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Combustion Simulation and Analysis Report

DISSERTATION ASSIGNMENT

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1. INTRODUCTION

Being able to model the combustion process inside a spark injection combustion engine, enables certain characteristics of the engine to be identified. The identification of when Auto-ignition takes place and the emissions (NO_x) that an engine produces can be calculated from making a simulation model.

Once a 2-zone model (burnt and unburnt zone) in Microsoft Excel had been created from cylinder volume and pressure data provided by Ford and Volkswagen for the Ford Fox GTDI 1 litre 3-cylinder and Volkswagen TFSI 1.4 litre 4-cylinder, the 2 models would be validated against actual figures obtained from Ford and Volkswagen for the relevant engines, to demonstrate the models were accurate.

By identifying when combustion took place, the inlet valve closing and exhaust valve opening could be identified, which would then enable the A and M Wiebe function constants to be calculated. This would then also allow a 2-zone model to be created. As combustion would be identified, Auto-Ignition could then be predicted. The non-dissociated burnt zone would enable the calculation of the specific heat values, thus giving the gamma values of each engine. The dissociated carbon dioxide and water in the burnt zone would then be calculated using linear interpolation, thus giving the NO_x parts per million (P.P.M.) figures.

2. RESEARCH

During the combustion process within a combustion engine, various processes could be calculate using various equations. Once the combustion chamber had been split into 2 zones (unburnt and burnt zone), it was then possible to calculate when Auto-Ignition would take place, analysing the unburnt zone and calculating the emissions produced by the engine, looking at the burnt zone.

Identifying when combustion took place was the first task. This would then enable the mass fraction burned (M.F.B.) to be identified. The derivation of M.F.B. can be found in the appendix. As the derivation showed that the specific heats, gas constant and gamma values needed to be identified, this meant that the temperatures in both zones also needed to be identified.

2.1. Combustion

2.1.1. Identifying Inlet Closing (I.C.), Exhaust Opening (E.O.), Start of Combustion (S.O.C.) and End of Combustion (E.O.C.)

Identifying when combustion took place enabled the identification of basic parameters of the engine. Finding the polytropic index would be found using,

$$n = \frac{\log P_2 - \log P_1}{\log V_1 - \log V_2} \text{ [EQUATION 1]}$$

This would then allow for the pressure to be calculated without combustion, using,

$$P_2^n = P_1 \times \left(\frac{V_1}{V_2}\right)^{n_{Exp \text{ or } n_{Comp}}} \text{ [EQUATION 2]}$$

The difference between these two pressures (dP) could then allow for the M.F.B. to be calculated, as it was the sum of all of these pressures, once the dP had gone from a negative pressure to a peak pressure, back to a negative pressure (usually around 40 to 60 degrees around T.D.C.). The compression and expansion polytropic index was an average value over 10 degrees once the dP was negative before combustion, and an average value over 10 degrees once the dP reached a negative value after combustion.

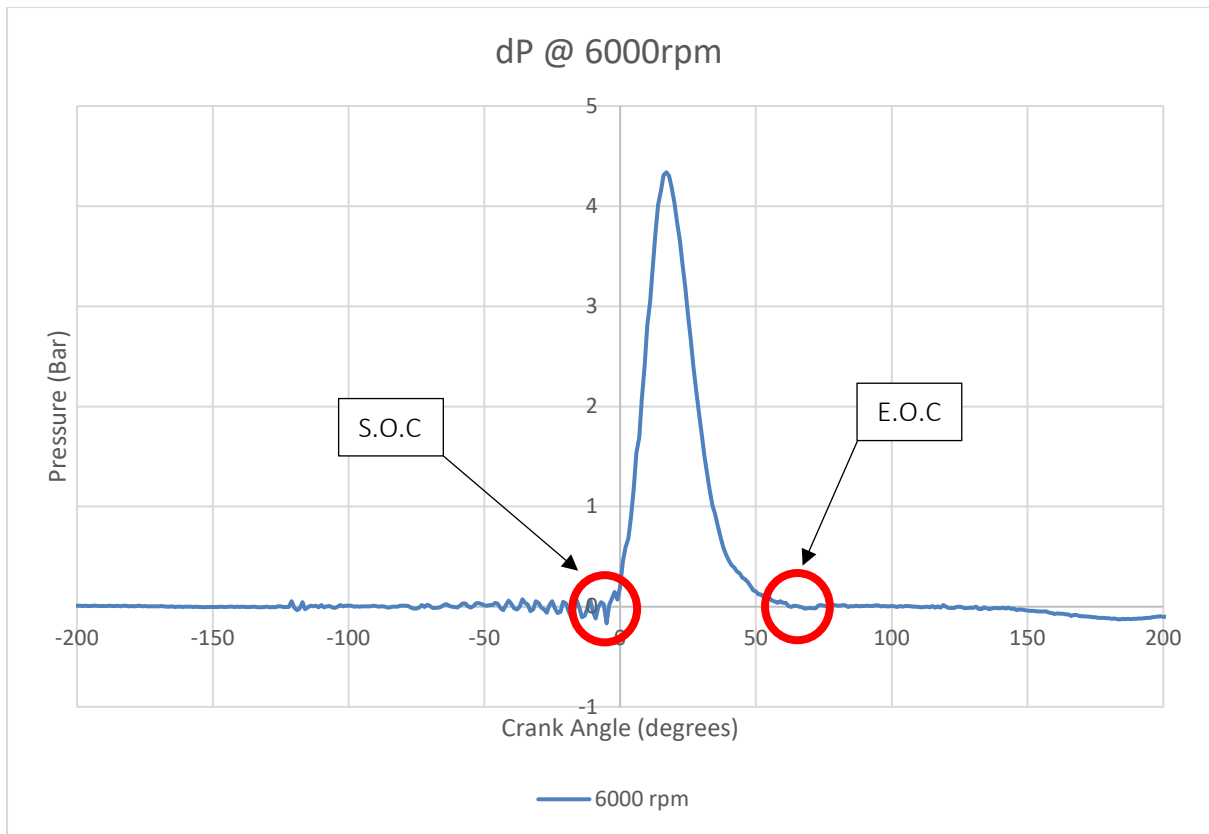


FIGURE 1: IDENTIFYING S.O.C. AND E.O.C.

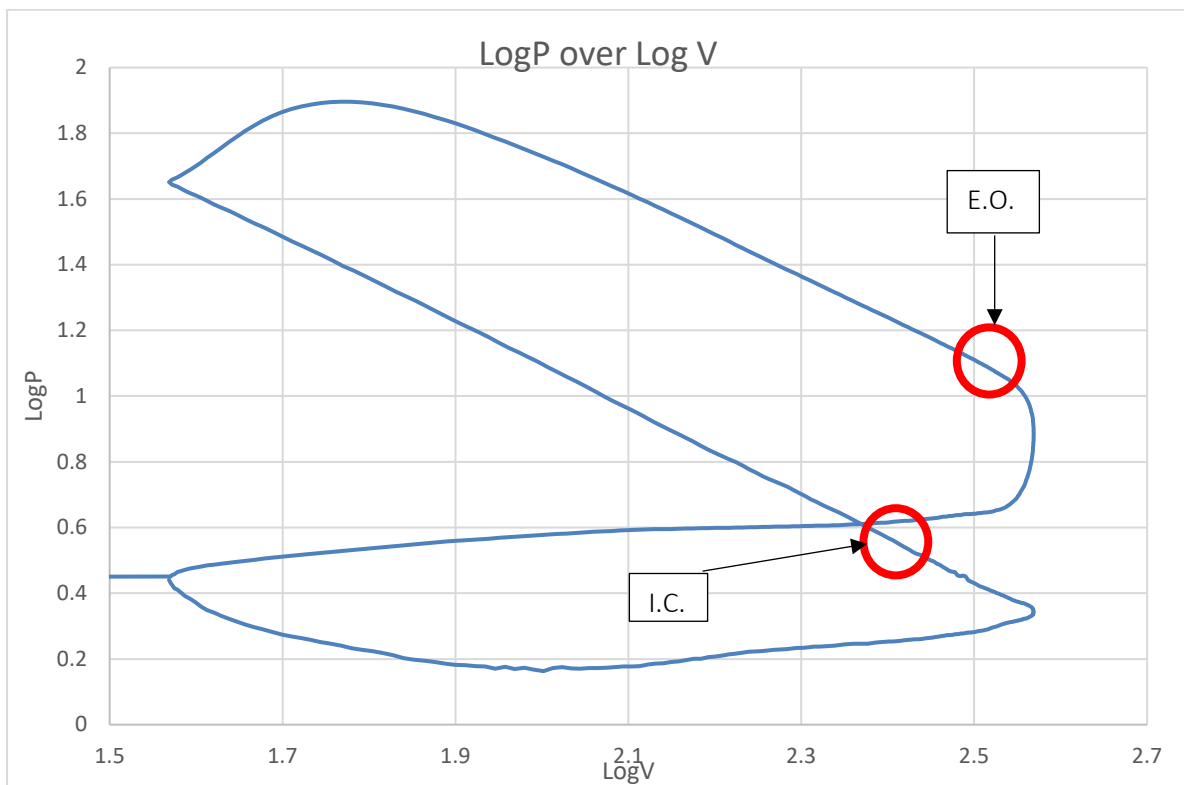


FIGURE 2: IDENTIFYING I.C. AND E.O.

2.1.2. Mass Fraction Burned (M.F.B.)

When calculating the M.F.B., it was possible to use the Wiebe function. This involved using an A and M constant. After deriving the M.F.B. (found in the appendix), it was possible to calculate the M.F.B. a simple, medium and complex way. This would then allow for 3 different A and M values for every RPM.

Rearranging the Wiebe function into the form, $y=mx+c$, this could then be plotted onto a graph to find the A and M constants, where $m=\text{slope}-1$ and $a=e^{(y \text{ intercept})}$.

$$\text{Wiebe Function } M.F.B. = 1 - e^{-a\left(\frac{\theta}{\theta_D}\right)^{m+1}} \quad [\text{EQUATION 3}]$$

$$1 - M.F.B. = e^{-a\left(\frac{\theta}{\theta_D}\right)^{m+1}}$$

$$\ln(1 - M.F.B.) = -a\left(\frac{\theta}{\theta_D}\right)^{m+1}$$

$$-\ln(1 - M.F.B.) = a\left(\frac{\theta}{\theta_D}\right)^{m+1}$$

$$\ln(-\ln(1 - M.F.B.)) = \ln(a) + (m + 1) \cdot \ln\left(\frac{\theta}{\theta_D}\right) \quad [\text{EQUATION 4}]$$

so,

$$y = \ln(-\ln(1 - M.F.B.))$$

$$c = \ln(a) \quad [\text{EQUATION 5}]$$

$$m = (m + 1) \quad [\text{EQUATION 6}]$$

$$x = \ln\left(\frac{\theta}{\theta_D}\right)$$

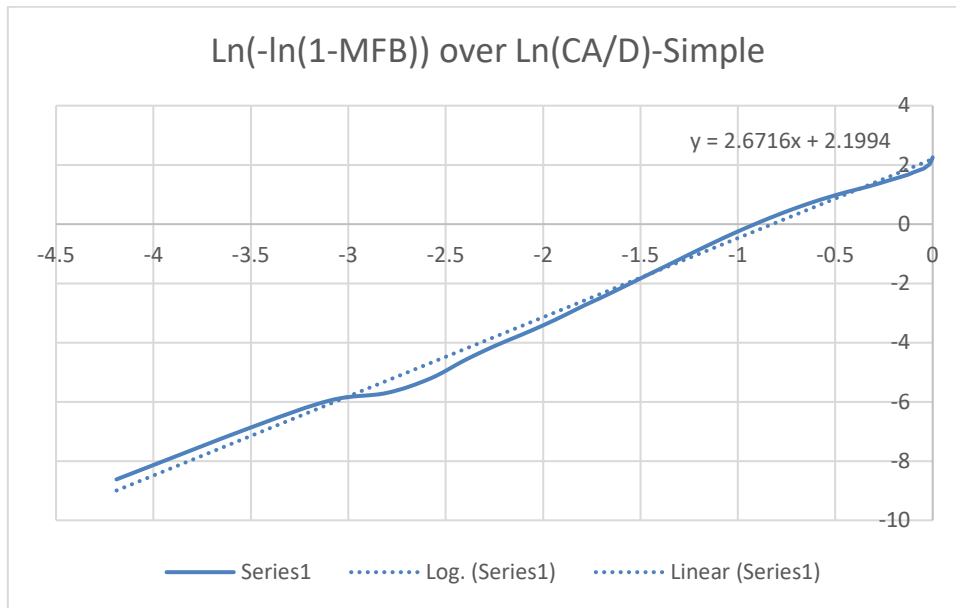


FIGURE 3: CALCULATING WIEBE FUNCTION A AND M CONSTANTS

As the mass of the air and fuel needed to be calculated, it was necessary to calculate the molecular weights of the fuels. This varied depending on whether it was a lean or rich mixture, as shown in figure 4 below.

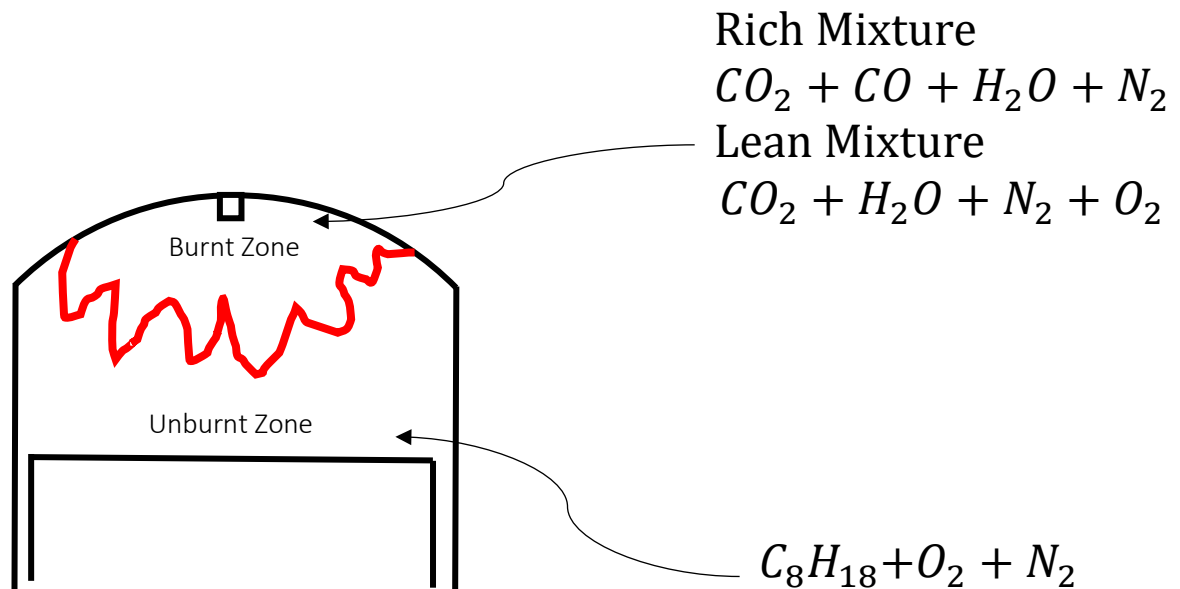


FIGURE 4: NON-DISSOCIATED RICH AND LEAN MIXTURES

An additional part to the Excel spreadsheet was created, which would calculate the non-dissociated molecular weights of the fuel at the relevant RPM, determined by the lambda value given in the Ford and Volkswagen PDF. The calculations used were from a previous assignment in Powertrain and Sustainability class, by McDonald, 2017.

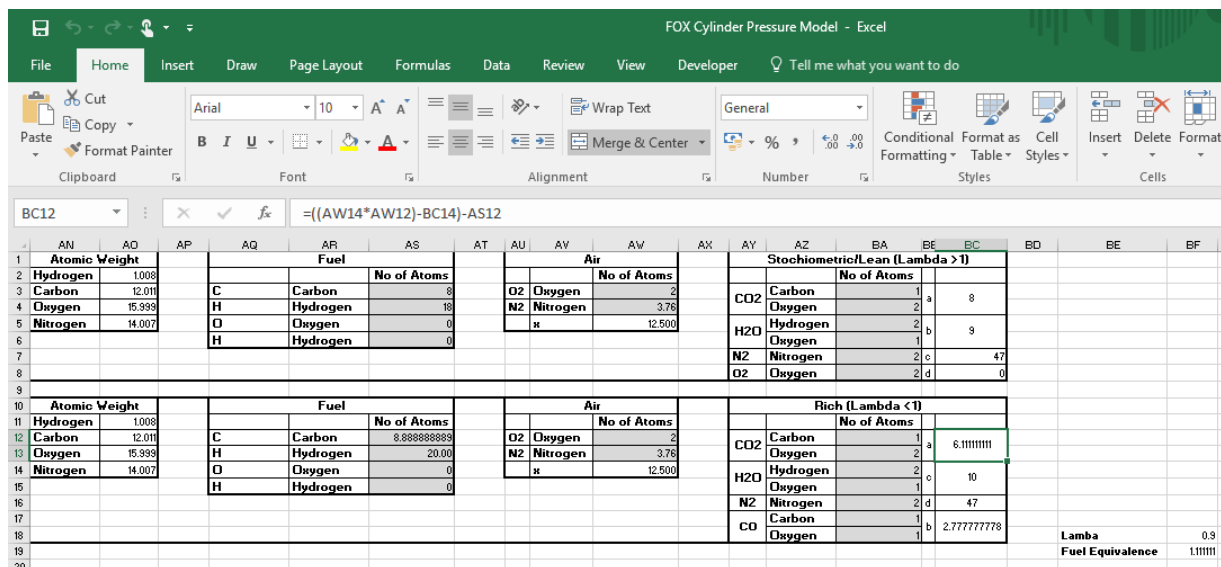


FIGURE 5: NON-DISSOCIATED FUEL EXCEL MODEL SCREENSHOT

2.2. Temperatures

As it was possible to create 2-zones in the combustion chamber (unburnt and burnt zone), there were therefore two temperature zones, which would be vital to know for calculating any relevant values.

2.2.1. Unburnt zone

I.C. to S.O.C.

As both valves were closed, it was a fixed mass so the ideal gas law could be used. The fuel mass was given in Kg/hour but needed to be kg/cylinder so the fuel mass was divided by 60 x RPM x 1.5 (the amount of air fuel sucked in per 2 revolutions per cylinder for a 3-cylinder engine. 2 for a 4-cylinder). Using the A/F ratio would then allow the air mass to be calculated. The residual gas percentage was the percentage of the air and fuel plus the total mass. The ideal gas law rearranged could then be used to calculate the temperatures at every crank angle.

S.O.C. to E.O.C.

The non-dissociated specific heat of the fuel was calculated using Turns, 2006 equation.

$$C_{pFUEL} = 4.184(A1 + A2(T/1000) + A3(T/1000)^2 + A4(T/1000)^3 + A5(T/1000)^4) \text{ [EQUATION 7]}$$

This then enabled the specific heat of the unburnt zone to be calculated, once the specific heats of the Oxygen and Nitrogen was calculated, using Heywood, 1988 equation.

$$C_{pUB} = \frac{\frac{1}{\lambda} C_{pFUEL} + 12.5(C_{pO_2} + 3.76 C_{pN_2})}{(\frac{1}{\lambda} + 12.5(1 + 3.76))} \text{ [EQUATION 8]}$$

$$C_p = Ru \times (ai1 + ai2T + ai3T^2 + ai4T^3 + ai5T^4) \text{ [EQUATION 9]}$$

Where,

Temp (K)	ai1	ai2	ai3	ai4	ai5	ai6	ai7
1000-5000	3.622	0.00073618	-0.00000019652	0.000000000036202	-0.0000000000000028946	-1202	3.6151
300-1000	3.6256	-0.0018782	0.0000070555	-0.0000000067635	0.00000000000021556	-1047.5	4.3053

FIGURE 6: HEYWOOD SPECIFIC HEATS CONSTANTS TABLE

The specific heat of the unburnt zone was also determined by the lambda values depending on whether it was a lean or rich mixture.

The Specific heat at a constant volume could then be calculated, and finally the gamma value.

$$C_{vUB} = C_{pUB} - Ru \text{ [EQUATION 10]}$$

$$\gamma_{UB} = \frac{C_{pUB}}{C_{vUB}} \text{ [EQUATION 11]}$$

The temperature could be calculated using,

$$T_{UB2} = T_{UB1} \left(\frac{P_2}{P_1} \right)^{\frac{\gamma_{UB}-1}{\gamma_{UB}}} \text{ [EQUATION 12]}$$

Finally the volume could be calculated using,

$$V_{UB} = \frac{(1-MFB) \times M_T \times R_{UB} \times T_{UB}}{P} \text{ [EQUATION 13]}$$

$$R_{UB} = \frac{Ru}{Mol W_{UB}} \text{ [EQUATION 14]}$$

Where,

$$Mol W_{UB} = \frac{1}{\lambda} C_8H_{18} + 12.5(O_2 + 3.76N_2) \text{ [EQUATION 15]}$$

2.2.2. Burnt zone

S.O.C. to E.O.C.

The temperature of the burnt zone was calculated using,

$$T_B = \frac{P \times V_B}{MFB \times M_T \times R_B} \text{ [EQUATION 16]}$$

Where,

$$R_B = \frac{Ru}{Mol W_B} \text{ [EQUATION 17]}$$

Where,

$$Mol W_B = 6.13CO_2 + 2.75CO + 9.99H_2O + 47N_2 \text{ (LAMBDA=0.9) [EQUATION 18]}$$

The specific heat at constant volume was then calculated from calculating the specific heat at a constant pressure, the same way this was calculated in the unburnt zone (depending on if the mixture was lean or rich)

$$C_{vB} = C_{pB} - Ru \text{ [EQUATION 19]}$$

Then the gamma value could be calculated.

$$\gamma_B = \frac{C_{pB}}{C_{vB}} \text{ [EQUATION 20]}$$

Finally the volume could be calculated using the previous volume calculated from the unburnt zone.

$$V_B = V - V_{UB} \text{ [EQUATION 21]}$$

E.O.C. to E.O.

Once the entire mass had been burnt, the ideal gas law could then be used to calculate the temperature.

2.3. Auto-Ignition

The term Auto-Ignition, also known as Knock, is a phenomenon by which the unburnt gases inside a cylinder spontaneously ignite without an external source of ignition such as a flame or spark. As shown by Heywood, 1998, it was possible to predict when Knock would occur during the combustion cycle, where τ values reached 1, using the equation,

$$\tau = 17.68 \left(\frac{ON}{100} \right)^{3.402} p^{-1.7} \exp \left(\frac{3800}{T} \right) \text{ [EQUATION 22]}$$

$$\text{AUTO-IGNITION} = \sum_{soc-EOC} \frac{dT}{\tau} \text{ [EQUATION 23]}$$

It was also necessary to calculate the time for 1 degree in seconds to occur, so using,

$$\text{TIME FOR 1 DEGREE} = \frac{1}{6 \times RPM} \times 1000 \text{ [EQUATION 24]}$$

As Knock could be damaging to an engine because the peak pressures could exceed that of material properties and cause damage to the surfaces inside the engine, it is necessary to be able to control this phenomenon. As shown by Eckert, et al., 2003, the octane rating, air/fuel ratio, E.G.R., compression ratio and ignition timing all effect when Knock occurs.

2.4. Cylinder Volume

To be able to calculate the cylinder volume at every crank angle, the engine dimensions had to be taken into consideration, for example the gudgeon pin offset. This would then allow for the distance the piston had travelled down the cylinder.

2.4.1. Gudgeon Pin Offset

The use of a gudgeon pin offset prevented piston slap inside the cylinder against the cylinder walls. Gudgeon pin offset was bad for friction inside the engine but it reduced the noise from the piston slapping the barrel.

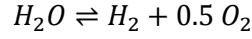
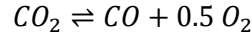
Derivation of gudgeon pin offset can be found in the appendix.

2.4.2. Distance (S)

Derivation of distance S can be found in the appendix.

2.5. Dissociation

As the temperature of the burnt zone inside the combustion chamber increased, dissociation between the different chemicals of the fuel took place. This was fundamental to know when calculating the NOx. As shown in Goodger & Allen, 2000, a condition of dynamic equilibrium between the reactants and products exists with the rates of combustion and dissociation equal above about 1800K. Therefore,



To determine the proportions of the products, the values of parameters known as ‘partial pressure equilibrium constants’ at given temperatures were used, as stated in Goodger & Allen, 2000. When balancing the reactants and products equation, the molecular weights could be identified as,

$$C_8H_{18} + 12.5(O_2 + 3.76 N_2) = n_1 CO_2 + n_2 H_2O + n_3 CO + n_4 H_2 + n_5 O_2 + n_6 N_2 \text{ [EQUATION 25]}$$

Therefore,

$$n_1 = \phi C_8 - n_3 \text{ [EQUATION 26]}$$

$$n_2 = \phi H_{18} - n_4 \text{ [EQUATION 27]}$$

$$n_3 = \frac{\phi C_8}{\left(\frac{n_1}{n_3} + 1\right)} \text{ [EQUATION 28]}$$

$$n_4 = \frac{\phi H_{18}}{\left(\frac{n_2}{n_4} + 1\right)} \text{ [EQUATION 29]}$$

$$n_5 = \frac{(25 - 2n_1 - n_2 - n_3)}{2} \text{ [EQUATION 30]}$$

$$n_6 = 47 \text{ [EQUATION 31]}$$

$$n_{Total} = n_1 + n_2 + n_3 + n_4 + n_5 + n_6 \text{ [EQUATION 32]}$$

The derivation of this can be found in the appendix.

2.6. NOx

Once disassociation had been calculated, it is possible to calculate the NOx produced by the engine. The use of the Zeldovich mechanism (Heywood, 1988) allowed for the calculation of the production of NOx in the burnt zone. It was controlled by the reaction between Nitrogen molecules and Oxygen atoms. The rate at which this would be produced could then be calculated using the time it would take for the engine to turn 1 degree at a given RPM, in seconds. The temperature at which the reaction started was the S.O.C.

$$\frac{d[NO]}{dt} = 4.7 \times 10^{13} [N_2][O_2]^{1/2}_{EXP} \left(\frac{-67837}{T} \right) \text{ [EQUATION 33]}$$

As the Zeldovich mechanism consisted of the concentration of Nitrogen and Oxygen in their burnt volumes, the molecular weights had to be calculated in Kmols/m³. Using,

$$P.V = n.Ru.T \text{ [EQUATION 34]}$$

The number of Kmols could be calculated in the cylinder. The amount of Kmols in the reactants equation could then be calculated, this would then allow for the multiplying constant (α) to be calculated.

For 10% lean,

$$\alpha = \frac{\lambda \text{Fuel Mass/cylinder}}{114 \times 60 \times 2} \text{ [EQUATION 35]}$$

The concentration of Nitrogen and Oxygen was,

$$[N_2] \text{ or } [O_2] = \frac{\alpha \cdot MFB \cdot \text{Kmols } N_2 \text{ or } O_2}{\text{Burnt volume}} \text{ [EQUATION 36]}$$

The molecular weights also varied depending on the fuel equivalence ratio being used. The Boltzmann probability was part of the end of the Zeldovich mechanism. This showed that as the temperature increased, the probability of the molecules having enough energy to react increased exponentially, as stated by McDonald, 2017.

2.6.1. Parts Per Million (P.P.M.)

After adding up all the reaction rates and multiplying them by the time it took the engine to turn 1 degree in seconds, and the burnt volume, the P.P.M. could be calculated for each fuel equivalence ratio and RPM.

$$NO_x \text{ PPM} = \frac{\sum \frac{d[NO]}{dt} \times \frac{1}{6 \times RPM} \times \text{Burnt Volume}}{\text{Kmols in exhaust}} \times 10^6 \text{ [EQUATION 37]}$$

Where,

$$\text{Kmols in exHaust} = \alpha \times n_{\text{Total}} \text{ [EQUATION 38]}$$

It was also necessary to identify where the peak burnt temperature was during combustion. At this point, the reaction rates would stop being added up, as in reality inside the engine, the sudden drop in temperature would cause NOx to stop being created.

2.6.2. Interpolation

As it was necessary to calculate the Oxygen concentration between two pressures, linear interpolation was used to find the value.

The formulae from Goodger & Allen, 2000 was used,

$$y = y_1 + (x - x_1) \left(\frac{y_2 - y_1}{x_2 - x_1} \right) \text{ [EQUATION 39]}$$

3. METHODOLOGY

Various models were created in Excel as to be able to create a 2-zone combustion model. Once the pressure and volume data had been inputted, the various equations from Chapter 2. Research could be calculated.

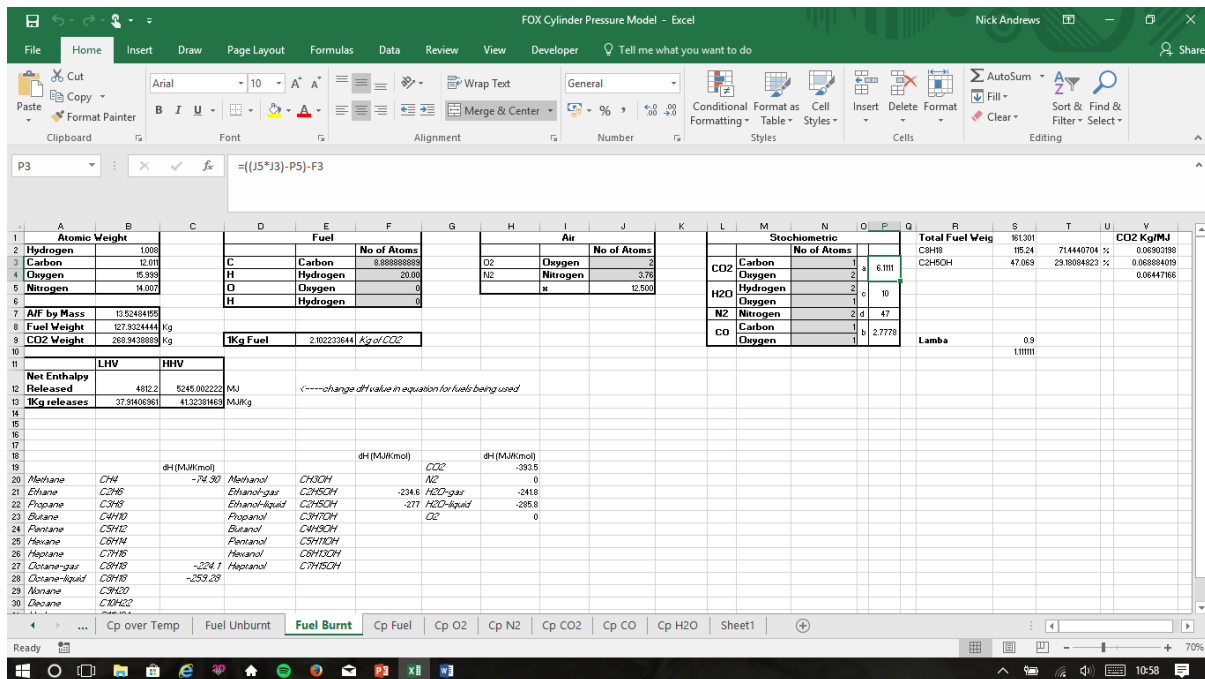


FIGURE 7: SCREENSHOT OF FUELS MODEL IN EXCEL

When carrying out the dissociation of the Carbon Dioxide and Water, it was necessary to calculate an error value at each temperature. This would then allow for a polynomial equation to be produced, which would then allow for linear interpolation to be conducted, to give the necessary Oxygen concentration value (n_5) between two pressures. The Goal seek function in Excel was a valuable time saving tool, as the Oxygen content values changed with lambda values and RPM. The values for all lambda values, and the different RPMs for both engines can be found in the appendix.

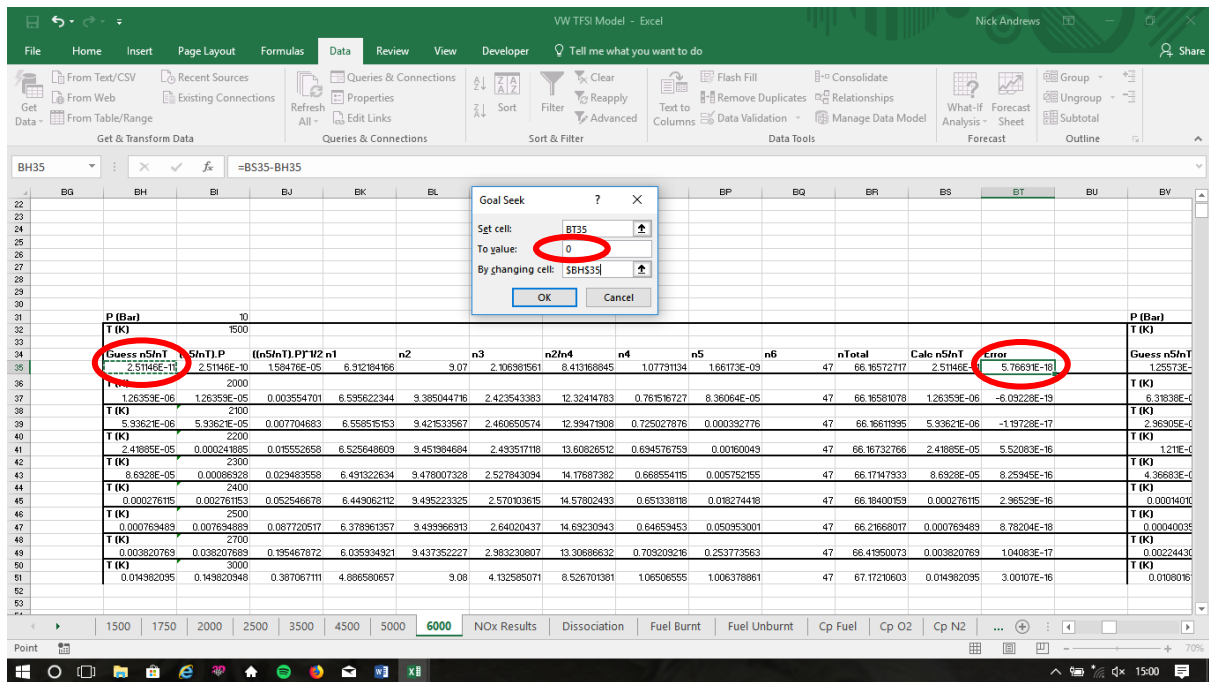


FIGURE 8: SCREENSHOT OF GOAL SEEK FUNCTION

As Excel had a limit on the amount of characters inside one cell, the linear interpolation formula was broken into 3 parts, and then a total value was calculated in a different cell. Below was the 3 part equation used in Excel, where the use of “IF” and “AND” statements were used, as to use the appropriate polynomial equation, relating to the relevant pressure and temperature figures, as each fuel equivalence and RPM had a different polynomial equation.

Oxygen concentration (@6500RPM and Lambda 0.887):

Part 1:

$$=(\text{IF}(\text{AND}(\text{G3499}>10, \text{G3499}<=20), (-3.265714510158\text{E}-18 * \text{AJ3499}^6 + 4.42166193045845\text{E}-14 * \text{AJ3499}^5 - 2.46340888467309\text{E}-10 * \text{AJ3499}^4 + 7.23629002091967\text{E}-07 * \text{AJ3499}^3 - 0.00118281555881131 * \text{AJ3499}^2 + 1.02028417115852 * \text{AJ3499} - 362.80980759934),$$

$$\text{IF}(\text{AND}(\text{G3499}>20, \text{G3499}<=30), (-1.695071273978\text{E}-18 * \text{AJ3499}^6 + 2.33909971711971\text{E}-14 * \text{AJ3499}^5 - 1.32462226319237\text{E}-10 * \text{AJ3499}^4 + 3.94688919591779\text{E}-07 * \text{AJ3499}^3 - 0.000653279715267016 * \text{AJ3499}^2 + 0.5697981841218 * \text{AJ3499} - 204.620463648661),$$

$$\text{IF}(\text{AND}(\text{G3499}>30, \text{G3499}<=40), (-9.38449848646\text{E}-19 * \text{AJ3499}^6 + 1.32307338799922\text{E}-14 * \text{AJ3499}^5 - 7.62167698224703\text{E}-11 * \text{AJ3499}^4 + 2.30288019121722\text{E}-07 * \text{AJ3499}^3 - 0.000385607809024501 * \text{AJ3499}^2 + 0.339622494630065 * \text{AJ3499} - 122.972194329876),$$

IF(AND(G3499>40,G3499<=50),(-5.28954650241E-19*AJ3499^6 + 7.69401257531527E-15*AJ3499^5
 - 4.53761462202695E-11*AJ3499^4 + 1.39635491615598E-07*AJ3499^3 -
 0.000237253889008004*AJ3499^2 + 0.21145560121238*AJ3499 - 77.3164796554674),
 IF(AND(G3499>50,G3499<=60),(-2.85544754013E-19*AJ3499^6 + 4.38334780186965E-
 15*AJ3499^5 - 2.68404288089378E-11*AJ3499^4 + 8.49075385012274E-08*AJ3499^3 -
 0.000147337529864819*AJ3499^2 + 0.133503600575026*AJ3499 - 49.4627445805817),
 IF(AND(G3499>60,G3499<=70),(-1.31269520609E-19*AJ3499^6 + 2.27246355943697E-15*AJ3499^5
 - 1.49626692024634E-11*AJ3499^4 + 4.96876949161859E-08*AJ3499^3 -
 0.0000892595883019094*AJ3499^2 + 0.0829932355253609*AJ3499 - 31.3645155097881),
 IF(AND(G3499>70,G3499<=80),(-2.8998775474E-20*AJ3499^6 + 8.64103249946989E-16*AJ3499^5 -
 6.99593608652091E-12*AJ3499^4 + 2.59602059060158E-08*AJ3499^3 -
 0.0000499862036948382*AJ3499^2 + 0.0487281482140183*AJ3499 - 19.0535024790868),
 IF(AND(G3499>80,G3499<=90),(4.0999583493E-20*AJ3499^6 - 1.0681430043763E-16*AJ3499^5 -
 1.47165306482776E-12*AJ3499^4 + 9.4282137266399E-09*AJ3499^3 -
 0.0000225133032222922*AJ3499^2 + 0.0246779948603207*AJ3499 - 10.3879275937699),
 IF(AND(G3499>90,G3499<=100),(9.0007208519E-20*AJ3499^6 - 7.92249877065255E-16*AJ3499^5 +
 2.45407663061234E-12*AJ3499^4 - 2.3827762359415E-09*AJ3499^3 - 2.79938675427576E-
 06*AJ3499^2 + 0.00735690164000656*AJ3499 - 4.1277163298096),
 IF(AND(G3499>100,G3499<=110),(1.24851045564E-19*AJ3499^6 - 1.28438522372364E-
 15*AJ3499^5 + 5.29427870044298E-12*AJ3499^4 - 1.09799614032099E-08*AJ3499^3 +
 0.00001162142666706*AJ3499^2 - 0.00536527797674934*AJ3499 + 0.485959577221457))))))))))

Part 2:

=((G3499-(IF(AND(G3499>10,G3499<=20),10,

IF(AND(G3499>20,G3499<=30),20,

IF(AND(G3499>30,G3499<=40),30,

IF(AND(G3499>40,G3499<=50),40,

IF(AND(G3499>50,G3499<=60),50,

IF(AND(G3499>60,G3499<=70),60,

IF(AND(G3499>70,G3499<=80),70,

IF(AND(G3499>80,G3499<=90),80,
 IF(AND(G3499>90,G3499<=100),90,
 IF(AND(G3499>100,G3499<=110),100))))))))))/
 ((IF(AND(G3499>10,G3499<=20),20,
 IF(AND(G3499>20,G3499<=30),30,
 IF(AND(G3499>30,G3499<=40),40,
 IF(AND(G3499>40,G3499<=50),50,
 IF(AND(G3499>50,G3499<=60),60,
 IF(AND(G3499>60,G3499<=70),70,
 IF(AND(G3499>70,G3499<=80),80,
 IF(AND(G3499>80,G3499<=90),90,
 IF(AND(G3499>90,G3499<=100),
 100,IF(AND(G3499>100,G3499<=110),110)))))))))))-
 (IF(AND(G3499>10,G3499<=20),10,
 IF(AND(G3499>20,G3499<=30),20,
 IF(AND(G3499>30,G3499<=40),30,
 IF(AND(G3499>40,G3499<=50),40,
 IF(AND(G3499>50,G3499<=60),50,
 IF(AND(G3499>60,G3499<=70),60,
 IF(AND(G3499>70,G3499<=80),70,
 IF(AND(G3499>80,G3499<=90),80,
 IF(AND(G3499>90,G3499<=100),90,
 IF(AND(G3499>100,G3499<=110),100))))))))))

Part 3:

=((IF(AND(G3499>10,G3499<=20),(-1.695071273978E-18*AJ3499^6 + 2.33909971711971E-14*AJ3499^5 - 1.32462226319237E-10*AJ3499^4 + 3.94688919591779E-07*AJ3499^3 - 0.000653279715267016*AJ3499^2 + 0.5697981841218*AJ3499 - 204.620463648661),
 IF(AND(G3499>20,G3499<=30),(-9.38449848646E-19*AJ3499^6 + 1.32307338799922E-14*AJ3499^5 - 7.62167698224703E-11*AJ3499^4 + 2.30288019121722E-07*AJ3499^3 - 0.000385607809024501*AJ3499^2 + 0.339622494630065*AJ3499 - 122.972194329876),
 IF(AND(G3499>30,G3499<=40),(-5.28954650241E-19*AJ3499^6 + 7.69401257531527E-15*AJ3499^5 - 4.53761462202695E-11*AJ3499^4 + 1.39635491615598E-07*AJ3499^3 - 0.000237253889008004*AJ3499^2 + 0.21145560121238*AJ3499 - 77.3164796554674),
 IF(AND(G3499>40,G3499<=50),(-2.85544754013E-19*AJ3499^6 + 4.38334780186965E-15*AJ3499^5 - 2.68404288089378E-11*AJ3499^4 + 8.49075385012274E-08*AJ3499^3 - 0.000147337529864819*AJ3499^2 + 0.133503600575026*AJ3499 - 49.4627445805817),
 IF(AND(G3499>50,G3499<=60),(-1.31269520609E-19*AJ3499^6 + 2.27246355943697E-15*AJ3499^5 - 1.49626692024634E-11*AJ3499^4 + 4.96876949161859E-08*AJ3499^3 - 0.0000892595883019094*AJ3499^2 + 0.0829932355253609*AJ3499 - 31.3645155097881),
 IF(AND(G3499>60,G3499<=70),(-2.8998775474E-20*AJ3499^6 + 8.64103249946989E-16*AJ3499^5 - 6.99593608652091E-12*AJ3499^4 + 2.59602059060158E-08*AJ3499^3 - 0.0000499862036948382*AJ3499^2 + 0.0487281482140183*AJ3499 - 19.0535024790868),
 IF(AND(G3499>70,G3499<=80),(4.0999583493E-20*AJ3499^6 - 1.0681430043763E-16*AJ3499^5 - 1.47165306482776E-12*AJ3499^4 + 9.4282137266399E-09*AJ3499^3 - 0.0000225133032222922*AJ3499^2 + 0.0246779948603207*AJ3499 - 10.3879275937699),
 IF(AND(G3499>80,G3499<=90),(9.0007208519E-20*AJ3499^6 - 7.92249877065255E-16*AJ3499^5 + 2.45407663061234E-12*AJ3499^4 - 2.3827762359415E-09*AJ3499^3 - 2.79938675427576E-06*AJ3499^2 + 0.00735690164000656*AJ3499 - 4.1277163298096),
 IF(AND(G3499>90,G3499<=100),(1.24851045564E-19*AJ3499^6 - 1.28438522372364E-15*AJ3499^5 + 5.29427870044298E-12*AJ3499^4 - 1.09799614032099E-08*AJ3499^3 + 0.00001162142666706*AJ3499^2 - 0.00536527797674934*AJ3499 + 0.485959577221457),
 IF(AND(G3499>100,G3499<=110),(1.49853331028E-19*AJ3499^6 - 1.64171906341539E-15*AJ3499^5 + 7.37518516945126E-12*AJ3499^4 - 1.73234828506745E-08*AJ3499^3 + 0.0000223224803420994*AJ3499^2 - 0.0148495780463704*AJ3499 + 3.93854699511298)))))))))))-

(IF(AND(G3499>10,G3499<=20),(-3.265714510158E-18*AJ3499^6 + 4.42166193045845E-14*AJ3499^5 - 2.46340888467309E-10*AJ3499^4 + 7.23629002091967E-07*AJ3499^3 - 0.00118281555881131*AJ3499^2 + 1.02028417115852*AJ3499 - 362.80980759934),
 IF(AND(G3499>20,G3499<=30),(-1.695071273978E-18*AJ3499^6 + 2.33909971711971E-14*AJ3499^5 - 1.32462226319237E-10*AJ3499^4 + 3.94688919591779E-07*AJ3499^3 - 0.000653279715267016*AJ3499^2 + 0.5697981841218*AJ3499 - 204.620463648661),
 IF(AND(G3499>30,G3499<=40),(-9.38449848646E-19*AJ3499^6 + 1.32307338799922E-14*AJ3499^5 - 7.62167698224703E-11*AJ3499^4 + 2.30288019121722E-07*AJ3499^3 - 0.000385607809024501*AJ3499^2 + 0.339622494630065*AJ3499 - 122.972194329876),
 IF(AND(G3499>40,G3499<=50),(-5.28954650241E-19*AJ3499^6 + 7.69401257531527E-15*AJ3499^5 - 4.53761462202695E-11*AJ3499^4 + 1.39635491615598E-07*AJ3499^3 - 0.000237253889008004*AJ3499^2 + 0.21145560121238*AJ3499 - 77.3164796554674),
 IF(AND(G3499>50,G3499<=60),(-2.85544754013E-19*AJ3499^6 + 4.38334780186965E-15*AJ3499^5 - 2.68404288089378E-11*AJ3499^4 + 8.49075385012274E-08*AJ3499^3 - 0.000147337529864819*AJ3499^2 + 0.133503600575026*AJ3499 - 49.4627445805817),
 IF(AND(G3499>60,G3499<=70),(-1.31269520609E-19*AJ3499^6 + 2.27246355943697E-15*AJ3499^5 - 1.49626692024634E-11*AJ3499^4 + 4.96876949161859E-08*AJ3499^3 - 0.0000892595883019094*AJ3499^2 + 0.0829932355253609*AJ3499 - 31.3645155097881),
 IF(AND(G3499>70,G3499<=80),(-2.8998775474E-20*AJ3499^6 + 8.64103249946989E-16*AJ3499^5 - 6.99593608652091E-12*AJ3499^4 + 2.59602059060158E-08*AJ3499^3 - 0.0000499862036948382*AJ3499^2 + 0.0487281482140183*AJ3499 - 19.0535024790868),
 IF(AND(G3499>80,G3499<=90),(4.0999583493E-20*AJ3499^6 - 1.0681430043763E-16*AJ3499^5 - 1.47165306482776E-12*AJ3499^4 + 9.4282137266399E-09*AJ3499^3 - 0.0000225133032222922*AJ3499^2 + 0.0246779948603207*AJ3499 - 10.3879275937699),
 IF(AND(G3499>90,G3499<=100),(9.0007208519E-20*AJ3499^6 - 7.92249877065255E-16*AJ3499^5 + 2.45407663061234E-12*AJ3499^4 - 2.3827762359415E-09*AJ3499^3 - 2.79938675427576E-06*AJ3499^2 + 0.00735690164000656*AJ3499 - 4.1277163298096),
 IF(AND(G3499>100,G3499<=110),(1.24851045564E-19*AJ3499^6 - 1.28438522372364E-15*AJ3499^5 + 5.29427870044298E-12*AJ3499^4 - 1.09799614032099E-08*AJ3499^3 + 0.00001162142666706*AJ3499^2 - 0.00536527797674934*AJ3499 + 0.485959577221457))))))))))

4. RESULTS

All the results obtained from both Excel models for both engines were inputted into either a graph or table for ease of analysis.

