NBS TECHNICAL NOTE 622

Thermophysical Properties
of Helium-4 from 4 to 3000 R
with Pressures to 15000 PSIA

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THERMOPHYSICAL PROPERTIES OF HELIUM-4 FROM 4 TO 3000 R
WITH PRESSURES TO 15000 PSIA*

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Tables of thermophysical properties of helium 4 are presented for temperatures from 4 to 3000 Rankine for pressures to 15000 psia. The tables include, entropy, enthalpy, internal energy, density, volume, speed of sound, specific heat, thermal conductivity, viscosity, thermal diffusivity, Prandtl number and the dielectric constant for 74 isobars. Also included in the isobaric tables are quantities of special utility in heat transfer calculations: $(\partial P/\partial V)_T$, $(\partial P/\partial T)_\rho$, $V(\partial H/\partial V)_P$, $V(\partial P/\partial U)_V$, $-V(\partial P/\partial V)_T$, $1/V(\partial V/\partial T)_P$.

In addition to the isobaric tables, tables for the saturated vapor and liquid are given which include all of the above properties, plus the surface tension. Tables for the $P\rho T$ of the freezing liquid, $P\rho T$ of the lambda line, index of refraction and the derived Joule-Thomson inversion curve are also presented.

Key Words: Density; dielectric constant; enthalpy; entropy; equation of state; fixed points; heat transfer coefficients; helium 4; index of refraction; Joule-Thomson coefficient; lambda line; latent heat; melting point; Prandtl number; specific heats; speed of sound; surface tension; thermal conductivity; thermal diffusivity; vapor pressure; viscosity; volume.

1. Introduction

The purpose of this document is to assemble data on many of the properties of helium commonly used in engineering calculations over as wide a temperature and pressure range as is practical, and present these properties in a form which is convenient to the engineer. All of these properties have been critically evaluated and represent the "best values" for that property at this time.

The properties of helium 4 have been of great interest to the scientific and engineering community for many years. Much of the interest, and consequently the work, has been in the more spectacular properties of helium II, the superfluid phase. The properties of the superfluid are not included here except for the $P\rho T$ of the boundary where the transition to the superfluid begins.

2. Thermodynamic and Related Properties

2.1 PVT Surface

The PVT surface described by McCarty (1972) was used to calculate all of the thermodynamic and related properties. The tables given here are essentially the same as those found in the referenced document. Figure 1 shows the range of PT covered by these tables, and table 1 gives estimates of uncertainties in density.

Table 1. Uncertainties in the PVT Data

Temperature Range	Pressure Range	Uncertainty in Density	
		Average	Maximum
2 - 20 K	0 - 2 atm	0.1%	0.5% } (except in
2 - 20 K	2 - 1000 atm	0.5%	1.5% } critical region)
Critical region	$T_c \pm 5\%, \rho_c \pm 20\%$	3%	8%
20 - 70 K	0 - 20 atm	0.5%	1%
20 - 70 K	20 - 1000 atm	1%	2% (no reliable experimental data)
70 - 150 K	0 - 100 atm	0.1%	0.5%
70 - 150 K	100 - 1000 atm	0.5%	2%
150 - 400 K	0 - 100 atm	0.05%	0.2%
150 - 400 K	100 - 1000 atm	0.1%	1%
400 - 1500 K	0 - 100 atm	0.1%	0.5%
400 - 1500 K	100 - 1000 atm	.2%	2%
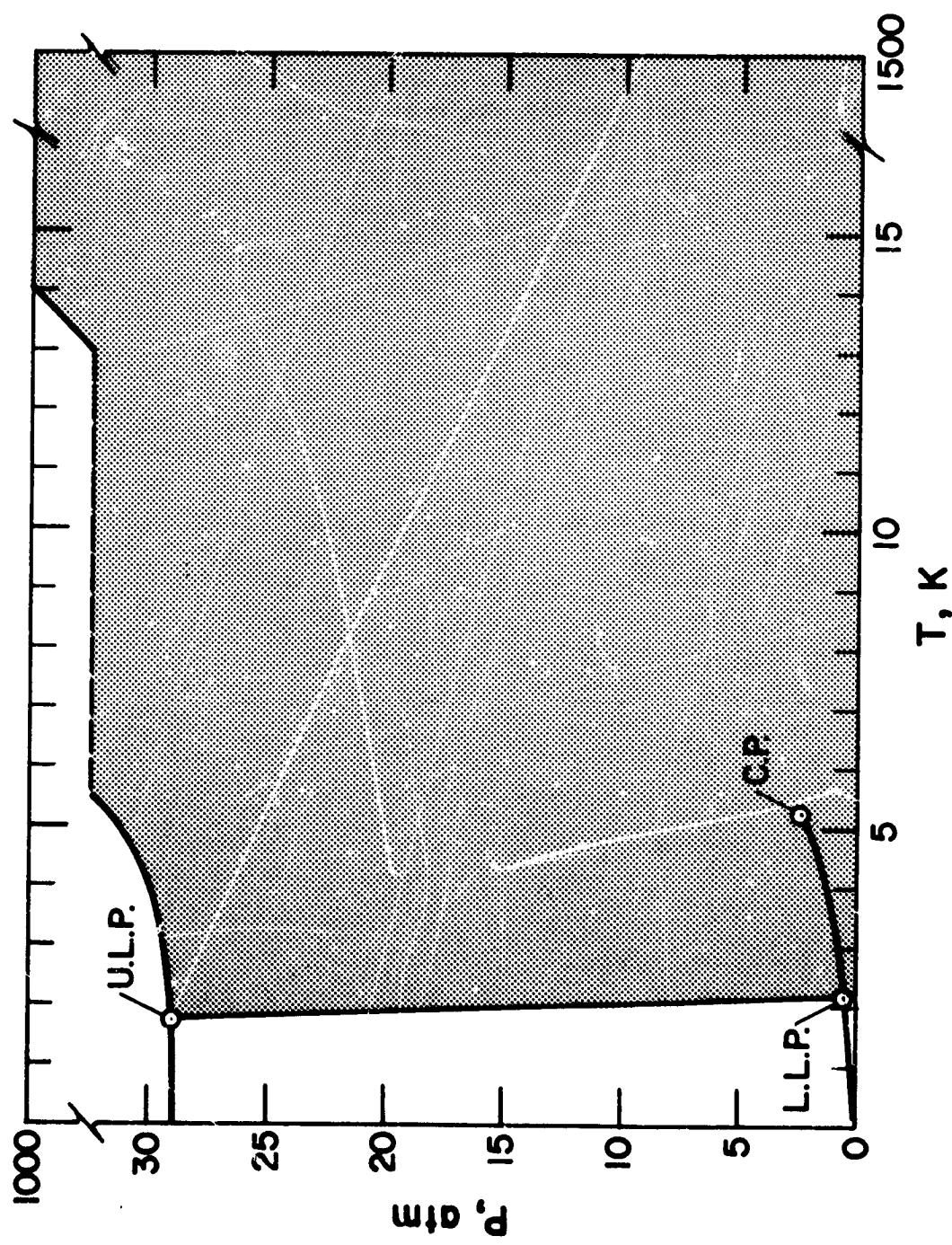
Figure 1. Range of PT Covered

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2.2 Derived Thermodynamic Properties

The enthalpy, H, speed of sound, W, entropy, S, and the internal energy, U, were calculated directly from the equations taken from McCarty (1972) and should be identical to those of McCarty when the proper unit conversions are applied.

2.3 Related Properties

A number of parameters such as the specific heat input $[V(\partial H/\partial V)_P]$ are of use to the engineer. Several of the more useful quantities of this kind have been tabulated here for the convenience of the user. These quantities have been derived from the equation of state in the following manner.

Specific heat input

$$\theta = V \left(\frac{\partial H}{\partial V} \right)_P = \rho \, C_p \left[\left(\frac{\partial P}{\partial \rho} \right)_T / \left(\frac{\partial P}{\partial T} \right)_V \right] \tag{1}$$

Energy derivative

$$\phi = V \left(\frac{\partial P}{\partial U} \right)_V = \frac{V}{C_v} \left(\frac{\partial P}{\partial T} \right)_V \tag{2}$$

Isothermal bulk modulus

$$\alpha = V \left(\frac{\partial P}{\partial V} \right)_T = -\rho \left(\frac{\partial P}{\partial \rho} \right)_T \tag{3}$$

Volume expansivity

$$\beta = \frac{1}{V} \left(\frac{\partial V}{\partial T} \right)_P = -\frac{1}{\rho} \left(\frac{\partial P}{\partial T} \right)_\rho / \left(\frac{\partial P}{\partial \rho} \right)_T \tag{4}$$

2.4 Heat Capacities

The heat capacities, C_V, C_P which appear in this document are taken from McCarty (1972). Except for the critical region and near the boundaries of phase changes, the uncertainty of the tabulated specific heats is estimated to be no greater than 5%.

At the critical point, and along the lambda line, the specific heats become anomalous and no realistic estimates of accuracy may be made.

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3. Transport Properties

3.1 Thermal Conductivity, 300 K and Below

For temperatures below 300 K, the thermal conductivity for helium-4 has been calculated using the following equations.

$$\lambda = \lambda_o(T) \, \lambda_y(\rho, T) + \lambda_c(\rho, T) \tag{5}$$

where $\lambda_o(T)$ is the dilute gas contribution, $\lambda_y(\rho, T)$ corrects the dilute gas value for increasing densities and $\lambda_c(\rho, T)$ predicts the enhancement in thermal conductivity in the region near the critical point. The dilute gas contribution, $\lambda_o(T)$ for this temperature region has been calculated from

$$\lambda_o(T) = e^{Z(\ln T)} \tag{6}$$

If $x = \ln T$, then

$$Z(T) = -4.3611622157 + 1.9250159286 \, x - 0.52544120165 \, x^2 + 0.090045763885x^3$$
$$-0.0054773874708x^4 \tag{7}$$

where T is in Kelvin and λ_o is in mW/cm-K.

The $\lambda_y(\rho, T)$ of equation (5) is given by

$$\lambda_y(\rho, T) = e^{(B(T)\rho + C(T)\rho^2)} \, , \tag{8}$$

if $x = \ln T$, then

$$B(T) = EXP(4.7470660612 - 5.3641468153x + 3.4639703698x^2 - 1.0702455443x^3$$
$$+ 0.1571349306x^4 - 0.0089212140047x^5 \tag{9}$$

and

$$C(T) = 2.2109006708 + 187.74174808/T - 1281.0947055/T^2 + 3645.2393216/T^3$$
$$- 3986.6937948/T^4 \tag{10}$$

where T is in Kelvin and ρ is in g/cm^3. The $\lambda_c(\rho, T)$ of equation (5) is given by

$$\lambda_c(\rho, T) = 0.000649578 \, \Delta C_p(\rho, T) \tag{11}$$

where the ΔC_p is the C_p at ρ and T minus the C_p at ρ and T = 11.83 K. For T > 11.83 K, $\rho > .12$ g/cm^3 or ΔC_p negative, $\lambda_c(\rho, T)$ is taken to be zero. The units of C_p must be J/mol-K and the resulting units of thermal conductivity are mW/cm-K. There are no known thermal conductivity measurements for helium-4 in the region of the critical

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point, and equation (11) is based on values scaled from hydrogen. The other term in equation (5), the λ_o (T) $\lambda_y(\rho, T)$ term relies heavily on two sources of experimental data, Golubev and Shpagina (1966) and Kerrisk (1968). These data were used by Roder (1971) and Arp (1971) to determine equations (7, 9, 10). Figure 2 shows the pressure and temperature regions covered by these two sources and figures 3 and 4 show typical differences, including the maximum differences, between the calculated and experimental conductivities.

3.2 Thermal Conductivity, 300 K and Above

When correlating thermal conductivity data it is common procedure to separate the equation into additive parts, with the $\lambda_o(T)$, or dilute gas contribution being a function of temperature only and $\lambda_E(\rho, T)$, called the excess or dense gas contribution being a function of density and temperature. For the heavier fluids, the temperature dependence of $\lambda_E(\rho, T)$ is so slight that it is usually neglected; however for helium this is not the case, and although equation (5) is multiplicative rather than additive, it does take into account the temperature dependence of the excess function. Since no experimental data above 300 K were used in obtaining the various parts of equation (5) it was not used for temperatures above 300 K. For temperatures greater than 300 K, the thermal conductivity has been calculated using the following equations

$$\lambda = \lambda_o'(T) + \lambda_E(\rho, T) \tag{12}$$

$$\lambda_o'(T) = \left(1.53220256 T^{0.71938}\right)\left(e^{(12.451/T - 295.67/T^2 - 4.1249)}\right) + C \tag{13}$$

where T is in Kelvin, $\lambda_o'(T)$ is in mW/cm-K and C is a constant such that $\lambda_o'(T)$ from equation (13) = $\lambda_o(T)$ from equation (6) at T = 300 K.
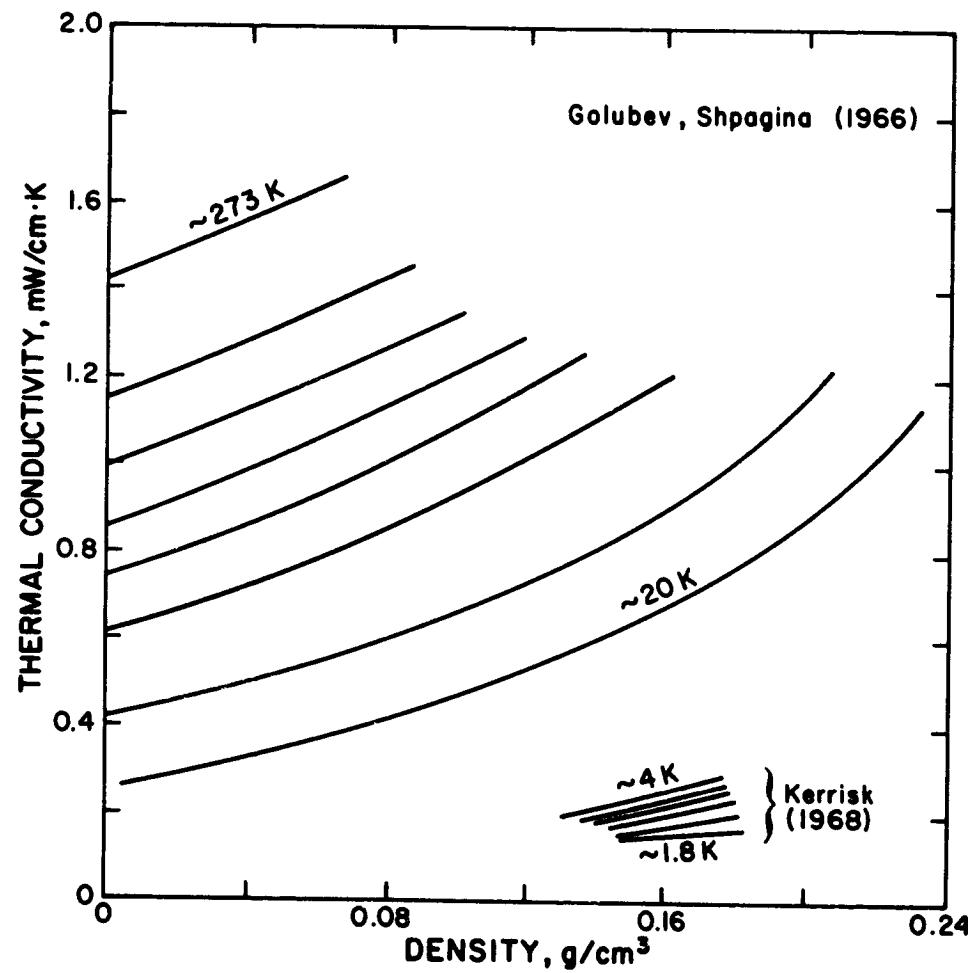
Figure 2. PVT Range of Experimental Data for Thermal Conductivity.
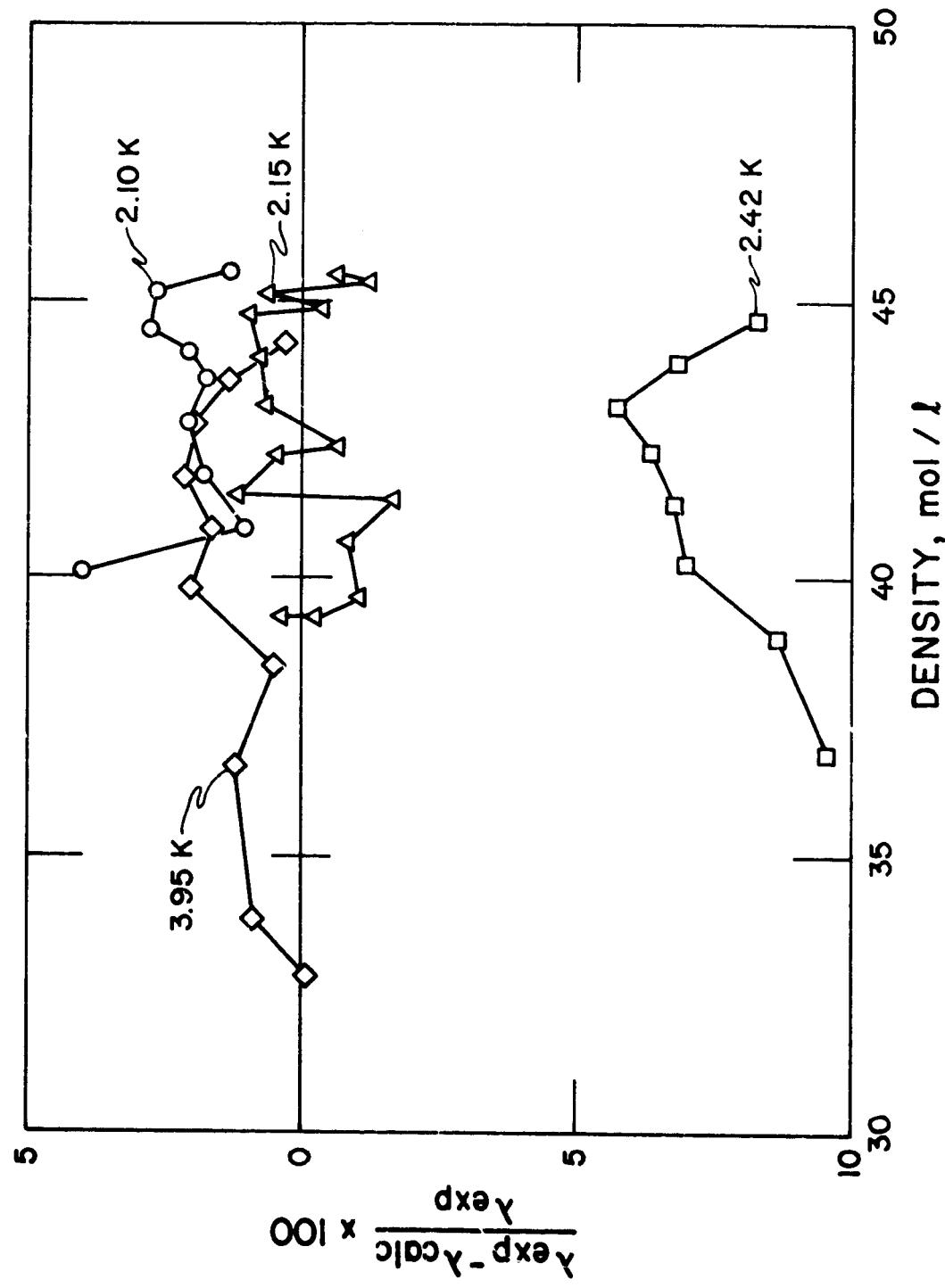
Figure 3. Deviations between Calculated Thermal Conductivities and Data by Kerrisk (1968).
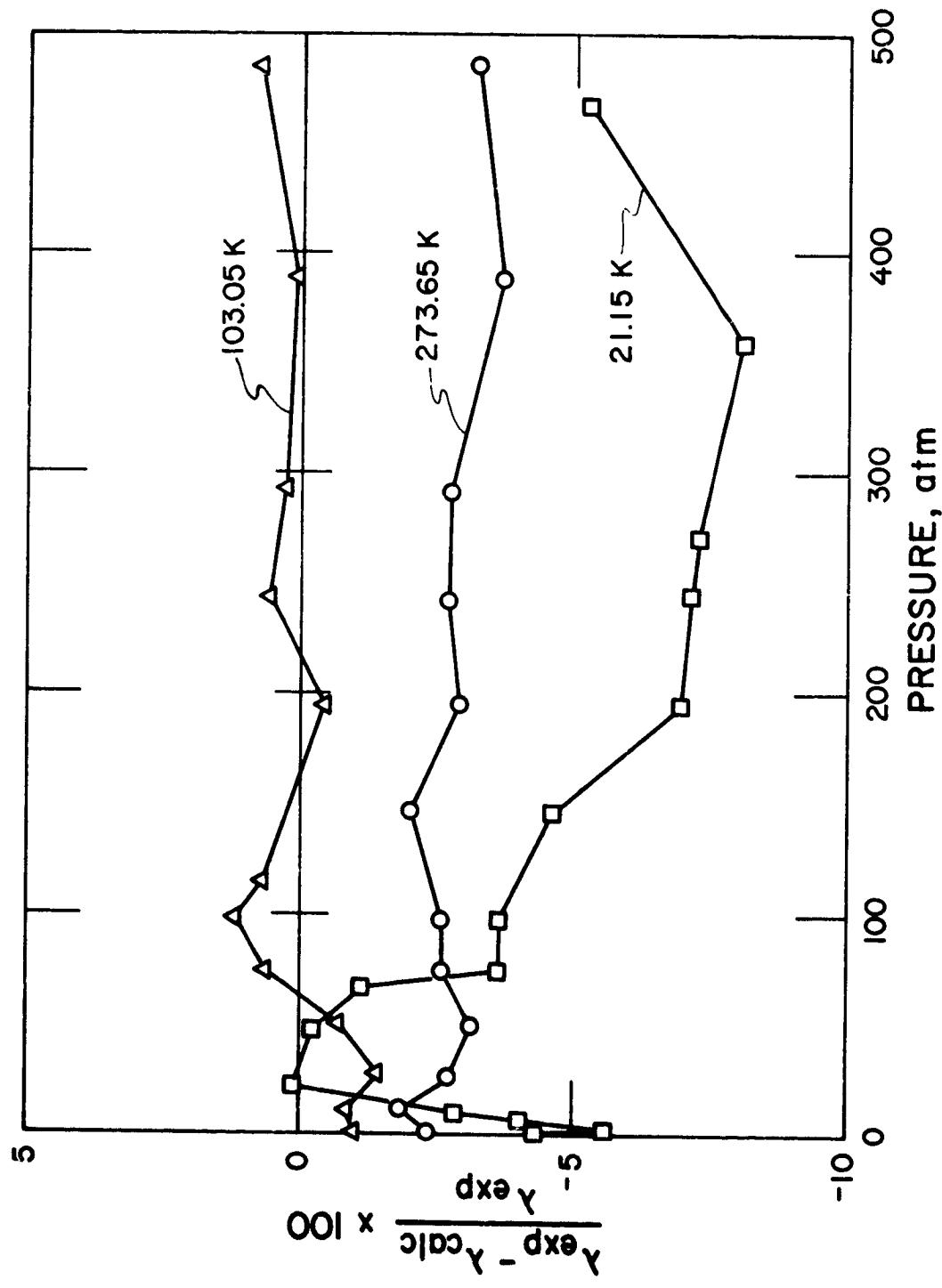
Figure 4. Deviations between Calculated Thermal Conductivities and Data by Golubev and Shpagina (1966).

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In selecting a suitable representation of the dilute gas contribution for temperatures above 300 K, the correlation by Tsederberg, et al., (1969) was considered but was not used for two reasons. First, their value at 300 K was in disagreement with our best estimates by an excessive amount and, second, the λ_0 at higher temperatures, (2000 °C), were not theoretically consistent with the recently measured dilute gas viscosities, Guevara, et al., (1969). The representation which was finally selected (equation 13) is from Maitland and Smith (1971), and was selected because the above two objections to the equation proposed by Tsederberg, et al., (1969) were not present. The original equation from Maitland and Smith (1971) is for the dilute gas viscosity and has been converted to thermal conductivity by a proportionality constant.

The $\lambda_E(\rho, T)$ of equation (12) is given by

$$\lambda_E(\rho, T) = \lambda_E(\rho) = \lambda_o(300) \left[\lambda_y(\rho, \ 300) - 1\right] \tag{14}$$

evaluated at ρ and $T = 300$ K. Thus equation (5) and equation (12) will give identical results for all ρ at 300 K.

3.3 Viscosity Below 100 K

For temperatures of 100 K and below the equation

$$\ell n \ \eta = \eta_0'(T) + \eta_E'(\rho, T) \tag{15}$$

was used to calculate the viscosity for helium. If $x = \ell n \ (T)$, then

$$\eta_0'(T) = -0.135311743/x + 1.00347841 + 1.20654649x - 0.149564551x^2$$

$$+ \ 0.0125208416x^3 \tag{16}$$

and

$$\eta_E'(\rho, T) = \rho \ B(T) + \rho^2 \ C(T) + \rho^3 \ D(T) \tag{17}$$

where ρ is in g/cm^3, and

$$B(T) = -47.5295259/x + 87.6799309 - 42.0741589x + 8.33128289x^2 - 0.589252385x^3 \tag{18}$$

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$$C(T) = 547.309267/x - 904.870586 + 431.404928x - 81.4504854x^2$$
$$+5.37008433x^3 \tag{19}$$

$$D(T) = -1684.39324/x + 3331.08630 - 1632.19172x + 308.804413x^2$$
$$- 20.2936367x^3 \ . \tag{20}$$

The resulting viscosities are in $\mu g/cm \cdot s$. Equations (15-20) are from Steward, et al. (1971). Steward's work included new measurements from 4 to 20 K at pressures from the dilute gas region to 10 MN/m^2. Steward reports a standard deviation of .032 in the natural log of the viscosity in the units of $\mu g/cm \cdot s$. In addition, Steward proposes the possibility of an uncertainty of $\pm 8\%$.

3.4 Viscosity Between 100 and 300 K

Steward included a few points calculated from the Enskog theory (Hanley, et al., 1971) when the equations (15-20) were derived. He found this necessary to enable the use of these equations up to 300 K; however, from 100 to 300 K the dilute gas values of Steward differ by 2.5% from a recent correlation by Maitland and Smith (1971). Since Steward reports using calculated dilute gas values and the correlation of Maitland and Smith is based on experimental data, the dilute gas values of Maitland and Smith were used for all T > 110. Between 100 and 110 K, a linear average of the dilute gas values of Steward and Maitland and Smith was used. In the 100 to 110 K temperature range the dense gas contribution for viscosity was calculated from Steward's equations. The equations for viscosity between 100 and 300 K are:

$$\eta(\rho,T) = \eta_0(T) + \eta_E(\rho,T) \tag{21}$$

where

$$\eta_0(T) = 196T^{.71938} e^{(12.451/T - 295.67/T^2 - 4.1249)} \tag{22}$$

and

$$\eta_E = e^{[\eta_0'(T) + \eta_E'(\rho,T)]} - e^{[\eta_0'(T) + \eta_E'(0,T)]} \tag{23}$$

where ρ is in g/cm^3, T in Kelvin, and η is in $\mu g/cm \cdot s$.

3.5 Viscosities for Temperatures Above 300 K

Since Steward's analysis did not include any dense gas data for temperatures above 300 K, either calculated or experimental, the temperature dependence of the excess function given by equation (23) was frozen at 300K. When equation (23) is fixed at 300 K, the resulting equation is a function of density alone and gives results similar to the excess

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function of Tsederberg, et al., (1969). Therefore, for temperatures above 300 K, the viscosities were calculated using equations (21-23) except that equation (23) was always evaluated at ρ and T = 300 K. The uncertainty of the viscosity for T > 100 K is estimated to be maximum of ± 10%.

4. Surface Tension

The surface tension for helium-4 has been calculated using the equation

$$\gamma = \gamma_0 \left(1 - T/T_c \right) \tag{24}$$

where $\gamma_0 = 0.5308$ dyn/cm and $T_c = 5.2014$ K. The γ_0 is based on a least squares fit of equation (24) to the data of van Urk, et al., (1925). Since the least squares fit of equation (24) was performed two sources of experimental data have appeared. These are Dickson, et al., (1970), and Devaraj and Hollis-Hallett (1967). Figure 5 shows that γ_0 would not change appreciably if these new data were included in a refit.

5. Dielectric Constant

The dielectric constant of a fluid may be calculated from the Clausius-Mossotti equation:

$$\frac{\epsilon - 1}{\epsilon + 2} \quad \frac{1}{\rho} = p \tag{25}$$

where ϵ is the dielectric constant, ρ is the density, and p is the specific polarizability, a property of the substance having dimensions of specific volume. Recent measurements of the dielectric constant by Kerr and Sherman (1970) indicate that for helium-4 the specific polarizability is a weak function of density and that the first density correction is negative. For the calculations here, the equation:

$$p = 0.123396 - 0.0014 \rho \tag{26}$$

was used, where p is the specific polarizability in cm^3/g and ρ is the density in g/cm^3. The uncertainty of the tabulated values of dielectric constant is estimated to be 0.01%.

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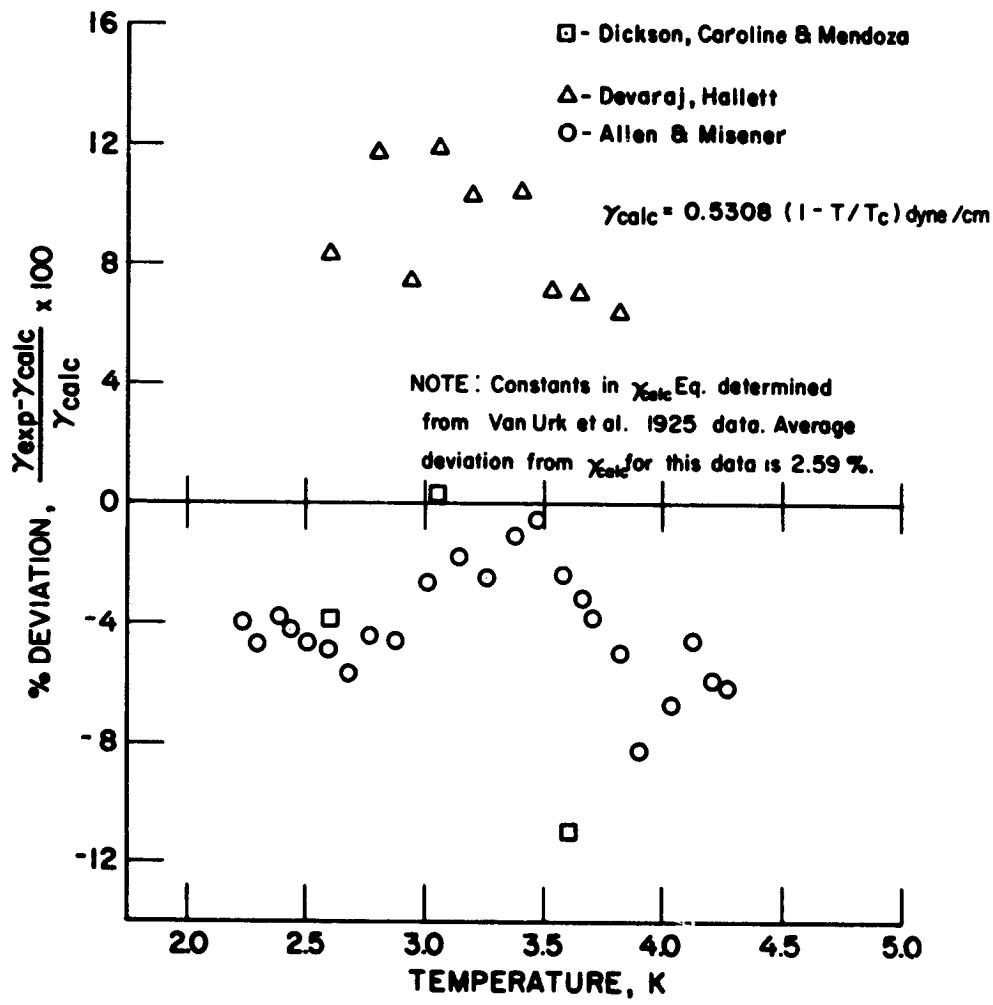
Figure 5. Deviations between Calculated and Experimental
Surface Tension Data.

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6. Index of Refraction

The refractive index of a non-polar fluid depends on the wavelength of the incident radiation and on the density of the fluid. However, the dependence on wavelength can be treated independently of the dependence on density. The Cauchy dispersion formula:

$$r_{\Lambda} = r(\rho, \Lambda) = r_{\infty}(\rho) + \theta_1 / \Lambda^2 + \theta_2 / \Lambda^4 \tag{27}$$

assuming the equivalence of the Maxwell's relation

$$\epsilon = n_{\infty}^2 \tag{28}$$

to

$$p = r_{\infty} \tag{29}$$

allows the calculation of r_{∞} from the polarizability as a function of density and

$$r_{\infty}(\rho) = 0.123396 - 0.0014 \rho \tag{30}$$

where ρ is density in g/cm^3. Equation (30) was then substituted for the first term in equation (27) and θ_1 and θ_2 were determined by least squares estimation using dispersion data from Landolt-Börnstein (1962). The resulting values were $\theta_1 = 33701.617944$ and $\theta_2 = -12325284955$. The specific refraction, r_{Λ}, is in cm^3/g, density, ρ, is in g/cm^3, and the wavelength, Λ, is in Å. Values of the index of refraction n in table 2 have been calculated from equations (27), (30), and (31).

$$r_{\Lambda} = \frac{n^2 - 1}{n^2 + 2} \cdot \frac{1}{\rho} \quad . \tag{31}$$

A comparison between experimental measurements of the index of refraction (Edwards, 1956, 1957, and 1958) and those calculated using equation (31) shows agreement to better than 0.1%, except with those values from the 1956 reference. Edwards (1956) and (1958) papers both report values of the index of refraction for the saturated liquid of helium-4. However, the values in the 1956 paper are about 4% higher than those in the 1958 paper, and the 1956 values are presumed to be in error. Figure 6 shows n as a function of density for the saturated vapor and saturated liquid conditions. The points are from Edwards (1957 and 1958).

Table 2. Index of Refraction of Saturated Liquid Helium at Three Wavelengths

Temp K	4358 Å n	5462 Å n	6939 Å n
2.2	1.02881	1.02867	1.02857
2.4	1.02864	1.02849	1.02839
2.6	1.02841	1.02827	1.02817
2.8	1.02814	1.02800	1.02790
3.0	1.02782	1.02768	1.02759
3.2	1.02745	1.02731	1.02722
3.4	1.02703	1.02690	1.02681
3.6	1.02656	1.02643	1.02634
3.8	1.02602	1.02589	1.02580
4.0	1.02541	1.02528	1.02520
4.2	1.02471	1.02459	1.02450
4.4	1.02389	1.02377	1.02369
4.6	1.02290	1.02278	1.02270
4.8	1.02163	1.02152	1.02145
5.0	1.01986	1.01976	1.01969
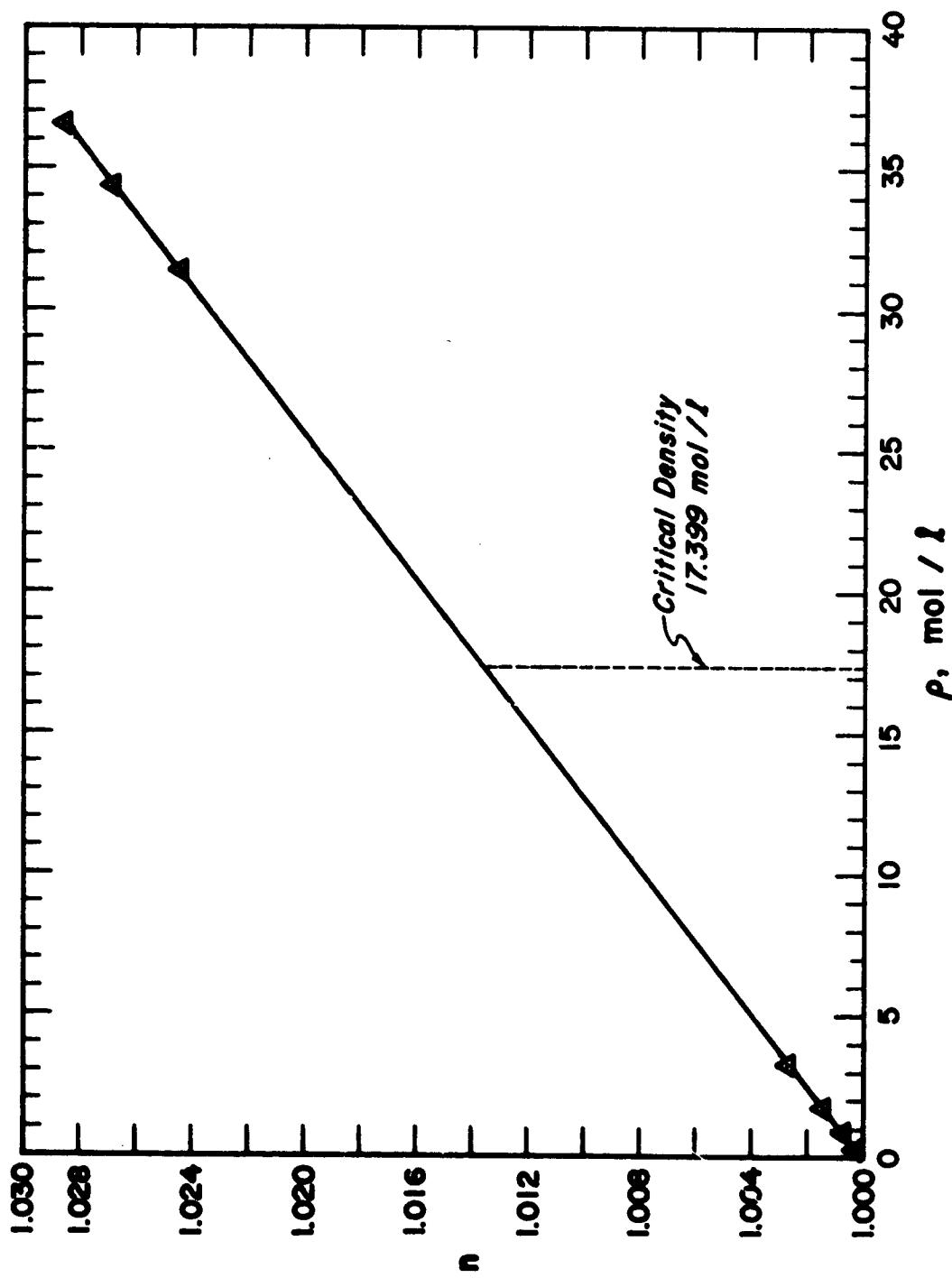
Figure 6. Index of Refraction for Saturated Liquid and Gaseous Helium. Points are from Edwards (1957, 1958).

7. Thermal Diffusivity

The thermal diffusivity of a fluid is defined as

$$\alpha = \lambda / (\rho \, C_p) \tag{32}$$

where α is the thermal diffusivity, λ is the thermal conductivity, and C_p is the specific heat at constant pressure. The tabulations of thermal diffusivity in appendices D and E have been calculated using the above equation, and ρ, λ, and C_p in the tables. The uncertainty of α is estimated to be 20%, except in the critical region.

8. Prandtl Number

The Prandtl number is frequently used in engineering calculations and is defined as:

$$Pr = C_p \, \eta / \lambda \tag{33}$$

where Pr is the Prandtl number, C_p is the specific heat at constant pressure, η is the viscosity, and λ is the thermal conductivity. The tabulations of the Prandtl number in appendices D and E have been calculated from equation (33) using values of η, λ, and C_p from adjacent entries in the tables. Since Pr is a function of both η and λ, the uncertainty in Pr could be as much as 25%.

9. Joule-Thomson Inversion Curve

The Joule-Thomson coefficient for a fluid is defined as:

$$J = (\partial T / \partial P)_H . \tag{34}$$

The locus of points where $J = 0$ is called the Joule-Thomson inversion curve: see figure 7. The inversion curve as given in table 5 has been calculated using the relationship:

$$T \, (\partial P / \partial T)_\rho = \rho \, (\partial P / \partial \rho)_T \tag{35}$$

and the equation of state from McCarty (1972).

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Table 3. Joule-Thomson Inversion Curve

Temperature		Pressure		Density	
K	R	atm	psia	mol/ℓ	lb/ft^3
4.5	8.1	1.821	26.76	30.83	7.703
5	9.0	3.768	55.37	30.68	7.667
6	10.8	7.266	106.8	30.03	7.504
7	12.6	10.74	157.8	29.53	7.378
8	12.4	14.10	207.2	28.99	7.245
9	16.2	17.31	254.4	28.43	7.106
10	18.0	20.36	299.2	27.86	6.962
12	21.6	25.57	375.8	26.42	6.602
14	25.2	29.29	430.5	24.72	6.177
16	28.8	32.07	471.3	23.07	5.764
18	32.4	34.44	506.2	21.61	5.400
20	36.0	36.18	531.7	20.20	5.046
22	39.6	37.33	548.6	18.82	4.703
24	43.2	37.93	557.4	17.48	4.367
26	46.8	37.98	558.2	16.15	4.035
28	50.4	37.48	550.8	14.83	3.705
30	54.0	36.40	535.0	13.49	3.372
32	57.6	34.71	510.1	12.13	3.030
34	61.2	32.32	475.0	10.71	2.675
36	64.8	29.13	428.0	9.194	2.297
38	68.4	24.89	365.8	7.527	1.881
40	72.0	19.11	280.8	5.567	1.391
42	75.6	9.80	144.0	2.780	.695
43	77.4	.03	.5	.009	.002
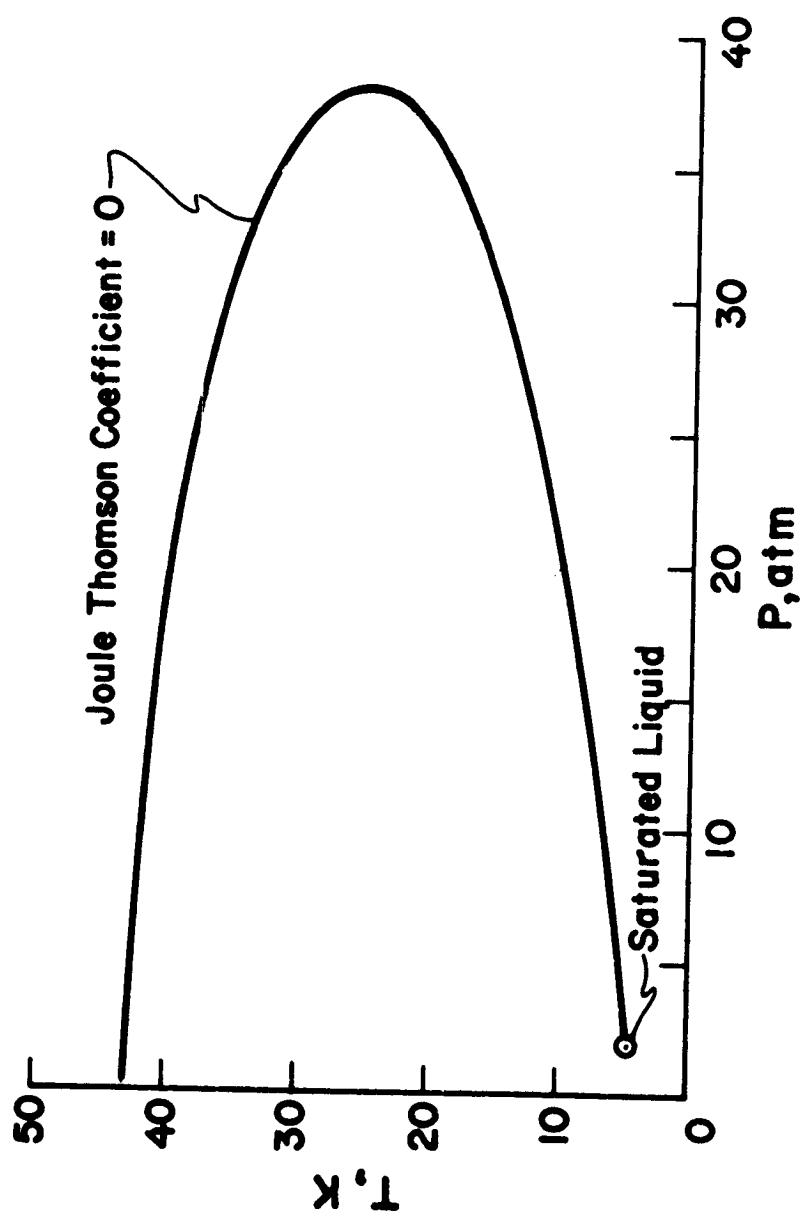
Figure 7. Joule-Thomson Inversion Curve

10. The Melting Line

The melting curve for helium may be calculated using the Simon melting equation.

$$P = -17.80 + 17.31457\ T^{1.555414} \tag{36}$$

where P is in kg/cm^2 and T is in Kelvin. The constants in equation (36) were reported by Mills and Grilly (1955), and were based on their experimental data which extended from the upper lambda point to 30.77 K where they found the melting pressure to be 3555.6 kg/cm^2. In a later paper (Grilly and Mills, 1959) a separate equation is reported for temperatures between 1.8 and 5.2 K. This equation is:

$$P = 33.28 - 44.156\ T + 31.799\ T^2 - 4.8159\ T^3 + 0.30313\ T^4 \tag{37}$$

where P is in kg/cm^2 and T is in Kelvin. The values in table 4 have been calculated using equation (37) for $T \le 5.2$ and equation (36) for $T > 5.2$

Table 4. Melting Line for Helium-4

Temperature		Pressure		Liquid Density	
K	R	atm	psia	mol/ℓ	lb/cu-ft
2.0	3.60	37.25	547.4	46.18	11.540
2.5	4.50	56.35	828.2	48.67	12.162
3.0	5.40	78.91	1159.6	50.97	12.737
3.5	6.30	103.83	1525.9	52.94	13.229
4.0	7.20	130.49	1917.7	54.63	13.650
5.0	9.00	188.67	2772.8	57.54	14.378
6.0	10.80	254.77	3744.1	60.25	15.055
7.0	12.60	328.47	4827.1	62.85	15.704
8.0	14.40	408.27	5999.9	65.30	16.317
9.0	16.20	493.81	7257.1	67.63	16.900
10.0	18.00	584.82	8594.4	69.85	17.455
12.0	21.60	782.21	11495.4	73.91	18.468
14.0	25.20	998.83	14678.8	77.37	19.332
16.0	28.80	1233.37	18125.7	80.43	20.096
18.0	32.40	1484.81	21820.8	83.34	20.824
20.0	36.00	1752.29	25751.6	86.07	21.507
22.0	39.60	2035.05	29907.1	88.67	22.156
24.0	43.20	2332.48	34278.1	91.17	22.780
26.0	46.80	2644.01	38856.3	93.60	23.387
28.0	50.40	2969.14	43634.5	95.98	23.983
30.0	54.00	3307.44	48606.2	98.34	24.573

Table 5. PρT of the Lambda Line

Temperature		Pressure		Density	
K	R	atm	psia	g/cm³	lb/ft³
2.172	3.910	0.0497	.730	0.1462	9.127
2.15	3.87	2.33	34.24	0.1506	9.402
2.10	3.78	6.84	100.5	0.1576	9.839
2.05	3.69	10.91	160.3	0.1627	10.16
2.00	3.6	14.68	215.7	0.1669	10.42
1.95	3.51	18.22	267.8	0.1705	10.64
1.90	3.42	21.55	316.7	0.1736	10.84
1.85	3.33	24.70	363.0	0.1763	11.01
1.80	3.24	27.67	406.6	0.1788	11.16
1.763	3.174	29.74	437.1	0.1804	11.26

11. The Lambda Line

The boundary of the superfluid phase (helium II) of liquid helium-4 is known as the lambda line. The lambda line begins at 2.172 K on the saturated liquid line and continues through the liquid phase to intersect the melting curve at 1.763 K. Table 5 gives the PρT of the lambda line as reported by Kierstead (1967).

12. Summary

The lack of sufficiently accurate experimental data for helium between the temperatures of 2 and 70 K has hampered the efforts of correlating the PVT surface by McCarty (1972). This is especially important for the temperature range of 2 - 20 K where small amounts of accurate data do exist but these data cover very restricted ranges of temperature and pressure. A single set of self consistent data covering the entire pressure and temperature range is needed.

The purpose of the previous sections has been to describe where or how the values were obtained in assembling the various tables and graphs presented here. Most of the material has been taken from McCarty (1972) and formulas and descriptions given there have not been repeated here.

In addition, an effort has been made to assign realistic uncertainties in the data wherever possible. Uncertainty is defined here to be an estimate of accuracy at a 95% confidence level. These assignments are made in the text of the section or subsection concerned with that property. Finally, the number of digits in the tables of appendices D and E should not be taken as an indication of accuracy of the number. The tabulations are a direct copy of computer printouts where it is often necessary to present more digits for a property than its accuracy justifies.

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Appendix A.   List of Symbols and Units

The calculation of the tables and properties presented here was performed in many different systems of units, and converted to engineering units at the very end of the calculations; therefore the reader is cautioned to pay particular attention to the units when consulting individual sections of this document. All conversion factors have been taken from the National Aeronautics and Space Administration Report Number SP-7012 (Mechtly 1964).

