
50.0	2.296179660129481
Scenario	3
0.0	0.135197612508057
10.0	0.26645522157191365
20.0	0.45240981322818774
30.0	0.7287922368161813
40.0	1.1519202225922176
50.0	1.788819683454854
Scenario	4
0.0	0.31136119826953396
10.0	0.5264468651682657
20.0	0.8433397557242052
30.0	1.3067625124661713
40.0	1.9261766555509294
50.0	2.613739588472391
Scenario	5
0.0	0.1842130181436886
10.0	0.3383353114910936
20.0	0.5600824903461553
30.0	0.8906619240805125
40.0	1.3846623653461694
50.0	2.0597499284945546
Scenario	6
0.0	0.17187305755816706
10.0	0.3200949562493796
20.0	0.5330454647863992
30.0	0.8518430525602733
40.0	1.3363455919517184
50.0	2.0249421399189833
Scenario	7

Temperature	Property
0.0	0.284201876194732
10.0	0.486274032576928
20.0	0.7869507016852241
30.0	1.2408053695915606
40.0	1.8877857217658447
50.0	2.646862799377999
Scenario	8
0.0	0.14913345489516638
10.0	0.28711320980253324
20.0	0.48327098820792913
30.0	0.7748759518018496
40.0	1.217244663868777
50.0	1.8619806806094052
Scenario	9
0.0	0.1274333661785295
10.0	0.2560784391216848
20.0	0.4371323387747243
30.0	0.7042635008118014
40.0	1.1103157099240244
50.0	1.7214621654169877
Scenario	10
0.0	0.1337713984519005
10.0	0.26532254044280296
20.0	0.4506821352081086
30.0	0.7240951244466856
40.0	1.1380770136003775
50.0	1.7534136963787819
Scenario	11
0.0	0.11256678834037205
10.0	0.23442041039827125
20.0	0.40477096583854233
30.0	0.6543545049675601
40.0	1.0323661252129812
50.0	1.606748243001326
Scenario	12
0.0	0.1637341530360498
10.0	0.30741702595706233
20.0	0.5129616097240577
30.0	0.8199618937818042
40.0	1.2879072775937255
50.0	1.9652099971956982

Table B384: Joule-Thomson Coefficients at 3MPa

Temperature	Property
Scenario	1
0.0	14.154734825215531
10.0	12.747837972776187
20.0	11.5676500948538
30.0	10.556729261886739
40.0	9.680584853624998
50.0	8.9136440666688
Scenario	2
0.0	12.875739887709107
10.0	11.672662953052518
20.0	10.641392708450915
30.0	9.747212531942393
40.0	8.963949314439402
50.0	8.272131846875547
Scenario	3
0.0	13.414480829058013
10.0	12.11855358128002
20.0	11.020304299925138
30.0	10.074793568866392
40.0	9.252194491120408
50.0	8.529401898689105
Scenario	4
0.0	12.316368223521835
10.0	11.189137924744045
20.0	10.21778302186223
30.0	9.371821990947014
40.0	8.627888402776192
50.0	7.969192015007261
Scenario	5
0.0	13.228171658007263
10.0	11.972808673000022
20.0	10.90184474463321
30.0	9.976079996749446
40.0	9.167621394245753
50.0	8.45508361512126
Scenario	6
0.0	13.149216120328585
10.0	11.902396170353155
20.0	10.83909919010733
30.0	9.920336643259892
40.0	9.118351871476898
50.0	8.411767153019158
Scenario	7

Temperature	Property
0.0	12.0744215426053
10.0	10.968846445229516
20.0	10.017631911072185
30.0	9.19034041449146
40.0	8.463619265536812
50.0	7.82067121984622
Scenario	8
0.0	13.463199122024838
10.0	12.16942368188629
20.0	11.070579834272348
30.0	10.123143287516333
40.0	9.297815017261042
50.0	8.571858833016071
Scenario	9
0.0	13.582244278693004
10.0	12.263691935366053
20.0	11.14807569369974
30.0	10.18852236156652
40.0	9.354408252610238
50.0	8.622024039761634
Scenario	10
0.0	13.617309569799744
10.0	12.3002909843114
20.0	11.18493737526256
30.0	10.224934396447663
40.0	9.389853774276096
50.0	8.656158594917578
Scenario	11
0.0	13.863366972013344
10.0	12.502759824693234
20.0	11.35398477084295
30.0	10.366924019230144
40.0	9.50991062176079
50.0	8.758514509488965
Scenario	12
0.0	13.173077056597421
10.0	11.915893090988884
20.0	10.846180911910432
30.0	9.923403739343657
40.0	9.11898831706465
50.0	8.41097666507148