RPM	CA Ignition Start (°ATDC)	Burn Duration (Degree)	A/F Ratio	Polytropic Index-nExp	Polytropic Index-nComp	50% Burn Duration (Degree)
1000	9	28	16.15	1.2	1.31	23
1250	8	31	16.19	1.18	1.27	24
1500	7	55	16.05	1.28	1.25	35
1750	7	55	14.92	1.26	1.25	35
2000	9	52	14.45	1.25	1.39	35
2250	8	59	14.35	1.29	1.34	38
2500	7	61	14.41	1.29	1.21	38
3000	4	63	13.56	1.29	1.1	36
3500	1	67	13.71	1.31	1.09	35
4000	-1	69	14.07	1.31	1.22	34
4500	-1	69	13.89	1.32	1.22	34
5000	0	68	13.36	1.3	1.18	34
5500	-2	69	13.34	1.3	1.24	33
6000	-4	66	13.04	1.28	1.25	29
6500	-11	48	13.13	1.12	1.26	13

TABLE 1: FORD FOX COMBUSTION CHARACTERISTICS

RPM	Simple		Medium		Complex	
	A	M	A	M	A	M
1000	5.38	1.82	4.96	1.91	4.76	1.95
1250	6.45	2.09	5.91	2.20	5.67	2.24
1500	10.61	1.62	9.26	1.71	9.08	1.75
1750	10.94	1.62	9.74	1.73	9.57	1.76
2000	10.15	1.62	9.15	1.74	8.98	1.78
2250	9.40	1.46	8.41	1.62	8.26	1.65
2500	9.81	1.62	8.61	1.75	8.45	1.79
3000	9.2	1.7	7.93	1.84	7.78	1.87
3500	11.43	1.98	9.66	2.09	9.53	2.12
4000	9.7	1.85	8.05	1.97	7.9	2
4500	8.76	1.45	7.1	1.54	7.07	1.57
5000	8.29	1.54	6.87	1.65	6.77	1.68
5500	9.4	1.65	7.74	1.75	7.66	1.77
6000	9.01	1.67	7.38	1.74	7.31	1.76
6500	9.01	1.67	7.38	1.74	7.31	1.76

TABLE 2: FORD FOX WIEBE FUNCTION A AND M RESULTS

RPM	Simple		Medium	
	A	M	A	M
1500	5.47	2.08	5.23	2.09
1750	6.05	1.97	5.71	1.99
2000	4.96	1.91	4.56	1.97
2500	4.95	1.78	4.49	1.85
3500	4.69	1.84	4.14	1.93
4500	4.75	2.01	4.08	2.06
5000	4.48	1.72	3.94	1.72
6000	3.13	1.67	2.75	1.66

TABLE 3: VW TFSI WIEBE FUNCTION A AND M RESULTS

RPM	Polytropic Index- nExp	Polytropic Index- nComp	Ignition Spark- VW (°ATDC)	10% MFB- Calculated (°ATDC)	Ignition Spark to 10% MFB- VW (°ATDC)	Ignition Spark to 10% MFB- Calculated (°ATDC)	5-50% Burn Duration- VW (°CA)	5-50% Burn Duration- Calculated (°CA)
1500	1.24	1.22	-8.17	2.6	11.94	10.77	6.13	6.5
1750	1.23	1.25	-6.04	5.1	12.48	11.14	6.65	6.9
2000	1.22	1.13	0.28	12.6	14.04	12.88	8.1	8.3
2500	1.22	1.23	1.27	14.8	15.54	13.53	9.06	9.2
3500	1.23	1.28	-6.83	10.7	20.34	17.53	12.55	11.9
4500	1.22	1.28	-8.43	9.1	20.17	17.53	11.95	11.5
5000	1.21	1.29	-13.65	2.9	20.45	16.55	11.31	10.7
6000	1.22	1.3	-15.84	4.4	21.01	20.24	11.2	11

TABLE 4: VW TFSI COMBUSTION CHARACTERISTICS

RPM	Lambda	A.I. Equation (@1)	Burnt Zone Maximum Temp (K)
1500	1	3	2694
1750	1.001	2.59	2691
2000	0.999	1.67	2692
2500	1	1.5	2673
3500	0.94	1.02	2569
4500	0.887	1.05	2547
5000	0.911	1.05	2426
6000	0.887	2.47	2794

TABLE 5: VW TFSI AUTO-IGNITION RESULTS

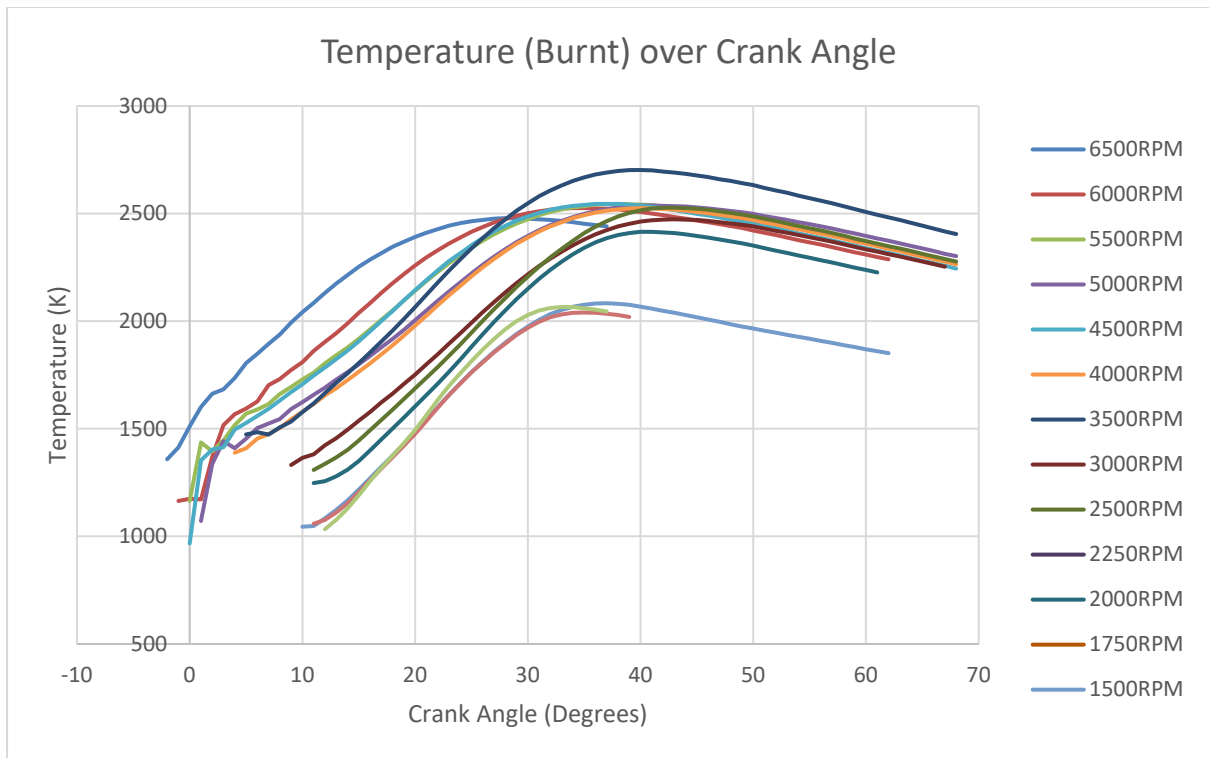


FIGURE 9: FORD FOX BURNT TEMPERATURE OVER CRANK ANGLE GRAPH

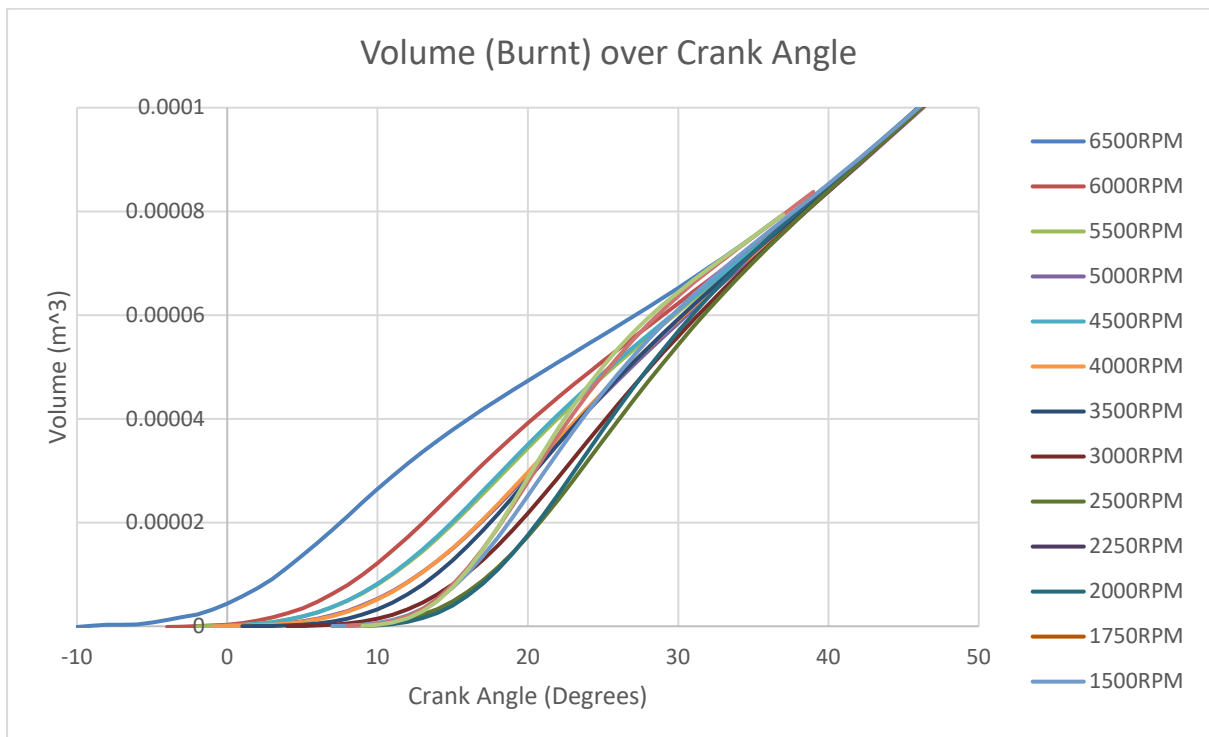


FIGURE 10: FORD FOX BURNT VOLUME OVER CRANK ANGLE GRAPH

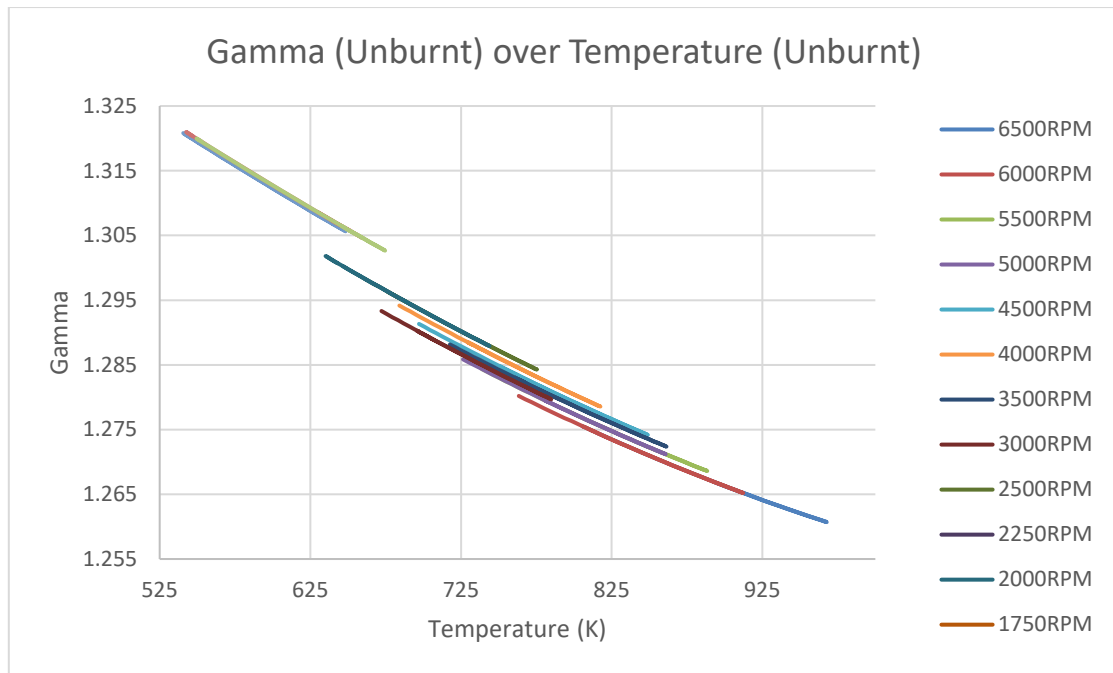


FIGURE 11: FORD FOX UNBURNT TEMPERATURE OVER CRANK ANGLE GRAPH

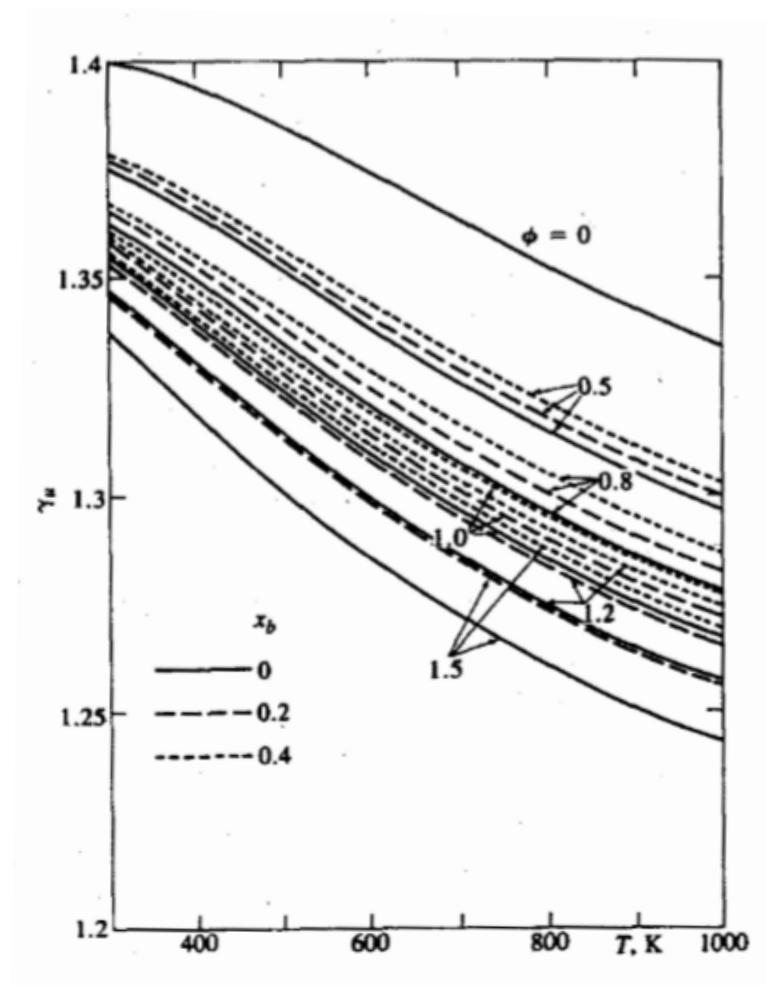


FIGURE 12: GAMMA OVER TEMPERATURE GRAPH (HEYWOOD, 1988)

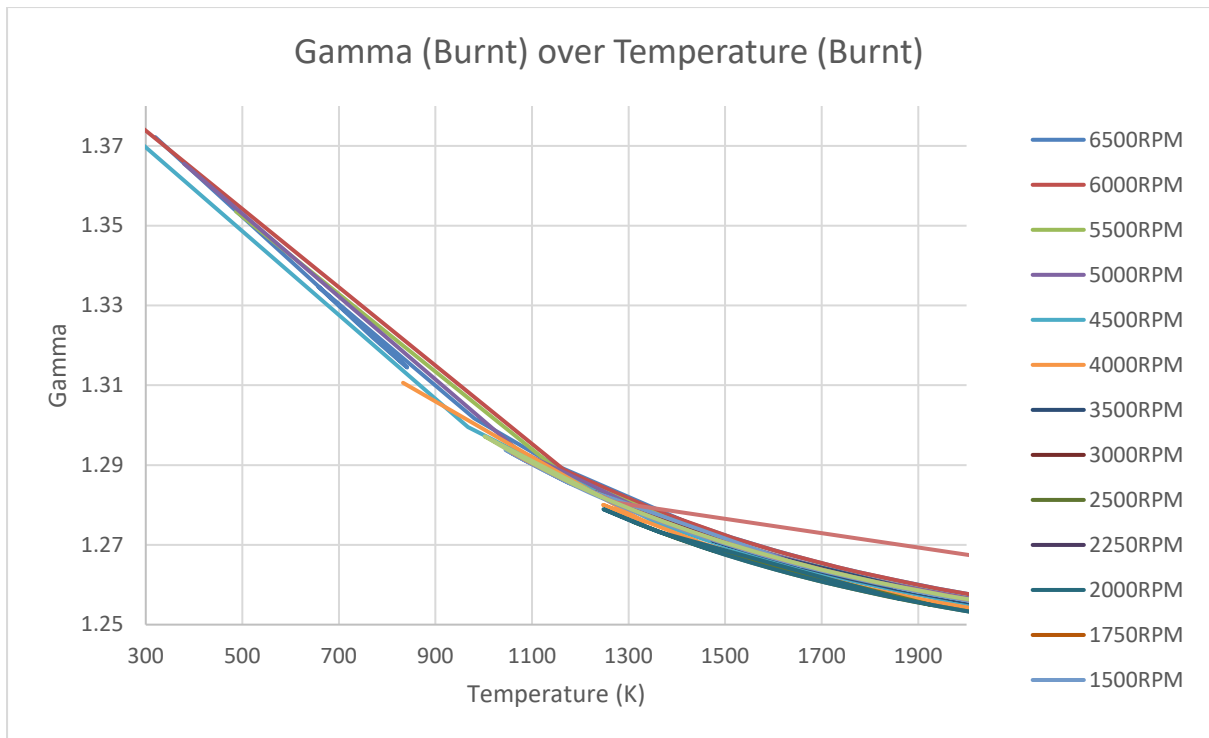


FIGURE 13: FORD FOX BURNT GAMMA OVER BURNT TEMPERATURE GRAPH

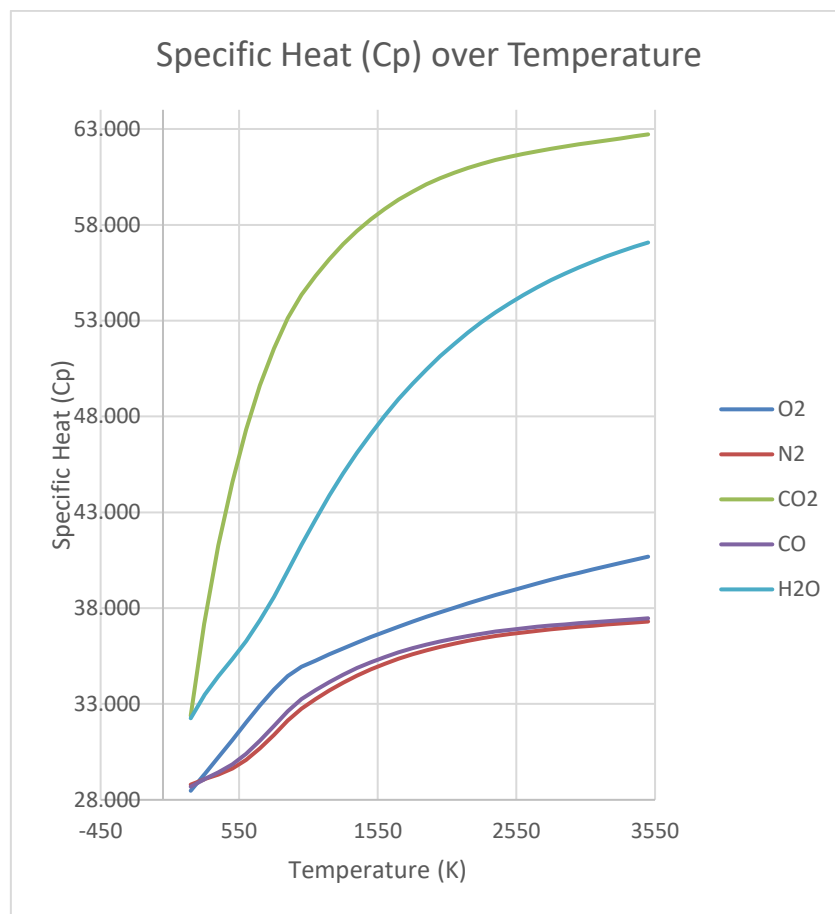


FIGURE 14: SPECIFIC HEAT OVER TEMPERATURE GRAPH

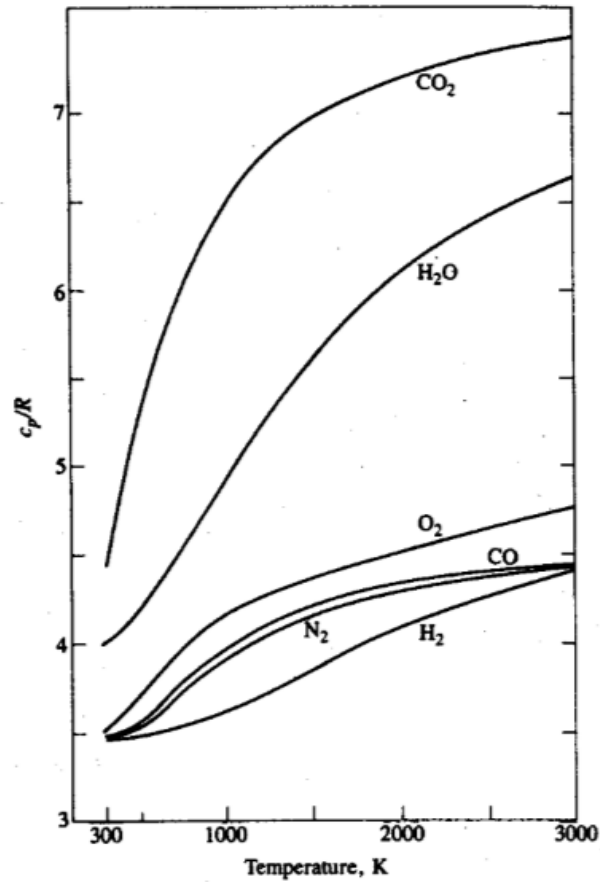


FIGURE 15: SPECIFIC HEAT OVER TEMPERATURE GRAPH (HEYWOOD, 1988)

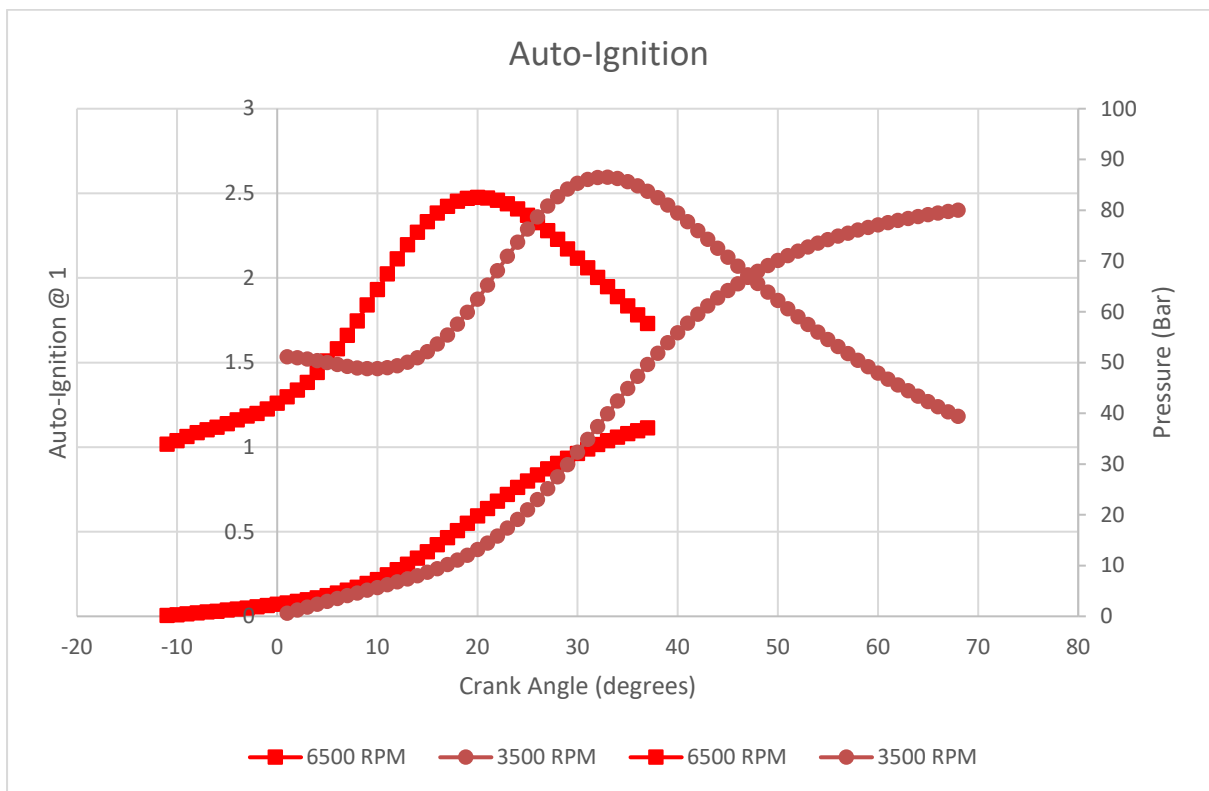


FIGURE 16: FORD FOX AUTO-IGNITION GRAPH

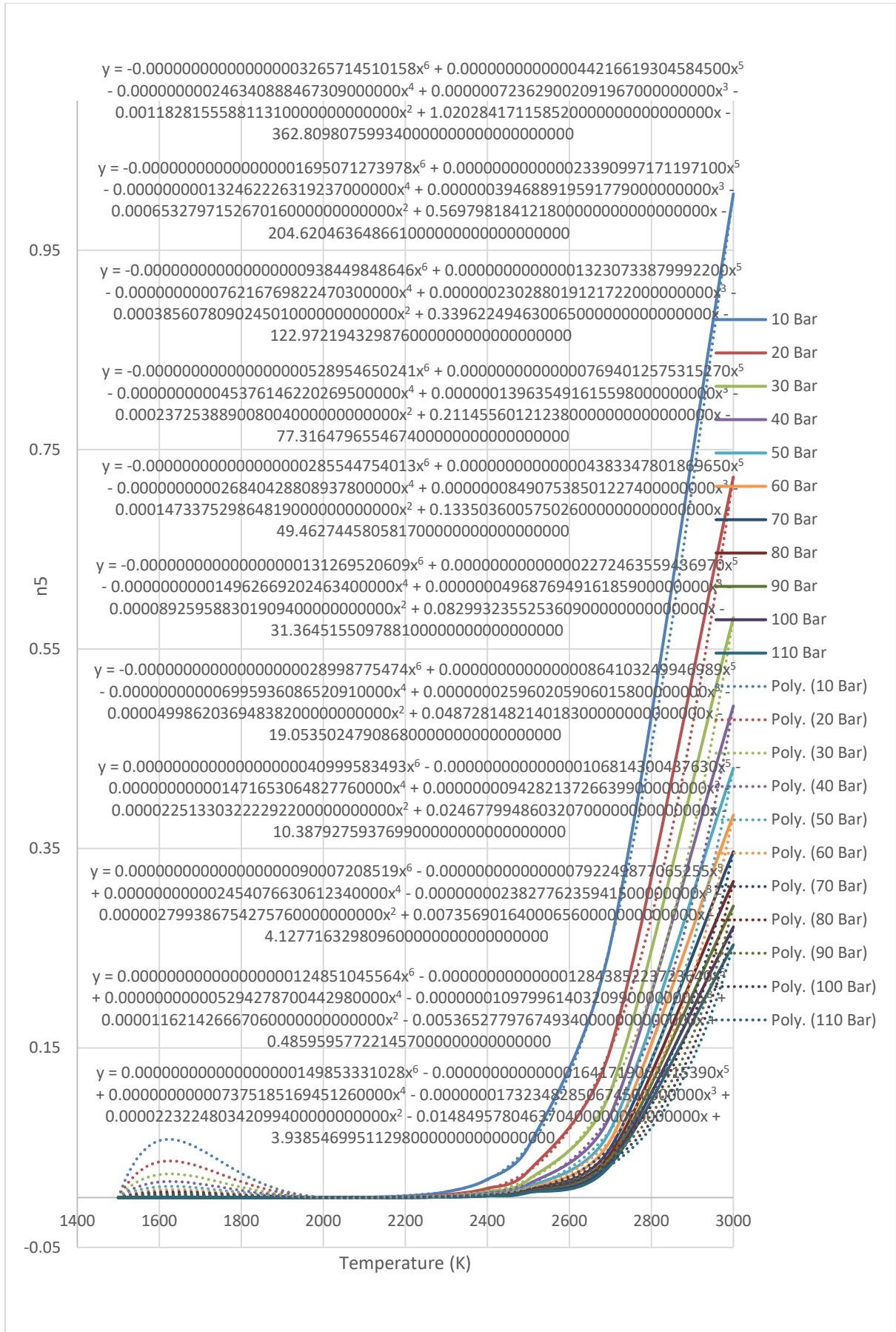


FIGURE 17: EXAMPLE OF N5 POLYNOMIAL EQUATIONS USED GRAPH

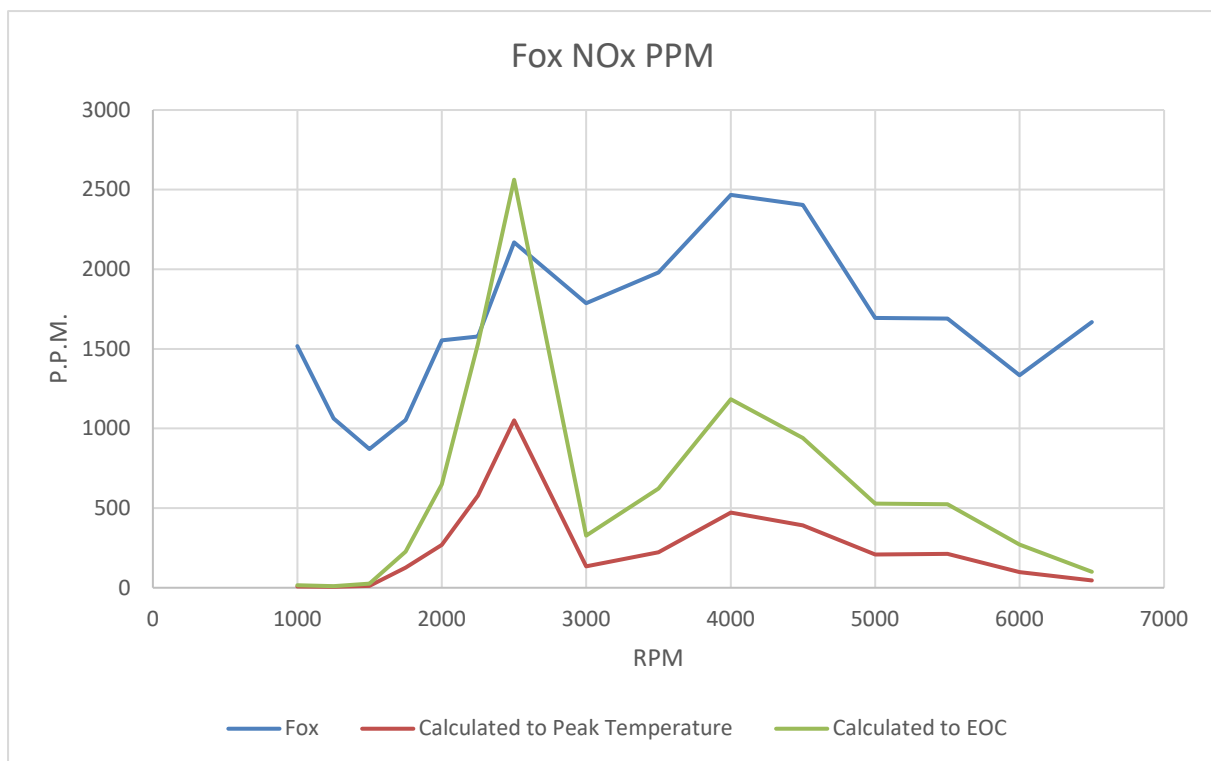


FIGURE 18: FORD FOX NOx P.P.M. GRAPH

RPM	Fuel Equivalence Ratio	Ford Fox (P.P.M.)	Calculated to Peak Temperature (P.P.M.)	Calculated to EOC (P.P.M.)
1000	0.9	1518	8.2	15.5
1250	0.9	1064	5.8	10
1500	0.9	871	11.1	24.9
1750	0.97	1053	126.7	226.2
2000	1.01	1553	269.6	649.4
2250	1.01	1577	578.5	1532.2
2500	1.01	2169	1051.3	2562.4
3000	1.08	1787	134.3	327.6
3251	1.06	1979	222.2	623.1
4000	1.03	2467	471.5	1184.3
4500	1.05	2404	392.5	941.5
5000	1.09	1695	208.5	528.9
5500	1.09	1690	212.5	524.3
6000	1.11	1335	97.8	271.6
6500	1.11	1668	45.9	99.9

TABLE 6: FORD FOX NOx P.P.M. RESULTS

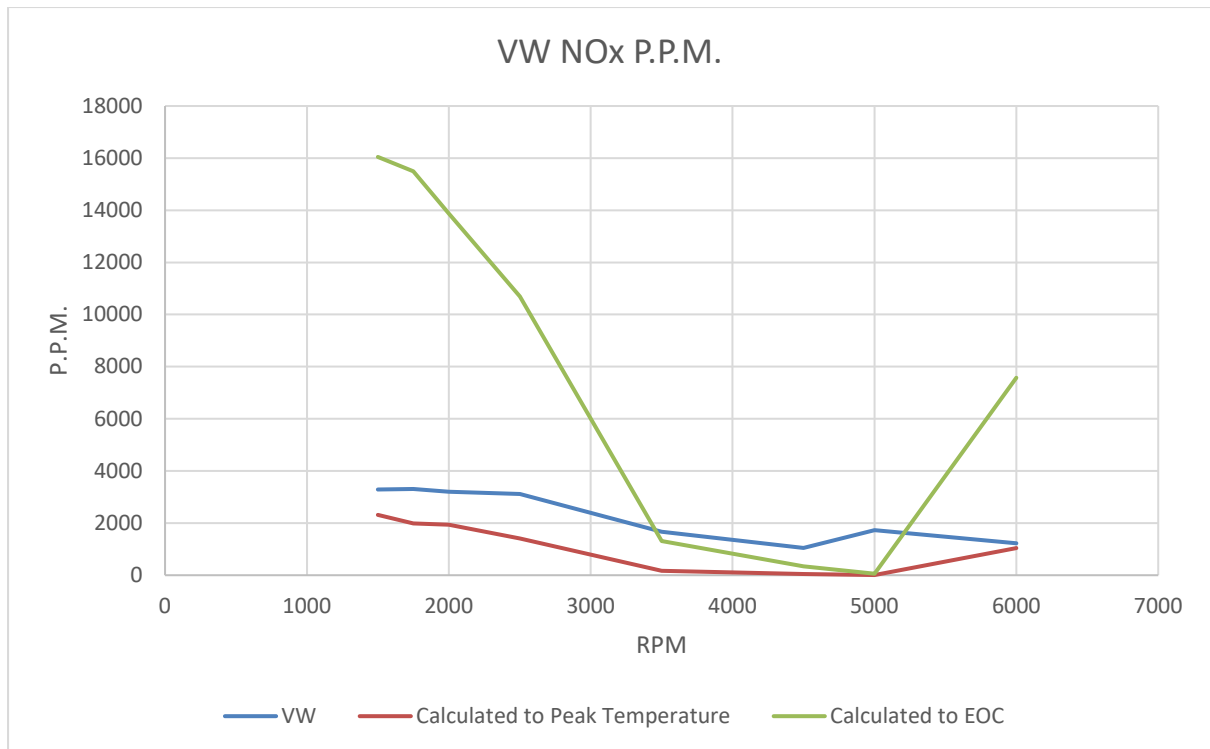


FIGURE 19: VW TFSI NOx P.P.M. GRAPH

RPM	Fuel Equivalence Ratio	VW TFSI (P.P.M.)	Calculated to Peak Temperature (P.P.M.)	Calculated to EOC (P.P.M.)
1500	1	3291.8	7657.659	16046.6
1750	1	3308.3	6590.427	15493.93
2000	1	3200.9	6427.397	13875.27
2500	1	3117.6	4715.296	10695
3500	1.06	1667.7	578.7907	1310.69
4500	1.13	1046.4	161.8607	341.82
5000	1.1	1725	25.76331	58
6000	1.13	1229.1	3320.54	7570.6

TABLE 7: VW TFSI NOx P.P.M. RESULTS

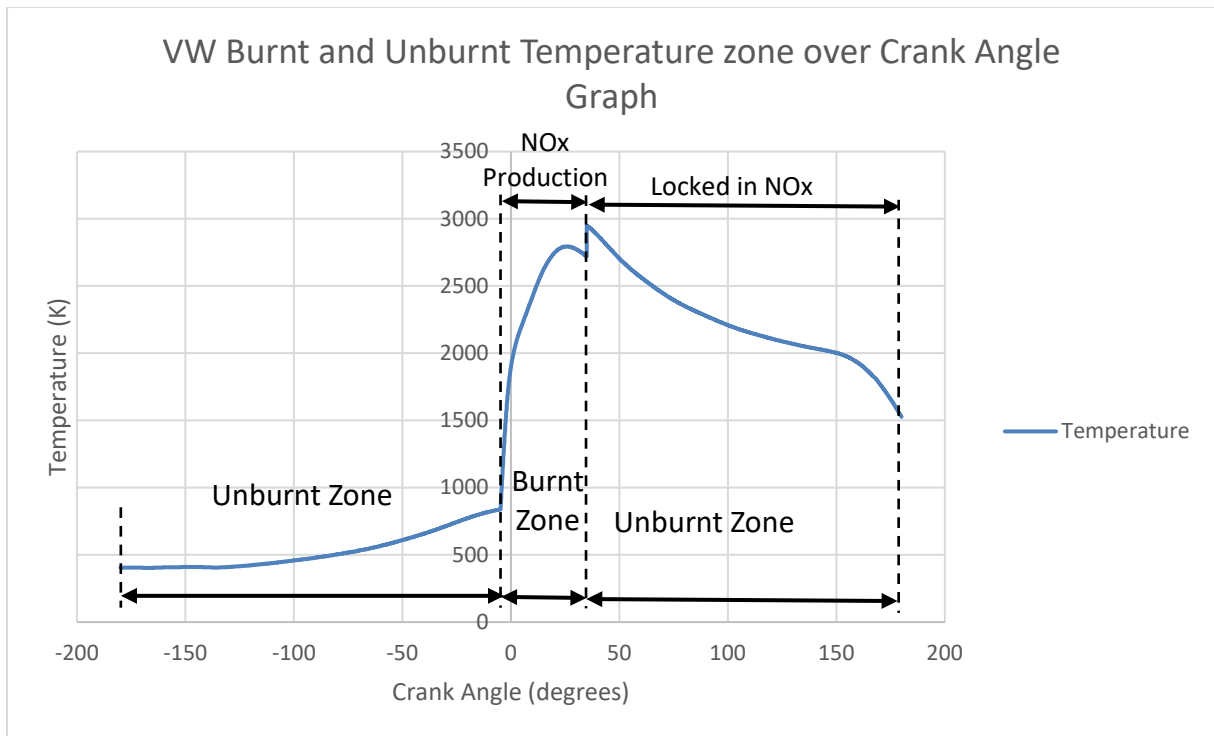


FIGURE 20: VW TFSI BURNT AND UNBURNT ZONE TEMPERATURE OVER CRANK ANGLE GRAPH

As the Zeldovich mechanism contained 2 constants, it was possible to change these constants and analyse the results.

Zeldovich Constant	Ford Fox Zeldovich Constants	VW TFSI Zeldovich Constants
4.7×10^{13}	4.7×10^{13}	2×10^{12}
-67837	-65337	-85237
<u>Multiplying Factor=1</u>	<u>1</u>	<u>5000</u>

TABLE 8:MODIFIED ZELDOVICH CONSTANTS

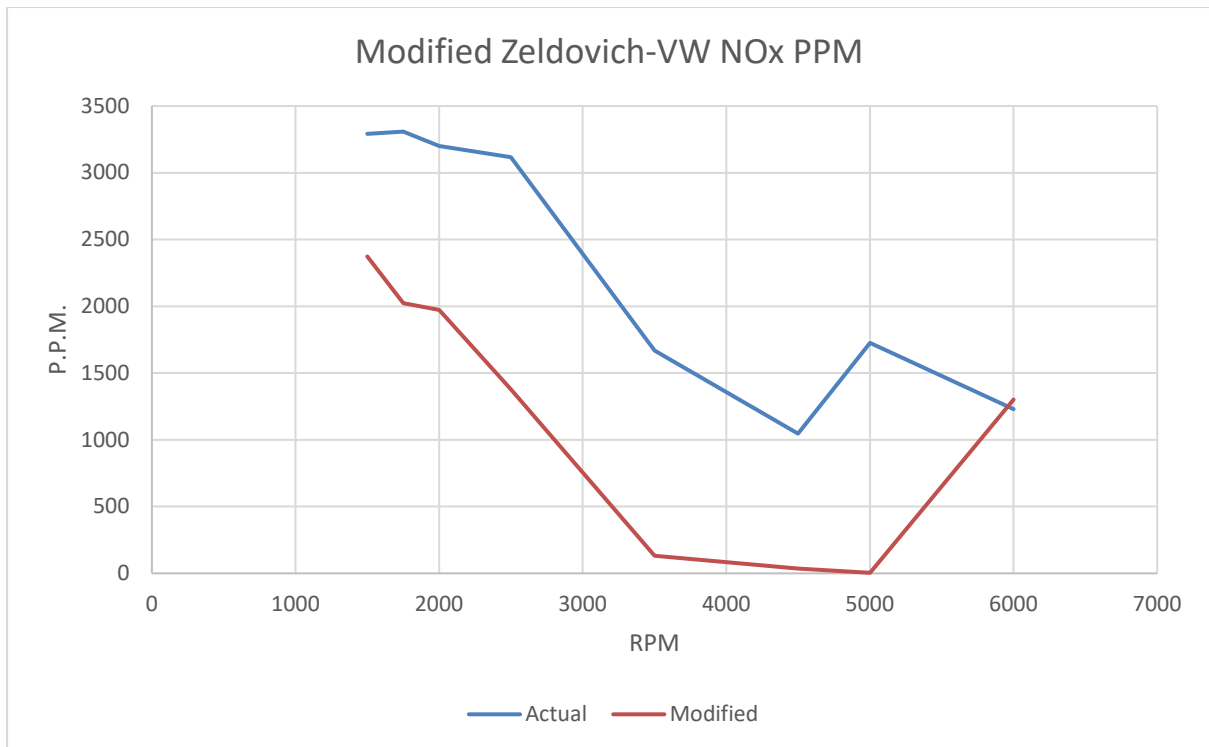


FIGURE 21:MODIFIED VW TFSI NOx P.P.M. ZELDOVICH CONSTANTS GRAPH

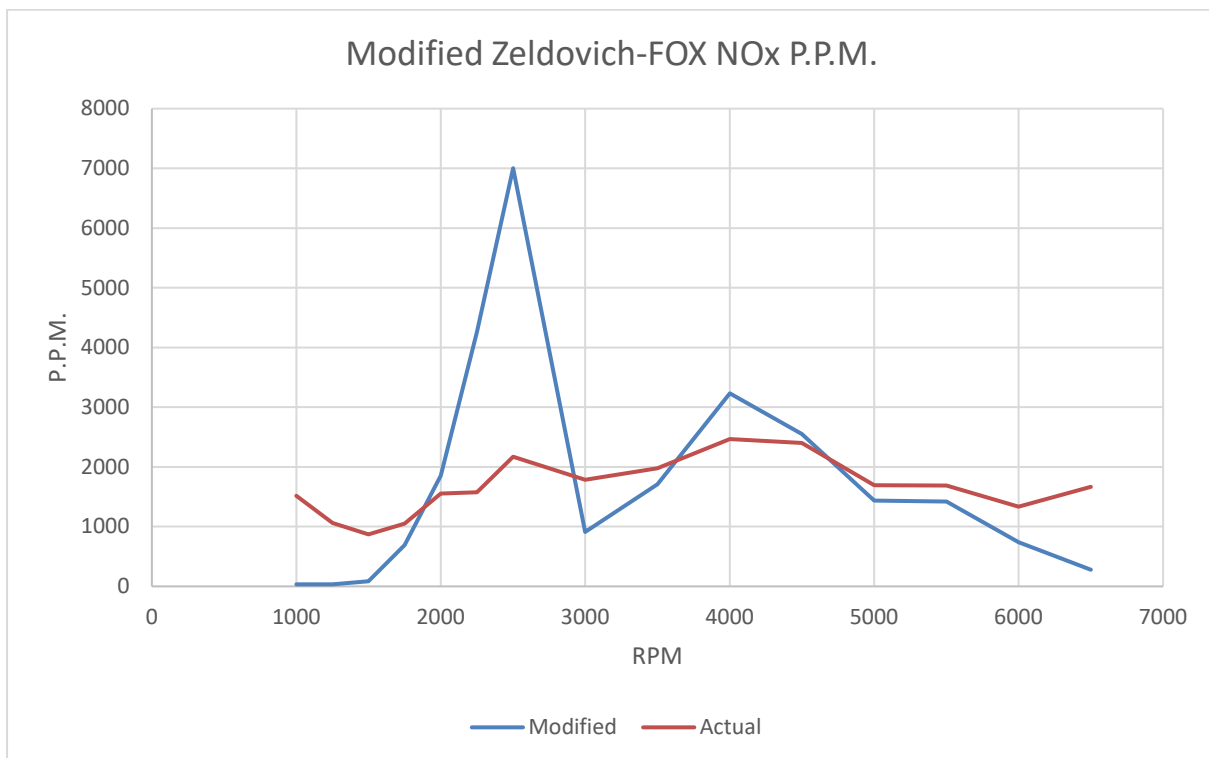


FIGURE 22:MODIFIED FORD FOX NOx P.P.M. ZELDOVICH CONSTANTS GRAPH

5. ANALYSIS

Tables 1-4, all showed that it was not acceptable to use a constant value when using the polytropic index or Wiebe function A and M constants. Every engine has different characteristics which effect these values. Also shown in figures 11, 13 and 14, the specific heat and gamma values changed with temperature, as shown by Heywood, 1988 in figures 12 and 15. This was due to the vibration degrees of freedom of the molecules. In an engine, once fuel was added or reduced, the specific heat (Cv) of the mixture increased, causing gamma to drop from 1.4 (air at a low temperature) to 1.35. It also lowered as the temperature increased, causing the specific heat (Cv) to increase because of the increased vibrations from the molecules.

These low gamma values were bad for engine efficiency because with rising temperatures inside the cylinder, the specific heats go up with vibration, therefore causing the gamma value to decrease. As shown by Butcher, 2016,

$$\eta = \frac{1}{\text{Compression Ratio}^{\gamma-1}}$$

Therefore, high gamma values and compression ratios improve an engines efficiency. Once way to practically do this is to use a pre-ignition chamber, which enables a lean mixture to also be used, as in reality, when a lean mixture is used, combustion slows down, the end of combustion is later and the expansion ratio gets smaller between TDC and the exhaust valve opening. This causes high exhaust gas temperatures, causing a less efficient engine.

5.1. Ford Fox Auto-Ignition Model

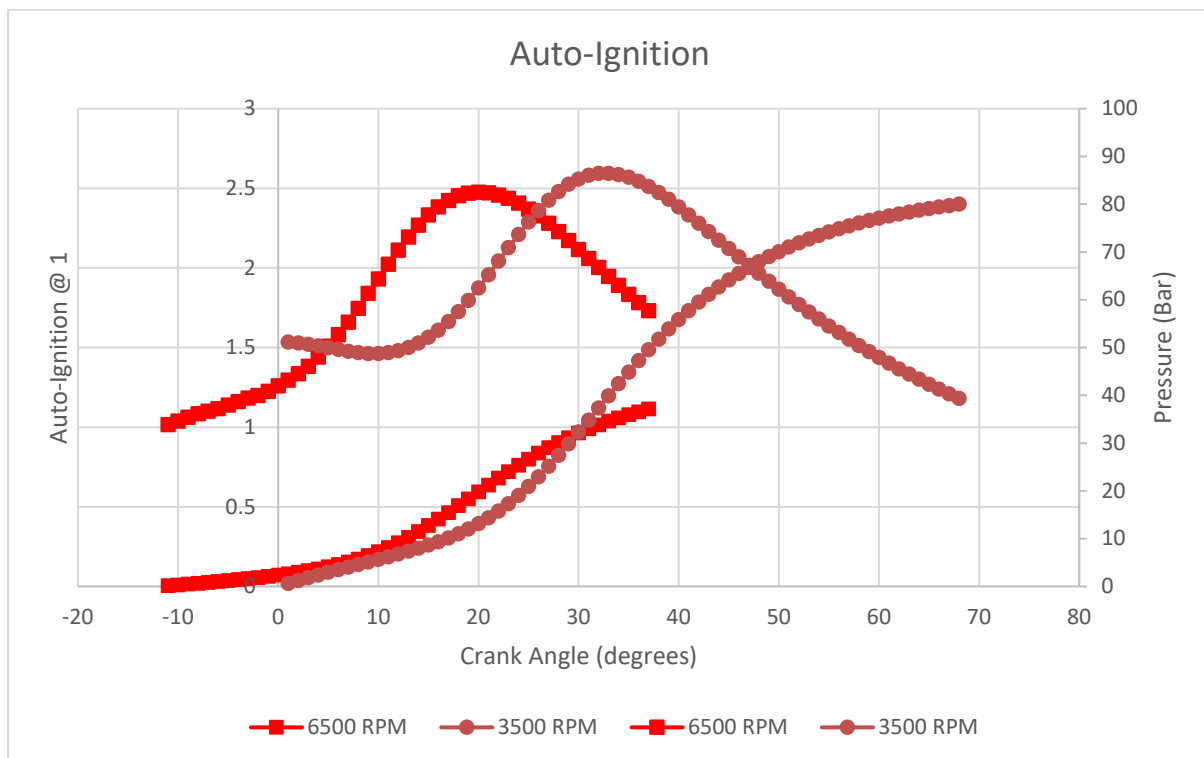


FIGURE 23: FORD FOX AUTO-IGNITION GRAPH

After analysing table 5, and figure 23, using the Auto-Ignition equation constants from Heywood, 1988, values came close to 1 but also exceeded 1. Unfortunately, after researching Auto-Ignition in more detail from Eckert, et al., 2003, Liang, et al., 2007, Shao & Rutland, 2014 and Subramanian, et al., 2007, a more detailed 3-dimensional model would need to be created as to identify when Auto-Ignition would take place. Turbulence modelling, spray modelling, a full 360 degrees combustion chamber geometry and intake flow simulation would need to be conducted. The use of chemical kinetics would also create a ~100 zone model (for example, instead of a 2 zone). This was not possible to do at a degree level and a complex CFD analysis would need to be conducted, which was not an option.

It was interesting however, to see how table 5 showed that at lower and higher RPM's where the combustion temperature was the hottest, was also where the Auto-Ignition values were the highest, showing that when the mixture was rich, it was less explosive, causing less Auto-Ignition.

Shao & Rutland, 2014, showed that even after creating a Auto-Ignition model, Auto-Ignition could not be found, but there was Auto-Ignition happening in the real engine, showing how difficult a task it was.

Table 4 showed how the 2-zone model created was a good validation tool and values were almost identical to the Volkswagen figures given.

5.2. VW TFSI NOx Model

The Volkswagen over predicted NOx at lower RPM's, because at low RPM there was more time for reverse reactions to take place, as shown below in figure 28. The Volkswagen also used a supercharger at lower RPM which would improve the mixture, but we were over estimating and not including the reverse reactions. When calculating NOx to peak temperature, the model underpredicted, showing it did not take into consideration the rich patches, causing more NOx in reality.

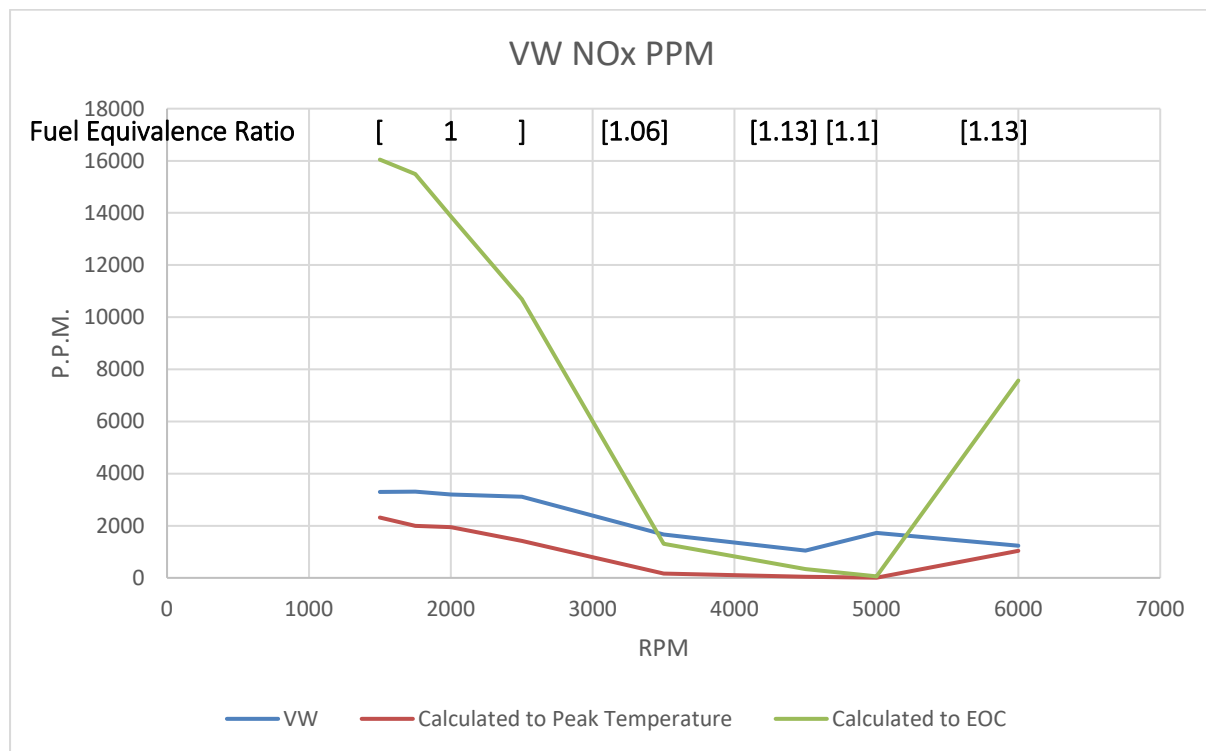


FIGURE 24: VW NOx P.P.M. GRAPH WITH FUEL EQUIVALENCE RATIOS

Figure 25 showed how the changed Zeldovich constants used in table 8 gave a better trend line in comparison to the standard Zeldovich constants used. The NOx created from the actual engine lowered at low and high RPM's, taking into account the reverse reactions at low RPM and less time for mixing at high RPM.

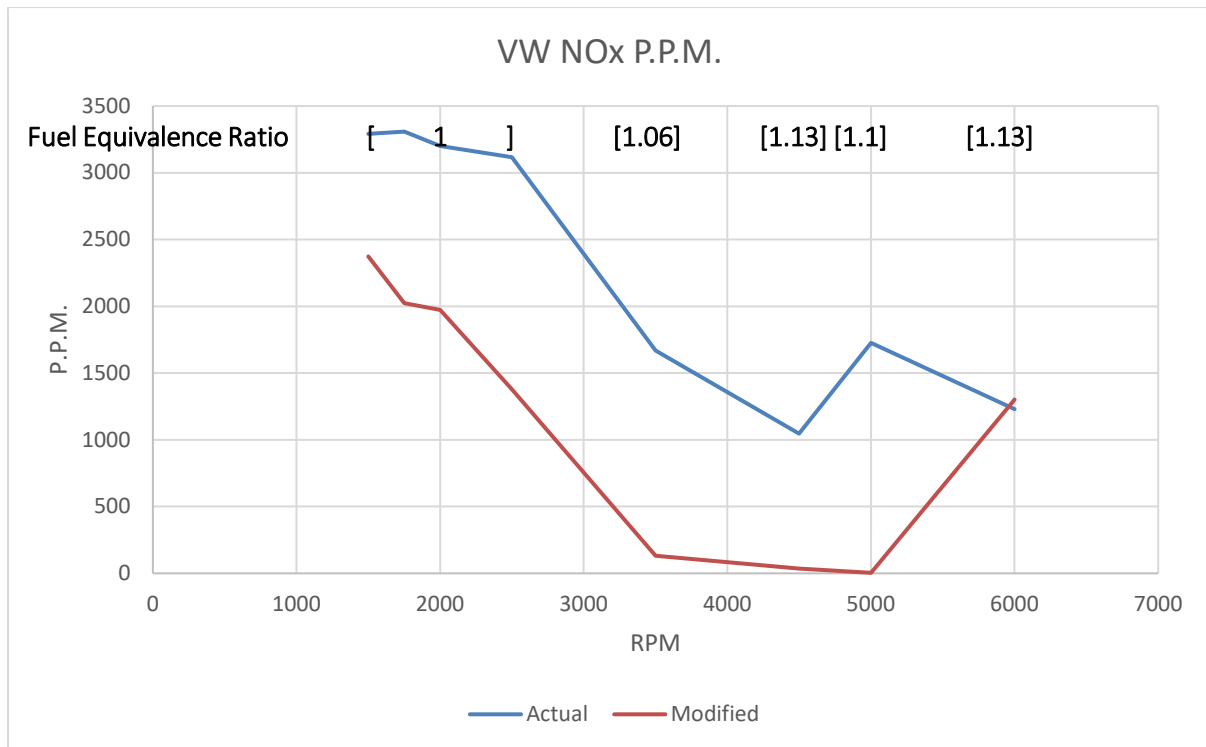


FIGURE 25:MODIFIED VW TFSI NOx P.P.M. ZELDOVICH CONSTANTS GRAPH

5.3. Ford Fox NOx Model

The Ford results showed the actual numbers were higher at lower RPM because at low RPM, there was low air speed, which was not good for mixing, but we were assuming it was homogenous, therefore well mixed, giving less NOx. The Ford only used a turbo, therefore it was not as homogenous as we predicted, therefore always under predicting the NOx. It was also a possibility that the burnt zone temperatures were too low, causing less NOx to be calculated.

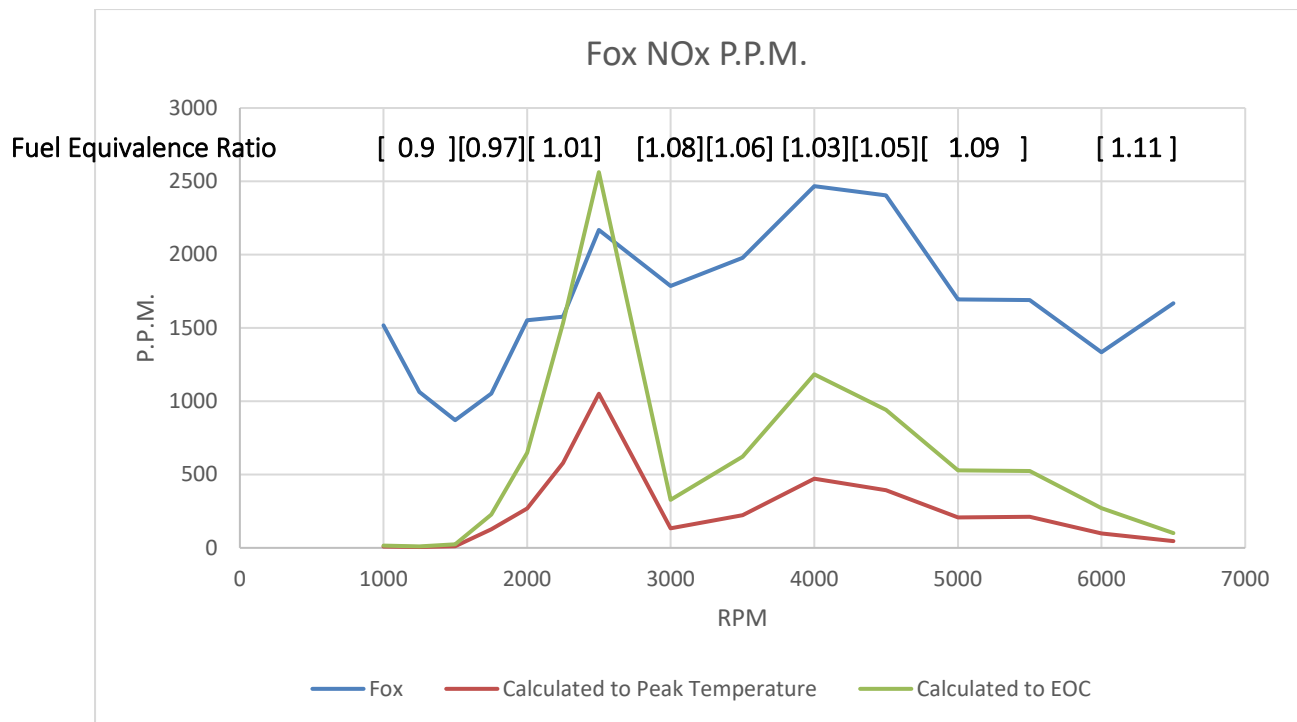


FIGURE 26: FORD FOX NOx P.P.M. GRAPH WITH FUEL EQUIVALENCE RATIOS

Once the Zeldovich constants were altered in table 8, the results showed in figure 27 a more accurate trendline, showing that the previous model was homogenous and in reality, it wasn't. The sharp rise at 3500 RPM was due to the NOx being calculated to the E.O.C. and not to peak temperature, as after peak temperatures, reverse reactions took place, reducing the NOx values.