R = gas constant, 2.68111 ft^3 - $psia/lb_m$ -R

P = pressure, psia

V = specific volume, ft^3/lb_m

T = absolute temperature, degrees Rankine

ρ = density, lb_m/ft^3

C_p = specific heat at constant pressure, BTU/lb_m -R

C_v = specific heat at constant volume, BTU/lb_m -R

S = entropy, BTU/lb_m -R

H = enthalpy, BTU/lb_m

U = internal energy BTU/lb_m

W = speed of sound, ft/s

$(\partial P/\partial T)_\rho$ = isochore derivative, psia/R

$(\partial P/\partial \rho)_T$ = isotherm derivative, ft^3 - $psia/lb_m$

θ = specific heat input, BTU/lb_m

ϕ = energy derivative, psia ft^3 /BTU

α = isothermal bulk modulus, psia

β = volume expansivity, 1/R

n = index of refraction, dimensionless

r = specific refraction, ft^3/lb_m

Pr = Prandtl number, dimensionless

p = specific polarizability, ft^3 /lb_m

J = Joule-Thomson coefficient, R/psia

λ = thermal conductivity, BTU/ft-h-R

η = viscosity, lb_m/ft-s

ϵ = dielectric constant, dimensionless

γ = surface tension, lb_f/in

Λ = wavelength, angstrom

$\propto$ = thermal diffusivity, ft^2 /h

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Appendix B. Fixed Points[*]

Critical Point

P_c = 32.99 psia (2.245 atm)

T_c = 9.3625 R (5.2014 K)

ρ_c = 4.348 lb_m/ft^3 (0.017399 mol/cm^3)

Normal Boiling Point

P = 14.696 psia (1 atm)

T = 7.604 R (4.224 K)

ρ_{gas} = 1.054 lb_m/ft^3 (0.004220 mol/cm^3)

ρ_{liquid} = 7.802 lb_m/ft^3 (0.03122 mol/cm^3)

Lower Lambda Point

P = 0.730 psia (0.0497 atm)

T = 3.919 R (2.177 K)

ρ_{liquid} = 9.127 lb_m/ft^3 (0.03653 mol/cm^3)

Upper Lambda Point

P = 437.1 psia (29.74 atm)

T = 3.174 R (1.763 K)

ρ_{liquid} = 11.26 lb_m/ft^3 (0.04507 mol/cm^3)

Appendix C. Conversion Factors

Temperature	1.8 R = 1 K
Pressure	14.695949 psia = 1 atm = 1.01325 x 10^5 N/m^2
Specific Volume	0.004002013 ft^3/lb_m = 1 cm^3/mol
Internal Energy	0.107483 BTU/lb_m = 1 J/mol
Entropy, Specific Heat	0.0597126 BTU/lb_m R = 1 J/mol-K
Thermal Conductivity	0.0578176 BTU/ft-hr-R = 1 mW/cm-K
Viscosity	0.067196897 lb_m/ft-s = 1 g/cm-s
Speed of Sound	3.2808 ft/s = 1 m/s = m/s
Molecular Weight	4.0026[**]
Surface Tension	0.5710147 x 10^{-5} lb_f/in = 1 dyn/cm
	(1 dyn = 10^{-5} N)

[*] Fixed Points from McCarty (1972)

[**] On the C^{12} = 12.000 scale

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C

Appendix D, Saturation Properties
THERMODYNAMIC PROPERTIES OF COEXISTING GASEOUS AND LIQUID HELIUM

TEMP DEG. R	PRESS PSIA	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB B	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC	SURFACE TENSION LB/IN X 10⁷
* 3.919	0.7303	0.1096									
* 3.919	0.7303	13.61	9.36	0.201	9.093	10.93	2.848	0.764	1.34	275.9	
4.0	0.8146	0.1097	106.8	13.7	1.423	1.440	0.4068	0.699	0.715	789.4	17.36
4.0	0.8146	12.40	9.47	0.220	9.141	11.01	2.817	0.765	1.35	278.2	
4.1	0.9266	0.1099	105.8	15.7	1.490	1.509	0.4233	0.614	0.635	710.5	17.04
4.1	0.9266	11.12	9.61	0.246	9.200	11.11	2.780	0.766	1.36	280.8	
4.2	1.049	0.1100	104.0	17.5	1.550	1.572	0.4379	0.553	0.580	711.9	16.71
4.2	1.049	10.01	9.73	0.274	9.258	11.20	2.746	0.767	1.37	283.4	
4.3	1.181	0.1102	103.0	19.0	1.606	1.630	0.4510	0.518	0.544	713.2	16.39
4.3	1.181	9.052	9.85	0.303	9.316	11.30	2.713	0.768	1.38	285.9	
4.4	1.325	0.1104	102.0	20.4	1.659	1.686	0.4632	0.488	0.521	714.2	16.07
4.4	1.325	8.211	10.0	0.334	9.372	11.39	2.681	0.770	1.39	288.3	
4.5	1.481	0.1106	100.8	21.6	1.710	1.740	0.4746	0.461	0.508	714.8	15.74
4.5	1.481	7.473	10.1	0.368	9.427	11.48	2.650	0.771	1.40	290.7	
4.6	1.649	0.1109	98.3	22.6	1.760	1.794	0.4857	0.448	0.503	714.7	15.42
4.6	1.649	6.821	10.1	0.404	9.481	11.56	2.620	0.772	1.41	292.9	
4.7	1.829	0.1112	96.6	23.5	1.810	1.847	0.4964	0.442	0.503	714.1	15.09
4.7	1.829	6.244	10.2	0.442	9.534	11.65	2.592	0.773	1.42	295.1	
4.8	2.022	0.1115	94.8	24.3	1.860	1.932	0.5069	0.439	0.508	712.7	14.77
4.8	2.022	5.731	10.3	0.492	9.586	11.73	2.564	0.774	1.43	297.2	
4.9	2.229	0.1118	92.8	25.1	1.910	1.956	0.5174	0.439	0.516	710.8	14.45
4.9	2.229	5.273	10.4	0.525	9.636	11.81	2.538	0.775	1.45	299.2	
5.0	2.450	0.1121	90.9	25.7	1.962	2.012	0.5278	0.441	0.526	708.2	14.12
5.0	2.450	4.862	10.4	0.570	9.686	11.89	2.512	0.776	1.46	301.2	
5.1	2.686	0.1124	88.8	26.3	2.014	2.070	0.5381	0.445	0.538	705.2	13.88
5.1	2.686	4.494	10.5	0.618	9.734	11.97	2.487	0.777	1.47	303.1	
5.2	2.936	0.1127	86.7	26.8	2.067	2.128	0.5485	0.449	0.551	701.6	13.48
5.2	2.936	4.162	10.5	0.668	9.781	12.04	2.462	0.778	1.49	304.9	
5.3	3.202	0.1131	84.6	27.3	2.122	2.189	0.5589	0.454	0.565	698.8	13.19
5.3	3.202	3.861	10.5	0.722	9.827	12.12	2.439	0.779	1.50	306.7	
5.4	3.484	0.1135	82.4	27.7	2.177	2.251	0.5694	0.459	0.579	694.0	12.83
5.4	3.484	3.589	10.5	0.778	9.871	12.19	2.415	0.780	1.52	308.4	
5.5	3.782	0.1139	80.2	28.1	2.234	2.314	0.5799	0.464	0.595	689.7	12.50
5.5	3.782	3.342	10.5	0.837	9.914	12.25	2.393	0.781	1.54	310.0	
5.6	4.097	0.1143	77.9	28.5	2.293	2.380	0.5905	0.470	0.611	685.2	12.10
5.6	4.097	3.116	10.5	0.899	9.9	12.32	2.371	0.782	1.55	311.5	
5.7	4.430	0.1147	75.7	28.8	2.353	2.447	0.6012	0.475	0.627	680.5	11.86
5.7	4.430	2.910	10.5	0.965	10.00	12.38	2.349	0.782	1.57	313.0	
5.8	4.780	0.1152	73.4	29.1	2.414	2.516	0.6119	0.480	0.645	675.6	11.53
5.8	4.780	2.721	10.5	1.03	10.03	12.44	2.328	0.783	1.59	314.5	
5.9	5.148	0.1157	71.1	29.4	2.477	2.587	0.6227	0.485	0.662	670.7	11.21
5.9	5.148	2.548	10.5	1.11	10.07	12.50	2.307	0.784	1.62	315.8	
6.0	5.536	0.1162	68.8	29.6	2.541	2.660	0.6336	0.490	0.681	665.6	10.89
6.0	5.536	2.389	10.4	1.18	10.11	12.55	2.286	0.785	1.64	317.1	
6.1	5.942	0.1167	66.5	29.8	2.607	2.735	0.6445	0.495	0.700	660.4	10.56
6.1	5.942	2.243	10.3	1.26	10.14	12.61	2.266	0.786	1.66	318.3	
6.2	6.368	0.1172	64.2	30.0	2.674	2.812	0.6556	0.500	0.721	655.0	10.24
6.2	6.368	2.107	10.3	1.35	10.17	12.65	2.246	0.787	1.69	319.5	
6.3	6.815	0.1178	61.9	30.2	2.742	2.892	0.6667	0.504	0.742	649.6	9.914
6.3	6.815	1.981	10.2	1.44	10.20	12.70	2.226	0.788	1.72	320.6	
6.4	7.282	0.1183	59.6	30.3	2.814	2.974	0.6780	0.509	0.764	644.1	9.591
6.4	7.292	1.865	10.1	1.53	10.23	12.74	2.207	0.789	1.74	321.6	
6.5	7.770	0.1190	57.3	30.4	2.886	3.058	0.6894	0.513	0.780	638.4	9.207
6.5	7.770	1.757	10.0	1.64	10.25	12.78	2.187	0.790	1.78	322.6	
6.6	8.280	0.1196	55.0	30.5	2.961	3.144	0.7009	0.518	0.813	632.6	8.943
6.6	8.280	1.657	9.88	1.73	10.28	12.82	2.168	0.791	1.81	323.5	
6.7	8.811	0.1203	52.7	30.5	3.037	3.237	0.7125	0.522	0.849	626.7	8.619
6.7	8.811	1.564	9.79	1.84	10.30	12.85	2.150	0.792	1.84	324.3	
6.8	9.365	0.1210	50.5	30.6	3.116	3.329	0.7242	0.527	0.860	620.6	8.296
6.8	9.365	1.477	9.61	1.95	10.32	12.89	2.131	0.793	1.88	325.1	

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THERMODYNAMIC PROPERTIES OF COEXISTING GASEOUS AND LIQUID HELIUM

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)_P$ DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10^6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
* 3.919	9.128								1.02040	
* 3.919	0.07350	4.60	3.57	8.688	0.292	8.00258	0.361	8.8262	1.00020	0.675
4.0	9.119	50.4	2.16	969.0	0.0142	0.00666	2.44	0.00133	1.02039	0.724
4.0	0.08863	4.68	3.57	0.764	0.288	0.00265	0.371	0.0244	1.00038	0.678
4.1	9.136	38.7	2.82	959.0	0.0164	0.00888	2.46	0.00154	1.02038	0.633
4.1	0.08993	4.77	3.57	0.864	0.285	0.00274	0.382	0.0225	1.00034	0.681
4.2	9.092	31.4	3.48	947.0	0.0185	0.00907	2.48	0.00172	1.02037	0.578
4.2	0.0999	4.86	3.57	0.972	0.281	0.00283	0.394	0.0207	1.00038	0.685
4.3	9.075	26.7	4.12	934.0	0.0204	0.00924	2.49	0.00187	1.02036	0.527
4.3	0.1105	4.94	3.57	1.09	0.278	0.00292	0.406	0.0192	1.00042	0.689
4.4	9.057	23.5	4.69	919.0	0.0222	0.00938	2.50	0.00199	1.02035	0.499
4.4	0.1218	5.03	3.57	1.21	0.276	0.00300	0.417	0.0178	1.00046	0.693
4.5	9.038	21.3	5.18	904.0	0.0239	0.00951	2.50	0.00207	1.02034	0.432
4.5	0.1338	5.11	3.57	1.35	0.273	0.00309	0.429	0.0165	1.00050	0.698
4.6	9.017	19.7	5.59	887.0	0.0255	0.00963	2.51	0.00212	1.02032	0.472
4.6	0.1466	5.19	3.57	1.49	0.271	0.00318	0.441	0.0154	1.00055	0.703
4.7	8.996	18.6	5.92	869.0	0.0271	0.00973	2.51	0.00215	1.02031	0.467
4.7	0.1602	5.27	3.57	1.64	0.270	0.00327	0.452	0.0144	1.00060	0.708
4.8	8.973	17.7	6.18	850.0	0.0286	0.00983	2.51	0.00216	1.02029	0.467
4.8	0.1745	5.34	3.57	1.80	0.268	0.00335	0.464	0.0134	1.00065	0.713
4.9	8.948	17.1	6.38	831.0	0.0302	0.00992	2.51	0.00215	1.02027	0.469
4.9	0.1897	5.41	3.57	1.97	0.267	0.00344	0.476	0.0126	1.00071	0.719
5.0	8.923	16.6	6.53	811.0	0.0317	0.0100	2.50	0.00213	1.02025	0.473
5.0	0.2057	5.48	3.57	2.14	0.266	0.00353	0.487	0.0118	1.00077	0.725
5.1	8.897	16.1	6.65	790.0	0.0333	0.0101	2.50	0.00211	1.02023	0.479
5.1	0.2225	5.55	3.57	2.33	0.265	0.00362	0.499	0.0110	1.00083	0.732
5.2	8.869	15.8	6.74	769.0	0.0349	0.0102	2.49	0.00208	1.02021	0.485
5.2	0.2403	5.61	3.58	2.52	0.265	0.00370	0.511	0.0104	1.00090	0.739
5.3	8.841	15.5	6.81	748.0	0.0365	0.0102	2.48	0.00205	1.02019	0.493
5.3	0.2590	5.67	3.58	2.72	0.265	0.00379	0.523	0.00974	1.00097	0.747
5.4	8.811	15.2	6.86	726.0	0.0382	0.0103	2.47	0.00202	1.02017	0.500
5.4	0.2786	5.73	3.58	2.94	0.265	0.00388	0.535	0.00916	1.00104	0.755
5.5	8.780	14.9	6.90	704.0	0.0400	0.0104	2.46	0.00199	1.02015	0.508
5.5	0.2992	5.79	3.58	3.15	0.265	0.00397	0.547	0.00863	1.00112	0.763
5.6	8.749	14.6	6.93	692.0	0.0418	0.0104	2.45	0.00195	1.02012	0.516
5.6	0.3209	5.84	3.58	3.38	0.266	0.00406	0.559	0.00813	1.00120	0.772
5.7	8.716	14.4	6.96	659.0	0.0437	0.0105	2.44	0.00192	1.02009	0.524
5.7	0.3436	5.89	3.59	3.61	0.267	0.00415	0.572	0.00767	1.00128	0.781
5.8	8.681	14.1	6.98	637.0	0.0457	0.0106	2.43	0.00189	1.02007	0.533
5.8	0.3675	5.94	3.59	3.85	0.268	0.00424	0.584	0.00723	1.00137	0.791
5.9	8.646	13.9	7.00	615.0	0.0478	0.0106	2.41	0.00186	1.02004	0.542
5.9	0.3924	5.99	3.60	4.10	0.270	0.00433	0.597	0.00682	1.00146	0.802
6.0	8.610	13.6	7.02	592.0	0.0500	0.0107	2.40	0.00182	1.02001	0.551
6.0	0.4186	6.03	3.60	4.35	0.272	0.00442	0.609	0.00644	1.00155	0.813
6.1	8.572	13.4	7.03	570.0	0.0523	0.0107	2.39	0.00179	1.01997	0.560
6.1	0.4460	6.07	3.60	4.61	0.274	0.00451	0.622	0.00608	1.00165	0.829
6.2	8.532	13.2	7.04	548.0	0.0548	0.0108	2.37	0.00176	1.01994	0.570
6.2	0.4747	6.11	3.61	4.88	0.276	0.00460	0.635	0.00575	1.00176	0.838
6.3	8.492	12.9	7.05	526.0	0.0574	0.0109	2.36	0.00172	1.01991	0.580
6.3	0.5047	6.14	3.61	5.14	0.279	0.00470	0.648	0.00543	1.00188	0.852
6.4	8.450	12.7	7.05	504.0	0.0602	0.0109	2.34	0.00169	1.01987	0.590
6.4	0.5361	6.17	3.62	5.41	0.283	0.00480	0.661	0.00513	1.00190	0.866
6.5	8.436	12.5	7.05	492.0	0.0631	0.0110	2.33	0.00166	1.01983	0.602
6.5	0.5698	6.20	3.62	5.69	0.286	0.00489	0.675	0.00484	1.00210	0.882
6.6	8.361	12.3	7.06	468.0	0.0663	0.0110	2.31	0.00162	1.01979	0.614
6.6	0.6034	6.23	3.63	5.96	0.290	0.00499	0.688	0.00497	1.00222	0.890
6.7	8.314	12.1	7.03	438.0	0.0696	0.0111	2.29	0.00159	1.01974	0.627
6.7	0.6394	6.25	3.63	6.23	0.294	0.00509	0.702	0.00432	1.00239	0.919
6.8	8.266	11.8	7.02	417.0	0.0733	0.0111	2.29	0.00155	1.01970	0.640
6.8	0.6771	6.27	3.64	6.50	0.300	0.00520	0.716	0.00400	1.00260	0.954

THERMODYNAMIC PROPERTIES OF COEXISTING GASEOUS AND LIQUID HELIUM

TEMP DEG. R	PRESS PSIA	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC	SURFACE TENSION LB/IN X 10[7]
6.9	9.942	0.1217	48.2	30.6	3.195	3.419	0.7362	0.531	0.898	614.3	7.972
6.9	9.942	1.396	9.45	2.87	10.34	12.91	2.112	0.794	1.92	325.8	
7.0	10.54	0.1225	46.8	30.5	3.278	3.517	0.7482	0.536	0.930	607.9	7.648
7.0	10.54	1.320	9.29	2.20	10.35	12.93	2.093	0.795	1.97	326.4	
7.1	11.17	0.1233	43.7	30.5	3.363	3.618	0.7605	0.541	0.965	601.2	7.324
7.1	11.17	1.248	9.11	2.33	10.36	12.94	2.075	0.795	2.02	327.0	
7.2	11.82	0.1242	41.5	30.4	3.450	3.721	0.7729	0.545	1.00	596.4	7.001
7.2	11.82	1.181	8.91	2.47	10.37	12.96	2.056	0.796	2.07	327.5	
7.3	12.49	0.1251	39.3	30.3	3.539	3.829	0.7856	0.550	1.04	587.3	6.677
7.3	12.49	1.118	8.7	2.61	10.38	12.97	2.038	0.797	2.13	327.9	
7.4	13.19	0.1260	37.1	30.1	3.631	3.939	0.7984	0.555	1.09	580.0	6.353
7.4	13.19	1.059	8.48	2.77	10.38	12.97	2.019	0.798	2.19	328.2	
7.5	13.91	0.1271	34.9	29.9	3.727	4.054	0.8115	0.560	1.14	572.4	6.030
7.5	13.91	1.003	8.25	2.93	10.38	12.97	2.000	0.799	2.26	328.4	
7.6	14.67	0.1281	32.8	29.7	3.825	4.173	0.8249	0.566	1.19	564.6	5.706
7.6	14.67	0.9505	7.99	3.11	10.38	12.96	1.981	0.800	2.33	328.6	
7.604	14.70	0.1282	32.7	29.7	3.829	4.178	0.8253	0.566	1.19	564.2	5.693
7.604	14.70	0.9484	7.98	3.11	10.38	12.96	1.981	0.800	2.34	328.6	
7.7	15.44	0.1293	30.6	29.5	3.927	4.296	0.8386	0.571	1.25	556.4	5.382
7.7	15.44	0.9004	7.72	3.29	10.37	12.95	1.962	0.801	2.42	328.7	
7.8	16.25	0.1305	28.5	29.2	4.031	4.424	0.8526	0.577	1.31	547.9	5.058
7.8	16.25	0.8530	7.43	3.48	10.36	12.93	1.943	0.802	2.52	328.7	
7.9	17.09	0.1318	26.4	28.9	4.140	4.557	0.8670	0.583	1.39	539.1	4.735
7.9	17.09	0.8078	7.13	3.69	10.35	12.90	1.923	0.803	2.63	328.6	
8.0	17.95	0.1332	24.3	28.5	4.253	4.696	0.8817	0.589	1.47	530.0	4.411
8.0	17.95	0.7649	6.88	3.91	10.33	12.87	1.903	3.804	2.75	328.4	
8.1	18.84	0.1347	22.2	28.2	4.370	4.840	0.8969	0.595	1.56	520.5	4.087
8.1	18.84	0.7234	6.65	4.15	10.30	12.83	1.882	0.805	2.90	328.0	
8.2	19.77	0.1363	20.2	27.7	4.493	4.992	0.9127	0.602	1.68	510.5	3.763
8.2	19.77	0.6845	6.88	4.40	10.27	12.77	1.861	0.806	3.07	327.6	
8.3	20.72	0.1381	18.2	27.3	4.621	5.150	0.9290	0.608	1.81	500.2	3.440
8.3	20.72	0.6467	5.69	4.67	10.23	12.71	1.839	0.807	3.27	327.1	
8.4	21.71	0.1400	16.2	26.8	4.755	5.318	0.9460	0.616	1.96	489.4	3.116
8.4	21.71	0.6103	5.28	4.97	10.18	12.64	1.816	0.807	3.52	326.5	
8.5	22.73	0.1421	14.3	26.2	4.897	5.495	0.9638	0.623	2.16	478.2	2.792
8.5	22.73	0.5751	4.83	5.30	10.12	12.55	1.793	0.808	3.83	325.7	
8.6	23.79	0.1445	12.3	25.6	5.047	5.684	0.9826	0.631	2.40	466.4	2.469
8.6	23.79	0.5409	4.36	5.66	10.06	12.44	1.767	0.809	4.22	324.9	
8.7	24.87	0.1472	10.5	25.0	5.208	5.886	1.003	0.640	2.72	454.1	2.145
8.7	24.87	0.5073	3.86	6.06	9.97	12.31	1.740	0.809	4.75	323.9	
8.8	26.00	0.1503	8.66	24.3	5.382	6.106	1.024	0.649	3.15	441.2	1.821
8.8	26.00	0.4742	3.33	6.51	9.873	12.16	1.711	0.810	5.47	322.9	
8.9	27.15	0.1540	6.98	23.5	5.573	6.348	1.048	0.660	3.78	427.7	1.497
8.9	27.15	0.4412	2.77	7.03	9.751	11.97	1.679	0.810	6.54	321.9	
9.0	28.35	0.1585	5.21	22.5	5.787	6.619	1.074	0.671	4.75	413.3	1.174
9.0	28.35	0.4076	2.18	7.66	9.596	11.74	1.642	0.809	8.26	321.0	
9.1	29.58	0.1642	3.61	21.5	6.035	6.934	1.109	0.684	6.48	398.1	0.8499
9.1	29.58	0.3726	1.58	8.43	9.393	11.43	1.594	0.808	11.5	320.3	
9.2	30.85	0.1721	2.13	20.2	6.339	7.392	1.153	0.700	10.3	381.4	0.5261
9.2	30.85	0.3342	0.915	9.48	9.187	11.02	1.546	0.805	19.5	320.4	
9.3	32.15	0.1857	0.793	18.3	6.779	7.893	1.199	0.724	25.8	361.6	0.2824
9.3	32.15	0.2867	0.293	11.2	8.627	10.33	1.487	0.797	61.2	322.9	
* 9.363	32.99	0.2388									0.000
* 9.363	32.99	0.2388									

THERMODYNAMIC PROPERTIES OF COEXISTING GASEOUS AND LIQUID HELIUM

TEMPERATURE	DENSITY	$V(DH/DV)_P$	$V(DP/DU)_V$	$-V(DP/DV)_T$	$(DV/DT)/V_P$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	DEG. R	BTU/FT-HR-R	LB/FT-SEC ×10⁶	SQ FT/HR		
6.9	0.215	11.6	7.00	396.0	0.0771	0.0112	2.26	0.00151	1.01965	0.655
6.9	0.7165	6.29	3.64	6.77	0.306	0.00530	0.730	0.00385	1.00262	0.954
7.0	0.163	11.4	6.98	375.0	0.0814	0.0112	2.24	0.00147	1.01968	0.671
7.0	0.7578	6.30	3.65	7.04	0.312	0.00541	0.745	0.00363	1.00277	0.975
7.1	0.109	11.2	6.95	355.0	0.0859	0.0112	2.22	0.00143	1.01954	0.688
7.1	0.8011	6.31	3.66	7.30	0.319	0.00552	0.759	0.00342	1.00292	1.00
7.2	0.353	11.0	6.92	334.0	0.0909	0.0113	2.21	0.00139	1.01949	0.707
7.2	0.8465	6.32	3.66	7.55	0.327	0.00563	0.774	0.00322	1.00308	1.02
7.3	7.995	10.8	6.88	314.0	0.0963	0.0113	2.19	0.00135	1.01942	0.728
7.3	0.8941	6.33	3.67	7.78	0.336	0.00575	0.798	0.00303	1.00325	1.05
7.4	7.934	10.6	6.83	294.0	0.102	0.0113	2.17	0.00131	1.01936	0.750
7.4	0.9441	6.33	3.67	8.31	0.346	0.00587	0.805	0.00284	1.00342	1.08
7.5	7.871	10.4	6.78	275.0	0.109	0.0113	2.15	0.00127	1.01929	0.775
7.5	0.997	6.33	3.68	8.22	0.357	0.00600	0.821	0.00267	1.00360	1.11
7.6	7.805	10.2	6.73	256.0	0.116	0.0114	2.13	0.00122	1.01922	0.803
7.6	1.052	6.32	3.69	8.41	0.369	0.00614	0.837	0.00250	1.00379	1.15
7.604	7.802	10.2	6.73	255.0	0.117	0.0114	2.13	0.00122	1.01921	0.804
7.604	1.054	6.32	3.69	8.42	0.370	0.00614	0.838	0.00249	1.00380	1.15
7.7	7.736	10.0	6.67	237.0	0.124	0.0114	2.11	0.00118	1.01914	0.833
7.7	1.111	6.31	3.70	8.58	0.383	0.00628	0.854	0.00234	1.00399	1.18
7.8	7.664	9.82	6.60	218.0	0.134	0.0114	2.09	0.00113	1.01906	0.868
7.8	1.172	6.30	3.70	8.72	0.399	0.00643	0.871	0.00218	1.00420	1.23
7.9	7.588	9.61	6.53	200.0	0.144	0.0114	2.07	0.00108	1.01897	0.907
7.9	1.239	6.28	3.71	8.82	0.418	0.00659	0.888	0.00203	1.00442	1.27
8.0	7.509	9.39	6.45	182.0	0.156	0.0114	2.05	0.00103	1.01887	0.952
8.0	1.307	6.26	3.72	8.89	0.440	0.00676	0.906	0.00188	1.00466	1.33
8.1	7.426	9.18	6.37	165.0	0.171	0.0115	2.03	0.000988	1.01877	0.994
8.1	1.382	6.23	3.73	8.92	0.465	0.00694	0.924	0.00173	1.00490	1.39
8.2	7.337	8.95	6.28	148.0	0.187	0.0115	2.01	0.000937	1.01866	1.05
8.2	1.461	6.20	3.74	8.89	0.495	0.00715	0.944	0.00160	1.00517	1.46
8.3	7.244	8.73	6.19	132.0	0.207	0.0116	1.98	0.000884	1.01853	1.11
8.3	1.546	6.16	3.75	8.80	0.531	0.00738	0.964	0.00146	1.00545	1.54
8.4	7.144	8.49	6.09	116.0	0.231	0.0116	1.96	0.000829	1.01840	1.19
8.4	1.630	6.12	3.76	8.64	0.575	0.00764	0.984	0.00132	1.00575	1.63
8.5	7.036	8.25	5.98	100.0	0.261	0.0117	1.93	0.000771	1.01825	1.28
8.5	1.739	6.08	3.77	8.40	0.630	0.00795	1.01	0.00119	1.00607	1.75
8.6	6.920	8.00	5.87	85.6	0.300	0.0118	1.90	0.000709	1.01809	1.40
8.6	1.849	6.02	3.78	8.06	0.701	0.00832	1.03	0.00136	1.00642	1.60
8.7	6.793	7.75	5.75	71.2	0.351	0.0119	1.88	0.000645	1.01790	1.54
8.7	1.971	5.97	3.80	7.61	0.796	0.00877	1.05	0.000937	1.00688	2.05
8.8	6.652	7.48	5.62	57.6	0.421	0.0121	1.84	0.000576	1.01769	1.73
8.8	2.109	5.90	3.81	7.03	0.927	0.00936	1.08	0.000612	1.00723	2.27
8.9	6.496	7.21	5.48	44.8	0.524	0.0124	1.81	0.000504	1.01745	1.99
8.9	2.267	5.84	3.83	6.20	1.12	0.0102	1.11	0.000647	1.00771	2.56
9.0	6.310	6.93	5.32	32.9	0.685	0.0128	1.77	0.000420	1.01715	2.37
9.0	2.493	5.77	3.86	5.36	1.43	0.0114	1.14	0.000565	1.00827	2.97
9.1	6.091	6.64	5.15	22.0	0.975	0.0137	1.73	0.000348	1.01679	2.94
9.1	2.684	5.69	3.89	4.18	2.02	0.0137	1.18	0.000444	1.00894	3.57
9.2	5.819	6.34	4.95	12.4	1.63	0.0159	1.60	0.000245	1.01629	3.93
9.2	2.993	5.63	3.94	2.74	3.46	0.0190	1.23	0.000326	1.00982	4.56
9.3	5.385	6.02	4.69	4.27	4.20	0.0252	1.60	0.000101	1.01549	5.90
9.3	3.608	5.59	4.02	1.02	10.9	0.0457	1.30	0.000214	1.01115	6.29
* 9.363	4.343									
* 9.363	4.348									

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Appendix E, Isobaric Properties
THERMODYNAMIC PROPERTIES OF HELIUM 4

1 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1096	106.0	13.7	1.423	1.443	0.4067	0.6983	0.7141	709.9
* 4.161	0.1099	105.0	16.8	1.528	1.548	0.4324	0.5740	0.5992	711.3
* 4.161	10.42	9.69	3.263	9.236	11.17	2.759	0.7668	1.363	282.4
5.0	12.84	12.3	0.211	9.906	12.28	3.004	0.7551	1.309	314.0
6.0	15.65	15.2	0.172	10.68	13.58	3.240	0.7492	1.281	347.1
7.0	18.41	18.0	0.146	11.44	14.85	3.436	0.7466	1.268	376.7
8.0	21.14	20.8	0.127	12.20	16.11	3.605	0.7455	1.260	404.0
9.0	23.87	23.6	0.113	12.95	17.37	3.753	0.7450	1.256	429.3
10.0	26.58	26.4	0.101	13.70	18.63	3.885	0.7447	1.252	453.1
11.0	29.29	29.1	0.0918	14.45	19.88	4.004	0.7446	1.250	475.7
12.0	32.00	31.8	0.0840	15.20	21.13	4.113	0.7446	1.249	497.2
13.0	34.70	34.5	0.0774	15.95	22.38	4.213	0.7446	1.248	517.8
14.0	37.39	37.3	0.0718	16.70	23.62	4.305	0.7446	1.247	537.5
15.0	40.09	40.0	0.0670	17.45	24.87	4.391	0.7446	1.246	556.6
16.0	42.78	42.7	0.0628	18.19	26.11	4.472	0.7446	1.245	575.0
17.0	45.48	45.4	0.0591	18.94	27.36	4.547	0.7446	1.245	592.8
18.0	48.17	48.1	0.0558	19.69	28.60	4.618	0.7446	1.245	610.1
19.0	50.86	50.8	0.0528	20.43	29.85	4.686	0.7447	1.244	626.9
20.0	53.55	53.5	0.0501	21.18	31.09	4.750	0.7447	1.244	643.2
22.0	58.92	58.9	0.0456	22.67	33.58	4.868	0.7447	1.244	674.7
24.0	64.30	64.2	0.0417	24.16	36.07	4.976	0.7447	1.243	704.8
26.0	69.67	69.6	0.0385	25.65	38.55	5.076	0.7447	1.243	733.7
28.0	75.04	75.0	0.0358	27.14	41.04	5.168	0.7447	1.243	761.4
30.0	80.41	80.4	0.0334	28.63	43.52	5.254	0.7447	1.242	788.2
32.0	85.78	85.8	0.0313	30.13	46.01	5.334	0.7447	1.242	814.0
34.0	91.14	.1	0.0294	31.62	48.49	5.409	0.7447	1.242	839.1
36.0	96.51	.5	0.0278	33.11	50.98	5.480	0.7447	1.242	863.4
38.0	101.9	102.0	0.0263	34.60	53.46	5.547	0.7447	1.242	887.1
40.0	107.2	107.0	0.0250	36.09	55.95	5.611	0.7447	1.242	910.2
45.0	120.7	121.0	0.0222	39.81	62.15	5.757	0.7447	1.242	965.4
50.0	134.1	134.0	0.0200	43.54	68.36	5.888	0.7447	1.242	1018.0
55.0	147.5	147.0	0.0182	47.26	74.57	6.006	0.7447	1.242	1067.0
60.0	160.9	161.0	0.0167	50.99	80.78	6.114	0.7447	1.242	1115.0
70.0	187.7	188.0	0.0143	58.43	93.19	6.306	0.7447	1.241	1204.0
80.0	214.5	215.0	0.0125	65.88	105.6	6.471	0.7447	1.241	1287.0
90.0	241.3	241.0	0.0111	73.33	118.0	6.618	0.7447	1.241	1365.0
100.0	268.2	268.0	0.0100	80.78	130.4	6.748	0.7447	1.241	1439.0
120.0	321.8	322.0	0.00833	95.67	155.3	6.975	0.7447	1.241	1576.0
140.0	375.4	375.0	0.00714	110.6	180.1	7.166	0.7447	1.241	1703.0
160.0	429.0	429.0	0.00625	125.5	204.9	7.332	0.7447	1.241	1820.0
180.0	482.6	483.0	0.00556	140.4	229.7	7.478	0.7447	1.241	1930.0
200.0	536.3	536.0	0.00500	155.3	254.6	7.609	0.7447	1.241	2035.0
250.0	670.3	670.0	0.00400	192.5	316.6	7.886	0.7447	1.241	2275.0
300.0	804.4	804.0	0.00333	229.7	378.7	8.112	0.7447	1.241	2492.0
350.0	938.4	938.0	0.00286	267.0	440.7	8.303	0.7447	1.241	2692.0
400.0	1072.0	1070.0	0.00250	304.2	502.8	8.469	0.7447	1.241	2878.0
450.0	1207.0	1210.0	0.00222	341.4	564.8	8.615	0.7447	1.241	3052.0
500.0	1341.0	1340.0	0.00200	378.7	626.9	8.746	0.7447	1.241	3217.0
600.0	1609.0	1610.0	0.00167	453.1	751.0	8.972	0.7447	1.241	3524.0
700.0	1877.0	1880.0	0.00143	527.6	875.1	9.164	0.7447	1.241	3807.0
800.0	2145.0	2140.0	0.00125	602.1	999.0	9.329	0.7447	1.241	4069.0
900.0	2413.0	2410.0	0.00111	676.5	1123.0	9.476	0.7447	1.241	4316.0
1000.0	2681.0	2680.0	0.00100	751.0	1247.0	9.606	0.7447	1.241	4550.0
1200.0	3217.0	3220.0	0.000833	900.0	1496.0	9.833	0.7447	1.241	4984.0
1400.0	3754.0	3750.0	0.000714	1049.0	1744.0	10.02	0.7447	1.241	5383.0
1600.0	4293.0	4290.0	0.000625	1198.0	1992.0	10.19	0.7447	1.241	5755.0
1800.0	4826.0	4830.0	0.000556	1347.0	2240.0	10.34	0.7447	1.241	6104.0
2000.0	5362.0	5360.0	0.000500	1496.0	2489.0	10.47	0.7447	1.241	6434.0
2500.0	6703.0	6700.0	0.000400	1868.0	3109.0	10.74	0.7447	1.241	7194.0
3000.0	8043.0	8040.0	0.000333	2240.0	3730.0	10.97	0.7447	1.241	7860.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

1 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.121	50.4	2.16	970.0	0.0142	0.00866	2.44	0.00133	1.02039	0.724
• 4.161	9.097	33.9	3.23	952.0	0.0177	0.00900	2.47	0.00165	1.02038	0.592
• 4.161	0.09992	4.82	3.57	0.929	0.283	0.00283	0.390	0.0214	1.00036	0.684
5.0	0.07786	5.93	3.59	0.956	0.221	0.00340	0.481	0.0333	1.00029	0.657
6.0	0.06392	7.22	3.60	0.972	0.177	0.00409	0.581	0.0499	1.00024	0.656
7.0	0.05433	8.49	3.61	0.980	0.149	0.00474	0.674	0.0688	1.00020	0.650
8.0	0.04729	9.76	3.61	0.986	0.129	0.00534	0.762	0.0896	1.00018	0.647
9.0	0.04190	11.0	3.61	0.989	0.114	0.00591	0.846	0.112	1.00016	0.647
10.0	0.03762	12.3	3.61	0.991	0.102	0.00644	0.925	0.137	1.00014	0.648
11.0	0.03414	13.5	3.61	0.993	0.0924	0.00694	1.00	0.163	1.00013	0.650
12.0	0.03125	14.8	3.61	0.994	0.0845	0.00742	1.08	0.190	1.00012	0.652
13.0	0.02882	16.0	3.61	1.00	0.0778	0.00787	1.15	0.219	1.00011	0.654
14.0	0.02674	17.3	3.61	1.00	0.0721	0.00830	1.21	0.249	1.00010	0.657
15.0	0.02494	18.5	3.61	1.00	0.0672	0.00872	1.28	0.280	1.00009	0.659
16.0	0.02337	19.8	3.61	1.00	0.0629	0.00911	1.35	0.313	1.00009	0.662
17.0	0.02199	21.0	3.61	1.00	0.0592	0.00950	1.41	0.347	1.00008	0.665
18.0	0.02076	22.3	3.61	1.00	0.0559	0.00987	1.47	0.382	1.00008	0.667
19.0	0.01966	23.5	3.61	1.00	0.0529	0.0102	1.53	0.418	1.00007	0.669
20.0	0.01868	24.8	3.61	1.00	0.0502	0.0106	1.59	0.456	1.00007	0.672
22.0	0.01697	27.3	3.60	1.00	0.0456	0.0113	1.70	0.533	1.00006	0.676
24.0	0.01555	29.8	3.60	1.00	0.0418	0.0119	1.81	0.615	1.00006	0.680
26.0	0.01435	32.2	3.60	1.00	0.0385	0.0125	1.91	0.702	1.00005	0.683
28.0	0.01333	34.7	3.60	1.00	0.0356	0.0131	2.01	0.792	1.00005	0.686
30.0	0.01244	37.2	3.60	1.00	0.0334	0.0137	2.11	0.885	1.00005	0.689
32.0	0.01166	39.7	3.60	1.00	0.0313	0.0142	2.23	0.983	1.00004	0.692
34.0	0.01097	42.2	3.60	1.00	0.0294	0.0148	2.29	1.08	1.00004	0.694
36.0	0.01036	44.7	3.60	1.00	0.0278	0.0153	2.38	1.19	1.00004	0.696
38.0	0.009816	47.2	3.60	1.00	0.0263	0.0158	2.47	1.30	1.00004	0.698
40.0	0.009325	49.6	3.60	1.00	0.0250	0.0163	2.55	1.41	1.00004	0.699
45.0	0.008288	55.9	3.60	1.00	0.0222	0.0175	2.76	1.70	1.00003	0.703
50.0	0.007459	62.1	3.60	1.00	0.0200	0.0187	2.95	2.02	1.00003	0.705
55.0	0.006781	68.3	3.60	1.00	0.0182	0.0198	3.13	2.35	1.00003	0.706
60.0	0.006215	74.5	3.60	1.00	0.0167	0.0209	3.31	2.71	1.00002	0.707
70.0	0.005327	86.9	3.60	1.00	0.0143	0.0230	3.65	3.48	1.00002	0.708
80.0	0.004662	99.3	3.60	1.00	0.0125	0.0250	3.96	4.32	1.00002	0.708
90.0	0.004144	112.0	3.60	1.00	0.0111	0.0269	4.26	5.24	1.00002	0.707
100.0	0.003729	124.0	3.60	1.00	0.0100	0.0288	4.55	6.23	1.00001	0.705
120.0	0.003108	149.0	3.60	1.00	0.00833	0.0324	5.09	8.41	1.00001	0.702
140.0	0.002664	174.0	3.60	1.00	0.00714	0.0359	5.61	10.9	1.00001	0.698
160.0	0.002331	199.0	3.60	1.00	0.00625	0.0392	6.09	13.6	1.00001	0.694
180.0	0.002072	223.0	3.60	1.00	0.00556	0.0425	6.56	16.5	1.00001	0.691
200.0	0.001865	248.0	3.60	1.00	0.00500	0.0456	6.89	19.7	1.00001	0.675
250.0	0.001492	310.0	3.60	1.00	0.00400	0.0531	7.90	28.7	1.00001	0.671
300.0	0.001243	372.0	3.60	1.00	0.00333	0.0602	9.00	39.0	1.00000	0.669
350.0	0.001066	434.0	3.60	1.00	0.00286	0.0669	10.0	50.6	1.00000	0.667
400.0	0.0009326	496.0	3.60	1.00	0.00250	0.0732	10.9	63.3	1.00000	0.666
450.0	0.0008288	559.0	3.60	1.00	0.00222	0.0793	11.8	77.1	1.00000	0.667
500.0	0.0007459	621.0	3.60	1.00	0.00200	0.0850	12.7	91.8	1.00000	0.668
600.0	0.0006216	745.0	3.60	1.00	0.00167	0.0962	14.4	125.0	1.00000	0.669
700.0	0.0005328	869.0	3.60	1.00	0.00143	0.107	16.0	162.0	1.00000	0.660
800.0	0.0004662	993.0	3.60	1.00	0.00125	0.117	17.6	203.0	1.00000	0.660
900.0	0.0004144	1120.0	3.60	1.00	0.00111	0.128	19.1	248.0	1.00000	0.660
1000.0	0.0003730	1240.0	3.60	1.00	0.00100	0.137	20.5	297.0	1.00000	0.667
1200.0	0.0003108	1490.0	3.60	1.00	0.000833	0.156	23.3	405.0	1.00000	0.667
1400.0	0.0002664	1740.0	3.60	1.00	0.000714	0.174	26.0	526.0	1.00000	0.667
1600.0	0.0002331	1990.0	3.60	1.00	0.000625	0.191	28.5	661.0	1.00000	0.666
1800.0	0.0002072	2230.0	3.60	1.00	0.000556	0.208	31.0	809.0	1.00000	0.666
2000.0	0.0001865	2600.0	3.60	1.00	0.000500	0.224	33.4	968.0	1.00000	0.666
2500.0	0.0001492	3100.0	3.60	1.00	0.000400	0.263	39.2	1420.0	1.00000	0.666
3000.0	0.0001243	3720.0	3.60	1.00	0.000333	0.299	44.6	1940.0	1.00000	0.666

• TWO-PHASE BOUNDARY

2 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1095	107.0	13.7	1.421	1.462	0.4063	0.6951	0.7107	713.0
* 4.789	0.1114	95.0	24.3	1.854	1.895	0.5858	0.4392	0.5074	712.9
* 4.789	5.786	10.3	0.477	9.580	11.72	2.567	8.7737	1.431	297.0
5.0	6.118	11.0	0.450	9.759	12.02	2.629	0.7686	1.403	305.5
6.0	7.569	14.3	0.358	10.57	13.30	2.877	0.7547	1.330	341.4
7.0	9.016	17.3	0.300	11.36	14.70	3.079	8.7498	1.298	372.7
8.8	10.42	20.2	0.255	12.13	15.98	3.251	0.7465	1.281	400.9
9.0	11.80	23.1	0.229	12.89	17.26	3.402	0.7453	1.271	426.9
10.0	13.18	25.9	0.205	13.65	18.53	3.535	0.7448	1.264	451.3
11.0	14.54	28.7	0.185	14.40	19.79	3.656	0.7446	1.260	474.2
12.0	15.91	31.5	0.169	15.16	21.05	3.785	0.7445	1.257	496.0
13.0	17.27	34.2	0.156	15.91	22.30	3.866	0.7444	1.254	516.0
14.0	18.63	37.0	0.145	16.66	23.56	3.958	0.7445	1.252	536.0
15.0	19.98	39.7	0.135	17.41	24.81	4.045	0.7445	1.251	556.0
16.0	21.33	42.4	0.126	18.16	26.06	4.125	0.7445	1.250	574.5
17.0	22.69	45.2	0.119	18.91	27.31	4.201	0.7446	1.249	592.4
18.0	24.04	47.9	0.112	19.65	28.56	4.273	0.7446	1.248	609.8
19.0	25.39	50.6	0.106	20.40	29.80	4.340	0.7446	1.247	626.6
20.0	26.73	53.3	0.101	21.15	31.05	4.404	0.7446	1.247	643.1
22.0	29.43	58.7	0.0913	22.64	33.54	4.523	0.7447	1.246	674.7
24.0	32.12	64.1	0.0837	24.14	36.03	4.631	0.7447	1.245	704.8
26.0	34.81	69.5	0.0772	25.63	38.52	4.731	0.7447	1.245	733.7
28.0	37.50	74.9	0.0716	27.12	41.01	4.823	0.7448	1.244	761.5
30.0	40.19	80.3	0.0668	28.62	43.50	4.909	0.7448	1.244	788.3
32.0	42.88	85.7	0.0626	30.11	45.99	4.989	0.7448	1.243	814.2
34.0	45.56	91.1	0.0589	31.60	48.47	5.064	0.7448	1.243	839.3
36.0	48.25	96.5	0.0557	33.09	50.96	5.135	0.7448	1.243	863.7
38.0	50.94	102.0	0.0527	34.58	53.45	5.203	0.7448	1.243	887.3
40.0	53.62	107.0	0.0501	36.07	55.93	5.266	0.7448	1.243	910.4
45.0	60.33	121.0	0.0445	39.80	62.14	5.413	0.7448	1.242	965.6
50.0	67.04	134.0	0.0400	43.53	68.35	5.544	0.7448	1.242	1018.0
55.0	73.75	148.0	0.0364	47.25	74.56	5.662	0.7448	1.242	1068.0
60.0	80.46	161.0	0.0334	50.90	80.77	5.770	0.7448	1.242	1115.0
70.0	93.07	188.0	0.0286	58.43	93.19	5.961	0.7448	1.242	1204.0
80.0	107.3	215.0	0.0250	65.88	105.6	6.127	0.7448	1.242	1287.0
90.0	120.7	241.0	0.0222	73.33	118.0	6.274	0.7448	1.241	1365.0
100.0	134.1	268.0	0.0200	80.77	130.4	6.404	0.7447	1.241	1439.0
120.0	160.9	322.0	0.0167	95.67	155.3	6.631	0.7447	1.241	1577.0
140.0	187.7	376.0	0.0143	110.6	180.1	6.822	0.7447	1.241	1703.0
160.0	214.5	429.0	0.0125	125.5	204.9	6.988	0.7447	1.241	1820.0
180.0	241.3	483.0	0.0111	140.4	229.7	7.134	0.7447	1.241	1931.0
200.0	268.2	536.0	0.0100	155.3	254.6	7.265	0.7447	1.241	2035.0
250.0	335.2	670.0	0.00808	192.5	316.6	7.542	0.7447	1.241	2275.0
300.0	402.2	805.0	0.00667	229.7	378.7	7.768	0.7447	1.241	2492.0
350.0	469.2	939.0	0.00571	267.0	440.7	7.959	0.7447	1.241	2692.0
400.0	536.3	1070.0	0.00500	304.2	502.8	8.125	0.7447	1.241	2878.0
450.0	603.3	1210.0	0.00444	341.4	564.9	8.271	0.7447	1.241	3052.0
500.0	670.3	1340.0	0.00400	378.7	626.9	8.402	0.7447	1.241	3217.0
600.0	804.4	1610.0	0.00333	453.1	751.0	8.628	0.7447	1.241	3524.0
700.0	938.4	1880.0	0.00286	527.6	875.2	8.828	0.7447	1.241	3807.0
800.0	1072.0	2150.0	0.00250	602.1	999.4	8.985	0.7447	1.241	4070.0
900.0	1207.0	2410.0	0.00222	676.9	1123.0	9.132	0.7447	1.241	4316.0
1000.0	1341.0	2680.0	0.00200	751.0	1248.0	9.262	0.7447	1.241	4550.0
1200.0	1609.0	3220.0	0.00167	900.0	1496.0	9.489	0.7447	1.241	4960.0
1400.0	1877.0	3750.0	0.00143	1049.0	1744.0	9.680	0.7447	1.241	5303.0
1600.0	2145.0	4290.0	0.00125	1198.0	1992.0	9.846	0.7447	1.241	5759.0
1800.0	2413.0	4830.0	0.00111	1347.0	2240.0	9.99	0.7447	1.241	6100.0
2000.0	2681.0	5360.0	0.00100	1496.0	2489.0	10.12	0.7447	1.241	6430.0
2500.0	3351.0	6700.0	0.000800	1868.0	3109.0	10.40	0.7447	1.241	7194.0
3000.0	4022.0	8040.0	0.000667	2240.0	3730.0	10.63	0.7447	1.241	7880.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