Table B385: Joule-Thomson Coefficients at 0.4MPa

Temperature	Property
Scenario	1
-50.0	23.933890382832853
-55.0	25.561367865895424
-60.0	27.363044615127432
-65.0	29.364586847953447
-70.0	31.59650468755785
-75.0	34.09527330921718
Scenario	2
-70.0	29.54142687162334
-75.0	31.782080259603365
Scenario	3
-65.0	27.649062844878546
-70.0	29.70357661337752
-75.0	31.998216090757897
Scenario	4
-65.0	26.399911198737122
-70.0	28.29992870503883
-75.0	30.43801857410972
Scenario	5
-65.0	28.070308830921498
-70.0	30.145394669938426
-75.0	32.4562319009569
Scenario	6
-65.0	27.413745359557147
-70.0	29.434435690544582
-75.0	31.68769395063939
Scenario	7
-65.0	24.959208090410673
-70.0	26.733771181863947
-75.0	28.72272497713486
Scenario	8
-65.0	28.21851478171068
-70.0	30.318508240891987
-75.0	32.66148712735493
Scenario	9
-60.0	26.1553115372066
-65.0	28.03945727099336
-70.0	30.137928846834505
-75.0	32.48437310792284
Scenario	10
-70.0	30.296563261396827
-75.0	32.63566692429746
Scenario	11

Temperature	Property
-60.0	26.605574408110943
-65.0	28.529119550241273
-70.0	30.671969469719865
-75.0	33.068623438564494
Scenario	12
-65.0	27.207088073731907
-70.0	29.218745199933895
-75.0	31.464880883418243

Table B386: Joule-Thomson Coefficients at 0.7MPa

Temperature	Property
Scenario	1
-50.0	23.933890382832853
-55.0	25.561367865895424
-60.0	27.363044615127432
-65.0	29.364586847953447
-70.0	31.59650468755785
-75.0	34.09527330921718
Scenario	2
-70.0	29.54142687162334
-75.0	31.782080259603365
Scenario	3
-65.0	27.649062844878546
-70.0	29.70357661337752
-75.0	31.998216090757897
Scenario	4
-75.0	30.43801857410972
Scenario	5
-65.0	28.070308830921498
-70.0	30.145394669938426
-75.0	32.4562319009569
Scenario	6
-65.0	27.413745359557147
-70.0	29.434435690544582
-75.0	31.68769395063939
Scenario	7
-75.0	28.72272497713486
Scenario	8
-65.0	28.21851478171068
-70.0	30.318508240891987
-75.0	32.66148712735493
Scenario	9
-60.0	26.1553115372066
-65.0	28.03945727099336
-70.0	30.137928846834505
-75.0	32.48437310792284
Scenario	10
-75.0	32.51264320872727
Scenario	11
-60.0	26.605574408110943
-65.0	28.529119550241273
-70.0	30.671969469719865
-75.0	33.068623438564494
Scenario	12

Temperature	Property
-65.0	27.207088073731907
-70.0	29.218745199933895
-75.0	31.464880883418243

Table B387: Speed of Sound at 10MPa

Temperature	Property
Scenario	1
0.0	640.9047962929948
10.0	563.692353315449
20.0	478.83746163982045
30.0	382.4458162286831
40.0	269.8905092368549
50.0	218.24206152870664
Scenario	2
0.0	524.6546208169899
10.0	436.43437967729056
20.0	337.72216293683465
30.0	243.5236748907958
40.0	223.76166763087414
50.0	234.23236893221198
Scenario	3
0.0	603.5986956918772
10.0	522.8631146606325
20.0	432.60977596734307
30.0	328.8957810383438
40.0	226.42043684195042
50.0	224.20655685088272
Scenario	4
0.0	475.76464829910157
10.0	382.14740076391064
20.0	282.3546670912347
30.0	226.93339476376283
40.0	229.5454572164762
50.0	240.75271999993174
Scenario	5
0.0	558.7680113954259
10.0	474.2241671284642
20.0	379.08332562921163
30.0	274.3613969113616
40.0	221.78679798511206
50.0	229.56237872090517
Scenario	6
0.0	572.4773150968183
10.0	489.0319337845854
20.0	395.0030480716227
30.0	287.91735712190945
40.0	220.78249800103714
50.0	228.60282848212626
Scenario	7