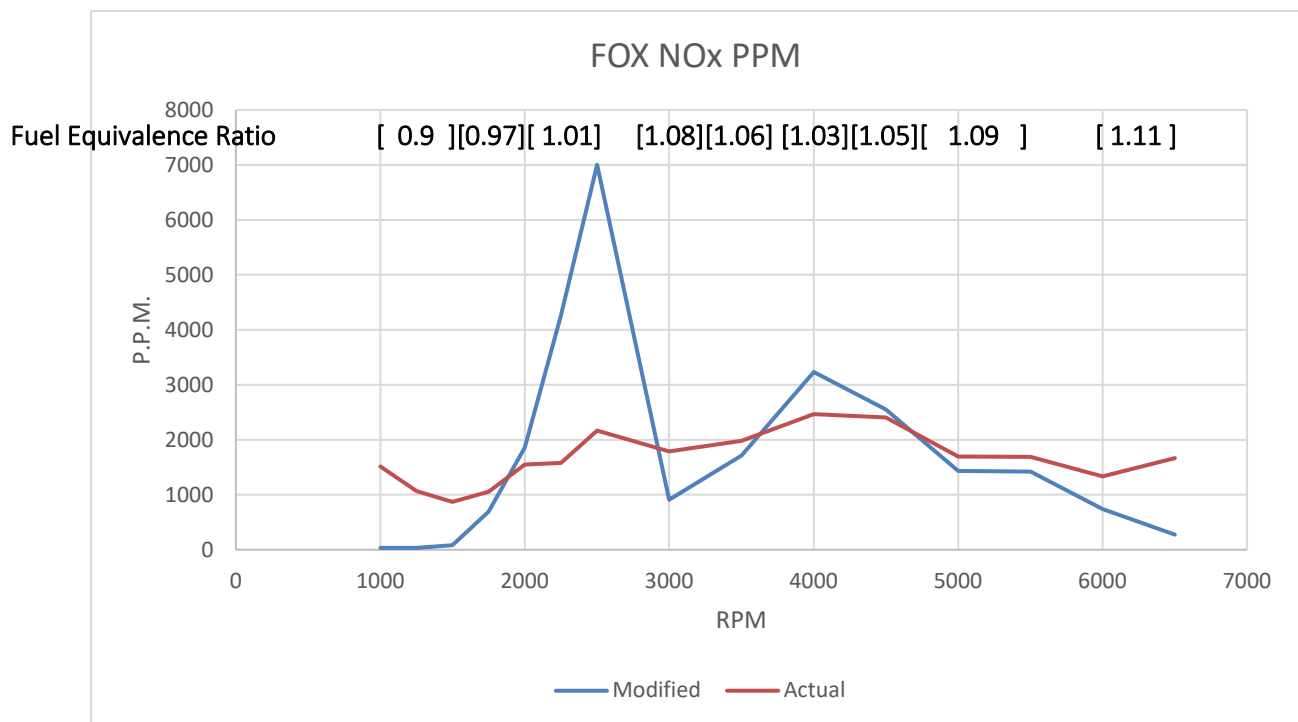


FIGURE 27: MODIFIED FORD FOX ZELDOVICH CONSTANTS GRAPH

Figures 24, 26 and tables 6 and 7 showed that as both NOx models were only an approximation, getting values near the actual P.P.M. values were quite good as the trend line of the figures 24 and 26 were almost identical. Once NOx was calculated to the E.O.C. in both models, it produced higher values than when it was calculated to the peak temperature. For the Ford Fox engine, it was a good thing, but with the Volkswagen engine, at low and high RPM's it was a bad thing as it was over predicting values. As shown in figure 28, at lower RPM there was more time for reverse reactions and at high RPM, there was less time for mixing. Other reasons why it was calculating less or more NOx at some RPM's in comparison to the actual data were, the model assumed there to be a constant temperature and the mixture to be homogenous. As the temperature of the burnt zone dropped rapidly, NOx was added in some instances, but in reality, the NOx was frozen in. If the temperature didn't drop rapidly then there would be time for reverse reactions to reduce the NOx concentration. Also, assuming the mixture was homogenous, in reality, it was not, as there were various lean/rich patches inside the combustion chamber, causing less or more NOx (figure 30). Therefore, it was hard to model a NOx combustion model 100% accurately.

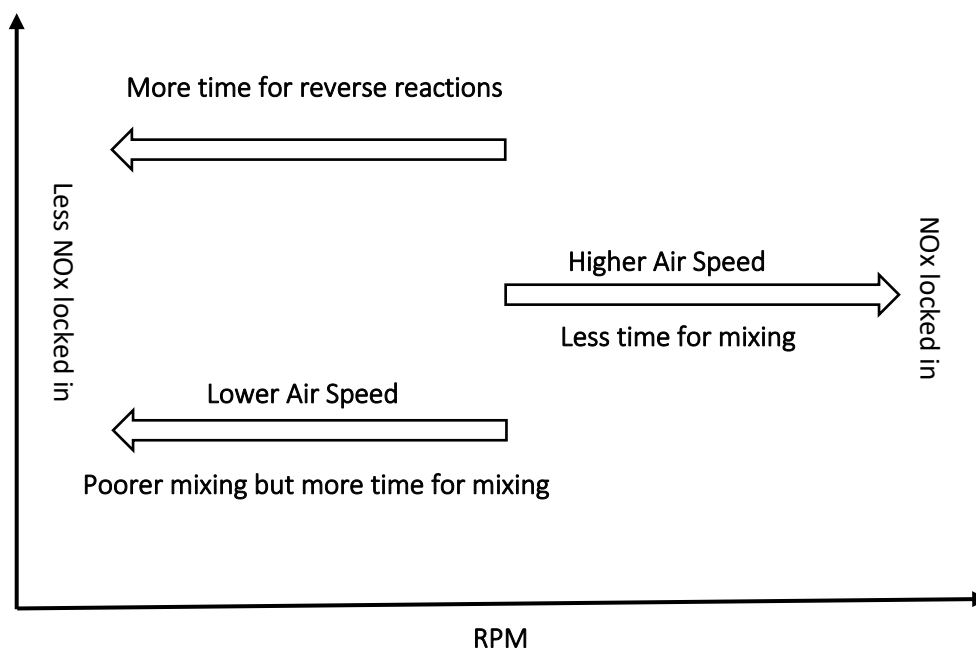


FIGURE 28: AMOUNT OF LOCKED IN NOx OVER RPM GRAPH

Looking at figure 28, showed that both Ford and Volkswagen would need to use fueling strategies to deal with these scenarios. Both Ford and Volkswagen injection durations increased with RPM, and both injected earlier, therefore both used similar techniques in trying to obtain a homogenous mixture.

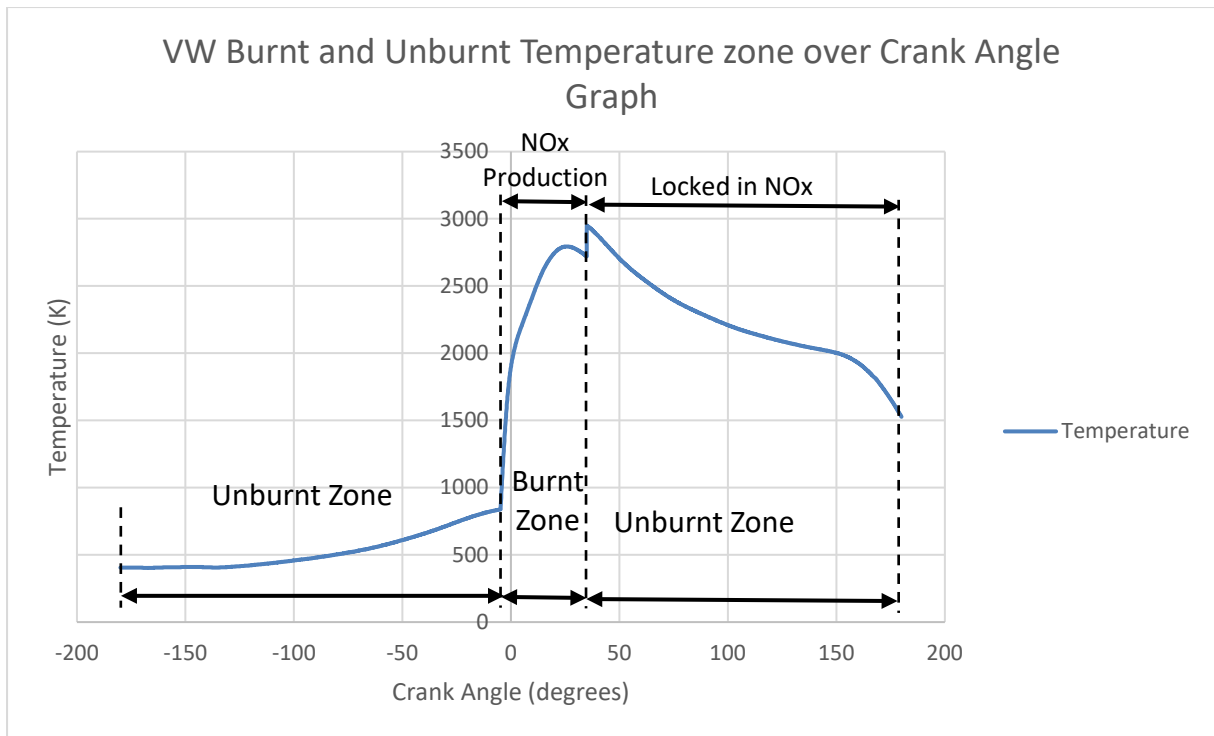


FIGURE 29: TFSI BURNT AND UNBURNT ZONE TEMPERATURE OVER CRANK ANGLE GRAPH

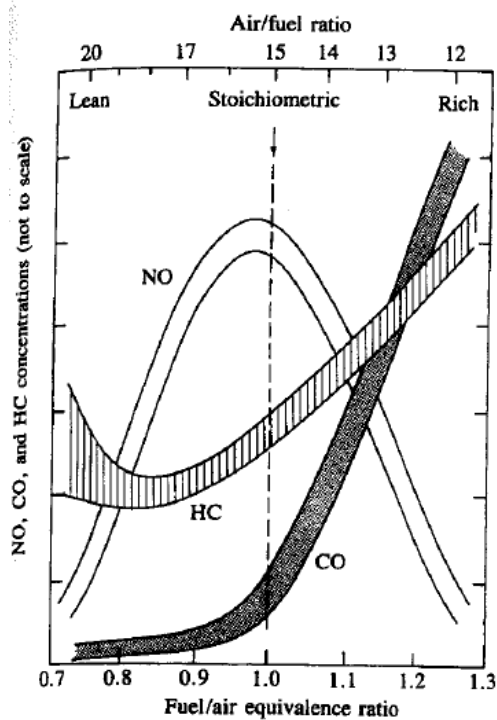


FIGURE 11-2
Variation of HC, CO, and NO concentration in the exhaust of a conventional spark-ignition engine with fuel/air equivalence ratio.

FIGURE 30:NOX OVER FUEL EQUIVALENCE GRAPH (HEYWOOD, 1988)

Koci, et al., 2006, showed that when creating a NO_x model, it was necessary to model the NO destruction, as this was significant in mixing controlled combustion. They showed that predicted NO could be up to 35% more for the cases presented and that there also needed to be a 3rd Zeldovich formulae for the NO destruction.

As NO_x production can depend on the temperature of the burnt zone, Merker, et al., 2006, showed that if the burned zone temperature was slightly too high, the NO_x production could sometimes be 10³ greater. Also, as the Zeldovich equation used an exponential, a 30°C change in temperature gave almost a 50% increase in NO_x, and if the Oxygen concentration increased, the NO_x would also increase.

When analysing the NO_x data, another factor which could have effected the overall number, was the polytropic index used. Brunt & Pond, 1997, showed that the polytropic used, effects the calculated pressure inside the cylinder, which in turn effects the temperature. A higher temperatrue would create more NO_x and a lower temperature would give less NO_x.

6. CONCLUSION

In conclusion I think my dissertation was a success as an Auto-Ignition model and 2 NOx models were also created with dissociation of Carbon Dioxide and Water calculated accurately. A lot was learnt in regard to the combustion process inside a internal combustion engine and that to create an accurate model, varying constants like the polytropic index, Wiebe function A and M constants, Specific heat and gamma values are constantly changing inside the engine, and it is not accurate to use a constant for these values.

As the modelling of combustion was an interesting topic to achieve in Excel, one reason for choosing to do this for my dissertation was so that I could carry on working on it when I was not on campus, and did not have to rely on resources from other people. As Excel is a common software package used in many engineering companies, it also made sense to learn new techniques in Excel which would benefit me in my future work life. Techniques like “IF” and “AND” statements, Goal Seek and general time saving shortcuts which saved a lot of time when making a new model were all valuable methods to become proficient in.

A lot was learnt from researching into Auto-Ignition and NOx papers, and after first being dis-heartened about the results I obtained, I quickly learnt that modelling a combustion engine can be a hard task to do, even with a C.F.D. exercise, which stated earlier was not academically possible at a degree level, and the results I obtained were actually quite good.

Further work could involve using Chemkin, a chemical kinetics package to model the Auto-ignition inside the cylinder, but as stated before, Shao & Rutland, 2014, showed that even after creating a Auto-Ignition model, Auto-Ignition could not be found, but there was Auto-Ignition happening in the real engine.

If changes were made to the NOx model, it would be possible to modify the gas constant, as the non-dissociated gas constant was used. The dissociated gas constant could now be calculated which would use,

$$R_B = \frac{Ru}{Mol W_B}$$

Where,

$$Burned = n_1 CO_2 + n_2 H_2O + n_3 CO + n_4 H_2 + n_5 O_2 + n_6 N_2$$

Also,

$$Mol\ Weight = \frac{(n_1 \times 44 + n_2 \times 18 + n_3 \times 28 + n_4 \times 2 + n_5 \times 32 + n_6 \times 28)}{(n_1 + n_2 + n_3 + n_4 + n_5 + n_6)}$$

This would then have an effect on the burnt zone temperatures. If R_B was higher, it would give a lower temperature, giving less NO_x, and if R_B was lower, it would give a higher temperature, creating more NO_x.

Finally, a lot of the success was down to the continued support and help from my course tutor, Malcolm McDonald, where weekly meetings and support from e-mails at any time were partly down to the success of this dissertation.

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APPENDIX

Derivation of the Mass Fraction Burned.

$$\begin{aligned} dQ_r &= du + P.dV && \text{From Ideal Gas Law } PV = m.R.T \\ &= m.C_v.dT + P.dV \end{aligned}$$

Heat release model assumes constant volume burning, i.e. $dv=0$

$$\text{If } P.V = m.R.T$$

$$d(P.V) = d(m.R.T)$$

$$P.dV + V.dP = m.R.dT$$

Initially at start of 1 degree $P=P, V=V$. At end of 1 degree $P=P+dP, V=V+dV$

$$\begin{aligned} \text{Change in } P \times V &= d(P.V) = (P+dP)(V+dV) - PV \\ &= PV + P.dV + V.dP + dP.dV - PV && \dots dP.dV \approx 0 \\ d(P.V) &= P.dV + V.dP \end{aligned}$$

$$P.V = m.R.T$$

$$d(P.V) = d(m.R.T) = m.R.dT$$

$$P.dV + V.dP = m.R.dT \quad \dots \text{when } dV=0$$

$$\therefore V.dP = m.R.dT$$

$$\text{But } dQ_r = m.C_v.dT$$

$$\therefore m.dT = \frac{dQ_r}{C_v}$$

$$\therefore V.dP = \frac{dQ_r.R}{C_v}$$

So,

$$MFB = \frac{\sum_{soc-\theta} dQ_r}{\sum_{soc-eoc} dQ_r} \quad \text{where } dQ_r = \frac{C_v}{R}.V_2.dP \quad \text{or} \quad V_2.dP = \frac{R}{C_v}.dQ_r$$

So,

$$\text{Simple MFB} = \frac{\sum_{soc-\theta} dP}{\sum_{soc-eoc} dP}$$

$$\text{Medium MFB} = \frac{\sum_{soc-\theta} V_2 \cdot dP}{\sum_{soc-eoc} V_2 \cdot dP}$$

$$\text{Complex MFB} = \frac{\sum_{soc-\theta} \frac{C_v}{R} \cdot V_2 \cdot dP}{\sum_{soc-eoc} \frac{C_v}{R} \cdot V_2 \cdot dP}$$

Where V is volume, P is pressure, T is temperature, Cv is specific heat at constant volume, R is gas constant, dQr is heat released and m is mass.

Derivation of Specific Heat at constant pressure (Cp) and PV^γ

1st Law of thermodynamics-conservation of energy, $dQ=dU+dW$

If gas volume is fixed in a solid container, $dW=0$, so $dQ=dU=m \cdot C_v \cdot dT$ (the increase in internal energy, or it is the increase in temp energy when temp rises and is the same always)

1st principles,

dU is always $m \cdot C_v \cdot dT$

It is the same as the heat in= dQ when volume is fixed $dW=0$

1st Law in general, $dQ=dU+dW$

$$dQ=m \cdot C_v \cdot dT+dW$$

$$dQ=m \cdot C_v \cdot dT+P \cdot dV$$

Using the ideal gas law, $P \cdot V=m \cdot R \cdot T$

Change in $P \cdot V$ =change in $m \cdot R \cdot T$

$$d(P \cdot V)=d(m \cdot R \cdot T)=m \cdot R \cdot dT$$

Work Done= $dW=P \cdot dV=m \cdot R \cdot dT$ at constant pressure

1st Law

$$dQ=dU+P \cdot dV$$

$$\text{so, } dQ=m \cdot C_v \cdot dT+P \cdot dV$$

At constant pressure, $P \cdot dV=m \cdot R \cdot dT$

$$\text{So, } dQ=m \cdot C_v \cdot dT+m \cdot R \cdot dT$$

$$dQ=m \cdot (C_v+R) \cdot dT$$

$$dQ=m.C_p.dT$$

$$\text{Put } m=1, dT=1$$

$$\text{So, } dQ=1.C_p.1=C_p$$

$$\text{So, } C_p=C_v+R$$

(C_p is heat required to raise temp of 1Kg gas 1K at constant pressure)

Divide everything by C_v , so,

$$\frac{C_p}{C_v} = \frac{C_v}{C_v} + \frac{R}{C_v} \text{ and } \gamma = \frac{C_p}{C_v} \text{ so,}$$

$$\gamma = 1 + \frac{R}{C_v} \text{ or } \gamma - 1 = \frac{R}{C_v} \text{ or } \frac{C_v}{R} = \frac{1}{\gamma - 1}$$

Imagine fixed mass of gas with adiabatic compression,

$$dQ=m.C_v.dT+P.dV$$

$$\text{If adiabatic, } dQ=0$$

$$0=m.C_v.dT+P.dV \quad (\text{equation } a)$$

$$\text{Ideal Gas Law } P.V=m.R.T$$

$$d(P.V)=d(m.R.T)=m.R.dT$$

$$P.dV+V.dP=m.R.dT$$

$$\frac{P.dV+V.dP}{R} = m.dT \quad (\text{equation } b)$$

Equation b into a , so,

$$0 = \frac{C_v}{R}(P.dV+V.dP)+P.dV$$

$$\text{But, } \gamma - 1 = \frac{R}{C_v} \text{ so,}$$

$$0 = \frac{(P.dV+V.dP)}{(\gamma - 1)} + P.dV$$

If you multiply the whole equation by $\gamma - 1$,

$$0(\gamma - 1) = (P.dV+V.dP)+P.dV. (\gamma - 1) \text{ so,}$$

$$0 = V.dP + \gamma.P.dV$$

Dividing whole equation by $P.V$

$$\frac{0}{P.V} = \frac{V.dP}{P.V} + \frac{\gamma.P.dV}{P.V}$$

$$0 = \frac{dP}{P} + \frac{\gamma.dV}{V}$$

$$\frac{dP}{P} = -\frac{\gamma.dV}{V} \quad (\text{equation for the speed of sound}) \text{ If you integrate this,}$$

$$\int \frac{dP}{P} = -\int \frac{\gamma.dV}{V} + \text{constant}$$

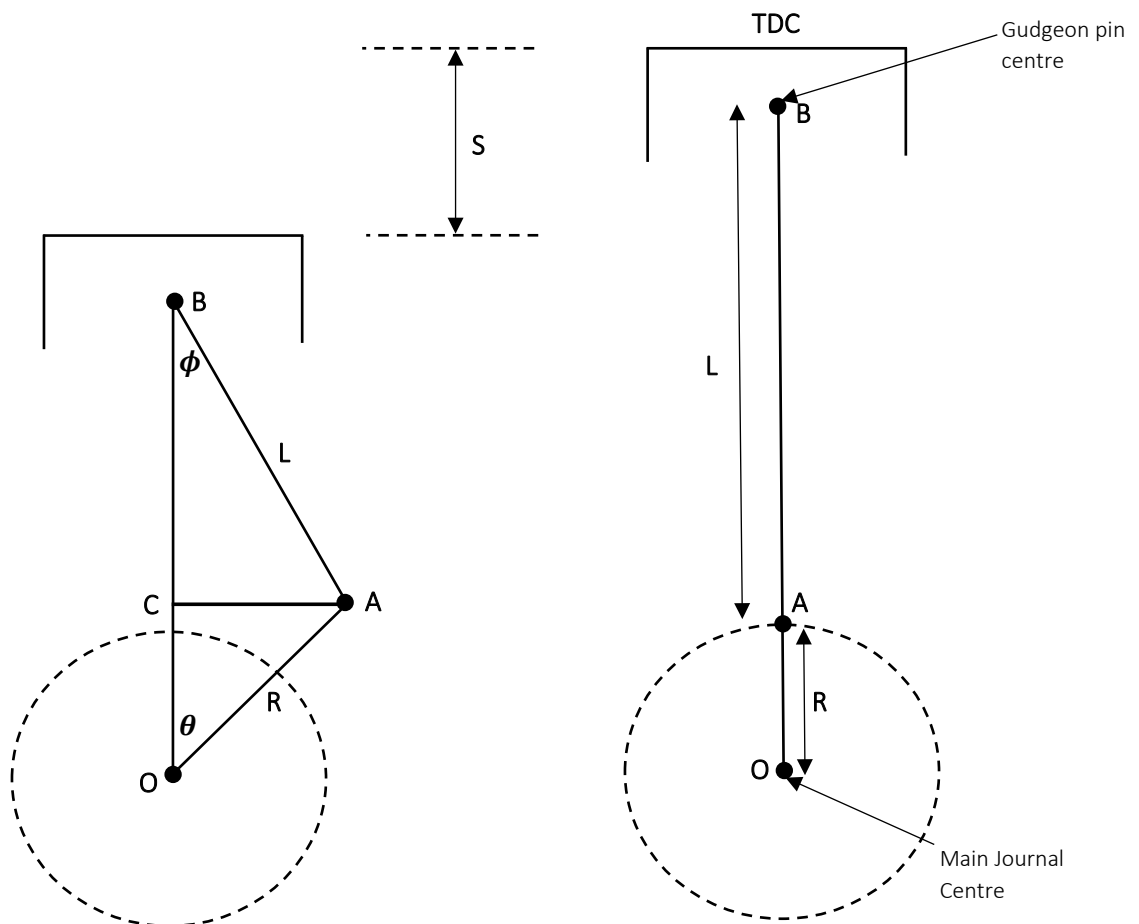
$$\ln P = -\gamma \ln V + \text{constant}$$

$$= -\ln V^\gamma + \text{constant}$$

$$\ln P + \gamma \ln V = \text{constant}$$

$$\ln PV^\gamma = \text{constant or } PV^\gamma = \text{constant}$$

Derivation of distance (s) the piston has moved from TDC with no gudgeon pin offset.



Vertical distance at TDC from crank main journal centre to gudgeon pin centre = $R + L$.

When the crank has turned angle θ , the vertical distance OB is now,

$$=OC+OB$$

$$=OA.\cos \theta+AB.\cos \phi$$

$$=R.\cos \theta+L.\cos \phi$$

Distance S when crankpin has turned angle θ , $S=R+L-R.\cos \theta+L.\cos \phi$

2 triangles OAC and ABC with a common side AC

$$AC=R.\sin \theta \quad \text{from } \triangle OAC$$

$$AC=L.\sin \phi \quad \text{from } \triangle ABC$$

$$L.\sin \phi = R.\sin \theta$$

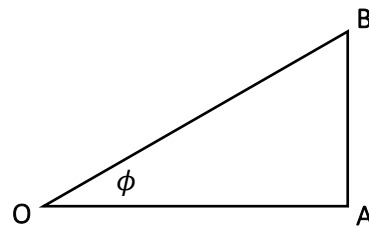
$$\therefore \sin \phi = \frac{R}{L}.\sin \theta$$

From Trigonometry:

$$\sin \phi = \frac{AB}{OB}$$

$$\cos \phi = \frac{OA}{OB}$$

$$\begin{aligned} \sin^2 \phi + \cos^2 \phi &= \left(\frac{AB}{OB}\right)^2 + \left(\frac{OA}{OB}\right)^2 \\ &= \frac{AB^2}{OB^2} + \frac{OA^2}{OB^2} \\ &= \frac{AB^2+OA^2}{OB^2} \end{aligned}$$



From Pythagoras,

$$AB^2 + OA^2 = OB^2$$

$$\therefore \frac{OB^2}{OB^2} = 1$$

$$\therefore \sin^2 \phi + \cos^2 \phi = 1$$

$$\therefore \cos^2 \phi = 1 - \sin^2 \phi$$

So,

$$S=R+L-R.\cos \theta+L.\cos \phi$$

$$\sin \phi = \frac{R}{L}.\sin \theta$$

$$\cos \phi = (1 - \sin^2 \phi)^{\frac{1}{2}}$$

$$S=R+L-R.\cos\theta+L.(1-\frac{R^2}{L^2}\sin^2\theta)^{\frac{1}{2}} \quad \dots \frac{R^2}{L^2} \text{ becomes very small}$$

$\therefore$ At TDC

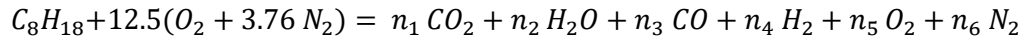
$$\theta = \sin^{-1} \left(\frac{x}{R+L} \right)$$

So, vertical distance of piston gudgeon pin from crank at TDC = $(R+L) \cos \theta$

Now vertical distance at angle $\theta = R \cos \theta + L \cos \phi$

$$\therefore S = (R+L) \cos \theta - (R \cos \theta + L \cos \phi)$$

Derivation of dissociation:



$$\text{Carbon: } 8 = n_1 + n_3 = n_3 \left(\frac{n_1}{n_3} + 1 \right)$$

$$\text{Hydrogen: } 18 = 2(n_2 + n_4)$$

$$9 = n_2 + n_4 = n_4 \left(\frac{n_2}{n_4} + 1 \right)$$

$$\text{Oxygen: } 25 = 2n_1 + n_2 + n_3 + 2n_5$$

$$\text{Nitrogen (N}_2\text{): } 47 = n_6$$

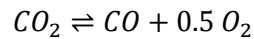
Partial pressure of $CO_2(n_1)$ using the ideal gas law,

$$P_{PCO_2} \cdot V = n_1 \cdot R_u \cdot T$$

$$P_{PCO_2} = \frac{n_1 \cdot R_u \cdot T}{V}$$

$$P_{PCO_2} = \frac{n_1}{n_T} \cdot P$$

When CO_2 dissociates,



The equilibrium constant is known as,

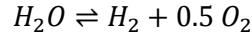
$$K_{CO_2} = \frac{[CO_2]}{[CO][O_2]^{0.5}}$$

Therefore, the partial pressure equilibrium constant is,

$$K_{PP\ CO_2} = \frac{\left(\frac{n_1}{n_T} \cdot P\right)}{\left(\frac{n_3}{n_T} \cdot P\right) \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}}$$

$$= \frac{n_1}{n_3 \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}}$$

This is the same for H_2O .



The equilibrium constant is known as,

$$K_{H_2O} = \frac{[H_2O]}{[H_2][O_2]^{0.5}}$$

Therefore, the partial pressure equilibrium constant is,

$$K_{PP\ H_2O} = \frac{\left(\frac{n_2}{n_T} \cdot P\right)}{\left(\frac{n_4}{n_T} \cdot P\right) \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}}$$

$$= \frac{n_2}{n_4 \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}}$$

To then calculate the n_5 value, it was necessary to guess the $\frac{n_5}{n_T}$ value, which would then allow for the use of interpolation to calculate the n_5 value. Assuming a temperature and pressure, would allow the use of Goodger & Allen, 2000 equilibrium constants table, finally giving the value of n_5 , as it was possible to calculate,

$$\frac{n_5}{n_T} \cdot P$$

$$\left(\frac{n_5}{n_T} \cdot P\right)^{0.5}$$

From,

$$K_{PP\ CO_2} = \frac{n_1}{n_3 \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}}$$

$$\frac{n_1}{n_3} = K_{CO_2} \times \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}$$

So,

$$n_3 = \frac{\phi C_8}{\left(\frac{n_1}{n_3} + 1\right)}$$

$$n_1 = \phi C_8 - n_3$$

Also,

$$\frac{n_2}{n_4} = K_{H_2O} \times \left(\frac{n_5}{n_T} \cdot P\right)^{0.5}$$

Therefore,

$$n_4 = \frac{\phi H_{18}}{\left(\frac{n_2}{n_4} + 1\right)}$$

Also,

$$n_2 = \phi H_{18} - n_4$$

Therefore,

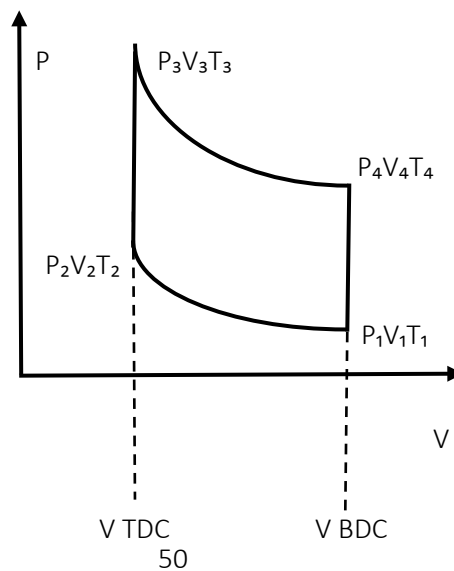
$$n_5 = \frac{(25 - 2n_1 - n_2 - n_3)}{2}$$

$$n_{Total} = n_1 + n_2 + n_3 + n_4 + n_5 + n_6$$

$$n_6 = 47$$

This then enabled $\frac{n_5}{n_T}$ to be calculated, and after subtracting the guessed value of $\frac{n_5}{n_T}$, where the error value became 0 (using interpolation), the n_5 value could be calculated.

Derivation of Engine Efficiency:



1-2 is adiabatic compression: $P_1 V_1^\gamma = P_2 V_2^\gamma$

Ideal Gas Law: $PV = nRT$

$$\frac{T_2}{T_1} = \left(\frac{V_1}{V_2}\right)^{\gamma-1} = CR^{\gamma-1}$$

3-4 is adiabatic expansion:

$$\frac{T_3}{T_4} = \left(\frac{V_4}{V_3}\right)^{\gamma-1} = \left(\frac{V_1}{V_2}\right)^{\gamma-1} = CR^{\gamma-1}$$

$$\text{So... } \frac{T_2}{T_1} = \frac{T_3}{T_4}$$

$$T_3 = T_{\text{hot}}$$

$$T_4 = \text{Temp you let heat out} = T_{\text{cold}} \text{ (exhaust temp)}$$

In thermodynamics, efficiency of perfect cycle (Carnot cycle)

$$\eta = 1 - \frac{T_{\text{cold}}}{T_{\text{hot}}}$$

$$\frac{T_{\text{hot}}}{T_{\text{cold}}} = \frac{T_3}{T_4} = CR^{\gamma-1}$$

$$\therefore \eta = 1 - \frac{1}{CR^{\gamma-1}}$$

Goal seek values calculated in Excel for C₈H₁₈;

Lambda-0.887, Phi-1.127

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-0.887	Phi-1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.51146E-11	2.51146E-10	1.58476E-05	6.912184166	9.07	2.106981561	8.413168845	1.077911334	1.66173E-09	47	66.16572717	2.51146E-11	5.76691E-18
36	T (K)	2000											
37	1.26353E-06	1.26353E-05	0.003554701	6.595622344	9.385044716	2.423543383	12.32414783	0.761516727	8.36064E-05	47	66.16581078	1.26353E-06	-6.0923E-19
38	T (K)	2100											
39	5.93621E-06	5.93621E-05	0.007704683	6.558515153	9.421533567	2.460650574	12.39471908	0.725027876	0.000392776	47	66.16611395	5.93621E-06	-1.1973E-17
40	T (K)	2200											
41	2.41885E-05	0.000241885	0.015552658	6.525648609	9.451984684	2.493517118	13.60826512	0.694576759	0.00160049	47	66.16732766	2.41885E-05	5.52083E-16
42	T (K)	2300											
43	8.6928E-05	0.00086928	0.029483558	6.491322634	9.478007328	2.527843094	14.17687382	0.668554115	0.005752155	47	66.17147933	8.6928E-05	8.25945E-16
44	T (K)	2400											
45	0.000276115	0.002761153	0.052546678	6.449062112	9.495223325	2.570103615	14.57802493	0.651338118	0.018274418	47	66.18400159	0.000276115	2.96529E-16
46	T (K)	2500											
47	0.000769489	0.007694889	0.087720517	6.378961357	9.499966913	2.64020437	14.69230943	0.64659453	0.050953001	47	66.21668017	0.000769489	8.78204E-18
48	T (K)	2700											
49	0.003820769	0.038207689	0.195467872	6.035934921	9.437352227	2.983230807	13.30686632	0.709209216	0.253773563	47	66.41950073	0.003820769	1.04083E-17
50	T (K)	3000											
51	0.014982095	0.149820948	0.387067111	4.886580657	9.08	4.132585071	8.526701381	1.06506555	1.006378861	47	67.17210603	0.014982095	3.00107E-16

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-0.887	Phi-1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.25573E-11	2.51146E-10	1.58476E-05	6.912184167	9.068650104	2.10698156	8.413168851	1.077911339	8.30904E-10	47	66.16572717	1.25573E-11	6.08605E-16
36	T (K)	2000											
37	6.31838E-07	1.26368E-05	0.003554821	6.595682169	9.385068432	2.423483558	12.32456385	0.761432951	4.1806E-05	47	66.16576898	6.31838E-07	5.47067E-18
38	T (K)	2100											
39	2.96905E-06	5.93811E-05	0.007705312	6.558800463	9.42164091	2.460365265	12.99679134	0.724920533	0.00019645	47	66.16592362	2.96905E-06	1.16094E-17
40	T (K)	2200											
41	1.211E-05	0.000242201	0.015562806	6.52682514	9.452406574	2.492340588	13.61714366	0.694154869	0.00080128	47	66.16652845	1.211E-05	2.33375E-17
42	T (K)	2300											
43	4.36683E-05	0.000873365	0.029552756	6.495585491	9.479469844	2.523580236	14.21014723	0.667091599	0.002889469	47	66.16861664	4.36683E-05	-5.19739E-18
44	T (K)	2400											
45	0.000140108	0.002802166	0.052935489	6.462588527	9.499702412	2.5565772	14.68589285	0.646859031	0.009271667	47	66.17499884	0.000140108	6.59466E-17
46	T (K)	2500											
47	0.000400352	0.008007037	0.089482048	6.415934412	9.5118995	2.603231315	14.98734816	0.634661943	0.02650018	47	66.19222735	0.000400352	2.60209E-18
48	T (K)	2700											
49	0.002244306	0.044886126	0.211863461	6.194496312	9.488677602	2.824669415	14.42302883	0.657883841	0.148830179	47	66.31455735	0.002244306	7.1991E-17
50	T (K)	3000											
51	0.010801616	0.216032317	0.464792768	5.292076685	9.243755698	3.727089042	10.23891988	0.902805745	0.722500945	47	66.88822812	0.010801616	0

#	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	8.37154E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168852	1.077911339	5.53962E-10	47	66.16572717	8.37234E-12	8.02846E-16
36	T (K)	2000											
37	4.21235E-07	1.2637E-05	0.003554861	6.595702112	9.385076418	2.423463615	12.32470254	0.761485025	2.78713E-05	47	66.16575504	4.21235E-07	1.86335E-17
38	T (K)	2100											
39	1.97958E-06	5.93874E-05	0.007706322	6.558895607	9.421676705	2.46027012	12.9974825	0.724884739	0.000130981	47	66.16585815	1.97958E-06	8.11542E-18
40	T (K)	2200											
41	8.07688E-06	0.000242306	0.015566196	6.527218011	9.452547427	2.491947716	13.62011028	0.694014016	0.000534417	47	66.16626159	8.07688E-06	-1.32323E-17
42	T (K)	2300											
43	2.9158E-05	0.000874741	0.029576022	6.497015506	9.479960129	2.522150221	14.2213343	0.666601314	0.001923919	47	66.16765649	2.9158E-05	-3.67612E-18
44	T (K)	2400											
45	9.3876E-05	0.002816281	0.053068643	6.46718815	9.501222205	2.551977577	14.72283358	0.645339238	0.006211959	47	66.17193913	9.3876E-05	-4.58075E-18
46	T (K)	2500											
47	0.000270681	0.008120425	0.090113403	6.428935202	9.516069783	2.590230525	15.09309382	0.63049166	0.017914644	47	66.18364181	0.000270681	1.73635E-16
48	T (K)	2700											
49	0.001600662	0.048019846	0.219134311	6.259542013	9.509134799	2.759623714	14.91800646	0.637426644	0.106078731	47	66.2718059	0.001600662	-2.01662E-17
50	T (K)	3000											
51	0.008712881	0.261386425	0.51259645	5.498594276	9.319117659	3.520571451	11.26253872	0.827443784	0.581561169	47	66.74728834	0.008712881	

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	6.27865E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168853	1.077911339	4.15432E-10	47	66.16572717	6.27865E-12	5.90734E-19
36	T (K)	2000											
37	3.15929E-07	1.26372E-05	0.003554881	6.595712084	9.385080381	2.423453643	12.32477188	0.761481062	2.09037E-05	47	66.16574807	3.15929E-07	6.53894E-18
38	T (K)	2100											
39	1.48476E-06	5.93906E-05	0.007706527	6.558943187	9.421694604	2.46022254	12.99782816	0.724866839	9.82406E-05	47	66.16582541	1.48476E-06	3.77901E-16
40	T (K)	2200											
41	6.05898E-06	0.000242359	0.015567893	6.527414578	9.452617896	2.491751149	13.62159493	0.6933943547	0.000400899	47	66.16612807	6.05898E-06	5.20734E-16
42	T (K)	2300											
43	2.18858E-05	0.000875432	0.029587692	6.497732232	9.480205739	2.521433495	14.22694605	0.666355644	0.001448121	47	66.16717529	2.18858E-05	6.69156E-18
44	T (K)	2400											
45	7.05856E-05	0.002823425	0.053135913	6.469505615	9.5019873	2.549660113	14.74149623	0.644574143	0.004670679	47	66.17039785	7.05856E-05	-1.17229E-17
46	T (K)	2500											
47	0.000204477	0.008179089	0.090438317	6.435575321	9.518194649	2.583590406	15.14751373	0.628366795	0.013532152	47	66.17925932	0.000204477	-7.72494E-18
48	T (K)	2700											
49	0.001246483	0.049859323	0.223292013	6.295408396	9.520271096	2.723757331	15.20105034	0.626290347	0.08257739	47	66.24830456	0.001246483	6.28837E-18
50	T (K)	3000											
51	0.007393911	0.295756439	0.543834938	5.630236327	9.364862512	3.3889294	11.98013984	0.781698931	0.492867717	47	66.65859489	0.007393911	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	5.02232E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168854	1.077911339	3.32359E-10	47	66.16572717	5.02312E-12	2.00483E-16
36	T (K)	2000											
37	2.52745E-07	1.26373E-05	0.003554893	6.595718068	9.385082759	2.42344766	12.32481349	0.761478684	1.67231E-05	47	66.16574389	2.52745E-07	4.24856E-18
38	T (K)	2100											
39	1.18785E-06	5.93925E-05	0.00770665	6.558971738	9.421705345	2.46019339	12.99803558	0.724856098	7.8595E-05	47	66.16580577	1.18785E-06	-6.55688E-18
40	T (K)	2200											
41	4.84782E-06	0.000242391	0.015568911	6.52753256	9.452660191	2.491633168	13.62248614	0.6933901252	0.000320761	47	66.16604793	4.84782E-06	3.61598E-18
42	T (K)	2300											
43	1.75169E-05	0.000875847	0.029594707	6.49816282	9.480353371	2.521002907	14.23031897	0.666208073	0.001159041	47	66.16688621	1.75169E-05	1.29528E-17
44	T (K)	2400											
45	5.65548E-05	0.00282774	0.0531765	6.470901826	9.502448044	2.548263901	14.75275636	0.644113399	0.003742201	47	66.16946937	5.65548E-05	-5.38035E-18
46	T (K)	2500											
47	0.000164239	0.00821495	0.090636361	6.439605975	9.519482799	2.579559752	15.1806841	0.627078644	0.010872749	47	66.17659992	0.000164239	-1.35525E-18
48	T (K)	2700											
49	0.001021466	0.051073308	0.225994044	6.318221811	9.527302145	2.700943917	15.38499652	0.619259298	0.067855159	47	66.23338233	0.001021466	6.96058E-17
50	T (K)	3000											
51	0.006464093	0.323204646	0.568510902	5.72358314	9.396282937	3.295582587	12.52372667	0.750278506	0.430484098	47	66.59621127	0.006464093	6.93889E-18

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	4.18577E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168854	1.077911339	2.76955E-10	47	66.16572717	4.18578E-12	7.1047E-18
36	T (K)	2000											
37	2.10622E-07	1.26373E-05	0.003554901	6.595722057	9.385084344	2.423443671	12.32484123	0.761477099	1.3936E-05	47	66.16574111	2.10622E-07	7.76046E-18
38	T (K)	2100											
39	9.89895E-07	5.93937E-05	0.007706732	6.558990772	9.421712506	2.460174955	12.99817386	0.724848937	6.54972E-05	47	66.16579267	9.89895E-07	1.71348E-17
40	T (K)	2200											
41	4.0402E-06	0.000242412	0.015569591	6.527611232	9.452688393	2.491554496	13.62308047	0.69387305	0.000267324	47	66.16599449	4.0402E-06	-9.59095E-18
42	T (K)	2300											
43	1.46021E-05	0.000876124	0.029599389	6.49845011	9.480451822	2.520715617	14.23257003	0.666109621	0.00096617	47	66.16669334	1.46021E-05	4.39685E-16
44	T (K)	2400											
45	4.71771E-05	0.002830629	0.053203653	6.471835042	9.502755916	2.547330685	14.76028943	0.643805527	0.003121657	47	66.16884883	4.71771E-05	8.23316E-18
46	T (K)	2500											
47	0.000137319	0.008239141	0.090769714	6.442312946	9.520347206	2.576852782	15.20301943	0.626214237	0.00908706	47	66.17481423	0.000137319	3.39084E-17
48	T (K)	2700											
49	0.000865536	0.051935737	0.227894134	6.334036874	9.532152637	2.685128853	15.51434899	0.614408806	0.057322381	47	66.22304955	0.000865536	4.66207E-18
50	T (K)	3000											
51	0.00576441	0.345864615	0.588102555	5.794112634	9.419486188	3.225053094	12.95531188	0.727075256	0.383617726	47	66.5493449	0.00576441	1.9082E-16

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	3.5878E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168855	1.077911339	2.3739E-10	47	66.16572717	3.58781E-12	8.966E-18
36	T (K)	2000											
37	1.80534E-07	1.26374E-05	0.003554907	6.595724906	9.385085477	2.423440821	12.32486105	0.761475966	1.19451E-05	47	66.16573912	1.80534E-07	2.3315E-16
38	T (K)	2100											
39	8.48495E-07	5.93946E-05	0.00770679	6.559004369	9.421717621	2.460161358	12.99827265	0.724843822	5.61413E-05	47	66.16578331	8.48495E-07	-8.39124E-18
40	T (K)	2200											
41	3.46325E-06	0.000242427	0.015570076	6.527667434	9.45270854	2.491498293	13.62350507	0.693852903	0.000229149	47	66.16595632	3.46325E-06	2.9193E-18
42	T (K)	2300											
43	1.25189E-05	0.000876322	0.029602735	6.49865543	9.48052218	2.520510297	14.23417913	0.666039263	0.000828331	47	66.1665555	1.25189E-05	3.21686E-16
44	T (K)	2400											
45	4.04671E-05	0.002832698	0.053223095	6.472502811	9.502976173	2.546662916	14.76568315	0.64358527	0.002677644	47	66.16840481	4.04671E-05	4.01155E-18
46	T (K)	2500											
47	0.000117951	0.008256562	0.090865626	6.444256376	9.520967444	2.574909352	15.21908371	0.625593999	0.007805227	47	66.1735324	0.000117951	-5.29904E-18
48	T (K)	2700											
49	0.00075115	0.052580474	0.229304326	6.345655138	9.535703691	2.67351059	15.61035063	0.610857752	0.049737722	47	66.21546489	0.00075115	-3.03577E-18
50	T (K)	3000											
51	0.005214467	0.365012666	0.604162781	5.849716244	9.437463031	3.169449483	13.30910191	0.709098412	0.346827499	47	66.51255467	0.005214467	3.98986E-17

#	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.13933E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168855	1.077911339	2.07716E-10	47	66.16572717	3.13932E-12	-3.06152E-18
36	T (K)	2000											
37	1.57967E-07	1.26374E-05	0.003554911	6.595727043	9.385086326	2.423438684	12.32487591	0.761475117	1.0452E-05	47	66.16573762	1.57967E-07	9.2883E-18
38	T (K)	2100											
39	7.42441E-07	5.93953E-05	0.007706834	6.559014567	9.421721458	2.46015116	12.39834674	0.724833965	4.91242E-05	47	66.16577629	7.42441E-07	3.902E-16
40	T (K)	2200											
41	3.03048E-06	0.000242439	0.01557044	6.527709591	9.452723652	2.491456136	13.62382358	0.693837791	0.000200515	47	66.16592768	3.03048E-06	5.26735E-16
42	T (K)	2300											
43	1.09559E-05	0.000876471	0.029605246	6.498809482	9.480574967	2.520356245	14.23538661	0.665986476	0.000724912	47	66.16645208	1.09559E-05	-2.73935E-18
44	T (K)	2400											
45	3.54282E-05	0.002834253	0.053237702	6.473004289	9.503141558	2.546161438	14.76973556	0.643419885	0.002344213	47	66.16807138	3.54282E-05	1.11198E-17
46	T (K)	2500											
47	0.000103371	0.008269706	0.090937925	6.445719409	9.521434171	2.573446318	15.23119307	0.625127272	0.006840346	47	66.17256752	0.000103371	-7.63007E-18
48	T (K)	2700											
49	0.000663511	0.05308091	0.230392948	6.354555513	9.538417037	2.664610214	15.6844607	0.608144406	0.043930861	47	66.20965803	0.000663511	5.20417E-18
50	T (K)	3000											
51	0.004768477	0.38147813	0.617639159	5.894915722	9.451875685	3.124250005	13.60597303	0.694685758	0.317021433	47	66.4827486	0.004768477	1.12757E-17

#	FP	FQ	FR	FS	FT	FU	FV	FV	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.79051E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168855	1.077911339	1.84636E-10	47	66.16572717	2.79051E-12	2.61553E-19
36	T (K)	2000											
37	1.40416E-07	1.26374E-05	0.003554914	6.595728705	9.385086987	2.423437022	12.32488747	0.761474457	9.29071E-06	47	66.16573646	1.40416E-07	5.22188E-18
38	T (K)	2100											
39	6.53954E-07	5.93958E-05	0.007706868	6.559022498	9.421724442	2.460143229	12.39840436	0.724837001	4.36663E-05	47	66.16577084	6.53954E-07	1.45637E-17
40	T (K)	2200											
41	2.69386E-06	0.000242447	0.015570723	6.527742383	9.452735407	2.491423345	13.62407133	0.693826036	0.000178242	47	66.16590541	2.69386E-06	4.20094E-17
42	T (K)	2300											
43	9.73985E-06	0.000876586	0.0296072	6.498923337	9.480616035	2.52023639	14.23632615	0.665945408	0.00064445	47	66.16637162	9.73985E-06	-1.24192E-17
44	T (K)	2400											
45	3.15052E-05	0.002834544	0.053249078	6.473394714	9.503270304	2.545771013	14.77289166	0.643291139	0.002084627	47	66.1678118	3.15052E-05	-1.91091E-18
46	T (K)	2500											
47	9.19997E-05	0.008279376	0.090994376	6.446860587	9.521798107	2.572305141	15.24064803	0.624763336	0.00608779	47	66.17181496	9.19997E-05	-8.17217E-18
48	T (K)	2700											
49	0.00059423	0.053480712	0.231258972	6.361593765	9.540558414	2.657571962	15.74341704	0.606003029	0.039341047	47	66.20506822	0.00059423	-1.6263E-17
50	T (K)	3000											
51	0.004398133	0.395831928	0.629151753	5.932519927	9.463732	3.0866458	13.85958397	0.682829443	0.292291173	47	66.45801834	0.004398133	-6.93889E-18

#	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.51146E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168855	1.077911339	1.66173E-10	47	66.16572717	2.51147E-12	6.27593E-18
36	T (K)	2000											
37	1.26374E-07	1.26374E-05	0.003554917	6.595730035	9.385087515	2.423435693	12.32489671	0.761473928	8.36165E-06	47	66.16573553	1.26374E-07	5.03836E-18
38	T (K)	2100											
39	5.93962E-07	5.93962E-05	0.007706896	6.559028844	9.421726829	2.460136883	12.39845047	0.724834614	3.93E-05	47	66.16576647	5.93962E-07	5.48464E-18
40	T (K)	2200											
41	2.42454E-06	0.000242454	0.01557095	6.527768618	9.452744811	2.49139711	13.62426955	0.693816632	0.000160422	47	66.16588759	2.42454E-06	1.01076E-17
42	T (K)	2300											
43	8.76679E-06	0.000876679	0.029608764	6.499025245	9.480648896	2.520140482	14.23707803	0.665912547	0.000580066	47	66.16630724	8.76679E-06	7.97905E-18
44	T (K)	2400											
45	2.83643E-05	0.002836435	0.053258188	6.473707298	9.503373373	2.545458429	14.77541922	0.64318807	0.001876801	47	66.16760397	2.83643E-05	-2.1989E-18
46	T (K)	2500											
47	8.28822E-05	0.008288222	0.091039675	6.447775596	9.522089842	2.571390131	15.24823519	0.624471601	0.005484417	47	66.17121159	8.28822E-05	1.83217E-16
48	T (K)	2700											
49	0.000538075	0.053807513	0.231964465	6.367299938	9.542291737	2.65186579	15.79144485	0.604269706	0.035621239	47	66.20134847	0.000538075	3.68846E-16
50	T (K)	3000											
51	0.004084843	0.408484296	0.639127762	5.964380597	9.473683335	3.05478513	14.07934546	0.672878108	0.27138517	47	66.43711234	0.004084843	0

#	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)	110	Lambda=0.887	Phi=1.127									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.28315E-12	2.51146E-10	1.58476E-05	6.912184168	9.068650104	2.106981559	8.413168855	1.077911339	1.51066E-10	47	66.16572717	2.28315E-12	-9.11954E-20
36	T (K)	2000											
37	1.14886E-07	1.26374E-05	0.003554919	6.595731123	9.385087947	2.423434605	12.32490428	0.761473496	7.60151E-06	47	66.16573477	1.14886E-07	1.0118E-17
38	T (K)	2100											
39	5.39969E-07	5.93966E-05	0.007706918	6.559034036	9.421728782	2.460131691	12.39848819	0.724832661	3.57275E-05	47	66.1657629	5.39969E-07	1.92065E-18
40	T (K)	2200											
41	2.20418E-06	0.000242426	0.015571135	6.527790084	9.452752506	2.491375644	13.62443174	0.693808937	0.000145842	47	66.16587301	2.20418E-06	-1.25238E-17
42	T (K)	2300											
43	7.3705E-06	0.000876755	0.029610044	6.499103373	9.480675787	2.520061998	14.23769337	0.665885856	0.000527378	47	66.16625455	7.3705E-06	-1.31256E-17
44	T (K)	2400											
45	2.5793E-05	0.002837229	0.053265649	6.473963211	9.50345775	2.545202516	14.77488899	0.643103693	0.001706656	47	66.16743383	2.5793E-05	-2.40557E-19
46	T (K)	2500											
47	7.5409E-05	0.008294989	0.09107683	6.448525615	9.522328924	2.570640112	15.25445829	0.624232519	0.004989867	47	66.17071704	7.5409E-05	6.73561E-18
48	T (K)	2700											
49	0.000491633	0.054079662	0.232550344	6.37202006	9.543723664	2.647145667	15.83132974	0.602837779	0.032545275	47	66.19827244	0.000491633	0
50	T (K)	3000											
51	0.003815818	0.419739952	0.647873407	5.991775614	9.482171759	3.027390113	14.27200329	0.664389684	0.25344345	47	66.41917062	0.003815818	1.47451E-17

10-110 Bar Polynomial equations-

$$\begin{aligned}
 &y = -0.00000000000000003265714510158x^6 + 0.000000000000044216619304584500x^5 - \\
 &0.000000000246340888467309000000x^4 + 0.000000723629002091967000000000x^3 - \\
 &0.001182815558811310000000000000x^2 + 1.020284171158520000000000000000x - \\
 10 \quad &362.809807599340000000000000000000 \\
 &y = -0.00000000000000001695071273978x^6 + 0.000000000000023390997171197100x^5 - \\
 &0.000000000132462226319237000000x^4 + 0.000000394688919591779000000000x^3 - \\
 &0.000653279715267016000000000000x^2 + 0.569798184121800000000000000000x - \\
 20 \quad &204.620463648661000000000000000000 \\
 &y = -0.00000000000000000938449848646x^6 + 0.000000000000013230733879992200x^5 - \\
 &0.000000000076216769822470300000x^4 + 0.000000230288019121722000000000x^3 - \\
 &0.000385607809024501000000000000x^2 + 0.339622494630065000000000000000x - \\
 30 \quad &122.972194329876000000000000000000 \\
 &y = -0.00000000000000000528954650241x^6 + 0.00000000000007694012575315270x^5 - \\
 &0.000000000045376146220269500000x^4 + 0.000000139635491615598000000000x^3 - \\
 &0.000237253889008004000000000000x^2 + 0.211455601212380000000000000000x - \\
 40 \quad &77.316479655467400000000000000000 \\
 &y = -0.00000000000000000285544754013x^6 + 0.00000000000004383347801869650x^5 - \\
 &0.000000000026840428808937800000x^4 + 0.000000084907538501227400000000x^3 - \\
 &0.000147337529864819000000000000x^2 + 0.133503600575026000000000000000x - \\
 50 \quad &49.462744580581700000000000000000 \\
 &y = -0.00000000000000000131269520609x^6 + 0.00000000000002272463559436970x^5 - \\
 &0.000000000014962669202463400000x^4 + 0.000000049687694916185900000000x^3 - \\
 &0.000089259588301909400000000000x^2 + 0.082993235525360900000000000000x - \\
 60 \quad &31.364515509788100000000000000000 \\
 &y = -0.0000000000000000028998775474x^6 + 0.00000000000000864103249946989x^5 - \\
 &0.00000000006995936086520910000x^4 + 0.000000025960205906015800000000x^3 - \\
 &0.000049986203694838200000000000x^2 + 0.048728148214018300000000000000x - \\
 70 \quad &19.053502479086800000000000000000 \\
 &y = 0.0000000000000000040999583493x^6 - 0.00000000000000106814300437630x^5 - \\
 &0.00000000001471653064827760000x^4 + 0.000000009428213726639900000000x^3 - \\
 &0.000022513303222292200000000000x^2 + 0.024677994860320700000000000000x - \\
 80 \quad &10.387927593769900000000000000000
 \end{aligned}$$

$y = 0.000000000000000090007208519x^6 - 0.00000000000000792249877065255x^5 +$
 $0.000000000002454076630612340000x^4 - 0.000000002382776235941500000000x^3 -$
 $0.000002799386754275760000000000x^2 + 0.007356901640006560000000000000x -$
 90 4.127716329809600000000000000000
 $y = 0.00000000000000000124851045564x^6 - 0.000000000000001284385223723640x^5 +$
 $0.000000000005294278700442980000x^4 - 0.000000010979961403209900000000x^3 +$
 $0.000011621426667060000000000000x^2 - 0.005365277976749340000000000000x +$
 100 0.485959577221457000000000000000
 $y = 0.00000000000000000149853331028x^6 - 0.000000000000001641719063415390x^5 +$
 $0.0000000000007375185169451260000x^4 - 0.000000017323482850674500000000x^3 +$
 $0.000022322480342099400000000000x^2 - 0.014849578046370400000000000000x +$
 110 3.938546995112980000000000000000