2 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_P$	V(DP/DU)$_v$	-V(DP/DV)$_T$	(DV/DT)/V$_P$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR	CONSTANT	NUMBER
4.0	9.131	58.7	2.17	980.0	0.0148	0.00868	2.45	0.00134	1.02848	0.723
* 4.789	8.975	17.8	6.15	852.0	0.0285	0.00982	2.51	0.00216	1.02829	0.467
* 4.789	0.1728	5.33	3.57	1.78	0.268	0.00334	0.463	0.0135	1.00065	0.713
5.0	0.1637	5.63	3.58	1.81	0.249	0.00348	0.485	0.0152	1.00061	0.704
6.6	0.1318	6.98	3.60	1.88	0.191	0.00414	0.587	0.0236	1.00049	0.679
7.0	0.1139	8.30	3.61	1.92	0.156	0.00477	0.680	0.0332	1.00042	0.665
8.0	0.09601	9.59	3.62	1.94	0.134	0.00537	0.768	0.0437	1.00036	0.659
9.0	0.08474	10.9	3.62	1.96	0.117	0.00593	0.851	0.0551	1.00032	0.656
10.0	0.07589	12.1	3.62	1.97	0.104	0.00646	0.931	0.0673	1.00029	0.656
11.0	0.06875	13.4	3.62	1.97	0.0939	0.00696	1.01	0.0804	1.00026	0.656
12.0	0.06286	14.7	3.62	1.98	0.0856	0.00743	1.08	0.0941	1.00024	0.657
13.0	0.05791	15.9	3.62	1.98	0.0787	0.00789	1.15	0.109	1.00022	0.659
14.0	0.05369	17.2	3.62	1.98	0.0728	0.00832	1.22	0.124	1.00020	0.661
15.0	0.05005	18.5	3.61	1.99	0.0678	0.00873	1.29	0.139	1.00019	0.663
16.0	0.04687	19.7	3.61	1.99	0.0634	0.00913	1.35	0.156	1.00018	0.665
17.0	0.04408	21.0	3.61	1.99	0.0596	0.00952	1.41	0.173	1.00017	0.667
18.0	0.04160	22.2	3.61	1.99	0.0562	0.00989	1.47	0.190	1.00016	0.669
19.0	0.03939	23.5	3.61	1.99	0.0531	0.0102	1.53	0.209	1.00015	0.672
20.0	0.03748	24.7	3.61	1.99	0.0504	0.0106	1.59	0.227	1.00014	0.674
22.0	0.03398	27.2	3.61	2.00	0.0458	0.0113	1.70	0.266	1.00013	0.678
24.0	0.03113	29.7	3.61	2.00	0.0419	0.0119	1.81	0.307	1.00012	0.681
26.0	0.02872	32.2	3.61	2.00	0.0386	0.0125	1.91	0.350	1.00011	0.684
28.0	0.02666	34.7	3.61	2.00	0.0358	0.0131	2.01	0.395	1.00010	0.687
30.0	0.02488	37.2	3.61	2.00	0.0334	0.0137	2.11	0.442	1.00009	0.690
32.0	0.02332	39.7	3.61	2.00	0.0313	0.0142	2.20	0.491	1.00009	0.692
34.0	0.02199	42.2	3.61	2.00	0.0295	0.0148	2.29	0.542	1.00008	0.695
36.0	0.02072	44.7	3.61	2.00	0.0278	0.0153	2.38	0.594	1.00008	0.697
38.0	0.01963	47.1	3.61	2.00	0.0264	0.0158	2.47	0.649	1.00007	0.698
40.0	0.01865	49.6	3.60	2.00	0.0250	0.0163	2.55	0.705	1.00007	0.700
45.0	0.01657	55.9	3.60	2.00	0.0222	0.0175	2.76	0.852	1.00006	0.703
50.0	0.01492	62.1	3.60	2.00	0.0200	0.0187	2.95	1.01	1.00006	0.705
55.0	0.01356	68.3	3.60	2.00	0.0182	0.0198	3.13	1.18	1.00005	0.707
60.0	0.01243	74.5	3.60	2.00	0.0167	0.0209	3.31	1.36	1.00005	0.707
70.0	0.01065	86.9	3.60	2.00	0.0143	0.0230	3.65	1.74	1.00004	0.708
80.0	0.009322	99.3	3.60	2.00	0.0125	0.0250	3.96	2.16	1.00004	0.708
90.0	0.008286	112.0	3.60	2.00	0.0111	0.0270	4.26	2.62	1.00003	0.707
100.0	0.007457	124.0	3.60	2.00	0.0100	0.0288	4.55	3.11	1.00003	0.705
120.0	0.006215	149.0	3.60	2.00	0.00833	0.0324	5.09	4.21	1.00002	0.702
140.0	0.005327	174.0	3.60	2.00	0.00714	0.0359	5.61	5.43	1.00002	0.698
160.0	0.004661	199.0	3.60	2.00	0.00625	0.0392	6.09	6.78	1.00002	0.694
180.0	0.004143	223.0	3.60	2.00	0.00555	0.0425	6.56	8.26	1.00002	0.691
200.0	0.003729	248.0	3.60	2.00	0.00500	0.0456	6.89	9.85	1.00001	0.679
250.0	0.002983	310.0	3.60	2.00	0.00400	0.0531	7.90	14.3	1.00001	0.671
300.0	0.002486	372.0	3.60	2.00	0.00333	0.0602	9.00	19.5	1.00001	0.669
350.0	0.002131	434.0	3.60	2.00	0.00286	0.0669	10.0	25.3	1.00001	0.667
400.0	0.001865	497.0	3.60	2.00	0.00250	0.0732	10.9	31.6	1.00001	0.666
450.0	0.001658	559.0	3.60	2.00	0.00222	0.0793	11.8	38.5	1.00001	0.667
500.0	0.001492	621.0	3.60	2.00	0.00200	0.0850	12.7	45.9	1.00001	0.660
600.0	0.001243	745.0	3.60	2.00	0.00167	0.0962	14.4	62.3	1.00000	0.669
700.0	0.001066	869.0	3.60	2.00	0.00143	0.107	16.0	80.9	1.00000	0.660
800.0	0.0009324	993.0	3.60	2.00	0.00125	0.117	17.6	102.0	1.00000	0.660
900.0	0.0008288	1120.0	3.60	2.00	0.00111	0.128	19.1	126.0	1.00000	0.660
1000.0	0.0007499	1240.0	3.60	2.00	0.00100	0.137	20.5	148.0	1.00000	0.667
1200.0	0.0006216	1490.0	3.60	2.00	0.000833	0.156	23.3	202.0	1.00000	0.667
1400.0	0.0005328	1740.0	3.60	2.00	0.000714	0.174	26.0	263.0	1.00000	0.667
1600.0	0.0004662	1990.0	3.60	2.00	0.000625	0.191	28.5	331.0	1.00000	0.666
1800.0	0.0004144	2230.0	3.60	2.00	0.000556	0.208	31.0	404.0	1.00000	0.666
2000.0	0.0003730	2480.0	3.60	2.00	0.000500	0.224	33.4	484.0	1.00000	0.666
2500.0	0.0002984	3100.0	3.60	2.00	0.000400	0.263	39.2	709.0	1.00000	0.666
3000.0	0.0002487	3720.0	3.60	2.00	0.000333	0.299	44.6	970.0	1.00000	0.666

* TWO-PHASE BOUNDARY

33

THERMODYNAMIC PROPERTIES OF HELIUM 4

4 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1093	109.0	13.7	1.418	1.439	0.4854	0.6888	0.7041	719.1
5.0	0.1118	92.3	25.8	1.955	2.032	0.5264	0.4407	0.5238	713.1
* 5.570	0.1142	78.6	28.4	2.275	2.360	0.5873	0.4688	0.6056	686.5
* 5.570	3.102	10.5	0.880	9.943	12.30	2.377	0.7813	1.549	311.1
6.0	3.536	12.2	0.784	10.33	12.95	2.489	0.7695	1.469	328.6
7.0	4.339	15.7	0.636	11.17	14.36	2.707	0.7553	1.374	364.0
8.0	5.046	18.9	0.540	11.97	15.71	2.888	0.7492	1.338	394.5
9.0	5.764	22.8	0.471	12.76	17.03	3.043	0.7464	1.305	422.1
10.0	6.471	25.0	0.419	13.53	18.32	3.179	0.7451	1.290	447.5
11.0	7.170	27.9	0.378	14.30	19.61	3.302	0.7446	1.280	471.2
12.0	7.864	30.7	0.344	15.06	20.89	3.413	0.7443	1.273	493.6
13.0	8.554	33.6	0.316	15.82	22.16	3.515	0.7442	1.268	514.9
14.0	9.242	36.4	0.292	16.58	23.42	3.602	0.7442	1.264	535.2
15.0	9.927	39.2	0.272	17.33	24.69	3.696	0.7443	1.261	554.7
16.0	10.61	42.0	0.254	18.09	25.95	3.777	0.7443	1.259	573.5
17.0	11.29	44.8	0.239	18.84	27.20	3.853	0.7444	1.257	591.6
18.0	11.97	47.5	0.225	19.59	28.46	3.925	0.7445	1.255	609.1
19.0	12.65	50.3	0.213	20.34	29.71	3.993	0.7445	1.254	626.1
20.0	13.33	53.0	0.202	21.09	30.97	4.057	0.7446	1.252	642.7
22.0	14.68	58.5	0.184	22.59	33.47	4.176	0.7447	1.251	674.5
24.0	16.04	63.9	0.168	24.09	35.97	4.285	0.7447	1.249	704.8
26.0	17.39	69.4	0.155	25.59	38.46	4.385	0.7448	1.248	733.8
28.0	18.73	74.8	0.144	27.08	40.96	4.477	0.7448	1.247	761.7
30.0	23.08	80.2	0.134	28.58	43.45	4.563	0.7448	1.246	788.6
32.0	21.43	85.6	0.126	30.07	45.95	4.644	0.7449	1.246	814.5
34.0	22.78	91.0	0.118	31.57	48.44	4.719	0.7449	1.245	839.7
36.0	24.12	96.4	0.111	33.06	50.93	4.791	0.7449	1.245	864.1
38.0	25.47	102.0	0.106	34.55	53.42	4.858	0.7449	1.244	887.8
40.0	26.81	107.0	0.100	36.05	55.90	4.922	0.7449	1.244	910.9
45.0	30.17	121.0	0.0891	39.78	62.12	5.068	0.7449	1.243	966.1
50.0	33.53	134.0	0.0801	43.51	68.34	5.199	0.7449	1.243	1018.0
55.0	36.88	148.0	0.0728	47.23	74.55	5.318	0.7449	1.243	1068.0
60.0	40.24	161.0	0.0667	50.96	80.77	5.426	0.7449	1.243	1116.0
70.0	46.95	188.0	0.0572	58.41	93.19	5.617	0.7448	1.242	1205.0
80.0	53.66	215.0	0.0588	65.87	105.6	5.783	0.7448	1.242	1288.0
90.0	60.36	242.0	0.3445	73.32	118.0	5.929	0.7448	1.242	1366.0
100.0	67.07	268.0	0.0400	80.77	130.4	6.060	0.7448	1.242	1440.0
120.0	80.48	322.0	0.0333	95.66	155.3	6.286	0.7448	1.241	1577.0
140.0	93.88	376.0	0.0286	110.6	180.1	6.478	0.7448	1.241	1703.0
160.0	107.3	429.0	0.0258	125.5	204.9	6.644	0.7448	1.241	1821.0
180.0	120.7	483.0	0.0222	140.4	229.8	6.790	0.7447	1.241	1931.0
200.0	134.1	537.0	0.0200	155.2	254.6	6.921	0.7447	1.241	2035.0
250.0	167.6	671.0	0.0160	192.5	316.6	7.198	0.7447	1.241	2275.0
300.0	201.1	805.0	0.0133	229.7	378.7	7.424	0.7447	1.241	2493.0
350.0	234.6	939.0	0.0114	267.0	440.8	7.615	0.7447	1.241	2692.0
400.0	268.2	1070.0	0.0100	304.2	502.8	7.781	0.7447	1.241	2878.0
450.0	301.7	1210.0	0.00889	341.4	564.9	7.927	0.7447	1.241	3052.0
500.0	335.2	1340.0	0.00800	378.7	626.9	8.058	0.7447	1.241	3218.0
600.0	402.2	1610.0	0.00667	453.1	751.1	8.284	0.7447	1.241	3525.0
700.0	469.2	1880.0	0.00571	527.6	875.2	8.475	0.7447	1.241	3807.0
800.0	536.3	2150.0	0.00500	602.1	999.0	8.641	0.7447	1.241	4078.0
900.0	603.3	2410.0	0.00444	676.5	1123.0	8.787	0.7447	1.241	4316.0
1000.0	670.3	2680.0	0.00400	751.0	1246.0	8.918	0.7447	1.241	4550.0
1200.0	804.4	3220.0	0.00333	900.0	1494.0	9.144	0.7447	1.241	4984.0
1400.0	938.4	3790.0	0.00286	1049.0	1744.0	9.336	0.7447	1.241	5363.0
1600.0	1072.0	4290.0	0.00250	1198.0	1992.0	9.502	0.7447	1.241	5755.0
1800.0	1207.0	4830.0	0.00222	1347.0	2240.0	9.648	0.7447	1.241	6104.0
2000.0	1341.0	5360.0	0.00200	1496.0	2489.0	9.778	0.7447	1.241	6434.0
2500.0	1676.0	6700.0	0.00160	1868.0	3109.0	10.06	0.7447	1.241	7194.0
3000.0	2011.0	8040.0	0.00133	2240.0	3730.0	10.28	0.7447	1.241	7888.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

4 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ P 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.3	9.150	51.2	2.18	1030.0	0.0137	0.00870	2.47	0.00135	1.02041	0.720
5.0	8.941	16.8	6.54	826.0	0.0312	0.0100	2.52	0.00214	1.02027	0.474
* 5.570	8.758	14.7	6.93	688.0	0.5412	0.0104	2.45	0.00196	1.02013	0.514
* 5.570	0.3142	5.83	3.58	3.31	0.266	0.00403	0.556	0.00828	1.00117	0.769
6.0	0.2828	6.47	3.60	3.45	0.227	0.00427	0.599	0.0103	1.00106	0.741
7.0	0.2321	7.09	3.63	3.65	0.174	0.00486	0.692	0.0152	1.00087	0.704
8.0	0.1982	9.24	3.64	3.75	0.144	0.00544	0.788	0.0206	1.00074	0.686
9.0	0.1735	10.6	3.64	3.82	0.123	0.00599	0.862	0.0264	1.00065	0.677
10.0	0.1545	11.9	3.64	3.86	0.109	0.00651	0.941	0.0326	1.00058	0.672
11.0	0.1395	13.2	3.64	3.89	0.0971	0.00700	1.02	0.0392	1.00052	0.669
12.0	0.1272	14.5	3.63	3.91	0.0880	0.00748	1.09	0.0462	1.00048	0.668
13.0	0.1169	15.8	3.63	3.93	0.0805	0.00793	1.16	0.0535	1.00046	0.668
14.0	0.1082	17.0	3.63	3.94	0.0742	0.00836	1.23	0.0611	1.00041	0.669
15.0	0.1007	18.3	3.63	3.95	0.0689	0.00877	1.29	0.0690	1.00038	0.670
16.0	0.09425	19.6	3.63	3.96	0.0643	0.00916	1.36	0.0773	1.00035	0.671
17.0	0.08857	20.8	3.63	3.96	0.0603	0.00955	1.42	0.0858	1.00033	0.673
18.0	0.08353	22.1	3.62	3.97	0.0568	0.00992	1.48	0.0946	1.00031	0.674
19.0	0.07905	23.4	3.62	3.97	0.0537	0.0103	1.54	0.104	1.00030	0.676
20.0	0.07503	24.6	3.62	3.98	0.0509	0.0106	1.60	0.113	1.00028	0.677
22.0	0.06810	27.1	3.62	3.98	0.0461	0.0113	1.71	0.133	1.00026	0.681
24.0	0.06236	29.6	3.62	3.99	0.0421	0.0119	1.82	0.153	1.00023	0.684
26.0	0.05752	32.2	3.62	3.99	0.0388	0.0126	1.92	0.175	1.00022	0.687
28.0	0.05338	34.7	3.61	3.99	0.0360	0.0131	2.02	0.197	1.00020	0.689
30.0	0.04979	37.2	3.61	3.99	0.0335	0.0137	2.11	0.221	1.00019	0.692
32.0	0.04666	39.7	3.61	4.00	0.0314	0.0143	2.21	0.245	1.00018	0.694
34.0	0.04391	42.1	3.61	4.00	0.0295	0.0148	2.30	0.271	1.00017	0.696
36.0	0.04146	44.6	3.61	4.00	0.0279	0.0153	2.39	0.297	1.00016	0.698
38.0	0.03927	47.1	3.61	4.00	0.0264	0.0158	2.47	0.324	1.00015	0.699
40.0	0.03730	49.6	3.61	4.00	0.0251	0.0163	2.56	0.352	1.00014	0.701
45.0	0.03315	55.9	3.61	4.00	0.0223	0.0176	2.76	0.426	1.00013	0.703
50.0	0.02983	62.1	3.61	4.00	0.0200	0.0187	2.95	0.505	1.00011	0.706
55.0	0.02711	68.3	3.61	4.00	0.0182	0.0198	3.14	0.589	1.00010	0.707
60.0	0.02485	74.5	3.61	4.00	0.0167	0.0209	3.31	0.678	1.00010	0.707
70.0	0.02130	86.9	3.60	4.00	0.0143	0.0230	3.65	0.870	1.00008	0.708
80.0	0.01864	99.4	3.60	4.00	0.0125	0.0250	3.96	1.08	1.00007	0.708
90.0	0.01657	112.0	3.60	4.00	0.0111	0.0270	4.26	1.31	1.00006	0.707
100.0	0.01491	124.0	3.60	4.00	0.0100	0.0288	4.55	1.56	1.00006	0.705
120.0	0.01243	149.0	3.60	4.00	0.00833	0.0325	5.10	2.10	1.00005	0.702
140.0	0.01065	174.0	3.60	4.00	0.00714	0.0359	5.61	2.72	1.00004	0.698
160.0	0.009328	199.0	3.60	4.00	0.00625	0.0392	6.10	3.39	1.00004	0.694
180.0	0.008285	224.0	3.60	4.00	0.00555	0.0425	6.56	4.13	1.00003	0.691
200.0	0.007457	248.0	3.60	4.00	0.00500	0.0456	6.99	4.93	1.00003	0.675
250.0	0.005966	310.0	3.60	4.00	0.00400	0.0531	7.98	7.17	1.00002	0.671
300.0	0.004972	372.0	3.60	4.00	0.00333	0.0602	9.00	9.75	1.00002	0.669
350.0	0.004262	435.0	3.60	4.00	0.00286	0.0669	10.0	12.6	1.00002	0.667
400.0	0.003729	497.0	3.60	4.00	0.00250	0.0732	10.9	15.8	1.00001	0.666
450.0	0.003315	559.0	3.60	4.00	0.00222	0.0793	11.8	19.3	1.00001	0.667
500.0	0.002983	621.0	3.60	4.00	0.00200	0.0850	12.7	23.0	1.00001	0.668
600.0	0.002486	745.0	3.60	4.00	0.00167	0.0962	14.4	31.2	1.00001	0.669
700.0	0.002131	869.0	3.60	4.00	0.00143	0.107	16.0	40.5	1.00001	0.668
800.0	0.001865	993.0	3.60	4.00	0.00125	0.117	17.6	50.8	1.00001	0.668
900.0	0.001658	1120.0	3.60	4.00	0.00111	0.128	19.1	62.0	1.00001	0.668
1000.0	0.001492	1240.0	3.60	4.00	0.00100	0.137	20.5	74.2	1.00001	0.667
1200.0	0.001243	1490.0	3.60	4.00	0.000833	0.156	23.3	101.0	1.00000	0.667
1400.0	0.001066	1740.0	3.60	4.00	0.000714	0.174	26.0	132.0	1.00000	0.667
1600.0	0.0009324	1990.0	3.60	4.00	0.000625	0.191	28.5	165.0	1.00000	0.666
1800.0	0.0008288	2230.0	3.60	4.00	0.000556	0.208	31.0	202.0	1.00000	0.666
2000.0	0.0007459	2480.0	3.60	4.00	0.000500	0.224	33.4	242.0	1.00000	0.666
2500.0	0.0005968	3100.0	3.60	4.00	0.000400	0.263	39.2	359.0	1.00000	0.666
3000.0	0.0004973	3720.0	3.60	4.00	0.000333	0.299	44.6	485.0	1.00000	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

6 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
4.0	0.1091	111.0	13.7	1.414	1.536	0.4045	0.6826	0.6976	725.8
5.0	0.1116	96.3	25.8	1.946	2.070	0.5246	0.4399	0.5213	719.2
6.0	0.1161	69.3	29.6	2.538	2.667	0.6330	0.4099	0.6798	667.3
• 6.114	0.1167	66.2	29.9	2.616	2.746	0.6461	0.4955	0.7032	659.6
• 6.114	2.223	10.3	1.28	10.14	12.61	2.263	0.7863	1.666	318.5
7.0	2.727	14.8	1.02	10.96	13.99	2.474	0.7637	1.478	354.3
8.0	3.250	17.6	0.846	11.81	15.42	2.665	0.7529	1.389	387.8
9.0	3.748	20.9	0.730	12.62	16.78	2.826	0.7480	1.345	417.1
10.0	4.234	24.0	0.644	13.41	18.12	2.966	0.7457	1.319	443.6
11.0	4.711	27.1	0.578	14.19	19.43	3.091	0.7447	1.302	468.2
12.0	5.182	30.0	0.524	14.96	20.72	3.204	0.7442	1.291	491.2
13.0	5.649	33.8	0.481	15.73	22.01	3.307	0.7441	1.283	512.9
14.0	6.113	35.8	0.444	16.50	23.29	3.401	0.7441	1.276	533.6
15.0	6.575	38.7	0.412	17.26	24.56	3.489	0.7441	1.272	553.4
16.0	7.035	41.5	0.385	18.02	25.83	3.571	0.7442	1.268	572.4
17.0	7.493	44.3	0.361	18.77	27.10	3.648	0.7443	1.265	590.8
18.0	7.950	47.1	0.340	19.53	28.36	3.720	0.7444	1.262	608.5
19.0	8.405	49.9	0.322	20.28	29.62	3.788	0.7444	1.260	625.7
20.0	8.868	52.7	0.305	21.04	30.88	3.853	0.7445	1.258	642.3
22.0	9.760	58.2	0.277	22.54	33.39	3.973	0.7446	1.255	674.3
24.0	10.67	63.7	0.253	24.04	35.90	4.082	0.7447	1.253	704.8
26.0	11.58	69.2	0.233	25.54	38.41	4.182	0.7448	1.251	733.9
28.0	12.48	74.7	0.216	27.04	40.91	4.275	0.7449	1.250	761.9
30.0	13.38	80.1	0.202	28.54	43.41	4.361	0.7449	1.249	788.9
32.0	14.28	85.6	0.189	30.04	45.90	4.441	0.7449	1.248	815.9
34.0	15.18	91.0	0.178	31.53	48.40	4.517	0.7449	1.247	848.1
36.0	16.08	96.4	0.168	33.03	50.89	4.588	0.7450	1.247	864.5
38.0	16.98	102.0	0.159	34.52	53.38	4.656	0.7450	1.246	888.2
40.0	17.87	107.0	0.151	36.02	55.88	4.720	0.7458	1.246	911.3
45.0	20.12	121.0	0.134	39.75	62.10	4.866	0.7450	1.245	966.7
50.0	22.36	134.0	0.120	43.48	68.32	4.997	0.7450	1.244	1019.0
55.0	24.60	148.0	0.109	47.21	74.54	5.116	0.7449	1.243	1069.0
60.0	26.83	161.0	0.100	50.94	80.76	5.224	0.7449	1.243	1116.0
70.0	31.31	188.0	0.0858	58.40	93.19	5.416	0.7449	1.243	1205.0
80.0	35.78	215.0	0.0751	65.85	105.6	5.582	0.7449	1.242	1288.6
90.0	40.25	242.0	0.0667	73.31	118.0	5.728	0.7449	1.242	1366.0
100.0	44.73	269.0	0.0600	80.76	130.4	5.859	0.7448	1.242	1440.0
120.0	53.67	322.0	0.0500	95.66	155.3	6.085	0.7448	1.242	1577.0
150.0	62.60	376.0	0.0429	110.6	180.1	6.276	0.7448	1.241	1704.0
160.0	71.54	430.0	0.0375	125.5	204.9	6.442	0.7448	1.241	1821.0
180.0	80.48	483.0	0.0333	140.4	229.8	6.588	0.7448	1.241	1931.0
200.0	89.42	537.0	0.0308	155.2	254.6	6.719	0.7448	1.241	2036.0
250.0	111.8	671.0	0.0248	192.5	316.7	6.996	0.7448	1.241	2276.0
300.0	134.1	805.0	0.0200	229.7	378.7	7.223	0.7447	1.241	2493.0
350.0	156.4	939.0	0.0171	267.0	440.8	7.414	0.7447	1.241	2692.0
400.0	178.8	1070.0	0.0150	304.2	502.8	7.580	0.7447	1.241	2878.0
450.0	201.1	1210.0	0.0133	341.4	564.9	7.726	0.7447	1.241	3053.0
500.0	223.5	1340.0	0.0120	378.7	627.0	7.857	0.7447	1.241	3210.0
600.0	268.2	1610.0	0.0100	453.1	751.1	8.083	0.7447	1.241	3525.0
700.0	312.8	1880.0	0.00897	527.6	875.2	8.274	0.7447	1.241	3807.0
800.0	357.5	2150.0	0.00750	602.1	999.0	8.440	0.7447	1.241	4075.0
900.0	402.2	2410.0	0.00667	676.6	1123.0	8.586	0.7447	1.241	4317.0
1000.0	446.9	2680.0	0.00608	751.0	1246.0	8.717	0.7447	1.241	4550.0
1200.0	536.3	3220.0	0.00508	900.0	1496.0	8.943	0.7447	1.241	4954.0
1400.0	625.6	3750.0	0.00429	1049.0	1744.0	9.134	0.7447	1.241	5304.0
1600.0	715.0	4290.0	0.00375	1198.0	1992.0	9.300	0.7447	1.241	5755.0
1800.0	804.4	4830.0	0.00333	1347.0	2240.0	9.446	0.7447	1.241	6104.0
2000.0	893.7	5360.0	0.00300	1496.0	2489.0	9.577	0.7447	1.241	6434.0
2500.0	1117.0	6700.0	0.00240	1868.0	3109.0	9.854	0.7447	1.241	7190.0
3000.0	1341.0	8040.0	0.00200	2240.0	3730.0	10.08	0.7447	1.241	7800.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

6 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)_P BTU/LB	V(DP/DU)_v PSIA-CU FT/BTU	-V(DP/DV)_T PSIA	(DV/DT)_P/V 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.168	51.8	2.19	1020.0	0.0135	0.00872	2.49	0.00136	1.02042	0.718
5.0	8.964	17.1	6.54	845.0	0.0305	0.0101	2.54	0.00215	1.02028	0.474
6.0	8.617	13.7	7.02	597.0	0.0497	0.0107	2.41	0.00183	1.92601	0.550
* 6.114	8.566	13.4	7.03	567.0	0.0526	0.0108	2.38	0.00179	1.01997	0.561
* 6.114	0.4499	6.08	3.60	4.65	0.274	0.00452	0.624	0.00604	1.00167	0.827
7.0	0.3666	7.45	3.64	5.14	0.198	0.00497	0.706	0.00917	1.00136	0.756
8.0	0.3277	8.83	3.65	5.41	0.156	0.00551	0.792	0.0129	1.00115	0.719
9.0	0.2668	10.3	3.66	5.57	0.131	0.00605	0.874	0.0169	1.00100	0.700
10.0	0.2362	11.6	3.66	5.67	0.114	0.00656	0.952	0.0211	1.00088	0.689
11.0	0.2123	12.9	3.65	5.74	0.101	0.00785	1.03	0.0255	1.00079	0.683
12.0	0.1930	14.3	3.65	5.80	0.0905	0.00752	1.10	0.0302	1.00072	0.680
13.0	0.1770	15.6	3.65	5.83	0.0824	0.00796	1.17	0.0351	1.00066	0.678
14.0	0.1636	16.9	3.65	5.86	0.0757	0.00839	1.24	0.0402	1.00061	0.677
15.0	0.1521	18.2	3.64	5.88	0.0701	0.00880	1.30	0.0455	1.00057	0.677
16.0	0.1422	19.4	3.64	5.90	0.0652	0.00920	1.37	0.0510	1.00053	0.677
17.0	0.1335	20.7	3.64	5.92	0.0611	0.00958	1.43	0.0568	1.00050	0.678
18.0	0.1258	22.0	3.64	5.93	0.0574	0.0100	1.49	0.0627	1.00047	0.679
19.0	0.1190	23.3	3.63	5.94	0.0542	0.0103	1.55	0.0688	1.00045	0.680
20.0	0.1129	24.5	3.63	5.95	0.0513	0.0107	1.60	0.0751	1.00042	0.681
22.0	0.1024	27.1	3.63	5.96	0.0464	0.0113	1.71	0.0882	1.00039	0.684
24.0	0.09369	29.6	3.63	5.97	0.0424	0.0120	1.82	0.102	1.00035	0.686
26.0	0.08638	32.1	3.62	5.98	0.0390	0.0126	1.92	0.116	1.00033	0.689
28.0	0.08014	34.6	3.62	5.98	0.0361	0.0132	2.02	0.131	1.00030	0.691
30.0	0.07474	37.1	3.62	5.99	0.0337	0.0137	2.12	0.147	1.00028	0.693
32.0	0.07003	39.6	3.62	5.99	0.0315	0.0143	2.21	0.164	1.00026	0.695
34.0	0.06588	42.1	3.62	5.99	0.0296	0.0148	2.30	0.181	1.00025	0.697
36.0	0.06220	44.6	3.62	6.00	0.0279	0.0154	2.39	0.198	1.00023	0.699
38.0	0.05891	47.1	3.61	6.00	0.0264	0.0159	2.48	0.216	1.00022	0.700
40.0	0.05595	49.6	3.61	6.00	0.0251	0.0164	2.56	0.235	1.00021	0.701
45.0	0.04971	55.9	3.61	6.00	0.0223	0.0176	2.76	0.284	1.00019	0.734
50.0	0.04473	62.1	3.61	6.00	0.0200	0.0187	2.95	0.337	1.00017	0.706
55.0	0.04066	68.3	3.61	6.00	0.0182	0.0199	3.14	0.393	1.00015	0.707
60.0	0.03727	74.5	3.61	6.01	0.0167	0.0210	3.32	0.452	1.00014	0.708
70.0	0.03194	87.0	3.61	6.01	0.0143	0.0230	3.65	0.581	1.00012	0.709
80.0	0.02795	99.4	3.61	6.01	0.0125	0.0250	3.97	0.722	1.00011	0.708
90.0	0.02484	112.0	3.61	6.01	0.0111	0.0270	4.27	0.874	1.00009	0.707
100.0	0.02236	124.0	3.60	6.01	0.0100	0.0289	4.55	1.04	1.00008	0.705
120.0	0.01863	149.0	3.60	6.00	0.00833	0.0325	5.10	1.40	1.00007	0.702
140.0	0.01597	174.0	3.60	6.00	0.00714	0.0359	5.61	1.81	1.00006	0.696
160.0	0.01398	199.0	3.60	6.00	0.00625	0.0393	6.10	2.26	1.00005	0.694
180.0	0.01243	224.0	3.60	6.00	0.00555	0.0425	6.57	2.75	1.00005	0.691
200.0	0.01118	248.0	3.60	6.00	0.00500	0.0456	6.89	3.29	1.00004	0.675
250.0	0.008948	310.0	3.60	6.00	0.00400	0.0531	7.98	4.78	1.00003	0.671
300.0	0.007457	373.0	3.60	6.00	0.00333	0.0602	9.00	6.50	1.00002	0.669
350.0	0.006392	435.0	3.60	6.00	0.00286	0.0669	9.00	8.43	1.00002	0.667
400.0	0.005593	497.0	3.60	6.00	0.00250	0.0732	10.9	10.5	1.00002	0.666
450.0	0.004972	559.0	3.60	6.00	0.00222	0.0793	11.8	12.8	1.00002	0.667
500.0	0.004475	621.0	3.60	6.00	0.00200	0.0850	12.7	15.3	1.00002	0.668
600.0	0.003729	745.0	3.60	6.00	0.00167	0.0962	14.4	20.8	1.00001	0.669
700.0	0.003196	869.0	3.60	6.00	0.00143	0.107	16.0	27.0	1.00001	0.668
800.0	0.002797	993.0	3.60	6.00	0.00125	0.117	17.6	33.0	1.00001	0.668
900.0	0.002486	1120.0	3.60	6.00	0.00111	0.128	19.1	41.3	1.00001	0.668
1000.0	0.002238	1240.0	3.60	6.00	0.00100	0.137	20.5	49.5	1.00001	0.667
1200.0	0.001865	1496.0	3.60	6.00	0.000833	0.156	23.3	67.5	1.00001	0.667
1400.0	0.001598	1740.0	3.60	6.00	0.000714	0.174	26.0	87.8	1.00001	0.667
1600.0	0.001399	1990.0	3.60	6.00	0.000625	0.191	28.5	110.0	1.00001	0.666
1800.0	0.001243	2230.0	3.60	6.00	0.000556	0.208	31.0	135.0	1.00006	0.666
2000.0	0.001119	2480.0	3.60	6.00	0.000500	0.224	33.4	161.0	1.00000	0.666
2500.0	0.0008951	3100.0	3.60	6.00	0.000400	0.263	39.2	236.0	1.00000	0.666
3000.0	0.0007459	3720.0	3.60	6.00	0.000333	0.299	44.6	323.0	1.00000	0.666

* TWO-PHASE BOUNDARY

= PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1089	113.0	13.7	1.411	1.573	0.4037	0.6766	0.6912	733.8
5.0	0.1113	96.1	25.8	1.938	2.103	0.5229	0.4392	0.5188	725.2
6.0	0.1157	71.3	29.8	2.523	2.694	0.6305	0.4894	0.6745	674.7
* 6.546	0.1193	56.3	30.4	2.920	3.097	0.6946	0.5153	0.7993	635.8
* 6.546	1.711	9.94	1.67	10.27	12.80	2.179	0.7903	1.790	323.0
7.0	1.924	12.1	1.47	10.72	13.57	2.293	0.7749	1.629	343.4
8.0	2.346	16.2	1.18	11.63	15.11	2.498	0.7576	1.465	380.5
9.0	2.738	19.7	1.01	12.48	16.53	2.666	0.7501	1.392	411.8
10.0	3.114	23.1	0.881	13.29	17.90	2.810	0.7466	1.351	439.7
11.0	3.480	26.2	0.786	14.08	19.24	2.938	0.7450	1.326	465.1
12.0	3.840	29.3	0.711	14.87	20.56	3.052	0.7443	1.310	488.8
13.0	4.196	32.3	0.650	15.64	21.86	3.157	0.7440	1.298	511.0
14.0	4.549	35.3	0.599	16.41	23.15	3.253	0.7439	1.289	532.1
15.0	4.899	38.2	0.555	17.18	24.44	3.341	0.7439	1.282	552.2
16.0	5.247	41.1	0.518	17.94	25.72	3.424	0.7440	1.277	571.4
17.0	5.594	43.9	0.486	18.71	26.99	3.501	0.7441	1.273	590.0
18.0	5.939	46.8	0.457	19.47	28.26	3.574	0.7443	1.269	607.9
19.0	6.283	49.6	0.432	20.22	29.53	3.642	0.7444	1.266	625.2
20.0	6.626	52.4	0.409	20.98	30.79	3.707	0.7445	1.264	642.0
22.0	7.310	58.0	0.371	22.49	33.32	3.827	0.7446	1.260	674.2
24.0	7.992	63.5	0.339	24.00	35.83	3.937	0.7448	1.257	704.8
26.0	8.672	69.0	0.312	25.50	38.35	4.037	0.7449	1.255	734.1
28.0	9.351	74.5	0.289	27.00	40.85	4.130	0.7449	1.253	762.1
30.0	10.03	80.0	0.269	28.50	43.36	4.217	0.7450	1.252	789.1
32.0	10.71	85.5	0.252	30.00	45.86	4.298	0.7450	1.250	815.2
34.0	11.38	90.9	0.237	31.50	48.36	4.373	0.7450	1.249	840.4
36.0	12.06	96.4	0.224	33.00	50.86	4.445	0.7450	1.248	864.9
38.0	12.73	102.0	0.212	34.49	53.35	4.512	0.7451	1.248	888.7
40.0	13.40	107.0	0.201	35.99	55.85	4.576	0.7451	1.247	911.8
45.0	15.09	121.0	0.179	39.73	62.08	4.723	0.7451	1.246	967.2
50.0	16.77	134.0	0.161	43.46	68.31	4.854	0.7450	1.245	1019.0
55.0	18.45	148.0	0.146	47.20	74.53	4.973	0.7450	1.244	1069.0
60.0	20.13	161.0	0.134	50.93	80.75	5.081	0.7450	1.244	1117.0
70.0	23.49	188.0	0.114	58.39	93.18	5.273	0.7450	1.243	1206.0
80.0	26.85	215.0	0.100	65.84	105.6	5.439	0.7449	1.243	1289.0
90.0	30.20	242.0	0.0890	73.30	118.0	5.585	0.7449	1.242	1367.0
100.0	33.55	269.0	0.0801	80.75	130.5	5.716	0.7449	1.242	1441.0
120.0	40.26	322.0	0.0667	95.65	155.3	5.942	0.7449	1.242	1578.0
140.0	46.97	376.0	0.0572	110.6	180.1	6.134	0.7448	1.242	1704.0
160.0	53.67	430.0	0.0500	125.5	205.0	6.299	0.7448	1.241	1822.0
180.0	60.37	483.0	0.0444	140.3	229.8	6.446	0.7448	1.241	1932.0
200.0	67.08	537.0	0.0408	155.2	254.6	6.576	0.7448	1.241	2036.0
250.0	83.83	671.0	0.0328	192.5	316.7	6.853	0.7448	1.241	2276.0
300.0	100.6	805.0	0.0267	229.7	378.7	7.080	0.7448	1.241	2493.0
350.0	117.3	939.0	0.0229	267.0	440.8	7.271	0.7447	1.241	2693.0
400.0	134.1	1070.0	0.0200	304.2	502.9	7.437	0.7447	1.241	2878.0
450.0	150.9	1210.0	0.0178	341.4	564.9	7.583	0.7447	1.241	3053.0
500.0	167.6	1340.0	0.0160	378.7	627.0	7.714	0.7447	1.241	3218.0
600.0	201.1	1610.0	0.0133	453.1	751.1	7.940	0.7447	1.241	3525.0
700.0	234.6	1880.0	0.0114	527.6	875.2	8.131	0.7447	1.241	3807.0
800.0	268.2	2150.0	0.0100	602.1	999.0	8.297	0.7447	1.241	4070.0
900.0	301.7	2410.0	0.00889	676.6	1123.0	8.443	0.7447	1.241	4317.0
1000.0	335.2	2680.0	0.00800	751.0	1248.0	8.574	0.7447	1.241	4550.0
1200.0	402.2	3220.0	0.00667	900.0	1496.0	8.808	0.7447	1.241	4984.0
1400.0	469.2	3750.0	0.00571	1049.0	1744.0	8.992	0.7447	1.241	5384.0
1600.0	536.3	4290.0	0.00500	1198.0	1992.0	9.157	0.7447	1.241	5759.0
1800.0	603.3	4830.0	0.00444	1347.0	2240.0	9.304	0.7447	1.241	6104.0
2000.0	670.3	5360.0	0.00400	1496.0	2489.0	9.434	0.7447	1.241	6434.0
2500.0	837.9	6700.0	0.00320	1868.0	3109.0	9.711	0.7447	1.241	7194.0
3000.0	1005.0	8040.0	0.00267	2240.0	3730.0	9.938	0.7447	1.241	7860.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

8 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/L3	$V(DU/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.187	52.3	2.20	1040.0	0.0132	0.00874	2.51	0.00135	1.02043	0.716
5.0	8.986	17.4	6.54	864.0	0.0299	0.0101	2.56	0.00216	1.02330	0.474
6.0	8.646	14.0	7.04	616.0	0.0483	0.0107	2.43	0.00184	1.02004	0.549
* 6.546	8.386	12.4	7.04	472.0	0.0645	0.0110	2.32	0.00164	1.01981	0.607
* 6.546	0.5845	6.21	3.62	5.81	0.288	0.00494	0.631	0.00472	1.00215	0.889
7.0	0.5199	6.98	3.64	6.30	0.233	0.00511	0.721	0.00604	1.00192	0.827
8.0	0.4262	8.52	3.67	6.89	0.172	0.00560	0.806	0.00897	1.00158	0.759
9.0	0.3653	10.0	3.67	7.21	0.140	0.00612	0.887	0.0120	1.00136	0.726
10.0	0.3212	11.4	3.67	7.41	0.119	0.00662	0.964	0.0152	1.00120	0.709
11.0	0.2873	12.7	3.67	7.54	0.104	0.00710	1.04	0.0186	1.00107	0.698
12.0	0.2604	14.1	3.67	7.63	0.0932	0.00756	1.11	0.0222	1.00097	0.692
13.0	0.2383	15.4	3.66	7.70	0.0844	0.00801	1.18	0.0259	1.00089	0.688
14.0	0.2138	16.7	3.66	7.75	0.0772	0.00843	1.25	0.0298	1.00082	0.685
15.0	0.2041	18.0	3.66	7.79	0.0712	0.00884	1.31	0.0338	1.00076	0.684
16.0	0.1906	19.3	3.65	7.83	0.0662	0.00923	1.37	0.0379	1.00071	0.684
17.0	0.1788	20.6	3.65	7.85	0.0618	0.00962	1.43	0.0423	1.00067	0.684
18.0	0.1684	21.9	3.65	7.88	0.0580	0.0100	1.49	0.0467	1.00063	0.684
19.0	0.1592	23.2	3.64	7.89	0.0547	0.0103	1.55	0.0513	1.00060	0.684
20.0	0.1519	24.4	3.64	7.91	0.0517	0.0107	1.61	0.0560	1.00057	0.685
22.0	0.1368	27.0	3.64	7.93	0.0467	0.0114	1.72	0.0659	1.00051	0.687
24.0	0.1251	29.5	3.63	7.95	0.0426	0.0120	1.83	0.0763	1.00047	0.689
26.0	0.1153	32.0	3.63	7.96	0.0332	0.0126	1.93	0.0871	1.00043	0.691
28.0	0.1069	34.6	3.63	7.97	0.0363	0.0132	2.03	0.0985	1.00040	0.693
30.0	0.0997	37.1	3.63	7.98	0.0338	0.0138	2.12	0.110	1.00038	0.695
32.0	0.09341	39.6	3.62	7.99	0.0316	0.0143	2.22	0.123	1.00035	0.697
34.0	0.08787	42.1	3.62	7.99	0.0297	0.0149	2.31	0.135	1.00033	0.698
36.0	0.08295	44.6	3.62	7.99	0.0280	0.0154	2.39	0.149	1.00031	0.700
38.0	0.07855	47.1	3.62	8.00	0.0265	0.0159	2.48	0.162	1.00030	0.701
40.0	0.07460	49.6	3.62	8.00	0.0251	0.0164	2.56	0.176	1.00028	0.702
45.0	0.06628	55.8	3.62	8.00	0.0223	0.0176	2.77	0.213	1.00025	0.705
50.0	0.05963	62.1	3.61	8.01	0.0201	0.0188	2.96	0.253	1.00022	0.706
55.0	0.05420	68.3	3.61	8.01	0.0182	0.0199	3.14	0.295	1.00020	0.708
60.0	0.04967	74.5	3.61	8.01	0.0167	0.0210	3.32	0.339	1.00019	0.708
70.0	0.04257	87.0	3.61	8.01	0.0143	0.0231	3.65	0.436	1.00016	0.709
80.0	0.03725	99.4	3.61	8.01	0.0125	0.0251	3.97	0.541	1.00014	0.708
90.0	0.03311	112.0	3.61	8.01	0.0111	0.0270	4.27	0.656	1.00012	0.707
100.0	0.02980	124.0	3.61	8.01	0.0100	0.0289	4.56	0.780	1.00011	0.705
120.0	0.02484	149.0	3.60	8.01	0.00833	0.0325	5.20	1.05	1.00009	0.702
140.0	0.02129	174.0	3.60	8.01	0.00714	0.0359	5.61	1.36	1.00008	0.698
160.0	0.01863	199.0	3.60	8.01	0.00625	0.0393	6.10	1.70	1.00007	0.694
180.0	0.01656	224.0	3.60	8.01	0.00555	0.0425	6.57	2.07	1.00006	0.691
200.0	0.01491	248.0	3.60	8.01	0.00506	0.0456	6.89	2.47	1.00006	0.675
250.0	0.01193	310.0	3.60	8.00	0.00400	0.0531	7.98	3.59	1.00005	0.671
300.0	0.009941	373.0	3.60	8.00	0.00333	0.0602	9.01	4.88	1.00004	0.669
350.0	0.008522	435.6	3.60	8.00	0.00286	0.0669	10.0	6.32	1.00003	0.667
400.0	0.007457	497.0	3.60	8.00	0.00250	0.0732	10.9	7.91	1.00003	0.666
450.0	0.006629	559.0	3.60	8.00	0.00222	0.0793	11.8	9.64	1.00003	0.667
500.0	0.005966	621.0	3.60	8.00	0.00200	0.0850	12.7	11.5	1.00002	0.666
600.0	0.004972	745.0	3.60	8.00	0.00167	0.0962	14.4	15.6	1.00002	0.669
700.0	0.004262	869.0	3.60	8.00	0.00143	0.107	16.0	20.2	1.00002	0.668
800.0	0.003729	993.0	3.60	8.00	0.00125	0.117	17.6	25.4	1.00001	0.668
900.0	0.003315	1120.0	3.60	8.00	0.00111	0.128	19.1	31.0	1.00001	3.668
1000.0	0.002983	1240.0	3.60	8.00	0.00100	0.137	20.5	37.1	1.00001	0.667
1200.0	0.002486	1490.0	3.60	8.00	0.000833	0.156	23.3	50.6	1.00001	0.667
1400.0	0.002131	1740.0	3.60	8.00	0.000714	0.174	26.0	65.8	1.00001	0.667
1600.0	0.001865	1990.0	3.60	8.00	0.000625	0.191	28.5	82.7	1.00001	0.666
1800.0	0.001658	2230.0	3.60	8.00	0.000556	0.208	31.0	101.0	1.00001	0.666
2000.0	0.001492	2480.0	3.60	8.00	0.000500	0.224	33.4	121.0	1.00001	0.666
2500.0	0.001193	3100.0	3.60	8.00	0.000400	0.263	39.2	177.0	1.00000	0.666
3000.0	0.0009946	3720.0	3.60	8.00	0.000333	0.299	44.6	242.0	1.00000	0.666

* TWO-PHASE BOUNDARY

39

THERMODYNAMIC PROPERTIES OF HELIUM 4

10 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
				1.408	1.618	0.4029	0.6707	0.6858	736.5
				1.930	2.135	0.5212	0.4385	0.5164	731.1
			13.7	2.509	2.723	0.6280	0.4869	0.6695	681.8
4.0	0.1086	115.8	25.9	3.203	3.429	0.7373	0.5313	0.9813	613.7
5.0	0.1118	98.0	29.9	12.91	12.91	2.110	0.7937	1.927	325.0
6.0	0.1153	73.3	30.6	10.34	13.05	2.135	0.7897	1.572	330.4
6.510	0.1218	48.0	2.08	10.44	14.77	2.361	0.7634	1.363	372.7
6.910	1.300	9.44	2.02	11.44	16.26	2.537	0.7526	1.447	406.3
7.0	1.426	9.94	1.56	12.32	17.60	2.686	0.7477	1.387	435.6
8.0	1.798	14.6	1.31	13.16	19.05	2.817	0.7454	1.352	462.0
9.0	2.129	18.5	1.13	13.97					
10.0	2.448	22.1	1.00					1.330	486.3
11.0	2.741	25.4		14.77	20.39	2.933	0.7444	1.314	509.0
			0.904	15.55	21.71	3.039	0.7439	1.302	530.5
12.0	3.035	28.6	0.824	16.33	23.02	3.136	0.7438	1.293	550.9
13.0	3.324	31.7	0.757	17.10	24.31	3.225	0.7439	1.287	570.4
14.0	3.618	34.7	0.701	17.87	25.60	3.309	0.7440	1.281	589.2
15.0	3.893	37.7	0.653	18.64	26.89	3.386	0.7442	1.277	607.2
16.0	4.174	40.6	0.612	19.40	28.16	3.459	0.7443	1.273	624.7
17.0	4.454	43.5	0.575	20.16	29.44	3.528	0.7444	1.270	641.6
18.0	4.732	46.4	0.543	20.92	30.71	3.594	0.7446	1.265	674.8
19.0	5.009	49.3	0.514	22.44	33.24	3.714			
20.0	5.285	52.1	0.465					1.261	704.8
22.0	5.835	57.7		23.95	35.77	3.824	0.7448	1.258	734.2
			0.425	25.46	38.29	3.925	0.7449	1.256	762.3
24.0	6.383	63.3	0.391	26.96	40.80	4.018	0.7450	1.254	789.4
26.0	6.929	66.3	0.362	28.47	43.31	4.105	0.7450	1.253	815.5
28.0	7.474	74.4	0.338	29.97	45.82	4.186	0.7451	1.251	840.8
30.0	8.017	79.9	0.316	31.47	48.32	4.262	0.7451	1.250	865.3
32.0	8.560	85.4	0.297	32.97	50.82	4.333	0.7451	1.249	889.1
34.0	9.102	90.9	0.280	34.47	53.32	4.401	0.7451	1.248	912.3
36.0	9.643	96.3	0.265	35.96	55.82	4.465	0.7451		
38.0	10.18	102.0	0.252					1.247	967.7
40.0	10.72	107.0		39.70	62.86	4.612	0.7451	1.246	1020.0
			0.223	43.44	68.29	4.743	0.7451	1.245	1070.0
45.0	12.07	121.0	0.201	47.18	74.52	4.862	0.7451	1.244	1117.0
50.0	13.42	134.0	0.182	50.91	60.74	4.970	0.7451	1.243	1206.0
55.0	14.77	148.0	0.167	58.37	93.18	5.162	0.7450	1.243	1290.0
60.0	16.11	161.0	0.143	65.83	105.6	5.328	0.7450	1.243	1368.0
70.0	18.80	188.0	0.125	73.29	118.0	5.474	0.7449	1.242	1441.0
80.0	21.48	242.0	0.111	80.74	130.5	5.605	0.7449	1.242	1578.0
90.0	24.17	269.0	0.100	95.65	155.3	5.831	0.7449	1.242	1705.0
100.0	26.85	323.0	0.0834	110.5	180.1	6.023			
120.0	32.22	376.0	0.0715					1.242	1822.0
140.0	37.58			125.4	205.0	6.189	0.7448	1.241	1932.0
		430.0	0.0625	148.3	229.8	6.335	0.7448	1.241	2037.0
160.0	42.94	484.0	0.0556	155.2	254.6	6.466	0.7443	1.241	2276.0
180.0	48.31	537.0	0.0500	192.5	316.7	6.743	0.7448	1.241	2493.0
200.0	53.67	671.0	0.0500	229.7	370.8	6.969	0.7448	1.241	2693.0
250.0	67.00	805.0	0.0333	267.0	440.5	7.160	0.7448	1.241	2879.0
300.0	80.40	939.0	0.0286	304.2	502.5	7.326	0.7447	1.241	3053.0
350.0	93.89	1070.0	0.0258	341.4	564.9	7.472	0.7447	1.241	3218.0
400.0	107.3	1210.0	0.0222	378.7	627.8	7.603	0.7447	1.241	3525.0
450.0	120.7	1340.0	0.0200	453.1	751.1	7.829			
500.0	134.1	1610.0	0.0167					1.241	3687.0
600.0	160.9			527.6	879.2	8.021	0.7447	1.241	4070.0
		1880.0	0.0143	602.1	999.5	8.186	0.7447	1.241	4317.0
700.0	187.7	2150.0	0.0125	676.6	1123.0	8.332	0.7447	1.241	4550.0
800.0	214.5	2410.0	0.0111	751.0	1240.0	8.463	0.7447	1.241	4904.0
900.0	241.3	2680.0	0.0100	980.0	1496.0	8.690	0.7447	1.241	5304.0
1000.0	268.2	3220.0	0.00833	1099.0	1744.0	8.881	0.7447	1.241	5755.0
1200.0	321.0	3750.0	0.00714	1198.0	1992.0	9.047	0.7447	1.241	6104.0
1400.0	375.4	4290.0	0.00625	1347.0	2241.0	9.193	0.7447	1.241	6435.0
1600.0	429.0	4830.0	0.00556	1496.0	2489.0	9.324	0.7447	1.241	7194.0
1800.0	482.6	5300.0	0.00500	1860.0	3189.0	9.681			
2000.0	536.3	6700.0	0.00444					1.241	7800.0
2500.0	670.3			2240.0	3738.0	9.627	0.7447		
3000.0	804.4	8040.0	0.00333						