Temperature	Property
0.0	500.53965211527327
10.0	408.1134551913353
20.0	304.0923758489322
30.0	225.70689235385598
40.0	227.98682455953679
50.0	239.66006531347273
Scenario	8
0.0	588.2038393134111
10.0	506.4701468637113
20.0	414.8404570466915
30.0	310.4314807696253
40.0	224.03157386936658
50.0	225.68045631976594
Scenario	9
0.0	609.9428111203486
10.0	530.177702845409
20.0	441.350806368612
30.0	339.8444516036772
40.0	234.18631505310051
50.0	224.54312051953303
Scenario	10
0.0	603.485584682099
10.0	523.3384817222349
20.0	434.0133433658575
30.0	332.24838693649787
40.0	232.1366947762552
50.0	225.2864371705461
Scenario	11
0.0	621.2779938507672
10.0	542.0814565156608
20.0	454.4990163955752
30.0	354.90818205105813
40.0	244.77953214094563
50.0	221.544027127542
Scenario	12
0.0	583.1340344280316
10.0	500.3096293355332
20.0	407.27153523097405
30.0	300.707775557139
40.0	222.20149135747954
50.0	228.2492803829437

Table B388: Speed of Sound at 15MPa

Temperature	Property
Scenario	1
0.0	695.2090357028751
10.0	630.3917181382595
20.0	563.9448578099787
30.0	495.7876917096776
40.0	427.38549385763747
50.0	362.46671048786646
Scenario	2
0.0	599.4132062098452
10.0	532.8217205933669
20.0	465.3246345285539
30.0	399.9317111957793
40.0	342.2272465476746
50.0	301.07781247960884
Scenario	3
0.0	663.4015204660262
10.0	597.6670886266842
20.0	530.1731944171487
30.0	461.4843026001082
40.0	394.2705382745727
50.0	333.9126651824912
Scenario	4
0.0	561.7753325943173
10.0	494.69471728779945
20.0	428.20825482263547
30.0	367.0698222347574
40.0	318.47659487836927
50.0	289.9796812866707
Scenario	5
0.0	626.6512102844601
10.0	560.5292225904266
20.0	492.9670856606223
30.0	425.73867851179966
40.0	363.28337511272946
50.0	313.2644010369858
Scenario	6
0.0	637.5393876580812
10.0	571.4684185638185
20.0	503.7744589084213
30.0	435.7902215599302
40.0	371.25386444822743
50.0	317.43412723463626
Scenario	7

Temperature	Property
0.0	580.2482978795006
10.0	512.6143721934079
20.0	444.56640156366893
30.0	379.71688679208165
40.0	324.8630172070397
50.0	290.52252312043925
Scenario	8
0.0	650.6829457076545
10.0	584.9612061446805
20.0	517.5728757034381
30.0	449.42681752311853
40.0	383.83156578349775
50.0	326.93304991916744
Scenario	9
0.0	669.6040694956698
10.0	604.4101480923052
20.0	537.5311570503748
30.0	469.4172236197369
40.0	402.48359230027904
50.0	341.6308779492984
Scenario	10
0.0	664.23500800955
10.0	599.044546566502
20.0	532.2264284662401
30.0	464.36705522267926
40.0	398.11927771645117
50.0	338.6780392428647
Scenario	11
0.0	679.186426684384
10.0	613.799059272607
20.0	546.847734429034
30.0	478.5735094561943
40.0	411.1000841291292
50.0	348.803501568227
Scenario	12
0.0	646.8721097931847
10.0	580.7302123976804
20.0	513.0000663670595
30.0	444.76657155542864
40.0	379.3168258266661
50.0	323.3393718517595