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CV	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	1.66172E-09	8.3086E-10	5.53905E-10	4.15423E-10	3.32342E-10	2.76951E-10	2.37386E-10	2.07713E-10	1.84633E-10	1.66169E-10	1.51062E-10
3	2000	8.36064E-05	4.1806E-05	2.78713E-05	2.09037E-05	1.67231E-05	1.3936E-05	1.19451E-05	1.0452E-05	9.29071E-06	8.36165E-06	7.60151E-06
4	2100	0.000392776	0.00019645	0.000130981	9.82406E-05	7.8595E-05	6.54972E-05	5.61413E-05	4.91242E-05	4.36663E-05	3.93E-05	3.57275E-05
5	2200	0.00160049	0.00080128	0.000534417	0.000400899	0.000320761	0.000267324	0.000229149	0.000200515	0.000178242	0.000160422	0.000145842
6	2300	0.005752155	0.002889469	0.001929319	0.001448121	0.001159041	0.00096617	0.000828331	0.000724912	0.00064445	0.000580066	0.000527378
7	2400	0.018274418	0.009271667	0.006211959	0.004670679	0.003742201	0.003121657	0.002677644	0.002344213	0.002084627	0.001876801	0.001706656
8	2500	0.050953001	0.02650018	0.017914644	0.013532152	0.010872749	0.00908706	0.007805227	0.006840346	0.00608779	0.005484417	0.004989867
9	2700	0.253773563	0.149830179	0.106078731	0.08257739	0.067655159	0.057322381	0.049737722	0.043330861	0.039341047	0.035621299	0.032545275
10	3000	1.006378661	0.722500945	0.581561169	0.492867717	0.430484098	0.383617726	0.346827499	0.317021433	0.292291173	0.27138517	0.25344345

Lambda-0.9, Phi-1.111

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^1/2	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.38347E-11	3.38347E-10	1.83942E-05	7.040036737	9.07	1.848852151	9.765124428	0.928925631	2.22933E-09	47	65.88888889	3.38347E-11	1.18728E-19
36	T (K)	2000											
37	1.72192E-06	1.72192E-05	0.004149597	6.760798154	9.350086046	2.128090735	14.38665225	0.649913954	0.000113495	47	65.88900234	1.72192E-06	3.64478E-18
38	T (K)	2100											
39	8.10111E-06	8.10111E-05	0.009000618	6.728073645	9.381969911	2.160815244	15.18044199	0.618030089	0.000533778	47	65.88942267	8.10111E-06	4.98225E-18
40	T (K)	2200											
41	3.30266E-05	0.000330266	0.018173221	6.698432593	9.408326203	2.190456296	15.90120477	0.591673797	0.002176158	47	65.89106505	3.30266E-05	3.50333E-18
42	T (K)	2300											
43	0.000118452	0.001184518	0.03441682	6.66533352	9.430166433	2.223555369	16.54898375	0.569833567	0.007805579	47	65.89669447	0.000118452	2.83248E-18
44	T (K)	2400											
45	0.000372993	0.003729926	0.061073117	6.61924505	9.44269599	2.269643839	16.94351491	0.55730441	0.024585236	47	65.91347412	0.000372993	-6.88468E-18
46	T (K)	2500											
47	0.001017048	0.010170477	0.100848781	6.535885557	9.441064824	2.353003332	16.8911624	0.558935176	0.067080365	47	65.95596925	0.001017048	2.81893E-18
48	T (K)	2700											
49	0.00463646	0.046364603	0.215324414	6.135907739	9.36137494	2.75298115	14.65864015	0.63862506	0.306914216	47	66.1958031	0.00463646	0
50	T (K)	3000											
51	0.016427371	0.164273712	0.405306936	4.917394177	8.99	3.971494712	8.928506487	1.007200833	1.100458883	47	66.98934777	0.016427371	0

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.63174E-11	3.38347E-10	1.83942E-05	7.040036739	9.07107437	1.84885215	9.765124437	0.92892563	1.11467E-09	47	65.88888889	1.63174E-11	1.71195E-18
36	T (K)	2000											
37	8.61045E-07	1.72209E-05	0.004149808	6.760880633	9.350117011	2.128008256	14.38738538	0.649882989	5.67334E-05	47	65.88894562	8.61045E-07	6.02865E-18
38	T (K)	2100											
39	4.05251E-06	8.10502E-05	0.009002786	6.728467532	9.382109546	2.160421357	15.18409856	0.617890454	0.000267016	47	65.88915591	4.05251E-06	-6.08932E-18
40	T (K)	2200											
41	1.65458E-05	0.000330917	0.018191116	6.700056843	9.408873858	2.188832046	15.91686308	0.591126142	0.001090205	47	65.88997909	1.65458E-05	-4.74338E-20
42	T (K)	2300											
43	5.96442E-05	0.001192884	0.034538157	6.671196226	9.432054634	2.217692663	16.60732741	0.567945366	0.003930125	47	65.89281901	5.96442E-05	1.15196E-18
44	T (K)	2400											
45	0.000190601	0.003812017	0.061741535	6.637593167	9.448396198	2.251295722	17.12895409	0.551603802	0.012560873	47	65.90144976	0.000190601	1.32815E-18
46	T (K)	2500											
47	0.000538057	0.010761135	0.103735891	6.584394869	9.455774148	2.30449402	17.37472433	0.544225852	0.035471047	47	65.92435994	0.000538057	-2.05998E-18
48	T (K)	2700											
49	0.00282437	0.05648741	0.237670801	6.319942721	9.417924947	2.568946168	16.17991512	0.582075053	0.186621722	47	66.07551061	0.00282437	1.73472E-17
50	T (K)	3000											
51	0.012117891	0.242357817	0.492298504	5.338903546	9.155750788	3.549985343	10.84484375	0.844249212	0.808228389	47	66.69711728	0.012117891	0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.12782E-11	3.38347E-10	1.83942E-05	7.040036739	9.07107437	1.84885215	9.76512444	0.92892563	7.43111E-10	47	65.88888889	1.12782E-11	1.69576E-18
36	T (K)	2000											
37	5.7405E-07	1.72215E-05	0.004149879	6.76090813	9.350127334	2.127980759	14.3876298	0.649872666	3.78235E-05	47	65.88892671	5.7405E-07	-9.18745E-18
38	T (K)	2100											
39	2.70211E-06	8.10632E-05	0.009003509	6.728598913	9.382156119	2.160289976	15.18531851	0.617843881	0.000178039	47	65.88906693	2.70211E-06	9.2136E-18
40	T (K)	2200											
41	1.10378E-05	0.000331135	0.018191703	6.700599704	9.409056852	2.188289185	15.92210161	0.590943148	0.000727278	47	65.88961617	1.10378E-05	5.38035E-18
42	T (K)	2300											
43	3.98572E-05	0.001195716	0.034579133	6.673169134	9.432689472	2.215719755	16.62703055	0.567310528	0.002626252	47	65.89151514	3.98572E-05	-2.968E-18
44	T (K)	2400											
45	0.000128024	0.003840713	0.061973484	6.643891046	9.450347218	2.244997843	17.19330372	0.549652782	0.008436423	47	65.89732531	0.000128024	5.9631E-18
46	T (K)	2500											
47	0.000366125	0.010983743	0.104803354	6.601827793	9.461018539	2.287061096	17.55351383	0.538981461	0.02413239	47	65.91302128	0.000366125	1.02999E-17
48	T (K)	2700											
49	0.002053914	0.061617412	0.248228548	6.398595068	9.441298798	2.490293821	16.89854588	0.558701202	0.135608623	47	66.02449751	0.002053914	2.59775E-16
50	T (K)	3000											
51	0.009933062	0.297991848	0.545886296	5.566756846	9.232265086	3.332132043	12.02532922	0.767734914	0.661044589	47	66.54993348	0.009933062	9.54098E-17

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	8.45868E-12	3.38347E-10	1.83942E-05	7.04003674	9.07107437	1.848852149	9.765124442	0.92892563	5.57334E-10	47	65.88888889	8.45868E-12	2.53286E-18
36	T (K)	2000											
37	4.30545E-07	1.72218E-05	0.004149914	6.760921879	9.350132496	2.12796701	14.38775202	0.649867504	2.83681E-05	47	65.88891726	4.30545E-07	1.88655E-18
38	T (K)	2100											
39	2.02674E-06	8.10697E-05	0.009003871	6.72866462	9.382179411	2.160224269	15.18592869	0.617820589	0.00013354	47	65.88902243	2.02674E-06	-1.74044E-17
40	T (K)	2200											
41	8.28109E-06	0.000331244	0.018200101	6.700871406	9.409148432	2.188017483	15.92472449	0.590851568	0.000545636	47	65.88943453	8.28109E-06	1.37965E-17
42	T (K)	2300											
43	2.99285E-05	0.001197141	0.034599723	6.67415915	9.433007929	2.214729738	16.63693093	0.566992071	0.001972016	47	65.8908609	2.99285E-05	5.32923E-19
44	T (K)	2400											
45	9.63832E-05	0.003855327	0.06209128	6.647075956	9.45133277	2.241812933	17.22598372	0.54866723	0.006351192	47	65.89524008	9.63832E-05	3.14419E-18
46	T (K)	2500											
47	0.000277519	0.011000755	0.105360119	6.610816155	9.463713984	2.278072734	17.6467663	0.536286016	0.018290486	47	65.90717937	0.000277519	2.07083E-17
48	T (K)	2700											
49	0.001619246	0.064769849	0.254499211	6.443070795	9.454313572	2.445818094	17.32554282	0.545686428	0.106863372	47	65.99575226	0.001619246	9.01189E-16
50	T (K)	3000											
51	0.008536602	0.34146408	0.584349279	5.697334702	9.279156166	3.191554187	12.87263028	0.720843834	0.567310122	47	66.46619901	0.008536602	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	6.76695E-12	3.38347E-10	1.83942E-05	7.04003674	9.07107437	1.848852149	9.765124443	0.928925629	4.45865E-10	47	65.88888889	6.76693E-12	-1.85319E-17
36	T (K)	2000											
37	3.44439E-07	1.7222E-05	0.004149935	6.760930129	9.350135593	2.12795876	14.38782535	0.649864407	2.26947E-05	47	65.88891158	3.44439E-07	4.74217E-18
38	T (K)	2100											
39	1.62147E-06	8.10736E-05	0.009004088	6.728704049	9.382193387	2.16018484	15.18629486	0.617806613	0.000106837	47	65.88899573	1.62147E-06	8.72465E-18
40	T (K)	2200											
41	6.62618E-06	0.000331309	0.018201901	6.701034515	9.409203407	2.187854374	15.32629936	0.590796593	0.000436595	47	65.88932548	6.62618E-06	-5.1669E-18
42	T (K)	2300											
43	2.396E-05	0.00197998	0.03461211	6.674754308	9.433199336	2.214134581	16.6428863	0.566800664	0.001578733	47	65.89046762	2.396E-05	-6.55942E-18
44	T (K)	2400											
45	7.72837E-05	0.003864183	0.062162554	6.648998669	9.451927385	2.239890219	17.24575746	0.548072615	0.005092528	47	65.89398142	7.72837E-05	-3.04932E-18
46	T (K)	2500											
47	0.000223459	0.011172926	0.105702064	6.616301552	9.465356109	2.272587336	17.70403865	0.534643891	0.014726725	47	65.90361561	0.000223459	9.02598E-18
48	T (K)	2700											
49	0.001338312	0.066915606	0.25868051	6.471854911	9.462660062	2.417033978	17.61019307	0.537339938	0.088298069	47	65.9718696	0.001338312	1.17094E-17
50	T (K)	3000											
51	0.007541647	0.377082353	0.614070316	5.798094168	9.311643447	3.090794721	13.52735499	0.688356553	0.500686748	47	66.38957564	0.007541647	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	5.63912E-12	3.38347E-10	1.83942E-05	7.04003674	9.071074371	1.848852149	9.765124443	0.928925629	3.71555E-10	47	65.88888889	5.63912E-12	-6.73819E-18
36	T (K)	2000											
37	2.87035E-07	1.72221E-05	0.004149949	6.760935629	9.350137658	2.12795326	14.38787425	0.649862342	1.89124E-05	47	65.8889078	2.87035E-07	-2.17873E-18
38	T (K)	2100											
39	1.35127E-06	8.10762E-05	0.009004233	6.728730338	9.382202706	2.160158551	15.18653901	0.617797294	8.90338E-05	47	65.88897792	1.35127E-06	1.21141E-17
40	T (K)	2200											
41	5.52255E-06	0.000331353	0.018203102	6.70114329	9.409240068	2.187745599	15.32734976	0.590759932	0.000363877	47	65.88925277	5.52255E-06	-5.90805E-18
42	T (K)	2300											
43	1.99762E-05	0.00198571	0.034620381	6.675151561	9.433327081	2.213737328	16.64686413	0.566672919	0.001316235	47	65.89020512	1.99762E-05	5.19062E-18
44	T (K)	2400											
45	6.45021E-05	0.003870124	0.062210323	6.650285443	9.45232518	2.238603446	17.25900998	0.54767482	0.004250244	47	65.89313913	6.45021E-05	-8.49743E-18
46	T (K)	2500											
47	0.000187032	0.011221834	0.105933443	6.619998324	9.466461571	2.268890565	17.74279239	0.533538429	0.012325608	47	65.9012145	0.000187032	6.12574E-18
48	T (K)	2700											
49	0.001141241	0.068474452	0.261676235	6.492064421	9.468484677	2.396824468	17.81413305	0.531515323	0.075281006	47	65.9641639	0.001141241	-1.73472E-17
50	T (K)	3000											
51	0.006785776	0.407146576	0.638080384	5.874962199	9.335824998	3.01392669	14.05627278	0.664175002	0.450161957	47	66.33905085	0.006785776	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	4.83353E-12	3.38347E-10	1.83942E-05	7.04003674	9.071074371	1.848852149	9.765124444	0.928925629	3.18476E-10	47	65.88888889	4.83353E-12	-6.01674E-18
36	T (K)	2000											
37	2.46031E-07	1.72222E-05	0.004149959	6.760939557	9.350139133	2.127949332	14.38790917	0.649860867	1.62107E-05	47	65.8889051	2.46031E-07	6.7904E-18
38	T (K)	2100											
39	1.15826E-06	8.10781E-05	0.009004336	6.728749116	9.382209362	2.160139773	15.18671341	0.617790638	7.63164E-05	47	65.88896521	1.15826E-06	-1.70775E-17
40	T (K)	2200											
41	4.73406E-06	0.000331384	0.018203959	6.701221005	9.40926626	2.187667884	15.32810028	0.59073374	0.000311923	47	65.88920081	4.73406E-06	1.11385E-17
42	T (K)	2300											
43	1.71283E-05	0.00198988	0.034626296	6.675435548	9.433418396	2.213453341	16.64970824	0.566581604	0.001128583	47	65.89001747	1.71283E-05	9.96111E-18
44	T (K)	2400											
45	5.53484E-05	0.003874386	0.062244569	6.651207018	9.452610003	2.237681871	17.26851068	0.547389997	0.003647045	47	65.89253593	5.53484E-05	1.15196E-19
46	T (K)	2500											
47	0.000160819	0.011257301	0.106100431	6.622658834	9.467258552	2.266230055	17.7707611	0.532743448	0.010597863	47	65.89948675	0.000160819	1.37423E-17
48	T (K)	2700											
49	0.00099514	0.06965978	0.263931393	6.507056412	9.472786768	2.381832477	17.96765747	0.527213232	0.065633965	47	65.95452285	0.00099514	9.1073E-18
50	T (K)	3000											
51	0.006186491	0.433054365	0.658068663	5.936097268	9.354696933	2.952791621	14.49659457	0.645303067	0.410158455	47	66.29904734	0.006186491	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	4.22934E-12	3.38347E-10	1.83942E-05	7.04003674	9.071074371	1.848852149	9.765124444	0.928925629	2.78666E-10	47	65.88888889	4.22933E-12	-8.84555E-18
36	T (K)	2000											
37	2.15278E-07	1.72222E-05	0.004149967	6.760942504	9.350140239	2.127946385	14.38733536	0.649859761	1.41844E-05	47	65.88890307	2.15278E-07	8.78127E-18
38	T (K)	2100											
39	1.01349E-06	8.10795E-05	0.009004414	6.7287632	9.382214355	2.160125689	15.18684422	0.617785645	6.6778E-05	47	65.88895567	1.01349E-06	-5.32784E-19
40	T (K)	2200											
41	4.14259E-06	0.000331408	0.018204603	6.701279301	9.409285906	2.187609588	15.9286633	0.590714094	0.000272952	47	65.88916184	4.14259E-06	-1.48459E-17
42	T (K)	2300											
43	1.49311E-05	0.00199288	0.034630736	6.675648668	9.43348692	2.213240221	16.65184311	0.56651308	0.000987762	47	65.88987655	1.49311E-05	1.4203E-17
44	T (K)	2400											
45	4.84699E-05	0.003877593	0.062270321	6.651899548	9.452823997	2.236989341	17.27565525	0.547176003	0.003193783	47	65.89208267	4.84699E-05	7.59619E-18
46	T (K)	2500											
47	0.000141051	0.011284096	0.106226627	6.624665308	9.467855767	2.264223581	17.79189771	0.532144233	0.009295018	47	65.89818391	0.000141051	3.87602E-18
48	T (K)	2700											
49	0.000882402	0.070592184	0.265691896	6.51863028	9.47609712	2.370258609	18.08750722	0.52390288	0.058191856	47	65.94708074	0.000882402	3.79471E-18
50	T (K)	3000											
51	0.005696597	0.455277228	0.675076091	5.986195468	9.369929952	2.902693421	14.8712512	0.630070048	0.377492845	47	66.26638173	0.005696597	0

	FP	FQ	FR	FS	FT	FU	FV	Fw	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.75942E-12	3.38347E-10	1.83942E-05	7.04003674	9.071074371	1.848852149	9.765124444	0.928925629	2.47704E-10	47	65.88888889	3.75942E-12	5.61703E-18
36	T (K)	2000											
37	1.91359E-07	1.72223E-05	0.004149973	6.760944795	9.350141099	2.127944094	14.38735573	0.649858901	1.26084E-05	47	65.8889015	1.91359E-07	-6.96933E-18
38	T (K)	2100											
39	9.00895E-07	8.10806E-05	0.009004474	6.728774155	9.382218238	2.160114734	15.18694596	0.617781762	5.9359E-05	47	65.88894825	9.00895E-07	7.1047E-18
40	T (K)	2200											
41	3.68251E-06	0.000331426	0.018205103	6.701324647	9.409301189	2.187564241	15.92910129	0.590698811	0.000242637	47	65.88913153	3.68251E-06	3.51688E-18
42	T (K)	2300											
43	1.33281E-05	0.00199527	0.034634191	6.675814504	9.433540239	2.213074385	16.6535046	0.566459761	0.000878184	47	65.88976707	1.33281E-05	1.04642E-17
44	T (K)	2400											
45	4.31121E-05	0.003890093	0.062290392	6.652438984	9.45299066	2.236449305	17.28122348	0.54700934	0.002840734	47	65.89172962	4.31121E-05	2.31071E-18
46	T (K)	2500											
47	0.000125612	0.011305081	0.106325353	6.626232551	9.46832361	2.262656338	17.80843344	0.53167639	0.008277475	47	65.89716636	0.000125612	8.64651E-18
48	T (K)	2700											
49	0.000792724	0.071345163	0.267105154	6.527840221	9.478724602	2.361048668	18.18371756	0.521275398	0.052273144	47	65.94116203	0.000792724	2.71051E-18
50	T (K)	3000											
51	0.005286786	0.475810737	0.689790357	6.028187018	9.382540408	2.860701871	15.19539178	0.617459592	0.350191842	47	66.23908073	0.005286786	0

	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.38347E-12	3.38347E-10	1.83942E-05	7.04003674	9.071074371	1.848852149	9.765124445	0.928925629	2.22935E-10	47	65.88888889	3.3835E-12	2.19051E-17
36	T (K)	2000											
37	1.72223E-07	1.72223E-05	0.004149978	6.760946629	9.350141787	2.127944226	14.38797203	0.649858213	1.13476E-05	47	65.88890024	1.72223E-07	-6.872E-18
38	T (K)	2100											
39	8.10814E-07	8.10814E-05	0.009004522	6.728782919	9.382221344	2.16010597	15.18702736	0.617778656	5.34237E-05	47	65.88894231	8.10814E-07	1.42693E-17
40	T (K)	2200											
41	3.3144E-06	0.00033144	0.018205504	6.701360929	9.409313416	2.18752796	15.92945172	0.590686584	0.000218383	47	65.88910727	3.3144E-06	1.64511E-17
42	T (K)	2300											
43	1.19972E-05	0.00199719	0.034636957	6.675947221	9.433582908	2.212941667	16.65483447	0.566417092	0.000790491	47	65.88967938	1.19972E-05	4.35375E-19
44	T (K)	2400											
45	3.8821E-05	0.003882097	0.062306475	6.65287104	9.453124131	2.236017849	17.28568524	0.546875869	0.00255797	47	65.89144686	3.8821E-05	1.48739E-17
46	T (K)	2500											
47	0.00011322	0.01132196	0.1064047	6.627490574	9.46869902	2.261398315	17.82172324	0.53130098	0.007460758	47	65.89634965	0.00011322	2.3988E-18
48	T (K)	2700											
49	0.000719662	0.071966153	0.268265079	6.535345931	9.480861485	2.353542958	18.26268177	0.519138515	0.047451848	47	65.93634074	0.000719662	9.86624E-18
50	T (K)	3000											
51	0.004937728	0.493772763	0.702689663	6.064012164	9.393187336	2.824876725	15.47955059	0.606812664	0.326955806	47	66.21584469	0.004937728	-1.38778E-17

	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)	110	Lambda-0.9	Phi-1.111									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	[(n5/nT).P]^1/2	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	3.07589E-12	3.38347E-10	1.83942E-05	7.04003674	9.071074371	1.848852149	9.765124445	0.928925629	2.02667E-10	47	65.88888889	3.0759E-12	1.16418E-17
36	T (K)	2000											
37	1.56567E-07	1.72223E-05	0.004149981	6.760948129	9.35014235	2.12794076	14.38798536	0.64985765	1.0316E-05	47	65.8888992	1.56567E-07	-8.69593E-18
38	T (K)	2100											
39	7.3711E-07	8.10821E-05	0.009004562	6.72879009	9.382223886	2.160098799	15.18709396	0.617776114	4.85674E-05	47	65.88893746	7.3711E-07	-5.8656E-18
40	T (K)	2200											
41	3.0132E-06	0.000331452	0.018205832	6.701390616	9.409323421	2.187498273	15.92973847	0.590676579	0.000198537	47	65.88908743	3.0132E-06	5.12921E-18
42	T (K)	2300											
43	1.0908E-05	0.00199876	0.034639221	6.67605584	9.433617828	2.212833048	16.65592298	0.566382172	0.000718721	47	65.88960761	1.0908E-05	-4.80268E-18
44	T (K)	2400											
45	3.53067E-05	0.003883739	0.06231965	6.653224877	9.453233429	2.235664012	17.28934052	0.546766571	0.002326402	47	65.89121529	3.53067E-05	-3.72694E-19
46	T (K)	2500											
47	0.000103053	0.011335832	0.106469864	6.628522683	9.46900693	2.260366206	17.83263751	0.53099307	0.006790749	47	65.89567964	0.000103053	6.6814E-18
48	T (K)	2700											
49	0.000658974	0.072487168	0.26923441	6.541581832	9.482633854	2.347307056	18.32867096	0.517366146	0.043447712	47	65.9323366	0.000658974	1.33357E-17
50	T (K)	3000											
51	0.004636066	0.509967227	0.714119897	6.095015672	9.402319498	2.793873217	15.73134721	0.597680502	0.306887971	47	66.19577686	0.004636066	0

10-110 Bar Polynomial equations-

$$\begin{aligned}
 y &= -0.00000000000000003626237440863x^6 + 0.000000000000048680133392777100x^5 - \\
 &0.000000000269014424202972000000x^4 + 0.000000784170625453676000000000x^3 - \\
 &0.001272484041743020000000000000x^2 + 1.090155923683300000000000000000x - \\
 10 \quad &385.194782427829000000000000000000 \\
 y &= -0.000000000000000002339273884518x^6 + 0.000000000000031902107234002900x^5 - \\
 &0.000000000178865692897905000000x^4 + 0.000000528397051989604000000000x^3 - \\
 &0.000868081219742035000000000000x^2 + 0.752212735868145000000000000000x - \\
 20 \quad &268.579675200677000000000000000000 \\
 y &= -0.000000000000000001525491716941x^6 + 0.000000000000021063364743161800x^5 - \\
 &0.000000000119335513729439000000x^4 + 0.000000355704070755706000000000x^3 - \\
 &0.000588921845691121000000000000x^2 + 0.513783238568252000000000000000x - \\
 30 \quad &184.539527881129000000000000000000 \\
 y &= -0.000000000000000001025171712059x^6 + 0.000000000000014350115804247600x^5 - \\
 &0.000000000082200871876118500000x^4 + 0.000000247244150271075000000000x^3 - \\
 &0.000412458885788407000000000000x^2 + 0.362144220955489000000000000000x - \\
 40 \quad &130.784777345784000000000000000000 \\
 y &= -0.00000000000000000699719297390x^6 + 0.00000000000009961611498807940x^5 - \\
 &0.000000000057815504331518300000x^4 + 0.000000175724038076290000000000x^3 - \\
 &0.000295649598387231000000000000x^2 + 0.261412972231024000000000000000x - \\
 50 \quad &94.961247235586200000000000000000 \\
 y &= -0.00000000000000000477442194083x^6 + 0.00000000000006951852128434210x^5 - \\
 60 \quad &0.000000000041029554630003700000x^4 + 0.000000126329980053492000000000x^3 -
 \end{aligned}$$

$$\begin{aligned}
& 0.00021473873690587400000000000000x^2 + 0.191453478164831000000000000000x - \\
& 70.021883875507700000000000000000 \\
& y = -0.000000000000000000319762496719x^6 + 0.000000000000004808393594987180x^5 - \\
& 0.000000000029034603954771300000x^4 + 0.000000090929457893187500000000x^3 - \\
& 0.000156599462276829000000000000x^2 + 0.141067990202947000000000000000x - \\
70 & 52.023877382410600000000000000000 \\
& y = -0.000000000000000000204560574999x^6 + 0.000000000000003236224935923930x^5 - \\
& 0.000000000020207441828399500000x^4 + 0.000000064803877526254800000000x^3 - \\
& 0.000113587043853705000000000000x^2 + 0.103712037821766000000000000000x - \\
80 & 38.655130898440900000000000000000 \\
& y = -0.000000000000000000118419372989x^6 + 0.000000000000002055880587223900x^5 - \\
& 0.000000000013557849958583700000x^4 + 0.000000045067034151659200000000x^3 - \\
& 0.000081013603936245400000000000x^2 + 0.075362854058333300000000000000x - \\
90 & 28.491269730195800000000000000000 \\
& y = -0.000000000000000000052810353430x^6 + 0.000000000000001153017245248780x^5 - \\
& 0.000000000008453544266947620000x^4 + 0.000000029872204684288900000000x^3 - \\
& 0.000055873849275909800000000000x^2 + 0.053436906488980100000000000000x - \\
100 & 20.616003692351300000000000000000 \\
& y = -0.00000000000000000002097863521x^6 + 0.000000000000000451925593388962x^5 - \\
& 0.000000000004475101335349710000x^4 + 0.000000017992279866474200000000x^3 - \\
& 0.000036167675376454000000000000x^2 + 0.036212286832809400000000000000x - \\
110 & 14.417818773586600000000000000000
\end{aligned}$$

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	2.22933E-09	1.11467E-09	7.4311E-10	5.57334E-10	4.45865E-10	3.71555E-10	3.18476E-10	2.78666E-10	2.47704E-10	2.22935E-10	2.02667E-10
3	2000	0.000113455	5.67334E-05	3.78235E-05	2.83681E-05	2.26947E-05	1.89124E-05	1.62107E-05	1.41844E-05	1.26084E-05	1.13476E-05	1.0316E-05
4	2100	0.000533778	0.000267016	0.000178039	0.00013354	0.000106837	8.90338E-05	7.63164E-05	6.6778E-05	5.9359E-05	5.34237E-05	4.85674E-05
5	2200	0.002176158	0.001090205	0.000727278	0.000545636	0.000436595	0.000363877	0.000311923	0.000272952	0.000242637	0.000218383	0.000198537
6	2300	0.007805579	0.003930125	0.002626252	0.001972016	0.001578733	0.001316235	0.001128583	0.000987762	0.000878184	0.000790491	0.000718721
7	2400	0.024585236	0.012560873	0.008436423	0.006351192	0.005092528	0.004250244	0.003647045	0.003193783	0.002840734	0.00255797	0.002326402
8	2500	0.067080365	0.035471047	0.02413239	0.018290486	0.014726725	0.012325608	0.010597863	0.009295018	0.008277475	0.007460758	0.006790749
9	2700	0.306914216	0.186621722	0.135608623	0.106863372	0.088298069	0.075281006	0.065633965	0.058191856	0.052273144	0.047451848	0.043447712
10	3000	1.100458883	0.808228389	0.661044589	0.567310122	0.500686748	0.450161957	0.410158455	0.377492845	0.350191842	0.326955806	0.306887971

Lambda-0.911, Phi-1.098

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*W2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	4.46602E-11	4.46602E-10	2.1133E-05	7.147699227	9.07	1.6338595	11.21906336	0.808511527	2.93243E-09	47	65.6608123	4.46602E-11	6.8094E-17
36	T (K)	2000											
37	2.29433E-06	2.29433E-05	0.004789919	6.899995704	9.318144273	1.881563022	16.60664752	0.561109234	0.000150648	47	65.66096294	2.29433E-06	1.23656E-16
38	T (K)	2100											
39	1.08053E-05	0.000108053	0.010394856	6.870861337	9.346160951	1.91069739	17.53196474	0.533092616	0.000709493	47	65.66152179	1.08053E-05	1.19457E-16
40	T (K)	2200											
41	4.40433E-05	0.000440433	0.020986497	6.84362277	9.369034411	1.937935957	18.36276487	0.510219157	0.002832047	47	65.66370434	4.40433E-05	9.94823E-17
42	T (K)	2300											
43	0.0001574	0.001573997	0.039673637	6.810590728	9.387177301	1.970967999	19.07667153	0.492076266	0.010336622	47	65.67114892	0.0001574	6.09322E-17
44	T (K)	2400											
45	0.000489629	0.004896294	0.069973522	6.758831836	9.395279014	2.02272689	19.41275414	0.483974553	0.032165211	47	65.69297751	0.000489629	0
46	T (K)	2500											
47	0.001239166	0.012391662	0.113980971	6.660090489	9.387520233	2.121468238	19.09067289	0.491733334	0.085415276	47	65.74622757	0.001239166	4.55365E-18
48	T (K)	2700											
49	0.005430573	0.054305734	0.233035907	6.207947746	9.29344784	2.573610981	15.86438542	0.585805728	0.358522844	47	66.01933514	0.005430573	-9.54098E-18
50	T (K)	3000											
51	0.017683018	0.17683018	0.420511807	4.937789135	8.92	3.843769592	9.2634546	0.96256611	1.18198234	47	66.84279463	0.017683018	0

	BY	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*W2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	2.23301E-11	4.46602E-10	2.1133E-05	7.147699228	9.070742042	1.633859498	11.21906337	0.808511526	1.46622E-09	47	65.6608123	2.23302E-11	6.18833E-17
36	T (K)	2000											
37	1.14734E-06	2.29468E-05	0.004790278	6.900106624	9.318183979	1.881452103	16.60789352	0.561069588	7.53352E-05	47	65.66088763	1.14734E-06	1.10402E-16
38	T (K)	2100											
39	5.40649E-06	0.00010813	0.010398544	6.871391492	9.346339789	1.910167234	17.53818377	0.532913779	0.000354996	47	65.66116729	5.40649E-06	1.19706E-16
40	T (K)	2200											
41	2.20855E-05	0.000441709	0.021016881	6.845806904	9.369734006	1.935751822	18.38935089	0.509519562	0.001450182	47	65.66226248	2.20855E-05	1.2942E-16
42	T (K)	2300											
43	7.95121E-05	0.001590241	0.039877827	6.818426753	9.389572038	1.963131974	19.17485441	0.48968153	0.005221241	47	65.66603354	7.95121E-05	9.62223E-17
44	T (K)	2400											
45	0.000252534	0.005050682	0.07106815	6.782896096	9.40237361	1.998662628	19.71643693	0.476879958	0.016585783	47	65.67739808	0.000252534	5.14996E-17
46	T (K)	2500											
47	0.00070134	0.014026795	0.118434769	6.721150922	9.405124639	2.060407805	19.83663954	0.474128928	0.046082856	47	65.70689515	0.00070134	2.71051E-18
48	T (K)	2700											
49	0.003422535	0.068450698	0.261630844	6.413375032	9.354069844	2.368183694	17.81104294	0.525183723	0.225498198	47	65.88631049	0.003422535	4.10696E-16
50	T (K)	3000											
51	0.013284493	0.265689858	0.515451121	5.370783217	9.079629503	3.41077551	11.35487275	0.799624065	0.884014277	47	66.54482657	0.013284493	-1.38778E-17

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*W2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	1.48867E-11	4.46602E-10	2.1133E-05	7.147699229	9.070742042	1.633859498	11.21906338	0.808511525	3.77478E-10	47	65.6608123	1.48868E-11	5.19503E-17
36	T (K)	2000											
37	7.6493E-07	2.29479E-05	0.004790398	6.900143604	9.318197217	1.881415123	16.60830897	0.56105635	5.0226E-05	47	65.66086252	7.6493E-07	1.36283E-16
38	T (K)	2100											
39	3.60518E-06	0.000108155	0.010399774	6.87156838	9.346399454	1.909990346	17.54025954	0.532854114	0.00023672	47	65.66104901	3.60518E-06	1.39065E-16
40	T (K)	2200											
41	1.47379E-05	0.000442137	0.021027065	6.846537798	9.36936804	1.935020929	18.39826097	0.509285527	0.000967718	47	65.66178001	1.47379E-05	1.33999E-16
42	T (K)	2300											
43	5.31326E-05	0.001595779	0.039947207	6.821075128	9.390380429	1.960483599	19.20821516	0.488873138	0.003492858	47	65.66430515	5.31326E-05	1.33072E-16
44	T (K)	2400											
45	0.000170193	0.005105775	0.071454709	6.791257948	9.404829563	1.990300778	19.82367983	0.474424004	0.011176881	47	65.67198918	0.000170193	5.53756E-17
46	T (K)	2500											
47	0.000481159	0.014434765	0.120144768	6.743670938	9.411553358	2.037887789	20.12304711	0.46770021	0.031608489	47	65.69242078	0.000481159	2.81893E-18
48	T (K)	2700											
49	0.002538141	0.07614422	0.275942422	6.504348899	9.379931471	2.277209828	18.78533223	0.499322096	0.167080452	47	65.82789275	0.002538141	6.07153E-18
50	T (K)	3000											
51	0.01031684	0.330950514	0.575282986	5.596871401	9.156711376	3.184687326	12.67290891	0.722542192	0.732429248	47	66.39324154	0.01031684	0

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*1/2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Cale n5lnT	Error
35	1.1165E-11	4.46602E-10	2.1133E-05	7.147693223	9.070742042	1.633859497	11.21906338	0.808511525	7.3311E-10	47	65.66081229	1.11651E-11	6.05158E-17
36	T (K)	2000											
37	5.73712E-07	2.29485E-05	0.004790458	6.900162096	9.318203837	1.881396631	16.60851672	0.561049731	3.76704E-05	47	65.66084936	5.73712E-07	1.19425E-16
38	T (K)	2100											
39	2.7042E-06	0.000108168	0.01040039	6.871656856	9.346429296	1.909901871	17.54129794	0.532824271	0.000177561	47	65.66098885	2.7042E-06	1.37605E-16
40	T (K)	2200											
41	1.10588E-05	0.000442352	0.021032167	6.846903782	9.370085215	1.934654944	18.4027251	0.509168352	0.000726138	47	65.66153843	1.10588E-05	1.28354E-16
42	T (K)	2300											
43	3.99643E-05	0.001538572	0.039982151	6.82240631	9.390786575	1.959152416	19.2250177	0.488466932	0.002624194	47	65.66343649	3.99643E-05	1.4241E-16
44	T (K)	2400											
45	0.000128352	0.00513407	0.071652422	6.795507794	9.406075957	1.986050932	19.87853132	0.473177611	0.008428761	47	65.66924106	0.000128352	8.73054E-17
46	T (K)	2500											
47	0.00036634	0.014653606	0.12105208	6.755421154	9.414894105	2.026137573	20.27501232	0.464353463	0.024063007	47	65.6848753	0.00036634	3.02492E-17
48	T (K)	2700											
49	0.002027283	0.081091311	0.284765361	6.557031214	9.394643179	2.224527512	19.38597151	0.484610388	0.13338344	47	65.79419573	0.002027283	1.73472E-17
50	T (K)	3000											
51	0.009579384	0.383173543	0.619011586	5.744027578	9.204266251	3.037531149	13.63620623	0.674987317	0.635073722	47	66.29588602	0.009579384	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*1/2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Cale n5lnT	Error
35	8.93204E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633859497	11.21906338	0.808511525	5.86489E-10	47	65.66081229	8.9321E-12	6.4304E-17
36	T (K)	2000											
37	4.58977E-07	2.29488E-05	0.004790494	6.900173191	9.318207808	1.881385535	16.60864138	0.561045759	3.01368E-05	47	65.66084243	4.58977E-07	1.21535E-16
38	T (K)	2100											
39	2.16352E-06	0.000108176	0.01040076	6.871709952	9.346447205	1.909848775	17.54192115	0.532806363	0.000142059	47	65.66095435	2.16352E-06	1.20309E-16
40	T (K)	2200											
41	8.84962E-06	0.000442481	0.021035231	6.847123546	9.370155571	1.934435181	18.4054065	0.509097996	0.000581078	47	65.66193337	8.84962E-06	1.43272E-16
42	T (K)	2300											
43	3.20051E-05	0.001600256	0.0400032	6.823207281	9.391030893	1.958351446	19.23513878	0.488222674	0.002101549	47	65.66291384	3.20051E-05	1.15339E-16
44	T (K)	2400											
45	0.000103026	0.005151295	0.071772521	6.798080476	9.406829875	1.98347825	19.91185038	0.472423692	0.006765461	47	65.66757776	0.000103026	9.39461E-17
46	T (K)	2500											
47	0.000295804	0.014790179	0.121614881	6.762641897	9.416942474	2.018918829	20.36327648	0.462311093	0.019428451	47	65.68024075	0.000295804	4.30428E-17
48	T (K)	2700											
49	0.001691377	0.084568832	0.290807208	6.591723241	9.404227388	2.189835486	19.79728231	0.47502618	0.111245322	47	65.77205762	0.001691377	-3.03577E-18
50	T (K)	3000											
51	0.008536723	0.426836174	0.653327004	5.850316295	9.237416032	2.931242432	14.39214057	0.641837535	0.565354473	47	66.22616677	0.008536723	1.38778E-17

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*1/2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Cale n5lnT	Error
35	7.44336E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633859497	11.21906338	0.808511525	4.88741E-10	47	65.66081229	7.44342E-12	5.72488E-17
36	T (K)	2000											
37	3.82484E-07	2.29491E-05	0.004790518	6.900180589	9.318210456	1.881378138	16.60872448	0.561043111	2.51142E-05	47	65.66083741	3.82484E-07	1.05046E-16
38	T (K)	2100											
39	1.80302E-06	0.000108181	0.010401006	6.871745353	9.346459145	1.909813374	17.54233669	0.532794422	0.00018388	47	65.66093068	1.80302E-06	1.39262E-16
40	T (K)	2200											
41	7.37612E-06	0.000442567	0.021037275	6.847270127	9.370202496	1.9342886	18.40719531	0.509051072	0.000484325	47	65.66129662	7.37612E-06	1.34431E-16
42	T (K)	2300											
43	2.66897E-05	0.001601382	0.040017267	6.823742209	9.391194036	1.957816517	19.24190276	0.488059531	0.001752514	47	65.66256481	2.66897E-05	1.33049E-16
44	T (K)	2400											
45	8.60481E-05	0.005162884	0.071853212	6.799805261	9.407335068	1.981753485	19.93423667	0.4719185	0.005650472	47	65.66646277	8.60481E-05	1.11863E-16
46	T (K)	2500											
47	0.000248059	0.014883559	0.121988192	6.767530383	9.418327256	2.014028344	20.43347715	0.460926312	0.016291817	47	65.67710411	0.000248059	2.98698E-17
48	T (K)	2700											
49	0.001452619	0.087157115	0.295223839	6.616406458	9.410997077	2.165152269	20.09795331	0.46825649	0.095518869	47	65.75633116	0.001452619	-4.55365E-18
50	T (K)	3000											
51	0.007739087	0.464345215	0.681428804	5.931973208	9.262231947	2.849585519	15.01119512	0.617021621	0.512118059	47	66.17293035	0.007739087	4.41487E-16

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	6.38003E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633859497	11.21906338	0.808511525	4.18921E-10	47	65.66081229	6.38008E-12	5.58323E-17
36	T (K)	2000											
37	3.27846E-07	2.29492E-05	0.004790535	6.900185872	9.318212348	1.881372854	16.60878385	0.56104122	2.15266E-05	47	65.66083382	3.27846E-07	1.30281E-16
38	T (K)	2100											
39	1.54549E-06	0.000108185	0.010401182	6.871770642	9.346467674	1.909788085	17.54263354	0.532785893	0.000101479	47	65.66091377	1.54549E-06	1.44151E-16
40	T (K)	2200											
41	6.32326E-06	0.000442628	0.021038736	6.847374863	9.370236024	1.934183864	18.40847363	0.509017543	0.000415193	47	65.66122749	6.32326E-06	1.5089E-16
42	T (K)	2300											
43	2.28884E-05	0.001602187	0.040027332	6.824124767	9.391310697	1.95743396	19.24674233	0.48794287	0.001502905	47	65.6623152	2.28884E-05	1.39093E-16
44	T (K)	2400											
45	7.38745E-05	0.005171215	0.07191116	6.80104204	9.407697198	1.980516687	19.95031305	0.47155637	0.004851018	47	65.66566331	7.38745E-05	1.11795E-16
46	T (K)	2500											
47	0.000213592	0.014951446	0.122276105	6.771059927	9.419326094	2.0104988	20.48002488	0.459927473	0.014027626	47	65.67483992	0.000213592	5.23941E-17
48	T (K)	2700											
49	0.001273755	0.089162855	0.298601499	6.634910894	9.416045459	2.146647833	20.32789426	0.463208109	0.08374246	47	65.74455475	0.001273755	-1.01915E-17
50	T (K)	3000											
51	0.007102615	0.497183038	0.705112075	5.997339256	9.28170291	2.784219471	15.53291389	0.597550658	0.469699554	47	66.13051185	0.007102615	1.04083E-17

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	5.58252E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633859497	11.21906338	0.808511525	3.66557E-10	47	65.66081229	5.58259E-12	6.66071E-17
36	T (K)	2000											
37	2.86867E-07	2.29493E-05	0.004790548	6.900189835	9.318213766	1.881368891	16.60882837	0.561039801	1.88359E-05	47	65.66083113	2.86867E-07	1.34516E-16
38	T (K)	2100											
39	1.35234E-06	0.000108187	0.010401314	6.871789609	9.346474072	1.909769117	17.54285619	0.532779496	8.8796E-05	47	65.66090109	1.35234E-06	1.3388E-16
40	T (K)	2200											
41	5.53343E-06	0.000442675	0.021039833	6.847453434	9.370261176	1.934105293	18.4094327	0.508992392	0.000363332	47	65.66117563	5.53343E-06	1.33269E-16
42	T (K)	2300											
43	2.00349E-05	0.001602792	0.04003489	6.824411941	9.391398264	1.957146786	19.25037648	0.487855304	0.001315535	47	65.66212783	2.00349E-05	1.42898E-16
44	T (K)	2400											
45	6.47187E-05	0.005177492	0.071954792	6.801972265	9.40796935	1.979586462	19.9624179	0.471284067	0.004249754	47	65.66506205	6.47187E-05	1.21132E-16
46	T (K)	2500											
47	0.000187538	0.015003029	0.122486853	6.773728222	9.420080654	2.007830504	20.51532306	0.459172913	0.012316198	47	65.67312849	0.000187538	5.82759E-17
48	T (K)	2700											
49	0.001134561	0.090764855	0.301272061	6.64931911	9.419960577	2.132239616	20.50969813	0.45929299	0.074580793	47	65.73539309	0.001134561	-1.19262E-17
50	T (K)	3000											
51	0.0065792	0.526335962	0.725490153	6.051229129	9.297498958	2.730329598	15.98182258	0.58175461	0.434856593	47	66.09566889	0.0065792	-1.47451E-17

	FP	FQ	FR	FS	FT	FU	FV	FV	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.911	Phi-1.098									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	4.96224E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633859497	11.21906338	0.808511525	3.25828E-10	47	65.66081229	4.96229E-12	4.83094E-17
36	T (K)	2000											
37	2.54994E-07	2.29494E-05	0.004790558	6.900192917	9.31821487	1.881365809	16.608863	0.561038698	1.67431E-05	47	65.66082904	2.54994E-07	1.15061E-16
38	T (K)	2100											
39	1.20211E-06	0.000108189	0.010401417	6.871804363	9.346479048	1.909754364	17.54302338	0.53277452	7.89313E-05	47	65.66089123	1.20211E-06	1.22726E-16
40	T (K)	2200											
41	4.919E-06	0.00044271	0.021040685	6.847514557	9.370280742	1.93404417	18.41017884	0.508972826	0.000322987	47	65.66113528	4.919E-06	1.39289E-16
42	T (K)	2300											
43	1.7814E-05	0.001603264	0.040040774	6.82463545	9.391466413	1.956923277	19.2532057	0.487787154	0.001169705	47	65.661982	1.7814E-05	1.4139E-16
44	T (K)	2400											
45	5.75821E-05	0.005182392	0.07198883	6.802697348	9.408181711	1.978861379	19.97186116	0.471071856	0.003781107	47	65.6645934	5.75821E-05	1.20136E-16
46	T (K)	2500											
47	0.000167151	0.015043554	0.122652166	6.775816308	9.420670808	2.005742419	20.54301129	0.45858276	0.010977079	47	65.67178937	0.000167151	6.40492E-17
48	T (K)	2700											
49	0.001023055	0.092074922	0.303438497	6.66086614	9.423088343	2.120692587	20.65718259	0.456165225	0.067243395	47	65.72805569	0.001023055	-1.21431E-17
50	T (K)	3000											
51	0.006138885	0.552499605	0.743303172	6.096655354	9.31063809	2.684903372	16.37422557	0.568615477	0.405573914	47	66.06638621	0.006138885	8.67362E-18

	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda=0.911	Phi=1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)^1/2	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	4.46602E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633853437	11.21906338	0.808511525	2.93245E-10	47	65.66081229	4.46606E-12	4.314E-17
36	T (K)	2000											
37	2.29495E-07	2.29495E-05	0.004790566	6.900195383	9.318215752	1.881363343	16.6088907	0.561037815	1.50688E-05	47	65.66082736	2.29495E-07	1.12489E-16
38	T (K)	2100											
39	1.08191E-06	0.000108191	0.010401499	6.871816166	9.346483029	1.909742561	17.54316793	0.532770539	7.10393E-05	47	65.66088333	1.08191E-06	1.44846E-16
40	T (K)	2200											
41	4.42739E-06	0.000442739	0.021041368	6.847563462	9.370296397	1.933995265	18.41077587	0.508957171	0.000290707	47	65.661103	4.42739E-06	1.47251E-16
42	T (K)	2300											
43	1.60364E-05	0.001603641	0.040045484	6.824814352	9.39152096	1.956744374	19.25547075	0.487732608	0.00105298	47	65.66186527	1.60364E-05	1.49186E-16
44	T (K)	2400											
45	5.18632E-05	0.005186322	0.072016126	6.803278411	9.408351746	1.978280316	19.97943376	0.470901821	0.003405558	47	65.66421785	5.18632E-05	1.2879E-16
46	T (K)	2500											
47	0.000150762	0.015076232	0.12278531	6.777494914	9.421145021	2.004063813	20.56531162	0.458108547	0.009900669	47	65.67071296	0.000150762	6.80337E-17
48	T (K)	2700											
49	0.000931668	0.093166773	0.305232326	6.670332958	9.425646101	2.111225768	20.77930106	0.453607466	0.061231107	47	65.7220434	0.000931668	-2.21177E-17
50	T (K)	3000											
51	0.005761857	0.576185681	0.759068956	6.135618116	9.32178175	2.645940611	16.72153004	0.557471818	0.380520704	47	66.041333	0.005761857	0

	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)	110	Lambda=0.911	Phi=1.098									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)^1/2	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	4.06002E-12	4.46602E-10	2.1133E-05	7.14769923	9.070742043	1.633853437	11.21906338	0.808511525	2.66588E-10	47	65.66081229	4.06007E-12	5.5819E-17
36	T (K)	2000											
37	2.08633E-07	2.29496E-05	0.004790572	6.900197401	9.318216475	1.881361326	16.60891337	0.561037093	1.3693E-05	47	65.66082599	2.08633E-07	1.11876E-16
38	T (K)	2100											
39	9.83569E-07	0.000108193	0.010401566	6.871825823	9.346486286	1.909732903	17.5432813	0.532767281	6.4582E-05	47	65.66087688	9.83569E-07	1.43549E-16
40	T (K)	2200											
41	4.02512E-06	0.000442763	0.021041926	6.84760348	9.370309207	1.933955247	18.41126443	0.508944361	0.000264293	47	65.66107659	4.02512E-06	1.28936E-16
42	T (K)	2300											
43	1.45814E-05	0.00160395	0.040049341	6.824960791	9.391565607	1.956597936	19.25732509	0.487687961	0.000957438	47	65.66176973	1.45814E-05	1.30391E-16
44	T (K)	2400											
45	4.71777E-05	0.005189546	0.072038501	6.803754488	9.408491042	1.977804238	19.98564146	0.470762525	0.003097871	47	65.66391017	4.71777E-05	1.13956E-16
46	T (K)	2500											
47	0.000137301	0.015103143	0.122894845	6.778873758	9.42153441	2.002684969	20.58365757	0.457719158	0.009016553	47	65.66982885	0.000137301	9.94755E-17
48	T (K)	2700											
49	0.000855373	0.09409108	0.306742693	6.678238532	9.427777545	2.103320195	20.88212234	0.451476023	0.056212599	47	65.71702489	0.000855373	-6.50521E-18
50	T (K)	3000											
51	0.005434391	0.597783048	0.773164309	6.169507456	9.331381255	2.612051271	17.03203656	0.547872312	0.358776281	47	66.01958858	0.005434391	0

10-110 Bar Polynomial equations-

$$\begin{aligned}
 y &= -0.000000000000000003265714510158x^6 + 0.000000000000044216619304584500x^5 - \\
 &0.000000000246340888467309000000x^4 + 0.000000723629002091967000000000x^3 - \\
 &0.001182815558811310000000000000x^2 + 1.020284171158520000000000000000x - \\
 10 \quad &362.809807599340000000000000000000 \\
 y &= -0.000000000000000002795754180467x^6 + 0.000000000000037809999780742000x^5 - \\
 &0.000000000210396437913739000000x^4 + 0.000000617296527679524000000000x^3 - \\
 &0.001007806527142530000000000000x^2 + 0.868317507385994000000000000000x - \\
 20 \quad &308.429687748300000000000000000000 \\
 y &= -0.000000000000000002060484934692x^6 + 0.000000000000028130917115435500x^5 - \\
 &0.000000000157864550361031000000x^4 + 0.000000466710796343128000000000x^3 - \\
 &0.000767234525741675000000000000x^2 + 0.665194538694051000000000000000x - \\
 30 \quad &237.622717600226000000000000000000 \\
 y &= -0.00000000000000000153655061744x^6 + 0.000000000000021156333372691200x^5 - \\
 40 \quad &0.000000000119579637726040000000x^4 + 0.000000355715937355997000000000x^3 -
 \end{aligned}$$

0.00058792125190698200000000000000x² + 0.512137639875460000000000000000x -
 183.706600002290000000000000000000
 y = -0.000000000000000000001163572250908x⁶ + 0.0000000000000016162739027455800x⁵ -
 0.0000000000092016266793492600000x⁴ + 0.000000275375730928876000000000x³ -
 0.0004574634025133650000000000000x² + 0.400238340436496000000000000000x -
 50 144.107580858477000000000000000000
 y = -0.00000000000000000000891110261396x⁶ + 0.0000000000000012500389280247400x⁵ -
 0.0000000000071725285578502700000x⁴ + 0.000000216024782439540000000000x³ -
 0.0003607712524282780000000000000x² + 0.317047183517998000000000000000x -
 60 114.584368337477000000000000000000
 y = -0.00000000000000000000686803719097x⁶ + 0.0000000000000009745230244951230x⁵ -
 0.0000000000056415225190615700000x⁴ + 0.000000171121254134103000000000x³ -
 0.0002874338883929270000000000000x² + 0.253805774258722000000000000000x -
 70 92.094286460904300000000000000000
 y = -0.00000000000000000000530081640609x⁶ + 0.0000000000000007625636498906220x⁵ -
 0.0000000000044606477937196300000x⁴ + 0.000000136406538319727000000000x³ -
 0.0002306185766525040000000000000x² + 0.204719508771269000000000000000x -
 80 74.608454130363100000000000000000
 y = -0.00000000000000000000407535396295x⁶ + 0.0000000000000005963724991160150x⁵ -
 0.0000000000035325472355082900000x⁴ + 0.000000109065243793806000000000x³ -
 0.0001857871246519040000000000000x² + 0.165922282113438000000000000000x -
 90 60.767340657809000000000000000000
 y = -0.00000000000000000000310157171038x⁶ + 0.0000000000000004639605572864060x⁵ -
 0.0000000000027913912074036500000x⁴ + 0.000000087187641588820300000000x³ -
 0.0001498516826733590000000000000x² + 0.134775726203801000000000000000x -
 100 49.640534720402500000000000000000
 y = -0.00000000000000000000231719944340x⁶ + 0.0000000000000003570193496298360x⁵ -
 0.0000000000021914485889839500000x⁴ + 0.000000069443944963739100000000x³ -
 0.0001206572553257350000000000000x² + 0.109434576311195000000000000000x -
 110 40.575991423474700000000000000000

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	2.93243E-09	1.46622E-09	9.77478E-10	7.3311E-10	5.86489E-10	4.88741E-10	4.18921E-10	3.66557E-10	3.25828E-10	2.93245E-10	2.66588E-10
3	2000	0.000150648	7.53352E-05	5.0226E-05	3.76704E-05	3.01368E-05	2.51142E-05	2.15266E-05	1.88359E-05	1.67431E-05	1.50688E-05	1.3699E-05
4	2100	0.000709493	0.000354996	0.00023672	0.000177561	0.000142059	0.000118388	0.000101479	8.8796E-05	7.89313E-05	7.10333E-05	6.4582E-05
5	2200	0.002892047	0.001450182	0.000967718	0.000726138	0.000581078	0.000484325	0.000415193	0.000363332	0.000322987	0.000290707	0.000264293
6	2300	0.010336622	0.005221241	0.003492858	0.002624194	0.002101549	0.001752514	0.001502905	0.001315535	0.001169705	0.00105298	0.000957438
7	2400	0.032165211	0.016585783	0.011176881	0.008428761	0.006765461	0.005650472	0.004851018	0.004249754	0.003781107	0.003405558	0.003097871
8	2500	0.085415276	0.046082856	0.031608489	0.024063007	0.019428451	0.016291817	0.014027626	0.012316198	0.010977079	0.009900669	0.009016553
9	2700	0.358522844	0.225498198	0.167080452	0.13338344	0.11245322	0.095518869	0.08374246	0.074580793	0.067243395	0.061231107	0.056212599
10	3000	1.18196234	0.884014277	0.732429248	0.635073722	0.565354473	0.512118059	0.469693954	0.434856593	0.405573914	0.380520704	0.358776281