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

13 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.205	52.9	2.22	1060.0	0.0130	0.00876	2.53	0.00139	1.02045	0.714
5.0	9.048	17.6	6.55	883.0	0.0293	0.0101	2.58	0.00218	1.02031	0.474
6.8	8.675	14.2	7.06	636.0	0.0471	0.0108	2.45	0.00186	1.0208C	0.548
6.910	8.210	11.6	7.00	394.0	0.3775	0.0112	2.26	0.00151	1.01964	0.657
6.910	0.7205	6.29	3.64	6.88	0.306	0.00531	0.732	0.00382	1.00264	0.956
7.8	0.7014	6.46	3.65	6.97	0.290	0.00533	0.739	0.00406	1.00257	0.935
8.0	0.5561	8.14	3.68	8.15	0.192	0.00571	0.821	0.00657	1.00205	0.808
9.0	0.4698	9.65	3.69	8.71	0.158	0.00613	0.900	0.00911	1.00174	0.757
10.0	0.4098	11.1	3.69	9.35	0.125	0.00668	0.976	0.0117	1.00152	0.730
11.0	0.3648	12.5	3.69	9.26	0.108	0.00715	1.05	0.0145	1.00136	0.714
12.0	0.3295	13.9	3.69	9.42	0.0960	0.00761	1.12	0.0174	1.00123	0.704
13.0	0.3088	15.2	3.68	9.53	0.0864	0.00805	1.19	0.0204	1.00112	0.698
14.0	0.2770	16.5	3.68	9.61	0.0788	0.00847	1.25	0.0235	1.00103	0.694
15.0	0.2569	17.8	3.67	9.68	0.0725	0.00888	1.32	0.0267	1.00096	0.691
16.0	0.2396	19.2	3.67	9.73	0.3671	0.00927	1.38	0.0301	1.00090	0.690
17.0	0.2245	20.5	3.66	9.77	0.0626	0.00965	1.44	0.0336	1.00084	0.689
18.0	0.2113	21.8	3.66	9.81	0.0587	0.0108	1.50	0.0371	1.00079	0.689
19.0	0.1996	23.0	3.66	9.83	0.0552	0.0104	1.56	0.0408	1.00075	0.689
20.0	0.1892	24.3	3.65	9.86	0.0522	0.3107	1.62	0.0446	1.00071	0.689
22.0	0.1714	26.9	3.65	9.89	0.0470	0.0114	1.73	0.0525	1.00064	0.690
24.0	0.1567	29.4	3.64	9.92	0.0428	0.0120	1.83	0.0609	1.00059	0.692
26.0	0.1443	32.0	3.64	9.94	0.0394	0.0126	1.93	0.0696	1.00056	0.693
28.0	0.1338	34.5	3.64	10.0	0.0364	0.0132	2.03	0.0787	1.00050	0.695
30.0	0.1247	37.0	3.63	10.0	0.0339	0.0138	2.13	0.0882	1.00347	0.697
32.0	0.1168	39.6	3.63	11.0	0.0317	0.0143	2.22	0.0980	1.00044	0.698
34.0	0.1099	42.1	3.63	10.0	0.0297	0.0149	2.31	0.108	1.00041	0.699
36.0	0.1037	44.6	3.63	11.0	0.0290	0.0154	2.43	0.119	1.00039	0.701
38.0	0.09820	47.1	3.62	10.0	0.0265	0.0159	2.48	0.136	1.00037	0.702
40.0	0.09325	49.6	3.62	10.0	0.0252	0.0164	2.57	0.141	1.00035	0.703
45.0	0.08283	55.0	3.62	10.0	0.0223	0.0176	2.77	0.171	1.00031	0.705
50.0	0.07452	62.1	3.62	10.0	0.0201	0.0188	2.96	0.202	1.00028	0.707
55.0	0.06773	68.3	3.62	10.0	0.0182	0.0199	3.14	0.236	1.00026	0.708
60.0	0.06237	74.6	3.61	10.0	0.0167	0.0210	3.32	0.272	1.00023	0.709
70.0	0.05320	87.0	3.61	10.0	0.0143	0.0231	3.65	0.349	1.00020	0.703
80.0	0.04655	99.4	3.61	10.0	0.0125	0.0251	3.97	0.433	1.00018	0.708
90.0	0.04133	112.0	3.61	10.3	0.0111	0.0270	4.27	0.525	1.00016	0.707
100.0	0.03724	124.0	3.61	10.0	0.0100	0.0289	4.56	0.624	1.00016	0.706
120.0	0.03106	149.0	3.61	10.0	0.00833	0.0325	5.13	0.843	1.00012	0.702
140.0	0.02661	174.0	3.61	10.0	0.00714	0.0359	5.61	1.09	1.00010	0.698
160.0	0.02329	199.0	3.60	10.0	0.30624	0.0393	6.13	1.36	1.00009	0.694
180.0	0.02370	224.0	3.60	10.0	0.00555	0.0425	6.57	1.65	1.00008	0.691
200.0	0.01863	248.0	3.60	10.3	0.00586	0.0456	6.89	1.97	1.00007	0.675
250.0	0.01691	311.0	3.60	10.0	0.00400	0.0531	7.98	2.87	1.00006	0.671
300.0	0.01243	373.0	3.60	10.0	0.00333	0.0602	9.01	3.98	1.00005	0.669
350.0	0.01305	435.0	3.60	10.3	0.06286	0.0669	10.0	5.06	1.30004	0.667
400.0	0.009320	497.0	3.60	10.0	0.00250	0.0732	10.9	6.33	1.00004	0.666
450.0	0.008285	559.0	3.60	10.0	0.00222	0.0793	11.8	7.71	1.00003	0.667
500.0	0.007457	621.0	3.60	10.0	0.00200	0.0858	12.7	9.19	1.00003	0.668
600.0	0.006215	745.0	3.60	10.0	0.00167	0.0962	14.4	12.5	1.00002	0.669
700.0	0.005327	869.0	3.60	10.0	0.00143	0.107	16.0	16.2	1.00002	0.668
800.0	0.004661	993.0	3.60	10.0	0.00125	0.117	17.6	20.3	1.00002	0.668
900.0	0.004143	1120.0	3.60	10.0	0.00111	0.128	19.1	24.8	1.00002	0.668
1000.0	0.303729	1240.0	3.60	10.0	0.00100	0.137	20.5	29.7	1.00001	0.667
1200.0	0.003108	1490.0	3.50	10.3	0.000833	0.156	23.3	40.5	1.00001	0.667
1400.0	0.002664	1740.0	3.60	10.0	0.000714	0.174	26.0	52.7	1.00001	0.667
1600.0	0.002331	1990.0	3.60	10.0	0.000625	0.191	28.5	66.1	1.00001	0.667
1800.0	0.002072	2230.0	3.60	10.0	0.000555	0.208	31.0	80.9	1.00001	0.666
2000.0	0.001865	2400.0	3.60	10.0	0.000500	0.224	33.4	96.9	1.00001	0.666
2500.0	0.001492	3100.0	3.60	10.0	0.000406	0.263	39.2	142.0	1.00001	0.666
3000.0	0.001243	3720.0	3.60	10.0	0.000333	0.299	44.6	194.0	1.00000	0.666

* TWO-PHASE BOUNDARY

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THERMODYNAMIC PROPERTIES OF HELIUM 4

12 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1084	116.0	13.7	1.406	1.646	0.4029	0.6650	0.6789	742.1
5.0	0.1108	100.0	25.9	1.922	2.168	0.5195	0.4378	0.5140	736.9
6.0	0.1149	75.3	30.1	2.496	2.751	0.6257	0.4884	0.6647	688.8
7.0	0.1223	47.6	30.7	3.259	3.530	0.7454	0.5352	0.9186	614.9
* 7.228	0.1244	40.9	30.3	3.474	3.751	0.7764	0.5467	1.013	592.4
* 7.228	1.154	8.86	2.51	10.38	12.96	2.051	0.7967	2.063	327.6
8.0	1.427	13.0	2.00	11.22	14.39	2.239	0.7707	1.694	363.9
9.0	1.720	17.3	1.63	12.16	15.98	2.427	0.7558	1.513	400.5
10.0	1.990	21.1	1.40	13.02	17.45	2.581	0.7491	1.428	431.3
11.0	2.248	24.5	1.23	13.85	18.85	2.715	0.7460	1.381	458.7
12.0	2.498	27.8	1.10	14.66	20.21	2.834	0.7445	1.351	483.8
13.0	2.743	31.0	1.00	15.46	21.55	2.941	0.7439	1.330	507.0
14.0	2.984	34.1	0.920	16.25	22.88	3.039	0.7437	1.316	528.9
15.0	3.223	37.2	0.850	17.03	24.19	3.130	0.7437	1.305	549.6
16.0	3.459	40.2	0.791	17.80	25.49	3.214	0.7438	1.296	569.4
17.0	3.694	43.1	0.740	18.57	26.78	3.292	0.7439	1.289	588.4
18.0	3.928	46.0	0.695	19.34	28.07	3.365	0.7441	1.284	606.6
19.0	4.160	48.9	0.656	20.10	29.35	3.435	0.7442	1.280	624.2
20.0	4.392	51.8	0.621	20.87	30.62	3.500	0.7443	1.276	641.2
22.0	4.852	57.5	0.561	22.39	33.17	3.621	0.7446	1.270	673.9
24.0	5.311	63.1	0.512	23.90	35.70	3.732	0.7448	1.265	704.8
26.0	5.767	68.7	0.471	25.41	38.23	3.833	0.7449	1.262	734.3
28.0	6.223	74.3	0.436	26.92	40.75	3.926	0.7450	1.259	762.5
30.0	6.677	79.8	0.406	28.43	43.26	4.013	0.7451	1.257	789.7
32.0	7.130	85.3	0.380	29.93	45.78	4.094	0.7452	1.255	815.9
34.0	7.583	90.8	0.357	31.44	48.28	4.170	0.7452	1.253	841.2
36.0	8.034	96.3	0.337	32.94	50.79	4.242	0.7452	1.252	865.7
38.0	8.486	102.0	0.319	34.44	53.29	4.309	0.7452	1.251	889.6
40.0	8.936	107.0	0.302	35.94	55.79	4.373	0.7452	1.250	912.7
45.0	10.06	121.0	0.268	39.68	62.04	4.521	0.7452	1.248	968.2
50.0	11.19	134.0	0.241	43.42	68.27	4.652	0.7452	1.247	1021.0
55.0	12.31	148.0	0.219	47.16	74.51	4.771	0.7452	1.246	1070.0
60.0	13.43	161.0	0.201	50.89	80.73	4.879	0.7451	1.245	1118.0
70.0	15.67	188.0	0.172	58.36	93.18	5.071	0.7451	1.244	1207.0
80.0	17.91	215.0	0.150	65.82	105.6	5.237	0.7450	1.243	1290.0
90.0	20.15	242.0	0.134	73.28	118.0	5.383	0.7450	1.243	1368.0
110.0	22.38	269.0	0.120	80.73	130.5	5.514	0.7450	1.242	1442.0
120.0	26.85	323.0	0.100	95.64	155.3	5.741	0.7449	1.242	1579.0
140.0	31.33	376.0	0.0857	110.5	180.1	5.932	0.7449	1.242	1705.0
160.0	35.80	430.0	0.0750	125.4	205.0	6.098	0.7449	1.242	1822.0
180.0	40.26	484.0	0.0667	140.3	229.8	6.244	0.7448	1.241	1933.0
200.0	44.73	537.0	0.0600	155.2	254.6	6.375	0.7448	1.241	2037.0
250.0	55.91	671.0	0.0480	192.5	316.7	6.652	0.7448	1.241	2277.0
300.0	67.08	806.0	0.0400	229.7	378.8	6.878	0.7448	1.241	2494.0
350.0	78.25	940.0	0.0343	267.0	440.8	7.070	0.7448	1.241	2693.0
400.0	89.42	1070.0	0.0300	304.2	502.9	7.235	0.7448	1.241	2879.0
450.0	100.6	1210.0	0.0267	341.4	565.0	7.382	0.7448	1.241	3053.0
500.0	111.8	1340.0	0.0240	378.7	627.0	7.512	0.7448	1.241	3218.0
600.0	134.1	1610.0	0.0200	453.1	751.1	7.739	0.7447	1.241	3525.0
700.0	156.4	1880.0	0.0171	527.6	875.2	7.930	0.7447	1.241	3808.0
800.0	178.8	2150.0	0.0150	602.1	999.0	8.096	0.7447	1.241	4070.0
900.0	201.1	2410.0	0.0133	676.6	1123.0	8.242	0.7447	1.241	4317.0
1000.0	223.5	2680.0	0.0120	751.0	1248.0	8.373	0.7447	1.241	4550.0
1200.0	268.2	3220.0	0.0100	900.0	1496.0	8.599	0.7447	1.241	4985.0
1400.0	312.8	3750.0	0.00857	1049.0	1744.0	8.790	0.7447	1.241	5384.0
1600.0	397.5	4290.0	0.00750	1198.0	1992.0	8.956	0.7447	1.241	5755.0
1800.0	402.2	4830.0	0.00667	1347.0	2241.0	9.102	0.7447	1.241	6104.0
2000.0	446.9	5360.0	0.00600	1496.0	2489.0	9.233	0.7447	1.241	6435.0
2500.0	559.6	6700.0	0.00480	1868.0	3109.0	9.518	0.7447	1.241	7194.0
3000.0	678.3	8040.0	0.00400	2240.0	3730.0	9.736	0.7447	1.241	7861.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

12 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)_P	V(DP/DU)_V	-V(DP/DV)_T	(DV/DT)/V_P	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	L3/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR	CONSTANT	
4.0	9.223	53.4	2.23	1070.0	0.0127	0.00877	2.56	0.00140	1.02046	0.712
5.0	9.029	17.9	6.55	901.0	0.0287	0.0102	2.60	0.00219	1.02033	0.475
6.0	8.703	14.5	7.08	655.0	0.0459	0.0106	2.47	0.00187	1.02008	0.546
7.0	8.193	11.6	7.01	390.0	0.0789	0.0112	2.26	0.00149	1.01963	0.665
* 7.228	8.337	11.0	6.91	329.0	0.0923	0.0113	2.20	0.00138	1.01947	0.713
* 7.228	0.8594	6.32	3.66	7.61	0.329	0.00567	0.779	0.00316	1.00312	1.03
8.0	0.7008	7.74	3.69	9.12	0.219	0.00585	0.837	0.00493	1.00257	0.873
9.0	0.5814	9.34	3.71	10.1	0.162	0.00628	0.914	0.00714	1.00214	0.793
10.0	0.5025	10.8	3.71	10.6	0.132	0.00674	0.989	0.00939	1.00186	0.754
11.0	0.4449	12.3	3.71	10.9	0.113	0.00721	1.06	0.0117	1.00165	0.731
12.0	0.4004	13.6	3.70	11.1	0.0990	0.00766	1.13	0.0142	1.00149	0.718
13.0	0.3646	15.0	3.70	11.3	0.0886	0.00809	1.20	0.0167	1.00136	0.709
14.0	0.3351	16.4	3.69	11.4	0.0834	0.00851	1.26	0.0193	1.00125	0.703
15.0	0.3103	17.7	3.68	11.5	0.0737	0.00892	1.33	0.0220	1.00116	0.699
16.0	0.2891	19.0	3.68	11.6	0.0681	0.00931	1.39	0.0248	1.00108	0.696
17.0	0.2707	20.3	3.67	11.7	0.0634	0.00968	1.45	0.0277	1.00101	0.695
18.0	0.2546	21.6	3.67	11.7	0.0593	0.0101	1.51	0.0307	1.00095	0.694
19.0	0.2404	22.9	3.67	11.8	0.0558	0.0104	1.57	0.0338	1.00090	0.693
20.0	0.2277	24.2	3.66	11.8	0.0524	0.0108	1.62	0.0370	1.00085	0.693
22.0	0.2061	26.8	3.66	11.8	0.0474	0.0114	1.73	0.0436	1.00077	0.694
24.0	0.1883	29.4	3.65	11.9	0.0431	0.0121	1.84	0.0506	1.00071	0.694
26.0	0.1734	31.9	3.65	11.9	0.0395	0.0127	1.94	0.0579	1.00065	0.696
28.0	0.1617	34.5	3.64	11.9	0.0365	0.0133	2.04	0.0655	1.00060	0.697
30.0	0.1498	37.0	3.64	12.0	0.0340	0.0138	2.13	0.0734	1.00056	0.698
32.0	0.1403	39.5	3.64	12.0	0.0318	0.0144	2.22	0.0816	1.00053	0.699
34.0	0.1319	42.0	3.63	12.0	0.0298	0.0149	2.31	0.0902	1.00050	0.701
36.0	0.1245	44.6	3.63	12.0	0.0281	0.0154	2.40	0.0990	1.00047	0.702
38.0	0.1178	47.1	3.63	12.0	0.0266	0.0159	2.49	0.108	1.00044	0.703
40.0	0.1119	49.6	3.63	12.0	0.0252	0.0164	2.57	0.118	1.00042	0.704
45.0	0.09939	55.8	3.62	12.0	0.0223	0.0176	2.77	0.142	1.00037	0.706
50.0	0.08940	62.1	3.62	12.0	0.0201	0.0188	2.96	0.169	1.00034	0.707
55.0	0.08125	68.3	3.62	12.0	0.0182	0.0199	3.15	0.197	1.00031	0.708
60.0	0.07447	74.6	3.62	12.0	0.0157	0.0210	3.32	0.227	1.00028	0.709
70.0	0.06382	87.0	3.61	12.0	0.0143	0.0231	3.66	0.291	1.00024	0.709
80.0	0.05564	99.5	3.61	12.0	0.0125	0.0251	3.97	0.361	1.00021	0.709
90.0	0.04964	112.0	3.61	12.0	0.0111	0.0270	4.27	0.438	1.00019	0.707
100.0	0.04468	124.0	3.61	12.0	0.0100	0.0289	4.56	0.521	1.00017	0.706
120.0	0.03724	149.0	3.61	12.0	0.00832	0.0325	5.10	0.703	1.00014	0.702
140.0	0.03192	174.8	3.61	12.0	0.00714	0.0360	5.61	0.907	1.00012	0.698
160.0	0.02794	199.0	3.61	12.0	0.00624	0.0393	6.10	1.13	1.00011	0.694
180.0	0.02484	224.0	3.60	12.0	0.00555	0.0425	6.57	1.38	1.00009	0.691
200.0	0.02235	249.0	3.60	12.0	0.00500	0.0457	6.90	1.64	1.00008	0.675
250.0	0.01789	311.0	3.60	12.0	0.00400	0.0531	7.98	2.39	1.00007	0.671
300.0	0.01491	373.0	3.50	12.0	0.00333	0.0602	9.01	3.25	1.00006	0.669
350.0	0.01278	435.0	3.60	12.0	0.00286	0.0669	10.0	4.22	1.00005	0.667
400.0	0.01118	497.0	3.60	12.0	0.00250	0.0732	10.9	5.28	1.00004	0.666
450.0	0.009941	559.0	3.60	12.0	0.00222	0.0793	11.8	6.43	1.00004	0.667
500.0	0.008948	621.0	3.60	12.0	0.00200	0.0850	12.7	7.66	1.00003	0.668
600.0	0.007457	745.0	3.60	12.0	0.00167	0.0942	14.4	10.4	1.00003	0.669
700.0	0.006392	869.0	3.60	12.0	0.00143	0.107	16.0	13.5	1.00002	0.668
800.0	0.005593	993.0	3.60	12.0	0.00125	0.117	17.6	16.9	1.00002	0.668
900.0	0.004972	1120.0	3.60	12.0	0.00111	0.128	19.1	20.7	1.00002	0.668
1000.0	0.004475	1240.0	3.60	12.0	0.00100	0.137	20.5	24.7	1.00002	0.667
1200.0	0.003729	1490.0	3.60	12.0	0.000833	0.156	23.3	33.7	1.00001	0.667
1400.0	0.003197	1740.0	3.60	12.0	0.000714	0.174	26.0	43.9	1.00001	0.667
1600.0	0.002797	1990.0	3.60	12.0	0.000625	0.191	28.5	55.1	1.00001	0.666
1800.0	0.002486	2230.0	3.60	12.0	0.000555	0.208	31.0	67.4	1.00001	0.666
2000.0	0.002238	2480.0	3.60	12.0	0.000503	0.224	33.4	80.7	1.00001	0.666
2500.0	0.001793	3100.0	3.60	12.0	0.000400	0.263	39.2	118.0	1.00001	0.666
3000.0	0.001492	3720.0	3.60	12.0	0.000333	0.299	44.6	162.0	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

14.696 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1081	119.0	13.6	1.482	1.696	0.4010	0.6574	0.6789	749.5
5.0	0.1104	102.0	25.9	1.912	2.213	0.5174	0.4369	0.5110	744.5
6.0	0.1144	77.9	30.3	2.478	2.798	0.6226	0.4877	0.6507	697.9
7.0	0.1212	50.4	31.1	3.227	3.556	0.7485	0.5330	0.8991	627.3
* 7.604	0.1282	32.7	29.7	3.829	4.178	0.8255	0.5659	1.191	564.2
* 7.604	0.9484	7.98	3.11	10.38	12.96	1.981	0.8002	2.337	328.6
8.0	1.075	10.5	2.70	10.88	13.88	2.089	0.7838	1.970	350.3
9.0	1.341	15.5	2.12	11.92	15.57	2.297	0.7609	1.626	392.1
10.0	1.575	19.7	1.78	12.83	17.12	2.468	0.7514	1.493	425.4
11.0	1.794	23.4	1.55	13.69	18.58	2.599	0.7478	1.424	454.3
12.0	2.004	26.8	1.38	14.52	19.98	2.721	0.7449	1.382	480.3
13.0	2.209	30.2	1.25	15.33	21.34	2.831	0.7440	1.355	504.3
14.0	2.410	33.4	1.14	16.13	22.69	2.930	0.7436	1.335	526.7
15.0	2.608	36.5	1.06	16.92	24.02	3.022	0.7435	1.321	547.9
16.0	2.803	39.5	0.981	17.70	25.33	3.107	0.7436	1.310	568.0
17.0	2.997	42.6	0.916	18.48	26.64	3.186	0.7438	1.301	587.3
18.0	3.190	45.5	0.859	19.25	27.93	3.260	0.7439	1.294	605.7
19.0	3.381	48.5	0.810	20.02	29.22	3.330	0.7441	1.289	623.5
20.0	3.572	51.4	0.766	20.79	30.51	3.396	0.7443	1.284	640.7
22.0	3.951	57.1	0.691	22.32	33.07	3.518	0.7446	1.277	673.6
24.0	4.327	62.8	0.630	23.84	35.61	3.628	0.7448	1.271	704.0
26.0	4.702	68.5	0.579	25.35	38.15	3.730	0.7450	1.267	734.5
28.0	5.075	74.1	0.536	26.87	40.68	3.824	0.7451	1.263	762.0
30.0	5.447	79.7	0.499	28.38	43.20	3.911	0.7452	1.258	790.1
32.0	5.818	85.2	0.467	29.88	45.72	3.992	0.7453	1.258	816.3
34.0	6.189	90.7	0.438	31.39	48.23	4.068	0.7453	1.256	841.7
36.0	6.559	96.3	0.413	32.89	50.74	4.140	0.7453	1.254	866.3
38.0	6.928	102.0	0.391	34.40	53.25	4.208	0.7453	1.253	890.2
40.0	7.297	107.0	0.371	35.90	55.76	4.272	0.7453	1.252	913.4
45.0	8.217	121.0	0.329	39.65	62.01	4.419	0.7453	1.258	968.9
50.0	9.136	134.0	0.296	43.39	68.25	4.551	0.7453	1.248	1021.0
55.0	10.05	148.0	0.269	47.13	74.49	4.673	0.7453	1.247	1071.0
60.0	10.97	162.0	0.246	50.87	80.72	4.778	0.7452	1.246	1118.0
70.0	12.80	189.0	0.211	58.34	93.17	4.970	0.7452	1.245	1208.0
80.0	14.63	215.0	0.184	65.80	105.6	5.136	0.7451	1.244	1291.0
90.0	16.46	242.0	0.164	73.26	118.0	5.283	0.7451	1.243	1369.0
100.0	18.28	269.0	0.147	80.72	130.5	5.414	0.7450	1.243	1442.0
120.0	21.94	323.0	0.123	95.65	155.3	5.648	0.7450	1.242	1580.0
140.0	25.59	377.0	0.105	110.5	180.2	5.872	0.7449	1.242	1706.0
160.0	29.24	430.0	0.0919	125.4	205.0	5.997	0.7449	1.242	1823.0
180.0	32.89	484.0	0.0817	140.3	229.8	6.144	0.7449	1.242	1933.0
200.0	36.54	538.0	0.0735	155.2	254.7	6.274	0.7449	1.241	2037.0
250.0	45.66	672.0	0.0588	192.5	316.7	6.551	0.7448	1.241	2277.0
300.0	54.78	806.0	0.0490	229.7	370.8	6.778	0.7448	1.241	2494.0
350.0	63.93	940.0	0.0420	267.0	440.9	6.969	0.7448	1.241	2694.0
400.0	73.02	1070.0	0.0367	304.2	502.9	7.135	0.7448	1.241	2879.0
450.0	82.15	1210.0	0.0327	341.4	565.0	7.281	0.7448	1.241	3054.0
500.0	91.27	1340.0	0.0294	378.7	627.0	7.412	0.7448	1.241	3219.0
600.0	109.5	1610.0	0.0245	453.1	751.2	7.630	0.7448	1.241	3526.0
700.0	127.8	1880.0	0.0210	527.6	875.3	7.829	0.7447	1.241	3800.0
800.0	146.0	2150.0	0.0184	602.1	999.3	7.995	0.7447	1.241	4078.0
900.0	164.2	2418.0	0.0163	676.6	1124.0	8.141	0.7447	1.241	4317.0
1000.0	182.5	2688.0	0.0147	751.8	1248.0	8.272	0.7447	1.241	4551.0
1200.0	219.0	3228.0	0.0122	900.0	1496.0	8.490	0.7447	1.241	4985.0
1400.0	255.5	3758.0	0.0105	1049.0	1744.0	8.690	0.7447	1.241	5380.0
1600.0	291.9	4298.0	0.00918	1198.0	1992.0	8.855	0.7447	1.241	5756.0
1800.0	328.4	4838.0	0.00816	1347.0	2241.0	9.002	0.7447	1.241	6105.0
2000.0	364.9	5368.0	0.00735	1496.0	2489.0	9.132	0.7447	1.241	6435.0
2500.0	456.1	6700.0	0.00588	1868.0	3109.0	9.409	0.7447	1.241	7194.0
3000.0	547.3	8048.0	0.00490	2240.0	3730.0	9.636	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

14.696 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.246	54.1	2.24	1100.0	0.0124	0.36880	2.58	0.00142	1.02047	0.709
5.0	9.357	18.3	6.55	927.0	0.0280	0.0102	2.63	0.00220	1.02035	0.475
6.0	8.740	14.8	7.10	680.0	0.0445	0.0109	2.53	0.00169	1.02011	0.545
7.0	8.250	12.0	7.06	416.0	0.0747	0.0113	2.29	0.00153	1.01968	0.656
* 7.604	7.832	10.2	6.73	255.0	0.117	0.0114	2.13	0.00122	1.01921	0.804
* 7.604	1.354	6.32	3.69	8.42	0.370	0.00614	0.838	0.00249	1.00380	1.15
8.0	0.9331	7.14	3.71	9.79	0.276	0.00611	0.863	0.00334	1.00337	1.00
9.0	0.7456	8.89	3.73	11.6	0.183	0.00642	0.935	0.08529	1.00273	0.852
10.0	0.6350	10.5	3.73	12.5	0.143	0.00684	1.01	0.00722	1.00233	0.790
11.0	0.5575	11.9	3.73	13.0	0.119	0.00729	1.08	0.00918	1.00205	0.757
12.0	0.4990	13.4	3.72	13.4	0.103	0.00773	1.14	0.0112	1.00184	0.737
13.0	0.4527	14.8	3.72	13.7	0.0917	0.00815	1.21	0.0133	1.00168	0.724
14.0	0.4150	16.1	3.71	13.8	0.0827	0.00857	1.28	0.0155	1.00154	0.715
15.0	0.3835	17.5	3.70	14.3	0.0755	0.00897	1.34	0.0177	1.00142	0.709
16.0	0.3567	18.8	3.70	14.1	0.0695	0.00936	1.40	0.0200	1.00133	0.705
17.0	0.3336	20.2	3.69	14.2	0.0645	0.00973	1.46	0.0224	1.00124	0.702
18.0	0.3135	21.5	3.69	14.3	0.0602	0.0101	1.52	0.0249	1.00117	0.700
19.0	0.2957	22.8	3.68	14.3	0.0565	0.0105	1.58	0.0274	1.00110	0.699
20.0	0.2800	24.1	3.68	14.4	0.0533	0.0108	1.63	0.0300	1.00104	0.699
22.0	0.2531	26.7	3.67	14.5	0.0478	0.0115	1.74	0.0355	1.00095	0.698
24.0	0.2311	29.3	3.66	14.5	0.0434	0.0121	1.84	0.0412	1.00086	0.698
26.0	0.2127	31.8	3.66	14.6	0.0398	0.0127	1.95	0.0471	1.00080	0.699
28.0	0.1970	34.4	3.65	14.5	0.0367	0.0133	2.04	0.0534	1.00074	0.699
30.0	0.1836	36.9	3.65	14.6	0.0341	0.0139	2.14	0.0599	1.00069	0.700
32.0	0.1719	39.5	3.64	14.6	0.0319	0.0144	2.23	0.0666	1.00064	0.701
34.0	0.1616	42.0	3.64	14.7	0.0299	0.0149	2.32	0.0736	1.00061	0.702
36.0	0.1525	44.5	3.64	14.7	0.0282	0.0155	2.41	0.0808	1.00057	0.703
38.0	0.1443	47.1	3.64	14.7	0.0266	0.0160	2.49	0.0883	1.00054	0.704
40.0	0.1370	49.6	3.63	14.7	0.0253	0.0165	2.58	0.0960	1.00051	0.705
45.0	0.1217	55.8	3.63	14.7	0.0224	0.0177	2.78	0.116	1.00046	0.707
50.0	0.1095	62.1	3.63	14.7	0.0201	0.0188	2.97	0.138	1.00041	0.708
55.0	0.09947	68.4	3.62	14.7	0.0182	0.0199	3.15	0.161	1.00037	0.709
60.0	0.09116	74.6	3.62	14.7	0.0167	0.0210	3.33	0.185	1.00034	0.709
70.0	0.07812	87.1	3.62	14.7	0.0143	0.0231	3.66	0.230	1.00029	0.709
80.0	0.06836	100.0	3.61	14.7	0.0125	0.0251	3.97	0.295	1.00026	0.709
90.0	0.06077	112.0	3.61	14.7	0.0111	0.0270	4.27	0.350	1.00023	0.707
100.0	0.05469	124.0	3.61	14.7	0.0100	0.0289	4.56	0.425	1.00021	0.706
120.0	0.04559	149.0	3.61	14.7	0.00832	0.0325	5.10	0.574	1.00017	0.702
140.0	0.03900	174.0	3.61	14.7	0.00713	0.0360	5.61	0.741	1.00015	0.698
160.0	0.03420	199.0	3.61	14.7	0.00626	0.0393	6.13	0.925	1.00013	0.694
180.0	0.03041	224.0	3.61	14.7	0.00555	0.0425	6.57	1.13	1.00011	0.691
200.0	0.02737	249.0	3.60	14.7	0.00499	0.0457	6.90	1.34	1.00010	0.675
250.0	0.02190	311.0	3.60	14.7	0.00400	0.0532	7.98	1.96	1.00008	0.671
300.0	0.01825	373.0	3.60	14.7	0.00333	0.0602	9.01	2.66	1.00007	0.669
350.0	0.01565	435.0	3.60	14.7	0.00285	0.0669	10.0	3.44	1.00006	0.667
400.0	0.01369	497.0	3.60	14.7	0.00250	0.0733	10.9	4.31	1.00005	0.666
450.0	0.01217	559.0	3.60	14.7	0.00222	0.0793	11.8	5.25	1.00005	0.667
500.0	0.01096	621.0	3.60	14.7	0.00200	0.0851	12.7	6.25	1.00004	0.668
600.0	0.009132	745.0	3.60	14.7	0.00167	0.0962	14.4	8.49	1.00003	0.669
700.0	0.007828	869.0	3.60	14.7	0.00143	0.107	16.0	11.0	1.00003	0.668
800.0	0.006853	993.0	3.60	14.7	0.00125	0.117	17.6	13.8	1.00003	0.668
900.0	0.006089	1120.0	3.60	14.7	0.00111	0.128	19.1	16.9	1.00002	0.668
1000.0	0.005403	1240.0	3.60	14.7	0.00100	0.137	20.5	20.2	1.00002	0.667
1200.0	0.004567	1490.0	3.60	14.7	0.000833	0.156	23.3	27.5	1.00002	0.667
1400.0	0.003915	1740.0	3.60	14.7	0.000714	0.174	26.0	35.8	1.00001	0.667
1600.0	0.003425	1990.0	3.60	14.7	0.000625	0.191	28.5	45.8	1.00001	0.666
1800.0	0.003045	2230.0	3.60	14.7	0.000555	0.208	31.0	55.0	1.00001	0.666
2000.0	0.002740	2480.0	3.60	14.7	0.000500	0.224	33.4	65.9	1.00001	0.666
2500.0	0.002192	3100.0	3.60	14.7	0.000400	0.263	39.2	96.6	1.00001	0.666
3000.0	0.001827	3720.0	3.60	14.7	0.000333	0.299	44.6	132.0	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

16 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1080	120.0	13.6	1.400	1.720	0.4005	0.6538	0.6672	753.8
5.0	0.1102	103.0	25.9	1.908	2.234	0.5164	0.4364	0.5096	748.1
6.0	0.1142	79.1	30.3	2.470	2.809	0.6212	0.4874	0.6559	702.2
7.0	0.1208	51.8	31.3	3.212	3.570	0.7382	0.5332	0.8905	633.2
* 7.769	0.1301	29.1	29.3	3.999	4.384	0.8483	0.5750	1.291	550.6
* 7.769	0.8673	7.53	3.42	10.37	12.94	1.949	0.8018	2.485	328.7
8.0	0.9411	9.17	3.12	10.68	13.47	2.017	0.7904	2.183	342.5
9.0	1.232	14.6	2.38	11.79	15.35	2.239	0.7637	1.694	387.7
10.0	1.423	19.0	1.96	12.74	16.95	2.408	0.7526	1.529	422.4
11.0	1.629	22.8	1.72	13.61	18.44	2.549	0.7475	1.447	452.1
12.0	1.825	26.4	1.53	14.45	19.86	2.673	0.7451	1.398	478.6
13.0	2.015	29.7	1.38	15.27	21.24	2.784	0.7448	1.367	503.0
14.0	2.201	33.0	1.26	16.07	22.60	2.884	0.7436	1.345	525.7
15.0	2.384	36.2	1.16	16.87	23.93	2.976	0.7435	1.329	547.1
16.0	2.565	39.3	1.07	17.65	25.25	3.062	0.7435	1.316	567.4
17.0	2.745	42.3	1.00	18.43	26.57	3.141	0.7437	1.307	586.7
18.0	2.922	45.3	0.940	19.21	27.87	3.216	0.7439	1.299	605.3
19.0	3.099	48.3	0.885	19.98	29.16	3.285	0.7440	1.293	623.2
20.0	3.274	51.2	0.837	20.75	30.45	3.352	0.7442	1.288	648.5
22.0	3.623	57.0	0.755	22.28	33.02	3.474	0.7445	1.280	673.5
24.0	3.973	62.7	0.688	23.81	35.57	3.585	0.7448	1.274	704.8
26.0	4.315	68.4	0.632	25.32	38.11	3.687	0.7450	1.269	734.5
28.0	4.659	74.0	0.585	26.84	40.64	3.780	0.7451	1.265	763.0
30.0	5.001	79.6	0.544	28.35	43.17	3.868	0.7452	1.262	790.3
32.0	5.343	85.2	0.509	29.86	45.69	3.949	0.7453	1.260	816.6
34.0	5.683	90.7	0.478	31.37	48.21	4.025	0.7454	1.257	842.0
36.0	6.023	96.2	0.451	32.87	50.72	4.097	0.7454	1.256	866.6
38.0	6.363	102.0	0.426	34.38	53.23	4.165	0.7454	1.254	890.5
40.0	6.702	107.0	0.404	35.88	55.74	4.229	0.7454	1.253	913.7
45.0	7.548	121.0	0.359	39.63	62.00	4.377	0.7454	1.250	969.2
50.0	8.392	134.0	0.322	43.38	68.24	4.508	0.7454	1.249	1022.0
55.0	9.235	148.0	0.293	47.12	74.48	4.627	0.7453	1.247	1071.0
60.0	10.08	162.0	0.268	50.86	80.72	4.736	0.7453	1.246	1119.0
70.0	11.76	189.0	0.229	58.33	93.17	4.928	0.7452	1.245	1208.0
80.0	13.44	216.0	0.200	65.80	105.6	5.094	0.7452	1.244	1291.0
90.0	15.12	242.0	0.178	73.26	118.1	5.240	0.7451	1.243	1369.0
100.0	16.81	269.0	0.160	80.72	130.5	5.371	0.7451	1.243	1443.0
120.0	20.15	323.0	0.133	95.63	155.3	5.598	0.7450	1.242	1580.0
140.0	23.51	377.0	0.114	110.5	180.2	5.789	0.7450	1.242	1706.0
160.0	26.86	430.0	0.100	125.4	205.0	5.955	0.7449	1.242	1823.0
180.0	30.21	484.0	0.0889	140.3	229.8	6.101	0.7449	1.242	1933.0
200.0	33.56	538.0	0.0800	155.2	254.7	6.232	0.7449	1.242	2038.0
250.0	41.94	672.0	0.0640	192.5	316.7	6.509	0.7448	1.241	2277.0
300.0	50.32	806.0	0.0533	229.7	378.8	6.736	0.7448	1.241	2494.0
350.0	58.70	940.0	0.0457	267.0	440.9	6.927	0.7448	1.241	2694.0
400.0	67.08	1070.0	0.0400	304.2	502.9	7.093	0.7448	1.241	2879.0
450.0	75.45	1210.0	0.0356	341.4	565.0	7.239	0.7448	1.241	3054.0
500.0	83.83	1348.0	0.0320	378.7	627.1	7.370	0.7448	1.241	3219.0
600.0	100.5	1610.0	0.0267	453.1	751.2	7.596	0.7448	1.241	3526.0
700.0	117.3	1880.0	0.0229	527.6	875.3	7.787	0.7448	1.241	3800.0
800.0	134.1	2150.0	0.0200	602.1	999.0	7.953	0.7447	1.241	4071.0
900.0	150.9	2410.0	0.0178	676.6	1124.0	8.099	0.7447	1.241	4317.0
1000.0	167.6	2680.0	0.0160	751.0	1248.0	8.230	0.7447	1.241	4551.0
1200.0	201.1	3220.0	0.0133	900.0	1496.0	8.456	0.7447	1.241	4985.0
1400.0	234.6	3750.0	0.0114	1049.0	1744.0	8.648	0.7447	1.241	5384.0
1600.0	268.1	4290.0	0.0100	1198.0	1992.0	8.813	0.7447	1.241	5756.0
1800.0	301.7	4830.0	0.00889	1347.0	2241.0	8.959	0.7447	1.241	6105.0
2000.0	335.2	5360.0	0.00800	1496.0	2489.0	9.090	0.7447	1.241	6435.0
2500.0	419.0	6700.0	0.00640	1868.0	3109.0	9.367	0.7447	1.241	7190.0
3000.0	502.7	8040.0	0.00533	2240.0	3730.8	9.593	0.7447	1.241	7801.0

* TWO-PHASE BOUNDARY

46

16 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V $_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.258	54.4	2.25	1110.0	0.0123	0.00881	2.60	0.00143	1.02048	0.738
5.0	9.071	16.4	6.55	939.0	0.0276	0.0102	2.65	0.00221	1.02036	0.475
6.0	8.757	15.0	7.11	693.0	0.0438	0.0109	2.51	0.00190	1.02013	0.545
7.0	8.275	12.2	7.09	429.0	0.0729	0.0114	2.31	0.00154	1.01971	0.652
* 7.763	7.686	9.68	6.62	224.0	0.131	0.0114	2.10	0.00115	1.01908	0.857
* 7.769	1.153	6.30	3.70	8.68	0.394	0.00638	0.865	0.00223	1.00414	1.21
8.0	1.063	6.82	3.71	9.74	0.320	0.00630	0.878	0.00271	1.00383	1.10
9.0	0.8321	8.67	3.74	12.2	0.195	0.00650	0.945	0.00461	1.00303	0.887
10.0	0.7025	10.3	3.75	13.3	0.149	0.00690	1.02	0.00642	1.00257	0.810
11.0	0.6140	11.8	3.74	14.0	0.123	0.00733	1.08	0.00825	1.00226	0.771
12.0	0.5480	13.2	3.74	14.4	0.106	0.00776	1.15	0.0101	1.00202	0.747
13.0	0.4963	14.7	3.73	14.8	0.0933	0.00819	1.22	0.0121	1.00183	0.732
14.0	0.4543	16.0	3.72	15.0	0.0838	0.00860	1.28	0.0141	1.00168	0.722
15.0	0.4194	17.4	3.71	15.2	0.0763	0.00900	1.34	0.0161	1.00156	0.715
16.0	0.3898	18.8	3.70	15.3	0.0702	0.00938	1.41	0.0183	1.00145	0.710
17.0	0.3644	20.1	3.70	15.4	0.0650	0.00976	1.46	0.0205	1.00135	0.706
18.0	0.3422	21.4	3.69	15.5	0.0606	0.0101	1.52	0.0228	1.00127	0.704
19.0	0.3227	22.7	3.69	15.6	0.0569	0.0105	1.58	0.0251	1.00120	0.702
20.0	0.3054	24.0	3.68	15.6	0.0536	0.0108	1.64	0.0275	1.00114	0.701
22.0	0.2760	26.7	3.67	15.7	0.0480	0.0115	1.74	0.0325	1.00103	0.730
24.0	0.2519	29.2	3.67	15.8	0.0436	0.0121	1.85	0.0377	1.00094	0.700
26.0	0.2317	31.8	3.66	15.8	0.0399	0.0127	1.95	0.0432	1.00087	0.700
28.0	0.2147	34.4	3.66	15.9	0.0368	0.0133	2.05	0.0490	1.00080	0.701
30.0	0.2000	36.9	3.65	15.9	0.0342	0.0139	2.14	0.0550	1.00075	0.701
32.0	0.1872	39.5	3.65	15.9	0.0319	0.0144	2.23	0.0612	1.00070	0.702
34.0	0.1760	42.0	3.64	16.0	0.0299	0.0150	2.32	0.0676	1.00066	0.703
36.0	0.1660	44.5	3.64	16.0	0.0282	0.0155	2.41	0.0742	1.00062	0.704
38.0	0.1572	47.0	3.64	16.0	0.0267	0.0160	2.49	0.0811	1.00059	0.705
40.0	0.1492	49.6	3.64	16.0	0.0253	0.0165	2.58	0.0882	1.00056	0.706
45.0	0.1325	55.8	3.63	16.0	0.0224	0.0177	2.78	0.107	1.00058	0.707
50.0	0.1192	62.1	3.63	16.0	0.0201	0.0188	2.97	0.127	1.00045	0.708
55.0	0.1083	68.4	3.62	16.0	0.0182	0.0200	3.15	0.148	1.00041	0.709
60.0	0.09923	74.6	3.62	16.0	0.0167	0.0210	3.33	0.170	1.00037	0.710
70.0	0.08504	87.1	3.62	16.0	0.0143	0.0231	3.66	0.211	1.00032	0.710
80.0	0.07441	100.0	3.62	16.0	0.0125	0.0251	3.98	0.271	1.00028	0.709
90.0	0.06614	112.0	3.61	16.0	0.0111	0.0270	4.28	0.329	1.00025	0.707
100.0	0.05954	124.0	3.61	16.0	0.0100	0.0289	4.56	0.391	1.00022	0.706
120.0	0.04962	149.0	3.61	16.0	0.00832	0.0325	5.10	0.528	1.00019	0.702
140.0	0.04254	174.0	3.61	16.0	0.00713	0.0360	5.62	0.681	1.00016	0.698
160.0	0.03723	199.0	3.61	16.0	0.00624	0.0393	6.10	0.850	1.00014	0.694
180.0	0.03310	224.0	3.61	16.0	0.00555	0.0425	6.57	1.03	1.00012	0.691
200.0	0.02980	249.0	3.61	16.0	0.00499	0.0457	6.98	1.23	1.00011	0.675
250.0	0.02384	311.0	3.60	16.0	0.00400	0.0532	7.98	1.88	1.00009	0.671
300.0	0.01987	373.0	3.60	16.0	0.00333	0.0602	9.01	2.44	1.00008	0.669
350.0	0.01784	435.0	3.60	16.0	0.00285	0.0669	10.0	3.16	1.00006	0.667
400.0	0.01491	497.0	3.60	16.0	0.00250	0.0733	10.9	3.96	1.00006	0.666
450.0	0.01325	559.0	3.60	16.0	0.00222	0.0793	11.8	4.82	1.00005	0.667
500.0	0.01193	621.0	3.60	16.0	0.00200	0.0851	12.7	5.74	1.00005	0.668
600.0	0.009941	745.0	3.60	16.0	0.00167	0.0962	14.4	7.00	1.00004	0.669
700.0	0.008522	869.0	3.60	16.0	0.00143	0.107	16.0	10.1	1.00003	0.668
800.0	0.007457	993.0	3.60	16.0	0.00125	0.117	17.6	12.7	1.00003	0.668
900.0	0.006629	1120.0	3.60	16.0	0.00111	0.128	19.1	15.5	1.00003	0.668
1000.0	0.005966	1240.0	3.60	16.0	0.00100	0.137	20.5	18.5	1.00002	0.667
1200.0	0.004972	1490.0	3.60	16.0	0.000833	0.156	23.3	25.3	1.00002	0.667
1400.0	0.004262	1740.0	3.60	16.0	0.000714	0.174	26.0	32.9	1.00002	0.667
1600.0	0.003729	1990.0	3.60	16.0	0.000625	0.191	28.5	41.3	1.00001	0.666
1800.0	0.003315	2230.0	3.60	16.0	0.000555	0.208	31.0	50.5	1.00001	0.666
2000.0	0.002984	2480.0	3.60	16.0	0.000500	0.224	33.4	60.5	1.00001	0.666
2500.0	0.002387	3100.0	3.60	16.0	0.000400	0.263	39.2	80.7	1.00001	0.666
3000.0	0.001989	3720.0	3.60	16.0	0.000333	0.299	44.6	121.0	1.00001	0.666

* TWO-PHASE BOUNDARY

18 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
4.0	3.1378	122.0	13.6	1.398	1.757	0.3997	0.6484	0.6614	750.3
5.0	0.1100	105.6	26.0	1.901	2.267	0.5148	0.4357	0.5874	753.5
6.0	0.1139	81.0	30.5	2.459	2.838	0.6190	0.4869	0.6518	708.7
7.0	0.1203	53.9	31.5	3.190	3.591	0.7348	0.5722	0.8782	641.8
8.0	0.1331	24.4	28.5	4.252	4.695	0.8815	0.5886	1.467	530.3
8.0	0.7625	6.78	3.92	10.33	12.87	1.982	0.8040	2.759	328.3
8.0	0.1333	24.2	28.5	4.259	4.704	0.8826	0.5890	1.474	529.5
9.0	1.024	13.2	2.82	11.59	15.00	2.154	0.7687	1.824	388.4
10.0	1.233	17.9	2.30	12.58	16.69	2.332	0.7540	1.592	417.6
11.0	1.421	21.9	1.98	13.49	18.22	2.479	0.7485	1.485	446.6
12.0	1.600	25.6	1.75	14.34	19.68	2.605	0.7455	1.425	476.0
13.0	1.772	29.1	1.57	15.17	21.08	2.717	0.7441	1.387	501.0
14.0	1.948	32.4	1.43	15.99	22.45	2.819	0.7436	1.360	524.1
15.0	2.105	35.6	1.32	16.79	23.80	2.912	0.7434	1.341	545.8
16.0	2.267	38.8	1.22	17.58	25.14	2.998	0.7434	1.327	566.4
17.0	2.428	41.9	1.14	18.37	26.46	3.079	0.7436	1.316	585.9
18.0	2.587	44.9	1.06	19.15	27.77	3.153	0.7438	1.307	604.7
19.0	2.745	47.9	1.00	19.92	29.07	3.224	0.7440	1.300	622.7
20.0	2.902	50.9	0.947	20.69	30.37	3.290	0.7442	1.294	640.2
22.0	3.214	56.7	0.853	22.23	32.94	3.413	0.7445	1.285	573.4
24.0	3.523	62.5	0.777	23.76	35.50	3.524	0.7448	1.278	704.8
26.0	3.831	68.2	0.714	25.28	38.05	3.626	0.7450	1.273	734.7
28.0	4.137	73.9	0.660	26.80	40.59	3.721	0.7452	1.268	763.2
30.0	4.443	79.5	0.614	28.31	43.12	3.808	0.7453	1.265	790.6
32.0	4.747	85.1	0.574	29.83	45.65	3.889	0.7454	1.262	816.9
34.0	5.050	90.7	0.539	31.34	48.17	3.966	0.7454	1.260	842.4
36.0	5.353	96.2	0.508	32.84	50.69	4.038	0.7455	1.258	867.8
38.0	5.655	102.0	0.480	34.35	53.20	4.106	0.7455	1.256	890.9
40.0	5.957	107.0	0.456	35.85	55.71	4.170	0.7455	1.254	914.2
45.0	6.710	121.0	0.404	39.61	61.97	4.318	0.7455	1.252	969.7
50.0	7.461	135.0	0.363	43.36	68.23	4.449	0.7455	1.250	1022.0
55.0	8.211	148.0	0.329	47.10	74.47	4.568	0.7454	1.248	1072.0
60.0	8.960	162.0	0.302	50.84	80.71	4.677	0.7454	1.247	1119.0
70.0	10.46	189.0	0.258	58.32	93.17	4.869	0.7453	1.245	1209.0
80.0	11.95	216.0	0.226	65.79	105.6	5.035	0.7452	1.244	1292.0
90.0	13.44	243.0	0.200	73.25	118.1	5.182	0.7452	1.244	1370.0
100.0	14.93	270.0	0.180	80.71	130.5	5.313	0.7451	1.243	1443.0
120.0	17.92	323.0	0.150	95.62	155.3	5.539	0.7450	1.242	1580.0
140.0	20.90	377.0	0.129	110.5	180.2	5.731	0.7450	1.242	1706.0
160.0	23.88	431.0	0.113	125.4	205.0	5.897	0.7449	1.242	1824.0
180.0	26.86	484.0	0.100	140.3	229.9	6.043	0.7449	1.242	1934.0
200.0	29.84	538.0	0.0908	155.2	254.7	6.174	0.7449	1.242	2038.0
250.0	37.29	672.0	0.0728	192.5	316.8	6.451	0.7449	1.241	2278.0
300.0	44.73	806.0	0.0608	229.7	378.8	6.677	0.7448	1.241	2495.0
350.0	52.18	940.0	0.0514	267.0	440.9	6.868	0.7448	1.241	2694.0
400.0	59.63	1070.0	0.0458	304.2	503.0	7.034	0.7448	1.241	2880.0
450.0	67.08	1210.0	0.0400	341.4	565.0	7.180	0.7448	1.241	3054.0
500.0	74.52	1348.0	0.0360	378.7	627.1	7.311	0.7448	1.241	3219.0
600.0	89.42	1618.0	0.0300	453.2	751.2	7.537	0.7448	1.241	3526.0
700.0	104.3	1888.0	0.0257	527.6	875.3	7.729	0.7448	1.241	3808.0
800.0	119.2	2158.0	0.0225	602.1	999.0	7.895	0.7448	1.241	4071.0
900.0	134.1	2418.0	0.0200	676.6	1124.0	8.041	0.7447	1.241	4317.0
1000.0	149.0	2688.0	0.0180	751.0	1248.0	8.171	0.7447	1.241	4551.0
1200.0	178.8	3220.0	0.0150	900.0	1496.0	8.398	0.7447	1.241	4985.0
1400.0	208.6	3760.0	0.0129	1049.0	1744.0	8.589	0.7447	1.241	5384.0
1600.0	238.4	4290.0	0.0112	1198.0	1992.0	8.755	0.7447	1.241	5756.0
1800.0	268.1	4838.0	0.0100	1347.0	2241.0	8.901	0.7447	1.241	6105.0
2000.0	297.9	5380.0	0.00900	1496.0	2489.0	9.032	0.7447	1.241	6435.0
2500.0	372.4	6700.0	0.00720	1868.0	3109.0	9.309	0.7447	1.241	7194.0
3000.0	446.9	8048.0	0.00600	2240.0	3738.0	9.535	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