Table B389: Speed of Sound at 3MPa

Temperature	Property
Scenario	1
0.0	221.53205406184912
10.0	231.48335054902242
20.0	239.9257451724805
30.0	247.39944850346504
40.0	254.19828983160295
50.0	260.48883995971005
Scenario	2
0.0	230.60558054093465
10.0	239.5492724392883
20.0	247.39529260793512
30.0	254.49176006508358
40.0	261.0285115579438
50.0	267.12585015327727
Scenario	3
0.0	225.7125988647052
10.0	235.02659468014653
20.0	243.0844206291055
30.0	250.30715913739198
40.0	256.92947180946726
50.0	263.0861033198548
Scenario	4
0.0	234.33242599994972
10.0	242.90521199323257
20.0	250.52164285266483
30.0	257.4612012383234
40.0	263.882553490304
50.0	269.8950252675005
Scenario	5
0.0	228.0760482744131
10.0	237.27185414500337
20.0	245.26987557846678
30.0	252.4646238949595
40.0	259.0721925703973
50.0	265.2213553506801
Scenario	6
0.0	227.86995684341926
10.0	236.94047872656884
20.0	244.84718653614485
30.0	251.97030678524445
40.0	258.5195826320793
50.0	264.6198247038638
Scenario	7

Temperature	Property
0.0	234.1990621818485
10.0	242.5657558330495
20.0	250.03168422128306
30.0	256.8548611227778
40.0	263.1826572702474
50.0	269.1175436164864
Scenario	8
0.0	226.1233656635212
10.0	235.47805959463545
20.0	243.56636449884542
30.0	250.81401834802364
40.0	257.4566035353174
50.0	263.62988957937426
Scenario	9
0.0	226.18142355068028
10.0	235.68817508105587
20.0	243.88029483977826
30.0	251.20503779356181
40.0	257.9105622974599
50.0	264.13815243132586
Scenario	10
0.0	226.18176419013102
10.0	235.7077729732244
20.0	243.91499614684318
30.0	251.25240871982064
40.0	257.9682279049667
50.0	264.20408928183787
Scenario	11
0.0	224.12151908010387
10.0	233.88348701854764
20.0	242.22345039737021
30.0	249.63852795671855
40.0	256.40241958298174
50.0	262.66975687610324
Scenario	12
0.0	227.55691465759887
10.0	236.69919636352847
20.0	244.6559418696277
30.0	251.8173035714686
40.0	258.3980808474275
50.0	264.5252399972618

Table B390: Thermal Conductivities at 10MPa

Temperature	Property
Scenario	1
0.0	0.12099777663026347
10.0	0.10947085157328165
20.0	0.09754979222921396
30.0	0.08473967552614275
40.0	0.07140976023622238
50.0	0.0524843814800297
Scenario	2
0.0	0.10456439320980633
10.0	0.09203442759621056
20.0	0.07850264872651756
30.0	0.06475417088596472
40.0	0.049566410987687604
50.0	0.039172877540446495
Scenario	3
0.0	0.114868885510245
10.0	0.10316026778023035
20.0	0.09086697851355667
30.0	0.07751404507892527
40.0	0.06381027485323393
50.0	0.04385802765522834
Scenario	4
0.0	0.09739796065571929
10.0	0.08429500592882232
20.0	0.07035751707527906
30.0	0.05730108052303816
40.0	0.04349534673571088
50.0	0.036757281169745235
Scenario	5
0.0	0.10939858713929261
10.0	0.09722471193661926
20.0	0.08420073932485338
30.0	0.07039026757051507
40.0	0.05543535847245312
50.0	0.041349611819276544
Scenario	6
0.0	0.11501927237343625
10.0	0.10325729759492361
20.0	0.09072533622258382
30.0	0.07730333704438763
40.0	0.0615759533804598
50.0	0.04659331948851507
Scenario	7

Temperature	Property
0.0	0.1006434613303386
10.0	0.08805694888983939
20.0	0.0745143749209342
30.0	0.05991548020621926
40.0	0.044122665007870855
50.0	0.03761855694504313
Scenario	8
0.0	0.11474925666047656
10.0	0.10292683684008307
20.0	0.09042934933177338
30.0	0.0768732268498411
40.0	0.06274258998454302
50.0	0.045212533343167036
Scenario	9
0.0	0.11924126172220591
10.0	0.10806004006773516
20.0	0.09633448460169568
30.0	0.08360146082806079
40.0	0.07119433248210696
50.0	0.051184009159977784
Scenario	10
0.0	0.11610898469670546
10.0	0.10471907405539584
20.0	0.09276560753962232
30.0	0.07981217503248347
40.0	0.06702994349519181
50.0	0.04806313839828248
Scenario	11
0.0	0.11789879420860759
10.0	0.10629706460322604
20.0	0.0942083835776652
30.0	0.08111973134517073
40.0	0.06821046643771167
50.0	0.04831234682733146
Scenario	12
0.0	0.11197200456983662
10.0	0.09995460441790271
20.0	0.08723248181541977
30.0	0.07351634234219476
40.0	0.05766589393055478
50.0	0.041477731738686706