Lambda-0.92, Phi-1.087

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	
31	P (Bar)	10	Lambda-0.92	Phi-1.087										
32	T (K)	1500												
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	5.72934E-11	5.72934E-10	2.3936E-05	7.235424945	9.07	1460227229	12.70716413	0.713685822	3.75147E-09		47	65.47826087	5.72934E-11	-5.03344E-18
36	T (K)	2000												
37	2.96547E-06	2.96547E-05	0.005445614	7.013435131	9.290524346	1.682217043	18.87994274	0.49208435	0.000194174		47	65.47845504	2.96547E-06	-8.87352E-18
38	T (K)	2100												
39	1.39749E-05	0.000139749	0.011821559	6.987121534	9.315396158	1.708530639	19.39824099	0.467212537	0.000915067		47	65.47917594	1.39749E-05	1.61885E-17
40	T (K)	2200												
41	5.69144E-05	0.000569144	0.023856745	6.96150723	9.335386586	1.734144944	20.8741748	0.447221884	0.00372687		47	65.48198774	5.69144E-05	-7.11508E-19
42	T (K)	2300												
43	0.000202357	0.002023566	0.044984064	6.927516188	9.350326358	1.769135986	21.6301374	0.432282338	0.01325264		47	65.49151351	0.000202357	5.3668E-18
44	T (K)	2400												
45	0.000619909	0.006199087	0.078734284	6.868757062	9.354359315	1.826895112	21.84325239	0.428249381	0.040615725		47	65.51887659	0.000619909	-5.9631E-18
46	T (K)	2500												
47	0.001595161	0.015951611	0.126299686	6.754082957	9.341034368	1.941569217	21.1539344	0.441574328	0.104615251		47	65.58287612	0.001595161	-7.80626E-18
48	T (K)	2700												
49	0.006151886	0.06151886	0.248023957	6.258091391	9.235640027	2.437560783	16.8851354	0.546968669	0.405308204		47	65.88356907	0.006151886	9.19403E-17
50	T (K)	3000												
51	0.018729414	0.18729414	0.43277493	4.950890284	8.85	3.74476189	9.533598944	0.928705255	1.249777051		47	66.72803792	0.018729414	0

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.86467E-11	5.72934E-10	2.3936E-05	7.235424947	9.068922875	1.460227227	12.70716415	0.713685821	1.87574E-09	47	65.47826087	2.86467E-11	1.68685E-17
36	T (K)	2000											
37	1.48305E-06	2.9661E-05	0.005446193	7.013579529	9.290574082	1.682072645	18.88195224	0.492034614	9.71077E-05	47	65.47835798	1.48305E-06	1.07404E-17
38	T (K)	2100											
39	6.9945E-06	0.00013989	0.011827506	6.987811956	9.315619889	1.707840218	19.94827231	0.466988807	0.000457991	47	65.47871886	6.9945E-06	1.70711E-17
40	T (K)	2200											
41	2.85739E-05	0.000571478	0.023905614	6.964346411	9.336259367	1.731305762	20.91693381	0.446349329	0.001871024	47	65.48013189	2.85739E-05	2.40185E-17
42	T (K)	2300											
43	0.000102643	0.0020252863	0.045308534	6.937618437	9.353286218	1.758033737	21.78615542	0.429322477	0.006721586	47	65.48498246	0.000102643	-1.36881E-18
44	T (K)	2400											
45	0.000323334	0.006466674	0.080415631	6.899062359	9.362929117	1.796589815	22.30970863	0.419679579	0.021178175	47	65.49943904	0.000323334	-1.57209E-18
46	T (K)	2500											
47	0.000880396	0.017607916	0.132694823	6.827553231	9.361399431	1.868098943	22.22505583	0.421209265	0.057697582	47	65.53595845	0.000880396	1.84314E-18
48	T (K)	2700											
49	0.003992562	0.07985125	0.282579634	6.480189115	9.299210727	2.215463059	19.23717377	0.483397969	0.262473992	47	65.74073486	0.003992562	0
50	T (K)	3000											
51	0.014271021	0.285420419	0.534247526	5.391924296	9.016483265	3.303727878	11.76893874	0.766125431	0.947970133	47	66.426231	0.014271021	

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	
31	P (Bar)		30	Lambda-0.92	Phi-1.087									
32	T (K)		1500											
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	1.90978E-11	5.72934E-10	2.3936E-05	7.235424949	9.068922875	1.460227226	12.70716416	0.71368582	1.25049E-09		47	65.47826087	1.90978E-11	3.30779E-18
36	T (K)		2000											
37	9.88771E-07	2.96631E-05	0.005446387	7.013627675	9.290590665	1.682024439	18.88262234	0.492018031	6.47431E-05		47	65.47832561	9.88771E-07	1.16414E-17
38	T (K)		2100											
39	4.66456E-06	0.000139937	0.011829493	6.988042409	9.315694559	1.707609765	19.95162242	0.466914137	0.000305429		47	65.4785663	4.66456E-06	1.3517E-17
40	T (K)		2200											
41	1.90754E-05	0.000572263	0.023922029	6.965298036	9.336551688	1.730354138	20.93129697	0.446057007	0.001249051		47	65.47950992	1.90754E-05	6.69495E-18
42	T (K)		2300											
43	6.87648E-05	0.002062944	0.045419649	6.941051476	9.354290529	1.754600698	21.8395839	0.428318166	0.00450291		47	65.48276378	6.87648E-05	1.46367E-18
44	T (K)		2400											
45	0.00021882	0.006564586	0.08102213	6.909748852	9.365936859	1.785903322	22.47796956	0.416671837	0.014331057		47	65.49259193	0.00021882	1.20889E-17
46	T (K)		2500											
47	0.000609783	0.018293487	0.135253417	6.855413455	9.369030601	1.840238719	22.65359484	0.413578095	0.039951885		47	65.51821276	0.000609783	4.66207E-18
48	T (K)		2700											
49	0.003014516	0.090435466	0.300724901	6.581363885	9.327019831	2.114288289	20.4724491	0.455588864	0.197982055		47	65.67624292	0.003014516	1.99493E-17
50	T (K)		3000											
51	0.011971584	0.359147529	0.599289186	5.623817771	9.093777069	3.071834403	13.20174149	0.688831627	0.793376493		47	66.27163736	0.011971584	0

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	
31	P (Bar)		40	Lambda-0.92	Phi-1.087									
32	T (K)		1500											
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	1.43233E-11	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716416	0.71368582	9.37869E-10		47	65.47826087	1.43234E-11	1.09492E-17
36	T (K)		2000											
37	7.41604E-07	2.96642E-05	0.005446483	7.013651751	9.290598957	1.682000423	18.88295744	0.492009739	4.8559E-05		47	65.47830943	7.41604E-07	-3.76189E-18
38	T (K)		2100											
39	3.49901E-06	0.00013996	0.011830487	6.988157694	9.315731912	1.707494479	19.95329867	0.466876784	0.00022911		47	65.47848998	3.49901E-06	1.9608E-17
40	T (K)		2200											
41	1.43164E-05	0.000572657	0.023930261	6.965774839	9.33669813	1.729877335	20.93849946	0.445910565	0.000937429		47	65.4791983	1.43164E-05	2.33273E-18
42	T (K)		2300											
43	5.17012E-05	0.002068047	0.045475784	6.942780749	9.354796121	1.752871425	21.86657588	0.427812574	0.003385478		47	65.48164635	5.17012E-05	8.49066E-18
44	T (K)		2400											
45	0.000165385	0.006615399	0.081335103	6.915213853	9.36747215	1.780438321	22.56479764	0.415136546	0.010830912		47	65.48909178	0.000165385	-8.61941E-18
46	T (K)		2500											
47	0.00046675	0.018670005	0.136638226	6.870148642	9.373046669	1.825503532	22.88553642	0.409562026	0.030576257		47	65.50883713	0.00046675	1.0842E-17
48	T (K)		2700											
49	0.002438092	0.097523693	0.312287837	6.641152506	9.343130883	2.054499668	21.25961907	0.439477813	0.160032219		47	65.63829309	0.002438092	3.44343E-16
50	T (K)		3000											
51	0.010480463	0.41921853	0.647470872	5.77564795	9.141678234	2.920004224	14.26313583	0.640930462	0.693510821		47	66.17177169	0.010480463	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	
31	P (Bar)		50	Lambda-0.92	Phi-1.087									
32	T (K)		1500											
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	1.14587E-11	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	7.50294E-10		47	65.47826087	1.14587E-11	-8.20081E-18
36	T (K)		2000											
37	5.93296E-07	2.96648E-05	0.005446541	7.013666197	9.290603933	1.681985976	18.88315852	0.492004763	3.8848E-05		47	65.47829972	5.93296E-07	-4.91036E-18
38	T (K)		2100											
39	2.79949E-06	0.000139975	0.011831083	6.988226884	9.315754329	1.70742529	19.95430481	0.466854367	0.000183306		47	65.47844418	2.79949E-06	7.76433E-18
40	T (K)		2200											
41	1.14579E-05	0.000572894	0.023935207	6.966061239	9.336786086	1.729590935	20.94282766	0.44582261	0.000750251		47	65.47901112	1.14579E-05	2.56211E-17
42	T (K)		2300											
43	4.14226E-05	0.002071128	0.045509653	6.943822454	9.355100592	1.75182972	21.88286142	0.427508104	0.00271239		47	65.48097326	4.14226E-05	-8.35513E-18
44	T (K)		2400											
45	0.00013293	0.006648515	0.08152616	6.918533592	9.368403831	1.777118582	22.61780249	0.414204865	0.008705202		47	65.48696607	0.00013293	-5.14996E-19
46	T (K)		2500											
47	0.000378166	0.018908301	0.137507459	6.879277861	9.375527922	1.816374313	23.03112436	0.407080774	0.024771021		47	65.50303189	0.000378166	-5.42101E-19
48	T (K)		2700											
49	0.002053182	0.102659078	0.320404553	6.68114111	9.353776012	2.014511064	21.81218075	0.428832684	0.134715352		47	65.61297622	0.002053182	-1.86483E-17
50	T (K)		3000											
51	0.009404258	0.470212881	0.685720702	5.885897355	9.17520985	2.809754819	15.10574134	0.607398846	0.621620311		47	66.09988118	0.009404258	1.56125E-17

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	9.5489E-12	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	6.25246E-10	47	65.47826087	9.54891E-12	1.18146E-17
36	T (K)	2000											
37	4.94421E-07	2.96652E-05	0.00544658	7.013675829	9.29060725	1.681976345	18.88329258	0.492001446	3.23738E-05	47	65.47829324	4.94421E-07	1.75046E-17
38	T (K)	2100											
39	2.33307E-06	0.00013984	0.01831481	6.988273019	9.315769276	1.707379155	19.95497572	0.466839419	0.000152765	47	65.47841364	2.33307E-06	1.68869E-17
40	T (K)	2200											
41	9.55087E-06	0.000573052	0.023938508	6.966252305	9.336844761	1.729399869	20.94571594	0.445763935	0.00062538	47	65.4788625	9.55087E-06	1.52483E-17
42	T (K)	2300											
43	3.45532E-05	0.002073191	0.045532311	6.944518663	9.355304041	1.751133511	21.89375645	0.427304655	0.002262561	47	65.48052343	3.45532E-05	7.06087E-18
44	T (K)	2400											
45	0.000111125	0.006667528	0.081654934	6.920764164	9.36902944	1.77488801	22.65352844	0.413579256	0.007277111	47	65.48553798	0.000111125	1.12757E-17
46	T (K)	2500											
47	0.000317879	0.019072764	0.138104177	6.885492272	9.377213937	1.810159902	23.13106853	0.405394758	0.020820808	47	65.49908168	0.000317879	-7.31836E-18
48	T (K)	2700											
49	0.001776205	0.106572314	0.326454152	6.709947646	9.361380632	1.985704528	22.22401932	0.421228064	0.116509774	47	65.59477064	0.001776205	-2.1684E-18
50	T (K)	3000											
51	0.008576946	0.514616768	0.717367945	5.971012761	9.200411004	2.724639413	15.80289845	0.582197692	0.56646203	47	66.0447229	0.008576946	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	8.18477E-12	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	5.35924E-10	47	65.47826087	8.18477E-12	-1.98587E-18
36	T (K)	2000											
37	4.23793E-07	2.96655E-05	0.005446608	7.013682708	9.290609619	1.681969466	18.88338834	0.491999076	2.77493E-05	47	65.47828862	4.23793E-07	1.10384E-18
38	T (K)	2100											
39	1.99987E-06	0.000139991	0.011831765	6.988305976	9.315779954	1.707346198	19.95545502	0.466828742	0.000130948	47	65.47839182	1.99987E-06	1.7316E-17
40	T (K)	2200											
41	8.18807E-06	0.000573165	0.023940868	6.96638846	9.33688669	1.729263328	20.94778037	0.445722006	0.000536145	47	65.47879701	8.18807E-06	4.58753E-18
42	T (K)	2300											
43	2.96381E-05	0.002074669	0.045548535	6.945016812	9.355449592	1.750635361	21.90155734	0.427159103	0.001940711	47	65.48020158	2.96381E-05	4.33003E-18
44	T (K)	2400											
45	9.54668E-05	0.006668263	0.081747617	6.9223661	9.369478538	1.773286074	22.6792413	0.413130158	0.006251594	47	65.48451246	9.54668E-05	-2.61564E-18
46	T (K)	2500											
47	0.000274188	0.019193131	0.138539276	6.8899968	9.378434526	1.805655374	23.20394332	0.40417417	0.01795825	47	65.49621912	0.000274188	-4.22839E-18
48	T (K)	2700											
49	0.001566611	0.109662787	0.331153721	6.731763372	9.367104588	1.963888802	22.54395186	0.415504107	0.102739933	47	65.5810008	0.001566611	6.07153E-18
50	T (K)	3000											
51	0.007913796	0.553965694	0.744288717	6.039459223	9.220258465	2.656192951	16.39593614	0.56235023	0.522315069	47	66.00057594	0.007913796	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	7.16167E-12	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	4.68935E-10	47	65.47826087	7.16168E-12	1.05542E-17
36	T (K)	2000											
37	3.70822E-07	2.96658E-05	0.005446628	7.013687868	9.290611396	1.681964306	18.88346016	0.491997239	2.42808E-05	47	65.47828515	3.70822E-07	1.33722E-17
38	T (K)	2100											
39	1.74995E-06	0.000139996	0.011831978	6.988330696	9.315787963	1.707321478	19.95581454	0.466820733	0.000114584	47	65.47837545	1.74995E-06	8.1654E-18
40	T (K)	2200											
41	7.16562E-06	0.00057325	0.023942638	6.966491288	9.336918147	1.729160886	20.94932945	0.445690549	0.000469196	47	65.47873007	7.16562E-06	-6.07916E-18
42	T (K)	2300											
43	2.59472E-05	0.00207578	0.045560723	6.945390894	9.355558893	1.750261279	21.90741828	0.427049813	0.001699025	47	65.47995989	2.59472E-05	1.32815E-17
44	T (K)	2400											
45	8.36763E-05	0.006694106	0.081817517	6.923572351	9.369816598	1.772079823	22.69863365	0.412792098	0.005479439	47	65.48374031	8.36763E-05	-2.71051E-19
46	T (K)	2500											
47	0.000241063	0.019285052	0.138870631	6.893412263	9.379359159	1.802239911	23.2594419	0.403249536	0.015788202	47	65.49404907	0.000241063	1.61546E-17
48	T (K)	2700											
49	0.001402125	0.112170009	0.334917913	6.748894295	9.371578288	1.946757879	22.80020677	0.411030408	0.091937622	47	65.57019849	0.001402125	-2.81893E-18
50	T (K)	3000											
51	0.00736611	0.589288832	0.767651504	6.096131721	9.236417533	2.599520453	16.91059498	0.546191163	0.485899286	47	65.96416016	0.00736611	1.56125E-17

	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	6.36593E-12	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	4.16831E-10	47	65.47826087	6.36595E-12	1.57862E-17
36	T (K)	2000											
37	3.29621E-07	2.96659E-05	0.005446644	7.013691881	9.290612779	1.681960293	18.88351602	0.491995917	2.1583E-05	47	65.47828245	3.29621E-07	8.43263E-18
38	T (K)	2100											
39	1.55555E-06	0.00014	0.011832144	6.988349923	9.315794193	1.70730225	19.95609419	0.466814503	0.000101855	47	65.47836272	1.55555E-06	-1.08251E-18
40	T (K)	2200											
41	6.37018E-06	0.000573316	0.023944016	6.966570986	9.336942619	1.729081188	20.95053474	0.445666077	0.000417111	47	65.47867798	6.37018E-06	2.11081E-18
42	T (K)	2300											
43	2.30738E-05	0.002076645	0.045570217	6.945682127	9.355643961	1.749970047	21.91198291	0.426964734	0.001510869	47	65.47977174	2.30738E-05	2.9619E-17
44	T (K)	2400											
45	7.44783E-05	0.006703043	0.081872116	6.924513413	9.370080272	1.771138761	22.71378103	0.412528423	0.00487707	47	65.48313794	7.44783E-05	1.16958E-17
46	T (K)	2500											
47	0.000215084	0.01935755	0.139131414	6.896091232	9.380083896	1.799560942	23.30312047	0.4025248	0.014086349	47	65.49234722	0.000215084	4.74338E-18
48	T (K)	2700											
49	0.001269415	0.114247391	0.338005017	6.762722296	9.375176003	1.932929878	23.01036753	0.407432693	0.083224763	47	65.56148563	0.001269415	9.32414E-18
50	T (K)	3000											
51	0.006903516	0.621316404	0.788236262	6.144098283	9.249904571	2.551553891	17.36405661	0.532704124	0.455172486	47	65.93343336	0.006903516	3.03577E-17

	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	5.72934E-12	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	3.75147E-10	47	65.47826087	5.72934E-12	-4.10496E-18
36	T (K)	2000											
37	2.96661E-07	2.96661E-05	0.005446657	7.013695092	9.290613885	1.681957082	18.88356071	0.491994811	1.94248E-05	47	65.47828029	2.96661E-07	-4.90803E-19
38	T (K)	2100											
39	1.40003E-06	0.000140003	0.011832277	6.988365307	9.315799177	1.707286867	19.95631793	0.466809519	9.16715E-05	47	65.47835254	1.40003E-06	-1.75378E-18
40	T (K)	2200											
41	5.73369E-06	0.000573369	0.023945118	6.966634757	9.336962201	1.729017417	20.95149925	0.445646495	0.000375434	47	65.4786363	5.73369E-06	7.44034E-18
42	T (K)	2300											
43	2.07734E-05	0.002077338	0.045577819	6.945915289	9.355712072	1.749373685	21.91563847	0.426896624	0.001360233	47	65.4796211	2.07734E-05	9.66634E-18
44	T (K)	2400											
45	6.71022E-05	0.006710222	0.081915942	6.925268083	9.370291681	1.770384091	22.72593985	0.412317015	0.004394031	47	65.4828549	6.71022E-05	9.40545E-18
46	T (K)	2500											
47	0.000194162	0.019416196	0.139342011	6.898248849	9.380667264	1.797403325	23.33839344	0.401941431	0.012715856	47	65.49097673	0.000194162	-9.94755E-18
48	T (K)	2700											
49	0.001159982	0.115998201	0.340585087	6.774129345	9.378134857	1.921522829	23.18601096	0.404473839	0.076041812	47	65.55430268	0.001159982	6.72205E-18
50	T (K)	3000											
51	0.006505888	0.650588784	0.806590841	6.185399369	9.261380775	2.510252805	17.76838963	0.52122792	0.428783841	47	65.90704471	0.006505888	5.29091E-17

	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)	110	Lambda-0.92	Phi-1.087									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	5.20849E-12	5.72934E-10	2.3936E-05	7.235424949	9.068922876	1.460227225	12.70716417	0.71368582	3.41044E-10	47	65.47826087	5.20851E-12	1.98515E-17
36	T (K)	2000											
37	2.69693E-07	2.96662E-05	0.005446668	7.013697719	9.290614789	1.681954455	18.88359727	0.491993906	1.7659E-05	47	65.47827853	2.69693E-07	1.02222E-17
38	T (K)	2100											
39	1.27278E-06	0.000140005	0.011832385	6.988377893	9.315803254	1.707274281	19.956501	0.466805441	8.33393E-05	47	65.47834421	1.27278E-06	1.74072E-17
40	T (K)	2200											
41	5.21284E-06	0.000573412	0.02394602	6.966686943	9.336978225	1.728965231	20.95228858	0.445630471	0.000341329	47	65.4786022	5.21284E-06	6.33581E-18
42	T (K)	2300											
43	1.889E-05	0.002077305	0.045584044	6.946106174	9.35576783	1.749545939	21.91863194	0.426840866	0.001236911	47	65.47949778	1.889E-05	5.76999E-18
44	T (K)	2400											
45	6.10556E-05	0.006716114	0.081951899	6.925886749	9.370464963	1.769765425	22.7359152	0.412143733	0.003998057	47	65.48225893	6.10556E-05	2.33103E-18
46	T (K)	2500											
47	0.000176951	0.019464615	0.139515644	6.900023865	9.381146367	1.795628309	23.36747515	0.401461729	0.011588497	47	65.48984937	0.000176951	2.13317E-17
48	T (K)	2700											
49	0.001068134	0.117494713	0.342775018	6.783706393	9.380612782	1.91194578	23.33509489	0.401995913	0.070014325	47	65.54827519	0.001068134	5.20417E-18
50	T (K)	3000											
51	0.006159264	0.677519031	0.823115442	6.221455367	9.271297854	2.474196806	18.13241007	0.511310842	0.405797302	47	65.88405817	0.006159264	8.41341E-17

10-110 Bar Polynomial equations-

		$y = -0.00000000000000003042396709435x^6 + 0.000000000000039896316433457200x^5 - 0.000000000215155398421708000000x^4 + 0.000000611727924395814000000000x^3 - 0.000968085687099167000000000000x^2 + 0.809019452130100000000000000000x - 279.001775227186000000000000000000$	
10		$y = -0.00000000000000002978047215541x^6 + 0.000000000000039979303512181400x^5 - 0.000000000220895211129064000000x^4 + 0.000000643714548919953000000000x^3 - 0.001044167770540070000000000000x^2 + 0.894167321982278000000000000000x - 315.799112768548000000000000000000$	
20		$y = -0.00000000000000002437058437210x^6 + 0.000000000000033015930008505000x^5 - 0.000000000183999910358137000000x^4 + 0.000000540585649033557000000000x^3 - 0.000883648347367386000000000000x^2 + 0.762184443735380000000000000000x - 271.000003423191000000000000000000$	
30		$y = -0.00000000000000001964183330643x^6 + 0.000000000000026788499296146500x^5 - 0.000000000150190047334254000000x^4 + 0.000000443640210374742000000000x^3 - 0.000728733235955998000000000000x^2 + 0.631357209478859000000000000000x - 225.386519837398000000000000000000$	
40		$y = -0.00000000000000001591229118122x^6 + 0.000000000000021834176435074500x^5 - 0.000000000123053446885872000000x^4 + 0.000000365136768040451000000000x^3 - 0.000602181711117167000000000000x^2 + 0.523561657544073000000000000000x - 187.490337040502000000000000000000$	
50		$y = -0.00000000000000001299427420918x^6 + 0.000000000000017938354819555800x^5 - 0.000000000101608398368554000000x^4 + 0.000000302796304912072000000000x^3 - 0.000501211625361644000000000000x^2 + 0.437166961458983000000000000000x - 156.987389207945000000000000000000$	
60		$y = -0.00000000000000001068846307584x^6 + 0.000000000000014848925266283000x^5 - 0.000000000084543968170743800000x^4 + 0.000000253027518307566000000000x^3 - 0.000420351708459125000000000000x^2 + 0.367775419045180000000000000000x - 132.420018998816000000000000000000$	
70		$y = -0.00000000000000000884177603733x^6 + 0.000000000000012367654367132500x^5 - 0.000000000070802267147588500000x^4 + 0.000000212849511337310000000000x^3 - 0.000354921461940919000000000000x^2 + 0.311502817528242000000000000000x - 112.457100332153000000000000000000$	
80			

$y = -0.000000000000000000734300420176x^6 + 0.000000000000010348977709592100x^5 -$
 $0.000000000059597573962942100000x^4 + 0.000000180021829263845000000000x^3 -$
 $0.000301359803922343000000000000x^2 + 0.265357158650731000000000000000x -$
 90 96.060543708950500000000000000000
 $y = -0.000000000000000000611170583380x^6 + 0.000000000000008686939186463230x^5 -$
 $0.000000000050354216777441900000x^4 + 0.000000152891984927660000000000x^3 -$
 $0.000257022514264832000000000000x^2 + 0.227101940742680000000000000000x -$
 100 82.449310434463000000000000000000
 $y = -0.000000000000000000508909932434x^6 + 0.000000000000007303786053154420x^5 -$
 $0.000000000042647931646525500000x^4 + 0.000000130236819744495000000000x^3 -$
 $0.000219943914906695000000000000x^2 + 0.195067546391846000000000000000x -$
 110 71.037947048712100000000000000000

N5 values-

#	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	3.75147E-09	1.87574E-09	1.25049E-09	9.37869E-10	7.50294E-10	6.25246E-10	5.35924E-10	4.68935E-10	4.16831E-10	3.75147E-10	3.41044E-10
3	2000	0.000194174	9.71077E-05	6.47431E-05	4.8559E-05	3.8848E-05	3.23738E-05	2.77493E-05	2.42908E-05	2.1583E-05	1.94248E-05	1.7659E-05
4	2100	0.000915067	0.000457991	0.000305429	0.00022911	0.000183306	0.000152765	0.000130948	0.000114584	0.000101855	9.16715E-05	8.33393E-05
5	2200	0.00372687	0.001871024	0.001249051	0.000937429	0.000750251	0.00062538	0.000536145	0.000469196	0.000417111	0.000375434	0.000341329
6	2300	0.01325264	0.006721586	0.00450291	0.003385478	0.00271239	0.002262561	0.001940711	0.001699025	0.001510863	0.001360233	0.001236911
7	2400	0.040615725	0.021178175	0.014331057	0.010830912	0.008705202	0.007277111	0.006251594	0.005479439	0.004877707	0.004394031	0.003998057
8	2500	0.104615251	0.057697582	0.039951885	0.030576257	0.024771021	0.020820808	0.01795825	0.015788202	0.014086349	0.012715856	0.011588497
9	2700	0.405308204	0.262473992	0.197982055	0.160032219	0.134715352	0.116509774	0.102739933	0.091937622	0.083224763	0.076041812	0.070014325
10	3000	1.249777051	0.947970133	0.793376493	0.693510821	0.621620311	0.56646203	0.522315069	0.485899286	0.455172486	0.428783841	0.405797302

Lambda-0.93, Phi-1.075

#	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	7.78324E-11	7.78324E-10	2.78985E-05	7.332509162	9.07	1.269641376	14.81073414	0.612079064	5.08087E-09	47	65.2795699	7.78324E-11	-8.59E-18
36	T (K)	2000											
37	4.06116E-06	4.06116E-05	0.006372724	7.138940372	9.258378867	1.463210166	22.09423463	0.419040488	0.000265112	47	65.279835	4.06116E-06	7.2243E-18
38	T (K)	2100											
39	1.91447E-05	0.000191447	0.013836434	7.115580481	9.27976942	1.486570057	23.33652944	0.397649935	0.001243781	47	65.28081967	1.91447E-05	-3.456E-18
40	T (K)	2200											
41	7.77917E-05	0.000777917	0.027891155	7.091210635	9.296481626	1.510939902	24.40420287	0.380937729	0.005078601	47	65.28464849	7.77917E-05	-5.584E-18
42	T (K)	2300											
43	0.000273901	0.002739015	0.052335595	7.05452054	9.307558787	1.547629997	25.16504756	0.369860568	0.017885068	47	65.29745496	0.000273901	3.6321E-18
44	T (K)	2400											
45	0.00081762	0.008176201	0.09042235	6.984578132	9.306436198	1.617572405	25.08587256	0.370983157	0.053417566	47	65.33298746	0.00081762	-1.301E-18
46	T (K)	2500											
47	0.002010331	0.020103315	0.141786158	6.848476431	9.286377177	1.753674107	23.74776356	0.391042178	0.131497927	47	65.41106782	0.002010331	-8.37E-17
48	T (K)	2700											
49	0.007027346	0.070273455	0.265091409	6.30454377	9.169328399	2.297606768	18.04662786	0.508090956	0.461988647	47	65.74155854	0.007027346	1.0408E-17
50	T (K)	3000											
51	0.019909201	0.199092013	0.44619728	4.961934737	8.78	3.640215801	9.829279889	0.893634614	1.326064993	47	66.60563488	0.019909201	0

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.89162E-11	7.78324E-10	2.78985E-05	7.332509165	9.065340292	1.269641373	14.81073418	0.612079062	2.54043E-09	47	65.2795699	3.89162E-11	-6.2333E-18
36	T (K)	2000											
37	2.03125E-06	4.06249E-05	0.00637377	7.139139619	9.258444645	1.46310918	22.09786037	0.41897471	0.000132599	47	65.27970249	2.03125E-06	-1.22612E-17
38	T (K)	2100											
39	9.58719E-06	0.000191744	0.013847159	7.116532998	9.280064757	1.48561754	23.35461779	0.397354598	0.000625854	47	65.28019575	9.58719E-06	-6.52554E-18
40	T (K)	2200											
41	3.91405E-05	0.00078281	0.027978739	7.09511181	9.297627304	1.507038728	24.480837	0.379792051	0.002555174	47	65.28212507	3.91405E-05	-1.15806E-17
42	T (K)	2300											
43	0.000139943	0.002798869	0.052904343	7.068191429	9.311384576	1.533959109	25.43852422	0.366034778	0.009136728	47	65.28870662	0.000139943	-8.42967E-18
44	T (K)	2400											
45	0.000434361	0.008687217	0.09320524	7.024014576	9.317100466	1.578135961	25.85792962	0.360318889	0.02836721	47	65.3079371	0.000434361	-1.73472E-18
46	T (K)	2500											
47	0.001145504	0.022910088	0.151360787	6.937947252	9.310174629	1.664203285	25.35141818	0.367244726	0.074863791	47	65.35443368	0.001145504	-8.0231E-18
48	T (K)	2700											
49	0.004715507	0.094310132	0.307099548	6.543622627	9.235657481	2.058527911	20.90641592	0.441761874	0.309284678	47	65.58885457	0.004715507	0
50	T (K)	3000											
51	0.015397106	0.307942116	0.554925325	5.410543798	8.945636985	3.191606739	12.24444998	0.73178237	1.02083434	47	66.30040423	0.015397106	3.29597E-16

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.59441E-11	7.78324E-10	2.78985E-05	7.332509166	9.065340293	1.269641372	14.8107342	0.612079062	1.69362E-09	47	65.27956989	2.59441E-11	-2.50756E-18
36	T (K)	2000											
37	1.35431E-06	4.06294E-05	0.006374119	7.139206064	9.25846658	1.462944473	22.09906971	0.418952775	8.84091E-05	47	65.2796583	1.35431E-06	-6.63227E-18
38	T (K)	2100											
39	6.39477E-06	0.000191843	0.013850744	7.116851166	9.280163395	1.485299371	23.36066499	0.39725596	0.000417451	47	65.27998734	6.39477E-06	-1.28156E-18
40	T (K)	2200											
41	2.61488E-05	0.000784464	0.028008282	7.096423202	9.298012207	1.505727336	24.50668698	0.379407148	0.001707027	47	65.28127692	2.61488E-05	-8.73799E-18
42	T (K)	2300											
43	9.39935E-05	0.002819804	0.053101829	7.072882045	9.312694557	1.529268493	25.53348336	0.364724798	0.00613643	47	65.28570632	9.39935E-05	-9.45966E-18
44	T (K)	2400											
45	0.000296069	0.008882057	0.094244665	7.038255523	9.320928035	1.563895015	26.14629734	0.356491319	0.019332952	47	65.29890284	0.000296069	3.95734E-18
46	T (K)	2500											
47	0.000805221	0.024156621	0.155424005	6.97321555	9.319420269	1.628934988	26.03196663	0.357399086	0.052606822	47	65.33217671	0.000805221	-1.44199E-17
48	T (K)	2700											
49	0.003637787	0.10913362	0.33035378	6.655738919	9.265430096	1.946411619	22.4894943	0.411989259	0.238340224	47	65.51791012	0.003637787	-3.90313E-18
50	T (K)	3000											
51	0.013054987	0.391649618	0.625819158	5.647927588	9.022928083	2.95422295	13.78617023	0.654491272	0.863496896	47	66.14306679	0.013054987	0

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.94581E-11	7.78324E-10	2.78985E-05	7.332509167	9.065340293	1.269641371	14.81073421	0.612079062	1.27022E-09	47	65.27956989	1.94581E-11	-3.17599E-18
36	T (K)	2000											
37	1.01579E-06	4.06316E-05	0.006374293	7.139239292	9.258477549	1.462911245	22.09967452	0.418941806	6.63104E-05	47	65.2796362	1.01579E-06	2.24464E-20
38	T (K)	2100											
39	4.79732E-06	0.000191893	0.013852539	7.117010375	9.28021275	1.485140162	23.36369193	0.397206605	0.000313169	47	65.27988306	4.79732E-06	1.38363E-17
40	T (K)	2200											
41	1.96324E-05	0.000785295	0.028023121	7.097080993	9.298205232	1.505069545	24.51967023	0.379214123	0.001281619	47	65.28085151	1.96324E-05	3.52027E-18
42	T (K)	2300											
43	7.07617E-05	0.002830468	0.053202147	7.075253806	9.313356414	1.526896731	25.58172055	0.364062941	0.004619621	47	65.28418951	7.07617E-05	1.21973E-19
44	T (K)	2400											
45	0.000224625	0.008985005	0.094789264	7.045614835	9.322901177	1.556535703	26.29738547	0.354518178	0.014666725	47	65.29423662	0.000224625	1.97867E-18
46	T (K)	2500											
47	0.000621665	0.024866602	0.157691478	6.992254713	9.324380206	1.609895825	26.41174568	0.353039149	0.040607272	47	65.32017716	0.000621665	-1.01915E-17
48	T (K)	2700											
49	0.002988536	0.119541446	0.345747662	6.723473466	9.283025724	1.878677071	23.53746357	0.394393631	0.195675136	47	65.47524503	0.002988536	3.90313E-18
50	T (K)	3000											
51	0.011527908	0.461116313	0.679055457	5.80419959	9.071023445	2.797950947	14.95891265	0.60639591	0.761313213	47	66.04088311	0.011527908	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.55665E-11	7.78324E-10	2.78985E-05	7.332509167	9.065340293	1.269641371	14.81073421	0.612079061	1.01617E-09	47	65.27956989	1.55665E-11	-7.3123E-18
36	T (K)	2000											
37	8.12659E-07	4.06329E-05	0.006374398	7.139259231	9.258484131	1.462891307	22.10003745	0.418935224	5.30501E-05	47	65.27962294	8.12659E-07	-1.93176E-18
38	T (K)	2100											
39	3.83845E-06	0.000191923	0.013853616	7.117105941	9.280242375	1.485044537	23.36550917	0.39717698	0.000250574	47	65.27982047	3.83845E-06	-9.90859E-18
40	T (K)	2200											
41	1.57159E-05	0.000785796	0.028032045	7.097476342	9.298321232	1.504674195	24.52747897	0.379098123	0.001025944	47	65.28059584	1.57159E-05	8.70072E-18
42	T (K)	2300											
43	5.67386E-05	0.002836932	0.053262856	7.07668552	9.313755775	1.525465018	25.61091153	0.36366358	0.003704084	47	65.28327398	5.67386E-05	-6.97278E-18
44	T (K)	2400											
45	0.000180974	0.009048691	0.095124607	7.050112065	9.324105334	1.552038472	26.39041983	0.353314021	0.011816031	47	65.29138592	0.000180974	-2.87314E-18
46	T (K)	2500											
47	0.000506524	0.025326189	0.159142041	7.004202877	9.327481761	1.59794766	26.65470051	0.349937594	0.033082412	47	65.3126523	0.000506524	4.66207E-18
48	T (K)	2700											
49	0.002547262	0.1273631	0.356879672	6.769590275	9.29484155	1.832560263	24.2952374	0.382577805	0.166708819	47	65.44627871	0.002547262	-1.69136E-17
50	T (K)	3000											
51	0.010420338	0.521016896	0.721815001	5.918233047	9.104820219	2.683917491	15.90096266	0.572599136	0.687398098	47	65.96696799	0.010420338	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.29721E-11	7.78324E-10	2.78985E-05	7.332509167	9.065340294	1.269641371	14.81073421	0.612079061	8.46811E-10	47	65.27956989	1.29721E-11	-7.23267E-18
36	T (K)	2000											
37	6.77231E-07	4.06338E-05	0.006374468	7.139272524	9.258488519	1.462878013	22.10027942	0.418930835	4.42094E-05	47	65.2796141	6.77231E-07	4.18964E-18
38	T (K)	2100											
39	3.19904E-06	0.000191943	0.013854335	7.117163668	9.280262129	1.48498087	23.36672111	0.397157226	0.000208833	47	65.27977873	3.19904E-06	-1.45436E-17
40	T (K)	2200											
41	1.31022E-05	0.00078613	0.028038004	7.097740191	9.298398642	1.504410347	24.53269264	0.379020712	0.000855315	47	65.28042521	1.31022E-05	2.23956E-18
42	T (K)	2300											
43	4.73545E-05	0.002841268	0.053303546	7.077643648	9.314022963	1.52450689	25.63047727	0.363396392	0.003091426	47	65.28266132	4.73545E-05	1.1418E-17
44	T (K)	2400											
45	0.000151533	0.009091986	0.095351905	7.053145557	9.324916876	1.54900498	26.45347887	0.352502479	0.009893514	47	65.28946341	0.000151533	-1.40946E-18
46	T (K)	2500											
47	0.000427472	0.025648298	0.160150861	7.012408409	9.329606856	1.589742128	26.82366763	0.347812498	0.027917098	47	65.30748699	0.000427472	-3.63208E-18
48	T (K)	2700											
49	0.002225034	0.133502062	0.36537934	6.803305745	9.303397333	1.798844792	24.87392933	0.374022022	0.145573192	47	65.42514308	0.002225034	-2.1684E-17
50	T (K)	3000											
51	0.009565051	0.573903079	0.757563911	6.006671167	9.130313183	2.59547937	16.8893754	0.547106172	0.630432556	47	65.91000245	0.009565051	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.11189E-11	7.78324E-10	2.78985E-05	7.332509167	9.065340294	1.269641371	14.81073422	0.612079061	7.25838E-10	47	65.27956989	1.11189E-11	4.48758E-18
36	T (K)	2000											
37	5.80492E-07	4.06345E-05	0.006374518	7.13928202	9.258491654	1.462868518	22.10045227	0.418927701	3.78943E-05	47	65.27960779	5.80492E-07	1.7154E-17
38	T (K)	2100											
39	2.74224E-06	0.000191957	0.013854848	7.117215195	9.280276242	1.484935343	23.367587	0.397143113	0.000179013	47	65.27974891	2.74224E-06	5.79582E-18
40	T (K)	2200											
41	1.12338E-05	0.000786369	0.028042264	7.097928792	9.298453974	1.504221745	24.53642056	0.378965381	0.000733348	47	65.28030324	1.12338E-05	-6.33242E-18
42	T (K)	2300											
43	4.0634E-05	0.002844379	0.053332719	7.078329829	9.31421428	1.523820709	25.64450476	0.363205075	0.002652677	47	65.28222257	4.0634E-05	8.1925E-18
44	T (K)	2400											
45	0.000130333	0.009123333	0.095516142	7.055330085	9.325500952	1.546820453	26.49904316	0.351918403	0.008509213	47	65.28807911	0.000130333	-3.1984E-18
46	T (K)	2500											
47	0.00036981	0.025886701	0.160893447	7.018394814	9.331154709	1.583755724	26.94804342	0.346264646	0.02414997	47	65.30371986	0.00036981	4.87891E-19
48	T (K)	2700											
49	0.00197815	0.138470522	0.372116276	6.829160337	9.30991162	1.772990201	25.33255969	0.367507735	0.129388753	47	65.40895865	0.00197815	-8.45678E-17
50	T (K)	3000											
51	0.008876558	0.621359089	0.788263337	6.078093969	9.150460347	2.524056569	17.36465305	0.526959008	0.584647573	47	65.86421747	0.008876558	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*1/2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	9.72905E-12	7.78324E-10	2.78985E-05	7.332509167	9.065340294	1.26964137	14.81073422	0.612079061	6.35108E-10	47	65.27956989	9.72904E-12	-7.55535E-18
36	T (K)	2000											
37	5.07937E-07	4.0635E-05	0.006374555	7.139289141	9.258494005	1.462861396	22.10058191	0.41892535	3.31579E-05	47	65.27960305	5.07937E-07	7.04573E-18
38	T (K)	2100											
39	2.39959E-06	0.000191967	0.013855233	7.117249345	9.280286828	1.484901193	23.36823654	0.397132527	0.000156645	47	65.27972654	2.39959E-06	-1.21083E-17
40	T (K)	2200											
41	9.83185E-06	0.000786548	0.028045462	7.098070319	9.298495493	1.504080218	24.53921861	0.378923862	0.000641825	47	65.28021172	9.83185E-06	-4.89416E-18
42	T (K)	2300											
43	3.5584E-05	0.00284672	0.053354658	7.078845457	9.314358025	1.523305081	25.6505397	0.36306133	0.002322991	47	65.28189288	3.5584E-05	-5.3532E-19
44	T (K)	2400											
45	0.000114339	0.00914708	0.09564037	7.05697836	9.325941459	1.545172178	26.53350771	0.351477896	0.007464822	47	65.28703471	0.000114339	-1.53957E-17
46	T (K)	2500											
47	0.000325879	0.026070322	0.161463068	7.022956381	9.332332726	1.579194157	27.04344927	0.345086628	0.021280178	47	65.30085007	0.000325879	-1.27394E-17
48	T (K)	2700											
49	0.00178232	0.14258564	0.377605137	6.849682073	9.315053675	1.752468464	25.70622493	0.36236568	0.116556857	47	65.39612675	0.00178232	-2.32453E-16
50	T (K)	3000											
51	0.008305652	0.664452194	0.815139371	6.137470493	9.166918229	2.464680045	17.9567052	0.510501126	0.54673037	47	65.82630026	0.008305652	0

	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.93	Phi-1.075									
32	T (K)	1500											
33													
34	Guess n5lnT	(n5lnT).P	((n5lnT).P)*1/2	n1	n2	n3	n2ln4	n4	n5	n6	nTotal	Calc n5lnT	Error
35	8.64804E-12	7.78324E-10	2.78985E-05	7.332509167	9.065340294	1.26964137	14.81073422	0.612079061	5.64541E-10	47	65.27956989	8.64805E-12	8.21122E-18
36	T (K)	2000											
37	4.51504E-07	4.06353E-05	0.006374584	7.139294681	9.258495834	1.462855857	22.10068274	0.418923521	2.9474E-05	47	65.27959937	4.51504E-07	-1.74524E-17
38	T (K)	2100											
39	2.13306E-06	0.000191976	0.013855533	7.117275909	9.280295062	1.484874629	23.3687418	0.397124293	0.000139246	47	65.27970914	2.13306E-06	-7.32387E-18
40	T (K)	2200											
41	8.74097E-06	0.000786688	0.028047951	7.098180441	9.298527797	1.503970097	24.54139612	0.378891557	0.000570612	47	65.2801405	8.74097E-06	-2.4193E-17
42	T (K)	2300											
43	3.16505E-05	0.002848545	0.053371758	7.079247091	9.314469979	1.522903447	25.66327594	0.362949376	0.002066196	47	65.28163609	3.16505E-05	1.0571E-18
44	T (K)	2400											
45	0.000101841	0.009165692	0.095737623	7.058266284	9.326285547	1.543884254	26.56049874	0.351133808	0.006649816	47	65.28621871	0.000101841	1.13164E-17
46	T (K)	2500											
47	0.00029129	0.02621612	0.161913928	7.026548311	9.333259469	1.575602227	27.11896379	0.344159885	0.019020841	47	65.29859073	0.00029129	-8.3436E-18
48	T (K)	2700											
49	0.001622849	0.146056393	0.382173257	6.866402589	9.319224716	1.735747949	26.01720884	0.358194639	0.106111079	47	65.38568097	0.001622849	-5.5619E-16
50	T (K)	3000											
51	0.007821594	0.703943472	0.839013392	6.18791976	9.180698874	2.414230777	18.48262601	0.496720481	0.514615414	47	65.79418531	0.007821594	0

10-90 Bar Polynomial equations-

$$y = -0.00000000000000001969025347469x^6 + 0.000000000000024864951104992900x^5 - 0.000000000128459820785685000000x^4 + 0.000000348236294062457000000000x^3 - 0.000523139444911443000000000000x^2 + 0.41331910752810800000000000000x -$$

10 134.274352470180000000000000000000

$$y = -0.000000000000000002802493462448x^6 + 0.000000000000037187984907811300x^5 - 0.000000000203045060222042000000x^4 + 0.000000584672787533484000000000x^3 - 0.000937242681612367000000000000x^2 + 0.79337339992234300000000000000x -$$

20 277.093215117855000000000000000000

$$y = -0.000000000000000002638356449708x^6 + 0.000000000000035416409054969500x^5 - 0.000000000195648134398653000000x^4 + 0.000000569995005235257000000000x^3 - 0.000924305857404152000000000000x^2 + 0.79126101410755900000000000000x -$$

30 279.358631828310000000000000000000

$y = -0.00000000000000002331536980310x^6 + 0.000000000000031503723063906400x^5 -$
 $0.000000000175132916566049000000x^4 + 0.000000513308603328880000000000x^3 -$
 $0.000837166887482933000000000000x^2 + 0.720558260567068000000000000000x -$
 40 255.691774031114000000000000000000
 $y = -0.00000000000000002030764289643x^6 + 0.000000000000027576178325262400x^5 -$
 $0.000000000154000435939029000000x^4 + 0.000000453276828682877000000000x^3 -$
 $0.000742147263465487000000000000x^2 + 0.641076812106504000000000000000x -$
 50 228.240895214152000000000000000000
 $y = -0.00000000000000001765506336447x^6 + 0.000000000000024077609862528000x^5 -$
 $0.000000000134978154434936000000x^4 + 0.000000398655393520496000000000x^3 -$
 $0.000654744723995542000000000000x^2 + 0.567167535549730000000000000000x -$
 60 202.439850234722000000000000000000
 $y = -0.00000000000000001538054487356x^6 + 0.000000000000021060296933488100x^5 -$
 $0.000000000118475460165425000000x^4 + 0.000000350986935860513000000000x^3 -$
 $0.000578017941361140000000000000x^2 + 0.501910962702373000000000000000x -$
 70 179.532195679764000000000000000000
 $y = -0.00000000000000001344209660559x^6 + 0.000000000000018478681265775400x^5 -$
 $0.000000000104300103124109000000x^4 + 0.000000309881605213907000000000x^3 -$
 $0.000511603340963325000000000000x^2 + 0.445217222355759000000000000000x -$
 80 159.560559881966000000000000000000
 $y = -0.00000000000000001178738345714x^6 + 0.000000000000016268417175999700x^5 -$
 $0.000000000092128480365541500000x^4 + 0.000000274486660260496000000000x^3 -$
 $0.000454258769645139000000000000x^2 + 0.396138031678304000000000000000x -$
 90 142.228589076028000000000000000000

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW
1	Temp	10	20	30	40	50	60	70	80	90
2	1500	5.08087E-09	2.54043E-09	1.69362E-09	1.27022E-09	1.01617E-09	8.46811E-10	7.25838E-10	6.35108E-10	5.64541E-10
3	2000	0.000265112	0.000132599	8.84091E-05	6.63104E-05	5.30501E-05	4.42094E-05	3.78943E-05	3.31579E-05	2.9474E-05
4	2100	0.001249781	0.000625854	0.000417451	0.000313169	0.000250574	0.000208833	0.000179013	0.000156645	0.000139246
5	2200	0.005078601	0.002555174	0.001707027	0.001281619	0.001025944	0.000855315	0.000733348	0.000641825	0.000570612
6	2300	0.017885068	0.009136728	0.00613643	0.004619621	0.003704084	0.003091426	0.002652677	0.002322991	0.002066196
7	2400	0.053417566	0.02836721	0.019332952	0.014666725	0.011816031	0.009893514	0.008509213	0.007464822	0.006648816
8	2500	0.131497927	0.074863791	0.052606822	0.040607272	0.033082412	0.027917098	0.02414997	0.021280178	0.019020841
9	2700	0.461988647	0.309284678	0.238340224	0.195675136	0.166708819	0.145573192	0.129388753	0.116556857	0.106111079
10	3000	1.326064993	1.02083434	0.863496896	0.761313213	0.687398098	0.630432556	0.584647573	0.54673037	0.514615414

Lambda-0.94, Phi-1.064

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)												
32	T (K)												
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.0123E-10	1.0123E-09	3.31847E-05	7.42917684	9.06	1.081461458	17.61711093	0.514283238	7.16734E-09		47	65.08510639	1.0123E-10 2.71162E-18
36	T (K)												
37	5.79037E-06	5.79037E-05	0.007609448	7.263803281	9.224804683	1.246835016	26.38195653	0.349663402	0.000376869		47	65.08548325	5.79037E-06 -5.45743E-18
38	T (K)												
39	2.72852E-05	0.000272852	0.016518222	7.243101681	9.242708209	1.267536617	27.85963245	0.331759876	0.001775906		47	65.08688229	2.72852E-05 1.27031E-16
40	T (K)												
41	0.000110324	0.001103244	0.033215113	7.219015883	9.255983288	1.291622415	29.06255925	0.318494797	0.007181266		47	65.09228765	0.000110324 -8.41612E-18
42	T (K)												
43	0.000381746	0.003817464	0.061785627	7.176963146	9.262687572	1.333675152	29.70900102	0.311780513	0.024855492		47	65.10996187	0.000381746 -8.86986E-16
44	T (K)												
45	0.001094429	0.010944293	0.104614977	7.091176335	9.255667181	1.419461963	29.02333314	0.318900904	0.071309093		47	65.15641548	0.001094429 2.54571E-16
46	T (K)												
47	0.002534638	0.025346377	0.159205454	6.930202845	9.228386146	1.580435453	26.66532145	0.346081939	0.165386356		47	65.25049274	0.002534638 0
48	T (K)												
49	0.007977107	0.079771066	0.282437721	6.341500938	9.101129211	2.16913736	19.22751271	0.473338874	0.523365777		47	65.60847216	0.007977107 -4.87457E-16
50	T (K)												
51	0.021104149	0.211041487	0.459392519	4.969552899	8.71	3.541085399	10.1199578	0.861016584	1.403178651		47	66.48828503	0.021104149 1.66533E-16

	BY	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)												
32	T (K)												
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	5.50613E-11	1.0123E-09	3.31847E-05	7.429176845	9.06018485	1.081461453	17.61711102	0.514283235	3.58374E-09		47	65.08510639	5.50623E-11 9.86781E-16
36	T (K)												
37	2.89674E-06	5.79348E-05	0.007611494	7.264089379	9.224895252	1.246548919	26.38905083	0.349572833	0.000188535		47	65.08523492	2.89674E-06 1.76797E-17
38	T (K)												
39	1.36772E-05	0.000273544	0.01653916	7.244467636	9.243113679	1.266170662	27.89494728	0.331354406	0.000890194		47	65.08599658	1.36772E-05 3.50502E-18
40	T (K)												
41	5.57249E-05	0.001144937	0.033384089	7.224566514	9.257541966	1.286072684	29.21041029	0.316926119	0.003627061		47	65.08873344	5.57249E-05 3.87602E-18
42	T (K)												
43	0.000197449	0.003948977	0.062840887	7.195899221	9.267755447	1.314739077	30.21641198	0.306712639	0.012853517		47	65.0979599	0.000197449 -1.33357E-17
44	T (K)												
45	0.000597716	0.01195432	0.109335815	7.142613302	9.268897046	1.368024996	30.33303505	0.305571039	0.038925677		47	65.12403206	0.000597716 1.11673E-17
46	T (K)												
47	0.001504036	0.030080721	0.173437946	7.037445238	9.255840865	1.473193059	29.04912161	0.31862722	0.098037799		47	65.18314418	0.001504036 -8.67362E-18
48	T (K)												
49	0.005533992	0.10679844	0.332685804	6.595394039	9.169598064	1.915244259	22.64825148	0.404870021	0.3621848		47	65.44729118	0.005533992 0
50	T (K)												
51	0.016550824	0.331016488	0.575340323	5.424398009	8.87428177	3.086240289	12.67417198	0.700186315	1.095340961		47	66.18044734	0.016550824 0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)												
32	T (K)												
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.67076E-11	1.0123E-09	3.31847E-05	7.429176847	9.060184851	1.081461451	17.61711105	0.514283234	2.38918E-09		47	65.08510639	3.67085E-11 9.96036E-16
36	T (K)												
37	1.93151E-06	5.79452E-05	0.007612177	7.264184814	9.224925463	1.246453484	26.39141804	0.349542622	0.000125713		47	65.0852321	1.93151E-06 -1.33103E-17
38	T (K)												
39	9.12586E-06	0.000273776	0.016546173	7.244924505	9.24324927	1.265713792	27.90677601	0.331218915	0.000593963		47	65.08570035	9.12586E-06 8.06037E-18
40	T (K)												
41	3.72778E-05	0.001183335	0.033441516	7.226440844	9.258068214	1.284197454	29.26065736	0.316399871	0.002426322		47	65.08753271	3.72778E-05 1.92378E-17
42	T (K)												
43	0.000133209	0.003996266	0.063216026	7.202501985	9.269517581	1.308136313	30.39679379	0.304950504	0.008671068		47	65.09377745	0.000133209 -6.29108E-16
44	T (K)												
45	0.000412135	0.012364056	0.11193779	7.161849264	9.27384259	1.348789034	30.84849004	0.300625495	0.026834924		47	65.11194131	0.000412135 -1.01373E-17
46	T (K)												
47	0.001079273	0.032378199	0.17993943	7.081737054	9.266983625	1.428901244	30.13805517	0.30748446	0.070320512		47	65.15542689	0.001079273 2.22912E-16
48	T (K)												
49	0.004366174	0.130985232	0.361918819	6.71749865	9.201024824	1.793139647	24.63834744	0.373443261	0.285419114		47	65.3705255	0.004366174 -1.23165E-16
50	T (K)												
51	0.014175071	0.425252122	0.652113581	5.666308406	8.951349793	2.844329892	14.36541007	0.623118292	0.935851752		47	66.02095813	0.014175071 2.25514E-17