18 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.275	54.9	2.26	3130.0	0.0120	0.00863	2.62	0.00144	1.02049	0.706
5.0	9.091	18.7	6.55	957.0	0.0271	0.0102	2.67	0.00222	1.02037	0.476
6.0	8.783	15.2	7.12	711.0	0.0428	0.0109	2.54	0.00191	1.02015	0.544
7.0	8.313	12.5	7.13	448.0	0.0704	0.0114	2.33	0.00156	1.01974	0.646
8.0	7.511	9.43	6.46	183.0	0.156	0.0114	2.05	0.00103	1.01887	0.951
8.0	1.311	6.26	3.72	8.69	0.441	0.00977	0.907	0.00187	1.00467	1.33
8.0	7.535	9.30	6.45	181.0	0.157	0.0114	2.05	0.00103	1.01887	0.955
9.0	0.9761	8.32	3.76	12.9	0.219	0.00664	0.963	0.00373	1.00393	0.952
10.0	0.8112	10.0	3.76	14.5	0.159	0.00699	1.03	0.00541	1.00296	0.845
11.0	0.7035	11.6	3.76	15.4	0.129	0.00740	1.10	0.00708	1.00258	0.793
12.0	0.6250	13.0	3.75	16.0	0.189	0.00782	1.16	0.00678	1.00230	0.763
13.0	0.5643	14.5	3.74	16.4	0.0958	0.00824	1.23	0.0105	1.00208	0.744
14.0	0.5155	15.9	3.73	16.7	0.0857	0.00864	1.29	0.0123	1.00190	0.731
15.0	0.4751	17.3	3.73	16.9	0.0777	0.00904	1.35	0.0142	1.00176	0.723
16.0	0.4411	18.6	3.72	17.1	0.0712	0.00942	1.41	0.0161	1.00163	0.717
17.0	0.4119	20.0	3.71	17.3	0.0659	0.00979	1.47	0.0181	1.00153	0.712
18.0	0.3865	21.3	3.70	17.4	0.0613	0.0102	1.53	0.0201	1.00144	0.709
19.0	0.3643	22.6	3.70	17.5	0.0574	0.0105	1.59	0.0222	1.00135	0.707
20.0	0.3446	24.0	3.69	17.5	0.0540	0.0108	1.64	0.0243	1.00128	0.705
22.0	0.3112	26.6	3.68	17.7	0.0484	0.0115	1.75	0.0288	1.00116	0.703
24.0	0.2838	29.2	3.68	17.7	0.0438	0.0121	1.85	0.0335	1.00106	0.702
26.0	0.2610	31.8	3.67	17.8	0.0401	0.0127	1.95	0.0384	1.00097	0.702
28.0	0.2417	34.3	3.66	17.9	0.0370	0.0133	2.05	0.0435	1.00090	0.703
30.0	0.2251	36.9	3.66	17.9	0.0343	0.0139	2.15	0.0488	1.00084	0.703
32.0	0.2107	39.4	3.65	17.9	0.0320	0.0144	2.24	0.0543	1.00079	0.704
34.0	0.1980	42.0	3.65	18.0	0.0300	0.0150	2.33	0.0601	1.00074	0.704
36.0	0.1868	44.5	3.65	18.0	0.0283	0.0155	2.41	0.0660	1.00070	0.705
38.0	0.1768	47.0	3.64	18.0	0.0267	0.0160	2.50	0.0721	1.00066	0.706
40.0	0.1679	49.6	3.64	18.0	0.0253	0.0165	2.58	0.0784	1.00063	0.706
45.0	0.1490	55.8	3.64	18.0	0.0224	0.0177	2.78	0.0949	1.00056	0.708
50.0	0.1348	62.1	3.63	18.0	0.0201	0.0189	2.97	0.113	1.00050	0.709
55.0	0.1218	68.4	3.63	18.0	0.0183	0.0200	3.15	0.131	1.00046	0.709
60.0	0.1116	74.6	3.62	18.0	0.0167	0.0211	3.33	0.151	1.00042	0.710
70.0	0.09564	87.1	3.62	18.1	0.0143	0.0231	3.66	0.194	1.00036	0.710
80.0	0.08368	100.0	3.62	18.1	0.0125	0.0251	3.98	0.241	1.00031	0.709
90.0	0.07439	112.0	3.62	18.1	0.0111	0.0271	4.28	0.293	1.00028	0.730
100.0	0.06696	124.0	3.61	18.0	0.0100	0.0289	4.56	0.348	1.00025	0.706
120.0	0.05581	149.0	3.61	18.0	0.00832	0.0325	5.11	0.469	1.00021	0.702
140.0	0.04785	174.0	3.61	18.0	0.00713	0.0360	5.62	0.606	1.00018	0.698
160.0	0.04188	199.0	3.61	18.0	0.00624	0.0393	6.10	0.756	1.00016	0.694
180.0	0.03723	224.0	3.61	18.0	0.00555	0.0425	6.57	0.928	1.00014	0.691
200.0	0.03351	249.0	3.61	18.0	0.00499	0.0457	6.98	1.10	1.00010	0.675
250.0	0.02682	311.0	3.62	18.0	0.00399	0.0532	7.99	1.60	1.00008	0.671
300.0	0.02235	373.0	3.60	18.0	0.00333	0.0602	9.01	2.17	1.00008	0.669
350.0	0.01916	435.0	3.60	18.0	0.00285	0.0669	10.0	2.81	1.00007	0.667
400.0	0.01677	497.0	3.60	18.0	0.00250	0.0733	10.9	3.52	1.00006	0.666
450.0	0.01491	559.0	3.60	18.0	0.00222	0.0793	11.8	4.29	1.00006	0.667
500.0	0.01342	621.0	3.60	18.0	0.00200	0.0851	12.7	5.11	1.00005	0.668
600.0	0.01118	745.0	3.60	18.0	0.00167	0.0962	14.4	6.93	1.00004	0.669
700.0	0.009587	869.0	3.60	18.0	0.00143	0.107	16.0	9.00	1.00004	0.668
800.0	0.008389	993.0	3.60	18.0	0.00125	0.118	17.6	11.3	1.00003	0.668
900.0	0.007457	1120.0	3.60	18.0	0.00111	0.128	19.1	13.8	1.00003	0.668
1000.0	0.006712	1240.0	3.60	18.0	0.00100	0.137	20.5	16.5	1.00003	0.667
1200.0	0.005593	1490.0	3.60	18.0	0.000833	0.156	23.3	22.5	1.00002	0.667
1400.0	0.004795	1740.0	3.60	18.0	0.000714	0.174	26.0	29.3	1.00002	0.667
1600.0	0.004195	1990.0	3.60	18.0	0.000625	0.191	28.5	30.7	1.00002	0.666
1800.0	0.003729	2230.0	3.60	18.0	0.000555	0.208	31.0	44.9	1.00001	0.666
2000.0	0.003356	2486.0	3.60	18.0	0.000500	0.224	33.4	53.8	1.00001	0.666
2500.0	0.002685	3100.0	3.60	18.0	0.000400	0.263	39.2	70.8	1.00001	0.666
3000.0	0.002238	3720.0	3.60	18.0	0.000333	0.299	44.6	100.0	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

20 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1076	123.0	13.6	1.396	1.794	0.3990	0.6431	0.5558	763.5
5.0	0.1098	107.0	26.0	1.894	2.301	0.5133	0.4350	0.5053	758.9
6.0	0.1135	82.9	30.6	2.447	2.867	0.6169	0.4864	0.6679	715.0
7.0	0.1198	55.9	31.8	3.169	3.612	0.7315	0.5313	0.8668	650.2
8.0	0.1318	26.8	29.1	4.200	4.689	0.8746	0.5862	1.397	544.1
* 8.224	0.1367	19.7	27.6	4.523	5.030	0.9166	0.6032	1.706	508.0
* 8.224	0.6751	5.99	4.46	10.26	12.76	1.856	0.8059	3.115	327.5
9.0	0.8789	11.6	3.32	11.36	14.61	2.072	0.7743	2.000	372.5
10.0	1.079	16.7	2.65	12.42	16.41	2.262	0.7572	1.665	412.6
11.0	1.255	21.0	2.26	13.36	18.00	2.414	0.7496	1.528	445.1
12.0	1.420	24.8	1.98	14.23	19.49	2.543	0.7468	1.453	473.4
13.0	1.578	28.4	1.77	15.08	20.92	2.657	0.7443	1.407	498.9
14.0	1.731	31.8	1.61	15.90	22.31	2.760	0.7436	1.376	522.5
15.0	1.881	35.1	1.48	16.71	23.67	2.855	0.7433	1.354	544.5
16.0	2.029	38.3	1.37	17.51	25.02	2.941	0.7434	1.338	565.3
17.0	2.175	41.5	1.27	18.30	26.35	3.022	0.7435	1.325	585.1
18.0	2.319	44.6	1.19	19.08	27.67	3.098	0.7437	1.315	604.1
19.0	2.462	47.6	1.12	19.86	28.98	3.168	0.7439	1.307	622.3
20.0	2.604	50.6	1.06	20.64	30.28	3.235	0.7441	1.300	539.8
22.0	2.886	56.5	0.953	22.18	32.86	3.358	0.7445	1.290	673.2
24.0	3.166	62.3	0.867	23.71	35.43	3.470	0.7448	1.262	744.8
26.0	3.444	68.0	0.796	25.24	37.99	3.572	0.7452	1.276	734.8
28.0	3.720	73.7	0.735	26.76	40.54	3.667	0.7452	1.271	762.4
30.0	3.996	79.4	0.684	28.28	43.07	3.754	0.7454	1.267	790.8
32.0	4.270	85.0	0.639	29.79	45.61	3.636	0.7455	1.264	817.2
34.0	4.544	90.6	0.600	31.30	48.13	3.913	0.7455	1.262	842.7
36.0	4.817	96.2	0.565	32.81	50.65	3.985	0.7455	1.259	867.4
38.0	5.089	102.0	0.534	34.32	53.17	4.053	0.7456	1.257	891.4
40.0	5.361	107.0	0.507	35.83	55.68	4.117	0.7456	1.256	914.6
45.0	6.043	121.0	0.449	39.58	61.95	4.265	0.7456	1.253	970.2
50.0	6.717	135.0	0.403	43.34	68.21	4.397	0.7455	1.250	1023.0
55.0	7.392	148.0	0.366	47.08	74.46	4.516	0.7455	1.249	1072.0
60.0	8.066	162.0	0.335	50.83	80.70	4.624	0.7454	1.248	1120.0
70.0	9.413	189.0	0.297	56.30	93.17	4.817	0.7454	1.246	1209.0
80.0	10.76	216.0	0.251	65.77	105.6	4.983	0.7453	1.245	1292.0
90.0	12.10	243.0	0.223	73.24	118.1	5.129	0.7452	1.244	1370.0
100.0	13.45	270.0	0.200	80.70	130.5	5.260	0.7452	1.243	1444.0
120.0	16.13	323.0	0.167	95.62	155.4	5.487	0.7451	1.243	1581.0
140.0	18.81	377.0	0.143	110.5	180.2	5.679	0.7450	1.242	1707.0
160.0	21.50	431.0	0.125	125.4	205.0	5.844	0.7450	1.242	1824.0
180.0	24.18	485.0	0.111	140.3	229.9	5.991	0.7449	1.242	1934.0
200.0	26.86	538.0	0.100	155.2	254.7	6.121	0.7449	1.242	2038.0
250.0	33.56	672.0	0.0880	192.5	316.8	6.398	0.7449	1.241	2278.0
300.0	40.27	806.0	0.0667	229.7	378.8	6.625	0.7448	1.241	2495.0
350.0	46.97	940.0	0.0571	267.0	440.9	6.816	0.7448	1.241	2694.0
400.0	53.67	1070.0	0.0500	304.2	503.0	6.982	0.7448	1.241	2880.0
450.0	60.37	1210.0	0.0444	341.4	565.0	7.128	0.7448	1.241	3054.0
500.0	67.06	1340.0	0.0400	378.7	627.1	7.259	0.7448	1.241	3219.0
600.0	80.46	1610.0	0.0333	453.2	751.2	7.485	0.7448	1.241	3526.0
700.0	93.89	1880.0	0.0286	527.6	875.3	7.676	0.7448	1.241	3808.0
800.0	107.3	2150.0	0.0250	602.1	999.0	7.842	0.7448	1.241	4071.0
900.0	120.7	2410.0	0.0222	676.6	1124.0	7.988	0.7448	1.241	4318.0
1000.0	134.1	2680.0	0.0200	751.0	1248.0	8.119	0.7447	1.241	4551.0
1200.0	160.9	3220.0	0.0167	900.0	1496.0	8.345	0.7447	1.241	4985.0
1400.0	187.7	3760.0	0.0143	1049.0	1744.0	8.537	0.7447	1.241	5384.0
1600.0	214.5	4290.0	0.0125	1198.0	1992.0	8.703	0.7447	1.241	5756.0
1800.0	241.3	4830.0	0.0111	1347.0	2241.0	8.849	0.7447	1.241	6105.0
2000.0	268.1	5360.0	0.0100	1496.0	2489.0	8.979	0.7447	1.241	6435.0
2500.0	335.2	6700.0	0.00800	1868.0	3109.0	9.256	0.7447	1.241	7194.0
3000.0	402.2	8040.0	0.00667	2240.0	3730.0	9.483	0.7447	1.241	7861.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

20 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_p$	V(DP/DU)$_v$	-V(DP/DV)$_T$	(DV/DT)/V$_p$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR		
4.0	9.292	55.5	2.27	1150.0	0.8110	0.00865	2.64	0.00145	1.02050	0.794
5.0	9.111	19.0	6.55	975.0	0.0266	0.0103	2.69	0.00223	1.02038	0.476
6.0	8.804	15.5	7.15	730.0	0.0419	0.0110	2.56	0.00192	1.02017	0.543
7.0	8.350	12.7	7.16	467.0	0.0680	0.0115	2.35	0.00158	1.01978	0.641
8.0	7.585	9.78	6.54	203.0	0.143	0.0115	2.08	0.00108	1.01896	0.911
* 8.224	7.315	8.90	6.26	144.0	0.192	0.0115	2.00	0.000924	1.01863	1.06
* 8.224	1.481	6.19	3.74	8.87	0.503	0.00720	0.948	0.00156	1.00523	1.48
9.0	1.138	7.94	3.77	13.2	0.252	0.00682	0.983	0.00308	1.00468	1.04
10.0	0.9269	9.72	3.78	15.5	0.171	0.00709	1.04	0.00459	1.00336	0.884
11.0	0.7968	11.3	3.78	16.7	0.135	0.00747	1.11	0.00614	1.00291	0.817
12.0	0.7044	12.8	3.77	17.5	0.113	0.00788	1.17	0.00770	1.00258	0.780
13.0	0.6339	14.3	3.76	18.0	0.0984	0.00829	1.24	0.00929	1.00233	0.757
14.0	0.5777	15.7	3.75	18.4	0.0876	0.00869	1.30	0.0109	1.00213	0.742
15.0	0.5316	17.1	3.74	18.7	0.0791	0.00908	1.36	0.0126	1.00196	0.731
16.0	0.4929	18.5	3.73	18.9	0.0723	0.00946	1.42	0.0143	1.00182	0.723
17.0	0.4599	19.9	3.72	19.1	0.0667	0.00983	1.48	0.0161	1.00170	0.718
18.0	0.4312	21.2	3.71	19.2	0.0620	0.0102	1.54	0.0180	1.00160	0.714
19.0	0.4062	22.5	3.71	19.3	0.0580	0.0105	1.59	0.0199	1.00151	0.711
20.0	0.3840	23.9	3.70	19.4	0.0545	0.0109	1.65	0.0218	1.00143	0.709
22.0	0.3465	26.5	3.69	19.6	0.0487	0.0115	1.76	0.0258	1.00129	0.707
24.0	0.3159	29.1	3.68	19.7	0.0441	0.0122	1.86	0.0300	1.00118	0.705
26.0	0.2904	31.7	3.68	19.8	0.0403	0.0128	1.96	0.0345	1.00108	0.705
28.0	0.2688	34.3	3.67	19.8	0.0371	0.0134	2.06	0.0391	1.00100	0.705
30.0	0.2503	36.8	3.66	19.9	0.0344	0.0139	2.15	0.0439	1.00094	0.705
32.0	0.2342	39.4	3.66	19.9	0.0321	0.0145	2.24	0.0489	1.00088	0.705
34.0	0.2201	41.9	3.66	19.9	0.0301	0.0150	2.33	0.0540	1.00082	0.706
36.0	0.2076	44.5	3.65	20.0	0.0283	0.0155	2.42	0.0594	1.00078	0.706
38.0	0.1965	47.0	3.65	20.0	0.0267	0.0160	2.50	0.0649	1.00074	0.707
40.0	0.1865	49.5	3.65	20.0	0.0253	0.0165	2.58	0.0705	1.00070	0.707
45.0	0.1656	55.8	3.64	20.0	0.0224	0.0177	2.78	0.0855	1.00062	0.708
50.0	0.1489	62.1	3.63	20.0	0.0201	0.0189	2.97	0.101	1.00056	0.709
55.0	0.1353	68.4	3.63	20.1	0.0183	0.0200	3.16	0.118	1.00051	0.710
60.0	0.1248	74.6	3.63	20.1	0.0167	0.0211	3.33	0.136	1.00047	0.710
70.0	0.1062	87.1	3.62	20.1	0.0143	0.0232	3.67	0.173	1.00040	0.710
80.0	0.09295	100.0	3.62	20.1	0.0125	0.0251	3.98	0.217	1.00035	0.709
90.0	0.08263	112.0	3.62	20.1	0.0111	0.0271	4.20	0.263	1.00031	0.708
100.0	0.07437	124.0	3.61	20.1	0.0100	0.0289	4.57	0.313	1.00028	0.706
120.0	0.06208	149.0	3.61	20.1	0.00832	0.0325	5.11	0.422	1.00023	0.702
140.0	0.05315	174.0	3.61	20.0	0.00713	0.0360	5.62	0.545	1.00028	0.698
160.0	0.04652	199.0	3.61	20.0	0.00624	0.0393	6.11	0.681	1.00018	0.694
180.0	0.04136	224.0	3.61	20.0	0.00555	0.0426	6.57	0.829	1.00016	0.691
200.0	0.03723	249.0	3.61	20.0	0.00499	0.0457	6.98	0.988	1.00014	0.675
250.0	0.02979	311.0	3.60	20.0	0.00399	0.0532	7.99	1.44	1.00011	0.671
300.0	0.02483	373.0	3.60	20.0	0.00333	0.0602	9.01	1.95	1.00009	0.669
350.0	0.02129	435.0	3.60	20.0	0.00285	0.0669	10.0	2.53	1.00008	0.667
400.0	0.01863	497.0	3.60	20.0	0.00250	0.0733	10.9	3.17	1.00007	0.666
450.0	0.01656	959.0	3.60	20.0	0.00222	0.0753	11.8	3.86	1.10006	0.666
500.0	0.01491	621.0	3.60	20.0	0.00200	0.0851	12.7	4.68	1.00006	0.668
600.0	0.01243	745.0	3.60	20.0	0.00167	0.0962	14.4	6.24	1.00005	0.669
700.0	0.01065	869.0	3.60	20.0	0.00143	0.107	16.0	8.10	1.00004	0.668
800.0	0.009321	993.0	3.60	20.0	0.00125	0.118	17.6	10.2	1.00014	0.668
900.0	0.008285	1120.0	3.60	20.0	0.00111	0.128	19.1	12.4	1.00003	0.668
1000.0	0.007457	1240.0	3.60	20.0	0.00100	0.137	20.5	14.8	1.00003	0.657
1200.0	0.006215	1490.0	3.60	20.0	0.000833	0.156	23.3	20.2	1.00002	0.667
1400.0	0.005327	1740.0	3.60	20.0	0.000714	0.174	26.0	26.3	1.00002	0.667
1600.0	0.004661	1990.0	3.60	20.0	0.000625	0.191	28.5	33.1	1.00002	0.666
1800.0	0.004144	2230.0	3.60	20.0	0.000555	0.208	31.0	40.4	1.00002	0.666
2000.0	0.003729	2480.0	3.60	20.0	0.000500	0.224	33.4	48.4	1.00001	0.666
2500.0	0.002984	3100.0	3.60	20.0	0.000400	0.263	39.2	71.0	1.00001	0.666
3000.0	0.002486	3720.0	3.60	20.0	0.000333	0.299	44.6	97.0	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

22 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1074	125.0	13.5	1.393	1.831	0.3982	0.6378	0.6503	768.6
5.0	0.1095	109.0	26.0	1.888	2.334	0.5119	0.4344	0.5033	764.1
6.0	0.1132	84.7	30.7	2.436	2.897	0.6148	0.4899	0.4441	721.2
7.0	0.1193	57.9	32.0	3.149	3.635	0.7284	0.5304	0.4563	650.3
8.0	0.1307	29.2	29.5	4.154	4.686	0.8682	0.5841	1.348	557.0
* 8.429	0.1486	15.6	26.6	4.795	5.367	0.9510	0.6178	2.015	486.3
* 8.429	0.6002	5.15	5.06	10.17	12.61	1.810	0.8075	3.602	326.3
9.0	0.7552	9.88	3.92	11.09	14.17	1.989	0.7808	2.255	363.6
10.0	0.9515	15.5	3.03	12.24	16.12	2.195	0.7599	1.753	407.4
11.0	1.118	20.0	2.55	13.22	17.77	2.353	0.7508	1.575	441.4
12.0	1.272	24.1	2.22	14.12	19.30	2.486	0.7465	1.484	470.7
13.0	1.418	27.8	1.98	14.98	20.75	2.602	0.7445	1.429	496.9
14.0	1.560	31.3	1.79	15.81	22.16	2.707	0.7436	1.393	520.9
15.0	1.698	34.6	1.64	16.63	23.54	2.802	0.7433	1.368	543.3
16.0	1.834	37.9	1.52	17.43	24.90	2.889	0.7433	1.349	564.3
17.0	1.967	41.1	1.41	18.23	26.24	2.971	0.7434	1.334	584.3
18.0	2.100	44.2	1.32	19.02	27.57	3.047	0.7436	1.323	603.4
19.0	2.230	47.3	1.24	19.80	28.89	3.118	0.7438	1.314	621.8
20.0	2.360	50.3	1.17	20.58	30.19	3.185	0.7440	1.306	639.5
22.0	2.618	56.2	1.05	22.12	32.79	3.309	0.7444	1.295	673.1
24.0	2.873	62.1	0.957	23.66	35.37	3.421	0.7448	1.286	704.8
26.0	3.127	67.9	0.878	25.19	37.93	3.523	0.7451	1.280	734.9
28.0	3.379	73.6	0.811	26.72	40.48	3.618	0.7453	1.275	763.6
30.0	3.630	79.3	0.754	28.24	43.03	3.706	0.7454	1.270	791.1
32.0	3.880	84.9	0.704	29.76	45.56	3.788	0.7455	1.267	817.6
34.0	4.130	90.5	0.661	31.27	48.09	3.864	0.7456	1.264	843.1
36.0	4.378	96.1	0.623	32.78	50.62	3.936	0.7456	1.261	867.9
38.0	4.626	102.0	0.589	34.29	53.14	4.005	0.7457	1.259	891.8
40.0	4.874	107.0	0.558	35.80	55.65	4.069	0.7457	1.257	915.1
45.0	5.492	121.0	0.495	39.56	61.93	4.217	0.7457	1.254	970.8
50.0	6.107	135.0	0.444	43.32	68.20	4.349	0.7456	1.251	1023.0
55.0	6.722	148.0	0.403	47.06	74.45	4.468	0.7456	1.250	1073.0
60.0	7.335	152.0	0.369	50.81	80.69	4.577	0.7455	1.248	1120.0
70.0	8.560	189.0	0.316	58.29	93.16	4.769	0.7454	1.246	1210.0
80.0	9.783	216.0	0.276	65.76	105.6	4.935	0.7453	1.245	1293.0
90.0	11.01	243.0	0.245	73.23	118.1	5.082	0.7453	1.244	1371.0
100.0	12.23	270.0	0.220	80.69	130.5	5.213	0.7452	1.244	1444.0
120.0	14.67	324.0	0.184	95.61	155.4	5.440	0.7451	1.243	1581.0
140.0	17.11	377.0	0.157	110.5	180.2	5.631	0.7450	1.242	1707.0
160.0	19.55	431.0	0.138	125.4	205.1	5.797	0.7450	1.242	1824.0
180.0	21.98	485.0	0.122	140.3	229.9	5.943	0.7450	1.242	1935.0
200.0	24.42	538.0	0.110	155.2	254.7	6.074	0.7449	1.242	2039.0
250.0	30.52	672.0	0.0888	192.5	316.8	6.351	0.7449	1.241	2278.0
300.0	36.61	807.0	0.0733	229.7	378.9	6.577	0.7449	1.241	2495.0
350.0	42.70	941.0	0.0629	267.0	440.9	6.769	0.7448	1.241	2695.0
400.0	48.80	1078.0	0.0550	304.2	503.0	6.935	0.7448	1.241	2880.0
450.0	54.89	1210.0	0.0489	341.4	565.1	7.081	0.7448	1.241	3055.0
500.0	60.98	1340.0	0.0440	378.7	627.1	7.212	0.7448	1.241	3219.0
600.0	73.17	1610.0	0.0367	453.2	751.2	7.438	0.7448	1.241	3526.0
700.0	85.35	1880.0	0.0314	527.6	875.3	7.629	0.7448	1.241	3800.0
800.0	97.54	2150.0	0.0275	602.1	999.0	7.795	0.7448	1.241	4071.0
900.0	109.7	2410.0	0.0245	676.6	1124.0	7.941	0.7448	1.241	4318.0
1000.0	121.9	2680.0	0.0220	751.0	1248.0	8.072	0.7448	1.241	4551.0
1200.0	146.3	3220.0	0.0183	900.0	1496.0	8.298	0.7447	1.241	4905.0
1400.0	170.7	3760.0	0.0157	1049.0	1744.0	8.489	0.7447	1.241	5304.0
1600.0	195.0	4290.0	0.0137	1198.0	1992.0	8.655	0.7447	1.241	5756.0
1800.0	219.4	4830.0	0.0122	1347.0	2241.0	8.801	0.7447	1.241	6185.0
2000.0	243.8	5360.0	0.0110	1496.0	2489.0	8.932	0.7447	1.241	6435.0
2500.0	304.7	6780.0	0.00886	1868.0	3109.0	9.209	0.7447	1.241	7194.0
3000.0	365.6	8040.0	0.00733	2240.0	3730.3	9.435	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

22 PSIA ISOBAR

TEMPERATURE	DENSITY	$V(DH/DV)_P$	$V(DP/DU)_V$	$-V(DP/DV)_T$	$(DV/DT)/V_P$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR	CONSTANT	NUMBER
4.0	9.308	56.0	2.28	1160.0	0.0116	0.00887	2.66	0.00146	1.02051	0.732
5.0	9.130	19.2	6.55	993.0	0.0262	0.0103	2.71	0.00224	1.02040	0.476
6.0	8.833	15.7	7.15	748.0	0.0410	0.0110	2.58	0.00194	1.02019	0.542
7.0	8.385	13.0	7.20	486.0	0.0659	0.0115	2.37	0.00168	1.01981	0.636
8.0	7.652	10.1	6.61	223.0	0.132	0.0116	2.11	0.00113	1.01904	0.878
* 8.429	7.114	8.42	6.06	111.0	0.239	0.0116	1.95	0.000812	1.01836	1.21
* 8.429	1.666	6.11	3.76	8.58	0.590	0.00773	0.998	0.00129	1.00583	1.66
9.0	1.324	7.54	3.79	13.1	0.299	0.00707	1.01	0.00237	1.00471	1.16
10.0	1.051	9.43	3.80	16.3	0.186	0.00720	1.06	0.00391	1.00379	0.930
11.0	0.8943	11.1	3.79	17.9	0.142	0.00755	1.12	0.00536	1.00325	0.844
12.0	0.7862	12.6	3.79	18.9	0.117	0.00794	1.19	0.00680	1.00287	0.798
13.0	0.7051	14.1	3.77	19.6	0.101	0.00834	1.25	0.00828	1.00258	0.770
14.0	0.6411	15.6	3.75	20.0	0.0895	0.00874	1.31	0.00978	1.00235	0.752
15.0	0.5890	17.0	3.75	20.4	0.0806	0.00912	1.37	0.0113	1.00217	0.740
16.0	0.5454	18.4	3.74	20.7	0.0736	0.00950	1.43	0.0129	1.00201	0.731
17.0	0.5083	19.7	3.73	20.9	0.0676	0.00987	1.49	0.0146	1.00188	0.724
18.0	0.4763	21.1	3.73	21.1	0.0627	0.0102	1.54	0.0162	1.00176	0.719
19.0	0.4484	22.4	3.72	21.2	0.0585	0.0106	1.60	0.0180	1.00166	0.716
20.0	0.4237	23.8	3.71	21.3	0.0550	0.0109	1.66	0.0197	1.00157	0.713
22.0	0.3828	26.4	3.70	21.5	0.0490	0.0116	1.76	0.0234	1.00142	0.710
24.0	0.3460	29.0	3.69	21.6	0.0443	0.0122	1.86	0.0272	1.00129	0.708
26.0	0.3198	31.6	3.69	21.7	0.0405	0.0128	1.96	0.0313	1.00119	0.707
28.0	0.2959	34.2	3.68	21.8	0.0372	0.0134	2.06	0.0355	1.00110	0.706
30.0	0.2755	36.8	3.67	21.8	0.0345	0.0139	2.15	0.0399	1.00103	0.706
32.0	0.2577	39.4	3.67	21.9	0.0322	0.0145	2.25	0.0444	1.00096	0.706
34.0	0.2422	41.9	3.66	21.9	0.0301	0.0150	2.33	0.0491	1.00091	0.706
36.0	0.2284	44.5	3.66	22.0	0.0284	0.0155	2.42	0.0540	1.00085	0.707
38.0	0.2162	47.0	3.65	22.0	0.0268	0.0160	2.51	0.0590	1.00081	0.707
40.0	0.2052	49.5	3.65	22.0	0.0254	0.0165	2.59	0.0641	1.00077	0.708
45.0	0.1821	55.8	3.64	22.0	0.0225	0.0177	2.79	0.0777	1.00068	0.709
50.0	0.1637	62.1	3.64	22.0	0.0201	0.0189	2.98	0.0922	1.00061	0.710
55.0	0.1488	68.4	3.63	22.0	0.0183	0.0200	3.16	0.108	1.00056	0.710
60.0	0.1363	74.7	3.63	22.1	0.0167	0.0211	3.33	0.124	1.00051	0.711
70.0	0.1168	87.2	3.62	22.1	0.0143	0.0232	3.67	0.159	1.00044	0.713
80.0	0.1022	100.0	3.62	22.1	0.0125	0.0252	3.98	0.198	1.00038	0.709
90.0	0.09086	112.0	3.62	22.1	0.0111	0.0271	4.28	0.240	1.00034	0.708
100.0	0.08179	125.0	3.62	22.1	0.0100	0.0290	4.57	0.285	1.00031	0.706
120.0	0.06818	149.0	3.61	22.1	0.00832	0.0326	5.11	0.384	1.00026	0.702
140.0	0.05845	174.0	3.61	22.1	0.00713	0.0360	5.62	0.496	1.00022	0.698
160.0	0.05116	199.0	3.61	22.1	0.00624	0.0393	6.11	0.619	1.00019	0.694
180.0	0.04549	224.0	3.61	22.0	0.00555	0.0426	6.57	0.754	1.00017	0.691
200.0	0.04095	245.0	3.61	22.8	0.00499	0.0457	6.98	0.899	1.00015	0.675
250.0	0.03277	311.0	3.61	22.4	0.00399	0.0532	7.99	1.31	1.00012	0.671
300.0	0.02731	373.0	3.60	22.0	0.00333	0.0602	9.01	1.78	1.00010	0.669
350.0	0.02342	435.0	3.60	22.0	0.00285	0.0669	10.0	2.30	1.00009	0.667
400.0	0.02049	497.0	3.60	22.0	0.00250	0.0733	10.9	2.88	1.00008	0.666
450.0	0.01822	559.0	3.60	22.0	0.00222	0.0793	11.0	3.51	1.00007	0.666
500.0	0.01644	621.0	3.60	22.0	0.00200	0.0851	12.7	4.18	1.00006	0.666
600.0	0.01367	745.0	3.60	22.0	0.00167	0.0962	14.4	5.67	1.00005	0.669
700.0	0.01172	869.0	3.60	22.0	0.00143	0.107	16.0	7.36	1.00004	0.668
800.0	0.01025	993.0	3.60	22.3	0.00125	0.118	17.4	9.23	1.00004	0.668
900.0	0.009114	1120.0	3.60	22.0	0.00111	0.128	19.1	11.3	1.00003	0.667
1000.0	0.008263	1240.0	3.60	22.0	0.00100	0.137	20.5	13.3	1.00003	0.667
1200.0	0.006838	1490.0	3.60	22.0	0.000833	0.156	23.3	18.4	1.00003	0.667
1400.0	0.005860	1740.0	3.60	22.0	0.000714	0.174	26.0	23.9	1.00002	0.667
1600.0	0.005127	1990.0	3.60	22.0	0.000625	0.191	28.5	30.1	1.00002	0.666
1800.0	0.004550	2230.0	3.60	22.0	0.000555	0.208	31.0	36.0	1.00002	0.666
2000.0	0.004102	2480.0	3.60	22.0	0.000500	0.224	33.4	44.0	1.00002	0.666
2500.0	0.003282	3100.0	3.60	22.0	0.000400	0.263	39.2	64.5	1.00001	0.666
3000.0	0.002735	3720.0	3.60	22.0	0.000333	0.299	44.6	88.1	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

24 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU/LB-R	CP BTU/LB-R	VELOCITY OF SOUND FT/SEC
4.0	0.1072	127.0	13.5	1.391	1.868	0.3975	0.6327	0.6450	773.7
5.0	0.1093	111.0	26.0	1.881	2.367	0.5104	0.4337	0.5013	769.3
6.0	0.1129	86.5	30.8	2.425	2.927	0.6128	0.4854	0.6405	727.3
7.0	0.1188	59.9	32.2	3.130	3.657	0.7254	0.5295	0.8465	666.1
8.0	0.1296	31.5	30.0	4.111	4.687	0.8622	0.5821	1.292	569.1
* 8.620	0.1450	12.0	25.5	5.079	5.723	0.9865	0.6331	2.458	464.0
* 8.620	0.5341	4.26	5.73	10.04	12.41	1.762	0.8088	4.317	324.7
9.0	0.6457	7.97	4.64	10.78	13.65	1.903	0.7883	2.667	353.4
10.0	0.8437	14.3	3.45	12.06	15.81	2.131	0.7629	1.861	401.9
11.0	1.084	19.1	2.86	13.08	17.54	2.296	0.7521	1.629	437.7
12.0	1.148	23.3	2.47	14.00	19.10	2.432	0.7471	1.518	467.9
13.0	1.285	27.1	2.20	14.87	20.59	2.551	0.7447	1.453	494.8
14.0	1.417	30.7	1.98	15.72	22.02	2.657	0.7436	1.411	519.3
15.0	1.545	34.1	1.81	16.55	23.41	2.753	0.7432	1.381	542.0
16.0	1.671	37.4	1.67	17.36	24.78	2.841	0.7432	1.360	563.3
17.0	1.795	40.7	1.55	18.16	26.13	2.923	0.7433	1.344	583.5
18.0	1.917	43.8	1.45	18.95	27.47	3.000	0.7435	1.331	602.6
19.0	2.037	46.9	1.36	19.74	28.79	3.071	0.7437	1.321	621.3
20.0	2.157	50.0	1.28	20.52	30.11	3.139	0.7440	1.313	639.1
22.0	2.394	56.0	1.15	22.07	32.71	3.263	0.7444	1.300	673.0
24.0	2.629	61.9	1.05	23.61	35.30	3.376	0.7448	1.291	704.8
26.0	2.863	67.7	0.961	25.15	37.87	3.478	0.7451	1.284	735.1
28.0	3.095	73.5	0.888	26.68	40.43	3.573	0.7453	1.278	763.9
30.0	3.325	79.2	0.825	28.20	42.98	3.661	0.7455	1.273	791.4
32.0	3.555	84.9	0.770	29.72	45.52	3.743	0.7456	1.269	818.0
34.0	3.784	90.5	0.722	31.24	48.06	3.820	0.7457	1.266	843.5
36.0	4.013	96.1	0.681	32.75	50.58	3.892	0.7457	1.263	868.3
38.0	4.240	102.0	0.643	34.26	53.11	3.961	0.7457	1.261	892.3
40.0	4.468	107.0	0.610	35.77	55.63	4.025	0.7457	1.259	915.6
45.0	5.035	121.0	0.540	39.54	61.91	4.173	0.7457	1.255	971.3
50.0	5.599	135.0	0.485	43.29	68.18	4.305	0.7457	1.252	1024.0
55.0	6.163	148.0	0.440	47.05	74.44	4.425	0.7456	1.250	1074.0
60.0	6.726	162.0	0.403	50.79	80.68	4.533	0.7456	1.249	1121.0
70.0	7.849	189.0	0.344	58.28	93.16	4.726	0.7455	1.247	1210.0
80.0	8.971	216.0	0.301	65.75	105.6	4.892	0.7454	1.245	1293.0
90.0	10.09	243.0	0.267	73.22	118.1	5.039	0.7453	1.244	1371.0
100.0	11.21	270.0	0.240	80.68	130.5	5.170	0.7453	1.244	1445.0
120.0	13.45	324.0	0.200	95.68	155.4	5.396	0.7452	1.243	1582.0
140.0	15.69	378.0	0.172	110.5	180.2	5.588	0.7451	1.242	1780.0
160.0	17.92	431.0	0.150	125.4	205.1	5.754	0.7450	1.242	1825.0
180.0	20.16	485.0	0.133	140.3	229.9	5.900	0.7450	1.242	1935.0
200.0	22.39	539.0	0.120	155.2	254.7	6.031	0.7450	1.242	2039.1
250.0	27.98	673.0	0.0960	192.5	316.8	6.308	0.7449	1.241	2279.0
300.0	33.56	807.0	0.0888	229.7	378.9	6.534	0.7449	1.241	2496.0
350.0	39.15	941.0	0.0686	267.0	440.9	6.726	0.7448	1.241	2695.0
400.0	44.73	1070.0	0.0680	304.2	503.0	6.891	0.7448	1.241	2880.0
450.0	50.32	1210.0	0.0533	341.4	565.1	7.038	0.7448	1.241	3055.0
500.0	55.90	1340.0	0.0488	378.7	627.1	7.168	0.7448	1.241	3228.0
600.0	67.07	1610.0	0.0400	453.2	751.2	7.395	0.7448	1.241	3526.0
700.0	78.25	1880.0	0.0343	527.6	875.4	7.586	0.7448	1.241	3809.0
800.0	89.42	2150.0	0.0300	602.1	999.0	7.752	0.7448	1.241	4071.0
900.0	100.6	2420.0	0.0267	676.6	1124.0	7.890	0.7448	1.241	4318.0
1000.0	111.8	2680.0	0.0240	751.0	1248.0	8.029	0.7448	1.241	4551.0
1200.0	134.1	3220.0	0.0200	900.0	1496.0	8.255	0.7448	1.241	4985.0
1400.0	156.4	3760.0	0.0171	1049.0	1744.0	8.446	0.7447	1.241	5384.0
1600.0	178.8	4290.0	0.0150	1198.0	1992.0	8.612	0.7447	1.241	5756.0
1800.0	201.1	4830.0	0.0133	1347.0	2241.0	8.758	0.7447	1.241	6105.0
2000.0	223.5	5360.0	0.0120	1496.0	2489.0	8.889	0.7447	1.241	6435.0
2500.0	279.3	6700.0	0.00960	1868.0	3139.0	9.186	0.7447	1.241	7194.0
3000.0	339.2	8040.0	0.00800	2240.0	3730.0	9.392	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

24 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.324	56.5	2.29	1160.0	0.0114	0.00889	2.68	0.00148	1.02852	0.700
5.0	9.149	19.5	6.55	1010.0	0.0257	0.0103	2.73	0.00225	1.02041	0.477
6.0	8.857	15.9	7.16	767.0	0.0402	0.0111	2.60	0.00195	1.02020	0.542
7.0	8.419	13.3	7.23	504.0	0.0639	0.0116	2.40	0.00162	1.01904	0.651
8.0	7.715	10.5	6.67	243.0	0.123	0.0117	2.14	0.00117	1.01911	0.892
* 8.620	6.895	7.95	5.84	82.5	0.309	0.0118	1.90	0.000697	1.01805	1.42
* 8.620	1.872	6.01	3.79	7.98	0.718	0.00840	1.03	0.00104	1.00649	1.91
9.0	1.543	7.09	3.80	12.3	0.376	0.00743	1.03	0.00180	1.00545	1.33
10.0	1.185	9.14	3.82	16.9	0.204	0.00733	1.08	0.00332	1.00425	0.985
11.0	0.996	10.8	3.81	19.0	0.150	0.00763	1.14	0.00470	1.00360	0.873
12.0	0.8707	12.4	3.80	20.3	0.122	0.00801	1.20	0.06606	1.00316	0.818
13.0	0.7780	13.9	3.79	21.1	0.104	0.00840	1.26	0.00743	1.30284	0.784
14.0	0.7057	15.4	3.78	21.7	0.0916	0.00879	1.32	0.00882	1.00256	0.763
15.0	0.6471	16.8	3.77	22.1	0.0821	0.00917	1.38	0.0103	1.00238	0.748
16.0	0.5985	18.2	3.76	22.4	0.0746	0.00954	1.44	0.0117	1.00220	0.738
17.0	0.5572	19.6	3.75	22.7	0.0685	0.00991	1.50	0.0132	1.00205	0.730
18.0	0.5217	21.0	3.74	22.9	0.0634	0.0103	1.55	0.0148	1.00193	0.724
19.0	0.4908	22.3	3.73	23.0	0.0591	0.0106	1.61	0.0164	1.00181	0.720
20.0	0.4636	23.7	3.72	23.2	0.0554	0.0109	1.66	0.0180	1.00172	0.717
22.0	0.4176	26.3	3.71	23.4	0.0494	0.0116	1.77	0.0214	1.00155	0.713
24.0	0.3833	29.0	3.70	23.5	0.0446	0.0122	1.87	0.0249	1.00141	0.711
26.0	0.3493	31.6	3.69	23.7	0.0406	0.0128	1.97	0.0286	1.00130	0.709
28.0	0.3231	34.2	3.69	23.7	0.0374	0.0134	2.07	0.0325	1.00120	0.708
30.0	0.3007	36.8	3.68	23.8	0.0346	0.0140	2.16	0.0365	1.00112	0.708
32.0	0.2813	39.3	3.67	23.9	0.0323	0.0145	2.25	0.0407	1.00105	0.708
34.0	0.2642	41.9	3.67	23.9	0.0302	0.0150	2.34	0.0450	1.00099	0.708
36.0	0.2492	44.4	3.66	23.9	0.0284	0.0156	2.42	0.0495	1.00093	0.708
38.0	0.2358	47.0	3.66	24.0	0.0268	0.0161	2.51	0.0541	1.00088	0.708
40.0	0.2238	49.5	3.65	24.0	0.0254	0.0166	2.59	0.0588	1.00084	0.709
45.0	0.1986	55.8	3.65	24.0	0.0225	0.0178	2.79	0.0713	1.00074	0.710
50.0	0.1786	62.1	3.64	24.1	0.0202	0.0189	2.98	0.0846	1.00067	0.710
55.0	0.1623	68.4	3.64	24.1	0.0183	0.0200	3.16	0.0987	1.00061	0.711
60.0	0.1487	74.7	3.63	24.1	0.0167	0.0211	3.34	0.114	1.00056	0.711
70.0	0.1274	87.2	3.63	24.1	0.0143	0.0232	3.67	0.146	1.00048	0.711
80.0	0.1115	100.0	3.62	24.1	0.0125	0.0252	3.98	0.181	1.00042	0.709
90.0	0.09909	112.0	3.62	24.1	0.0111	0.0271	4.28	0.220	1.00037	0.708
100.0	0.08920	125.8	3.62	24.1	0.0100	0.0290	4.57	0.261	1.00034	0.706
120.0	0.07436	149.0	3.61	24.1	0.00832	0.0326	5.11	0.352	1.00028	0.702
140.0	0.06375	174.0	3.61	24.1	0.00713	0.0360	5.62	0.455	1.00024	0.698
160.0	0.05580	199.0	3.61	24.1	0.00624	0.0393	6.11	0.568	1.00021	0.694
180.0	0.04961	224.0	3.61	24.1	0.00554	0.0426	6.58	0.691	1.00019	0.691
200.0	0.04466	249.0	3.61	24.1	0.00499	0.0457	6.93	0.824	1.00017	0.675
250.0	0.03974	311.0	3.61	24.0	0.00399	0.0532	7.99	1.20	1.00013	0.671
300.0	0.02979	373.0	3.60	24.0	0.00333	0.0602	9.01	1.63	1.00011	0.669
350.0	0.02354	435.0	3.60	24.0	0.00285	0.0669	10.0	2.11	1.00010	0.667
400.0	0.02235	497.0	3.60	24.0	0.00250	0.0733	10.9	2.64	1.00008	5.666
450.0	0.01907	559.0	3.60	24.0	0.00222	0.0793	11.8	3.22	1.00008	0.666
500.0	0.01709	621.0	3.60	24.0	0.00288	0.0851	12.7	3.83	1.00007	0.667
600.0	0.01491	745.0	3.60	24.0	0.00167	0.0962	14.4	5.20	1.00006	0.668
700.0	0.01278	869.0	3.60	24.0	0.00143	0.107	16.0	6.75	1.00005	0.668
800.0	0.01118	994.0	3.60	24.0	0.00125	0.110	17.6	8.47	1.00004	0.668
900.0	0.009942	1120.0	3.60	24.0	0.00111	0.128	19.1	10.3	1.00004	0.667
1000.0	0.008946	1248.0	3.60	24.0	0.00100	0.137	20.5	12.4	1.00003	0.667
1200.0	0.007457	1490.0	3.60	24.0	0.000833	0.156	23.3	16.9	1.00003	0.667
1400.0	0.006392	1740.0	3.60	24.0	0.000714	0.174	26.0	21.9	1.00002	0.667
1600.0	0.005593	1990.0	3.60	24.0	0.000625	0.191	28.5	27.6	1.00002	0.666
1800.0	0.004972	2230.0	3.60	24.0	0.000555	0.208	31.0	33.7	1.00002	0.666
2000.0	0.004475	2480.0	3.60	24.0	0.000500	0.224	33.4	40.4	1.00002	0.666
2500.0	0.003580	3100.0	3.60	24.0	0.000400	0.263	39.2	59.1	1.00001	0.666
3000.0	0.002984	3720.0	3.60	24.0	0.000333	0.299	44.6	80.8	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