Table B391: Thermal Conductivities at 15MPa

Temperature	Property
Scenario	1
0.0	0.12737330039961567
10.0	0.116941015331225
20.0	0.10662999036427372
30.0	0.09636326560584764
40.0	0.08605700220282414
50.0	0.07579696863444191
Scenario	2
0.0	0.11279946623793433
10.0	0.10223048509034126
20.0	0.09172603298197461
30.0	0.08128918166008542
40.0	0.0712055148994918
50.0	0.062077841258597596
Scenario	3
0.0	0.12172826194158352
10.0	0.11132632820975215
20.0	0.10102609007209823
30.0	0.090744251454074
40.0	0.08045925967381673
50.0	0.07041858472848748
Scenario	4
0.0	0.10665861303104876
10.0	0.09606084910831689
20.0	0.08554123481473419
30.0	0.07525518053452691
40.0	0.06569373321687838
50.0	0.057435921361196296
Scenario	5
0.0	0.11700722789421568
10.0	0.10647918503501716
20.0	0.09602467460391416
30.0	0.08559077734298963
40.0	0.0753122197463029
50.0	0.0656662337103557
Scenario	6
0.0	0.12233619527917379
10.0	0.11209552530338587
20.0	0.10193583682150736
30.0	0.09178443425291839
40.0	0.08171278018890583
50.0	0.07211892171171172
Scenario	7

Temperature	Property
0.0	0.10925521669520821
10.0	0.09887885835744521
20.0	0.08856067234973859
30.0	0.07836107914708006
40.0	0.06864427616961065
50.0	0.059974106947115455
Scenario	8
0.0	0.12185787776309323
10.0	0.11144937476321157
20.0	0.10112934085064693
30.0	0.09082210399238781
40.0	0.08055000628979801
50.0	0.07063998777317668
Scenario	9
0.0	0.1259293788926981
10.0	0.11599658943112923
20.0	0.1061555117444641
30.0	0.09632537941970497
40.0	0.08647127092015093
50.0	0.07679865521129882
Scenario	10
0.0	0.12302845396209255
10.0	0.11292475340923469
20.0	0.10292038924037172
30.0	0.09293980775950404
40.0	0.08296758491736872
50.0	0.07324239841231778
Scenario	11
0.0	0.12457960292609735
10.0	0.1141873903591786
20.0	0.10390824913125876
30.0	0.09366354799905913
40.0	0.08339880566229627
50.0	0.07328347125658807
Scenario	12
0.0	0.11995321045196737
10.0	0.10936713005672277
20.0	0.09888442286736092
30.0	0.08842638880947809
40.0	0.07802910569861123
50.0	0.06803750784714763

Table B392: Thermal Conductivities at 3MPa

Temperature	Property
Scenario	1
0.0	0.017913128444673385
10.0	0.018109406534435078
20.0	0.018546269368679726
30.0	0.019105746261766626
40.0	0.019738529112940155
50.0	0.020419503946152145
Scenario	2
0.0	0.018241427482938718
10.0	0.018589824391538997
20.0	0.01909227897867018
30.0	0.01968413176887174
40.0	0.02033351605882717
50.0	0.021022376052902816
Scenario	3
0.0	0.017955571025165373
10.0	0.018241793903672202
20.0	0.01871565998427155
30.0	0.019293656032705015
40.0	0.01993695750232004
50.0	0.02062439958453551
Scenario	4
0.0	0.01839691985132413
10.0	0.018794127211554903
20.0	0.019320500478852323
30.0	0.01992526267615654
40.0	0.020581820098841297
50.0	0.02127449124412108
Scenario	5
0.0	0.018124961450899438
10.0	0.018439383515388732
20.0	0.018926517226024987
30.0	0.01951075956975735
40.0	0.020156362106658512
50.0	0.020843623311847675
Scenario	6
0.0	0.02282918504785933
10.0	0.023313973894250835
20.0	0.023962552700156563
30.0	0.02470363467482918
40.0	0.02550306539700742
50.0	0.026341843918819472
Scenario	7