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.94	Phi-1.064									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.75307E-11	1.10123E-09	3.31847E-05	7.429176847	9.060184851	1.08146145	17.61711106	0.514283234	1.7919E-09	47	65.08510638	2.75317E-11	9.94749E-16
36	T (K)	2000											
37	1.44876E-06	5.79504E-05	0.007612519	7.264232544	9.224940572	1.246405754	26.3926021	0.349527513	9.42929E-05	47	65.08520068	1.44876E-06	-6.70511E-18
38	T (K)	2100											
39	6.8473E-06	0.000273892	0.016549686	7.245153233	9.243317148	1.265485065	27.91270117	0.331150937	0.00044566	47	65.08555204	6.8473E-06	-1.43885E-17
40	T (K)	2200											
41	2.80068E-05	0.00112027	0.033470441	7.227383329	9.258332625	1.283254968	29.28596687	0.316135461	0.001822874	47	65.08632926	2.80068E-05	1.47584E-16
42	T (K)	2300											
43	0.000100516	0.004020628	0.063408426	7.205862728	9.270413507	1.30477557	30.48930748	0.304054578	0.006542733	47	65.09164912	0.000100516	-1.63678E-17
44	T (K)	2400											
45	0.000314672	0.012586891	0.112191315	7.171955489	9.276432362	1.338682809	31.12523653	0.298035723	0.020486925	47	65.10559331	0.000314672	-5.11906E-16
46	T (K)	2500											
47	0.000843853	0.033754129	0.183722967	7.106307814	9.273116565	1.404330484	30.77175971	0.30135152	0.054968662	47	65.14007504	0.000843853	8.25078E-17
48	T (K)	2700											
49	0.003648334	0.145933368	0.382012261	6.792778103	9.219940206	1.717860195	26.00624872	0.354527879	0.238321697	47	65.32342808	0.003648334	0
50	T (K)	3000											
51	0.012619287	0.504771499	0.710472729	5.826252675	8.999459622	2.684385623	15.65100375	0.575008464	0.831824703	47	65.91639109	0.012619287	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-0.94	Phi-1.064									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.20245E-11	1.10123E-09	3.31847E-05	7.429176848	9.060184851	1.08146145	17.61711107	0.514283234	1.43353E-09	47	65.08510638	2.20255E-11	9.98085E-16
36	T (K)	2000											
37	1.15907E-06	5.79536E-05	0.007612724	7.264261187	9.224949639	1.246377111	26.39331268	0.349518446	7.54384E-05	47	65.08518182	1.15907E-06	-1.94818E-18
38	T (K)	2100											
39	5.47924E-06	0.000273962	0.016551796	7.245290564	9.243357901	1.265347734	27.91625972	0.331110184	0.000356619	47	65.085463	5.47924E-06	3.40253E-18
40	T (K)	2200											
41	2.24287E-05	0.001121437	0.033487866	7.227950396	9.258491687	1.282687902	29.30121278	0.315976399	0.00145981	47	65.08656619	2.24287E-05	3.4809E-16
42	T (K)	2300											
43	8.07097E-05	0.004035486	0.063525476	7.207898863	9.27095599	1.302739435	30.54558989	0.303512095	0.005253425	47	65.09035981	8.07097E-05	-1.92446E-18
44	T (K)	2400											
45	0.000254542	0.012727096	0.112814433	7.178191926	9.278027563	1.332446372	31.29810829	0.296440522	0.016571107	47	65.10167749	0.000254542	-4.97215E-16
46	T (K)	2500											
47	0.00069349	0.034874505	0.186210916	7.12200949	9.277017812	1.388628807	31.18846624	0.297450273	0.0451672	47	65.13027358	0.00069349	2.52619E-17
48	T (K)	2700											
49	0.003152076	0.157603797	0.396933447	6.84491638	9.23284152	1.665721918	27.02612289	0.341626565	0.205801901	47	65.29090828	0.003152076	0
50	T (K)	3000											
51	0.01148645	0.574322498	0.757840681	5.943425331	9.033368702	2.567212967	16.69447237	0.541099383	0.756283834	47	65.84139022	0.01148645	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.94	Phi-1.064									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.83538E-11	1.10123E-09	3.31847E-05	7.429176848	9.060184852	1.08146145	17.61711108	0.514283234	1.19462E-09	47	65.08510638	1.83548E-11	9.96904E-16
36	T (K)	2000											
37	9.65927E-07	5.79556E-05	0.00761286	7.264280283	9.224955684	1.246358015	26.39378646	0.349512401	6.28675E-05	47	65.08516925	9.65927E-07	-4.44099E-18
38	T (K)	2100											
39	4.56681E-06	0.000274009	0.016553204	7.245382157	9.24338508	1.265256141	27.91863354	0.331083005	0.000297233	47	65.08540362	4.56681E-06	-1.16882E-17
40	T (K)	2200											
41	1.87036E-05	0.001122217	0.033499511	7.2283291	9.258597902	1.282309198	29.31140198	0.315870183	0.00121735	47	65.08632373	1.87036E-05	6.1357E-16
42	T (K)	2300											
43	6.74249E-05	0.004045494	0.063604196	7.209264658	9.271319739	1.30137364	30.58344161	0.303148346	0.004388652	47	65.08949504	6.74249E-05	2.38524E-18
44	T (K)	2400											
45	0.000213725	0.01282348	0.113240807	7.182425881	9.279109287	1.328212417	31.41639715	0.295358798	0.013913267	47	65.09901965	0.000213725	2.43945E-18
46	T (K)	2500											
47	0.000588912	0.03533473	0.187975344	7.132933834	9.279723875	1.377704464	31.48399033	0.294744211	0.038351997	47	65.12345838	0.000588912	7.26415E-18
48	T (K)	2700											
49	0.002784333	0.167059953	0.408729682	6.883601926	9.242310652	1.627036372	27.82509056	0.332157433	0.181724562	47	65.26683094	0.002784333	1.34441E-17
50	T (K)	3000											
51	0.010608454	0.636507233	0.797814034	6.034630479	9.059020187	2.476007819	17.57504536	0.515447898	0.697855518	47	65.7829619	0.010608454	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.94	Phi-1.064									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.57318E-11	1.10123E-09	3.31847E-05	7.429176848	9.060184852	1.081461449	17.61711108	0.514283233	1.02397E-09	47	65.08510638	1.57328E-11	9.97038E-16
36	T (K)	2000											
37	8.27959E-07	5.79571E-05	0.007612958	7.264293924	9.224960002	1.246344373	26.3941249	0.349508083	5.38878E-05	47	65.08516027	8.27959E-07	6.46424E-18
38	T (K)	2100											
39	3.91488E-06	0.000274042	0.01655421	7.245447599	9.2434045	1.265190699	27.92032983	0.331063585	0.000254802	47	65.08536118	3.91488E-06	-9.96788E-18
40	T (K)	2200											
41	1.60397E-05	0.001122776	0.033507843	7.228599928	9.258673856	1.28203837	29.3186924	0.315794229	0.001043959	47	65.08615034	1.60397E-05	9.57652E-16
42	T (K)	2300											
43	5.78956E-05	0.004052693	0.063660766	7.210244382	9.271580599	1.300393916	30.61064269	0.302887486	0.00376836	47	65.08887474	5.78956E-05	-1.4569E-18
44	T (K)	2400											
45	0.000184197	0.012893824	0.113550974	7.185489016	9.279891244	1.325149282	31.5024467	0.294576841	0.011990721	47	65.0970971	0.000184197	4.60786E-18
46	T (K)	2500											
47	0.000511885	0.035831941	0.189293266	7.140982179	9.281713235	1.369656118	31.70472918	0.29275485	0.033333144	47	65.11843953	0.000511885	-2.38524E-18
48	T (K)	2700											
49	0.002498919	0.174824295	0.418239519	6.913655135	9.249606917	1.596983163	28.47249174	0.324861168	0.163049825	47	65.24815621	0.002498919	8.23994E-18
50	T (K)	3000											
51	0.009899249	0.692947408	0.832434627	6.108541943	9.079348867	2.402096355	18.3377024	0.495119218	0.650735446	47	65.73584183	0.009899249	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.94	Phi-1.064									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.37653E-11	1.10123E-09	3.31847E-05	7.429176849	9.060184852	1.081461449	17.61711109	0.514283233	8.95983E-10	47	65.08510638	1.37663E-11	9.95434E-16
36	T (K)	2000											
37	7.24478E-07	5.79582E-05	0.007613031	7.264304156	9.224963241	1.246334142	26.39437876	0.349504844	4.71528E-05	47	65.08515354	7.24478E-07	7.46723E-18
38	T (K)	2100											
39	3.42584E-06	0.000274067	0.016554964	7.245496692	9.243419067	1.265141606	27.92160243	0.331049018	0.000222972	47	65.08532935	3.42584E-06	1.51704E-17
40	T (K)	2200											
41	1.40399E-05	0.001123195	0.0335141	7.228803226	9.258730869	1.281835072	29.32416703	0.315737216	0.000913804	47	65.08602019	1.40399E-05	-1.55346E-18
42	T (K)	2300											
43	5.07265E-05	0.004058121	0.063703382	7.210981468	9.271776818	1.299656683	30.63113422	0.302691267	0.003301708	47	65.08840809	5.07265E-05	1.03406E-17
44	T (K)	2400											
45	0.000161843	0.012947429	0.113786769	7.187808235	9.280482938	1.322830063	31.56786328	0.293985147	0.010535265	47	65.09564165	0.000161843	-1.39591E-17
46	T (K)	2500											
47	0.000452751	0.036220095	0.190315778	7.147162009	9.283238279	1.363476289	31.87598966	0.291229806	0.029480707	47	65.11458709	0.000452751	2.1684E-18
48	T (K)	2700											
49	0.002269922	0.181593772	0.426138207	6.937785482	9.255427737	1.572852815	29.01021074	0.319040348	0.148074241	47	65.23318062	0.002269922	-1.46584E-16
50	T (K)	3000											
51	0.009309245	0.744739601	0.862982967	6.170188971	9.095999508	2.340449327	19.01065178	0.478468577	0.611586612	47	65.69669299	0.009309245	-2.42861E-17

	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.94	Phi-1.064									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.22359E-11	1.10123E-09	3.31847E-05	7.429176849	9.060184852	1.081461449	17.61711109	0.514283233	7.96371E-10	47	65.08510638	1.22359E-11	-1.65944E-17
36	T (K)	2000											
37	6.4399E-07	5.79591E-05	0.007613088	7.264312114	9.22496576	1.246326184	26.3945762	0.349502325	4.19142E-05	47	65.0851493	6.4399E-07	-3.66246E-18
38	T (K)	2100											
39	3.0454E-06	0.000274086	0.016555551	7.245534881	9.243430399	1.265103417	27.92259247	0.331037686	0.000198211	47	65.08530459	3.0454E-06	1.77038E-17
40	T (K)	2200											
41	1.24836E-05	0.001123521	0.033518971	7.228861453	9.25877524	1.281676845	29.32842912	0.315692845	0.000812505	47	65.08591889	1.24836E-05	1.77369E-18
42	T (K)	2300											
43	4.51373E-05	0.004062359	0.063736641	7.211556126	9.271929775	1.299082172	30.64712625	0.30253831	0.0029379	47	65.08804428	4.51373E-05	1.07472E-17
44	T (K)	2400											
45	0.000144329	0.012989637	0.113972089	7.189625307	9.280946307	1.32101299	31.61927665	0.293521778	0.009395044	47	65.09450143	0.000144329	-2.04941E-16
46	T (K)	2500											
47	0.000405907	0.036531634	0.191132505	7.152058205	9.284445035	1.358580093	32.01278323	0.29002305	0.026429231	47	65.11153561	0.000405907	4.8247E-18
48	T (K)	2700											
49	0.002081524	0.187337135	0.432824601	6.957649564	9.260194582	1.552988734	29.46540034	0.314273503	0.135758778	47	65.22086516	0.002081524	9.54098E-18
50	T (K)	3000											
51	0.008807429	0.792668635	0.890319401	6.222731892	9.109977735	2.287906406	19.61284608	0.46449035	0.578326037	47	65.66343242	0.008807429	-8.67362E-17

	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)		110	Lambda=0.94	Phi=1.064								
32	T (K)		1500										
33													
34	Guess n5/nT	n5/nT.P	((n5/nT).P)^1/2	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.00112E-11	1.10123E-09	3.31847E-05	7.429176849	9.060184852	1.081461449	17.61711109	0.514283233	6.51577E-10	47	65.08510638	1.00112E-11	5.43269E-18
36	T (K)		2000										
37	5.26912E-07	5.79604E-05	0.007613171	7.26432369	9.224969424	1.246314608	26.39486342	0.349498661	3.42942E-05	47	65.08514068	5.26912E-07	3.20172E-17
38	T (K)		2100										
39	2.49195E-06	0.000274115	0.016556405	7.245590439	9.243446885	1.265047859	27.92403288	0.3310212	0.000162189	47	65.08526857	2.49195E-06	4.62357E-17
40	T (K)		2200										
41	1.02182E-05	0.001123997	0.033526063	7.229191766	9.258839823	1.281446532	29.33463486	0.315628262	0.000665056	47	65.08577144	1.02182E-05	4.42964E-17
42	T (K)		2300										
43	3.69668E-05	0.004068551	0.063785194	7.212394144	9.272152796	1.298244153	30.67047266	0.302315289	0.002407381	47	65.08751376	3.69668E-05	3.27361E-17
44	T (K)		2400										
45	0.000118653	0.013051856	0.11424472	7.192289415	9.281625337	1.318348883	31.69491275	0.292842748	0.007723475	47	65.09282986	0.000118653	2.21855E-17
46	T (K)		2500										
47	0.000336371	0.037000819	0.192355968	7.159327305	9.286234169	1.351310993	32.21770113	0.288233916	0.021900114	47	65.10700065	0.000336371	9.54098E-18
48	T (K)		2700										
49	0.001788687	0.196755585	0.443571397	6.968546008	9.267564697	1.52209229	30.19701002	0.306903388	0.116625499	47	65.20173188	0.001788687	2.30501E-16
50	T (K)		3000										
51	0.007992238	0.879146143	0.937627934	6.3082971	9.132331602	2.202341198	20.65500576	0.442136483	0.5243665	47	65.60947288	0.007992238	6.40113E-16

y = -0.000000000000000000370958317388x ⁶	+ 0.000000000000000002787694378212490x ⁵	- 0.00000000000002741111316494950000x ⁴	- 0.000000029347945743952700000000x ³	+ 0.000107521299950642000000000000x ²	- 0.141936503639064000000000000000x	+ 66.964417313917600000000000000000
y = -0.0000000000000000002042675629475x ⁶	+ 0.0000000000000026422445526322900x ⁵	- 0.000000000140291672577322000000x ⁴	+ 0.000000392126698366849000000000x ³	- 0.000609333840996944000000000000x ²	+ 0.499559178397084000000000000000x	- 168.916733192863000000000000000000
y = -0.0000000000000000002389508413273x ⁶	+ 0.0000000000000031627412045114500x ⁵	- 0.00000000001721936650474890000000x ⁴	+ 0.000000494326780170032000000000x ³	- 0.000789911778572264000000000000x ²	+ 0.666513191285902000000000000000x	- 232.043404816924000000000000000000
y = -0.0000000000000000002378469492513x ⁶	+ 0.0000000000000031778582863109900x ⁵	- 0.00000000001747092713885550000000x ⁴	+ 0.000000506534070881246000000000x ³	- 0.000817469779636797000000000000x ²	+ 0.696537128614818000000000000000x	- 244.811851227649000000000000000000

$y = -0.00000000000000002253320497340x^6 + 0.0000000000000030279004468266500x^5 -$
 $0.000000000167416701783644000000x^4 + 0.000000488126128153675000000000x^3 -$
 $0.000792092016147027000000000000x^2 + 0.678493617209499000000000000000x -$
50 239.676480811798000000000000000000
 $y = -0.00000000000000002094067458224x^6 + 0.0000000000000028257095231240000x^5 -$
 $0.000000000156870362108962000000x^4 + 0.000000459157598573058000000000x^3 -$
 $0.000747855094134545000000000000x^2 + 0.642860142594197000000000000000x -$
60 227.841519109441000000000000000000
 $y = -0.00000000000000001930455250385x^6 + 0.0000000000000026138466199919600x^5 -$
 $0.000000000145574864464700000000x^4 + 0.000000427381631524449000000000x^3 -$
 $0.000698069537879515000000000000x^2 + 0.601649879742979000000000000000x -$
70 213.758500561661000000000000000000
 $y = -0.00000000000000001773965053887x^6 + 0.0000000000000024091356806266800x^5 -$
 $0.000000000134541003331646000000x^4 + 0.000000395983583658828000000000x^3 -$
 $0.000648288306341566000000000000x^2 + 0.559940615014625000000000000000x -$
80 199.330169064583000000000000000000
 $y = -0.00000000000000001628744261042x^6 + 0.0000000000000022179609332069100x^5 -$
 $0.000000000124168035994953000000x^4 + 0.000000366263347041222000000000x^3 -$
 $0.000600838632194062000000000000x^2 + 0.519907497260940000000000000000x -$
90 185.386431036222000000000000000000
 $y = -0.00000000000000001495833589056x^6 + 0.0000000000000020422201506769300x^5 -$
 $0.000000000114589035868809000000x^4 + 0.000000338690901508862000000000x^3 -$
 $0.000556614029392645000000000000x^2 + 0.482424645815039000000000000000x -$
100 172.272814583950000000000000000000
 $y = -0.00000000000000001374944060281x^6 + 0.0000000000000018818466817304000x^5 -$
 $0.000000000105818234925175000000x^4 + 0.000000313359532132763000000000x^3 -$
 $0.000515848097883365000000000000x^2 + 0.447760226539397000000000000000x -$
110 160.106986683774000000000000000000

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	7E-09	4E-09	2E-09	2E-09	1E-09	1E-09	1E-09	9E-10	8E-10	7E-10	7E-10
3	2000	0.0004	0.0002	0.0001	9E-05	8E-05	6E-05	5E-05	5E-05	4E-05	4E-05	3E-05
4	2100	0.0018	0.0009	0.0006	0.0004	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002
5	2200	0.0072	0.0036	0.0024	0.0018	0.0015	0.0012	0.001	0.0009	0.0008	0.0007	0.0007
6	2300	0.0249	0.0129	0.0087	0.0065	0.0053	0.0044	0.0038	0.0033	0.0029	0.0026	0.0024
7	2400	0.0713	0.0389	0.0268	0.0205	0.0166	0.0139	0.012	0.0105	0.0094	0.0085	0.0077
8	2500	0.1654	0.098	0.0703	0.055	0.0452	0.0384	0.0333	0.0295	0.0264	0.024	0.0219
9	2700	0.5234	0.3622	0.2854	0.2383	0.2058	0.1817	0.163	0.1481	0.1358	0.1254	0.1166
10	3000	1.4032	1.0953	0.9359	0.8318	0.7563	0.6979	0.6507	0.6116	0.5783	0.5496	0.5244

Lambda-0.95, Phi-1.053

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	
31	P (Bar)	10	Lambda-0.95	Phi-1.053										
32	T (K)	1500												
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	1.64748E-10	1.64748E-09	4.05891E-05	7.525420296	9.05	0.895632335	21.54795375	0.42015716	1.06913E-08		47	64.89473685	1.64748E-10	7.61873E-18
36	T (K)	2000												
37	8.72422E-06	8.72422E-05	0.009340356	7.387918405	9.189896641	1.033134226	32.38301327	0.28378757	0.000566161		47	64.895303	8.72422E-06	-9.3936E-18
38	T (K)	2100												
39	4.10281E-05	0.000410281	0.020255406	7.369361658	9.20426047	1.051690973	34.16276701	0.26942374	0.00266262		47	64.89739946	4.10281E-05	5.63108E-18
40	T (K)	2200												
41	0.000164153	0.001641529	0.040515783	7.343859815	9.213778742	1.077192817	35.45049967	0.259905469	0.010654406		47	64.90539125	0.000164153	5.39391E-18
42	T (K)	2300												
43	0.000550114	0.005501141	0.074169678	7.292218611	9.215290437	1.12883402	35.663748	0.258393774	0.03571916		47	64.930456	0.000550114	-5.52943E-18
44	T (K)	2400												
45	0.001481972	0.014819716	0.121736257	7.185074782	9.201242797	1.23597785	33.77328977	0.272441413	0.096314895		47	64.99105174	0.001481972	1.95156E-17
46	T (K)	2500												
47	0.003184314	0.031843141	0.178446466	6.997363302	9.166973363	1.42368933	29.88799854	0.306710847	0.207305352		47	65.10204219	0.003184314	9.06827E-16
48	T (K)	2700												
49	0.008995776	0.089957763	0.299929597	6.369424798	9.031367078	2.051627834	20.41830715	0.442317133	0.589077747		47	65.48381459	0.008995776	0
50	T (K)	3000												
51	0.022311478	0.223114778	0.472350271	4.974015474	8.64	3.447037158	10.40540411	0.830631174	1.480939429		47	66.37567627	0.022311478	0

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	
31	P (Bar)	20	Lambda-0.95	Phi-1.053										
32	T (K)	1500												
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	8.23738E-11	1.64748E-09	4.05891E-05	7.525420304	9.053527054	0.895632328	21.54795394	0.420157156	5.34563E-09		47	64.89473685	8.23738E-11	3.20607E-18
36	T (K)	2000												
37	4.36629E-06	8.73258E-05	0.009344829	7.388352262	9.190028406	1.03270037	32.39852047	0.283655805	0.000283351		47	64.89502019	4.36629E-06	-1.20956E-18
38	T (K)	2100												
39	2.06064E-05	0.000412127	0.020300917	7.371425493	9.204847331	1.049627138	34.23952604	0.268836879	0.001337272		47	64.89607411	2.06064E-05	-1.41963E-17
40	T (K)	2200												
41	8.35353E-05	0.001670706	0.040874275	7.352108192	9.215996266	1.06894444	35.76417311	0.257687945	0.005421455		47	64.9001583	8.35353E-05	-4.5401E-18
42	T (K)	2300												
43	0.000290734	0.005814674	0.076254011	7.319036343	9.222165877	1.10216289	36.66597872	0.251518334	0.018872575		47	64.91360942	0.000290734	-2.05998E-18
44	T (K)	2400												
45	0.000843107	0.016862146	0.129854327	7.25161364	9.217814937	1.169438991	36.02548603	0.255863274	0.054753395		47	64.94949624	0.000843107	-6.39679E-18
46	T (K)	2500												
47	0.00198426	0.039685199	0.199211444	7.122885932	9.198013345	1.298166699	33.36592472	0.275670866	0.129024046		47	65.02376089	0.00198426	-3.46945E-18
48	T (K)	2700												
49	0.006445711	0.128914216	0.359046259	6.635602752	9.101331831	1.78544988	24.4427922	0.372352379	0.421006393		47	65.31574323	0.006445711	4.90927E-16
50	T (K)	3000												
51	0.017728289	0.35456577	0.595454255	5.433860826	8.802613266	2.987191805	13.11726179	0.671070945	1.171236638		47	66.06597348	0.017728289	0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	5.49159E-11	1.64748E-09	4.05891E-05	7.525420306	9.053527055	0.895632326	21.54795401	0.420157155	3.56375E-09		47	64.89473685	5.49159E-11 -7.88134E-18
36	T (K)	2000											
37	2.91179E-06	8.73537E-05	0.009346322	7.388497067	9.190072381	1.032555565	32.40369908	0.28361183	0.00018896		47	64.8949258	2.91179E-06 -8.44068E-18
38	T (K)	2100											
39	1.37583E-05	0.000412749	0.020316219	7.372117588	9.205044075	1.048935044	34.26533434	0.268640136	0.000892853		47	64.8956297	1.37583E-05 -3.76083E-19
40	T (K)	2200											
41	5.60276E-05	0.001680827	0.040997884	7.354923047	9.216752127	1.066129584	35.87232865	0.256932083	0.003636097		47	64.89837294	5.60276E-05 -2.7986E-18
42	T (K)	2300											
43	0.000197769	0.005933056	0.077026331	7.328652545	9.224621474	1.092400087	37.03734086	0.249062737	0.012836675		47	64.90757352	0.000197769 1.49078E-18
44	T (K)	2400											
45	0.000592326	0.017769785	0.133303356	7.277763225	9.22426088	1.143289407	36.98234995	0.24942333	0.038461632		47	64.93319847	0.000592326 8.89046E-18
46	T (K)	2500											
47	0.001463677	0.043910299	0.209547844	7.177464388	9.211234699	1.243588243	35.09716837	0.262449512	0.095124141		47	64.98986098	0.001463677 3.29597E-17
48	T (K)	2700											
49	0.005201573	0.156047176	0.39502807	6.766275803	9.134032213	1.654776829	26.8923259	0.339651998	0.339319676		47	65.23405652	0.005201573 1.30104E-17
50	T (K)	3000											
51	0.015327242	0.459817247	0.678098258	5.67939829	8.879269144	2.741654341	14.93782652	0.594415067	1.010139967		47	65.90487681	0.015327242 0

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	4.11869E-11	1.64748E-09	4.05891E-05	7.525420307	9.053527056	0.895632324	21.54795404	0.420157155	2.67281E-09	47	64.89473684	4.11869E-11	-1.32785E-18
36	T (K)	2000											
37	2.18419E-06	8.73677E-05	0.00934707	7.388569504	9.190094379	1.032483128	32.40629018	0.283589832	0.000141743	47	64.89487859	2.18419E-06	-8.44534E-18
38	T (K)	2100											
39	1.03265E-05	0.000413061	0.020323895	7.372464422	9.205142659	1.04858821	34.27828065	0.268541551	0.000670144	47	64.89540699	1.03265E-05	1.09759E-17
40	T (K)	2200											
41	4.21491E-05	0.001685965	0.0410605	7.356343297	9.217133329	1.064709334	35.92711616	0.256550882	0.002735371	47	64.89747221	4.21491E-05	-5.14996E-19
42	T (K)	2300											
43	0.000149883	0.005995335	0.077429546	7.333606624	9.225884545	1.087446007	37.23122277	0.247799665	0.0097281	47	64.90446494	0.000149883	-4.58075E-18
44	T (K)	2400											
45	0.000457174	0.01828697	0.135229325	7.291862823	9.227721	1.129189809	37.51667158	0.245963211	0.029681773	47	64.92441861	0.000457174	3.90313E-18
46	T (K)	2500											
47	0.001165306	0.046612236	0.21589867	7.208779374	9.218747104	1.212273258	36.16086824	0.254937106	0.075710445	47	64.97044729	0.001165306	2.64762E-16
48	T (K)	2700											
49	0.004423614	0.176344572	0.4206478	6.848236899	9.154020846	1.572815733	28.63644029	0.319663364	0.288344812	47	65.18308165	0.004423614	-7.80626E-18
50	T (K)	3000											
51	0.013749534	0.549981375	0.741607292	5.842286899	8.927236909	2.578765733	16.33686703	0.546447302	0.90471178	47	65.79944862	0.013749534	1.38778E-17

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	3.29495E-11	1.64748E-09	4.05891E-05	7.525420308	9.053527056	0.895632324	21.54795406	0.420157154	2.13825E-09	47	64.89473684	3.29495E-11	-4.37116E-18
36	T (K)	2000											
37	1.74752E-06	8.73761E-05	0.009347518	7.388612977	9.190107581	1.032439654	32.40784541	0.28357663	0.000113405	47	64.89485025	1.74752E-06	4.92973E-19
38	T (K)	2100											
39	8.26496E-06	0.000413248	0.020328508	7.372672776	9.205201879	1.048379856	34.286062	0.268482332	0.000536357	47	64.8952732	8.26496E-06	4.69256E-19
40	T (K)	2200											
41	3.37815E-05	0.001689073	0.041098334	7.357199627	9.217363115	1.063853005	35.96022058	0.256321095	0.002192313	47	64.89692916	3.37815E-05	5.69884E-18
42	T (K)	2300											
43	0.000120675	0.006033767	0.077677324	7.336628714	9.226654376	1.084423918	37.35036461	0.247029834	0.007832139	47	64.90256898	0.000120675	-1.88109E-17
44	T (K)	2400											
45	0.000372437	0.01862186	0.136461934	7.300705412	9.22988552	1.12034722	37.85863448	0.243798691	0.024178218	47	64.91891506	0.000372437	1.42573E-17
46	T (K)	2500											
47	0.000970089	0.048504458	0.220237276	7.229281016	9.223636731	1.191771616	36.88754138	0.250047479	0.06301481	47	64.95775165	0.000970089	5.20417E-18
48	T (K)	2700											
49	0.00387766	0.19388299	0.440321462	6.905866415	9.167842386	1.515186216	29.97576414	0.305841824	0.252619283	47	65.14735613	0.00387766	0
50	T (K)	3000											
51	0.012597209	0.62986043	0.793637467	5.96198001	8.961123272	2.459072622	17.48303977	0.512560939	0.827922043	47	65.72265889	0.012597209	2.42861E-17

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.74579E-11	1.64748E-09	4.05891E-05	7.525420308	9.053527057	0.895632323	21.54795407	0.420157154	1.78188E-09	47	64.89473684	2.74579E-11	-6.66896E-18
36	T (K)	2000											
37	1.45636E-06	8.73817E-05	0.009347817	7.388641964	9.190116383	1.032410667	32.40888248	0.283567827	9.45103E-05	47	64.89483135	1.45636E-06	2.32275E-17
38	T (K)	2100											
39	6.88956E-06	0.000413373	0.020331587	7.372811784	9.205241387	1.048240848	34.29125523	0.268442824	0.000447099	47	64.89518394	6.88956E-06	1.68314E-17
40	T (K)	2200											
41	2.81859E-05	0.001691156	0.041123669	7.357772272	9.217516755	1.063280359	35.98238795	0.256167455	0.00182917	47	64.89656601	2.81859E-05	1.87025E-18
42	T (K)	2300											
43	0.000100998	0.006059851	0.077845046	7.338664861	9.227172769	1.082387771	37.43101211	0.246511442	0.00655487	47	64.90129171	0.000100998	-4.79759E-18
44	T (K)	2400											
45	0.000314277	0.018956625	0.137319426	7.306775707	9.231368981	1.114276925	38.0965283	0.242315229	0.02040134	47	64.91513818	0.000314277	-1.26852E-17
46	T (K)	2500											
47	0.000831816	0.049308955	0.223403121	7.243808621	9.22708792	1.17724401	37.41778876	0.246596291	0.054025414	47	64.94876226	0.000831816	-2.04914E-17
48	T (K)	2700											
49	0.003467615	0.208056929	0.456132578	6.949208162	9.178113152	1.47184447	31.05213754	0.295571058	0.225813027	47	65.12054987	0.003467615	1.52656E-16
50	T (K)	3000											
51	0.011701569	0.702094117	0.837910566	6.055410979	8.986813893	2.365641653	18.45833187	0.486870317	0.768361248	47	65.66309809	0.011701569	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.35354E-11	1.64748E-09	4.05891E-05	7.525420309	9.053527057	0.895632323	21.54795408	0.420157154	1.52732E-09	47	64.89473684	2.35354E-11	1.1372E-17
36	T (K)	2000											
37	1.24837E-06	8.73857E-05	0.009348031	7.388662672	9.190122672	1.03238996	32.40962335	0.283561539	8.10125E-05	47	64.89481785	1.24837E-06	-4.42384E-18
38	T (K)	2100											
39	5.90661E-06	0.000413463	0.020333788	7.372911127	9.205269621	1.048141505	34.29496746	0.26841459	0.00038331	47	64.89512015	5.90661E-06	2.12343E-17
40	T (K)	2200											
41	2.41807E-05	0.001692649	0.04114182	7.358182172	9.217626719	1.062870459	35.98827004	0.256057491	0.001569238	47	64.89630608	2.41807E-05	8.16879E-18
42	T (K)	2300											
43	8.68388E-05	0.006078716	0.077966123	7.340129987	9.22754564	1.080922645	37.48923065	0.24613857	0.006535871	47	64.90037271	8.68388E-05	-4.26905E-18
44	T (K)	2400											
45	0.000271863	0.019030412	0.137950758	7.311203114	9.2324497	1.109849517	38.2716788	0.24123451	0.017647277	47	64.91238412	0.000271863	1.65883E-17
46	T (K)	2500											
47	0.000728501	0.0509395037	0.225820806	7.25466671	9.229660027	1.166385921	37.82272688	0.244024183	0.047310315	47	64.94204716	0.000728501	0
48	T (K)	2700											
49	0.003145471	0.22018294	0.46923655	6.983293447	9.186116765	1.437759185	31.9442166	0.287567445	0.204768578	47	65.09950542	0.003145471	-6.93889E-18
50	T (K)	3000											
51	0.010976173	0.76833212	0.876545561	6.131328766	9.007216768	2.289723866	19.30942215	0.466467442	0.720200917	47	65.61493776	0.010976173	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.05935E-11	1.64748E-09	4.05891E-05	7.525420309	9.053527057	0.895632323	21.54795409	0.420157154	1.33641E-09	47	64.89473684	2.05935E-11	-1.35861E-17
36	T (K)	2000											
37	1.09236E-06	8.73887E-05	0.009348191	7.388678203	9.190127388	1.032374428	32.41017907	0.283556822	7.08884E-05	47	64.89480773	1.09236E-06	-2.74905E-18
38	T (K)	2100											
39	5.16913E-06	0.000413553	0.02033544	7.372985663	9.205290804	1.048066969	34.29775316	0.268393406	0.000335451	47	64.89507229	5.16913E-06	6.13591E-18
40	T (K)	2200											
41	2.11722E-05	0.001693772	0.041155464	7.358490074	9.217709314	1.062562558	36.01020814	0.255974897	0.001373399	47	64.89611083	2.11722E-05	-6.00716E-18
42	T (K)	2300											
43	7.61624E-05	0.006092995	0.078057641	7.341234799	9.227826734	1.079817833	37.53323615	0.245857477	0.004942918	47	64.89967976	7.61624E-05	-2.91379E-18
44	T (K)	2400											
45	0.000239554	0.019164282	0.13843512	7.31457607	9.233272321	1.106476561	38.40605536	0.240411889	0.015549488	47	64.91028633	0.000239554	-1.22786E-17
46	T (K)	2500											
47	0.000648263	0.051861032	0.227730173	7.263101352	9.231653738	1.15795128	38.14252661	0.242030472	0.042096139	47	64.93683298	0.000648263	6.17995E-18
48	T (K)	2700											
49	0.002884111	0.230728843	0.480342423	7.010969209	9.192568246	1.410083422	32.70027112	0.281115964	0.187704956	47	65.0824418	0.002884111	1.77809E-17
50	T (K)	3000											
51	0.010371161	0.829692889	0.910874793	6.194810704	9.023962538	2.226241928	20.06566081	0.449721672	0.680087063	47	65.57482391	0.010371161	0

	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.83053E-11	1.64748E-09	4.05891E-05	7.525420309	9.053527057	0.895632323	21.54795409	0.420157154	1.18732E-09	47	64.89473684	1.83053E-11	-5.33739E-18
36	T (K)	2000											
37	9.71011E-07	8.7391E-05	0.009348316	7.388690284	9.190131057	1.032362347	32.41061134	0.283553154	6.30136E-05	47	64.89479986	9.71011E-07	6.59669E-18
38	T (K)	2100											
39	4.59536E-06	0.000413582	0.020336725	7.373043652	9.205307285	1.04800898	34.29992072	0.268376926	0.000298216	47	64.89503506	4.59536E-06	5.30497E-18
40	T (K)	2200											
41	1.88294E-05	0.001694647	0.041166094	7.358729837	9.217773626	1.062322795	36.0195091	0.255910584	0.001221953	47	64.8959588	1.88294E-05	2.67662E-19
42	T (K)	2300											
43	6.78242E-05	0.006104179	0.078129249	7.342097676	9.228046226	1.078954956	37.5676679	0.245637985	0.004401733	47	64.89913958	6.78242E-05	-7.86047E-19
44	T (K)	2400											
45	0.000214118	0.019270589	0.138818548	7.317231646	9.233919552	1.103820985	38.51242973	0.239764658	0.013898085	47	64.90863493	0.000214118	-5.23128E-18
46	T (K)	2500											
47	0.000584092	0.052568235	0.229277638	7.269848317	9.233245818	1.151204315	38.40171157	0.240438393	0.037926617	47	64.93266346	0.000584092	1.09504E-17
48	T (K)	2700											
49	0.002666873	0.240018593	0.489916924	7.033987536	9.197902198	1.387065096	33.35207445	0.275782012	0.173528817	47	65.06826566	0.002666873	0
50	T (K)	3000											
51	0.009855322	0.886978961	0.941795605	6.24905002	9.038048737	2.172002612	20.74681537	0.435635473	0.645924306	47	65.54066115	0.009855322	0

	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.64748E-11	1.64748E-09	4.05891E-05	7.525420309	9.053527057	0.895632322	21.5479541	0.420157153	1.06913E-09	47	64.89473684	1.64748E-11	1.60539E-18
36	T (K)	2000											
37	8.73929E-07	8.73929E-05	0.009348416	7.38869995	9.190133992	1.032352682	32.41095718	0.283550219	5.67134E-05	47	64.89479356	8.73929E-07	-1.67582E-17
38	T (K)	2100											
39	4.13624E-06	0.000413624	0.020337754	7.373090054	9.205320472	1.047962578	34.30165533	0.268363739	0.000268421	47	64.89500526	4.13624E-06	-1.91514E-18
40	T (K)	2200											
41	1.69535E-05	0.001695348	0.041117461	7.358921826	9.217825122	1.062130806	36.02639585	0.255859089	0.001100211	47	64.89583705	1.69535E-05	8.8498E-18
42	T (K)	2300											
43	6.11318E-05	0.006113177	0.078186806	7.342790254	9.228222369	1.078262377	37.595344	0.245461841	0.003967372	47	64.89870421	6.11318E-05	7.7656E-18
44	T (K)	2400											
45	0.000193571	0.019357059	0.139129648	7.319376941	9.234442138	1.10167569	38.59873827	0.239242072	0.012564145	47	64.90730099	0.000193571	5.74627E-18
46	T (K)	2500											
47	0.00053157	0.05315636	0.230557931	7.275371261	9.234547275	1.14568137	38.61614794	0.239136935	0.034514416	47	64.92925126	0.00053157	4.87891E-18
48	T (K)	2700											
49	0.002482865	0.248286487	0.498283541	7.05349533	9.202400219	1.367557302	33.32164861	0.271283991	0.161525909	47	65.05626275	0.002482865	0
50	T (K)	3000											
51	0.009407908	0.940790844	0.969943732	6.296177464	9.050125817	2.124875167	21.36689048	0.423558394	0.616322044	47	65.51105889	0.009407908	0

	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)	110	Lambda-0.95	Phi-1.053									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.49771E-11	1.64748E-09	4.05891E-05	7.525420309	9.053527057	0.895632322	21.5479541	0.420157153	9.71933E-10	47	64.89473684	1.49771E-11	1.68791E-18
36	T (K)	2000											
37	7.94495E-07	8.73944E-05	0.009348497	7.388707858	9.190136393	1.032344774	32.41124015	0.283547817	5.15586E-05	47	64.89478884	7.94495E-07	-2.3684E-18
38	T (K)	2100											
39	3.76053E-06	0.000413658	0.020338595	7.373128026	9.205331263	1.047924606	34.30307494	0.268352947	0.00024404	47	64.89498088	3.76053E-06	-5.40534E-18
40	T (K)	2200											
41	1.54175E-05	0.001695923	0.041181584	7.359079026	9.217867285	1.061973605	36.03306253	0.255816926	0.001000529	47	64.89573737	1.54175E-05	-1.80858E-17
42	T (K)	2300											
43	5.56416E-05	0.006120571	0.07823408	7.343358426	9.228366852	1.077694206	37.61807525	0.245317358	0.003611045	47	64.89834789	5.56416E-05	1.12486E-18
44	T (K)	2400											
45	0.000176625	0.019428775	0.139387141	7.32114627	9.234872954	1.099906362	38.67017443	0.238811257	0.011464072	47	64.90620091	0.000176625	5.42101E-19
46	T (K)	2500											
47	0.000487771	0.053654856	0.231635178	7.279977414	9.235631464	1.141075218	38.79657604	0.238052746	0.031669245	47	64.92640609	0.000487771	1.24141E-17
48	T (K)	2700											
49	0.002324616	0.255707764	0.505675552	7.070279753	9.206253928	1.350772879	34.42487456	0.267430282	0.151206844	47	65.04594369	0.002324616	0
50	T (K)	3000											
51	0.009014478	0.991592626	0.99578744	6.337681048	9.060639173	2.083371584	21.93620152	0.413045037	0.590313574	47	65.48505042	0.009014478	0

10-110 Bar Polynomial equations-

$$\begin{aligned}
& y = 0.00000000000000001449631538726x^6 - 0.000000000000022088544758979500x^5 + \\
& 0.000000000137373612843494000000x^4 - 0.000000445651061943433000000000x^3 + \\
& 0.000795566693541485000000000000x^2 - 0.741589550719161000000000000000x + \\
10 \quad & 282.200363083881000000000000000000 \\
& y = -0.00000000000000000624932451855x^6 + 0.000000000000006768682074861260x^5 - \\
& 0.000000000028003106448135900000x^4 + 0.000000053821241582729200000000x^3 - \\
& 0.000042614932359303500000000000x^2 - 0.000767725648268266000000000000x + \\
20 \quad & 12.872914728221700000000000000000 \\
& y = -0.000000000000000001462744486434x^6 + 0.000000000000018602091524114100x^5 - \\
& 0.000000000096818913661841500000x^4 + 0.000000264554395733588000000000x^3 - \\
& 0.000400859741043831000000000000x^2 + 0.319688397091481000000000000000x - \\
30 \quad & 104.921571659672000000000000000000 \\
& y = -0.000000000000000001823924549935x^6 + 0.000000000000023817925210817800x^5 - \\
& 0.000000000127766524035707000000x^4 + 0.000000361036771235097000000000x^3 - \\
& 0.000567495802708259000000000000x^2 + 0.470836651434150000000000000000x - \\
40 \quad & 161.162224827358000000000000000000 \\
& y = -0.000000000000000001969029699053x^6 + 0.000000000000026012038170369500x^5 - \\
& 0.000000000141301428851812000000x^4 + 0.000000404631759321073000000000x^3 - \\
& 0.000644872949261178000000000000x^2 + 0.542646719778604000000000000000x - \\
50 \quad & 188.400838443700000000000000000000 \\
& y = -0.000000000000000002006380583614x^6 + 0.000000000000026686856278592400x^5 - \\
& 0.000000000146013822047542000000x^4 + 0.000000421239310140713000000000x^3 - \\
& 0.000676406263816262000000000000x^2 + 0.573467538310830000000000000000x - \\
60 \quad & 200.574297541992000000000000000000 \\
& y = -0.000000000000000001987136744862x^6 + 0.000000000000026555240102285500x^5 - \\
& 0.000000000145997824121103000000x^4 + 0.000000423256767218647000000000x^3 - \\
& 0.000682962347019741000000000000x^2 + 0.581802102933304000000000000000x - \\
70 \quad & 204.434603486910000000000000000000 \\
& y = -0.000000000000000001937610038354x^6 + 0.000000000000025985605895498600x^5 - \\
& 0.000000000143379142301745000000x^4 + 0.000000417148938465574000000000x^3 - \\
& 0.000675466355516857000000000000x^2 + 0.577374016879148000000000000000x - \\
80 \quad & 203.540090386181000000000000000000
\end{aligned}$$

$y = -0.00000000000000001872150058526x^6 + 0.000000000000025179990377913700x^5 -$
 $0.000000000139329546235801000000x^4 + 0.000000406496477685175000000000x^3 -$
 $0.000659995690245043000000000000x^2 + 0.56561352638764000000000000000x -$
 90 199.885363739312000000000000000000
 $y = -0.000000000000000001798903301719x^6 + 0.000000000000024253856589219200x^5 -$
 $0.000000000134522795874849000000x^4 + 0.000000393369639158347000000000x^3 -$
 $0.000640081603670065000000000000x^2 + 0.549689787016231000000000000000x -$
 100 194.639041054443000000000000000000
 $y = -0.000000000000000001722615097522x^6 + 0.000000000000023275022893332400x^5 -$
 $0.000000000129357615420496000000x^4 + 0.000000379001799509664000000000x^3 -$
 $0.000617840330834399000000000000x^2 + 0.531511893733815000000000000000x -$
 110 188.508284210514000000000000000000

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	1.06913E-08	5.34563E-09	3.56375E-09	2.67281E-09	2.13825E-09	1.78188E-09	1.52732E-09	1.33641E-09	1.18792E-09	1.06913E-09	9.71933E-10
3	2000	0.000566161	0.000283351	0.00018896	0.000141743	0.000113405	9.45103E-05	8.10125E-05	7.08884E-05	6.30136E-05	5.67134E-05	5.15586E-05
4	2100	0.00266262	0.001337272	0.000892853	0.000670144	0.000536357	0.000447099	0.00038331	0.000335451	0.000298216	0.000268421	0.00024404
5	2200	0.010654406	0.005421455	0.003636097	0.002735371	0.002192313	0.00182917	0.001569238	0.001373399	0.001221953	0.001100211	0.001000529
6	2300	0.03571916	0.018872575	0.012836675	0.0097281	0.007832139	0.00655487	0.005635871	0.004942918	0.004401733	0.003967372	0.003611045
7	2400	0.096314895	0.054759395	0.038461632	0.029681773	0.024178218	0.020440134	0.017647277	0.015549488	0.013898085	0.012564145	0.011464072
8	2500	0.207305352	0.129024046	0.095124141	0.075710445	0.06301481	0.054025414	0.047310315	0.042096139	0.037926617	0.034514416	0.031669245
9	2700	0.589077747	0.421006393	0.339319676	0.288344812	0.252619283	0.225813027	0.204768578	0.187704956	0.173528817	0.161525909	0.151206844
10	3000	1.480939429	1.171236638	1.010139967	0.90471178	0.827922043	0.768361248	0.720200917	0.680087063	0.645924306	0.616322044	0.590313574

Lambda-0.97, Phi-1.03

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	
31	P (Bar)	10	Lambda-0.97	Phi-1.03										
32	T (K)	1500												
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error	
35	4.93147E-10	4.93147E-09	7.02244E-05	7.716603267	9.04	0.530819413	37.28073054	0.242376527	3.18207E-08		47	64.52577323	4.93147E-10	2.94489E-18
36	T (K)	2000												
37	2.63211E-05	0.000263211	0.016223786	7.632903235	9.116277214	0.614519446	56.24786513	0.162073302	0.001698435		47	64.52747163	2.63211E-05	5.38035E-18
38	T (K)	2100												
39	0.000120833	0.001208332	0.034761067	7.614235088	9.122746639	0.633817593	58.62801632	0.155603877	0.007797797		47	64.53357099	0.000120833	-1.9597E-17
40	T (K)	2200												
41	0.000445271	0.004452708	0.066728616	7.572975791	9.122113043	0.674446889	58.38620449	0.156237473	0.028744243		47	64.55451744	0.000445271	-4.3368E-18
42	T (K)	2300												
43	0.001255923	0.012559232	0.112067978	7.480989475	9.109305204	0.766433206	53.88676641	0.169045311	0.08114132		47	64.60691452	0.001255923	6.93889E-18
44	T (K)	2400												
45	0.002727878	0.027278779	0.165162885	7.31939285	9.080184673	0.92802983	45.82113922	0.198165843	0.176499898		47	64.70227309	0.002727878	-1.4311E-17
46	T (K)	2500												
47	0.004888841	0.048888411	0.221107239	7.084168367	9.034396885	1.163254313	37.03325139	0.24395365	0.317006044		47	64.84277924	0.004888841	4.51028E-17
48	T (K)	2700												
49	0.011212597	0.112125971	0.334852163	6.400731771	8.888433911	1.846690909	22.79573068	0.389916605	0.731705819		47	65.25747901	0.011212597	0
50	T (K)	3000												
51	0.024753174	0.247531742	0.497525619	4.974494354	8.50	3.272928327	10.95999187	0.775782343	1.637757397		47	66.16353059	0.024753174	0

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.46573E-10	4.93147E-09	7.02244E-05	7.716603289	9.035973999	0.530819391	37.28073216	0.242376517	1.59103E-08	47	64.52577321	2.46573E-10	2.055E-17
36	T (K)	2000											
37	1.32219E-05	0.000264438	0.016261544	7.634224014	9.116646977	0.613198666	56.37877237	0.161703538	0.000853164	47	64.52662636	1.32219E-05	2.5699E-18
38	T (K)	2100											
39	6.16861E-05	0.001233723	0.03512439	7.620286669	9.124329468	0.627136011	59.24079596	0.154021048	0.003980591	47	64.52975379	6.16861E-05	1.68729E-17
40	T (K)	2200											
41	0.00023879	0.004775798	0.069107149	7.594350805	9.127402948	0.653071875	60.4673735	0.150947568	0.015411783	47	64.54118498	0.00023879	-1.30104E-18
42	T (K)	2300											
43	0.000737659	0.014753188	0.121462703	7.535150781	9.122160177	0.712271899	58.40412591	0.156190338	0.047633181	47	64.57340638	0.000737659	7.0343E-16
44	T (K)	2400											
45	0.001765872	0.035317439	0.187923945	7.420546246	9.103739436	0.826876435	52.1372382	0.174611079	0.114145819	47	64.63991901	0.001765872	4.98733E-18
46	T (K)	2500											
47	0.003407482	0.068149635	0.26105485	7.240440103	9.070892896	1.006382577	43.72407687	0.207457619	0.22062216	47	64.74639536	0.003407482	3.46945E-18
48	T (K)	2700											
49	0.008523537	0.170470743	0.412881028	6.683554165	8.959591219	1.563868515	28.10770173	0.318759236	0.554715968	47	65.08048916	0.008523537	1.56125E-17
50	T (K)	3000											
51	0.020139886	0.402797724	0.634663473	5.44106334	8.659009383	2.80635934	13.98100164	0.619341132	1.326252298	47	65.85202549	0.020139886	0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.64382E-10	4.93147E-09	7.02244E-05	7.716603296	9.035974002	0.530819384	37.2807327	0.242376513	1.06069E-08	47	64.52577321	1.64382E-10	-5.38404E-18
36	T (K)	2000											
37	8.82837E-06	0.000264851	0.016274245	7.634667017	9.116770978	0.612755663	56.42280638	0.161579538	0.000569662	47	64.52634286	8.82837E-06	8.53809E-18
38	T (K)	2100											
39	4.14199E-05	0.001242598	0.035250509	7.622360382	9.124871408	0.625062299	59.45350849	0.153479107	0.002672785	47	64.52844596	4.14199E-05	-6.97278E-18
40	T (K)	2200											
41	0.000163404	0.004902116	0.070015116	7.60215733	9.129329019	0.64526535	61.26182635	0.149021496	0.010545485	47	64.53631868	0.000163404	-4.41812E-18
42	T (K)	2300											
43	0.000526776	0.015803282	0.125711105	7.557207502	9.127352722	0.690215179	60.44692788	0.150997793	0.034008548	47	64.55978174	0.000526776	4.87891E-18
44	T (K)	2400											
45	0.001334359	0.040030768	0.200076905	7.465932911	9.114153241	0.78142977	55.5073357	0.164197275	0.086215584	47	64.61198878	0.001334359	6.28837E-18
46	T (K)	2500											
47	0.002703625	0.081108753	0.284795985	7.314892601	9.087831847	0.93253008	47.70047956	0.190518668	0.174926436	47	64.70069963	0.002703625	-7.37257E-18
48	T (K)	2700											
49	0.007176334	0.215290008	0.463993543	6.826138694	8.993627515	1.421283987	31.5872884	0.284723	0.466405555	47	64.93217875	0.007176334	9.54098E-18
50	T (K)	3000											
51	0.017710143	0.531304281	0.728966222	5.691457874	8.734391459	2.555964806	16.05707517	0.543959056	1.163363993	47	65.68913719	0.017710143	9.36751E-17

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.23287E-10	4.93147E-09	7.02244E-05	7.7166033	9.035974004	0.530819381	37.28073297	0.242376512	7.95517E-09	47	64.5257732	1.23287E-10	-7.96845E-18
36	T (K)	2000											
37	6.62646E-06	0.000265058	0.016280617	7.634889039	9.116833119	0.612533641	56.44489908	0.161517396	0.00042758	47	64.52620078	6.62646E-06	9.52319E-18
38	T (K)	2100											
39	3.1178E-05	0.001247119	0.035314567	7.623408417	9.125145212	0.624014263	59.56154925	0.153205303	0.002011845	47	64.52778504	3.1178E-05	6.46456E-18
40	T (K)	2200											
41	0.000124241	0.004963629	0.070495596	7.606213363	9.130328507	0.641209318	61.68223627	0.149022009	0.008017725	47	64.53379092	0.000124241	-5.69206E-18
42	T (K)	2300											
43	0.000410681	0.016427243	0.128168805	7.569354572	9.130201947	0.678068108	61.62868811	0.148148569	0.0265104	47	64.5522836	0.000410681	-7.48099E-18
44	T (K)	2400											
45	0.001080648	0.043225906	0.207908408	7.49273437	9.120232829	0.75468831	57.68002963	0.158117686	0.06980506	47	64.59557826	0.001080648	1.32273E-17
46	T (K)	2500											
47	0.002270938	0.090837523	0.30139264	7.360722931	9.098119263	0.88669975	50.48025325	0.180231252	0.146867563	47	64.67264076	0.002270938	1.42247E-16
48	T (K)	2700											
49	0.00631445	0.252577983	0.502571371	6.917647112	9.014862449	1.329775569	34.21355123	0.263488066	0.410033879	47	64.93580708	0.00631445	0
50	T (K)	3000											
51	0.016106532	0.644261273	0.802658877	5.858279896	8.781697933	2.389142785	17.68177241	0.496652583	1.056299746	47	65.58207294	0.016106532	6.17562E-16

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	9.86293E-11	4.93147E-09	7.02244E-05	7.716603302	9.035974005	0.530819379	37.28073313	0.24237651	6.36414E-09	47	64.5257732	9.86294E-11	1.96122E-17
36	T (K)	2000											
37	5.30366E-06	0.000265183	0.016284447	7.63502242	9.11687045	0.612400261	56.45817906	0.161480065	0.000342225	47	64.52611542	5.30366E-06	1.92217E-17
38	T (K)	2100											
39	2.49972E-05	0.001243858	0.03535333	7.624040895	9.125310422	0.623381785	59.62692648	0.153040094	0.001613001	47	64.5273862	2.49972E-05	2.78504E-18
40	T (K)	2200											
41	0.000100233	0.005011673	0.070793171	7.608693915	9.130940824	0.638722765	61.94260877	0.147409691	0.00646829	47	64.53224149	0.000100233	-3.89334E-19
42	T (K)	2300											
43	0.000336849	0.016842456	0.129778487	7.577081277	9.132010496	0.670341404	62.40268746	0.146340019	0.021742773	47	64.54751597	0.000336849	5.20417E-18
44	T (K)	2400											
45	0.000911268	0.045563414	0.213455884	7.510595586	9.124273889	0.736827094	59.21908577	0.154076627	0.058853922	47	64.58462712	0.000911268	7.44847E-17
46	T (K)	2500											
47	0.001971211	0.098560539	0.313943529	7.39249637	9.105190108	0.85492571	52.58240159	0.173160408	0.127445121	47	64.65321832	0.001971211	7.37257E-18
48	T (K)	2700											
49	0.005696945	0.284847233	0.533710814	6.983341491	9.02982392	1.264081189	36.33343111	0.248526595	0.369705954	47	64.89547915	0.005696945	0
50	T (K)	3000											
51	0.014930675	0.746533746	0.864021844	5.981336149	8.815209612	2.266086532	19.03353719	0.463140903	0.97801578	47	65.50378898	0.014930675	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	8.21911E-11	4.93147E-09	7.02244E-05	7.716603303	9.035974006	0.530819377	37.28073324	0.24237651	5.30345E-09	47	64.5257732	8.21911E-11	-7.63465E-19
36	T (K)	2000											
37	4.42111E-06	0.000265266	0.016287004	7.63511141	9.116895356	0.61231127	56.46704255	0.161455159	0.000285277	47	64.52605847	4.42111E-06	1.00145E-17
38	T (K)	2100											
39	2.08616E-05	0.001251696	0.03537931	7.62446409	9.125420952	0.62235859	59.6707449	0.152329563	0.001346139	47	64.52711933	2.08616E-05	1.29156E-17
40	T (K)	2200											
41	8.40063E-05	0.00504038	0.070995635	7.610380717	9.131354544	0.637041963	62.11976062	0.146995971	0.005421029	47	64.53119423	8.40063E-05	-3.25261E-19
42	T (K)	2300											
43	0.000285653	0.017139202	0.130916776	7.582439787	9.13326299	0.664982893	62.95002245	0.145087526	0.018437271	47	64.54421047	0.000285653	1.19262E-18
44	T (K)	2400											
45	0.000789315	0.047358875	0.217620943	7.523459865	9.127174723	0.723962815	60.37457818	0.151175793	0.050971366	47	64.57674456	0.000789315	3.8023E-16
46	T (K)	2500											
47	0.00174849	0.10490941	0.323897221	7.416121542	9.110415188	0.831301138	54.24954553	0.167935327	0.113020295	47	64.63879349	0.00174849	-1.04083E-17
48	T (K)	2700											
49	0.005224197	0.313451798	0.559867661	7.033707908	9.041138156	1.213714772	38.1141078	0.23721236	0.338865628	47	64.86463882	0.005224197	0
50	T (K)	3000											
51	0.014013427	0.840805636	0.916954544	6.077735988	8.840684042	2.169686692	20.19959165	0.437666473	0.917078645	47	65.44285184	0.014013427	1.38778E-17