26 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
4.0	0.1071	128.0	13.5	1.389	1.905	0.3968	0.6277	0.6397	778.6
5.0	0.1091	112.0	26.0	1.875	2.401	0.5090	0.4330	0.4994	774.3
6.0	0.1126	88.4	30.9	2.415	2.957	0.6109	0.4049	0.6378	733.3
7.0	0.1163	61.9	32.4	3.111	3.681	0.7225	0.5286	0.8373	673.8
8.0	0.1207	33.7	30.4	4.071	4.690	0.8567	0.5802	1.251	580.5
* 8.008	0.1503	8.65	24.3	5.383	6.107	1.024	0.6494	3.154	441.2
* 8.588	0.4741	3.33	6.51	9.873	12.16	1.711	0.8095	5.474	322.9
9.0	0.5431	5.74	5.61	10.39	13.00	1.886	0.7969	3.486	341.1
10.0	0.7509	13.0	3.91	11.06	15.47	2.068	0.7660	1.995	396.0
11.0	0.9058	18.1	3.19	12.93	17.29	2.241	0.7535	1.690	433.9
12.0	1.044	22.5	2.74	13.88	18.90	2.382	0.7477	1.554	465.2
13.0	1.173	26.4	2.42	14.77	20.42	2.503	0.7458	1.478	492.7
14.0	1.296	30.1	2.18	15.63	21.87	2.610	0.7437	1.429	517.6
15.0	1.416	33.6	1.98	16.46	23.28	2.708	0.7432	1.396	540.7
16.0	1.533	37.0	1.83	17.28	24.66	2.797	0.7431	1.372	562.3
17.0	1.648	40.3	1.69	18.09	26.02	2.880	0.7432	1.353	582.8
18.0	1.762	43.5	1.58	18.89	27.37	2.956	0.7434	1.339	602.2
19.0	1.874	46.6	1.48	19.68	28.70	3.028	0.7437	1.328	620.8
20.0	1.985	49.7	1.40	20.46	30.02	3.096	0.7439	1.319	638.0
22.0	2.205	55.7	1.26	22.02	32.64	3.221	0.7444	1.305	672.8
24.0	2.423	61.7	1.14	23.56	35.23	3.334	0.7448	1.295	704.8
26.0	2.639	67.6	1.04	25.10	37.81	3.437	0.7451	1.287	735.2
28.0	2.854	73.4	0.964	26.63	40.38	3.532	0.7454	1.281	764.1
30.0	3.068	79.1	0.895	28.16	42.93	3.620	0.7456	1.276	791.7
32.0	3.288	84.8	0.836	29.69	45.48	3.702	0.7457	1.271	818.3
34.0	3.492	90.4	0.784	31.20	48.02	3.779	0.7457	1.268	843.9
36.0	3.703	96.1	0.738	32.72	50.55	3.852	0.7458	1.265	868.7
38.0	3.914	102.0	0.698	34.23	53.08	3.920	0.7458	1.262	892.7
40.0	4.124	107.0	0.662	35.74	55.60	3.985	0.7458	1.260	916.1
45.0	4.648	121.0	0.586	39.51	61.89	4.133	0.7458	1.256	971.8
50.0	5.170	135.0	0.526	43.27	68.10	4.265	0.7458	1.253	1024.0
55.0	5.690	148.0	0.477	47.03	74.42	4.385	0.7457	1.251	1074.0
60.0	6.210	162.0	0.437	50.78	80.67	4.493	0.7457	1.249	1122.0
70.0	7.240	189.0	0.373	58.26	93.16	4.686	0.7456	1.247	1211.0
80.0	8.284	216.0	0.326	65.74	105.6	4.852	0.7455	1.246	1294.0
90.0	9.318	243.0	0.290	73.21	118.1	4.999	0.7454	1.245	1372.0
100.0	10.35	270.0	0.261	80.68	130.5	5.130	0.7453	1.244	1445.0
120.0	12.42	324.0	0.217	95.60	155.4	5.397	0.7452	1.243	1582.0
140.0	14.48	378.0	0.186	110.5	180.2	5.540	0.7451	1.242	1708.0
160.0	16.55	431.0	0.163	125.4	205.1	5.714	0.7451	1.242	1825.0
180.0	18.61	485.6	0.144	140.3	229.9	5.860	0.7450	1.242	1935.0
200.0	20.67	539.0	0.138	155.2	254.8	5.991	0.7450	1.242	2040.0
250.0	25.83	673.0	0.104	192.5	316.8	6.260	0.7449	1.241	2279.0
300.0	30.99	807.0	0.0867	229.7	378.9	6.495	0.7449	1.241	2496.0
350.0	36.16	941.0	0.0743	267.0	441.0	6.686	0.7449	1.241	2695.0
400.0	41.30	1078.0	0.0650	304.2	503.0	6.852	0.7448	1.241	2881.0
450.0	46.45	1210.0	0.0578	341.4	565.1	6.998	0.7448	1.241	3055.0
500.0	51.61	1340.0	0.0520	378.7	627.2	7.129	0.7448	1.241	3220.0
600.0	61.92	1616.0	0.0433	453.2	751.3	7.355	0.7448	1.241	3527.0
700.0	72.23	1888.0	0.0371	527.6	875.4	7.546	0.7448	1.241	3809.0
800.0	82.54	2158.0	0.0325	602.1	1000.0	7.712	0.7448	1.241	4071.0
900.0	92.85	2426.0	0.0289	676.6	1124.0	7.858	0.7448	1.241	4318.0
1000.0	103.2	2680.0	0.0268	751.1	1248.0	7.989	0.7448	1.241	4551.0
1200.0	123.8	3220.0	0.0217	900.0	1498.0	8.215	0.7448	1.241	4985.0
1400.0	144.4	3760.0	0.0186	1049.0	1744.0	8.407	0.7448	1.241	5385.0
1600.0	165.0	4290.0	0.0162	1198.0	1992.0	8.572	0.7447	1.241	5756.0
1800.0	185.7	4830.0	0.0144	1347.0	2241.0	8.718	0.7447	1.241	6105.0
2000.0	206.3	5360.0	0.0130	1496.0	2489.0	8.849	0.7447	1.241	6435.0
2500.0	257.8	6700.0	0.0104	1868.0	3109.0	9.126	0.7447	1.241	7194.0
3000.0	309.4	8040.0	0.00867	2240.0	3738.0	9.352	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

26 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.341	57.0	2.30	1208.0	0.0112	0.00890	2.70	0.00149	1.02053	0.698
5.0	9.168	19.8	6.55	1030.0	0.0253	0.0104	2.75	0.00226	1.02042	0.477
6.0	8.881	16.2	7.17	705.0	0.0394	0.0111	2.62	0.00196	1.02022	0.541
7.0	8.452	13.5	7.26	523.0	0.0620	0.0116	2.42	0.00164	1.01987	0.627
8.0	7.773	10.8	6.74	262.0	0.116	0.0118	2.16	0.00121	1.01918	0.829
* 8.800	6.651	7.48	5.62	57.5	0.422	0.0121	1.84	0.000576	1.01769	1.73
* 8.808	2.139	5.90	3.81	7.02	0.927	0.00937	1.08	0.000811	1.00723	2.27
9.0	1.841	6.58	3.82	10.6	0.530	0.00818	1.07	0.00126	1.00639	1.66
10.0	1.332	8.83	3.83	17.3	0.226	0.00749	1.13	0.00282	1.00474	1.05
11.0	1.174	10.6	3.83	20.0	0.159	0.00773	1.15	0.00414	1.00397	0.907
12.0	0.9582	12.2	3.82	21.5	0.127	0.00808	1.21	0.00542	1.00347	0.838
13.0	0.8528	13.8	3.81	22.5	0.107	0.00845	1.27	0.00671	1.00310	0.799
14.0	0.7715	15.2	3.79	23.2	0.0937	0.00884	1.33	0.00801	1.00282	0.774
15.0	0.7062	16.7	3.78	23.7	0.0836	0.00921	1.39	0.00935	1.00259	0.757
16.0	0.6522	18.1	3.77	24.1	0.0757	0.00958	1.45	0.0107	1.00239	0.745
17.0	0.6067	19.5	3.76	24.4	0.0694	0.00995	1.50	0.0121	1.00223	0.736
18.0	0.5675	20.9	3.75	24.7	0.0641	0.0103	1.56	0.0136	1.00223	0.736
19.0	0.5336	22.2	3.74	24.9	0.0597	0.0106	1.61	0.0150	1.00197	0.725
20.0	0.5037	23.6	3.73	25.0	0.0559	0.0110	1.67	0.0165	1.00186	0.721
22.0	0.4534	26.3	3.72	25.3	0.0497	0.0116	1.77	0.0197	1.00168	0.716
24.0	0.4127	28.9	3.71	25.5	0.0448	0.0123	1.88	0.0229	1.00153	0.713
26.0	0.3789	31.5	3.70	25.6	0.0408	0.0129	1.97	0.0264	1.00141	0.711
28.0	0.3504	34.1	3.69	25.7	0.0375	0.0134	2.07	0.0299	1.00130	0.710
30.0	0.3260	36.7	3.68	25.8	0.0347	0.0140	2.16	0.0337	1.00121	0.710
32.0	0.3048	39.3	3.68	25.8	0.0323	0.0145	2.25	0.0375	1.00114	0.709
34.0	0.2864	41.9	3.67	25.9	0.0303	0.0151	2.34	0.0415	1.00114	0.709
36.0	0.2730	44.4	3.67	25.9	0.0285	0.0156	2.43	0.0456	1.00107	0.709
38.0	0.2555	47.0	3.66	26.0	0.0269	0.0161	2.51	0.0499	1.00101	0.709
40.0	0.2425	49.5	3.66	26.0	0.0255	0.0166	2.59	0.0543	1.00095	0.710
45.0	0.2152	55.8	3.65	26.0	0.0225	0.0178	2.79	0.0658	1.00081	0.710
50.0	0.1934	62.1	3.64	26.1	0.0202	0.0189	2.98	0.0781	1.00072	0.711
55.0	0.1757	68.4	3.64	26.1	0.0183	0.0200	3.16	0.0912	1.00066	0.711
60.0	0.1610	74.7	3.64	26.1	0.0167	0.0211	3.34	0.105	1.00060	0.711
70.0	0.1380	87.2	3.63	26.1	0.0143	0.0232	3.67	0.135	1.00052	0.711
80.0	0.1207	100.0	3.62	26.1	0.0125	0.0252	3.99	0.168	1.00045	0.709
90.0	0.1073	112.0	3.62	26.1	0.0111	0.0271	4.28	0.203	1.00040	0.708
100.0	0.09660	125.0	3.62	26.1	0.0100	0.0290	4.57	0.241	1.00036	0.706
120.0	0.08053	149.0	3.62	26.1	0.00832	0.0326	5.11	0.325	1.00030	0.702
140.0	0.06905	174.0	3.61	26.1	0.00713	0.0360	5.62	0.420	1.00026	0.698
160.0	0.06044	199.0	3.61	26.1	0.00624	0.0394	6.11	0.524	1.00023	0.696
180.0	0.05374	224.0	3.61	26.1	0.00554	0.0426	6.58	0.638	1.00020	0.691
200.0	0.04837	249.0	3.61	26.1	0.00499	0.0457	6.93	0.761	1.00018	0.675
250.0	0.03872	311.0	3.61	26.0	0.00399	0.0532	7.99	1.11	1.30015	0.671
300.0	0.03227	373.0	3.61	26.0	0.00333	0.0603	9.01	1.50	1.00012	0.669
350.0	0.02767	435.0	3.60	26.0	0.00285	0.0669	10.0	1.95	1.00010	0.667
400.0	0.02421	497.0	3.60	26.0	0.00250	0.0733	10.9	2.44	1.00009	0.666
450.0	0.02153	559.0	3.60	26.0	0.00222	0.0793	11.8	2.97	1.00008	0.666
500.0	0.01938	621.0	3.60	26.0	0.00200	0.0851	12.7	3.54	1.00007	0.667
600.0	0.01615	745.0	3.60	26.0	0.00167	0.0962	14.4	4.80	1.00006	0.668
700.0	0.01384	869.0	3.60	26.0	0.00143	0.107	16.0	6.23	1.00005	0.668
800.0	0.01212	994.0	3.60	26.0	0.00125	0.110	17.6	7.81	1.00005	0.668
900.0	0.01077	1120.0	3.60	26.0	0.00111	0.120	19.1	9.55	1.00004	0.667
1006.0	0.009693	1240.0	3.60	26.0	0.00100	0.137	20.5	11.4	1.00004	0.667
1256.0	0.008878	1490.0	3.60	26.0	0.000833	0.150	23.3	15.6	1.00003	0.667
1400.0	0.006925	1740.0	3.60	26.0	0.000714	0.174	26.0	20.3	1.00003	0.667
1600.0	0.006059	1990.0	3.60	26.0	0.000625	0.191	28.5	25.4	1.00002	0.666
1800.0	0.005386	2230.0	3.60	26.0	0.000555	0.208	31.0	31.1	1.00002	0.666
2006.0	0.004848	2480.0	3.60	26.0	0.000500	0.224	33.6	37.3	1.00002	0.666
2906.0	0.003878	3180.0	3.60	26.0	0.000400	0.263	39.2	54.6	1.00001	0.666
3000.0	0.003232	3720.0	3.60	26.0	0.000333	0.299	44.6	74.6	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

28 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1069	130.0	13.4	1.388	1.942	0.3961	0.6227	0.6345	783.5
5.8	0.1089	114.0	26.0	1.878	2.434	0.5076	0.4323	0.4975	779.3
6.0	0.1123	90.1	31.0	2.405	2.987	0.6890	0.4844	0.6336	739.1
7.0	0.1179	63.8	32.6	3.094	3.705	0.7196	0.5278	0.8287	681.2
8.0	0.1278	35.9	30.8	4.034	4.696	0.8515	0.5785	1.216	591.4
* 8.971	0.1571	5.69	22.8	5.723	6.537	1.066	0.6676	4.418	417.6
* 8.971	0.4174	2.35	7.47	9.644	11.81	1.653	0.8093	7.668	321.2
9.0	0.4320	2.85	7.19	9.770	12.01	1.676	0.8072	6.443	324.8
10.0	0.6693	11.6	4.43	11.64	15.11	2.005	0.7694	2.167	389.9
11.0	0.8214	17.1	3.54	12.77	17.03	2.189	0.7551	1.759	430.0
12.0	0.9535	21.7	3.01	13.75	18.70	2.334	0.7484	1.594	462.4
13.0	1.076	25.7	2.65	14.67	20.24	2.457	0.7452	1.504	490.6
14.0	1.192	29.5	2.38	15.53	21.72	2.567	0.7438	1.448	516.0
15.0	1.305	33.1	2.16	16.38	23.15	2.665	0.7432	1.411	539.4
16.0	1.415	36.5	1.99	17.20	24.54	2.755	0.7431	1.383	561.3
17.0	1.523	39.9	1.84	18.02	25.91	2.839	0.7432	1.363	582.8
18.0	1.629	43.1	1.72	18.82	27.27	2.916	0.7434	1.347	601.5
19.0	1.734	46.3	1.61	19.61	28.61	2.988	0.7436	1.335	620.4
20.0	1.838	49.4	1.52	20.40	29.93	3.056	0.7438	1.326	638.4
22.0	2.043	55.5	1.36	21.97	32.56	3.182	0.7443	1.310	672.7
24.0	2.246	61.5	1.23	23.52	35.16	3.295	0.7448	1.299	704.9
26.0	2.448	67.4	1.13	25.06	37.75	3.398	0.7452	1.291	735.4
28.0	2.648	73.2	1.04	26.59	40.32	3.494	0.7454	1.284	764.3
30.0	2.847	79.0	0.967	28.12	42.88	3.582	0.7456	1.278	792.0
32.0	3.045	84.7	0.902	29.65	45.44	3.665	0.7457	1.274	818.7
34.0	3.242	90.4	0.846	31.17	47.98	3.742	0.7458	1.270	844.3
36.0	3.438	96.0	0.797	32.69	50.52	3.814	0.7459	1.267	869.1
38.0	3.634	102.0	0.753	34.20	53.05	3.883	0.7459	1.264	893.2
40.0	3.829	107.0	0.714	35.72	55.57	3.947	0.7459	1.262	916.6
45.0	4.316	121.0	0.632	39.49	61.87	4.096	0.7459	1.257	972.3
50.0	4.802	135.0	0.567	43.25	68.15	4.228	0.7459	1.254	1025.0
55.0	5.285	149.0	0.514	47.01	74.41	4.347	0.7458	1.252	1075.0
60.0	5.768	162.0	0.470	50.76	80.67	4.456	0.7457	1.250	1122.0
70.0	6.732	189.0	0.402	58.25	93.15	4.649	0.7456	1.248	1211.0
80.0	7.694	216.0	0.351	65.73	105.6	4.815	0.7455	1.246	1294.8
90.0	8.655	243.0	0.312	73.20	118.1	4.962	0.7454	1.245	1372.0
100.0	9.615	270.0	0.281	80.67	130.5	5.093	0.7453	1.244	1446.0
120.0	11.53	324.0	0.234	95.59	155.4	5.328	0.7452	1.243	1583.0
140.0	13.45	378.0	0.200	110.5	180.2	5.511	0.7451	1.243	1709.0
160.0	15.37	432.0	0.175	125.4	205.1	5.677	0.7451	1.242	1826.0
180.0	17.28	485.0	0.156	140.3	229.9	5.824	0.7450	1.242	1938.0
200.0	19.20	539.0	0.140	155.2	254.8	5.954	0.7450	1.242	2040.0
250.0	23.99	673.0	0.112	192.5	316.9	6.231	0.7459	1.241	2279.0
300.0	28.78	807.0	0.0933	229.7	378.9	6.458	0.7449	1.241	2496.0
350.0	33.56	941.0	0.0800	267.0	441.0	6.649	0.7449	1.241	2695.0
400.0	38.35	1080.0	0.0780	304.2	503.1	6.815	0.7448	1.241	2881.0
450.0	43.14	1210.0	0.0622	341.4	565.1	6.961	0.7448	1.241	3055.0
500.0	47.93	1340.0	0.0560	378.7	627.2	7.092	0.7448	1.241	3220.0
600.0	57.53	1610.0	0.0467	453.2	751.3	7.318	0.7448	1.241	3527.0
700.0	67.07	1880.0	0.0400	527.6	875.4	7.509	0.7448	1.241	3809.0
800.0	76.65	2150.0	0.0350	602.1	1000.0	7.675	0.7448	1.241	4072.0
900.0	86.22	2420.0	0.0311	676.6	1124.0	7.821	0.7448	1.241	4318.0
1000.0	95.80	2688.0	0.0288	751.1	1248.0	7.952	0.7448	1.241	4551.0
1200.0	114.9	3228.0	0.0233	900.0	1496.0	8.178	0.7448	1.241	4985.0
1400.0	134.1	3768.0	0.0200	1049.0	1744.0	8.370	0.7448	1.241	5385.0
1600.0	153.2	4290.0	0.0175	1198.0	1992.0	8.535	0.7448	1.241	5756.0
1800.0	172.4	4838.0	0.0156	1347.0	2241.0	8.682	0.7447	1.241	6105.0
2000.0	191.5	5360.0	0.0140	1496.0	2489.0	8.812	0.7447	1.241	6435.0
2500.0	239.4	6700.0	0.0112	1868.0	3109.0	9.089	0.7447	1.241	7194.0
3000.0	287.3	8098.0	0.00933	2240.0	3730.0	9.316	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

28 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_v$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.356	57.5	2.31	1220.0	0.0110	0.00892	2.72	0.00150	1.02054	0.696
5.0	9.187	20.0	6.55	1050.0	0.0249	0.0104	2.77	0.00227	1.02043	0.478
6.0	8.904	16.4	7.18	803.0	0.0386	0.0111	2.64	0.00197	1.02024	0.541
7.0	8.484	13.7	7.29	541.0	0.0603	0.0117	2.44	0.00166	1.01990	0.624
8.0	7.828	11.1	6.80	281.0	0.109	0.0118	2.19	0.00124	1.01924	0.809
* 8.971	6.366	7.01	5.37	36.2	0.630	0.0127	1.79	0.000450	1.01724	2.24
* 8.971	2.396	5.79	3.85	5.63	1.33	0.0110	1.13	0.000688	1.00810	2.84
9.0	2.315	5.92	3.85	6.68	1.09	0.0102	1.13	0.000645	1.00786	2.55
10.0	1.494	8.51	3.85	17.4	0.255	0.00768	1.12	0.00237	1.00528	1.14
11.0	1.217	10.4	3.85	20.9	0.470	0.00783	1.17	0.00366	1.00435	0.944
12.0	1.049	12.0	3.84	22.7	0.132	0.00815	1.22	0.00488	1.00378	0.861
13.0	0.9295	13.6	3.82	23.9	0.111	0.00852	1.28	0.00609	1.00337	0.815
14.0	0.8386	15.1	3.81	24.8	0.0559	0.00889	1.34	0.00732	1.00305	0.786
15.0	0.7662	16.6	3.79	25.4	0.0852	0.00926	1.40	0.00857	1.00280	0.766
16.0	0.7066	18.0	3.78	25.8	0.0769	0.00963	1.46	0.00985	1.00259	0.753
17.0	0.6566	19.4	3.77	26.2	0.0703	0.0100	1.51	0.0112	1.00241	0.743
18.0	0.6137	20.8	3.76	26.5	0.0648	0.0103	1.57	0.0125	1.00226	0.735
19.0	0.5767	22.1	3.75	26.7	0.0603	0.0107	1.62	0.0139	1.00212	0.730
20.0	0.5441	23.5	3.74	26.9	0.0564	0.0110	1.68	0.0153	1.00201	0.726
22.0	0.4834	26.2	3.73	27.2	0.0500	0.0117.	1.78	0.0182	1.00181	0.720
24.0	0.4452	28.8	3.72	27.4	0.0451	0.0123	1.88	0.0212	1.00165	0.716
26.0	0.4085	31.5	3.71	27.5	0.0410	0.0129	1.98	0.0244	1.00152	0.714
28.0	0.3777	34.1	3.70	27.7	0.0377	0.0135	2.07	0.0278	1.00140	0.712
30.0	0.3513	36.7	3.69	27.7	0.0348	0.0140	2.17	0.0312	1.00131	0.711
32.0	0.3284	39.3	3.68	27.8	0.0324	0.0146	2.26	0.0348	1.00122	0.711
34.0	0.3085	41.8	3.68	27.9	0.0303	0.0151	2.35	0.0385	1.00115	0.710
36.0	0.2909	44.4	3.67	27.9	0.0285	0.0156	2.43	0.0424	1.00108	0.710
38.0	0.2752	47.0	3.67	28.0	0.0269	0.0161	2.52	0.0463	1.00103	0.710
40.0	0.2611	49.5	3.66	28.0	0.0255	0.0166	2.60	0.0504	1.00098	0.710
45.0	0.2317	55.8	3.65	28.0	0.0225	0.0178	2.88	0.0611	1.00087	0.711
50.0	0.2083	62.2	3.65	28.1	0.0202	0.0190	2.39	0.0726	1.00078	0.711
55.0	0.1892	68.4	3.64	28.1	0.0183	0.0201	3.17	0.0847	1.00071	0.711
60.0	0.1734	74.7	3.64	28.1	0.0167	0.0211	3.34	0.0976	1.00065	0.711
70.0	0.1485	87.2	3.63	28.1	0.0143	0.0232	3.67	0.125	1.00056	0.711
80.0	0.1300	100.0	3.63	28.1	0.0125	0.0252	3.99	0.156	1.00049	0.711
90.0	0.1155	112.0	3.62	28.1	0.0111	0.0271	4.29	0.189	1.00043	0.708
100.0	0.1040	125.0	3.62	28.1	0.0100	0.0290	4.57	0.224	1.00039	0.706
120.0	0.08670	150.0	3.62	28.1	0.00831	0.0326	5.11	0.302	1.00033	0.702
140.0	0.07434	174.0	3.61	28.1	0.00713	0.0360	5.62	0.390	1.00028	0.698
160.0	0.06507	199.0	3.61	28.1	0.00623	0.0394	6.11	0.487	1.00025	0.694
180.0	0.05786	224.0	3.61	28.1	0.00554	0.0426	6.58	0.593	1.00022	0.691
200.0	0.05208	249.0	3.61	28.1	0.00499	0.0457	6.90	0.707	1.00020	0.675
250.0	0.04169	311.0	3.61	28.1	0.00399	0.0532	7.99	1.03	1.00016	0.671
300.0	0.03475	373.0	3.61	28.0	0.00333	0.0603	9.01	1.40	1.00013	0.669
350.0	0.02979	435.0	3.60	28.0	0.00285	0.0669	10.0	1.81	1.00011	0.667
400.0	0.02608	497.0	3.60	28.0	0.00250	0.0733	10.9	2.26	1.00010	0.666
450.0	0.02318	559.0	3.60	28.0	0.00222	0.0793	11.8	2.76	1.00009	0.666
500.0	0.02087	621.0	3.60	28.0	0.00200	0.0851	12.7	3.29	1.00008	0.666
600.0	0.01739	745.0	3.60	28.0	0.00167	0.0962	14.4	4.46	1.00007	0.666
700.0	0.01491	870.0	3.60	28.0	0.00143	0.107	16.0	5.79	1.00006	0.666
800.0	0.01305	994.0	3.60	28.0	0.00125	0.118	17.6	7.26	1.00005	0.666
900.0	0.01160	1120.0	3.60	28.0	0.00111	0.128	19.1	8.86	1.00004	0.667
1000.0	0.01044	1240.0	3.60	28.0	0.00100	0.137	20.5	10.6	1.00004	0.667
1200.0	0.008700	1490.0	3.60	28.0	0.000833	0.156	23.3	14.5	1.00003	0.667
1400.0	0.007457	1740.0	3.60	28.0	0.000714	0.174	26.0	18.8	1.00003	0.667
1600.0	0.006525	1990.0	3.60	28.0	0.000625	0.191	28.5	23.6	1.30002	0.666
1800.0	0.005801	2230.0	3.60	28.0	0.000555	0.208	31.0	28.9	1.00002	0.666
2000.0	0.005221	2480.0	3.60	28.0	0.000500	0.224	33.4	34.6	1.00002	0.666
2500.0	0.004177	3100.0	3.60	28.0	0.000400	0.263	39.2	50.7	1.00002	0.666
3000.0	0.003481	3720.0	3.60	28.0	0.000333	0.299	44.6	69.3	1.00001	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

30 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.8	0.1067	132.0	13.4	1.386	1.979	0.3955	0.6179	0.6294	788.4
5.8	0.1086	116.0	26.0	1.864	2.469	0.5063	0.4316	0.4956	784.2
6.0	0.1120	91.9	3..1	2.395	3.018	0.6071	0.4839	0.6304	744.8
7.8	0.1174	65.7	32.8	3.077	3.729	0.7163	0.5270	0.8206	688.4
8.0	0.1269	38.1	3..1	3.999	4.704	0.8466	0.5769	1.185	601.8
9.0	0.1536	7.87	23.7	5.626	6.479	1.053	0.6623	3.463	436.5
* 9.134	0.1665	3.10	21.1	6.129	7.354	1.117	0.6892	7.394	392.7
* 9.134	0.3632	1.34	8.74	7.389	11.31	1.582	0.8372	13.31	320.2
10.0	0.5963	10.2	5.02	11.39	14.70	1.941	0.7730	2.397	383.4
11.0	0.7475	16.1	3.92	12.61	16.76	2.138	0.7566	1.839	426.0
12.0	0.8750	20.9	3.30	13.63	18.49	2.288	0.7491	1.637	459.6
13.0	0.9919	25.1	2.89	14.56	20.07	2.414	0.7455	1.532	488.5
14.0	1.103	28.9	2.58	15.44	21.57	2.525	0.7439	1.468	514.4
15.0	1.209	32.6	2.34	16.29	23.01	2.625	0.7432	1.426	538.2
16.0	1.313	36.1	2.15	17.13	24.42	2.716	0.7430	1.396	560.4
17.0	1.414	39.5	1.99	17.95	25.80	2.800	0.7431	1.373	581.2
18.0	1.514	42.8	1.85	18.76	27.17	2.878	0.7433	1.356	601.0
19.0	1.613	45.9	1.73	19.55	28.51	2.951	0.7435	1.343	619.9
20.0	1.710	49.1	1.63	20.34	29.84	3.019	0.7438	1.332	638.1
22.0	1.903	55.2	1.46	21.91	32.48	3.145	0.7443	1.316	672.6
24.0	2.093	61.3	1.33	23.47	35.10	3.259	0.7448	1.304	704.9
26.0	2.282	67.2	1.21	25.01	37.69	3.363	0.7452	1.295	735.5
28.0	2.469	73.1	1.12	26.55	40.27	3.458	0.7455	1.287	764.6
30.0	2.655	78.9	1.04	28.09	42.84	3.547	0.7457	1.281	792.4
32.0	2.840	84.6	0.969	29.61	45.39	3.629	0.7458	1.276	819.0
34.0	3.025	90.3	0.908	31.14	47.94	3.706	0.7459	1.272	844.7
36.0	3.208	96.0	0.855	32.66	50.48	3.779	0.7460	1.269	869.6
38.0	3.391	102.0	0.808	34.18	53.02	3.848	0.7460	1.266	893.7
40.0	3.574	107.0	0.766	35.69	55.54	3.912	0.7460	1.263	917.0
45.0	4.029	121.0	0.677	39.47	61.85	4.061	0.7460	1.259	972.8
50.0	4.482	135.0	0.608	43.23	68.13	4.193	0.7459	1.255	1025.0
55.0	4.934	149.0	0.551	46.99	74.40	4.313	0.7459	1.253	1075.0
60.0	5.385	162.0	0.504	50.74	80.66	4.422	0.7458	1.251	1123.0
70.0	6.285	189.0	0.431	58.23	93.15	4.614	0.7457	1.248	1212.0
80.0	7.184	217.0	0.377	65.72	105.6	4.781	0.7456	1.246	1295.0
90.0	8.081	244.0	0.334	73.19	118.1	4.928	0.7455	1.245	1373.0
100.0	8.977	271.0	0.301	80.66	130.5	5.059	0.7454	1.244	1446.0
120.0	10.77	324.0	0.250	95.50	155.4	5.285	0.7453	1.243	1583.0
140.0	12.56	378.0	0.214	110.5	180.3	5.477	0.7452	1.243	1709.0
160.0	14.35	432.0	0.188	125.4	205.1	5.643	0.7451	1.242	1826.0
180.0	16.13	485.0	0.167	140.3	230.0	5.789	0.7451	1.242	1936.0
200.0	17.92	539.0	0.150	155.2	254.8	5.920	0.7450	1.242	2040.0
250.0	22.39	673.0	0.120	192.5	316.9	6.197	0.7450	1.242	2280.0
300.0	26.86	807.0	0.100	229.7	378.9	6.423	0.7449	1.241	2496.0
350.0	31.33	941.0	0.0857	267.0	441.0	6.615	0.7449	1.241	2696.0
400.0	35.80	1080.0	0.0750	304.2	503.1	6.781	0.7449	1.241	2881.0
450.0	40.27	1210.0	0.0667	341.4	565.1	6.927	0.7448	1.241	3055.0
500.0	44.73	1340.0	0.0600	378.7	627.2	7.058	0.7448	1.241	3220.0
600.0	53.67	1610.0	0.0500	453.2	751.3	7.284	0.7448	1.241	3527.0
700.0	62.61	1880.0	0.0429	527.6	875.4	7.475	0.7448	1.241	3809.0
800.0	71.54	2150.0	0.0375	602.1	1000.0	7.641	0.7448	1.241	4072.0
900.0	80.48	2420.0	0.0333	676.6	1124.0	7.787	0.7448	1.241	4318.0
1000.0	89.41	2680.0	0.0300	751.1	1248.0	7.918	0.7448	1.241	4552.0
1200.0	107.3	3220.0	0.0250	900.0	1496.0	8.144	0.7448	1.241	4986.0
1400.0	125.2	3760.0	0.0214	1049.0	1744.0	8.335	0.7448	1.241	5385.0
1600.0	143.0	4290.0	0.0187	1198.0	1992.0	8.501	0.7448	1.241	5756.0
1800.0	160.9	4830.0	0.0167	1347.0	2241.0	8.647	0.7448	1.241	6189.0
2000.0	178.8	5360.0	0.0150	1496.0	2481.0	8.778	0.7447	1.241	6435.0
2500.0	223.5	6700.0	0.0120	1868.0	3105.0	9.055	0.7447	1.241	7194.0
3000.0	260.1	8050.0	0.0100	2240.0	3730.0	9.281	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

30 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_v$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.372	58.0	2.31	1230.0	0.0109	0.00894	2.74	0.00152	1.02055	0.695
5.0	9.205	20.3	6.55	1060.0	0.0244	0.0104	2.79	0.00228	1.02045	0.478
6.0	8.927	16.6	7.20	821.0	0.0379	0.0112	2.66	0.00194	1.02026	0.540
7.0	8.515	14.0	7.32	559.0	0.0587	0.0117	2.46	0.00168	1.01993	0.628
8.0	7.879	11.4	6.85	300.0	0.104	0.0119	2.21	0.00128	1.01938	0.793
9.0	6.510	7.49	5.49	51.2	0.462	0.0123	1.83	0.000544	1.01747	1.06
* 9.134	6.306	6.54	5.09	18.6	1.13	0.0142	1.71	0.000328	1.01664	3.21
* 9.134	2.776	5.67	3.90	3.73	2.35	0.0149	1.20	0.000404	1.00921	3.84
10.0	1.677	8.19	3.88	17.2	0.293	0.00793	1.14	0.00197	1.00587	1.24
11.0	1.338	10.1	3.87	21.6	0.182	0.00795	1.18	0.00323	1.00476	0.986
12.0	1.143	11.8	3.85	23.8	0.138	0.00823	1.24	0.00448	1.00410	0.885
13.0	1.008	13.4	3.84	25.3	0.114	0.00858	1.29	0.00555	1.00364	0.831
14.0	0.9070	14.9	3.82	26.2	0.0983	0.00894	1.35	0.00671	1.00329	0.798
15.0	0.8271	16.4	3.81	27.0	0.0868	0.00931	1.41	0.00789	1.00301	0.776
16.0	0.7617	17.9	3.79	27.5	0.0781	0.00967	1.46	0.00910	1.00278	0.760
17.0	0.7078	19.3	3.76	27.9	0.0712	0.0100	1.52	0.0103	1.00259	0.749
18.0	0.6633	20.7	3.77	28.2	0.0656	0.0104	1.57	0.0116	1.00242	0.741
19.0	0.6231	22.1	3.76	28.5	0.0609	0.0107	1.63	0.0129	1.00228	0.734
20.0	0.5847	23.4	3.75	28.7	0.0569	0.0111	1.68	0.0142	1.00215	0.730
22.0	0.5255	26.1	3.74	29.0	0.0504	0.0117	1.79	0.0169	1.00194	0.723
24.0	0.4777	28.8	3.73	29.3	0.0453	0.0123	1.89	0.0198	1.00177	0.719
26.0	0.4382	31.4	3.72	29.5	0.0412	0.0129	1.98	0.0228	1.00162	0.716
28.0	0.4058	34.0	3.71	29.6	0.0378	0.0135	2.06	0.0259	1.00150	0.714
30.0	0.3766	36.7	3.70	29.7	0.0349	0.0141	2.17	0.0291	1.00140	0.713
32.0	0.3521	39.2	3.69	29.8	0.0325	0.0146	2.26	0.0325	1.00131	0.712
34.0	0.3306	41.8	3.68	29.9	0.0304	0.0151	2.35	0.0360	1.00123	0.711
36.0	0.3117	44.4	3.68	29.9	0.0286	0.0156	2.44	0.0395	1.00116	0.711
38.0	0.2949	46.9	3.67	30.0	0.0270	0.0161	2.52	0.0432	1.00110	0.711
40.0	0.2798	49.5	3.67	30.0	0.0255	0.0166	2.63	0.0471	1.00104	0.711
45.0	0.2482	55.8	3.66	30.1	0.0225	0.0178	2.83	0.0571	1.00093	0.711
50.0	0.2231	62.2	3.65	30.1	0.0202	0.0190	2.99	0.0678	1.00083	0.712
55.0	0.2027	68.5	3.65	30.1	0.0183	0.0201	3.17	0.0791	1.00076	0.712
60.0	0.1857	74.7	3.64	30.1	0.0167	0.0212	3.34	0.0911	1.00070	0.712
70.0	0.1591	87.3	3.63	30.1	0.0143	0.0232	3.68	0.117	1.00060	0.711
80.0	0.1392	100.0	3.63	30.1	0.0125	0.0252	3.99	0.145	1.00052	0.710
90.0	0.1238	112.0	3.62	30.1	0.0111	0.0271	4.29	0.176	1.00046	0.708
100.0	0.1114	125.0	3.62	30.1	0.0100	0.0290	4.57	0.209	1.00042	0.706
120.0	0.09287	150.0	3.62	30.1	0.00831	0.0326	5.11	0.282	1.00035	0.702
140.0	0.07963	174.0	3.61	30.1	0.00712	0.0361	5.63	0.364	1.00030	0.698
160.0	0.06970	199.0	3.61	30.1	0.00623	0.0394	6.11	0.455	1.00026	0.694
180.0	0.06198	224.0	3.61	30.1	0.00554	0.0426	6.58	0.553	1.00023	0.691
200.0	0.05580	249.0	3.61	30.1	0.00499	0.0457	6.91	0.660	1.00021	0.675
250.0	0.04466	311.0	3.61	30.1	0.00399	0.0532	7.99	0.960	1.00017	0.671
300.0	0.03723	373.0	3.61	30.1	0.00333	0.0603	9.01	1.30	1.00014	0.669
350.0	0.03192	435.0	3.60	30.0	0.00285	0.0669	10.0	1.69	1.00012	0.667
400.0	0.02794	497.0	3.60	30.0	0.00250	0.0733	10.9	2.11	1.00011	0.666
450.0	0.02484	559.0	3.60	30.0	0.00222	0.0793	11.8	2.57	1.00009	0.666
500.0	0.02235	621.0	3.60	30.0	0.00200	0.0851	12.7	3.07	1.00008	0.667
600.0	0.01863	745.0	3.60	30.0	0.00167	0.0962	14.4	4.16	1.00007	0.668
700.0	0.01597	870.0	3.60	30.0	0.00143	0.107	16.0	5.40	1.00006	0.668
800.0	0.01398	994.0	3.60	30.0	0.00125	0.118	17.6	6.77	1.00005	0.668
900.0	0.01243	1120.0	3.60	30.0	0.00111	0.128	19.1	8.17	1.00005	0.667
1000.0	0.01118	1240.0	3.60	30.0	0.00100	0.137	20.5	9.90	1.00004	0.667
1200.0	0.009321	1490.0	3.60	30.0	0.000833	0.156	23.3	13.5	1.00004	0.667
1400.0	0.007990	1740.0	3.60	30.0	0.000714	0.174	26.0	17.6	1.00003	0.667
1600.0	0.006991	1990.0	3.60	30.0	0.000625	0.191	28.5	22.1	1.00003	0.666
1800.0	0.006215	2230.0	3.60	30.0	0.000555	0.208	31.0	27.0	1.00002	0.666
2000.0	0.005594	2480.0	3.60	30.0	0.000500	0.224	33.4	32.3	1.00002	0.666
2500.0	0.004475	3100.0	3.60	30.0	0.000460	0.263	39.2	47.3	1.00002	0.666
3000.0	0.003729	3720.0	3.60	30.0	0.000333	0.299	44.6	64.6	1.00001	0.666

* TWO-PHASE BOUNDARY

61

32 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1365	133.0	13.4	1.384	2.015	0.3948	0.6131	8.6243	793.1
5.0	0.1084	117.0	26.0	1.859	2.501	0.5050	0.4310	0.4938	789.1
6.0	0.1117	93.7	31.2	2.386	3.048	0.6053	0.4834	0.6272	750.4
7.0	0.1170	67.6	33.0	3.061	3.754	0.7142	0.5261	0.8130	695.5
8.0	0.1261	40.2	31.5	3.967	4.714	0.8420	0.5754	1.158	611.8
9.0	0.1495	10.8	24.7	5.482	6.368	1.035	0.6548	2.774	459.5
* 9.288	0.1835	0.947	18.6	6.711	7.799	1.191	0.7202	21.78	364.3
* 9.288	0.2327	0.354	10.9	8.697	10.43	1.474	0.7982	50.57	322.3
10.0	0.5296	8.74	5.72	11.11	14.25	1.875	0.7766	2.721	376.6
11.0	0.6821	15.1	4.32	12.44	16.48	2.088	0.7583	1.933	421.9
12.0	0.8061	20.0	3.60	13.49	18.27	2.244	0.7499	1.685	456.8
13.0	0.9182	24.4	3.13	14.45	19.89	2.373	0.7459	1.562	486.4
14.0	1.02.	28.4	2.79	15.34	21.41	2.486	0.7440	1.490	512.8
15.0	1.125	32.1	2.53	16.21	22.87	2.587	0.7432	1.442	537.0
16.0	1.223	35.6	2.31	17.05	24.30	2.679	0.7429	1.408	559.4
17.0	1.319	39.1	2.14	17.88	25.69	2.764	0.7430	1.383	580.5
18.0	1.414	42.4	1.99	18.69	27.07	2.842	0.7432	1.364	600.4
19.0	1.537	45.6	1.86	19.49	28.42	2.915	0.7434	1.350	619.5
20.0	1.598	48.8	1.75	20.29	29.76	2.984	0.7437	1.339	637.8
22.0	1.780	55.0	1.57	21.86	32.41	3.111	0.7443	1.321	672.5
24.0	1.959	61.1	1.42	23.42	35.03	3.225	0.7448	1.308	704.9
26.0	2.137	67.1	1.30	24.97	37.63	3.329	0.7452	1.298	735.7
28.0	2.313	73.0	1.20	26.51	40.21	3.425	0.7455	1.290	764.8
30.0	2.488	78.8	1.11	28.05	42.79	3.513	0.7457	1.284	792.7
32.0	2.662	84.6	1.04	29.58	45.35	3.596	0.7459	1.278	819.4
34.0	2.835	90.3	0.971	31.11	47.90	3.673	0.7460	1.274	845.1
36.0	3.007	96.0	0.914	32.63	50.45	3.746	0.7460	1.270	870.0
38.0	3.179	102.0	0.863	34.15	52.98	3.815	0.7461	1.267	894.1
40.0	3.351	107.0	0.818	35.66	55.52	3.880	0.7461	1.265	917.5
45.0	3.778	121.0	0.723	39.44	61.83	4.028	0.7461	1.260	973.3
50.0	4.203	135.0	0.649	43.21	68.12	4.161	0.7460	1.256	1026.0
55.0	4.627	149.0	0.588	46.97	74.39	4.280	0.7460	1.253	1076.0
60.0	5.050	162.0	0.536	50.73	80.65	4.389	0.7459	1.251	1123.0
70.0	5.894	190.0	0.460	58.22	93.15	4.582	0.7457	1.249	1212.0
80.0	6.737	217.0	0.402	65.71	105.6	4.749	0.7456	1.247	1295.0
90.0	7.578	244.0	0.357	73.18	118.1	4.895	0.7455	1.245	1373.0
100.0	8.418	271.0	0.321	80.65	130.5	5.027	0.7454	1.245	1447.0
120.0	10.10	325.0	0.267	95.58	155.4	5.253	0.7453	1.243	1584.0
140.0	11.78	378.0	0.229	110.5	180.3	5.445	0.7452	1.243	1709.0
160.0	13.45	432.0	0.200	125.4	205.1	5.611	0.7451	1.242	1827.0
180.0	15.13	486.0	0.178	140.3	230.0	5.757	0.7451	1.242	1937.0
200.0	16.81	539.0	0.160	155.2	254.8	5.888	0.7450	1.242	2041.0
250.0	21.00	672.0	0.128	192.5	316.9	6.165	0.7450	1.242	2280.0
300.0	25.18	806.0	0.107	229.7	379.0	6.391	0.7449	1.241	2497.0
350.0	29.37	942.0	0.0914	267.0	441.0	6.583	0.7449	1.241	2696.0
400.0	33.56	1080.0	0.0800	304.2	503.1	6.749	0.7449	1.241	2881.0
450.0	37.75	1210.0	0.0711	341.5	565.2	6.895	0.7448	1.241	3056.0
500.0	41.94	1340.0	0.0640	378.7	627.2	7.026	0.7448	1.241	3221.0
600.0	50.32	1616.0	0.0533	453.2	751.3	7.252	0.7448	1.241	3527.0
700.0	58.70	1880.0	0.0457	527.6	875.4	7.443	0.7448	1.241	3809.0
800.0	67.07	2150.0	0.0400	602.1	1000.0	7.609	0.7448	1.241	4072.0
900.0	75.45	2420.0	0.0356	676.6	1124.0	7.755	0.7448	1.241	4318.0
1000.0	83.83	2680.0	0.0320	751.1	1248.0	7.886	0.7448	1.241	4552.0
1200.0	100.6	3220.0	0.0267	900.0	1496.0	8.112	0.7448	1.241	4986.0
1400.0	117.3	3760.0	0.0229	1049.0	1744.0	8.303	0.7448	1.241	5385.0
1600.0	134.1	4290.0	0.0200	1198.0	1992.0	8.469	0.7448	1.241	5756.0
1800.0	150.9	4830.0	0.0178	1347.0	2241.0	8.615	0.7448	1.241	6105.0
2000.0	167.6	5360.0	0.0160	1496.0	2489.0	8.746	0.7448	1.241	6435.0
2500.0	209.5	6700.0	0.0128	1868.0	3110.0	9.023	0.7447	1.241	7195.0
3000.0	251.4	8050.0	0.0107	2240.0	3730.0	9.249	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

32 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.388	58.4	2.32	1250.0	0.0107	0.00896	2.76	0.00153	1.02056	0.693
5.0	9.223	20.5	6.55	1080.0	0.0241	0.0104	2.81	0.00225	1.02046	0.478
6.0	8.949	16.9	7.21	838.0	0.0372	0.0112	2.68	0.00199	1.02027	0.540
7.0	8.565	14.2	7.35	577.0	0.0572	0.0118	2.48	0.00169	1.01995	0.617
8.0	7.929	11.7	6.90	318.0	0.0989	0.0128	2.24	0.00131	1.01935	0.778
9.0	6.690	8.07	5.65	72.0	0.344	0.0121	1.88	0.000651	1.01775	1.55
• 9.200	5.451	6.06	4.73	5.16	3.60	0.0227	1.61	0.000191	1.01562	5.57
• 9.200	3.416	5.59	4.01	1.21	9.04	0.0389	1.29	0.000225	1.01096	6.05
10.0	1.888	7.65	3.90	16.5	0.347	0.08825	1.17	0.00161	1.00654	1.39
11.0	1.466	9.88	3.89	22.1	0.196	0.00808	1.20	0.00285	1.00510	1.03
12.0	1.241	11.6	3.87	24.9	8.145	0.00832	1.25	0.00398	1.00443	0.912
13.0	1.089	13.2	3.86	26.6	0.118	0.00865	1.33	0.00508	1.00392	0.849
14.0	0.9768	14.6	3.84	27.7	0.101	0.00900	1.36	0.00619	1.00353	0.811
15.0	0.8889	16.3	3.82	28.5	0.0885	0.00936	1.42	0.00730	1.00323	0.786
16.0	0.8175	17.7	3.81	29.1	0.0794	0.00972	1.47	0.09844	1.00298	0.768
17.0	0.7579	19.2	3.79	29.6	0.0722	0.0101	1.53	0.00960	1.00277	0.756
18.0	0.7073	20.6	3.78	30.0	0.0663	0.0104	1.58	0.0108	1.00259	0.746
19.0	0.6637	22.0	3.77	30.3	0.0615	0.0108	1.64	0.0120	1.00243	0.739
20.0	0.6256	23.3	3.76	30.5	0.0574	0.0111	1.69	0.0132	1.00230	0.734
22.0	0.5618	26.0	3.75	30.9	0.0507	0.0117	1.79	0.0156	1.00207	0.726
24.0	0.5104	28.7	3.74	31.2	0.0456	0.0124	1.89	0.0185	1.00189	0.721
26.0	0.4680	31.4	3.72	31.4	0.0414	0.0129	1.99	0.0213	1.00173	0.718
28.0	0.4324	34.0	3.71	31.5	0.0379	0.0135	2.08	0.0242	1.00160	0.716
30.0	0.4020	36.6	3.70	31.7	0.0351	0.0141	2.18	0.0273	1.00149	0.714
32.0	0.3757	39.2	3.70	31.8	0.0326	0.0146	2.27	0.0304	1.00140	0.713
34.0	0.3528	41.8	3.69	31.8	0.0305	0.0151	2.35	0.0337	1.00131	0.713
36.0	0.3325	44.4	3.68	31.9	0.0286	0.0157	2.44	0.0371	1.00124	0.712
38.0	0.3145	46.9	3.68	32.0	0.0270	0.0162	2.52	0.0405	1.00117	0.712
40.0	0.2984	49.5	3.67	32.0	0.0256	0.0167	2.60	0.8441	1.00111	0.712
45.0	0.2647	55.8	3.66	32.1	0.0226	0.0178	2.80	0.0535	1.00099	0.712
50.0	0.2379	62.2	3.65	32.1	0.0232	0.0190	2.99	0.0636	1.00089	0.712
55.0	0.2161	68.5	3.65	32.1	0.0183	0.0201	3.17	7.0742	1.00081	0.712
60.0	0.1980	74.8	3.64	32.1	8.0167	0.0212	3.35	0.0855	1.00074	0.712
70.0	0.1697	87.3	3.64	32.2	0.0143	0.0232	3.68	0.110	1.00064	0.711
80.0	0.1484	100.0	3.63	32.2	0.0125	0.0252	3.99	0.136	1.00056	0.710
90.0	0.1320	112.0	3.63	32.2	8.0111	0.0272	4.29	0.165	1.00050	0.708
100.0	0.1188	125.0	3.62	32.2	0.0100	0.0290	4.58	0.196	1.00045	0.706
120.0	0.09903	150.0	3.62	32.1	0.00831	0.0326	5.12	0.265	1.00037	0.702
140.0	0.08492	174.0	3.62	32.1	0.00712	0.0361	5.63	0.342	1.00032	0.698
160.0	0.07434	199.0	3.61	32.1	0.00623	0.0394	6.11	0.426	1.00028	0.694
180.0	0.06610	224.0	3.61	32.1	0.00554	0.0426	6.58	0.519	1.00025	0.691
200.0	0.05950	249.0	3.61	32.1	0.00499	0.0457	6.91	0.619	1.00022	0.675
250.0	0.04763	311.0	3.61	32.1	0.00399	0.0532	7.93	0.900	1.00018	0.671
300.0	0.03971	373.0	3.61	32.1	0.00333	0.0603	9.02	1.22	1.00015	0.669
350.0	0.03404	435.0	3.61	32.1	0.00285	0.0670	10.0	1.58	1.00013	0.667
400.0	0.02979	497.0	3.60	32.0	0.00250	0.0733	10.9	1.98	1.00011	0.666
450.0	0.02648	559.0	3.60	32.0	0.00222	0.0793	11.8	2.41	1.00010	0.666
500.0	0.02384	621.0	3.60	32.0	0.00200	0.0851	12.7	2.88	1.00009	0.667
600.0	0.01987	745.0	3.60	32.0	0.00166	0.0962	14.4	3.98	1.00008	0.666
700.0	0.01794	870.0	3.60	32.0	0.00143	0.107	16.0	5.86	1.00006	0.666
800.0	0.01491	994.0	3.60	32.0	0.00125	0.118	17.6	6.35	1.00006	0.666
900.0	0.01325	1120.0	3.60	32.0	0.00111	0.128	19.1	7.76	1.00005	0.667
1000.0	0.01193	1240.0	3.60	32.0	0.00100	0.137	20.5	9.28	1.00005	0.667
1200.0	0.009942	1490.0	3.60	32.0	0.000833	0.156	23.3	12.7	1.00004	0.667
1400.0	0.008522	1740.0	3.60	32.0	0.000714	0.174	26.0	16.5	1.00003	0.667
1600.0	0.007457	1990.0	3.60	32.0	0.000625	0.191	28.5	20.7	1.00003	0.666
1800.0	0.006629	2230.0	3.60	32.0	0.000555	0.208	31.0	25.3	1.00003	0.666
2000.0	0.005956	2480.0	3.60	32.0	0.000500	0.224	33.4	30.3	1.00002	0.666
2500.0	0.004773	3100.0	3.60	32.0	0.000400	0.263	39.2	44.3	1.00002	0.666
3000.0	0.003976	3720.0	3.60	32.0	0.000333	0.299	44.6	60.6	1.00002	0.666

• TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

33 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1064	134.0	13.4	1.383	2.334	0.3945	0.6107	0.6219	795.4
5.0	0.1083	110.0	26.0	1.856	2.518	0.5943	0.4306	0.4929	791.4
6.0	0.1116	94.6	31.2	2.341	3.063	0.6044	0.4831	0.6257	753.2
7.0	0.1168	68.5	33.1	3.053	3.767	0.7129	0.5257	0.8093	698.9
8.0	0.1258	41.2	31.7	3.951	4.720	0.8398	0.5746	1.145	616.6
9.0	0.1478	12.1	25.2	5.422	6.326	1.027	0.6517	2.561	469.6
10.0	0.4980	7.97	6.12	10.96	14.00	1.840	0.7784	2.936	373.1
11.0	0.6921	14.6	4.54	12.35	16.33	2.063	0.7591	1.985	419.9
12.0	0.7746	19.6	3.76	13.43	18.16	2.222	0.7503	1.710	455.4
13.0	0.8847	24.0	3.26	14.39	19.80	2.354	0.7460	1.578	485.4
14.0	0.9879	28.1	2.90	15.30	21.33	2.467	0.7440	1.501	512.0
15.0	1.087	31.8	2.62	16.17	22.81	2.569	0.7432	1.450	536.3
16.0	1.183	35.4	2.40	17.01	24.24	2.661	0.7429	1.415	558.9
17.0	1.276	38.9	2.21	17.84	25.64	2.746	0.7430	1.389	580.1
18.0	1.368	42.2	2.06	18.66	27.02	2.825	0.7432	1.369	600.1
19.0	1.458	45.5	1.93	19.46	28.37	2.899	0.7434	1.354	619.3
20.0	1.548	48.6	1.81	20.26	29.71	2.967	0.7437	1.342	637.6
22.0	1.724	54.9	1.62	21.83	32.37	3.094	0.7442	1.324	672.4
24.0	1.898	61.0	1.47	23.40	34.99	3.208	0.7448	1.310	705.0
26.0	2.071	67.0	1.34	24.95	37.60	3.313	0.7452	1.300	735.7
28.0	2.242	72.9	1.24	26.49	40.19	3.409	0.7455	1.292	765.0
30.0	2.412	78.7	1.15	28.03	42.76	3.497	0.7458	1.285	792.8
32.0	2.588	84.5	1.07	29.56	45.33	3.580	0.7459	1.280	819.6
34.0	2.748	90.3	1.03	31.09	47.88	3.658	0.7460	1.275	845.3
36.0	2.916	95.9	0.943	32.61	50.43	3.730	0.7461	1.271	870.2
38.0	3.083	102.0	0.891	34.13	52.97	3.799	0.7461	1.268	894.3
40.0	3.249	107.0	0.844	35.65	55.50	3.864	0.7461	1.265	917.8
45.0	3.664	121.0	0.746	39.43	61.82	4.013	0.7461	1.260	973.6
50.0	4.076	135.0	0.669	43.20	68.11	4.145	0.7461	1.257	1026.0
55.0	4.487	149.0	0.607	46.96	74.38	4.265	0.7460	1.254	1076.0
60.0	4.898	162.0	0.555	50.72	80.65	4.374	0.7459	1.252	1124.0
70.0	5.717	190.0	0.474	58.21	93.15	4.567	0.7458	1.249	1213.0
80.0	6.534	217.0	0.414	65.70	105.6	4.733	0.7457	1.247	1296.0
90.0	7.349	244.0	0.368	73.18	118.1	4.880	0.7455	1.246	1374.0
100.0	8.164	271.0	0.331	80.65	130.5	5.011	0.7455	1.245	1447.0
120.0	9.793	325.0	0.275	95.58	155.4	5.230	0.7453	1.243	1584.0
140.0	11.42	378.0	0.236	110.5	180.3	5.436	0.7452	1.243	1710.0
160.0	13.05	432.0	0.206	125.4	205.1	5.596	0.7452	1.242	1827.0
180.0	14.67	486.0	0.183	140.3	230.0	5.742	0.7451	1.242	1937.0
200.0	16.30	539.0	0.165	155.2	254.8	5.873	0.7451	1.242	2041.0
250.0	20.36	674.0	0.132	192.5	316.9	6.150	0.7450	1.242	2288.0
300.0	24.42	888.0	0.118	229.7	379.0	6.376	0.7449	1.241	2497.0
350.0	28.49	942.0	0.0943	267.0	441.0	6.568	0.7449	1.241	2696.0
400.0	32.55	1000.0	0.0825	304.2	503.1	6.733	0.7449	1.241	2882.0
450.0	36.61	1210.0	0.0733	341.5	565.2	6.879	0.7449	1.241	3056.0
500.0	40.67	1340.0	0.0660	378.7	627.2	7.010	0.7448	1.241	3221.0
600.0	48.79	1610.0	0.0550	453.2	751.3	7.237	0.7448	1.241	3527.0
700.0	56.92	1880.0	0.0471	527.6	875.5	7.428	0.7448	1.241	3809.0
800.0	65.05	2150.0	0.0412	602.1	1000.0	7.594	0.7448	1.241	4072.0
900.0	73.17	2420.0	0.0367	676.6	1124.0	7.740	0.7448	1.241	4319.0
1000.0	81.29	2688.0	0.0330	751.1	1248.0	7.871	0.7448	1.241	4552.0
1200.0	97.54	3228.0	0.0275	900.0	1496.0	8.097	0.7448	1.241	4986.0
1400.0	113.8	3768.0	0.0236	1049.0	1744.0	8.288	0.7448	1.241	5385.0
1600.0	130.0	4298.0	0.0206	1198.0	1992.0	8.454	0.7448	1.241	5756.0
1800.0	146.3	4838.0	0.0183	1347.0	2241.0	8.600	0.7448	1.241	6105.0
2000.0	162.5	5308.0	0.0165	1496.0	2489.0	8.731	0.7448	1.241	6435.0
2500.0	203.1	6780.0	0.0132	1868.0	3110.0	9.008	0.7447	1.241	7195.0
3000.0	243.8	8050.0	0.0110	2241.0	3730.0	9.234	0.7447	1.241	7801.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

33 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.395	58.7	2.33	1260.0	0.0106	0.00896	2.77	0.00153	1.02056	0.692
5.0	9.232	20.7	6.55	1098.0	0.0239	0.0104	2.83	0.00229	1.02046	0.479
6.0	8.963	17.0	7.21	847.0	0.0168	0.0112	2.69	0.00208	1.02028	0.540
7.0	8.563	14.3	7.36	556.0	0.0565	0.0118	2.49	0.00170	1.01996	0.613
8.0	7.952	11.8	6.93	328.0	0.0967	0.0120	2.25	0.00132	1.01938	0.771
9.0	6.765	8.33	5.72	82.0	0.307	0.0121	1.93	0.000696	1.01786	1.45
10.0	2.008	7.63	3.91	16.0	0.382	0.00845	1.18	0.00143	1.00692	1.48
11.0	1.534	9.76	3.90	22.3	0.203	0.00815	1.21	0.00268	1.00540	1.06
12.0	1.291	11.5	3.88	25.4	0.148	0.00836	1.26	0.00379	1.00460	0.926
13.0	1.133	13.2	3.86	27.2	0.120	0.00868	1.31	0.00487	1.00406	0.858
14.0	1.012	14.7	3.85	28.4	0.102	0.00903	1.37	0.00594	1.00365	0.817
15.0	0.9232	16.2	3.83	29.3	0.0894	0.00930	1.42	0.00703	1.00334	0.791
16.0	0.8456	17.7	3.81	29.9	0.0800	0.00974	1.48	0.00814	1.00308	0.772
17.0	0.7836	19.1	3.80	30.5	0.0727	0.0101	1.53	0.00927	1.00286	0.759
18.0	0.7309	20.5	3.79	30.9	0.0667	0.0104	1.59	0.0104	1.00267	0.749
19.0	0.6857	21.9	3.78	31.2	0.0618	0.0108	1.64	0.0116	1.00251	0.742
20.0	0.6461	23.3	3.77	31.4	0.0576	0.0111	1.69	0.0128	1.00237	0.736
22.0	0.5800	26.0	3.75	31.8	0.0509	0.0117	1.79	0.0153	1.00214	0.728
24.0	0.5268	28.7	3.74	32.1	0.0457	0.0124	1.83	0.0179	1.00194	0.723
26.0	0.4830	31.3	3.73	32.3	0.0415	0.0130	1.99	0.0206	1.00179	0.719
28.0	0.4461	34.0	3.72	32.5	0.0380	0.0135	2.09	0.0235	1.00165	0.717
30.0	0.4147	36.6	3.71	32.7	0.0351	0.0141	2.18	0.0264	1.00154	0.715
32.0	0.3875	39.2	3.70	32.8	0.0326	0.0146	2.27	0.0245	1.00144	0.714
34.0	0.3638	41.8	3.69	32.8	0.0305	0.0152	2.36	0.0327	1.00135	0.713
36.0	0.3429	44.4	3.69	32.9	0.0287	0.0157	2.44	0.0359	1.00128	0.713
38.0	0.3244	46.9	3.68	33.0	0.0270	0.0162	2.52	0.0393	1.00121	0.713
40.0	0.3078	49.5	3.67	33.0	0.0256	0.0167	2.61	0.0428	1.00115	0.712
45.0	0.2730	55.8	3.66	33.1	0.0226	0.0179	2.80	0.0519	1.00102	0.712
50.0	0.2453	62.2	3.66	33.1	0.0202	0.0190	2.99	0.0616	1.00092	0.712
55.0	0.2228	68.5	3.65	33.1	0.0183	0.0201	3.17	0.0728	1.00083	0.712
60.0	0.2042	74.8	3.64	33.2	0.0167	0.0212	3.35	0.0829	1.00076	0.712
70.0	0.1749	87.3	3.64	33.2	0.0143	0.0233	3.68	0.106	1.00066	0.711
80.0	0.1531	100.0	3.63	33.2	0.0125	0.0252	3.99	0.132	1.00057	0.710
90.0	0.1361	112.0	3.63	33.2	0.0111	0.0272	4.29	0.160	1.00051	0.708
100.0	0.1225	125.0	3.62	33.2	0.0100	0.0290	4.58	0.190	1.00046	0.706
120.0	0.1021	150.0	3.62	33.1	0.00831	0.0326	5.12	0.257	1.00038	0.702
140.0	0.08757	174.0	3.62	33.1	0.00712	0.0361	5.63	0.331	1.00033	0.698
160.0	0.07665	199.0	3.61	33.1	0.00623	0.0394	6.11	0.414	1.00029	0.694
180.0	0.06816	224.0	3.61	33.1	0.00554	0.0426	6.58	0.503	1.00026	0.691
200.0	0.06136	249.0	3.61	33.1	0.00499	0.0457	6.91	0.600	1.00023	0.675
250.0	0.04911	311.0	3.61	33.1	0.00399	0.0532	7.99	0.873	1.00019	0.671
300.0	0.04394	373.0	3.61	33.1	0.00333	0.0683	9.02	1.19	1.00015	0.669
350.0	0.03511	435.0	3.61	33.1	0.00285	0.0670	10.0	1.54	1.00013	0.667
400.0	0.03072	497.0	3.60	33.0	0.00250	0.0733	10.9	1.92	1.00012	0.666
450.0	0.02732	559.0	3.60	33.0	0.00222	0.0793	11.8	2.34	1.00010	0.665
500.0	0.02459	621.0	3.60	32.0	0.00200	0.0851	12.7	2.79	1.00009	0.667
600.0	0.02049	746.0	3.60	33.0	0.00166	0.0962	14.4	3.78	1.00008	0.668
700.0	0.01757	870.0	3.60	33.0	0.00143	0.107	16.0	4.91	1.00007	0.668
800.0	0.01537	994.0	3.60	33.0	0.00125	0.118	17.6	6.16	1.00006	0.667
900.0	0.01367	1120.0	3.60	33.0	0.00111	0.128	19.1	7.52	1.00005	0.667
1000.0	0.01230	1240.0	3.60	33.0	0.00100	0.137	20.5	9.00	1.00005	0.667
1200.0	0.01025	1490.0	3.60	33.0	0.000833	0.156	23.3	12.3	1.00004	0.667
1400.0	0.308789	1740.0	3.60	33.0	0.003714	0.174	26.0	16.0	1.00003	0.667
1600.0	0.007690	1990.0	3.60	33.0	0.000625	0.191	28.5	20.0	1.00003	0.667
1800.0	0.006836	2230.0	3.60	33.0	0.000555	0.208	31.0	24.5	1.00003	0.666
2000.0	0.006153	2480.0	3.60	33.0	0.000500	0.224	33.4	29.4	1.00002	0.666
2500.0	0.004923	3100.0	3.60	33.0	0.000400	0.263	39.2	43.0	1.00002	0.666
3000.0	0.004102	3720.0	3.60	33.0	0.000333	0.299	44.6	58.0	1.00002	0.666

* TWO-PHASE BOUNDARY

34 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.3	0.1063	135.0	13.3	1.383	2.092	0.3941	0.6084	0.6194	797.8
5.0	0.1082	119.0	26.0	1.853	2.535	0.5037	0.4303	0.4920	793.8
6.0	0.1115	95.4	31.3	2.377	3.079	0.6035	0.4828	0.6242	755.9
7.0	0.1166	69.4	33.2	3.045	3.779	0.7117	0.5253	0.8057	702.4
8.0	0.1254	42.2	31.8	3.936	4.726	0.8376	0.5739	1.133	621.3
9.0	0.1463	13.4	25.6	5.369	6.290	1.028	0.6490	2.394	479.1
10.0	0.4672	7.18	6.56	10.79	13.73	1.804	0.7801	3.206	369.6
11.0	0.6236	14.0	4.76	12.25	16.18	2.039	0.7599	2.042	417.8
12.0	0.7449	19.2	3.92	13.36	18.05	2.201	0.7506	1.737	453.9
13.0	0.8530	23.7	3.39	14.33	19.70	2.334	0.7462	1.594	484.3
14.0	0.9541	27.8	3.01	15.25	21.25	2.449	0.7441	1.512	511.2
15.0	1.051	31.6	2.71	16.12	22.74	2.551	0.7432	1.458	535.7
16.0	1.144	35.2	2.48	16.97	24.18	2.644	0.7429	1.421	558.4
17.0	1.235	38.7	2.29	17.80	25.58	2.729	0.7429	1.394	579.7
18.0	1.325	42.0	2.13	18.62	26.97	2.809	0.7431	1.373	599.9
19.0	1.413	45.3	1.99	19.43	28.32	2.882	0.7433	1.358	619.1
20.0	1.500	48.5	1.87	20.23	29.67	2.951	0.7436	1.345	637.5
22.0	1.671	54.8	1.67	21.81	32.33	3.078	0.7442	1.326	672.3
24.0	1.841	60.9	1.51	23.37	34.96	3.193	0.7448	1.313	705.0
26.0	2.008	66.9	1.38	24.92	37.57	3.297	0.7452	1.302	735.8
28.0	2.175	72.8	1.28	26.47	40.16	3.393	0.7456	1.293	765.1
30.0	2.340	78.7	1.18	28.01	42.74	3.482	0.7458	1.286	793.0
32.0	2.504	84.5	1.10	29.54	45.31	3.565	0.7459	1.281	819.8
34.0	2.667	90.2	1.03	31.07	47.86	3.642	0.7460	1.276	845.5
36.0	2.830	95.9	0.972	32.60	50.41	3.715	0.7461	1.272	870.4
38.0	2.992	102.0	0.918	34.12	52.95	3.784	0.7461	1.269	894.6
40.0	3.154	107.0	0.870	35.63	55.49	3.849	0.7462	1.266	918.0
45.0	3.556	121.0	0.769	39.42	61.81	3.998	0.7462	1.261	973.9
50.0	3.957	135.0	0.690	43.19	68.10	4.130	0.7461	1.257	1026.0
55.0	4.356	149.0	0.625	46.95	74.38	4.250	0.7460	1.254	1076.0
60.0	4.754	162.0	0.572	50.71	80.64	4.359	0.7460	1.252	1124.0
70.0	5.549	190.0	0.489	58.21	93.15	4.552	0.7458	1.249	1213.0
80.0	6.342	217.0	0.427	65.69	105.6	4.718	0.7457	1.247	1296.0
90.0	7.134	244.0	0.379	73.17	118.1	4.865	0.7456	1.246	1374.0
100.0	7.925	271.0	0.341	80.64	130.5	4.996	0.7455	1.245	1447.0
120.0	9.506	325.0	0.284	95.57	155.4	5.223	0.7453	1.244	1584.0
140.0	11.09	378.0	0.243	110.5	180.3	5.415	0.7452	1.243	1710.0
160.0	12.66	432.0	0.213	125.4	205.1	5.581	0.7452	1.242	1827.0
180.0	14.24	486.0	0.189	140.3	230.0	5.727	0.7451	1.242	1937.0
200.0	15.82	540.0	0.170	155.2	254.8	5.858	0.7451	1.242	2041.0
250.0	19.76	674.0	0.136	192.5	316.9	6.135	0.7450	1.242	2280.0
300.0	23.71	808.0	0.113	229.7	379.0	6.361	0.7449	1.241	2497.0
350.0	27.65	942.0	0.0971	267.0	441.0	6.553	0.7449	1.241	2696.0
400.0	31.59	1080.0	0.0850	304.2	503.1	6.718	0.7449	1.241	2882.0
450.0	35.53	1210.0	0.0755	341.5	565.2	6.865	0.7449	1.241	3056.0
500.0	39.48	1340.0	0.0680	378.7	627.2	6.995	0.7448	1.241	3221.0
600.0	47.36	1610.0	0.0567	453.2	751.3	7.222	0.7448	1.241	3527.0
700.0	55.25	1880.0	0.0486	527.6	875.5	7.413	0.7448	1.241	3809.0
800.0	63.13	2150.0	0.0425	602.1	1000.0	7.579	0.7448	1.241	4072.0
900.0	71.01	2420.0	0.0378	676.6	1124.0	7.725	0.7448	1.241	4319.0
1000.0	78.90	2680.0	0.0340	751.1	1248.0	7.856	0.7448	1.241	4552.0
1200.0	94.67	3220.0	0.0283	900.0	1496.0	8.082	0.7448	1.241	4986.0
1400.0	110.4	3760.0	0.0243	1049.0	1744.0	8.273	0.7448	1.241	5385.0
1600.0	126.2	4290.0	0.0212	1198.0	1992.0	8.439	0.7448	1.241	5756.0
1800.0	142.0	4830.0	0.0189	1347.0	2241.0	8.585	0.7448	1.241	6105.0
2000.0	157.7	5360.0	0.0170	1496.0	2489.0	8.716	0.7448	1.241	6435.0
2500.0	197.2	6710.0	0.0136	1868.0	3110.0	8.993	0.7448	1.241	7195.0
3000.0	236.6	8050.0	0.0113	2241.0	3730.0	9.219	0.7447	1.241	7861.0

* TWO-PHASE BOUNDARY

34 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY L3/CU FT	$V(GH/DV)_P$ BTU/L9	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 1E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.403	58.9	2.33	1270.0	0.0105	0.00897	2.79	0.00154	1.02356	0.691
5.0	9.201	20.8	6.55	1100.8	0.0237	0.0105	2.83	0.00230	1.02047	0.479
6.0	8.971	17.1	7.22	856.0	0.0365	0.0112	2.70	0.00200	1.02029	0.540
7.0	8.574	14.4	7.38	595.0	0.0558	0.0118	2.50	0.00171	1.01998	0.614
8.0	7.975	12.0	6.95	337.0	0.0945	0.0121	2.26	0.00133	1.01940	0.765
9.0	6.834	8.58	5.78	91.8	0.279	0.0121	1.92	0.000737	1.01796	1.37
10.0	2.140	7.50	3.93	15.4	0.427	0.00873	1.23	0.00127	1.00733	1.50
11.0	1.604	9.64	3.91	22.5	0.212	0.00823	1.22	0.00251	1.00563	2.09
12.0	1.342	11.4	3.89	25.6	0.152	0.00841	1.26	0.00361	1.00477	1.940
13.0	1.172	13.1	3.87	27.8	0.122	0.00872	1.32	0.00466	1.00420	0.867
14.0	1.048	14.6	3.85	29.1	0.103	0.00906	1.37	0.00572	1.00378	0.84
15.0	0.9518	16.1	3.84	30.1	0.0903	0.00941	1.43	0.00678	1.00345	0.796
16.0	0.8740	17.6	3.82	30.8	0.0807	0.00976	1.48	0.00786	1.00318	0.776
17.0	0.8034	19.1	3.81	31.3	0.0731	0.0101	1.54	0.00896	1.00295	0.762
18.0	0.7547	20.5	3.79	31.7	0.0671	0.0105	1.59	0.0101	1.00276	0.752
19.0	0.7077	21.9	3.78	32.1	0.0621	0.0108	1.64	0.0112	1.00259	0.744
20.0	0.6667	23.2	3.77	32.3	0.0579	0.0111	1.73	0.0124	1.00245	0.738
22.0	0.5983	26.0	3.76	32.8	0.0511	0.0118	1.50	0.0148	1.00220	0.730
24.0	0.5432	28.7	3.74	33.1	1.0458	0.0124	1.90	0.0174	1.00200	0.724
26.0	0.4979	31.3	3.73	33.3	0.0416	0.0130	1.99	0.0200	1.00184	0.720
28.0	0.4598	34.0	3.72	33.5	0.0381	0.0135	2.09	0.0229	1.00170	0.718
30.0	0.4274	36.6	3.71	33.6	0.0352	0.0141	2.18	0.0257	1.00158	0.716
32.0	0.3994	39.2	3.70	33.7	0.0327	0.0146	2.27	0.0286	1.00148	0.715
34.0	0.3749	41.8	3.69	33.8	0.0305	0.0152	2.36	0.0317	1.00139	0.714
36.0	0.3534	44.4	3.69	33.9	0.0287	0.0157	2.44	0.0349	1.00131	0.713
38.0	0.3342	46.9	3.68	34.7	0.0270	0.0162	2.53	0.0382	1.00124	0.713
40.0	0.3171	49.5	3.66	34.0	0.0256	0.0167	2.61	0.0415	1.00118	0.713
45.0	0.2812	55.8	3.67	34.1	0.0226	0.0179	2.81	0.0504	1.00105	0.713
50.0	0.2527	62.2	3.66	34.1	0.0202	0.0190	2.93	0.0599	1.00094	0.712
55.0	0.2296	68.5	3.65	34.1	0.0183	0.0201	3.17	0.0699	1.00086	0.712
60.0	0.2103	74.8	3.65	34.2	0.0167	0.0212	3.35	0.0805	1.00079	0.712
70.0	0.1802	87.3	3.64	34.2	0.0143	0.0233	3.68	0.103	1.00068	0.711
80.0	0.1577	100.0	3.63	34.2	0.0125	0.0253	3.99	0.128	1.00059	0.710
90.0	0.1402	112.0	3.63	34.2	0.0111	0.0272	4.29	0.156	1.00053	0.708
100.0	0.1262	125.0	3.62	34.2	0.0100	0.0290	4.58	0.185	1.00047	0.706
120.0	0.1092	150.0	3.62	34.2	0.00831	0.0326	5.12	0.249	1.00048	0.732
140.0	0.09321	175.0	3.62	34.1	0.00712	0.0361	5.63	0.322	1.00034	0.698
160.0	0.07896	199.8	3.61	34.1	0.00623	0.0394	6.11	0.402	1.00030	0.694
180.0	0.07021	224.0	3.61	34.1	0.00554	0.0426	6.55	0.489	1.00026	0.691
200.0	0.06321	249.0	3.61	34.1	0.00499	0.0457	6.91	0.583	1.00024	0.675
250.0	0.05060	311.0	3.61	34.1	0.00399	0.0532	7.99	0.847	1.00019	0.671
300.0	0.04218	373.8	3.61	34.1	0.00333	0.0603	9.02	1.15	1.00016	0.669
350.0	0.03617	435.0	3.61	34.1	0.00285	0.0670	10.0	1.49	1.00014	0.667
400.0	0.03165	497.0	3.60	34.1	0.00250	0.0733	10.9	1.87	1.00012	0.667
450.0	0.02814	559.0	3.60	34.0	0.00222	0.0793	11.8	2.27	1.00011	0.666
500.0	0.02533	621.0	3.60	34.0	0.00200	0.0851	12.7	2.71	1.00010	0.667
600.0	0.02111	746.0	3.60	34.0	0.00166	0.0962	14.4	3.67	1.00008	0.668
700.0	0.01810	870.0	3.60	34.0	0.00143	0.107	16.0	4.77	1.00007	0.668
800.0	0.01594	994.0	3.60	34.0	0.00125	0.118	17.6	5.98	1.00006	0.668
900.0	0.01408	1120.0	3.60	34.0	0.00111	0.128	19.1	7.30	1.00005	0.667
1000.0	0.01267	1240.0	3.60	34.0	0.00100	0.137	20.5	8.73	1.00005	0.667
1200.0	0.01056	1490.0	3.60	34.0	0.000833	0.156	23.3	11.9	1.00004	0.667
1400.0	0.009055	1740.0	3.60	34.0	0.000714	0.174	26.0	15.5	1.00003	0.667
1600.0	0.007923	1990.0	3.60	34.0	0.000625	0.191	28.5	19.5	1.00003	0.666
1800.0	0.007043	2230.0	3.60	34.0	0.000595	0.208	31.0	23.8	1.00003	0.666
2000.0	0.006339	2480.0	3.60	34.0	0.000500	0.224	33.4	28.5	1.00002	0.666
2500.0	0.005072	3100.0	3.60	34.0	0.000400	0.263	39.2	41.7	1.00002	0.666
3000.0	0.004227	3720.0	3.60	34.0	0.000333	0.299	44.6	57.0	1.00002	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

35 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1063	136.0	13.3	1.382	2.071	0.3938	0.6060	0.6170	800.1
5.0	0.1081	120.0	26.0	1.851	2.552	0.5033	0.4300	0.4912	796.2
6.0	0.1113	96.3	31.3	2.372	3.094	0.6026	0.4926	0.6227	758.7
7.0	0.1164	70.4	33.3	3.037	3.792	0.7104	0.5250	0.8023	705.8
8.8	0.1253	43.2	32.0	3.922	4.732	0.8355	0.5732	1.122	626.0
9.0	0.1450	14.7	26.3	5.319	6.259	1.014	0.6465	2.260	488.1
10.0	0.4371	6.38	7.36	10.60	13.43	1.766	0.7816	3.549	366.2
11.0	0.5966	13.5	5.00	12.16	16.02	2.014	0.7607	2.104	415.8
12.0	0.7168	18.8	4.39	13.29	17.93	2.180	0.7510	1.765	452.6
13.0	0.8232	23.4	3.52	14.28	19.61	2.315	0.7454	1.611	483.3
14.0	0.9222	27.5	3.12	15.20	21.18	2.431	0.7441	1.523	510.5
15.0	1.017	31.3	2.81	16.08	22.67	2.534	0.7432	1.467	535.1
16.0	1.108	35.0	2.57	16.93	24.11	2.627	0.7429	1.428	558.0
17.0	1.197	38.5	2.37	17.77	25.53	2.713	0.7429	1.339	579.3
18.0	1.284	41.9	2.20	18.59	26.92	2.792	0.7431	1.378	599.6
19.0	1.370	45.1	2.06	19.40	28.28	2.866	0.7433	1.362	618.9
20.0	1.455	48.3	1.93	20.20	29.63	2.935	0.7436	1.349	637.3
22.0	1.622	54.6	1.73	21.78	32.29	3.062	0.7442	1.329	672.3
24.0	1.797	60.8	1.56	23.35	34.93	3.177	0.7448	1.315	705.0
26.0	1.950	66.8	1.43	24.90	37.54	3.282	0.7452	1.304	735.9
28.0	2.112	72.8	1.32	26.45	40.13	3.378	0.7456	1.295	765.2
30.0	2.272	78.6	1.22	27.99	42.72	3.467	0.7458	1.288	793.1
32.0	2.432	84.5	1.14	29.53	45.29	3.550	0.7460	1.282	819.9
34.0	2.591	90.2	1.06	31.06	47.85	3.627	0.7461	1.277	845.7
36.0	2.749	95.9	1.00	32.58	50.40	3.700	0.7461	1.273	870.7
38.0	2.906	102.0	0.946	34.10	52.94	3.769	0.7461	1.270	894.8
40.0	3.063	107.0	0.896	35.62	55.48	3.834	0.7462	1.267	918.2
45.0	3.455	121.0	0.792	39.41	61.80	3.983	0.7462	1.261	974.1
50.0	3.844	135.0	0.710	43.18	68.09	4.116	0.7461	1.257	1027.0
55.0	4.232	149.0	0.644	46.94	74.37	4.235	0.7461	1.255	1077.0
60.0	4.619	162.0	0.589	50.70	80.64	4.344	0.7460	1.252	1124.0
70.8	5.392	190.0	0.503	58.20	93.14	4.537	0.7458	1.249	1213.0
80.0	6.162	217.0	0.440	65.69	105.6	4.704	0.7457	1.247	1296.0
90.0	6.932	244.0	0.390	73.17	118.1	4.851	0.7456	1.246	1374.0
100.0	7.700	271.0	0.351	80.64	130.5	4.982	0.7455	1.245	1448.0
120.8	9.236	325.0	0.292	95.57	155.4	5.209	0.7454	1.244	1584.0
140.0	10.77	379.0	0.250	110.5	180.3	5.400	0.7453	1.243	1710.0
160.6	12.30	432.0	0.219	125.4	205.1	5.566	0.7452	1.242	1827.0
180.0	13.84	486.0	0.195	140.3	230.0	5.713	0.7451	1.242	1937.0
200.0	15.37	540.0	0.175	155.2	254.8	5.844	0.7451	1.242	2041.0
250.0	19.23	674.0	0.146	192.5	316.9	6.121	0.7450	1.242	2281.0
300.0	23.03	808.0	0.117	229.7	379.0	6.347	0.7449	1.241	2497.0
350.0	26.86	942.0	0.130	267.0	441.1	6.538	0.7449	1.241	2696.0
400.0	33.69	1086.0	0.0875	304.2	503.1	6.704	0.7449	1.241	2882.0
450.0	34.52	1210.0	0.0778	341.5	565.2	6.850	0.7449	1.241	3056.0
500.0	38.35	1348.0	0.0700	378.7	627.2	6.981	0.7448	1.241	3221.0
600.0	46.01	1610.0	0.0583	453.2	751.4	7.207	0.7448	1.241	3527.0
700.0	53.67	1880.0	0.0500	527.6	875.5	7.399	0.7448	1.241	3810.0
800.0	61.33	2150.0	0.0437	602.1	1000.0	7.564	0.7448	1.241	4072.0
900.0	68.99	2420.0	0.0389	676.6	1124.0	7.711	0.7448	1.241	4319.0
1000.0	76.65	2680.0	0.0350	751.1	1248.0	7.841	0.7448	1.241	4552.0
1200.0	91.97	3220.0	0.0292	900.0	1496.0	8.068	0.7448	1.241	4986.0
1400.0	107.3	3760.0	0.0250	1049.0	1744.0	8.259	0.7448	1.241	5385.0
1600.0	122.6	4298.0	0.0219	1198.0	1993.0	8.425	0.7448	1.241	5756.0
1800.0	137.9	4830.0	0.0194	1347.0	2241.0	8.571	0.7448	1.241	6105.0
2000.0	153.2	5380.0	0.0175	1496.0	2489.0	8.702	0.7448	1.241	6435.0
2500.0	191.5	6710.0	0.0140	1868.0	3110.0	8.979	0.7448	1.241	7195.0
3000.0	229.0	8050.0	0.0117	2241.0	3733.0	9.205	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

35 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_P$	V(DP/DU)$_v$	-V(DP/DV)$_T$	(DV/DT)/V	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR		
4.0	9.411	59.2	2.34	1280.0	0.0184	0.00898	2.79	0.00155	1.02857	0.690
5.0	9.249	20.9	6.54	1110.0	0.0235	0.0185	2.84	0.00230	1.02047	0.479
6.0	8.902	17.2	7.22	865.0	0.0362	0.0112	2.71	0.00281	1.02038	0.540
7.0	8.589	14.5	7.39	604.0	0.0951	0.0118	2.51	0.00172	1.01999	0.613
8.0	7.990	12.1	6.98	346.0	0.0025	0.0121	2.27	0.00135	1.01943	0.759
9.0	6.897	8.01	5.04	101.8	0.237	0.0121	1.94	0.000774	1.01886	1.31
10.0	2.288	7.33	3.95	14.6	0.408	0.00981	1.22	0.00111	1.00778	1.73
11.0	1.676	9.52	3.92	22.6	0.221	0.00831	1.23	0.03236	1.00587	1.12
12.0	1.395	11.3	3.90	26.2	0.190	0.00846	1.27	0.00344	1.00495	0.955
13.0	1.215	13.0	3.88	28.4	0.124	0.00875	1.32	0.00447	1.00435	0.876
14.0	1.084	14.6	3.86	29.8	0.105	0.00589	1.38	0.00550	1.00398	0.830
15.0	0.9836	16.1	3.84	30.8	0.0912	0.00944	1.43	0.00654	1.00356	0.801
16.0	0.9025	17.6	3.83	31.6	0.0813	0.00979	1.49	0.00760	1.00327	0.780
17.0	0.8353	19.0	3.81	32.1	0.0736	0.0101	1.54	0.00867	1.00304	0.765
18.0	0.7785	20.4	3.80	32.6	0.0674	0.0105	1.59	0.00977	1.00284	0.754
19.0	0.7299	21.8	3.79	32.9	0.0624	0.0108	1.65	0.0109	1.00267	0.746
20.0	0.6874	23.2	3.78	33.2	0.0581	0.0111	1.70	0.0120	1.00252	0.740
22.0	0.6165	25.9	3.76	33.7	0.0513	0.0118	1.80	0.0144	1.00227	0.731
24.0	0.5597	28.6	3.75	34.0	0.0459	0.0124	1.90	0.0168	1.00206	0.726
26.0	0.5128	31.3	3.74	34.3	0.0417	0.0130	2.00	0.0194	1.00189	0.722
28.0	0.4736	33.9	3.72	34.5	0.0382	0.0136	2.09	0.0221	1.00175	0.719
30.0	0.4401	36.6	3.71	34.6	0.0352	0.0141	2.18	0.0249	1.00163	0.717
32.0	0.4112	39.2	3.71	34.7	0.0327	0.0147	2.27	0.0278	1.00153	0.715
34.0	0.3868	41.8	3.70	34.8	0.0306	0.0152	2.36	0.0308	1.00143	0.714
36.0	0.3638	44.3	3.69	34.9	0.0287	0.0157	2.44	0.0339	1.00135	0.714
38.0	0.3441	46.9	3.68	34.9	0.0271	0.0162	2.53	0.0371	1.00128	0.713
40.0	0.3266	49.5	3.68	35.0	0.0256	0.0167	2.61	0.0404	1.00122	0.713
45.0	0.2895	55.8	3.67	35.1	0.0226	0.0179	2.81	0.0490	1.00108	0.713
50.0	0.2601	62.2	3.66	35.1	0.0202	0.0190	2.99	0.0582	1.00097	0.713
55.0	0.2363	68.5	3.65	35.2	0.0183	0.0201	3.18	0.0679	1.00088	0.713
60.0	0.2165	74.8	3.65	35.2	0.0167	0.0212	3.35	0.0782	1.00081	0.712
70.0	0.1855	87.3	3.64	35.2	0.0143	0.0233	3.68	0.100	1.00069	0.711
80.0	0.1623	100.0	3.63	35.2	0.0125	0.0253	3.99	0.125	1.00061	0.710
90.0	0.1443	112.0	3.63	35.2	0.0111	0.0272	4.29	0.151	1.00054	0.708
100.0	0.1299	125.0	3.63	35.2	0.0190	0.0290	4.58	0.180	1.00049	0.706
120.0	0.1083	150.0	3.62	35.2	0.00831	0.0326	5.12	0.242	1.00041	0.702
140.0	0.09285	175.0	3.62	35.1	0.00712	0.0361	5.63	0.313	1.00035	0.698
160.0	0.08128	199.0	3.61	35.1	0.00623	0.0394	6.12	0.390	1.00031	0.694
180.0	0.07227	224.0	3.61	35.1	0.00554	0.0426	6.58	0.475	1.00027	0.691
200.0	0.06506	249.0	3.61	35.1	0.00499	0.0457	6.91	0.562	1.00029	0.675
250.0	0.05208	311.0	3.61	35.1	0.00390	0.0532	7.99	0.823	1.00028	0.671
300.0	0.04342	373.0	3.61	35.1	0.00333	0.0603	9.02	1.12	1.00016	0.668
350.0	0.03723	435.0	3.61	35.1	0.00289	0.0670	10.0	1.45	1.00016	0.667
400.0	0.03258	497.0	3.60	35.1	0.00250	0.0733	10.9	1.81	1.00012	0.654
450.0	0.02897	559.0	3.60	35.0	0.00222	0.0793	11.8	2.21	1.00011	0.606
500.0	0.02606	621.0	3.60	35.0	0.00206	0.0851	12.7	2.63	1.00010	0.607
600.0	0.02173	746.0	3.60	35.0	0.00166	0.0962	14.4	3.57	1.00008	0.668
700.0	0.01863	870.0	3.60	35.0	0.00143	0.107	16.0	4.63	1.00007	0.668
800.0	0.01631	996.0	3.60	35.0	0.00125	0.118	17.6	5.81	1.00006	0.668
900.0	0.01498	1120.0	3.60	35.0	0.00111	0.128	19.1	7.09	1.00005	0.667
1000.0	0.01305	1240.0	3.60	35.0	0.00100	0.137	20.5	0.40	1.00005	0.667
1200.0	0.01087	1490.0	3.60	35.0	0.000833	0.156	23.3	11.0	1.00004	0.667
1400.0	0.009321	1740.0	3.60	35.0	0.000714	0.174	26.0	15.1	1.00004	0.667
1600.0	0.008196	1990.0	3.60	35.0	0.000625	0.191	28.5	16.9	1.00003	0.666
1800.0	0.007298	2230.0	3.60	35.0	0.000595	0.200	31.0	23.1	1.00003	0.666
2000.0	0.006526	2480.0	3.60	35.0	0.000500	0.224	33.4	27.7	1.00002	0.666
2500.0	0.005221	3100.0	3.60	35.0	0.000438	0.263	39.2	40.5	1.00002	0.666
3000.0	0.004351	3720.0	3.60	35.0	0.000333	0.299	44.6	55.4	1.00002	0.666

* TWO-PHASE BOUNDARY

36 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1362	137.0	13.3	1.381	2.089	0.3935	0.6037	0.6146	802.4
5.0	0.1080	121.0	26.0	1.848	2.568	0.5024	0.4296	0.4903	798.5
6.0	0.1112	97.2	31.3	2.368	3.139	0.6017	0.4823	0.6213	761.4
7.0	0.1162	71.3	33.4	3.030	3.805	0.7091	0.5246	0.7989	709.1
8.0	0.1247	44.2	32.2	3.907	4.739	0.8334	0.5725	1.111	630.5
9.0	0.1438	16.0	26.4	5.274	6.233	1.008	0.6443	2.149	496.6
10.0	0.4072	5.57	7.63	10.39	13.10	1.725	0.7829	3.997	362.9
11.0	0.5708	13.0	5.25	12.06	15.86	1.990	0.7615	2.171	413.8
12.0	0.6902	18.4	4.26	13.21	17.82	2.160	0.7514	1.795	451.2
13.0	0.7950	23.0	3.65	14.22	19.52	2.296	0.7465	1.628	482.3
14.0	0.8921	27.2	3.23	15.15	21.10	2.413	0.7442	1.535	509.7
15.0	0.9846	31.1	2.91	16.04	22.60	2.517	0.7432	1.475	534.5
16.0	1.074	34.7	2.65	16.89	24.05	2.611	0.7428	1.435	557.5
17.0	1.161	38.3	2.44	17.73	25.47	2.697	0.7429	1.405	579.0
18.0	1.246	41.7	2.27	18.56	26.86	2.776	0.7431	1.382	599.3
19.0	1.330	45.0	2.12	19.37	28.23	2.850	0.7433	1.366	618.7
20.0	1.412	48.2	1.99	20.17	29.58	2.920	0.7435	1.352	637.2
22.0	1.575	54.5	1.78	21.75	32.25	3.047	0.7442	1.332	672.2
24.0	1.736	60.7	1.61	23.32	34.89	3.162	0.7448	1.317	705.0
26.0	1.895	66.7	1.47	24.88	37.51	3.267	0.7452	1.306	736.0
28.0	2.052	72.7	1.35	26.43	40.11	3.363	0.7456	1.297	765.4
30.0	2.208	78.6	1.26	27.97	42.69	3.452	0.7458	1.289	793.3
32.0	2.364	84.4	1.17	29.51	45.27	3.535	0.7460	1.283	820.1
34.0	2.518	90.2	1.10	31.04	47.83	3.613	0.7461	1.278	845.9
36.0	2.672	95.9	1.03	32.57	50.38	3.686	0.7462	1.274	870.9
38.0	2.826	102.0	0.974	34.09	52.92	3.755	0.7462	1.271	895.0
40.0	2.978	107.0	0.922	35.61	55.46	3.820	0.7462	1.268	918.5
45.0	3.359	121.0	0.815	39.39	61.78	3.969	0.7462	1.262	974.4
50.0	3.738	135.0	0.731	43.17	68.08	4.102	0.7462	1.258	1027.0
55.0	4.115	149.0	0.663	46.93	74.37	4.221	0.7461	1.255	1077.0
60.0	4.492	163.0	0.606	50.69	80.63	4.330	0.7460	1.253	1124.0
70.0	5.243	190.0	0.518	58.19	93.14	4.523	0.7459	1.249	1214.0
80.0	5.992	217.0	0.452	65.68	105.6	4.690	0.7457	1.247	1296.0
90.0	6.740	244.0	0.402	73.16	118.1	4.837	0.7456	1.246	1374.0
100.0	7.487	271.0	0.361	80.63	130.5	4.968	0.7455	1.245	1448.0
120.0	8.980	325.0	0.301	95.57	155.4	5.195	0.7454	1.244	1585.0
140.0	10.47	379.0	0.257	110.5	180.3	5.386	0.7453	1.243	1710.0
160.0	11.96	432.0	0.225	125.4	205.2	5.552	0.7452	1.242	1827.0
180.0	13.45	486.0	0.200	140.3	230.0	5.699	0.7451	1.242	1937.0
200.0	14.94	540.0	0.180	155.2	254.8	5.830	0.7451	1.242	2041.0
250.0	18.67	674.0	0.144	192.5	316.9	6.107	0.7450	1.242	2281.0
300.0	22.39	808.0	0.120	229.7	379.0	6.333	0.7449	1.241	2497.0
350.0	26.12	942.0	0.103	267.0	441.1	6.524	0.7449	1.241	2696.0
400.0	29.84	1080.0	0.0900	304.2	503.1	6.690	0.7449	1.241	2882.0
450.0	33.56	1210.0	0.0800	341.5	565.2	6.836	0.7449	1.241	3056.0
500.0	37.29	1340.0	0.0720	378.7	627.2	6.967	0.7449	1.241	3221.0
600.0	44.73	1610.0	0.0600	453.2	751.4	7.193	0.7448	1.241	3528.0
700.0	52.18	1886.0	0.0514	527.6	875.5	7.385	0.7448	1.241	3810.0
800.0	59.63	2150.0	0.0450	602.1	1000.0	7.550	0.7448	1.241	4072.0
900.0	67.07	2420.0	0.0400	676.6	1124.0	7.697	0.7448	1.241	4319.0
1000.0	74.52	2680.0	0.0360	751.1	1248.0	7.827	0.7448	1.241	4552.0
1200.0	89.41	3220.0	0.0300	900.0	1496.0	8.054	0.7448	1.241	4986.0
1400.0	104.3	3760.0	0.0257	1049.0	1744.0	8.245	0.7448	1.241	5385.0
1600.0	119.2	4290.0	0.0225	1198.0	1993.0	8.411	0.7448	1.241	5756.0
1800.0	134.1	4830.0	0.0200	1347.0	2241.0	8.557	0.7448	1.241	6105.0
2000.0	149.0	5360.0	0.0180	1496.0	2489.0	8.688	0.7448	1.241	6435.0
2500.0	186.2	6710.0	0.0144	1868.0	3110.0	8.965	0.7448	1.241	7195.0
3000.0	223.5	8050.0	0.0120	2241.0	3730.0	9.191	0.7447	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

36 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)_P/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.8	9.418	59.4	2.34	1290.3	0.0103	0.00899	2.80	0.00155	1.02057	0.689
5.0	9.258	21.0	6.54	1120.0	0.0233	0.0105	2.85	0.00231	1.02048	0.479
6.0	8.992	17.3	7.23	874.0	0.0359	0.0113	2.71	0.00201	1.02030	0.539
7.0	8.603	14.7	7.40	613.0	0.0545	0.0115	2.52	0.00172	1.02000	0.612
8.0	8.020	12.3	7.00	355.3	0.0906	0.0121	2.28	0.00136	1.01945	0.753
9.0	6.955	9.03	5.89	111.0	0.238	0.0121	1.96	0.000808	1.01814	1.26
10.0	2.456	7.16	3.97	13.7	0.558	0.00940	1.24	0.000958	1.00828	1.90
11.0	1.752	9.40	3.93	22.7	0.231	0.00839	1.24	0.00221	1.00611	1.15
12.0	1.469	11.2	3.91	26.7	0.160	0.00851	1.28	0.00327	1.00513	0.971
13.0	1.258	12.9	3.89	29.0	0.126	0.00879	1.33	0.00429	1.00449	0.886
14.0	1.121	14.5	3.87	30.5	0.106	0.00912	1.38	0.00530	1.00403	0.837
15.0	1.016	16.0	3.85	31.6	0.0921	0.00946	1.44	0.00632	1.00367	0.806
16.0	0.9312	17.5	3.83	32.4	0.0820	0.00981	1.49	0.00735	1.00337	0.784
17.0	0.8614	19.0	3.82	33.0	0.0741	0.0102	1.54	0.00839	1.00313	0.769
18.0	0.8025	20.4	3.80	33.4	0.0678	0.0105	1.60	0.00946	1.00293	0.757
19.0	0.7521	21.8	3.79	33.8	0.0627	0.0108	1.65	0.0105	1.00275	0.749
20.0	0.7081	23.2	3.78	34.1	0.0584	0.0112	1.70	0.0117	1.00259	0.742
22.0	0.6349	25.9	3.77	34.6	0.0514	0.0118	1.80	0.0140	1.00233	0.733
24.0	0.5761	28.6	3.75	35.0	0.0461	0.0124	1.90	0.0164	1.00212	0.727
26.0	0.5278	31.3	3.74	35.2	0.0418	0.0130	2.00	0.0189	1.00195	0.723
28.0	0.4873	33.9	3.73	35.4	0.0382	0.0136	2.09	0.0215	1.00180	0.720
30.0	0.4528	36.5	3.72	35.6	0.0353	0.0141	2.19	0.0242	1.00168	0.718
32.0	0.4230	39.2	3.71	35.7	0.0328	0.0147	2.27	0.0270	1.00157	0.716
34.0	0.3971	41.8	3.71	35.8	0.0306	0.0152	2.36	0.0299	1.00147	0.715
36.0	0.3742	44.3	3.69	35.9	0.0287	0.0157	2.45	0.0329	1.00147	0.715
38.0	0.3539	46.9	3.69	35.9	0.0271	0.0162	2.53	0.0360	1.00132	0.714
40.0	0.3358	49.5	3.68	36.0	0.0256	0.0167	2.61	0.0392	1.00125	0.714
45.0	0.2977	55.8	3.67	36.1	0.0226	0.0179	2.81	0.0476	1.00111	0.713
50.0	0.2676	62.2	3.66	36.1	0.0202	0.0190	3.00	0.0566	1.00100	0.713
55.0	0.2430	68.5	3.65	36.2	0.0183	0.0201	3.18	0.0660	1.00091	0.713
60.0	0.2226	74.8	3.65	36.2	0.0167	0.0212	3.35	0.0761	1.00083	0.712
70.0	0.1907	87.3	3.64	36.2	0.0143	0.0233	3.68	0.0977	1.00071	0.711
80.0	0.1669	100.0	3.63	36.2	0.0125	0.0253	4.00	0.121	1.00063	0.711
90.0	0.1484	112.0	3.63	36.2	0.0111	0.0272	4.29	0.147	1.00056	0.710
100.0	0.1336	125.0	3.63	36.2	0.0100	0.0290	4.58	0.175	1.00050	0.708
120.0	0.1114	150.0	3.62	36.2	0.00831	0.0326	5.12	0.236	1.00042	0.706
140.0	0.09549	175.0	3.62	36.2	0.00712	0.0361	5.63	0.304	1.00036	0.698
160.0	0.08359	199.0	3.61	36.1	0.00623	0.0394	6.12	0.379	1.00031	0.694
180.0	0.07433	224.0	3.61	36.1	0.00554	0.0426	6.58	0.462	1.00028	0.691
200.0	0.06692	249.0	3.61	36.1	0.00499	0.0458	6.91	0.551	1.00025	0.675
250.0	0.05357	311.0	3.61	36.1	0.00399	0.0532	7.99	0.800	1.00020	0.671
300.0	0.04466	373.0	3.61	36.1	0.00333	0.0603	9.02	1.09	1.00017	0.668
350.0	0.03829	435.0	3.61	36.1	0.00285	0.0670	10.0	1.41	1.00014	0.667
400.0	0.03351	497.0	3.60	36.1	0.00250	0.0733	10.9	1.76	1.00013	0.666
450.0	0.02980	559.0	3.60	36.1	0.00222	0.0793	11.8	2.15	1.00011	0.666
500.0	0.02682	621.0	3.60	36.0	0.00200	0.0851	12.7	2.56	1.00010	0.667
600.0	0.02236	746.0	3.60	36.0	0.00166	0.0963	14.4	3.47	1.00008	0.668
700.0	0.01916	870.0	3.60	36.2	0.00143	0.107	16.0	4.50	1.00007	0.668
800.0	0.01677	994.0	3.60	36.0	0.00125	0.118	17.6	5.65	1.00006	0.668
900.0	0.01491	1120.0	3.60	36.0	0.00111	0.128	19.1	6.90	1.00006	0.667
1000.0	0.01342	1240.0	3.60	36.0	0.00100	0.137	20.5	8.25	1.00005	0.667
1200.0	0.01118	1490.0	3.60	36.0	0.000833	0.156	23.3	11.3	1.00004	0.667
1400.0	0.009587	1740.0	3.60	36.0	0.000714	0.174	26.0	14.6	1.00004	0.667
1600.0	0.008389	1990.0	3.60	36.0	0.000625	0.191	28.5	18.4	1.00003	0.666
1800.0	0.007450	2230.0	3.60	36.0	0.000555	0.208	31.0	22.5	1.00003	0.666
2000.0	0.006712	2480.0	3.60	36.0	0.000500	0.224	33.4	26.9	1.00003	0.666
2500.0	0.005373	3100.0	3.60	36.0	0.000400	0.263	39.2	39.4	1.00002	0.666
3000.0	0.004475	3720.0	3.60	36.0	0.000333	0.299	44.6	53.9	1.00002	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