Temperature	Property
0.0	0.019538252871510994
10.0	0.020002388333387286
20.0	0.020585279613216094
30.0	0.021241723479244523
40.0	0.02194737959440008
50.0	0.022687591023021373
Scenario	8
0.0	0.019558714041485938
10.0	0.019899597298116942
20.0	0.02042601629957133
30.0	0.02105430265497494
40.0	0.021745996098886586
50.0	0.022480292483490007
Scenario	9
0.0	0.02287685576242166
10.0	0.023292922537891454
20.0	0.02390399074256366
30.0	0.024619988324917026
40.0	0.02540017444730476
50.0	0.026222782981994857
Scenario	10
0.0	0.020476217792726056
10.0	0.02081730268726118
20.0	0.021354585481563146
30.0	0.021997764339153285
40.0	0.02270603359031549
50.0	0.023457594673372693
Scenario	11
0.0	0.018134664082717678
10.0	0.018362441409621625
20.0	0.018813803798202723
30.0	0.019381205921275305
40.0	0.0200254245455495
50.0	0.02071685479438258
Scenario	12
0.0	0.01796085469868919
10.0	0.01829029391827889
20.0	0.018786043393056073
30.0	0.019375942010391008
40.0	0.020025662121061088
50.0	0.020716182679342016

Table B393: Viscosities at 10MPa

Temperature	Property
Scenario	1
0.0	113.92472281274905
10.0	97.03336528538914
20.0	81.48745668259707
30.0	66.07967965764567
40.0	47.82478156191144
50.0	28.368241431672324
Scenario	2
0.0	90.50090018167188
10.0	74.94776384963535
20.0	59.08459822298464
30.0	40.719239985549265
40.0	27.446728774130165
50.0	23.624615814278087
Scenario	3
0.0	104.70783893839446
10.0	88.5975673585674
20.0	73.34872292700943
30.0	57.23858440734625
40.0	35.97103798381242
50.0	25.26896886688987
Scenario	4
0.0	81.43735821017374
10.0	65.94811842404151
20.0	49.1693412894889
30.0	32.304862488611754
40.0	25.019020247245848
50.0	22.819521103156717
Scenario	5
0.0	96.97094515374052
10.0	81.19219737851755
20.0	65.69686223424844
30.0	48.23671527940271
40.0	30.34291518734478
50.0	24.37317099250535
Scenario	6
0.0	98.79240712696722
10.0	83.02277920057061
20.0	67.68160284662048
30.0	50.50840862909398
40.0	30.804564115637326
50.0	24.44177765377811
Scenario	7

Temperature	Property
0.0	84.14368090787268
10.0	68.87656736442332
20.0	52.4025810952901
30.0	33.01296792050671
40.0	24.89245711814697
50.0	22.772675317591165
Scenario	8
0.0	102.48064473547439
10.0	86.44202759776424
20.0	71.1054461182577
30.0	54.6063883955823
40.0	34.153951085166725
50.0	25.13931292765775
Scenario	9
0.0	102.64961409619694
10.0	87.06780072643653
20.0	72.40764773867181
30.0	57.143189867581285
40.0	37.35214251703547
50.0	25.467920475469317
Scenario	10
0.0	102.37232349167658
10.0	86.75855642941765
20.0	71.98818368826478
30.0	56.48106510535368
40.0	36.645313934455196
50.0	25.48370267251866
Scenario	11
0.0	107.53267062753369
10.0	91.35257929654847
20.0	76.26270981282246
30.0	60.87935753645449
40.0	41.594585538417604
50.0	26.56574315878367
Scenario	12
0.0	100.1207384682609
10.0	84.3582426997889
20.0	69.13719256493167
30.0	52.3509353152274
40.0	31.89952216727387
50.0	24.65414627401155