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	7.04495E-11	4.93147E-09	7.02244E-05	7.716603304	9.035974006	0.530819376	37.28073332	0.242376509	4.54581E-09	47	64.5257732	7.04495E-11	1.26723E-18
36	T (K)	2000											
37	3.79037E-06	0.000265326	0.016288831	7.635175009	9.116913155	0.612247671	56.47337862	0.16143736	0.000244578	47	64.52601777	3.79037E-06	2.73549E-18
38	T (K)	2100											
39	1.79002E-05	0.001253014	0.035397936	7.624767134	9.125500096	0.622655546	59.70215925	0.15285042	0.001155045	47	64.52692824	1.79002E-05	4.25549E-18
40	T (K)	2200											
41	7.23033E-05	0.00506123	0.071142322	7.611592955	9.13165284	0.635829726	62.24810847	0.146697676	0.004665763	47	64.53043896	7.23033E-05	1.381E-17
42	T (K)	2300											
43	0.000248029	0.017362057	0.131765158	7.586378168	9.134182635	0.661044512	63.35795862	0.144167881	0.016008258	47	64.54178145	0.000248029	-6.77626E-18
44	T (K)	2400											
45	0.000696947	0.048786289	0.220876186	7.533205549	9.129366955	0.714217132	61.27768019	0.14898356	0.045002408	47	64.5707756	0.000696947	-1.6263E-18
46	T (K)	2500											
47	0.001575105	0.110257362	0.33205024	7.434521117	9.114465768	0.812901563	55.61509472	0.163884748	0.101795217	47	64.62756841	0.001575105	2.34188E-17
48	T (K)	2700											
49	0.004846076	0.339225318	0.582430527	7.074036757	9.050101501	1.173385924	39.65012297	0.228249015	0.314219531	47	64.83999273	0.004846076	3.64292E-17
50	T (K)	3000											
51	0.013267998	0.92875985	0.963721874	6.156330378	8.860967618	2.091092302	21.22982916	0.417382898	0.867639662	47	65.39341286	0.013267998	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	6.16433E-11	4.93147E-09	7.02244E-05	7.716603305	9.035974007	0.530819375	37.28073337	0.242376509	3.97758E-09	47	64.5257732	6.16433E-11	-4.4587E-18
36	T (K)	2000											
37	3.31713E-06	0.000265371	0.016290203	7.635222727	9.11692651	0.612199954	56.47813341	0.161424005	0.000214041	47	64.52598724	3.31713E-06	2.83023E-17
38	T (K)	2100											
39	1.56751E-05	0.001254006	0.035411943	7.624994836	9.12555956	0.622427844	59.72578357	0.152790956	0.001011462	47	64.52678466	1.56751E-05	1.7022E-17
40	T (K)	2200											
41	6.34633E-05	0.005077061	0.071253497	7.612508653	9.131878115	0.634914028	62.34538458	0.1464724	0.004095276	47	64.52986847	6.34633E-05	5.01444E-18
42	T (K)	2300											
43	0.000219196	0.017535653	0.132422251	7.58939663	9.134886949	0.658026051	63.67391525	0.143463566	0.01414687	47	64.53992007	0.000219196	-5.93601E-18
44	T (K)	2400											
45	0.000624386	0.049950851	0.22349687	7.540862862	9.131086183	0.706559819	62.00473675	0.147264333	0.040314138	47	64.56608733	0.000624386	-9.75782E-19
46	T (K)	2500											
47	0.001435559	0.114844742	0.338887507	7.449334839	9.117715	0.798087842	56.76026855	0.160635516	0.09276374	47	64.61853694	0.001435559	8.0231E-18
48	T (K)	2700											
49	0.004534077	0.362726132	0.602267492	7.107342234	9.057440375	1.140080446	41.00056409	0.220910141	0.293897355	47	64.81967055	0.004534077	1.38778E-16
50	T (K)	3000											
51	0.012644262	1.01154094	1.005753916	6.222261731	8.877657413	2.025160949	22.15575302	0.400693102	0.826329087	47	65.35210228	0.012644262	2.08167E-17

	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.97	Phi-1.03									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	5.47941E-11	4.93147E-09	7.02244E-05	7.716603306	9.035974007	0.530819375	37.28073342	0.242376509	3.53563E-09	47	64.5257732	5.47941E-11	1.53093E-17
36	T (K)	2000											
37	2.94895E-06	0.000265405	0.01629127	7.635259852	9.1169369	0.612162829	56.4818332	0.161413615	0.000190284	47	64.52596348	2.94895E-06	-1.40311E-18
38	T (K)	2100											
39	1.3942E-05	0.001254779	0.03542286	7.625172187	9.125605872	0.622250494	59.74419589	0.152744643	0.00089963	47	64.52667283	1.3942E-05	1.69349E-17
40	T (K)	2200											
41	5.65499E-05	0.005089491	0.071340667	7.613224789	9.132054266	0.634197891	62.42165671	0.14629625	0.003649132	47	64.52942233	5.65499E-05	-6.84403E-19
42	T (K)	2300											
43	0.000196386	0.017674739	0.132946378	7.591784598	9.135443828	0.655638083	63.92593633	0.142906688	0.012674447	47	64.53844764	0.000196386	-8.97177E-18
44	T (K)	2400											
45	0.000565783	0.050920434	0.225655566	7.547048053	9.132472813	0.700374628	62.60362365	0.145877703	0.036528227	47	64.56230142	0.000565783	1.30104E-17
46	T (K)	2500											
47	0.001320399	0.118835868	0.344725787	7.461563345	9.120389209	0.785859335	57.73812206	0.157961307	0.085312383	47	64.61108558	0.001320399	-1.64799E-17
48	T (K)	2700											
49	0.004270564	0.384350718	0.619960255	7.135491883	9.063598909	1.111930798	42.20503431	0.214751606	0.276743264	47	64.80251646	0.004270564	4.32814E-16
50	T (K)	3000											
51	0.012110807	1.089972633	1.044017544	6.278767665	8.891731031	1.968655016	22.99866248	0.386619484	0.791039312	47	65.31681251	0.012110807	0

10-90 Bar Polynomial equations-

$$\begin{aligned}
 y &= 0.00000000000000002663706952966x^6 - 0.000000000000037479640238304000x^5 + \\
 &0.000000000216948016787916000000x^4 - 0.000000660079786090581000000000x^3 + \\
 &0.001112775359346510000000000000x^2 - 0.985507010903472000000000000000x + \\
 10 \quad &358.255631492222000000000000000000 \\
 y &= 0.000000000000000002307859860199x^6 - 0.000000000000032893120084157000x^5 + \\
 &0.000000000192961334857781000000x^4 - 0.000000595222274006029000000000x^3 + \\
 &0.001017493132994160000000000000x^2 - 0.913682240349049000000000000000x + \\
 20 \quad &336.666392900717000000000000000000 \\
 y &= 0.000000000000000001734799350411x^6 - 0.000000000000025096512784162400x^5 + \\
 &0.000000000149325717708468000000x^4 - 0.000000466727365197240000000000x^3 + \\
 &0.000807543161726369000000000000x^2 - 0.733181986760996000000000000000x + \\
 30 \quad &272.860473400525000000000000000000
 \end{aligned}$$

$y = 0.00000000000000001227370777891x^6 - 0.000000000000018129283846118700x^5 +$
 $0.000000000109925096238035000000x^4 - 0.000000349343097823245000000000x^3 +$
 $0.000613276612202565000000000000x^2 - 0.563862130729028000000000000000x +$
40 212.146703527244000000000000000000
 $y = 0.00000000000000000808246989553x^6 - 0.000000000000012346416015359700x^5 +$
 $0.000000000077049304709865600000x^4 - 0.000000250841869436553000000000x^3 +$
 $0.000449284799385064000000000000x^2 - 0.420045943747044000000000000000x +$
50 160.256480043333000000000000000000
 $y = 0.00000000000000000465840353894x^6 - 0.000000000000007605172634741510x^5 +$
 $0.000000000049994444694859400000x^4 - 0.000000169467018366652000000000x^3 +$
 $0.000313269911477674000000000000x^2 - 0.300290597534619000000000000000x +$
60 116.878473639948000000000000000000
 $y = 0.00000000000000000185460794315x^6 - 0.000000000000003710987463557560x^5 +$
 $0.000000000027704241941329300000x^4 - 0.000000102213690692285000000000x^3 +$
 $0.000200509094330467000000000000x^2 - 0.200706627652386000000000000000x +$
70 80.700757691352100000000000000000
 $y = -0.00000000000000000045428362615x^6 - 0.000000000000000495115886945396x^5 +$
 $0.000000000009244834989812710000x^4 - 0.000000046363981324168200000000x^3 +$
 $0.000106615269740993000000000000x^2 - 0.117569432739256000000000000000x +$
80 50.423496209528400000000000000000
 $y = -0.000000000000000000236725087000x^6 + 0.000000000000002176662923169920x^5 -$
 $0.000000000006132972045430260000x^4 + 0.000000000284091370150063000000x^3 +$
 $0.000027994714473222100000000000x^2 - 0.047790862645702100000000000000x +$
90 24.954962070829900000000000000000

N5 values-

	CN	CQ	CP	CQ	CR	CS	CT	CU	CV	CW
1	Temp	10	20	30	40	50	60	70	80	90
2	1500	3.18207E-08	1.59103E-08	1.06069E-08	7.95517E-09	6.36414E-09	5.30345E-09	4.54581E-09	3.97758E-09	3.53563E-09
3	2000	0.001698435	0.000853164	0.000569662	0.00042758	0.000342225	0.000285277	0.000244578	0.000214041	0.000190284
4	2100	0.007797797	0.003980591	0.002672765	0.002011845	0.001613001	0.001346139	0.001155045	0.001011462	0.00089963
5	2200	0.028744243	0.015411783	0.010545485	0.008017725	0.00646829	0.005421029	0.004665763	0.004095276	0.003649132
6	2300	0.08114132	0.047633181	0.034008548	0.0265104	0.021742773	0.018437271	0.016008258	0.01414687	0.012674447
7	2400	0.176499898	0.114145819	0.086215584	0.06980506	0.058853922	0.050971366	0.045002408	0.040314138	0.036528227
8	2500	0.317006044	0.22062216	0.174926436	0.146867563	0.127445121	0.113020295	0.101795217	0.09276374	0.085312383
9	2700	0.731705819	0.554715968	0.466405555	0.410033879	0.369705954	0.338865628	0.314219531	0.293897355	0.276743264
10	3000	1.637757397	1.326252298	1.163363993	1.056299746	0.97801578	0.917078645	0.867639662	0.826329087	0.791039312

Lambda-0.99, Phi-1.01

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	10 Lambda-0.99 Phi-1.01												
32	P (Bar)												
33	T (K)	1500											
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	4.77289E-09	4.77289E-08	0.00021847	7.905394843	9.01	0.174813238	115.9811066	0.077712627	3.06285E-07		47	64.17171748	4.77289E-09 1.67707E-17
36	T (K)	2000											
37	0.0002117	0.002116399	0.04601086	7.857741024	9.034274847	0.223067057	159.5196511	0.056634244	0.013588024		47	64.1853052	0.0002117 -3.3339E-18
38	T (K)	2100											
39	0.000676539	0.006765392	0.082252002	7.806456978	9.025846795	0.274351103	138.7262271	0.065062296	0.043444073		47	64.21516124	0.000676539 -6.6136E-18
40	T (K)	2200											
41	0.001546589	0.015465886	0.124361916	7.712265337	9.008124624	0.368542744	108.814189	0.082784467	0.099400979		47	64.2711815	0.001546589 2.28116E-16
42	T (K)	2300											
43	0.002875245	0.028752451	0.163565478	7.568347538	8.980761467	0.512460542	81.53386445	0.110147624	0.185041457		47	64.35675863	0.002875245 7.37257E-18
44	T (K)	2400											
45	0.004708835	0.047088351	0.216398505	7.369615186	8.942369425	0.711192895	60.20189519	0.148539666	0.303603654		47	64.47532083	0.004708835 0
46	T (K)	2500											
47	0.007090131	0.070901309	0.266272997	7.11183636	8.891538586	0.969624385	44.59806425	0.193370505	0.458234819		47	64.62995199	0.007090131 0
48	T (K)	2700											
49	0.013618881	0.136188806	0.3639037675	6.40426022	8.742904772	1.676547861	25.12297781	0.348004319	0.886013463		47	65.05773064	0.013618881 0
50	T (K)	3000											
51	0.027216092	0.272160919	0.521690444	4.965270328	8.36	3.115537752	11.49231879	0.727719909	1.795366204		47	65.96708338	0.027216092 8.67362E-17

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	20 Lambda-0.99 Phi-1.01												
32	P (Bar)												
33	T (K)	1500											
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	2.38645E-09	4.77291E-08	0.00021847	7.905395054	9.013196559	0.174813027	115.9812498	0.077712532	1.53143E-07		47	64.17171732	2.38645E-09 7.53392E-18
36	T (K)	2000											
37	0.000116038	0.002320766	0.048174328	7.867494332	9.036803105	0.213313749	167.0203956	0.054105986	0.007447241		47	64.17916441	0.000116038 1.03677E-17
38	T (K)	2100											
39	0.000418048	0.008360952	0.091438244	7.833174717	9.032341096	0.247633364	154.2197417	0.058567995	0.026838053		47	64.19855522	0.000418048 7.42678E-18
40	T (K)	2200											
41	0.001056654	0.021133076	0.145372199	7.763437963	9.019995928	0.317370118	127.1977665	0.070913163	0.067879014		47	64.23959619	0.001056654 0
42	T (K)	2300											
43	0.002089546	0.047190921	0.204428278	7.651094201	8.993356655	0.42971388	98.29723338	0.091552436	0.134370532		47	64.3060877	0.002089546 -8.67362E-18
44	T (K)	2400											
45	0.003551655	0.071033094	0.266520345	7.492134509	8.969601119	0.588673571	73.94073932	0.121307972	0.228728145		47	64.40044532	0.003551655 9.54098E-18
46	T (K)	2500											
47	0.005479772	0.109595439	0.331052019	7.282164504	8.929859545	0.798643577	55.44790259	0.161049546	0.353583935		47	64.52530111	0.005479772 1.35308E-16
48	T (K)	2700											
49	0.01087848	0.217563939	0.466443564	6.694296424	8.813358645	1.386511657	31.75407852	0.277550446	0.705768425		47	64.8774856	0.01087848 0
50	T (K)	3000											
51	0.022605166	0.452103329	0.672386294	5.43489609	8.515971674	2.645911991	14.81199767	0.574937416	1.484162077		47	65.65587925	0.022605166 0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	30 Lambda-0.99 Phi-1.01												
32	P (Bar)												
33	T (K)	1500											
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.59097E-09	4.77291E-08	0.00021847	7.905395124	9.013196591	0.174812957	115.9812975	0.0777125	1.02095E-07		47	64.17171727	1.59097E-09 1.00642E-17
36	T (K)	2000											
37	8.0157E-05	0.00240471	0.049037847	7.871153169	9.037750299	0.209654912	170.0142164	0.053158792	0.005144226		47	64.1768614	8.0157E-05 4.14707E-18
38	T (K)	2100											
39	0.000307281	0.009218421	0.096012611	7.844627986	9.035114348	0.236180094	161.9348696	0.055794742	0.019724792		47	64.19144196	0.000307281 2.03559E-16
40	T (K)	2200											
41	0.000828574	0.024857222	0.157661733	7.787277952	9.025483739	0.293530128	137.9508635	0.065425352	0.053215114		47	64.22493229	0.000828574 1.48644E-16
42	T (K)	2300											
43	0.001710817	0.051324511	0.226549137	7.691028732	9.008214761	0.389779349	108.9338868	0.08269433	0.109974213		47	64.28169138	0.001710817 2.27682E-17
44	T (K)	2400											
45	0.002984663	0.089539883	0.299232155	7.552278754	8.982704563	0.528529327	83.01597683	0.108204528	0.192104301		47	64.36382147	0.002984663 0
46	T (K)	2500											
47	0.004681945	0.140458364	0.374777753	7.367113626	8.94835473	0.713694455	62.77152591	0.14255436	0.301861782		47	64.47357895	0.004681945 0
48	T (K)	2700											
49	0.009491051	0.284731522	0.533602401	6.842050823	8.847355087	1.238757258	36.32605065	0.243554004	0.614893005		47	64.7866108	0.009491051 0
50	T (K)	3000											
51	0.020170635	0.605119058	0.777893989	5.6874791	8.589652173	2.39332898	17.13622669	0.501256918	1.321030323		47	65.49274749	0.020170635 0

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-0.99	Phi-1.01									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	1.19323E-09	4.77291E-08	0.00021847	7.905995159	9.013196607	0.174812921	115.9813214	0.077712484	7.65715E-08	n6	64.17171725	1.19323E-09	-2.29441E-18
36	T (K)	2000											
37	6.12678E-05	0.002450714	0.049504684	7.873079421	9.038248691	0.207728659	171.6327382	0.0526604	0.003931904	47	64.17564908	6.12678E-05	-3.483E-18
38	T (K)	2100											
39	0.000244155	0.003766211	0.03882414	7.851156309	9.036692232	0.229651772	166.6767942	0.054216859	0.015671689	47	64.18738886	0.000244155	-5.63785E-18
40	T (K)	2200											
41	0.000690134	0.027605364	0.16614862	7.801753727	9.028802841	0.279054354	145.3767198	0.06210625	0.044317675	47	64.21603485	0.000690134	-1.06252E-17
42	T (K)	2300											
43	0.001474232	0.058963284	0.242835921	7.71599066	9.013713899	0.364817421	116.7652241	0.077195192	0.09474368	47	64.26646085	0.001474232	8.57387E-16
44	T (K)	2400											
45	0.002625958	0.105038336	0.324096184	7.590365561	8.990914495	0.49044252	89.91400422	0.099994596	0.168955931	47	64.3406731	0.002625958	2.94903E-17
46	T (K)	2500											
47	0.004173418	0.16693673	0.408578915	7.421338109	8.959978201	0.659469972	68.43288243	0.13093089	0.268937805	47	64.44065498	0.004173418	1.21431E-17
48	T (K)	2700											
49	0.008595366	0.343814626	0.586357081	6.937736746	8.868732164	1.143071334	39.917431	0.222176927	0.556361505	47	64.72807868	0.008595366	0
50	T (K)	3000											
51	0.018560727	0.742429091	0.86164325	5.856059301	8.635934576	2.22474878	18.98113916	0.454974515	1.213599021	47	65.38531619	0.018560727	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	Dw	DX
31	P (Bar)	50	Lambda-0.99	Phi-1.01									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	9.54583E-10	4.77291E-08	0.00021847	7.905995158	9.013196616	0.1748129	115.9813357	0.077712475	6.12572E-08	47	64.17171723	9.54583E-10	7.83405E-18
36	T (K)	2000											
37	4.95958E-05	0.002479792	0.049797513	7.87426973	9.038556572	0.206538351	172.6479792	0.052352519	0.003182809	47	64.17489998	4.95958E-05	-1.07065E-18
38	T (K)	2100											
39	0.000202993	0.010149636	0.100745403	7.855413722	9.037720124	0.225394359	169.917197	0.053188967	0.013029037	47	64.18474621	0.000202993	0
40	T (K)	2200											
41	0.000595138	0.029756921	0.172501944	7.81168914	9.031075187	0.269118941	150.9357505	0.059833904	0.038213796	47	64.20993097	0.000595138	6.50521E-18
42	T (K)	2300											
43	0.001307728	0.065386378	0.255707603	7.733565534	9.017568363	0.347242546	122.9544439	0.073340727	0.084029011	47	64.25574618	0.001307728	1.71304E-17
44	T (K)	2400											
45	0.002370722	0.118536104	0.344290725	7.617483303	8.996718958	0.463324778	95.51657596	0.094190133	0.152494829	47	64.324212	0.002370722	0
46	T (K)	2500											
47	0.003809407	0.190470356	0.436429096	7.460189306	8.968220634	0.620618775	73.09750923	0.122688457	0.24539099	47	64.41710816	0.003809407	3.46945E-16
48	T (K)	2700											
49	0.007948325	0.397416237	0.630409579	7.006999276	8.883904178	1.073808805	42.91639289	0.207004913	0.514144233	47	64.6858614	0.007948325	2.41127E-16
50	T (K)	3000											
51	0.017378252	0.868912605	0.932154818	5.980609362	8.668752317	2.100198718	20.53443849	0.422156774	1.13491512	47	65.30663229	0.017378252	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-0.99	Phi-1.01									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	7.95486E-10	4.77291E-08	0.00021847	7.905995195	9.013196623	0.174812886	115.9813452	0.077712468	5.10477E-08	47	64.17171722	7.95486E-10	-7.85927E-18
36	T (K)	2000											
37	4.16641E-05	0.002499845	0.049998446	7.875078628	9.038765758	0.205729453	173.3446108	0.052143333	0.002673767	47	64.17439094	4.16641E-05	4.05898E-18
38	T (K)	2100											
39	0.000173902	0.010434145	0.102147661	7.858422729	9.038446076	0.222385352	172.2822456	0.052463015	0.011161557	47	64.18287873	0.000173902	1.06252E-17
40	T (K)	2200											
41	0.000525086	0.031505135	0.17749686	7.819017034	9.032748193	0.261791047	155.3062025	0.058160898	0.033713346	47	64.20543052	0.000525086	-4.66207E-18
42	T (K)	2300											
43	0.001182099	0.070925925	0.266319217	7.746829735	9.020468016	0.333978345	128.0569324	0.070441075	0.075947084	47	64.24766426	0.001182099	2.10335E-17
44	T (K)	2400											
45	0.00217622	0.13057322	0.361349166	7.638157641	9.001121536	0.44285044	100.2490991	0.089787555	0.139956371	47	64.31167354	0.00217622	5.20417E-18
46	T (K)	2500											
47	0.003530586	0.211835154	0.460255532	7.48996831	8.974490615	0.590839771	77.08819899	0.116418476	0.227366497	47	64.39908367	0.003530586	3.46945E-18
48	T (K)	2700											
49	0.007449125	0.446947486	0.668541312	7.060513193	8.895457315	1.020294888	45.51228691	0.195451776	0.481610706	47	64.65332788	0.007449125	8.67362E-18
50	T (K)	3000											
51	0.016454426	0.987265559	0.993612379	6.078321288	8.693723008	2.002486793	21.88828709	0.397186083	1.073573811	47	65.24529098	0.016454426	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.99	Phi-1.01									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	6.81845E-10	4.77231E-08	0.00021847	7.905995205	9.013196627	0.174812876	115.9813521	0.077712464	4.37552E-08	47	64.17171722	6.81845E-10	1.63711E-17
36	T (K)	2000											
37	3.53216E-05	0.002514512	0.050144908	7.875664266	9.038917187	0.205143815	173.8523971	0.051991904	0.002305233	47	64.17402241	3.53216E-05	7.58942E-18
38	T (K)	2100											
39	0.000152202	0.010654109	0.103218742	7.860667511	9.038987365	0.22014057	174.0887295	0.051921726	0.009768522	47	64.18148569	0.000152202	0
40	T (K)	2200											
41	0.000470899	0.03296295	0.181557017	7.824685906	9.034040708	0.256122175	158.8587584	0.056868383	0.030232653	47	64.20194382	0.000470899	-7.80626E-18
42	T (K)	2300											
43	0.001082863	0.075800394	0.275318714	7.757309635	9.0227533	0.323498446	132.3842502	0.068155791	0.069564492	47	64.24128166	0.001082863	1.06252E-17
44	T (K)	2400											
45	0.002021158	0.141481067	0.376139691	7.654645552	9.00461864	0.426162529	104.3524345	0.086290451	0.129963864	47	64.30168104	0.002021158	1.38778E-17
46	T (K)	2500											
47	0.003307279	0.231503507	0.481154348	7.513830681	8.973485245	0.566377399	80.58854173	0.111423846	0.212937996	47	64.38465517	0.003307279	-9.97466E-18
48	T (K)	2700											
49	0.007046911	0.493283796	0.702341652	7.103677702	8.904670776	0.977130379	47.81331266	0.186238315	0.45542172	47	64.62713889	0.007046911	0
50	T (K)	3000											
51	0.015702582	1.099180752	1.048418214	6.158093827	8.71362414	1.922714254	23.09606484	0.377284951	1.023736976	47	65.19545415	0.015702582	3.22659E-16

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.99	Phi-1.01									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	5.96614E-10	4.77231E-08	0.00021847	7.905995212	9.01319663	0.174812869	115.9813572	0.07771246	3.82858E-08	47	64.17171721	5.96614E-10	-4.04239E-18
36	T (K)	2000											
37	3.15713E-05	0.002525708	0.050256421	7.876107924	9.039031892	0.204700157	174.2390121	0.051877199	0.002026052	47	64.17374322	3.15713E-05	-1.01644E-18
38	T (K)	2100											
39	0.000135368	0.010829475	0.104064764	7.862408832	9.039407085	0.218399249	175.5156302	0.051502006	0.008688001	47	64.18040517	0.000135368	2.73761E-18
40	T (K)	2200											
41	0.00042753	0.034202376	0.184938845	7.829223592	9.035074227	0.251584488	161.8177904	0.055834863	0.02744705	47	64.19916422	0.00042753	-1.24683E-17
42	T (K)	2300											
43	0.001001878	0.080150274	0.283108238	7.765863562	9.024614893	0.314944518	136.1297649	0.066294208	0.064356737	47	64.23607391	0.001001878	-9.97466E-18
44	T (K)	2400											
45	0.001893514	0.151481134	0.389205773	7.668221846	9.007488926	0.412586235	107.9773576	0.083420164	0.121740573	47	64.29345775	0.001893514	0
46	T (K)	2500											
47	0.003122681	0.249814518	0.499814484	7.533564787	8.983596051	0.547243294	83.71392793	0.107313039	0.20101554	47	64.37273271	0.003122681	-4.77049E-18
48	T (K)	2700											
49	0.006712697	0.537015776	0.732813602	7.13957625	8.91226278	0.941231831	49.88775159	0.178646311	0.433676444	47	64.60539362	0.006712697	-1.21431E-17
50	T (K)	3000											
51	0.015072637	1.205810938	1.09809423	6.225099785	8.730014341	1.855708296	24.1899178	0.36089475	0.982038897	47	65.15375607	0.015072637	0

	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	90											
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Cale n5/nT	Error
35	5.30324E-10	4.77231E-08	0.00021847	7.905995218	9.013196633	0.174812863	115.9813611	0.077712458	3.40318E-08	47	64.17171721	5.30324E-10	-3.91393E-18
36	T (K)	2000											
37	2.81615E-05	0.002534535	0.050344167	7.876455679	9.039121795	0.204352402	174.5432278	0.051787296	0.001807223	47	64.17352439	2.81615E-05	-8.08408E-18
38	T (K)	2100											
39	0.000121919	0.010972672	0.104750525	7.863800211	9.039742351	0.21700787	176.6722347	0.05116674	0.007824679	47	64.17954185	0.000121919	-9.35124E-19
40	T (K)	2200											
41	0.000391913	0.035272195	0.187808933	7.83295037	9.035922332	0.247857711	164.3290601	0.054986758	0.025159609	47	64.19687678	0.000391913	1.91362E-17
42	T (K)	2300											
43	0.000934157	0.084074161	0.289955447	7.773017601	9.026169252	0.30779048	139.4221773	0.064739839	0.060002533	47	64.2317197	0.000934157	1.77809E-17
44	T (K)	2400											
45	0.001785894	0.160730498	0.400912082	7.679671	9.009903023	0.401137081	111.2250389	0.081006068	0.114808948	47	64.28652612	0.001785894	0
46	T (K)	2500											
47	0.002966431	0.266978827	0.516699939	7.550274259	8.987062919	0.530533821	86.54207272	0.103846171	0.19092737	47	64.36264454	0.002966431	1.04083E-17
48	T (K)	2700											
49	0.006428509	0.578565786	0.76063512	7.170123555	8.918673273	0.910684525	51.78175708	0.172235818	0.415197545	47	64.58691472	0.006428509	0
50	T (K)	3000											
51	0.014533186	1.307986743	1.143672481	6.28259744	8.743847833	1.798210641	25.19396108	0.347061258	0.946373323	47	65.1180905	0.014533186	0

10-90 Bar Polynomial equations-

$$\begin{aligned}
& y = -0.0000000000000000697845421091x^6 + 0.000000000000009535549888893080x^5 - \\
& 0.000000000054269289576010700000x^4 + 0.000000165207851900512000000000x^3 - \\
& 0.000283043381465519000000000000x^2 + 0.257619495158687000000000000000x - \\
10 \quad & 96.881542405553000000000000000000 \\
& y = -0.0000000000000000559514159022x^6 + 0.000000000000007758479922714480x^5 - \\
& 0.000000000044800752286471200000x^4 + 0.000000138364095137389000000000x^3 - \\
& 0.000240452450942063000000000000x^2 + 0.221907684855789000000000000000x - \\
20 \quad & 84.561266285209400000000000000000 \\
& y = -0.0000000000000000374286601367x^6 + 0.000000000000005241400929771690x^5 - \\
& 0.000000000030637587844535400000x^4 + 0.000000096115980713619800000000x^3 - \\
& 0.000170100313027212000000000000x^2 + 0.160021975259058000000000000000x - \\
30 \quad & 62.134435168206500000000000000000 \\
& y = -0.0000000000000000203735399128x^6 + 0.000000000000002896045503016100x^5 - \\
& 0.000000000017292458502805600000x^4 + 0.000000055900095259844000000000x^3 - \\
& 0.000102494769208393000000000000x^2 + 0.100009886637063000000000000000x - \\
40 \quad & 40.192521802473200000000000000000 \\
& y = -0.0000000000000000055623236841x^6 + 0.00000000000000847418715082180x^5 - \\
& 0.000000000005571406520361340000x^4 + 0.000000020397477776044100000000x^3 - \\
& 0.000042524811176571300000000000x^2 + 0.046529170842705000000000000000x - \\
50 \quad & 20.550675811014000000000000000000 \\
& y = 0.0000000000000000071325714653x^6 - 0.00000000000000915132168137943x^5 + \\
& 0.000000000004549601634101350000x^4 - 0.000000010364318750235700000000x^3 + \\
& 0.000009608047014614020000000000x^2 - 0.000110170251111867000000000000x - \\
60 \quad & 3.368792768291490000000000000000 \\
& y = 0.00000000000000000180006636774x^6 - 0.000000000000002428396884617590x^5 + \\
& 0.0000000000013263549385299500000x^4 - 0.000000036921137634021400000000x^3 + \\
& 0.000054732263683668200000000000x^2 - 0.040581728242519700000000000000x + \\
70 \quad & 11.577370248610400000000000000000 \\
& y = 0.00000000000000000273281312716x^6 - 0.000000000000003730286068409050x^5 + \\
& 0.0000000000020778194234576700000x^4 - 0.000000059876307459154200000000x^3 + \\
& 0.000093825409407767700000000000x^2 - 0.075721607619898800000000000000x + \\
80 \quad & 24.582184168378000000000000000000
\end{aligned}$$

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30 Lambda=0.999		Phi=1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.64005E-07	4.92016E-06	0.002218143	7.990606018	9.001364976	0.01740199	1177.567552	0.007644033	1.04991E-05		47	64.01702752	1.64005E-07 -8.70962E-18
36	T (K)	2000											
37	0.000574576	0.017237276	0.131230807	7.329124	8.989260432	0.078884008	455.1852285	0.019748577	0.03680378		47	64.0538208	0.000574576 -7.37257E-18
38	T (K)	2100											
39	0.001043748	0.031312441	0.176953216	7.879293344	8.978923752	0.128714664	298.4492937	0.030085257	0.066887448		47	64.08390447	0.001043748 1.34441E-17
40	T (K)	2200											
41	0.001738308	0.05214925	0.228362103	7.804895639	8.964146168	0.203112369	193.8122729	0.044862841	0.111475092		47	64.12849211	0.001738308 7.13405E-17
42	T (K)	2300											
43	0.002721626	0.081648769	0.285742488	7.698666986	8.943913328	0.309341022	137.3964178	0.065095681	0.174705839		47	64.19172286	0.002721626 -5.63785E-18
44	T (K)	2400											
45	0.004051923	0.121557682	0.348651233	7.554274458	8.916822894	0.45373355	96.7263165	0.092186115	0.26044732		47	64.27746434	0.004051923 1.04083E-17
46	T (K)	2500											
47	0.005781045	0.173431959	0.416450908	7.365841958	8.881675645	0.64216605	69.75136253	0.127333364	0.372237194		47	64.38925421	0.005781045 1.30104E-17
48	T (K)	2700											
49	0.010617251	0.318517533	0.564373576	6.837559901	8.780474953	1.170448107	38.42085993	0.228534056	0.686978569		47	64.70399559	0.010617251 -4.85723E-17
50	T (K)	3000											
51	0.021295403	0.638862039	0.799288496	5.681279941	8.524849595	2.326728067	17.60752627	0.484159414	1.392931228		47	65.40994825	0.021295403 4.16334E-17

	CK	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40 Lambda=0.999		Phi=1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.23056E-07	4.92222E-06	0.002218608	7.990609659	9.001366578	0.017398349	1177.814544	0.007642431	7.87765E-06		47	64.01702489	1.23056E-07 -1.71117E-17
36	T (K)	2000											
37	0.000511712	0.020468499	0.143068163	7.335558974	8.990882862	0.072449034	496.0173203	0.018126147	0.032775078		47	64.04979209	0.000511712 -1.22515E-17
38	T (K)	2100											
39	0.000938038	0.037521519	0.193704722	7.890260866	8.981517573	0.117747142	326.7023844	0.027491436	0.060106776		47	64.07712379	0.000938038 -2.60209E-18
40	T (K)	2200											
41	0.001570261	0.062810431	0.250620093	7.822516552	8.968112425	0.185491456	219.2875691	0.040896584	0.100681507		47	64.11769852	0.001570261 1.55041E-16
42	T (K)	2300											
43	0.002466763	0.098670539	0.314118671	7.725626182	8.949755126	0.282381826	151.0408218	0.059323883	0.158305342		47	64.17532236	0.002466763 0
44	T (K)	2400											
45	0.003682	0.147280011	0.38377078	7.593647942	8.925180512	0.414360066	106.4695274	0.083828497	0.236581769		47	64.25359879	0.003682 -1.86483E-17
46	T (K)	2500											
47	0.005265608	0.210624326	0.458938259	7.420933737	8.89331246	0.587074271	76.86756899	0.115696549	0.338872898		47	64.35588991	0.005265608 0
48	T (K)	2700											
49	0.009719501	0.388780059	0.6235223	6.933695856	8.801655231	1.074312152	42.44752763	0.207353778	0.628320453		47	64.64533747	0.009719501 -1.40513E-16
50	T (K)	3000											
51	0.019687719	0.787508746	0.887416895	5.850079412	8.570591087	2.157928596	19.54890678	0.438417922	1.285660746		47	65.30267776	0.019687719 6.245E-17

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50 Lambda=0.999		Phi=1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	9.84693E-08	4.92346E-06	0.002218887	7.990611845	9.001367539	0.017396163	1177.962888	0.00764147	6.30371E-06		47	64.01702332	9.84693E-08 6.92836E-17
36	T (K)	2000											
37	0.000466995	0.023349766	0.152806302	7.940136922	8.992035841	0.067871086	529.7794492	0.016973168	0.029909615		47	64.04692663	0.000466995 0
38	T (K)	2100											
39	0.000862688	0.04313441	0.207688252	7.898079886	8.983363287	0.109928122	350.2870059	0.025645722	0.05527441		47	64.07229143	0.000862688 -1.33357E-17
40	T (K)	2200											
41	0.001450314	0.072515679	0.269287355	7.835097358	8.970935435	0.17291065	235.6210496	0.038073574	0.092979599		47	64.10999662	0.001450314 2.74737E-16
42	T (K)	2300											
43	0.00228458	0.114229018	0.337977837	7.744905666	8.953912506	0.263102342	162.5132632	0.055096503	0.14658691		47	64.16360393	0.00228458 1.17094E-17
44	T (K)	2400											
45	0.003417068	0.170853425	0.413344196	7.621864516	8.931126315	0.386143492	114.6740804	0.077882694	0.21950058		47	64.2365176	0.003417068 0
46	T (K)	2500											
47	0.004895557	0.244777842	0.494750282	7.460523294	8.901587186	0.547484714	82.86572479	0.107421823	0.314940756		47	64.33195777	0.004895557 0
48	T (K)	2700											
49	0.009070451	0.453522558	0.673440835	7.003338214	8.816697149	1.004669734	45.84583172	0.19231186	0.585978314		47	64.60299533	0.009070451 -3.52149E-16
50	T (K)	3000											
51	0.018506604	0.925330189	0.961940845	5.974813285	8.603025796	2.033194723	21.19059488	0.405983213	1.207076455		47	65.22409347	0.018506604 2.77558E-17

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60 Lambda=0.999		Phi=1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	8.20715E-08	4.92429E-06	0.002219074	7.990613303	9.001368181	0.017394705	1178.061847	0.007640828	5.25397E-06		47	64.01702227	8.20715E-08 8.33661E-17
36	T (K)	2000											
37	0.000432896	0.025973734	0.161163688	7.943628184	8.992914437	0.064379824	558.754508	0.016094572	0.027724685		47	64.04474717	0.000432896 8.40257E-18
38	T (K)	2100											
39	0.000805126	0.048307544	0.219789772	7.904053905	8.984771529	0.103954103	370.6974298	0.02423748	0.051583279		47	64.0686003	0.000805126 1.33357E-17
40	T (K)	2200											
41	0.001358582	0.081514899	0.285508142	7.84472075	8.973089913	0.163287258	249.8139139	0.035319096	0.087090664		47	64.10410768	0.001358582 4.35849E-16
42	T (K)	2300											
43	0.002145096	0.128705754	0.358755842	7.759671174	8.95708513	0.248336834	172.5041589	0.051923879	0.137617844		47	64.15463486	0.002145096 1.04083E-17
44	T (K)	2400											
45	0.003213945	0.192836683	0.439131737	7.643508244	8.935662657	0.364499764	121.8283179	0.073346352	0.206410545		47	64.22342756	0.003213945 -5.63785E-18
46	T (K)	2500											
47	0.004611324	0.276679439	0.526003269	7.490952289	8.907898123	0.517055719	88.10028751	0.101110886	0.29657079		47	64.31358781	0.004611324 0
48	T (K)	2700											
49	0.008569333	0.514159933	0.717049505	7.057184284	8.828158159	0.950823724	48.81457917	0.18085085	0.553324775		47	64.57034179	0.008569333 -6.88685E-16
50	T (K)	3000											
51	0.017583657	1.055019432	1.027141388	6.072684775	8.627705922	1.935323233	22.62689764	0.381303087	1.145800648		47	65.16281766	0.017583657 4.51028E-17

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-0.999	Phi-1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	7.03554E-08	4.32488E-06	0.002219207	7.990614345	9.001368639	0.017393663	1178.132562	0.00764037	4.50394E-06	47	64.01702152	7.03554E-08	-8.05321E-16
36	T (K)	2000											
37	0.000405677	0.028397357	0.168515152	7.946415148	8.993615362	0.06159286	584.2420331	0.015393647	0.025980741	47	64.04299776	0.000405677	2.6563E-18
38	T (K)	2100											
39	0.000759103	0.053137226	0.230515131	7.908830758	8.985896352	0.09917725	388.7868201	0.023112657	0.048632441	47	64.06564946	0.000759103	4.42354E-17
40	T (K)	2200											
41	0.001285172	0.089962073	0.299936782	7.85242317	8.974811264	0.155584838	262.4386857	0.034197745	0.082378779	47	64.0993958	0.001285172	6.66784E-16
42	T (K)	2300											
43	0.002033372	0.14233604	0.37727449	7.771500864	8.953619859	0.236507144	181.4086656	0.04338915	0.130435635	47	64.14745265	0.002033372	2.0383E-17
44	T (K)	2400											
45	0.003051067	0.213574722	0.462141452	7.660869739	8.939286261	0.347138269	128.211903	0.069722748	0.195917996	47	64.21293501	0.003051067	4.33681E-18
46	T (K)	2500											
47	0.004383085	0.306815348	0.553909693	7.515399547	8.91293785	0.432608461	92.77433442	0.096071159	0.281827298	47	64.29884431	0.004383085	0
48	T (K)	2700											
49	0.008165297	0.571570775	0.756022399	7.100646084	8.837303452	0.907361924	51.46777777	0.171705557	0.527021228	47	64.54403825	0.008165297	0
50	T (K)	3000											
51	0.016832396	1.178267727	1.085480413	6.152599131	8.647376396	1.855408877	23.91204802	0.361632613	1.096008232	47	65.11302525	0.016832396	2.77556E-17

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-0.999	Phi-1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	6.15665E-08	4.92532E-06	0.002219307	7.990615127	9.001368983	0.017392881	1178.185615	0.007640026	3.94131E-06	47	64.01702096	6.15665E-08	-4.2631E-16
36	T (K)	2000											
37	0.000383235	0.030658776	0.175096475	7.948713087	8.994193009	0.059234921	607.0594791	0.014816	0.024542948	47	64.04155396	0.000383235	-1.04626E-17
38	T (K)	2100											
39	0.000721101	0.05768805	0.240183367	7.912775519	8.986824428	0.095232489	405.0932662	0.022184581	0.046196023	47	64.06321304	0.000721101	8.18573E-17
40	T (K)	2200											
41	0.001224507	0.09796056	0.312986517	7.858789284	8.976231925	0.149218724	273.8569425	0.032777084	0.078485391	47	64.09550241	0.001224507	9.74915E-16
42	T (K)	2300											
43	0.001940974	0.155277918	0.394053191	7.781286176	8.961711798	0.226721832	189.4785366	0.047297211	0.124497009	47	64.14151403	0.001940974	2.10335E-17
44	T (K)	2400											
45	0.002916243	0.233299409	0.483010775	7.675245201	8.942276439	0.332762807	134.0016793	0.06673257	0.187235176	47	64.20425219	0.002916243	4.33681E-18
46	T (K)	2500											
47	0.004193937	0.335514962	0.579236534	7.535668168	8.917095659	0.472333984	97.01632706	0.09191335	0.269614083	47	64.2866311	0.004193937	-8.67362E-18
48	T (K)	2700											
49	0.007829349	0.626347911	0.79142145	7.136815121	8.844843496	0.871192887	53.87759804	0.164165513	0.505166687	47	64.5221837	0.007829349	0
50	T (K)	3000											
51	0.016202837	1.296226965	1.138519637	6.219733287	8.663577495	1.788274721	25.08044909	0.345431514	1.054340605	47	65.07135762	0.016202837	2.77556E-17

	FP	FQ	FR	FS	FT	FU	FV	FV	FX	FY	FZ	GA	GB
31	P (Bar)	90	Lambda-0.999	Phi-1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	5.47236E-08	4.32567E-06	0.002219385	7.990615735	9.001369325	0.017392273	1178.226888	0.007639759	3.50363E-06	47	64.01702052	5.47236E-08	-1.09242E-16
36	T (K)	2000											
37	0.000364279	0.032785105	0.181066577	7.950654149	8.994680744	0.057353859	627.7578235	0.014328265	0.02332855	47	64.04034557	0.000364279	1.00289E-17
38	T (K)	2100											
39	0.000688955	0.062005935	0.249010029	7.916112489	8.987608937	0.091895519	419.9803157	0.021400072	0.044135283	47	64.0611523	0.000688955	2.06107E-16
40	T (K)	2200											
41	0.001173155	0.105589376	0.324936881	7.864178609	8.977433159	0.143823399	284.3132718	0.03157585	0.075190112	47	64.09220713	0.001173155	9.1073E-18
42	T (K)	2300											
43	0.001862711	0.167644014	0.409443542	7.789575844	8.963480642	0.218432164	196.8768328	0.045528367	0.119467753	47	64.13648477	0.001862711	2.21177E-17
44	T (K)	2400											
45	0.002801957	0.252176094	0.502171379	7.687433663	8.944804508	0.320574345	139.3174057	0.064204501	0.179876911	47	64.19689393	0.002801957	1.34441E-17
46	T (K)	2500											
47	0.004033448	0.363010234	0.602503356	7.552871786	8.920610241	0.455136222	100.9132871	0.088398768	0.259254382	47	64.276272	0.004033448	0
48	T (K)	2700											
49	0.007543508	0.67891574	0.823963434	7.16761155	8.851213561	0.840396458	56.09295868	0.157795448	0.486583441	47	64.50360046	0.007543508	1.38778E-17
50	T (K)	3000											
51	0.015663636	1.409727269	1.187319363	6.277348317	8.677252169	1.730659691	26.15545824	0.33175684	1.018695753	47	65.03571277	0.015663636	0

	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda-0.999	Phi-1.001									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	4.92594E-08	4.92594E-06	0.002219447	7.990616221	9.001369464	0.017391787	1178.259913	0.007639545	3.15344E-06	47	64.01702017	4.92594E-08	-1.79934E-17
36	T (K)	2000											
37	0.000347965	0.034796484	0.186538157	7.952324767	8.995100375	0.055683241	646.7277904	0.013908634	0.022283425	47	64.03930044	0.000347965	-8.67362E-19
38	T (K)	2100											
39	0.000661253	0.066125255	0.257748313	7.918988487	8.988284653	0.089019521	433.706344	0.020724356	0.042359426	47	64.05937644	0.000661253	4.3921E-16
40	T (K)	2200											
41	0.001128871	0.112887103	0.335986761	7.868826635	8.9784681	0.139181373	293.9816959	0.030540909	0.072348628	47	64.08936565	0.001128871	2.60209E-18
42	T (K)	2300											
43	0.001795182	0.179518177	0.423635854	7.796729626	8.965004648	0.21278382	203.7299145	0.044004361	0.115128859	47	64.13214588	0.001795182	2.73219E-17
44	T (K)	2400											
45	0.002703279	0.270327934	0.519930706	7.697959604	8.946982449	0.310048404	144.2443759	0.06202856	0.17352497	47	64.19054199	0.002703279	0
46	T (K)	2500											
47	0.003894762	0.389476222	0.624080301	7.567742532	8.923637577	0.440265476	104.5272097	0.085371432	0.250305942	47	64.26732296	0.003894762	3.46945E-18
48	T (K)	2700											
49	0.007295912	0.729591233	0.854161129	7.194303633	8.856697887	0.813704375	58.14872715	0.152311122	0.470495236	47	64.48751225	0.007295912	-1.21431E-17
50	T (K)	3000											
51	0.015193924	1.519392379	1.232636353	6.327623528	8.68901575	1.68038448	27.15374622	0.319993259	0.987676357	47	65.00469337	0.015193924	1.38778E-17

Lambda 1, Phi-1

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)*1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	2.66163E-05	0.000266163	0.016314631	7.997631948	9.00	0.002368052	8661.143274	0.001033904	0.001703528	47	64.00170353	2.66163E-05	3.15333E-16
36	T (K)	2000											
37	0.001004703	0.010047027	0.100234861	7.897092621	8.974176093	0.102907379	347.5142619	0.025823907	0.064365643	47	64.06436564	0.001004703	1.73472E-17
38	T (K)	2100											
39	0.001680545	0.016805447	0.123635826	7.825503539	8.959024563	0.174496401	218.6437847	0.0409375437	0.107735319	47	64.10773532	0.001680545	8.89046E-18
40	T (K)	2200											
41	0.002673305	0.026730437	0.16349464	7.719408937	8.937523663	0.280591063	143.0545399	0.062476337	0.1715337	47	64.1715337	0.002673305	6.50521E-18
42	T (K)	2300											
43	0.004067466	0.040674663	0.201679604	7.569097586	8.908140414	0.430902414	96.97562095	0.091859586	0.261381	47	64.261381	0.004067466	0
44	T (K)	2400											
45	0.005936269	0.059362693	0.243644604	7.366826159	8.868733806	0.633173841	67.59432241	0.131206194	0.382190018	47	64.38219002	0.005936269	8.67362E-18
46	T (K)	2500											
47	0.008335969	0.083359688	0.288720779	7.106368551	8.817658159	0.893631449	48.35784329	0.182341841	0.537986645	47	64.53798664	0.008335969	5.75328E-16
48	T (K)	2700											
49	0.014874768	0.148747681	0.385678209	6.3974857	8.66979524	1.6025143	26.25581542	0.33020476	0.96635953	47	64.96635953	0.014874768	0
50	T (K)	3000											
51	0.028450676	0.284506765	0.533391755	4.957548453	8.29	3.042451547	11.75008698	0.705877538	1.874164542	47	65.87416454	0.028450676	0

	BV	Bw	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)*1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	2.11266E-05	0.000422533	0.020555601	7.998120396	8.999175338	0.001879604	10912.55752	0.000824662	0.001352133	47	64.00135213	2.11266E-05	-8.29076E-18
36	T (K)	2000											
37	0.00079874	0.015974802	0.126391464	7.91817138	8.97950816	0.08182862	438.1992045	0.02049184	0.05116023	47	64.05116023	0.00079874	1.4203E-17
38	T (K)	2100											
39	0.001337586	0.026751716	0.163553519	7.861067164	8.967492535	0.138932836	275.8594852	0.032507465	0.08572015	47	64.08572015	0.001337586	8.52183E-17
40	T (K)	2200											
41	0.002131241	0.042624826	0.206457807	7.776165268	8.950453202	0.223834732	180.6464523	0.049546798	0.136690765	47	64.13669076	0.002131241	-1.04083E-17
42	T (K)	2300											
43	0.003251107	0.065022133	0.254994379	7.655309776	8.927191239	0.344690224	122.611497	0.072808761	0.208749493	47	64.20874949	0.003251107	0
44	T (K)	2400											
45	0.004760985	0.095219703	0.3085769	7.491594556	8.89608409	0.508405444	85.60848944	0.10391591	0.306160677	47	64.30616068	0.004760985	4.42354E-17
46	T (K)	2500											
47	0.006715413	0.134308253	0.366480904	7.278888419	8.855727351	0.721111581	61.38188655	0.144272649	0.432692115	47	64.43269211	0.006715413	0
48	T (K)	2700											
49	0.012134102	0.242682033	0.492627682	6.688350234	8.739407001	1.311649766	33.5366147	0.260592399	0.786121382	47	64.78612138	0.012134102	4.33681E-17
50	T (K)	3000											
51	0.023850703	0.477014058	0.690662043	5.427572893	8.444944479	2.572427107	15.21459415	0.555055521	1.563741314	47	65.56374131	0.023850703	0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV
31	P (Bar)	30	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)*1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.84561E-05	0.000536884	0.0235305	7.99835798	8.999279589	0.00164202	12491.87182	0.000720411	0.001181215	47	64.00118122	1.84561E-05	4.61701E-16
36	T (K)	2000											
37	0.00069832	0.02094961	0.144739802	7.928451836	8.982100698	0.071548164	501.8128924	0.017899302	0.044723733	47	64.04472373	0.00069832	2.5804E-17
38	T (K)	2100											
39	0.001170083	0.035102477	0.187356551	7.878445547	8.971608435	0.121554453	315.9955585	0.028391565	0.074973009	47	64.07497301	0.001170083	-5.42101E-18
40	T (K)	2200											
41	0.001865932	0.059377972	0.236596845	7.803979786	8.956734374	0.196020214	207.0173322	0.043265626	0.11964292	47	64.11964292	0.001865932	5.68122E-17
42	T (K)	2300											
43	0.002849866	0.085495962	0.292396959	7.697735639	8.936438952	0.302264361	140.5961539	0.063561048	0.182912705	47	64.1829127	0.002849866	3.46945E-18
44	T (K)	2400											
45	0.004180382	0.125411464	0.354134811	7.553347095	8.909317725	0.446652905	98.24762048	0.090682275	0.26866759	47	64.26866759	0.004180382	0
46	T (K)	2500											
47	0.00590946	0.117283802	0.421050831	7.364928311	8.874164247	0.635071689	70.52180369	0.125835753	0.380453721	47	64.38045372	0.00590946	0
48	T (K)	2700											
49	0.010744998	0.322349345	0.567758703	6.83668016	8.773021366	1.163319884	38.65130921	0.226978634	0.695149259	47	64.69514926	0.010744998	0
50	T (K)	3000											
51	0.021420887	0.642626613	0.801639952	5.680439947	8.517667479	2.319560053	17.65932651	0.482332521	1.400946287	47	65.40094629	0.021420887	0