Table B394: Viscosities at 15MPa

Temperature	Property
Scenario	1
0.0	123.07493460628937
10.0	106.81386473297472
20.0	92.48553600061288
30.0	79.61358519473431
40.0	67.73915480838892
50.0	56.531672906058404
Scenario	2
0.0	100.7751149626277
10.0	86.80283096431019
20.0	74.21980994530887
30.0	62.62963030182696
40.0	51.93318936440493
50.0	42.6468737746047
Scenario	3
0.0	114.08546492999685
10.0	98.8388254031914
20.0	85.30671630135366
30.0	73.01309692988913
40.0	61.55539610148496
50.0	50.75622221180023
Scenario	4
0.0	92.44357103610155
10.0	79.26598883782577
20.0	67.28208584030912
30.0	56.23558464048654
40.0	46.34717673274044
50.0	38.41610247457531
Scenario	5
0.0	106.83379648864859
10.0	92.2671226996682
20.0	79.24066952000076
30.0	67.30510189882888
40.0	56.197550892481445
50.0	46.12809649232125
Scenario	6
0.0	108.47523631628508
10.0	93.80900931751258
20.0	80.71274505388848
30.0	68.72628185600217
40.0	57.523583305259095
50.0	47.1923096220234
Scenario	7

Temperature	Property
0.0	94.663721401589
10.0	81.38680297016896
20.0	69.32013252261568
30.0	58.123958388912015
40.0	47.82369180498091
50.0	39.261831058140785
Scenario	8
0.0	112.03380116274066
10.0	96.96142819300088
20.0	83.55518442999528
30.0	71.34572692420683
40.0	59.966998286902964
50.0	49.37368913926414
Scenario	9
0.0	111.76582623915387
10.0	96.97298285600931
20.0	83.87090004596945
30.0	72.00198637128707
40.0	60.96979974576954
50.0	50.57865990171422
Scenario	10
0.0	111.57537756597739
10.0	96.80620752743816
20.0	83.69380307987916
30.0	71.7876559974004
40.0	60.707563531980895
50.0	50.30716003595579
Scenario	11
0.0	116.72640086677191
10.0	101.28299903119584
20.0	87.62735001654976
30.0	75.29504636747849
40.0	63.86377663379051
50.0	53.09078482400935
Scenario	12
0.0	109.58673014666331
10.0	94.87514480599565
20.0	81.75087901299739
30.0	69.75513590817202
40.0	58.540168476207526
50.0	48.10475233728863

Table B395: Viscosities at 3MPa

Temperature	Property
Scenario	1
0.0	14.447671874019301
10.0	14.845339251453805
20.0	15.265694730672905
30.0	15.698222978200512
40.0	16.13767742056982
50.0	16.581031742511016
Scenario	2
0.0	14.627780062125968
10.0	15.042710102305623
20.0	15.47287588482606
30.0	15.911616830107409
40.0	16.35522862264046
50.0	16.801431662603214
Scenario	3
0.0	14.538688358578463
10.0	14.951482341184084
20.0	15.381541271316939
30.0	15.82109007891257
40.0	16.26599643125757
50.0	16.71378438551634
Scenario	4
0.0	14.718577898862018
10.0	15.141022217608015
20.0	15.576065325192282
30.0	16.01824688646866
40.0	16.46441302810507
50.0	16.912576157791076
Scenario	5
0.0	14.573463842740303
10.0	14.984175421245554
20.0	15.41187506006149
30.0	15.849043267398574
40.0	16.291609090078108
50.0	16.73710804207269
Scenario	6
0.0	14.648359728835363
10.0	15.06629194750523
20.0	15.500622679988401
30.0	15.944247703872001
40.0	16.39328475935092
50.0	16.84536524949148
Scenario	7

Temperature	Property
0.0	14.796193329355736
10.0	15.229797122628224
20.0	15.67429530482539
30.0	16.124946825595075
40.0	16.578974052142794
50.0	17.034607168119145
Scenario	8
0.0	14.553888544410112
10.0	14.963550826662853
20.0	15.391362326602732
30.0	15.829237817823984
40.0	16.27288106359247
50.0	16.719718746484972
Scenario	9
0.0	14.402844132043644
10.0	14.809425381560894
20.0	15.234435345721433
30.0	15.669618490129974
40.0	16.110626462676546
50.0	16.554864312813756
Scenario	10
0.0	14.431401659797636
10.0	14.837267905176693
20.0	15.261765018174641
30.0	15.696569885888685
40.0	16.13729179030967
50.0	16.58131015606159
Scenario	11
0.0	14.394805927093117
10.0	14.79867288591967
20.0	15.222112568947063
30.0	15.65624219438687
40.0	16.096476257335
50.0	16.540112996051505
Scenario	12
0.0	14.541938691624507
10.0	14.951512228099986
20.0	15.37817540580212
30.0	15.814415988641656
40.0	16.25615464093787
50.0	16.700915055781866