	CK	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)*1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.67687E-05	0.000670749	0.025836813	7.998508107	8.999345462	0.001491833	13749.16174	0.000654538	0.001073216	47	64.00107322	1.67687E-05	2.66985E-18
36	T (K)	2000											
37	0.000634786	0.025391442	0.159346923	7.934957237	8.983738538	0.065042763	552.4557827	0.016261462	0.040652112	47	64.04065211	0.000634786	-8.5652E-18
38	T (K)	2100											
39	0.001064007	0.042580295	0.206301467	7.889453795	8.974208196	0.110546205	347.9480546	0.025791804	0.068169005	47	64.068169	0.001064007	9.54098E-18
40	T (K)	2200											
41	0.001637686	0.067907446	0.260590573	7.82162596	8.96070067	0.17837404	228.0115391	0.03929333	0.108836685	47	64.10883668	0.001637686	2.60209E-18
42	T (K)	2300											
43	0.002594909	0.103796355	0.322174417	7.724711529	8.942275998	0.275288471	154.9143485	0.057724002	0.166506236	47	64.16650624	0.002594909	6.72205E-17
44	T (K)	2400											
45	0.003810439	0.152417575	0.390406935	7.592732357	8.917665804	0.407267643	108.310536	0.082334196	0.244800919	47	64.24480092	0.003810439	1.43115E-17
46	T (K)	2500											
47	0.005394065	0.215762617	0.464502548	7.420029023	8.885786123	0.579970977	77.79953179	0.114213877	0.347092427	47	64.34709243	0.005394065	0
48	T (K)	2700											
49	0.009847415	0.393896619	0.627611838	6.93282253	8.794172479	1.06717747	42.7259311	0.205827521	0.636502495	47	64.6365025	0.009847415	0
50	T (K)	3000											
51	0.019813614	0.792544569	0.890249723	5.849244907	8.563346556	2.150755093	19.61131115	0.436653444	1.293704268	47	65.29370427	0.019813614	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
31	P (Bar)	50	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P) ^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.55668E-05	0.000778341	0.027898763	7.998615036	8.9993238	0.001384364	14810.89516	0.00060762	0.000936292	47	64.00093629	1.55668E-05	-6.25449E-18
36	T (K)	2000											
37	0.000589495	0.029474743	0.171682099	7.939595204	8.984904947	0.060404796	595.2218357	0.015095053	0.037749324	47	64.03774932	0.000589495	8.89046E-18
38	T (K)	2100											
39	0.000988344	0.049417193	0.222299795	7.897307388	8.976059426	0.102692612	374.9308339	0.023940574	0.063316593	47	64.06331659	0.000988344	1.45283E-17
40	T (K)	2200											
41	0.001577565	0.07887827	0.280852755	7.834228132	8.963524438	0.165771868	245.7405436	0.036475562	0.101123715	47	64.10112371	0.001577565	-1.34441E-17
42	T (K)	2300											
43	0.002412638	0.120631888	0.347321016	7.744005067	8.946430433	0.255994933	167.0058373	0.053569567	0.15478225	47	64.15478225	0.002412638	-7.37257E-18
44	T (K)	2400											
45	0.00354548	0.177273983	0.421039171	7.620958772	8.923605091	0.379041228	116.8088971	0.076394909	0.227718068	47	64.22771807	0.00354548	4.64039E-17
46	T (K)	2500											
47	0.005024035	0.251201756	0.501200315	7.459625963	8.894050389	0.540374037	83.94604079	0.105349611	0.323161824	47	64.32316182	0.005024035	1.30104E-17
48	T (K)	2700											
49	0.009198479	0.459923964	0.678176942	7.002470074	8.809139361	0.937523926	46.16825166	0.190806309	0.594168117	47	64.59416812	0.009198479	0
50	T (K)	3000											
51	0.018632791	0.931639545	0.965214766	5.973983204	8.595736658	2.026016796	21.26271609	0.404263342	1.215140069	47	65.21514007	0.018632791	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P) ^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.4649E-05	0.000878942	0.02964695	7.99869669	8.999428207	0.00130331	15738.97307	0.000571793	0.000937552	47	64.00093755	1.4649E-05	1.07658E-17
36	T (K)	2000											
37	0.000554888	0.032333287	0.18246448	7.943139337	8.985795552	0.056860663	632.6043531	0.014204448	0.035532556	47	64.03553256	0.000554888	-9.6494E-18
38	T (K)	2100											
39	0.000930504	0.055830235	0.236284225	7.903311771	8.977472797	0.096688229	398.5169743	0.022527203	0.059607716	47	64.05960772	0.000930504	2.77447E-16
40	T (K)	2200											
41	0.001485678	0.08914069	0.298564382	7.843870234	8.965680013	0.156129766	261.2378631	0.034319987	0.095224876	47	64.09522488	0.001485678	1.97325E-17
42	T (K)	2300											
43	0.002273072	0.136384303	0.369302455	7.758782837	8.949601119	0.241217163	177.5753924	0.050398881	0.145808022	47	64.14580802	0.002273072	4.77049E-18
44	T (K)	2400											
45	0.003342325	0.200539502	0.447816371	7.642611042	8.928136653	0.357388958	124.2376958	0.071863347	0.214626153	47	64.21462615	0.003342325	9.87491E-16
46	T (K)	2500											
47	0.004739812	0.284388704	0.533281074	7.490061315	8.900353465	0.509398695	89.31924704	0.099646535	0.30479261	47	64.30479261	0.004739812	6.59195E-17
48	T (K)	2700											
49	0.008697445	0.521846705	0.72238958	7.056320507	8.820638939	0.943679493	49.1781541	0.179361061	0.561520277	47	64.56152028	0.008697445	6.07153E-17
50	T (K)	3000											
51	0.017710066	1.062603934	1.030826821	6.071858393	8.620382651	1.928141607	22.70808403	0.379617349	1.153879478	47	65.15387948	0.017710066	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P) ^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.39154E-05	0.000974077	0.03121021	7.99876196	8.999456846	0.00123804	16568.87633	0.000543154	0.000890597	47	64.0008906	1.39154E-05	3.0129E-17
36	T (K)	2000											
37	0.000527212	0.036904822	0.192106279	7.945973896	8.986507403	0.054026104	666.032469	0.013492597	0.03375935	47	64.03375935	0.000527212	-4.11997E-18
38	T (K)	2100											
39	0.000884231	0.061896151	0.24878937	7.908115888	8.978602412	0.091884112	419.6081522	0.021397588	0.05664085	47	64.05664085	0.000884231	-7.04731E-18
40	T (K)	2200											
41	0.001412128	0.09884894	0.314402512	7.851589415	8.967402632	0.148410585	275.0953103	0.032597368	0.090503977	47	64.09050398	0.001412128	3.68629E-18
42	T (K)	2300											
43	0.002161272	0.151289026	0.3889589	7.770623481	8.952134533	0.229376519	187.0269974	0.047865467	0.138620993	47	64.13862099	0.002161272	-1.34441E-17
44	T (K)	2400											
45	0.003179416	0.222559116	0.471761716	7.659980137	8.931756583	0.340019863	130.8808528	0.068243417	0.20413164	47	64.20413164	0.003179416	7.80626E-18
46	T (K)	2500											
47	0.004511575	0.315810274	0.561969994	7.514514191	8.905387006	0.485485809	94.12435427	0.094612994	0.290049402	47	64.2900494	0.004511575	5.45571E-16
48	T (K)	2700											
49	0.008293473	0.580543112	0.761933798	7.099786094	8.829771675	0.900213906	51.87016714	0.170228325	0.53522116	47	64.53522112	0.008293473	7.8583E-16
50	T (K)	3000											
51	0.01695898	1.18712662	1.089554322	6.157775928	8.640025805	1.848224072	24.00173215	0.359974195	1.104099133	47	65.10409913	0.01695898	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P) ^{1/2}	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.33096E-05	0.001064772	0.032630838	7.998815852	8.999480491	0.001184148	17323.0591	0.000519509	0.000851829	47	64.00085183	1.33096E-05	1.65141E-16
36	T (K)	2000											
37	0.000504351	0.040348099	0.200868363	7.948315345	8.98709512	0.051684655	696.4106155	0.01290488	0.032294767	47	64.03229477	0.000504351	8.13152E-18
38	T (K)	2100											
39	0.000845998	0.067679876	0.260153563	7.91208552	8.979534989	0.08791448	438.7749992	0.020465011	0.054189745	47	64.05418975	0.000845998	-1.63715E-17
40	T (K)	2200											
41	0.001351332	0.108106567	0.328795631	7.857970788	8.968824648	0.142029212	287.6896013	0.031175352	0.086602282	47	64.08660228	0.001351332	4.70544E-17
42	T (K)	2300											
43	0.002068802	0.165504199	0.406822072	7.780418743	8.954225571	0.219581257	195.6163253	0.045774429	0.132677843	47	64.13267784	0.002068802	6.50521E-18
44	T (K)	2400											
45	0.003044559	0.243564736	0.493522782	7.674362477	8.934743845	0.325637523	136.9180254	0.065256155	0.195446839	47	64.19544684	0.003044559	-8.23994E-18
46	T (K)	2500											
47	0.004322426	0.345794057	0.588042564	7.534787874	8.909539783	0.465212126	98.49124896	0.090460217	0.277836171	47	64.27783617	0.004322426	0
48	T (K)	2700											
49	0.007957576	0.636606103	0.797875994	7.135958489	8.837301384	0.864041511	54.31700407	0.162698616	0.513370063	47	64.51337006	0.007957576	0
50	T (K)	3000											
51	0.016329566	1.306365244	1.142963361	6.218912871	8.656204326	1.781087129	25.17833987	0.343795674	1.062441401	47	65.0624414	0.016329566	5.55112E-17

#	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB
31	P (Bar)	30	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.27973E-05	0.00115754	0.033937497	7.998861437	8.999500492	0.001138563	18016.73844	0.000499508	0.000819035	47	64.00081904	1.27973E-05	6.2913E-16
36	T (K)	2000											
37	0.000485008	0.04365071	0.208927523	7.95029664	8.987592226	0.049370336	724.3517231	0.012407774	0.031055567	47	64.03105557	0.000485008	4.99817E-17
38	T (K)	2100											
39	0.000813641	0.073227856	0.27060609	7.915445444	8.98032375	0.084554556	456.4042312	0.01967625	0.052115403	47	64.0521154	0.000813641	1.6263E-17
40	T (K)	2200											
41	0.001299859	0.116987342	0.342034124	7.863374171	8.970027277	0.136625829	299.2730177	0.029972723	0.083299276	47	64.08329928	0.001299859	3.02276E-16
42	T (K)	2300											
43	0.001990473	0.179142533	0.423252328	7.78871756	8.955933803	0.21128244	203.5166495	0.044006197	0.127644318	47	64.12764432	0.001990473	1.0842E-17
44	T (K)	2400											
45	0.002930242	0.263721749	0.513538459	7.686557248	8.937269542	0.313442752	142.4709747	0.062730458	0.188086605	47	64.18808661	0.002930242	0
46	T (K)	2500											
47	0.004161932	0.374573864	0.612024398	7.551996115	8.913050171	0.448003885	102.5079665	0.086949829	0.267476857	47	64.26747686	0.004161932	0
48	T (K)	2700											
49	0.007671777	0.690459953	0.830933199	7.166757946	8.843662733	0.833242054	56.56784788	0.156337267	0.49478966	47	64.49478966	0.007671777	0
50	T (K)	3000											
51	0.015790486	1.421143755	1.192117341	6.276530384	8.669859891	1.723469616	26.26115291	0.330140109	1.026804863	47	65.02680486	0.015790486	0

#	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP
31	P (Bar)	100	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.23557E-05	0.001235566	0.035150617	7.998900726	8.99951773	0.001099274	18660.75939	0.00048227	0.000790772	47	64.00079077	1.23557E-05	6.52215E-18
36	T (K)	2000											
37	0.000468332	0.046833182	0.216409755	7.952004792	8.988020646	0.047995208	750.2926217	0.011979354	0.023987281	47	64.02398728	0.000468332	2.08113E-16
38	T (K)	2100											
39	0.000785739	0.078573899	0.280310363	7.918342822	8.981003499	0.081657178	472.7714579	0.018996501	0.050326839	47	64.05032684	0.000785739	1.43115E-17
40	T (K)	2200											
41	0.001255462	0.125546169	0.354324948	7.868035271	8.971063628	0.131964729	310.0272431	0.028936372	0.080450551	47	64.08045055	0.001255462	0
42	T (K)	2300											
43	0.001922879	0.192287947	0.438506496	7.795879836	8.957517405	0.204120164	210.8514635	0.042482595	0.12330138	47	64.12330138	0.001922879	6.07153E-18
44	T (K)	2400											
45	0.002831533	0.283153349	0.532121555	7.697089033	8.939445516	0.302910967	147.626483	0.060554484	0.181732726	47	64.18173273	0.002831533	6.93889E-18
46	T (K)	2500											
47	0.00402324	0.40232398	0.634290139	7.566871127	8.916073943	0.433128873	106.2372553	0.083926057	0.258527465	47	64.25852747	0.00402324	0
48	T (K)	2700											
49	0.007424216	0.742421591	0.861638898	7.193452791	8.849139571	0.806547209	58.65779128	0.150860429	0.478703819	47	64.47870382	0.007424216	-1.04083E-17
50	T (K)	3000											
51	0.015320878	1.532087765	1.237775329	6.326807832	8.681606996	1.673192168	27.26695272	0.318393004	0.995792586	47	64.99579259	0.015320878	0

#	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
31	P (Bar)	110	Lambda-1	Phi-1									
32	T (K)	1500											
33													
34	Guess n5InT	(n5InT).P	((n5InT).P)^1/2	n1	n2	n3	n2In4	n4	n5	n6	nTotal	Calc n5InT	Error
35	1.19693E-05	0.001316825	0.03628533	7.998935098	8.999532811	0.001064902	19263.1558	0.000467189	0.000766046	47	64.00076605	1.19693E-05	5.26516E-18
36	T (K)	2000											
37	0.000453739	0.049911311	0.223408396	7.953499583	8.988395436	0.046500471	774.5569083	0.011604564	0.029052491	47	64.02905249	0.000453739	7.1823E-16
38	T (K)	2100											
39	0.000761319	0.083745087	0.289387434	7.920878791	8.981598134	0.079121209	488.080847	0.018401866	0.048761537	47	64.04876154	0.000761319	-8.99888E-18
40	T (K)	2200											
41	0.001216594	0.133825308	0.365821415	7.872116159	8.971970163	0.127883841	320.086422	0.028029837	0.077956839	47	64.07795684	0.001216594	5.63785E-18
42	T (K)	2300											
43	0.001863682	0.205005049	0.452774833	7.802153214	8.958850042	0.197846786	217.7122507	0.041149358	0.119498372	47	64.11949837	0.001863682	9.25909E-17
44	T (K)	2400											
45	0.00274504	0.301954429	0.549503802	7.70631915	8.94134853	0.29368085	152.4488399	0.05865147	0.17616616	47	64.17616616	0.00274504	9.97466E-18
46	T (K)	2500											
47	0.003901625	0.429178725	0.655117337	7.579917909	8.918717986	0.420082091	109.7256027	0.081282014	0.250682053	47	64.25068205	0.003901625	0
48	T (K)	2700											
49	0.007206688	0.792735714	0.890357071	7.216921239	8.853926548	0.783078761	60.61283831	0.148073452	0.464576107	47	64.46457611	0.007206688	0
50	T (K)	3000											
51	0.014906192	1.639681161	1.280500356	6.371269366	8.691866744	1.628730634	28.20814234	0.308133256	0.968431945	47	64.96843194	0.014906192	1.56125E-17

10-110 Bar Polynomial equations-

$$\begin{aligned}
 y &= -0.00000000000000000000128514406959x^6 + 0.00000000000000001342898467838280x^5 - \\
 &0.0000000000005515014917395980000x^4 + 0.000000011775107085712100000000x^3 - \\
 &0.0000140994998022639000000000000x^2 + 0.009166717654310160000000000000x - \\
 10 \quad &2.5794978007959700000000000000000 \\
 y &= -0.00000000000000000000137330896978x^6 + 0.00000000000000001570742195987520x^5 - \\
 20 \quad &0.0000000000007284899571728490000x^4 + 0.000000018064919117225400000000x^3 -
 \end{aligned}$$

0.000025625494876583400000000000x² + 0.019823490886966000000000000000x -
 6.52935762188606000000000000000000
 y = -0.000000000000000000131404129310x⁶ + 0.0000000000000001542485552284330x⁵ -
 0.0000000000007372066535849540000x⁴ + 0.000000018863762242886000000000x³ -
 0.000027564352872441400000000000x² + 0.021870108380778100000000000000x -
 30 7.34477276760233000000000000000000
 y = -0.000000000000000000124607761365x⁶ + 0.0000000000000001482442250197660x⁵ -
 0.0000000000007189716812766120000x⁴ + 0.000000018668512825962600000000x³ -
 0.000027645417149387700000000000x² + 0.022178819198647700000000000000x -
 40 7.51119210487435000000000000000000
 y = -0.000000000000000000118470040023x⁶ + 0.0000000000000001421515901328990x⁵ -
 0.0000000000006956693802300510000x⁴ + 0.000000018223214193119300000000x³ -
 0.000027199919746194600000000000x² + 0.021963724139026200000000000000x -
 50 7.47504471362837000000000000000000
 y = -0.000000000000000000113121397286x⁶ + 0.0000000000000001365617994570960x⁵ -
 0.0000000000006725080415172710000x⁴ + 0.000000017722854245530400000000x³ -
 0.000026595032915190000000000000x² + 0.021569827422157300000000000000x -
 60 7.36553134587476000000000000000000
 y = -0.000000000000000000108467392393x⁶ + 0.0000000000000001315514887221910x⁵ -
 0.0000000000006508663382793620000x⁴ + 0.000000017228949136514500000000x³ -
 0.000025955759445765000000000000x² + 0.021119385712857800000000000000x -
 70 7.22950407394279000000000000000000
 y = -0.000000000000000000104390387175x⁶ + 0.0000000000000001270754628985190x⁵ -
 0.0000000000006310264879606960000x⁴ + 0.000000016761639247334400000000x³ -
 0.000025328880012065200000000000x² + 0.020660987076836600000000000000x -
 80 7.08618658321677000000000000000000
 y = -0.000000000000000000100788061651x⁶ + 0.0000000000000001230645068715480x⁵ -
 0.0000000000006129289522280540000x⁴ + 0.000000016326438015838800000000x³ -
 0.000024731932528450900000000000x² + 0.020214848456441300000000000000x -
 90 6.94397763645571000000000000000000
 y = -0.000000000000000000097577941715x⁶ + 0.0000000000000001194518230189590x⁵ -
 0.0000000000005964134874083100000x⁴ + 0.000000015923370913144600000000x³ -
 0.000024170529761587900000000000x² + 0.019789147306794300000000000000x -
 100 6.80658142497029000000000000000000

$$y = -0.0000000000000000094694712409x^6 + 0.0000000000000001161794563838680x^5 - 0.000000000005813017198036220000x^4 + 0.000000015550433576493300000000x^3 - 0.000023645212226026600000000000x^2 + 0.019386640568360400000000000000x - 110.67552666211325000000000000000$$

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1	Temp	10	20	30	40	50	60	70	80	90	100	110
2	1500	0.0017	0.0014	0.0012	0.0011	0.001	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008
3	2000	0.0644	0.0512	0.0447	0.0407	0.0377	0.0355	0.0338	0.0323	0.0311	0.03	0.0291
4	2100	0.1077	0.0857	0.075	0.0682	0.0633	0.0596	0.0566	0.0542	0.0521	0.0503	0.0488
5	2200	0.1715	0.1367	0.1196	0.1088	0.1011	0.0952	0.0905	0.0866	0.0833	0.0805	0.078
6	2300	0.2614	0.2087	0.1829	0.1665	0.1548	0.1458	0.1386	0.1327	0.1276	0.1233	0.1195
7	2400	0.3822	0.3062	0.2687	0.2448	0.2277	0.2146	0.2041	0.1954	0.1881	0.1817	0.1762
8	2500	0.538	0.4327	0.3805	0.3471	0.3232	0.3048	0.29	0.2778	0.2675	0.2585	0.2507
9	2700	0.9664	0.7861	0.6951	0.6365	0.5942	0.5615	0.5352	0.5134	0.4948	0.4787	0.4646
10	3000	1.8742	1.5637	1.4009	1.2937	1.2151	1.1539	1.1041	1.0624	1.0268	0.9958	0.9684

Lambda 1.03, Phi-0.97

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-1.03	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.005702147	0.057021472	0.238791691	7.766833171	8.74	0.000157121	126769.7327	6.89265E-05	0.364190694	47	63.86904506	0.005702147	0
36	T (K)	2000											
37	0.006097689	0.060976891	0.246934994	7.726122888	8.727669674	0.040867404	856.1236259	0.010194403	0.389608573	47	63.89446294	0.006097689	0
38	T (K)	2100											
39	0.006533184	0.065331837	0.255600933	7.68013315	8.717642059	0.086857142	431.0965339	0.020222018	0.41761725	47	63.92247162	0.006533184	0
40	T (K)	2200											
41	0.00728691	0.072869096	0.269942763	7.599682161	8.701025688	0.16730813	236.1945192	0.036838389	0.46615093	47	63.9710053	0.00728691	0
42	T (K)	2300											
43	0.008469829	0.084698295	0.291029715	7.472203408	8.675966469	0.294786884	139.9387281	0.061997608	0.542469916	47	64.04732428	0.008469829	0
44	T (K)	2400											
45	0.010166494	0.101664938	0.318849397	7.288315142	8.640188899	0.47867515	88.45838833	0.097675179	0.652252834	47	64.15710172	0.010166494	0
46	T (K)	2500											
47	0.012431415	0.124314147	0.352582114	7.041860273	8.592363907	0.725130018	59.05397829	0.145500017	0.799392764	47	64.30424713	0.012431415	0
48	T (K)	2700											
49	0.018777608	0.187777608	0.433331374	6.351054935	8.451375791	1.415935356	29.49889997	0.286488286	1.215289491	47	64.72014386	0.018777608	1.53E-16
50	T (K)	3000											
51	0.032147999	0.321479994	0.566992058	4.924129923	8.09	2.842860368	12.49026805	0.64771612	2.109365914	47	65.61422028	0.032147999	8.33E-17

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-1.03	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.005701632	0.114032637	0.337687188	7.766879184	8.737815337	0.000111017	179271.3746	4.87407E-05	0.364157594	47	63.86901196	0.005701632	-8.67362E-18
36	T (K)	2000											
37	0.005984363	0.119687268	0.345958477	7.737776342	8.730585181	0.029213949	1199.438041	0.007278896	0.382324093	47	63.88717846	0.005984363	0
38	T (K)	2100											
39	0.006301722	0.126034437	0.355013291	7.70425882	8.723295275	0.062731471	598.7654169	0.014568803	0.402727807	47	63.90758218	0.006301722	0
40	T (K)	2200											
41	0.006862688	0.137253755	0.370477739	7.64436707	8.710991622	0.122623221	324.1606119	0.026872456	0.438825508	47	63.94367988	0.006862688	8.67362E-18
42	T (K)	2300											
43	0.007764728	0.155294561	0.394074309	7.547103576	8.69199282	0.219886715	189.4866906	0.045871258	0.496956656	47	64.00181103	0.007764728	1.64799E-17
44	T (K)	2400											
45	0.009089358	0.181787153	0.426365047	7.403370726	8.664612577	0.363619565	118.2864549	0.0732511	0.582513003	47	64.08736737	0.009089358	2.08167E-17
46	T (K)	2500											
47	0.010985008	0.217900158	0.466797769	7.206480502	8.62751516	0.560509789	78.1839584	0.110348917	0.699507023	47	64.20436139	0.010985008	0
48	T (K)	2700											
49	0.016101689	0.322033778	0.567480201	6.637079853	8.517391051	1.129910438	38.63234963	0.220473027	1.039269402	47	64.54412377	0.016101689	0
50	T (K)	3000											
51	0.027610288	0.552205753	0.743105479	5.391845927	8.234816917	2.375144365	16.36987059	0.50304716	1.803173432	47	65.3080278	0.027610288	0

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	
31	P (Bar)	30	Lambda-1.03	Phi-0.97										
32	T (K)	1500												
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	0.005701404	0.171042107	0.413572372	7.766899571	8.73782428	9.07204E-05	219557.3009	3.37975E-05	0.364142929		47	63.8689973	0.005701404	0
36	T (K)	2000												
37	0.0059333392	0.178001757	0.421902544	7.743018734	8.731894515	0.023971557	1462.73612	0.005369562	0.37904823		47	63.8839026	0.0059333392	2.08167E-17
38	T (K)	2100												
39	0.006196192	0.185885773	0.431144724	7.715262155	8.725864298	0.051728136	727.1686908	0.01199978	0.395941628		47	63.9007396	0.006196192	6.93889E-18
40	T (K)	2200												
41	0.006665747	0.199972397	0.447182734	7.685124702	8.715589288	0.10186559	391.2759484	0.022274789	0.426147859		47	63.93100223	0.006665747	2.42861E-17
42	T (K)	2300												
43	0.007430904	0.222327131	0.472151597	7.582610891	8.699545049	0.1843884	227.029374	0.038319028	0.475431384		47	63.98028575	0.007430904	1.30104E-17
44	T (K)	2400												
45	0.008570022	0.257100666	0.507050595	7.458937801	8.676186987	0.308052491	140.6711451	0.061677091	0.548942461		47	64.05379683	0.008570022	0
46	T (K)	2500												
47	0.010142334	0.304270011	0.551606754	7.28733637	8.644299524	0.479653921	92.38861515	0.093564553	0.650686907		47	64.15554128	0.010142334	0
48	T (K)	2700												
49	0.014752785	0.442583552	0.665269533	6.78210715	8.549098723	0.984883141	45.289554	0.188765355	0.950901918		47	64.45575629	0.014752785	0
50	T (K)	3000												
51	0.025215495	0.756464861	0.869749884	5.643120293	8.304432265	2.123869998	19.1597202	0.433431813	1.642728576		47	65.14758294	0.025215495	0

	CK	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ
31	P (Bar)	40	Lambda-1.03	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.005701267	0.228050639	0.477546541	7.766911724	8.737829612	7.85672E-05	253519.9076	3.4466E-05	0.364134187	47	63.86898856	0.005701267	-1.04083E-17
36	T (K)	2000											
37	0.005902774	0.236110946	0.485912488	7.746168076	8.732680428	0.020822215	1684.658596	0.00518365	0.377080602	47	63.88193497	0.005902774	5.93275E-16
38	T (K)	2100											
39	0.006132341	0.245293654	0.495271293	7.721920929	8.727416143	0.045069362	835.3245631	0.010447934	0.391836318	47	63.89669069	0.006132341	0
40	T (K)	2200											
41	0.006545364	0.26181454	0.511678161	7.677817125	8.718390699	0.089173166	447.7081572	0.019473379	0.418400943	47	63.92325531	0.006545364	0
42	T (K)	2300											
43	0.007224427	0.288977081	0.537565886	7.60457019	8.704189972	0.162420101	258.4831804	0.033674106	0.462124773	47	63.96697914	0.007224427	0
44	T (K)	2400											
45	0.008245091	0.329803654	0.574285342	7.493734175	8.683362786	0.273256116	159.3239824	0.054501291	0.527956374	47	64.03281074	0.008245091	0
46	T (K)	2500											
47	0.009666589	0.386663549	0.621822763	7.338510763	8.654764322	0.428479528	104.1490946	0.083099756	0.619867312	47	64.12472168	0.009666589	0
48	T (K)	2700											
49	0.013885032	0.555401298	0.745252506	6.875678217	8.568966054	0.891312074	50.73455484	0.168898024	0.894182719	47	64.39903709	0.013885032	1.38778E-17
50	T (K)	3000											
51	0.023632801	0.945312038	0.972271587	5.810664408	8.348097037	1.956325883	21.41817078	0.38976704	1.537124132	47	65.0419785	0.023632801	0

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	D'W	DX
31	P (Bar)	50	Lambda-1.03	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.005701175	0.285058729	0.533908915	7.766920018	8.73783325	7.02733E-05	283441.5647	3.08276E-05	0.36412822	47	63.86898259	0.005701175	0
36	T (K)	2000											
37	0.005881777	0.294088828	0.542299574	7.748327921	8.733219125	0.01866237	1880.152622	0.004644952	0.375731331	47	63.8805857	0.005881777	-1.64799E-17
38	T (K)	2100											
39	0.006088345	0.304417268	0.551740218	7.726509599	8.72848431	0.040480692	930.5650513	0.009379768	0.3890079	47	63.89386227	0.006088345	0
40	T (K)	2200											
41	0.006461837	0.323091827	0.56841167	7.68662546	8.720330448	0.080364832	497.3488432	0.01753363	0.413026901	47	63.91788127	0.006461837	1.12757E-17
42	T (K)	2300											
43	0.007079962	0.353998087	0.594977383	7.619945976	8.707427989	0.147044315	286.088925	0.030436089	0.452817872	47	63.95767224	0.007079962	-1.21431E-17
44	T (K)	2400											
45	0.008015826	0.400791305	0.633080805	7.518299438	8.688395773	0.248690853	175.6356077	0.049468305	0.513157249	47	64.01801162	0.008015826	0
46	T (K)	2500											
47	0.009328353	0.466417672	0.682947781	7.374924596	8.662137437	0.392065695	114.3869238	0.07572664	0.597973838	47	64.10282821	0.009328353	0
48	T (K)	2700											
49	0.013260071	0.663003553	0.814250301	6.943195304	8.583024487	0.823794988	55.43171775	0.154839591	0.853394959	47	64.35824933	0.013260071	0
50	T (K)	3000											
51	0.022471019	1.123550944	1.05997686	5.934341799	8.37902295	1.832648492	23.35023025	0.358841128	1.45982248	47	64.96467685	0.022471019	0

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-103	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.005701106	0.342066361	0.584864396	7.76692614	8.737835936	6.41509E-05	310492.8104	2.81418E-05	0.364123816	47	63.86897819	0.005701106	0
36	T (K)	2000											
37	0.005866223	0.351973391	0.593273454	7.749927864	8.733618024	0.017062428	2056.879065	0.004246053	0.37473191	47	63.87958628	0.005866223	1.21431E-17
38	T (K)	2100											
39	0.006055643	0.363338579	0.602775729	7.72992064	8.729277691	0.037069651	1016.641544	0.008586387	0.386305689	47	63.89176006	0.006055643	6.85216E-17
40	T (K)	2200											
41	0.006399429	0.383965739	0.619649691	7.693207595	8.721777612	0.073782636	542.1810865	0.016086466	0.409012251	47	63.91396662	0.006399429	0
42	T (K)	2300											
43	0.006971331	0.418279831	0.646745569	7.631510706	8.70985641	0.135479586	310.9811393	0.028007668	0.445821297	47	63.95067567	0.006971331	0
44	T (K)	2400											
45	0.007842283	0.470536972	0.685956976	7.536901583	8.692189045	0.230088709	190.3050437	0.045675032	0.50195954	47	64.00681391	0.007842283	0
46	T (K)	2500											
47	0.009070765	0.544245892	0.73773023	7.402673033	8.66771561	0.364317259	123.5624362	0.070148468	0.581310533	47	64.0861649	0.009070765	0
48	T (K)	2700											
49	0.012779207	0.766752438	0.875644013	6.995214511	8.593701587	0.77177578	59.6112175	0.144162491	0.822046805	47	64.32690117	0.012779207	0
50	T (K)	3000											
51	0.0215639	1.233833979	1.137468232	6.031292483	8.402531246	1.735697808	25.05728769	0.335332832	1.39959239	47	64.90444736	0.0215639	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-103	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.005701053	0.399073692	0.631722796	7.766930899	8.737838023	5.93925E-05	335368.9982	2.60544E-05	0.364120393	47	63.86897476	0.005701053	0
36	T (K)	2000											
37	0.005854103	0.40978722	0.640146249	7.751174665	8.733928789	0.015815626	2219.387044	0.003935289	0.373953127	47	63.8788075	0.005854103	1.56125E-17
38	T (K)	2100											
39	0.006030091	0.4221064	0.64969716	7.732585969	8.729897238	0.034404322	1095.779231	0.007966839	0.385263251	47	63.89011762	0.006030091	4.93529E-16
40	T (K)	2200											
41	0.006350469	0.444532855	0.666732972	7.698371943	8.72291166	0.068618349	583.3780155	0.014952418	0.405863053	47	63.91071742	0.006350469	1.73472E-17
42	T (K)	2300											
43	0.006885668	0.481996768	0.694259871	7.64063192	8.711767496	0.126358371	333.8279164	0.026096582	0.440305146	47	63.94515952	0.006885668	0
44	T (K)	2400											
45	0.007704686	0.539328013	0.734389551	7.551655107	8.695186575	0.215335185	203.7416932	0.042677502	0.493084013	47	63.99793838	0.007704686	0
46	T (K)	2500											
47	0.008854593	0.620584541	0.787771884	7.424795964	8.672138134	0.342194327	131.9439128	0.065725943	0.568037805	47	64.07289217	0.008854593	2.51535E-16
48	T (K)	2700											
49	0.012392717	0.867490177	0.931391527	7.037067194	8.602196317	0.729923097	63.406341	0.135667761	0.796873099	47	64.30172747	0.012392717	0
50	T (K)	3000											
51	0.020826078	1.457825481	1.20740444	6.110385709	8.421250852	1.656604582	26.5979124	0.316613226	1.350686574	47	64.85554094	0.020826078	0

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-103	Phi-0.97									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.00570101	0.456080783	0.675337532	7.766934734	8.737839706	5.55568E-05	358523.1892	2.43718E-05	0.364117634	47	63.868972	0.00570101	1.82146E-17
36	T (K)	2000											
37	0.005844313	0.467545034	0.683772648	7.752181817	8.734179764	0.014808474	2370.639769	0.003684313	0.373324063	47	63.87817843	0.005844313	4.68375E-17
38	T (K)	2100											
39	0.006009407	0.480752589	0.693363245	7.734743662	8.730398539	0.03224663	1169.426449	0.007465539	0.383933754	47	63.88878812	0.006009407	0
40	T (K)	2200											
41	0.006310705	0.504856407	0.710532481	7.702566714	8.723831895	0.064423577	621.7017105	0.014032183	0.40330555	47	63.90815932	0.006310705	0
42	T (K)	2300											
43	0.006815797	0.545263726	0.738419749	7.648072861	8.713323772	0.118917431	355.0617523	0.024540305	0.435806538	47	63.94066091	0.006815797	7.80626E-18
44	T (K)	2400											
45	0.007591935	0.607354786	0.779329703	7.563747508	8.697636249	0.203242783	216.2094395	0.040227828	0.485812976	47	63.99066734	0.007591935	1.12757E-17
46	T (K)	2500											
47	0.008696555	0.695724413	0.834100961	7.443009895	8.675762853	0.323980397	139.70357	0.062101225	0.557118481	47	64.06197285	0.008696555	0
48	T (K)	2700											
49	0.012072291	0.96578327	0.982742728	7.07179399	8.609180956	0.695196302	66.90217672	0.128683122	0.776017382	47	64.28087175	0.012072291	1.82146E-16
50	T (K)	3000											
51	0.020208226	1.61658089	1.271478702	6.176775675	8.436656098	1.590214616	28.00940432	0.30120798	1.309788968	47	64.81464334	0.020208226	0

10-80 Bar Polynomial equations-

$$\begin{aligned}
& y = 0.0000000000000000160620571021x^6 - 0.000000000000002639632549361870x^5 + \\
& 0.000000000017007777132589200000x^4 - 0.000000055047877718602000000000x^3 + \\
& 0.000095418850872603900000000000x^2 - 0.084820573293680700000000000000x + \\
10 \quad & 30.802492474699600000000000000000 \\
& y = 0.0000000000000000165517740357x^6 - 0.000000000000002664222185546160x^5 + \\
& 0.000000000017064828945874900000x^4 - 0.000000055495836848288700000000x^3 + \\
& 0.000097331951428939100000000000x^2 - 0.087950324595811900000000000000x + \\
20 \quad & 32.546593118151400000000000000000 \\
& y = 0.0000000000000000153835785221x^6 - 0.000000000000002480137472425850x^5 + \\
& 0.000000000015961027613131900000x^4 - 0.000000052267800491287700000000x^3 + \\
& 0.000092438983112805700000000000x^2 - 0.084301624899783100000000000000x + \\
30 \quad & 31.511250673510900000000000000000 \\
& y = 0.0000000000000000138404467553x^6 - 0.000000000000002251303004052460x^5 + \\
& 0.000000000014612676297617300000x^4 - 0.000000048240119859727200000000x^3 + \\
& 0.000085973734541826200000000000x^2 - 0.078984358914737000000000000000x + \\
40 \quad & 29.752819270477700000000000000000 \\
& y = 0.0000000000000000122814215693x^6 - 0.000000000000002023746734174790x^5 + \\
& 0.000000000013277181918961100000x^4 - 0.000000044220599438697500000000x^3 + \\
& 0.000079407041815447400000000000x^2 - 0.073437453738501500000000000000x + \\
50 \quad & 27.852150347848400000000000000000 \\
& y = 0.0000000000000000108123818402x^6 - 0.000000000000001810692287744370x^5 + \\
& 0.000000000012028037420139200000x^4 - 0.000000040444365069963000000000x^3 + \\
& 0.000073182026691267600000000000x^2 - 0.068111041274945800000000000000x + \\
60 \quad & 25.997264923390600000000000000000 \\
& y = 0.0000000000000000094609311666x^6 - 0.000000000000001615269871114520x^5 + \\
& 0.000000000010882167748152200000x^4 - 0.000000036969353168244100000000x^3 + \\
& 0.000067420549832647900000000000x^2 - 0.063142463861774600000000000000x + \\
70 \quad & 24.250468069038200000000000000000 \\
& y = 0.0000000000000000082280904380x^6 - 0.000000000000001437238136285730x^5 + \\
& 0.000000000009837662560977470000x^4 - 0.000000033793704394919600000000x^3 + \\
& 0.000062133474429053700000000000x^2 - 0.058558149235831900000000000000x + \\
80 \quad & 22.628405713623000000000000000000
\end{aligned}$$

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV
1	Temp	10	20	30	40	50	60	70	80
2	1500	0.364190694	0.364157594	0.364142929	0.364134187	0.36412822	0.364123816	0.364120393	0.364117634
3	2000	0.389608573	0.382324093	0.37904823	0.377080602	0.375731331	0.37473191	0.373953127	0.373324063
4	2100	0.41761725	0.402727807	0.395941628	0.391836318	0.3890079	0.386905689	0.385263251	0.383933754
5	2200	0.46615093	0.438825508	0.426147859	0.418400943	0.413026901	0.409012251	0.405863053	0.40330555
6	2300	0.542469916	0.496956656	0.475431384	0.462124773	0.452817872	0.445821297	0.440305146	0.435806538
7	2400	0.652252834	0.582513003	0.548942461	0.527956374	0.513157249	0.501959354	0.493084013	0.485812976
8	2500	0.799392764	0.699507023	0.650686907	0.619867312	0.597973838	0.581310533	0.568037805	0.557118481
9	2700	1.215289491	1.039269402	0.950901918	0.894182719	0.853394959	0.822046805	0.796873099	0.776017382
10	3000	2.109365914	1.803173432	1.642728576	1.537124132	1.45982248	1.39959299	1.350686574	1.309788968

Lambda 1.11, Phi-0.9

	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
31	P (Bar)	10	Lambda-1.11	Phi-0.9									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.01787083	0.178708304	0.422739049	7.207124851	8.11	8.23566E-05	224423.7064	3.61284E-05	1.238797981	47	63.5541133	0.019432019	0.001621189
36	T (K)	2000											
37	0.018084654	0.180846543	0.425260559	7.185138438	8.102612495	0.022068769	1474.378358	0.005495613	1.25252093	47	63.56783624	0.01970369	0.001619036
38	T (K)	2100											
39	0.018333668	0.183336683	0.428178331	7.158876914	8.096896142	0.048330293	722.1655736	0.01121966	1.268509868	47	63.58382518	0.019950197	0.001616529
40	T (K)	2200											
41	0.018794621	0.187946208	0.433527632	7.109746261	8.086789383	0.097460946	379.3280077	0.021318725	1.298128574	47	63.61344389	0.020406513	0.001611892
42	T (K)	2300											
43	0.019582747	0.195827474	0.442523981	7.024942424	8.070181335	0.182264783	212.783231	0.037926773	1.348834517	47	63.66414983	0.02118672	0.001603973
44	T (K)	2400											
45	0.020820585	0.20820585	0.456295792	6.890955888	8.044560031	0.316251319	126.5901417	0.063548077	1.428638437	47	63.74395375	0.02241214	0.001591555
46	T (K)	2500											
47	0.02261402	0.226140199	0.475542006	6.695973933	8.007571768	0.511227275	79.64853058	0.10053634	1.544620546	47	63.85933586	0.024187631	0.001573611
48	T (K)	2700											
49	0.028119834	0.281198342	0.53028138	6.096516654	7.889560517	1.110690553	36.09396553	0.218547591	1.903357811	47	64.21867313	0.023638637	0.001518863
50	T (K)	3000											
51	0.040594941	0.405949415	0.637141597	4.76110425	7.57	2.446102957	14.03559224	0.539260973	2.731420704	47	65.04673602	0.041991684	0.001396723

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH
31	P (Bar)	20	Lambda-1.11	Phi-0.9									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.01787056	0.357411199	0.597838773	7.207148972	8.108082561	5.82355E-05	317380.648	2.55469E-05	1.23878063	47	63.55409595	0.019491751	0.001621191
36	T (K)	2000											
37	0.018022144	0.360442879	0.600368953	7.191561218	8.10421462	0.015645989	2081.479159	0.003893488	1.248508478	47	63.56382379	0.019641809	0.001619685
38	T (K)	2100											
39	0.018199632	0.363992643	0.603318028	7.172840014	8.100147715	0.034367193	1017.556186	0.007960394	1.259902532	47	63.57521785	0.01981751	0.001617878
40	T (K)	2200											
41	0.018530795	0.370615908	0.608782316	7.137531829	8.092915063	0.069675378	532.6723506	0.015193045	1.28117295	47	63.59648827	0.020145341	0.001614546
42	T (K)	2300											
43	0.019104367	0.382087332	0.618132131	7.075778655	8.080920006	0.131428552	297.222654	0.027188103	1.318047066	47	63.63336238	0.020713145	0.001608778
44	T (K)	2400											
45	0.020022038	0.400440764	0.63280389	6.97634227	8.062185113	0.230864937	175.5587833	0.045922995	1.377132705	47	63.69244802	0.021621601	0.001599563
46	T (K)	2500											
47	0.021382951	0.427659012	0.65395643	6.82818379	8.034752251	0.379088828	109.5111625	0.073355857	1.464961081	47	63.7802764	0.022968873	0.001585923
48	T (K)	2700											
49	0.025738766	0.514775324	0.717478449	6.351916746	7.9454377	0.855290461	48.84378034	0.162670408	1.747719173	47	64.06303449	0.027281242	0.001542476
50	T (K)	3000											
51	0.036300856	0.726017127	0.852066387	5.206859717	7.697989837	2.00034749	18.77017043	0.410118271	2.443971619	47	64.75928693	0.037739323	0.001438466

	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	
31	P (Bar)		30 Lambda-1.11	Phi-0.9										
32	T (K)		1500											
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	0.01787044	0.536113204	0.732197517	7.207159658	8.108087249	4.75493E-05	388709.018	2.0859E-05	1.238772943		47	63.55408826	0.019491633	0.001621193
36	T (K)		2000											
37	0.017994349	0.539830476	0.734731567	7.19441737	8.104926355	0.012789837	2547.314344	0.003181754	1.246724534		47	63.56203985	0.019614294	0.001619945
38	T (K)		2100											
39	0.018139786	0.544193582	0.737694776	7.179075826	8.101596597	0.028131381	1244.196008	0.006511511	1.256060185		47	63.5713755	0.019758267	0.001618481
40	T (K)		2200											
41	0.018412133	0.552363993	0.743211944	7.150034499	8.095658909	0.057172708	650.2955864	0.012443199	1.273549692		47	63.58886501	0.020027873	0.00161574
42	T (K)		2300											
43	0.018886708	0.566601241	0.752729195	7.098926589	8.085768172	0.108280619	361.9423062	0.022339937	1.304049016		47	63.61936433	0.020497674	0.001610966
44	T (K)		2400											
45	0.019652887	0.589586622	0.767845442	7.015866727	8.070223888	0.19134048	213.0233609	0.03788422	1.353351089		47	63.6686664	0.021256156	0.001603268
46	T (K)		2500											
47	0.020802764	0.624082912	0.789989185	6.890527606	8.047289066	0.316679601	132.3152886	0.060819042	1.42748806		47	63.74280338	0.022394498	0.001591734
48	T (K)		2700											
49	0.024567539	0.737026176	0.858502287	6.478201863	7.971709605	0.729005344	58.44426016	0.136398503	1.671440662		47	63.98675598	0.026121666	0.001554127
50	T (K)		3000											
51	0.034053569	1.021607075	1.010745801	5.444074152	7.759607895	1.763133055	22.26571926	0.348500213	2.294555372		47	64.60987069	0.035514007	0.001460437

	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	
31	P (Bar)		40 Lambda-1.11	Phi-0.9										
32	T (K)		1500											
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	0.017870369	0.714814749	0.845467178	7.207166028	8.108090044	4.11791E-05	448841.6155	1.80645E-05	1.238768361		47	63.55408368	0.019491562	0.001621193
36	T (K)		2000											
37	0.01797775	0.719110011	0.848003544	7.196123144	8.105351212	0.011084063	2940.028288	0.002756896	1.245659218		47	63.56097453	0.019597862	0.001620112
38	T (K)		2100											
39	0.018103972	0.724158888	0.850975257	7.182807954	8.102462795	0.024399254	1435.254868	0.005645313	1.253761022		47	63.56907634	0.019722813	0.001618841
40	T (K)		2200											
41	0.018340857	0.733634293	0.856524543	7.157545958	8.097303662	0.049661249	749.4418447	0.010804446	1.268971586		47	63.5842863	0.019957314	0.001616457
42	T (K)		2300											
43	0.018755182	0.750207277	0.866145067	7.112913717	8.088686429	0.09428749	416.477194	0.019421679	1.295593323		47	63.61090864	0.020367471	0.001612289
44	T (K)		2400											
45	0.019427895	0.777115799	0.881541717	7.039972117	8.075090084	0.16723509	244.5661186	0.033018024	1.338865296		47	63.65418061	0.021033423	0.001605528
46	T (K)		2500											
47	0.020445283	0.817811318	0.904329209	6.929021934	8.054928364	0.278185274	151.4660992	0.053179744	1.404421247		47	63.71973656	0.0220406	0.001595317
48	T (K)		2700											
49	0.023827322	0.953092874	0.976264756	6.558220101	7.987918858	0.648987106	66.4611758	0.12018925	1.623326916		47	63.93864223	0.025388824	0.001561502
50	T (K)		3000											
51	0.032578362	1.303134466	1.141549152	5.60107936	7.798013246	1.606127847	25.14718627	0.310094862	2.196850093		47	64.51216541	0.034053269	0.001474907

	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	
31	P (Bar)		50 Lambda-1.11	Phi-0.9										
32	T (K)		1500											
33														
34	Guess n5/nT	(n5/nT).P	((n5/nT).P) ^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error	
35	0.01787032	0.893516	0.945259752	7.207170375	8.108091951	3.68317E-05	501819.4974	1.61574E-05	1.238765233		47	63.55408055	0.019491514	0.001621194
36	T (K)		2000											
37	0.01796641	0.898320486	0.947797703	7.197288585	8.105641399	0.009318622	3286.014637	0.002466709	1.244931404		47	63.56024672	0.019586636	0.001620226
38	T (K)		2100											
39	0.018079472	0.903973584	0.950775254	7.185361306	8.103054997	0.021845901	1603.577544	0.005053111	1.252188245		47	63.56750356	0.019698559	0.001619088
40	T (K)		2200											
41	0.018291981	0.91459305	0.956346721	7.16269752	8.09843007	0.044509687	836.7842537	0.009678038	1.265832602		47	63.58114792	0.01990893	0.001616949
42	T (K)		2300											
43	0.018664638	0.933231886	0.966039278	7.122555088	8.090690432	0.084652119	464.5103263	0.017417676	1.289773637		47	63.60508895	0.020277837	0.001613199
44	T (K)		2400											
45	0.019272124	0.963606188	0.981634447	7.056668132	8.078444462	0.150539075	272.3348447	0.029663646	1.328840099		47	63.64415541	0.020879216	0.001607093
46	T (K)		2500											
47	0.020195949	1.009797467	1.004886793	6.955888827	8.060218554	0.25131838	168.308489	0.047889554	1.388342706		47	63.70365802	0.021793767	0.001597818
48	T (K)		2700											
49	0.023301071	1.165085574	1.079391298	6.615131477	7.999247733	0.59207573	73.48172137	0.108860375	1.589206791		47	63.90452211	0.024868456	0.001566744
50	T (K)		3000											
51	0.031501729	1.57508646	1.255024486	5.71625861	7.825072304	1.490948598	27.6469344	0.283035804	2.12573094		47	64.44104625	0.03298722	0.00148549

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
31	P (Bar)	60	Lambda-1.11	Phi-0.9									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.017870284	1.072217041	1.035479136	7.207173585	8.108093358	3.36227E-05	549715.1637	1.47496E-05	1.238762925	47	63.55407824	0.019491478	0.001621194
36	T (K)	2000											
37	0.017958032	1.077481904	1.038018258	7.19814959	8.105855737	0.009057617	3598.809301	0.002252372	1.244393733	47	63.55970905	0.019578342	0.00162031
38	T (K)	2100											
39	0.018061355	1.083681285	1.041000137	7.187249477	8.103492708	0.01995773	1755.750831	0.0046154	1.251025304	47	63.56634062	0.019680625	0.00161927
40	T (K)	2200											
41	0.018255778	1.095346683	1.046588115	7.16651367	8.099263642	0.040693537	915.7436691	0.008844466	1.26350774	47	63.57882306	0.019873091	0.001617313
42	T (K)	2300											
43	0.018597383	1.115842958	1.056334681	7.12971334	8.092176368	0.077493867	507.9279679	0.01593174	1.285451542	47	63.60076686	0.020211259	0.001613876
44	T (K)	2400											
45	0.019155937	1.149356217	1.072080322	7.069125014	8.080938645	0.138082193	297.4272437	0.027169464	1.321364567	47	63.63667998	0.020764197	0.00160826
46	T (K)	2500											
47	0.020008951	1.200537065	1.095690223	6.976048394	8.064165809	0.231158813	183.5171555	0.043942299	1.376289295	47	63.69160461	0.021608645	0.001599694
48	T (K)	2700											
49	0.022902072	1.374142322	1.17223049	6.658452821	8.007762639	0.548754387	79.80193508	0.100345469	1.563288667	47	63.87860398	0.024472806	0.001570734
50	T (K)	3000											
51	0.030665385	1.839923118	1.356437657	5.806057616	7.845548047	1.401149592	29.88096516	0.262560061	2.070593565	47	64.38590888	0.032159111	0.001493725

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
31	P (Bar)	70	Lambda-1.11	Phi-0.9									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.017870256	1.250917924	1.118444421	7.207176079	8.108094453	3.11286E-05	593759.7744	1.36555E-05	1.238761131	47	63.55407645	0.01949145	0.001621194
36	T (K)	2000											
37	0.017951516	1.256806149	1.120984456	7.198819182	8.106022396	0.008388026	3886.453107	0.002085712	1.243975608	47	63.55923092	0.019571892	0.001620376
38	T (K)	2100											
39	0.018047256	1.263307906	1.123969709	7.188718944	8.103833229	0.018488263	1895.68731	0.004274879	1.25102031	47	63.56543563	0.019666668	0.001619412
40	T (K)	2200											
41	0.018227568	1.275923745	1.129570602	7.169487524	8.099912733	0.037719683	988.3516955	0.008195375	1.261696268	47	63.57701158	0.019845165	0.001617597
42	T (K)	2300											
43	0.018544863	1.298140401	1.139359645	7.135303969	8.09335196	0.071903238	547.8496918	0.014772912	1.282076814	47	63.59739213	0.020159267	0.001614404
44	T (K)	2400											
45	0.019064914	1.334543945	1.15522463	7.078886179	8.082888014	0.128321028	320.4939691	0.025220094	1.3155093	47	63.63082461	0.020674089	0.001609175
46	T (K)	2500											
47	0.019861818	1.390327287	1.179121405	6.991915931	8.067259373	0.215291276	197.4910441	0.040848735	1.366808745	47	63.68212406	0.021462989	0.001601171
48	T (K)	2700											
49	0.022584152	1.580890624	1.25733473	6.692945631	8.014476211	0.514261576	85.59557644	0.093631897	1.542685475	47	63.85800079	0.024158061	0.001573909
50	T (K)	3000											
51	0.029988264	2.099178461	1.448854189	5.878960213	7.861786901	1.328246994	31.91680893	0.246321207	2.026022839	47	64.34133815	0.031488665	0.001500401

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN
31	P (Bar)	80	Lambda-1.11	Phi-0.9									
32	T (K)	1500											
33													
34	Guess n5/nT	(n5/nT).P	((n5/nT).P)^{1/2}	n1	n2	n3	n2/n4	n4	n5	n6	nTotal	Calc n5/nT	Error
35	0.017870234	1.429618681	1.195666626	7.207178089	8.108095335	2.91182E-05	634755.4986	1.27736E-05	1.238759685	47	63.554075	0.019491428	0.001621195
36	T (K)	2000											
37	0.017946262	1.435700964	1.198207396	7.19935919	8.106156785	0.007849017	4154.185042	0.001951323	1.243638409	47	63.55895372	0.019566691	0.001620429
38	T (K)	2100											
39	0.018035879	1.442870331	1.201195376	7.189904713	8.104107929	0.017302494	2025.936121	0.004000179	1.249390075	47	63.56470539	0.019655406	0.001619527
40	T (K)	2200											
41	0.018204781	1.456382491	1.206806733	7.17188977	8.100436744	0.035317438	1055.931755	0.007671364	1.260233139	47	63.57554845	0.019822807	0.001617826
42	T (K)	2300											
43	0.018502367	1.480189388	1.216630342	7.139827998	8.094271853	0.067379209	585.0045334	0.013836255	1.279346471	47	63.59466179	0.020117199	0.001614832
44	T (K)	2400											
45	0.018991072	1.51928575	1.2325931	7.086806188	8.084466435	0.120401019	341.9583037	0.023641673	1.310760085	47	63.6260754	0.020600989	0.001609917
46	T (K)	2500											
47	0.019742038	1.579363036	1.256727113	7.004837348	8.069769946	0.202369859	210.4892241	0.038338162	1.359092749	47	63.67440806	0.021344411	0.001602373
48	T (K)	2700											
49	0.022322958	1.785836619	1.336351982	6.721303371	8.019952384	0.485903836	90.97483385	0.088155724	1.525768519	47	63.84108383	0.023899477	0.001576519
50	T (K)	3000											
51	0.029423632	2.353890566	1.53423941	5.939882934	7.875101497	1.267324273	33.79775995	0.233006611	1.988904181	47	64.3042195	0.030923606	0.001505974

10-80 Bar Polynomial equations-

$$\begin{aligned}
& y = -0.0000000000000000037904566062x^6 - 0.0000000000000000310091438675493x^5 + \\
& 0.000000000006249363754703540000x^4 - 0.000000030567875928661100000000x^3 + \\
& 0.000067672579536098200000000000x^2 - 0.071653717686436300000000000000x + \\
10 \quad & 30.669386660158400000000000000000 \\
& y = -0.00000000000000000220768178851x^6 + 0.00000000000000002395956010754930x^5 - \\
& 0.0000000000010020407442957900000x^4 + 0.000000020295260954628700000000x^3 - \\
& 0.000019716161942856000000000000x^2 + 0.006767790655974900000000000000x + \\
20 \quad & 1.89828769301377000000000000000000 \\
& y = -0.00000000000000000274830110670x^6 + 0.00000000000000003249619845512260x^5 - \\
& 0.0000000000015418551895947100000x^4 + 0.000000037843439488018400000000x^3 - \\
& 0.000050806766079611500000000000x^2 + 0.035363946862760600000000000000x - \\
30 \quad & 8.80580187895270000000000000000000 \\
& y = -0.00000000000000000293326893449x^6 + 0.00000000000000003578050042046420x^5 - \\
& 0.0000000000017663102835935400000x^4 + 0.000000045539560701638500000000x^3 - \\
& 0.000064973049666213700000000000x^2 + 0.048768941927324900000000000000x - \\
40 \quad & 13.93385788259760000000000000000000 \\
& y = -0.00000000000000000298164045339x^6 + 0.00000000000000003698745695944370x^5 - \\
& 0.0000000000018630596963415200000x^4 + 0.000000049170404213921100000000x^3 - \\
& 0.000072049510622838400000000000x^2 + 0.055731228953308900000000000000x - \\
50 \quad & 16.67284669786700000000000000000000 \\
& y = -0.00000000000000000296911294841x^6 + 0.00000000000000003723329664390500x^5 - \\
& 0.0000000000018990490391980100000x^4 + 0.000000050825849681009900000000x^3 - \\
& 0.000075624634684015200000000000x^2 + 0.059471064615541300000000000000x - \\
60 \quad & 18.20469547420770000000000000000000 \\
& y = -0.00000000000000000292748317769x^6 + 0.00000000000000003699572582067700x^5 - \\
& 0.0000000000019033674540983000000x^4 + 0.000000051425164876700600000000x^3 - \\
& 0.000077292619120472300000000000x^2 + 0.061430778053348000000000000000x - \\
70 \quad & 19.06238505731140000000000000000000 \\
& y = -0.00000000000000000287177645700x^6 + 0.00000000000000003650537133647240x^5 - \\
& 0.0000000000018902960034926800000x^4 + 0.000000051425571567271400000000x^3 - \\
& 0.000077854544647891700000000000x^2 + 0.062341102594155900000000000000x - \\
80 \quad & 19.51774615867950000000000000000000
\end{aligned}$$

N5 values-

	CN	CO	CP	CQ	CR	CS	CT	CU	CV
1	Temp	10	20	30	40	50	60	70	80
2	1500	1.238797981	1.23878063	1.238772943	1.238768361	1.238765233	1.238762925	1.238761131	1.238759685
3	2000	1.25252093	1.248508478	1.246724534	1.245659218	1.244931404	1.244393733	1.243975608	1.243638409
4	2100	1.268509868	1.259902532	1.256060185	1.253761022	1.252188245	1.251025304	1.25012031	1.249390075
5	2200	1.298128574	1.28117295	1.273549632	1.268971586	1.265832602	1.26350774	1.261696268	1.260233139
6	2300	1.348834517	1.318047066	1.304049016	1.295593323	1.289773637	1.285451542	1.282076814	1.279346471
7	2400	1.428638437	1.377132705	1.353351089	1.338865296	1.328840099	1.321364567	1.3155093	1.310760085
8	2500	1.544620546	1.464961081	1.42748806	1.404421247	1.388342706	1.376289295	1.366808745	1.359092749
9	2700	1.903357811	1.747719173	1.671440662	1.623326916	1.589206791	1.563288667	1.542685475	1.525768519
10	3000	2.731420704	2.443971619	2.294555372	2.196850093	2.12573094	2.070593565	2.026022839	1.988904181