36 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.1368	138.0	13.3	1.380	2.126	0.3929	0.5992	0.6098	806.9
5.0	0.1378	122.0	26.0	1.843	2.602	0.5011	0.4298	0.4886	803.1
6.0	0.1189	90.9	31.4	2.360	3.140	0.6008	0.4818	0.6184	766.7
7.0	0.1159	73.1	33.6	3.015	3.631	0.7067	0.5238	0.7924	715.7
8.0	0.1248	46.2	32.5	3.880	4.753	0.8294	0.5712	1.091	639.4
9.0	0.1416	18.4	27.1	5.193	6.189	0.997	0.6403	1.975	512.4
10.0	0.3474	4.80	9.10	9.076	12.32	1.633	0.7835	5.408	357.7
11.0	0.5228	11.9	5.78	11.85	15.53	1.941	0.7631	2.325	409.8
12.0	0.6418	17.6	4.61	13.07	17.58	2.120	0.7522	1.858	448.4
13.0	0.7429	22.3	3.93	14.10	19.33	2.260	0.7469	1.665	480.3
14.0	0.8366	26.6	3.46	15.05	20.94	2.379	0.7443	1.559	508.2
15.0	0.9255	30.6	3.10	15.95	22.46	2.484	0.7432	1.493	533.3
16.0	1.011	34.3	2.83	16.81	23.93	2.579	0.7428	1.448	556.6
17.0	1.094	37.9	2.60	17.66	25.36	2.666	0.7428	1.416	578.3
18.0	1.176	41.3	2.41	18.49	26.76	2.746	0.7430	1.391	598.7
19.0	1.255	44.7	2.25	19.30	28.14	2.820	0.7432	1.373	618.2
20.0	1.334	47.9	2.12	20.11	29.49	2.890	0.7435	1.359	636.9
22.0	1.489	54.3	1.89	21.70	32.18	3.018	0.7441	1.337	672.2
24.0	1.642	60.5	1.71	23.27	34.82	3.133	0.7448	1.321	705.1
26.0	1.793	66.6	1.56	24.83	37.45	3.238	0.7453	1.310	736.2
28.0	1.942	72.6	1.43	26.39	40.05	3.335	0.7456	1.300	765.6
30.0	2.091	78.5	1.33	27.93	42.65	3.426	0.7459	1.292	793.6
32.0	2.238	84.3	1.24	29.47	45.22	3.507	0.7461	1.286	820.5
34.0	2.385	90.1	1.16	31.01	47.79	3.585	0.7462	1.280	846.4
36.0	2.531	95.9	1.09	32.53	50.34	3.658	0.7463	1.276	871.3
38.0	2.677	102.0	1.03	34.06	52.89	3.727	0.7463	1.272	895.5
40.0	2.822	107.0	0.975	35.58	55.43	3.792	0.7463	1.269	919.0
45.0	3.182	121.0	0.862	39.37	61.76	3.941	0.7463	1.263	974.9
50.0	3.542	135.0	0.772	43.15	68.07	4.074	0.7463	1.259	1026.0
55.0	3.899	149.0	0.708	46.91	74.35	4.194	0.7462	1.256	1077.0
60.0	4.256	163.0	0.640	50.67	80.63	4.303	0.7461	1.253	1125.0
70.0	4.968	190.0	0.547	58.18	93.14	4.496	0.7459	1.250	1214.8
80.0	5.678	217.0	0.478	65.67	105.6	4.663	0.7458	1.248	1297.0
90.0	6.387	244.0	0.424	73.15	118.1	4.818	0.7457	1.246	1375.0
100.0	7.095	271.0	0.381	80.63	130.6	4.941	0.7456	1.245	1448.0
120.0	8.510	325.0	0.317	95.58	155.4	5.160	0.7454	1.244	1585.0
140.0	9.923	379.0	0.272	110.5	180.3	5.360	0.7453	1.243	1711.0
160.0	11.34	433.0	0.238	125.4	205.2	5.526	0.7452	1.243	1828.0
180.0	12.75	486.0	0.211	140.3	230.0	5.672	0.7452	1.242	1938.0
200.0	14.16	540.0	0.190	155.2	254.9	5.803	0.7451	1.242	2042.0
250.0	17.69	674.0	0.152	192.5	316.9	6.088	0.7450	1.242	2281.0
300.0	21.22	808.0	0.127	229.7	379.0	6.306	0.7450	1.241	2498.0
350.0	24.74	942.0	0.109	267.0	441.1	6.497	0.7449	1.241	2697.0
400.0	28.27	1080.0	0.0950	304.2	503.1	6.663	0.7449	1.241	2882.0
450.0	31.80	1218.0	0.0844	341.5	565.2	6.809	0.7449	1.241	3056.0
500.0	35.33	1340.0	0.0760	378.7	627.3	6.940	0.7449	1.241	3221.0
600.0	42.38	1610.0	0.0633	453.2	751.4	7.167	0.7448	1.241	3528.0
700.0	49.44	1880.0	0.0543	527.6	875.5	7.358	0.7448	1.241	3810.0
800.0	56.49	2150.0	0.0475	602.1	1000.0	7.526	0.7448	1.241	4072.0
900.0	63.54	2420.0	0.0422	676.6	1124.0	7.670	0.7448	1.241	4319.0
1000.0	70.60	2600.0	0.0380	751.1	1248.0	7.801	0.7448	1.241	4552.0
1200.0	84.71	3220.0	0.0317	900.0	1496.0	8.027	0.7448	1.241	4986.0
1400.0	98.82	3760.0	0.0271	1049.0	1744.0	8.210	0.7448	1.241	5385.0
1600.0	112.9	4290.0	0.0237	1198.0	1993.0	8.306	0.7448	1.241	5757.0
1800.0	127.0	4830.0	0.0211	1347.0	2241.0	8.530	0.7448	1.241	6106.0
2000.0	141.1	5360.0	0.0190	1496.0	2489.0	8.661	0.7448	1.241	6436.0
2500.0	176.4	6710.0	0.0152	1860.0	3110.0	8.930	0.7448	1.241	7199.0
3000.0	211.7	8098.0	0.0127	2241.0	3730.0	9.164	0.7448	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

38 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.433	59.9	2.35	1300.0	0.0182	0.00901	2.82	0.00157	1.02058	0.688
5.0	9.275	21.3	6.54	1130.3	0.0230	0.0105	2.87	0.00232	1.02049	0.490
6.0	9.014	17.5	7.24	891.0	0.0353	0.0113	2.73	0.00202	1.02032	0.539
7.0	8.630	14.9	7.43	631.0	0.0532	0.0119	2.54	0.00174	1.02002	0.609
8.0	8.362	12.5	7.05	373.0	0.0871	0.0122	2.30	0.00139	1.01949	0.742
9.0	7.061	9.46	5.99	130.0	0.209	0.0121	1.99	0.000869	1.01829	1.17
10.0	2.378	6.85	4.03	11.5	0.790	0.0106	1.29	0.000680	1.00950	2.38
11.0	1.913	9.16	3.96	22.8	0.254	0.00859	1.26	0.00193	1.00662	1.23
12.0	1.508	11.0	3.93	27.4	0.168	0.00862	1.29	0.00297	1.00549	1.00
13.0	1.346	12.7	3.91	30.1	0.131	0.00887	1.34	0.00396	1.00479	0.907
14.0	1.195	14.3	3.83	31.0	0.109	0.00918	1.39	0.00493	1.00428	0.851
15.0	1.081	15.9	3.87	33.0	0.0940	0.00952	1.45	0.00590	1.00389	0.816
16.0	0.9891	17.4	3.85	33.9	0.0833	0.00986	1.50	0.00688	1.00357	0.793
17.0	0.9139	18.8	3.83	34.6	0.0751	0.0102	1.55	0.00788	1.00331	0.775
18.0	0.8506	20.3	3.82	35.2	0.0686	0.0105	1.60	0.00890	1.00309	0.763
19.0	0.7967	21.7	3.81	35.6	0.0633	0.0109	1.66	0.00993	1.00290	0.754
20.0	0.7497	23.1	3.80	35.9	0.0589	0.0112	1.71	0.0110	1.00274	0.747
22.0	0.6716	25.8	3.78	36.5	0.0518	0.0118	1.81	0.0132	1.00246	0.736
24.0	0.6091	28.5	3.76	36.8	0.0463	0.0124	1.91	0.0155	1.00224	0.730
26.0	0.5578	31.2	3.75	37.1	0.0420	0.0130	2.00	0.0178	1.00206	0.725
28.0	0.5148	33.9	3.74	37.4	0.0384	0.0136	2.10	0.0203	1.00190	0.722
30.0	0.4783	36.5	3.72	37.5	0.0354	0.0142	2.19	0.0229	1.00177	0.719
32.0	0.4468	39.1	3.71	37.7	0.0329	0.0147	2.28	0.0256	1.00165	0.717
34.0	0.4193	41.7	3.71	37.8	0.0307	0.0152	2.37	0.0284	1.00155	0.716
36.0	0.3951	44.3	3.70	37.9	0.0288	0.0157	2.45	0.0312	1.00147	0.715
38.0	0.3736	46.9	3.69	37.9	0.0271	0.0162	2.53	0.0342	1.00139	0.715
40.0	0.3544	49.5	3.69	38.0	0.0257	0.0167	2.61	0.0372	1.00132	0.714
45.0	0.3142	55.8	3.67	38.1	0.0226	0.0179	2.81	0.0451	1.00117	0.714
50.0	0.2824	62.2	3.66	38.2	0.0202	0.0191	3.03	0.0536	1.00105	0.713
55.0	0.2564	68.5	3.66	38.2	0.0183	0.0202	3.18	0.0626	1.00096	0.713
60.0	0.2349	74.8	3.65	38.2	0.0168	0.0212	3.35	0.0721	1.00088	0.713
70.0	0.2013	87.4	3.64	38.2	0.0143	0.0233	3.68	0.0926	1.00075	0.712
80.0	0.1761	100.0	3.64	38.2	0.0125	0.0253	4.03	0.115	1.00066	0.710
90.0	0.1566	112.0	3.63	38.2	0.0111	0.0272	4.29	0.139	1.00059	0.708
100.0	0.1409	125.0	3.63	38.2	0.0100	0.0291	4.55	0.166	1.00053	0.706
120.0	0.1175	150.0	3.62	38.2	0.00831	0.0326	5.12	0.223	1.00044	0.702
140.0	0.1008	175.0	3.62	38.2	0.00712	0.0361	5.63	0.288	1.00038	0.698
160.0	0.08822	199.0	3.62	38.2	0.00623	0.0394	6.12	0.360	1.00033	0.696
180.0	0.07844	224.0	3.61	38.1	0.00554	0.0426	6.58	0.438	1.00030	0.691
200.0	0.07062	249.0	3.61	38.1	0.00498	0.0450	6.91	0.522	1.00027	0.675
250.0	0.05653	311.0	3.61	38.1	0.00399	0.0532	8.03	0.755	1.00021	0.671
300.0	0.04713	373.0	3.61	38.1	0.00333	0.0603	9.02	1.03	1.00018	0.668
350.0	0.04041	435.0	3.61	38.1	0.00285	0.0670	10.0	1.33	1.00015	0.667
400.0	0.03537	497.0	3.61	38.1	0.00250	0.0733	10.9	1.67	1.00013	0.667
450.0	0.03145	559.0	3.61	38.1	0.00222	0.0794	11.8	2.03	1.00012	0.666
500.0	0.02831	622.0	3.60	38.1	0.00200	0.0851	12.7	2.42	1.00011	0.666
600.0	0.02360	746.0	3.60	38.0	0.00166	0.0963	14.4	3.29	1.00009	0.666
700.0	0.02023	870.0	3.60	38.0	0.00143	0.107	16.0	4.27	1.00008	0.666
800.0	0.01770	994.0	3.60	38.0	0.00125	0.118	17.6	5.35	1.00007	0.666
900.0	0.01574	1120.0	3.60	38.0	0.00111	0.128	19.1	6.53	1.00006	0.667
1000.0	0.01416	1240.0	3.60	38.0	0.00100	0.137	20.5	7.81	1.00005	0.667
1200.0	0.01181	1490.0	3.60	38.0	0.000833	0.156	23.3	10.7	1.00004	0.667
1400.0	0.01012	1740.0	3.60	38.0	0.000714	0.174	26.0	13.9	1.00004	0.667
1600.0	0.008855	1990.0	3.60	38.0	0.000625	0.191	28.5	17.4	1.00003	0.667
1800.0	0.007872	2230.0	3.60	38.0	0.000599	0.208	31.0	21.3	1.00003	0.666
2000.0	0.007085	2480.0	3.60	38.0	0.000563	0.224	33.4	25.5	1.00003	0.666
2500.0	0.005668	3100.0	3.60	38.0	0.000480	0.263	39.2	37.3	1.00003	0.666
3000.0	0.004724	3720.0	3.60	38.0	0.000333	0.299	44.6	51.0	1.00002	0.666

* TWO-PHASE BOUNDARY

40 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
4.0	0.1058	140.0	13.2	1.378	2.162	0.3922	0.5947	0.6051	811.4
5.0	0.1076	124.0	26.0	1.839	2.636	0.4999	0.4203	0.4869	807.7
6.0	0.1107	161.0	31.5	2.351	3.171	0.5904	0.4813	0.6157	771.9
7.0	0.1155	74.9	33.8	3.001	3.857	0.7043	0.5230	0.7862	722.1
8.0	0.1234	48.2	32.8	3.854	4.768	0.8256	0.5708	1.072	648.0
9.0	0.1390	20.7	27.7	5.121	6.156	0.9076	0.6368	1.844	526.9
10.0	0.2869	2.77	11.3	9.181	11.31	1.520	0.7777	7.751	357.5
11.0	0.4787	10.8	6.37	11.62	15.17	1.891	0.7644	2.510	406.1
12.0	0.5965	16.7	4.99	12.91	17.33	2.080	0.7529	1.928	445.8
13.0	0.6959	21.7	4.22	13.98	19.13	2.224	0.7472	1.704	478.3
14.0	0.7866	26.0	3.69	14.95	20.77	2.346	0.7444	1.585	506.7
15.0	0.8722	30.1	3.31	15.86	22.32	2.452	0.7432	1.511	532.2
16.0	0.9544	33.9	3.00	16.73	23.88	2.548	0.7427	1.462	555.7
17.0	1.034	37.5	2.76	17.59	25.25	2.636	0.7427	1.427	577.6
18.0	1.112	41.0	2.56	18.42	26.66	2.717	0.7429	1.401	598.2
19.0	1.188	44.3	2.39	19.24	28.04	2.791	0.7431	1.381	617.9
20.0	1.263	47.6	2.24	20.05	29.41	2.862	0.7434	1.366	636.6
22.0	1.411	54.0	2.00	21.65	32.10	2.990	0.7441	1.343	672.1
24.0	1.557	60.3	1.80	23.22	34.76	3.186	0.7447	1.326	705.2
26.0	1.701	66.4	1.65	24.79	37.39	3.211	0.7453	1.313	736.4
28.0	1.844	72.5	1.51	26.35	40.08	3.388	0.7457	1.303	765.9
30.0	1.985	78.4	1.40	27.89	42.68	3.398	0.7459	1.295	794.0
32.0	2.126	84.3	1.31	29.44	45.18	3.481	0.7461	1.288	820.9
34.0	2.265	90.1	1.22	30.97	47.75	3.559	0.7463	1.282	846.8
36.0	2.404	95.8	1.15	32.50	50.31	3.632	0.7463	1.278	871.8
38.0	2.543	102.0	1.09	34.03	52.86	3.781	0.7464	1.274	896.0
40.0	2.681	107.0	1.03	35.55	55.41	3.766	0.7464	1.271	919.5
45.0	3.024	121.0	0.908	39.35	61.74	3.915	0.7464	1.264	975.4
50.0	3.365	135.0	0.814	43.13	68.05	4.048	0.7463	1.260	1028.0
55.0	3.705	149.0	0.737	46.90	74.34	4.168	0.7463	1.256	1078.0
60.0	4.045	163.0	0.674	50.66	80.62	4.277	0.7462	1.254	1125.0
70.0	4.721	190.0	0.576	58.17	93.14	4.470	0.7468	1.250	1215.0
80.0	5.396	217.0	0.503	65.66	105.6	4.637	0.7459	1.248	1298.0
90.0	6.070	244.0	0.446	73.14	118.1	4.784	0.7457	1.247	1375.0
100.0	6.743	271.0	0.401	81.62	130.6	4.915	0.7456	1.245	1449.8
120.0	8.087	325.0	0.334	95.55	155.5	5.142	0.7455	1.244	1586.0
140.0	9.429	379.0	0.286	110.5	180.3	5.334	0.7453	1.243	1711.0
160.0	10.77	433.0	0.250	125.4	205.2	5.500	0.7452	1.243	1820.0
180.0	12.11	486.0	0.222	140.3	230.0	5.646	0.7452	1.242	1938.0
200.0	13.45	540.0	0.200	155.2	254.9	5.777	0.7451	1.242	2042.0
250.0	16.81	674.0	0.160	192.5	317.0	6.054	0.7450	1.242	2281.0
300.0	20.16	808.0	0.133	229.7	379.0	6.281	0.7450	1.241	2496.0
350.0	23.51	942.0	0.114	267.0	441.1	6.472	0.7449	1.241	2697.0
400.0	26.86	1066.0	0.100	304.2	503.2	6.638	0.7449	1.241	2882.0
450.0	30.21	1210.0	0.0889	341.5	565.2	6.784	0.7449	1.241	3057.0
500.0	33.56	1340.0	0.0800	378.7	627.3	6.915	0.7449	1.241	3221.0
600.0	40.26	1610.0	0.0667	453.2	751.4	7.141	0.7448	1.241	3528.0
700.0	46.97	1880.0	0.0571	527.7	875.5	7.332	0.7448	1.241	3810.0
800.0	53.67	2150.0	0.0500	602.1	1000.0	7.498	0.7448	1.241	4072.0
900.0	60.37	2420.0	0.0444	676.6	1124.0	7.646	0.7448	1.241	4319.0
1000.0	67.07	2680.0	0.0400	751.1	1248.0	7.775	0.7448	1.241	4552.0
1200.0	80.48	3220.0	0.0333	900.0	1496.0	8.001	0.7448	1.241	4986.0
1400.0	93.88	3760.0	0.0286	1049.0	1744.0	8.193	0.7448	1.241	5385.0
1600.0	107.3	4290.0	0.0250	1198.0	1993.0	8.358	0.7448	1.241	5757.0
1800.0	120.7	4830.0	0.0222	1347.0	2241.0	8.505	0.7448	1.241	6106.0
2000.0	134.1	5370.0	0.0200	1496.0	2489.0	8.635	0.7448	1.241	6436.0
2500.0	167.6	6710.0	0.0160	1868.0	3110.0	8.912	0.7448	1.241	7195.0
3000.0	201.1	8050.0	0.0133	2241.0	3730.0	9.139	0.7448	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

40 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)_P BTU/LB	V(DP/DU)_V PSIA-CU FT/BTU	-V(DP/DV)_T PSIA	(DV/DT)/V_P 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.446	60.4	2.35	1320.0	0.0100	0.00902	2.84	0.08158	1.02059	0.686
5.0	9.292	21.5	6.54	1150.0	0.0226	0.0105	2.89	0.00233	1.02050	0.480
6.0	9.034	17.8	7.25	908.3	0.0347	0.0113	2.75	0.00204	1.02033	0.539
7.0	8.658	15.1	7.46	648.0	0.0521	0.0119	2.56	0.00175	1.02005	0.607
8.0	8.103	12.8	7.09	391.0	0.0839	0.0122	2.32	0.00141	1.01954	0.733
9.0	7.155	9.86	6.08	148.0	0.187	0.0122	2.03	0.000923	1.01841	1.10
10.0	3.485	6.65	4.15	9.65	1.17	0.0125	1.37	0.080464	1.01114	3.06
11.0	2.089	8.93	3.93	22.6	0.281	0.00882	1.28	0.00168	1.00717	1.32
12.0	1.677	10.9	3.95	28.1	0.178	0.00874	1.31	0.00273	1.00587	1.04
13.0	1.437	12.6	3.93	31.1	0.135	0.00895	1.35	0.00366	1.00509	0.928
14.0	1.271	14.2	3.93	33.1	0.112	0.00925	1.40	0.00459	1.00454	0.866
15.0	1.147	15.8	3.88	34.5	0.0959	0.00957	1.46	0.00553	1.00411	0.827
16.0	1.048	17.3	3.86	35.5	0.0847	0.00991	1.51	0.00647	1.00378	0.801
17.0	0.9670	18.7	3.84	36.2	0.0761	0.0102	1.56	0.00743	1.00350	0.782
18.0	0.8992	20.2	3.83	36.8	0.0694	0.0106	1.61	0.00840	1.00326	0.769
19.0	0.8416	21.6	3.82	37.3	0.0640	0.0109	1.66	0.00938	1.00306	0.759
20.0	0.7916	23.0	3.81	37.7	0.0594	0.0112	1.72	0.0104	1.00289	0.751
22.0	0.7086	25.8	3.79	38.3	0.0521	0.0119	1.82	0.0125	1.00259	0.740
24.0	0.6423	28.5	3.77	38.7	0.0466	0.0125	1.91	0.0147	1.00236	0.732
26.0	0.5879	31.2	3.76	39.1	0.0421	0.0131	2.01	0.0169	1.00216	0.727
28.0	0.5424	33.8	3.74	39.3	0.0385	0.0136	2.13	0.0193	1.00208	0.724
30.0	0.5038	36.5	3.73	39.5	0.0355	0.0142	2.19	0.0218	1.00186	0.721
32.0	0.4705	39.1	3.72	39.6	0.0329	0.0147	2.28	0.0243	1.00174	0.721
34.0	0.4415	41.7	3.71	39.8	0.0307	0.0152	2.28	0.0243	1.00174	0.719
36.0	0.4159	44.3	3.70	39.9	0.0288	0.0158	2.45	0.0296	1.00154	0.717
38.0	0.3933	46.9	3.70	39.9	0.0272	0.0163	2.54	0.0324	1.00146	0.716
40.0	0.3731	49.5	3.69	40.0	0.0257	0.0167	2.62	0.0353	1.00139	0.715
45.0	0.3307	55.8	3.68	40.1	0.0226	0.0179	2.81	0.0429	1.00123	0.714
50.0	0.2972	62.2	3.67	40.2	0.0203	0.0191	3.03	0.0509	1.00111	0.714
55.0	0.2699	68.5	3.66	40.2	0.0183	0.0202	3.18	0.0595	1.00101	0.713
60.0	0.2472	74.8	3.65	40.2	0.0168	0.0212	3.36	0.0685	1.00092	0.713
70.0	0.2118	87.4	3.65	40.3	0.0143	0.0233	3.69	0.0880	1.00079	0.712
80.0	0.1853	100.0	3.64	40.3	0.0125	0.0253	4.00	0.109	1.00069	0.712
90.0	0.1648	112.0	3.63	40.2	0.0111	0.0272	4.30	0.133	1.00062	0.710
100.0	0.1483	125.0	3.63	40.2	0.0100	0.0291	4.58	0.157	1.00056	0.709
120.0	0.1237	150.0	3.62	40.2	0.00831	0.0327	5.12	0.212	1.00046	0.707
140.0	0.1061	175.0	3.62	40.2	0.00712	0.0361	5.63	0.274	1.00040	0.698
160.0	0.09284	200.0	3.62	40.2	0.00623	0.0394	6.12	0.342	1.00035	0.694
180.0	0.08256	224.0	3.61	40.2	0.00554	0.0426	6.59	0.416	1.00031	0.691
200.0	0.07433	249.0	3.61	40.1	0.00498	0.0458	6.91	0.496	1.00028	0.675
250.0	0.05950	311.0	3.61	40.1	0.00399	0.0532	8.00	0.721	1.00022	0.671
300.0	0.04961	373.0	3.61	40.1	0.00333	0.0603	9.02	0.979	1.00019	0.668
350.0	0.04254	435.0	3.61	40.1	0.00285	0.0670	10.0	1.27	1.00016	0.667
400.0	0.03723	497.0	3.61	40.1	0.00250	0.0733	10.9	1.59	1.00014	0.667
450.0	0.03310	560.0	3.60	40.1	0.00222	0.0794	11.8	1.93	1.00014	0.666
500.0	0.02980	622.0	3.60	40.1	0.00200	0.0851	12.7	2.30	1.00011	0.666
600.0	0.02484	746.0	3.60	40.0	0.00166	0.0963	14.4	3.12	1.00009	0.668
700.0	0.02129	870.0	3.60	40.0	0.00143	0.107	16.0	4.05	1.00008	0.668
800.0	0.01863	994.0	3.60	40.0	0.00125	0.118	17.6	5.08	1.00007	0.668
900.0	0.01656	1120.0	3.60	40.0	0.00111	0.128	19.1	6.21	1.00006	0.667
1000.0	0.01491	1240.0	3.60	40.0	0.00100	0.137	20.5	7.42	1.00006	0.667
1200.0	0.01243	1490.0	3.60	40.0	0.000833	0.156	23.3	10.1	1.00005	0.667
1400.0	0.01065	1740.0	3.60	40.0	0.000714	0.174	26.0	13.2	1.00004	0.667
1600.0	0.009321	1990.0	3.60	40.0	0.000625	0.191	28.5	16.5	1.00004	0.666
1800.0	0.008206	2230.0	3.60	40.0	0.000555	0.208	31.0	20.2	1.00003	0.666
2000.0	0.007458	2480.0	3.60	40.0	0.000500	0.224	33.4	24.2	1.00003	0.666
2500.0	0.005966	3100.0	3.60	40.0	0.000400	0.263	39.2	35.5	1.00002	0.666
3000.0	0.004972	3720.0	3.60	40.0	0.000333	0.299	44.6	40.5	1.00002	0.666

* TWO-PHASE BOUNDARY

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THERMODYNAMIC PROPERTIES OF HELIUM 4

45 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1854	144.0	13.1	1.376	2.254	0.3907	0.5838	0.5937	822.3
5.0	0.1371	128.0	26.0	1.827	2.720	0.4969	0.4266	0.4829	818.8
6.0	0.1101	185.0	31.7	2.332	3.249	0.5943	0.4800	0.6091	784.7
7.0	0.1146	79.3	34.2	2.968	3.924	0.6986	0.5211	0.7718	737.6
8.0	0.1220	53.0	33.4	3.793	4.810	0.8166	0.5670	1.032	668.4
9.0	0.1363	26.2	29.0	4.972	6.105	0.9677	0.6296	1.622	559.2
10.0	0.1888	4.3	18.4	7.356	8.929	1.261	0.7090	5.871	406.7
11.0	0.3826	8.3	6.17	10.97	14.16	1.763	0.7660	3.141	399.2
12.0	0.5013	14.7	6.04	12.50	16.68	1.983	0.7544	2.137	439.8
13.0	0.5962	20.0	4.99	13.66	18.63	2.140	0.7479	1.812	473.5
14.0	0.6809	24.6	4.31	14.68	20.36	2.268	0.7447	1.654	503.2
15.0	0.7597	28.8	3.83	15.63	21.96	2.378	0.7432	1.560	529.5
16.0	0.8348	32.8	3.46	16.77	23.49	2.477	0.7426	1.499	553.6
17.0	0.9073	36.5	3.17	17.40	24.96	2.567	0.7425	1.456	575.9
18.0	0.9779	40.1	2.93	18.25	26.40	2.649	0.7427	1.424	597.0
19.0	1.047	43.6	2.73	19.08	27.90	2.725	0.7429	1.401	616.9
20.0	1.114	46.9	2.56	19.90	29.19	2.796	0.7432	1.383	636.0
22.0	1.248	53.5	2.27	21.51	31.91	2.926	0.7440	1.356	671.9
24.0	1.378	59.8	2.05	23.10	34.59	3.042	0.7447	1.337	705.4
26.0	1.507	66.0	1.87	24.68	37.24	3.148	0.7453	1.323	736.9
28.0	1.635	72.2	1.72	26.24	39.87	3.246	0.7458	1.311	766.6
30.0	1.762	78.2	1.59	27.80	42.48	3.336	0.7461	1.302	794.8
32.0	1.887	84.1	1.48	29.35	45.07	3.420	0.7463	1.294	821.8
34.0	2.012	90.0	1.38	30.89	47.66	3.498	0.7464	1.288	847.8
36.0	2.136	95.8	1.30	32.43	50.23	3.571	0.7465	1.282	872.9
38.0	2.260	102.0	1.23	33.96	52.79	3.641	0.7466	1.278	897.2
40.0	2.383	107.0	1.16	35.48	55.34	3.706	0.7466	1.274	920.7
45.0	2.689	121.0	1.02	39.29	61.69	3.856	0.7466	1.267	976.7
50.0	2.993	135.0	0.917	43.07	68.01	3.989	0.7465	1.262	1029.0
55.0	3.296	149.0	0.831	46.85	74.31	4.109	0.7465	1.258	1079.0
60.0	3.598	163.0	0.759	50.62	80.63	4.218	0.7464	1.255	1127.0
70.0	4.200	190.0	0.649	58.13	93.13	4.412	0.7462	1.251	1216.0
80.0	4.800	218.0	0.566	65.63	105.6	4.578	0.7460	1.249	1299.0
90.0	5.400	245.0	0.502	73.12	118.1	4.725	0.7459	1.247	1377.0
100.0	5.998	272.0	0.452	80.60	130.6	4.857	0.7457	1.246	1450.0
120.0	7.193	326.0	0.376	95.54	155.5	5.084	0.7455	1.244	1587.0
140.0	8.387	379.0	0.322	110.5	180.4	5.276	0.7454	1.243	1712.0
160.0	9.580	433.0	0.282	125.4	205.2	5.441	0.7453	1.243	1829.0
180.0	10.77	487.0	0.250	140.3	230.1	5.588	0.7452	1.242	1939.0
200.0	11.96	541.0	0.225	155.2	254.9	5.719	0.7452	1.242	2043.0
250.0	14.94	675.0	0.180	192.5	317.0	5.996	0.7451	1.242	2282.0
300.0	17.92	819.0	0.150	229.7	379.1	6.222	0.7450	1.241	2499.0
350.0	20.90	943.0	0.129	267.0	441.1	6.414	0.7450	1.241	2698.0
400.0	23.88	1380.0	0.112	304.2	503.2	6.579	0.7449	1.241	2883.0
450.0	26.86	1210.0	0.100	341.5	565.3	6.726	0.7449	1.241	3057.0
500.0	29.84	1340.0	0.0968	378.7	627.3	6.856	0.7449	1.241	3222.0
600.0	35.80	1610.0	0.0758	453.2	751.5	7.003	0.7449	1.241	3528.0
700.0	41.75	1880.0	0.0643	527.7	875.6	7.274	0.7448	1.241	3810.0
800.0	47.71	2150.0	0.0562	602.1	1000.0	7.448	0.7448	1.241	4073.0
900.0	53.67	2420.0	0.0500	676.6	1124.0	7.586	0.7448	1.241	4319.0
1000.0	59.62	2690.0	0.0450	751.1	1248.0	7.717	0.7448	1.241	4553.0
1200.0	71.54	3228.0	0.0375	900.0	1496.0	7.943	0.7448	1.241	4980.0
1400.0	83.45	3760.0	0.0321	1049.0	1744.0	8.134	0.7448	1.241	5385.0
1600.0	95.37	4290.0	0.0281	1198.0	1993.0	8.300	0.7448	1.241	5757.0
1800.0	107.3	4830.0	0.0250	1347.0	2241.0	8.446	0.7448	1.241	6108.0
2000.0	119.2	5370.0	0.0225	1496.0	2489.0	8.577	0.7448	1.241	6436.0
2500.0	149.0	6710.0	0.0180	1868.0	3110.0	8.854	0.7448	1.241	7195.0
3000.0	178.8	8050.0	0.0150	2241.0	3730.0	9.088	0.7448	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

45 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_P$	V(DP/DU)$_V$	-V(DP/DV)$_T$	(DV/DT)/V$_P$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR		
4.0	9.484	61.6	2.37	1360.0	0.00964	0.00906	2.89	0.00161	1.02061	0.682
5.0	9.334	22.2	6.53	1190.0	0.0210	0.0106	2.93	0.00235	1.02252	0.401
6.0	9.086	18.3	7.27	952.0	0.3333	0.0114	2.80	0.00206	1.02037	0.539
7.0	8.723	15.6	7.52	692.0	0.0494	0.0122	2.60	0.00179	1.02010	0.602
8.0	8.199	13.4	7.19	434.0	0.0770	0.0124	2.38	0.00146	1.01963	0.713
9.0	7.353	10.8	6.27	193.0	0.151	0.0123	2.15	0.00104	1.01868	0.993
10.0	5.297	7.30	4.69	22.8	0.804	0.0131	1.66	0.000422	1.01531	2.67
11.0	2.013	8.43	4.08	21.9	0.373	0.00958	1.35	0.00117	1.00874	1.60
12.0	1.995	10.4	4.01	29.4	0.205	0.00908	1.35	0.00213	1.00688	1.15
13.0	1.677	12.2	3.98	33.5	0.149	0.00918	1.39	0.00302	1.00587	0.987
14.0	1.469	13.9	3.94	36.2	0.119	0.00942	1.43	0.00388	1.00519	0.905
15.0	1.316	15.4	3.92	38.0	0.101	0.00972	1.48	0.00473	1.00469	0.856
16.0	1.198	17.0	3.90	39.3	0.0883	0.0100	1.53	0.00559	1.00429	0.823
17.0	1.102	18.5	3.87	40.2	0.3788	0.0104	1.58	0.00646	1.00396	0.800
18.0	1.023	19.9	3.86	41.0	0.0714	0.0107	1.63	0.00734	1.00369	0.783
19.0	0.9554	21.4	3.84	41.6	0.0655	0.0110	1.68	0.00822	1.00346	0.771
20.0	0.8974	22.8	3.83	42.1	0.0607	0.0113	1.73	0.00913	1.00326	0.762
22.0	0.8016	25.6	3.81	42.9	0.0530	0.0120	1.83	0.0110	1.00292	0.748
24.0	0.7255	28.3	3.79	43.4	0.0472	0.0126	1.93	0.0129	1.00265	0.739
26.0	0.6634	31.0	3.78	43.8	0.0426	0.0131	2.02	0.0150	1.00243	0.733
28.0	0.6116	33.7	3.76	44.1	0.0389	0.0137	2.11	0.0171	1.00225	0.728
30.0	0.5676	36.4	3.75	44.4	0.0359	0.0143	2.20	0.0193	1.00209	0.725
32.0	0.5299	39.0	3.74	44.6	0.3331	0.0148	2.29	0.0216	1.00196	0.722
34.0	0.4970	41.7	3.73	44.7	0.0309	0.0153	2.38	0.0239	1.00184	0.720
36.0	0.4681	44.3	3.72	44.8	0.0290	0.0158	2.46	0.0263	1.00173	0.719
38.0	0.4426	46.9	3.71	44.9	0.0273	0.0163	2.55	0.0288	1.00164	0.718
40.0	0.4197	49.4	3.70	45.0	0.0258	0.0168	2.63	0.0314	1.00156	0.717
45.0	0.3719	55.8	3.69	45.1	0.3227	0.0180	2.82	0.0382	1.00138	0.716
50.0	0.3341	62.2	3.68	45.2	0.0203	0.0191	3.01	0.0453	1.00124	0.715
55.0	0.3034	68.6	3.67	45.3	0.0184	0.0202	3.19	0.0533	1.00113	0.714
60.0	0.2779	74.9	3.66	45.3	0.0168	0.0213	3.36	0.0610	1.00104	0.714
70.0	0.2381	87.4	3.65	45.3	0.0143	0.0234	3.69	0.0784	1.00089	0.712
80.0	0.2083	100.0	3.64	45.3	0.0125	0.0253	4.00	0.0974	1.00078	0.711
90.0	0.1852	112.0	3.64	45.3	0.0111	0.0272	4.30	0.118	1.00069	0.709
100.0	0.1667	125.0	3.63	45.3	0.0100	0.0291	4.59	0.140	1.00063	0.707
120.0	0.1390	150.0	3.63	45.3	0.00830	0.0327	5.13	0.189	1.00052	0.702
140.0	0.1192	175.0	3.62	45.2	0.00711	0.0361	5.64	0.244	1.00045	0.698
160.0	0.1044	208.0	3.62	45.2	0.00623	0.0394	6.12	0.304	1.00039	0.694
180.0	0.09283	226.0	3.62	45.2	0.00553	0.0427	6.59	0.370	1.00035	0.691
200.0	0.08358	249.0	3.61	45.2	0.00498	0.0458	6.91	0.441	1.00031	0.675
250.0	0.06691	311.0	3.61	45.1	0.00399	0.0533	8.00	0.641	1.00025	0.671
300.0	0.05579	373.0	3.61	45.1	0.00332	0.0693	9.02	0.871	1.00021	0.668
350.0	0.04784	436.0	3.61	45.1	0.00285	0.0678	10.0	1.13	1.00018	0.667
400.0	0.04187	490.0	3.61	45.1	0.00249	0.0733	10.9	1.41	1.00016	0.666
450.0	0.03723	560.0	3.61	45.1	0.00222	0.0794	11.8	1.72	1.00014	0.666
500.0	0.03351	622.0	3.60	45.1	0.00200	0.0851	12.7	2.05	1.00013	0.667
600.0	0.02794	746.0	3.60	45.1	0.00166	0.0963	14.4	2.70	1.00011	0.666
700.0	0.02399	870.0	3.60	45.3	0.00143	0.107	16.0	3.60	1.00009	0.666
800.0	0.02096	994.0	3.60	45.0	0.00125	0.118	17.6	4.52	1.00008	0.666
900.0	0.01863	1120.0	3.60	45.0	0.00111	0.128	19.1	5.52	1.00007	0.667
1000.0	0.01677	1240.0	3.60	45.0	0.00100	0.137	20.5	6.60	1.00006	0.667
1200.0	0.01398	1490.0	3.60	45.0	0.000833	0.156	23.3	9.00	1.00005	0.667
1400.0	0.01198	1740.0	3.60	45.0	0.000714	0.174	26.0	11.7	1.00005	0.667
1600.0	0.01049	1990.0	3.60	45.0	0.000625	3.191	28.5	14.7	1.00004	0.667
1800.0	0.009321	2240.0	3.60	45.0	0.000555	0.208	31.0	18.0	1.00004	0.666
2000.0	0.008389	2480.0	3.60	45.0	0.000500	0.224	33.4	21.5	1.00003	0.666
2500.0	0.006712	3100.0	3.60	45.0	0.000400	0.263	39.2	31.5	1.00003	0.666
3000.0	0.005594	3720.0	3.60	45.0	0.000333	0.299	44.0	43.1	1.00002	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

50 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1051	147.0	13.0	1.373	2.346	0.3893	0.5733	0.5827	832.9
5.0	0.1067	132.0	26.0	1.817	2.805	0.4940	0.4250	8.4790	829.5
6.0	0.1095	109.0	31.9	2.314	3.327	0.5904	0.4786	0.6029	796.9
7.0	0.1138	83.6	34.5	2.938	3.992	0.6933	0.5193	0.7590	752.4
8.0	0.1207	57.6	34.1	3.739	4.856	0.8084	0.5643	0.999	687.3
9.0	0.1330	31.4	30.2	4.851	6.083	0.9515	0.6240	1.480	587.3
10.0	0.1651	9.68	22.1	6.674	8.203	1.172	0.6738	3.219	462.8
11.0	0.3042	6.70	10.6	10.17	12.99	1.628	0.7618	3.927	400.0
12.0	0.4242	12.9	7.28	12.34	15.97	1.889	0.7551	2.396	435.7
13.0	0.5161	18.4	5.85	13.33	18.10	2.060	0.7484	1.939	470.1
14.0	0.5960	23.2	4.99	14.41	19.93	2.195	0.7449	1.730	500.2
15.0	0.6696	27.6	4.39	15.39	21.59	2.310	0.7431	1.613	527.1
16.0	0.7391	31.7	3.95	16.32	23.17	2.412	0.7424	1.538	551.7
17.0	0.8059	35.6	3.60	17.22	24.68	2.503	0.7423	1.486	574.5
18.0	0.8717	39.3	3.31	18.08	26.14	2.587	0.7425	1.449	595.9
19.0	0.9335	42.8	3.08	18.92	27.57	2.664	0.7426	1.422	616.2
20.0	0.995	46.2	2.88	19.75	28.97	2.736	0.7430	1.401	635.5
22.0	1.117	52.9	2.55	21.38	31.72	2.867	0.7438	1.370	671.8
24.0	1.235	59.4	2.30	22.98	34.42	2.985	0.7446	1.348	705.6
26.0	1.353	65.7	2.09	24.56	37.09	3.092	0.7453	1.332	737.4
28.0	1.468	71.9	1.92	26.14	39.73	3.190	0.7458	1.319	767.3
30.0	1.543	77.9	1.77	27.70	42.36	3.280	0.7462	1.308	795.7
32.0	1.697	83.9	1.65	29.26	44.97	3.365	0.7464	1.300	822.6
34.0	1.810	89.8	1.54	30.81	47.56	3.443	0.7466	1.293	848.9
36.0	1.922	95.7	1.45	32.35	50.14	3.517	0.7467	1.287	874.0
38.0	2.033	101.0	1.37	33.88	52.71	3.586	0.7468	1.282	898.4
40.0	2.144	107.0	1.29	35.42	55.27	3.652	0.7468	1.278	921.9
45.0	2.421	121.0	1.14	39.23	61.64	3.802	0.7468	1.278	978.0
50.0	2.695	135.0	1.02	43.02	67.92	3.936	0.7467	1.264	1031.0
55.0	2.968	149.0	0.925	46.80	74.28	4.056	0.7466	1.260	1081.5
60.0	3.240	163.0	0.845	50.57	80.58	4.165	0.7465	1.257	1128.0
70.0	3.763	191.0	0.721	58.10	93.12	4.359	0.7463	1.253	1217.0
80.0	4.324	218.0	0.629	65.60	105.6	4.526	0.7461	1.250	1300.0
90.0	4.863	245.0	0.559	73.09	118.1	4.673	0.7460	1.248	1378.0
100.0	5.402	272.0	0.502	80.58	130.6	4.804	0.7458	1.246	1451.0
120.0	6.478	326.0	0.418	95.52	155.5	5.031	0.7456	1.245	1588.0
140.0	7.553	380.0	0.358	110.5	180.4	5.223	0.7455	1.244	1713.0
160.0	8.627	434.0	0.313	125.4	205.2	5.389	0.7454	1.243	1830.0
180.0	9.700	487.0	0.278	140.3	230.1	5.536	0.7453	1.243	1940.0
200.0	10.77	541.0	0.250	155.2	254.9	5.665	0.7452	1.242	2044.0
250.0	13.45	675.0	0.200	192.5	317.0	5.944	0.7451	1.242	2283.0
300.0	16.14	809.0	0.167	229.7	379.1	6.170	0.7450	1.242	2499.0
350.0	18.82	943.0	0.143	267.0	441.2	6.361	0.7450	1.241	2696.0
400.0	21.53	1080.0	0.125	304.2	503.3	6.527	0.7450	1.241	2884.0
450.0	24.18	1210.0	0.111	341.5	565.3	6.673	0.7449	1.241	3058.0
500.0	26.86	1350.0	0.100	378.7	627.4	6.894	0.7449	1.241	3222.0
600.0	32.22	1610.0	0.0833	453.2	751.5	7.036	0.7449	1.241	3529.0
700.0	37.58	1880.0	0.0714	527.7	875.6	7.222	0.7449	1.241	3811.0
800.0	42.94	2150.0	0.0625	602.1	1000.0	7.387	0.7448	1.241	4073.0
900.0	48.30	2420.0	0.0555	676.6	1124.0	7.534	0.7448	1.241	4320.0
1000.0	53.67	2690.0	0.0500	751.1	1248.0	7.664	0.7448	1.241	4553.0
1200.0	64.39	3220.0	0.0417	900.0	1496.0	7.891	0.7448	1.241	4987.0
1400.0	75.11	3760.0	0.0357	1049.0	1744.0	8.082	0.7448	1.241	5386.0
1600.0	85.83	4290.0	0.0312	1198.0	1993.0	8.248	0.7448	1.241	5757.0
1800.0	96.56	4830.0	0.0278	1347.0	2241.0	8.394	0.7448	1.241	6106.0
2000.0	107.3	5370.0	0.0250	1496.0	2489.0	8.525	0.7448	1.241	6436.0
2500.0	134.1	6710.0	0.0208	1868.0	3110.0	8.802	0.7448	1.241	7195.0
3000.0	160.9	8050.0	0.0167	2241.0	3730.0	9.328	0.7448	1.241	7881.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

50 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.519	62.7	2.39	1408.0						
5.0	9.374	22.8	6.52	1240.0	0.00929	0.00910	2.94	0.00164	1.02063	0.677
6.0	9.133	18.8	7.29	994.0	0.0210	0.0107	2.98	0.00237	1.02055	0.483
7.0	8.784	16.1	7.57	735.0	0.0321	0.0115	2.85	0.00208	1.02040	0.539
8.0	5.287	14.0	7.29	477.0	0.0470	0.0121	2.65	0.00182	1.02015	0.597
9.0	7.517	11.6	6.44	236.0	0.0714	0.0125	2.43	0.00151	1.01972	0.696
10.0	6.059	0.54	5.41	58.6	0.128	0.0125	2.16	0.00112	1.01886	0.925
11.0	3.287	8.15	4.24	22.0	0.377	0.0124	1.82	0.000636	1.01673	1.70
12.0	2.357	10.0	4.09	30.5	0.482	0.0106	1.44	0.000821	1.01062	1.52
13.0	1.936	11.8	4.03	35.7	0.239	0.00950	1.40	0.00168	1.00798	1.27
					0.164	0.00944	1.43	0.00251	1.00670	1.05
14.0	1.675	13.5	3.99	39.0						
15.0	1.493	15.2	3.96	41.3	0.128	0.00962	1.46	0.00331	1.00587	0.947
16.0	1.353	16.7	3.93	42.9	0.106	0.00988	1.51	0.00410	1.00527	0.886
17.0	1.241	18.2	3.91	44.2	0.0920	0.0102	1.55	0.00459	1.00481	0.846
18.0	1.149	19.7	3.89	45.1	0.0815	0.0105	1.60	0.00569	1.00443	0.818
19.0	1.071	21.2	3.87	45.9	0.0735	0.0108	1.65	0.00649	1.00412	0.798
20.0	1.005	22.6	3.86	46.5	0.0672	0.0111	1.70	0.00730	1.00386	0.783
22.0	0.8956	25.4	3.83	47.4	0.0620	0.0114	1.75	0.00812	1.00363	0.772
24.0	0.8094	28.2	3.81	48.0	0.0539	0.0120	1.85	0.00981	1.00325	0.757
26.0	0.7393	30.9	3.80	48.6	0.0478	0.0126	1.94	0.0116	1.00295	0.746
					0.0431	0.0132	2.04	0.0134	1.00270	0.739
28.0	0.6810	33.6	3.78	48.9						
30.0	0.6317	36.3	3.76	49.2	0.0392	0.0138	2.13	0.0153	1.00250	0.733
32.0	0.5894	39.0	3.75	49.5	0.0360	0.0143	2.22	0.0173	1.00232	0.729
34.0	0.5526	41.6	3.74	49.5	0.0334	0.0149	2.30	0.0194	1.00217	0.726
36.0	0.5204	44.2	3.73	49.6	0.0311	0.0154	2.39	0.0215	1.00204	0.723
38.0	0.4918	46.8	3.72	49.8	0.0291	0.0159	2.47	0.0237	1.00192	0.721
40.0	0.4663	49.4	3.71	49.9	0.0274	0.0164	2.55	0.0260	1.00182	0.720
				50.0	0.0259	0.0169	2.63	0.0283	1.00173	0.719
45.0	0.4131	55.9	3.70	50.2						
50.0	0.3711	62.2	3.69	50.3	0.0227	0.0180	2.83	0.0344	1.00153	0.717
55.0	0.3369	68.6	3.68	50.3	0.0203	0.0192	3.02	0.0409	1.00138	0.716
60.0	0.3086	74.9	3.67	50.4	0.0184	0.0203	3.19	0.0477	1.00125	0.715
70.0	0.2643	87.3	3.66	50.4	0.0168	0.0213	3.37	0.0550	1.00115	0.714
80.0	0.2313	100.0	3.65	50.4	0.0153	0.0234	3.70	0.0706	1.00099	0.713
90.0	0.2056	113.0	3.64	50.4	0.0125	0.0254	4.01	0.0878	1.00086	0.711
100.0	0.1851	125.0	3.64	50.4	0.0111	0.0273	4.31	0.106	1.00077	0.709
120.0	0.1544	150.0	3.6.	50.3	0.0100	0.0291	4.59	0.126	1.00069	0.707
140.0	0.1324	175.0	3.62	50.3	0.00830	0.0327	5.13	0.170	1.00058	0.703
					0.00711	0.0362	5.64	0.220	1.00050	0.698
160.0	0.1159	200.0	3.62	50.3						
180.0	0.1031	225.0	3.62	50.2	0.00622	0.0395	6.12	0.274	1.00044	0.694
200.0	0.09282	249.0	3.62	50.2	0.00553	0.0427	6.59	0.333	1.00039	0.691
250.0	0.07432	312.0	3.61	50.2	0.00498	0.0458	6.92	0.397	1.00035	0.675
300.0	0.06197	374.8	3.61	50.2	0.00339	0.0533	8.00	0.577	1.00028	0.671
350.0	0.35314	436.0	3.61	50.1	0.00332	0.0603	9.02	0.784	1.00023	0.668
400.0	0.04652	498.0	3.61	50.1	0.00285	0.0670	10.0	1.02	1.00020	0.667
450.0	0.04136	566.0	3.61	50.1	0.00249	0.0733	10.9	1.27	1.00018	0.666
500.0	0.03723	622.0	3.61	50.1	0.00222	0.0794	11.8	1.55	1.00016	0.666
606.0	0.03104	746.0	3.60	50.1	0.00200	0.0851	12.7	1.84	1.00014	0.666
					0.00166	0.0963	14.4	2.50	1.00012	0.668
760.0	0.02661	870.0	3.60	50.1						
800.0	0.02329	99.8	3.60	50.1	0.00143	0.107	16.0	3.24	1.00010	0.668
900.0	0.02070	1120.0	3.60	50.0	0.00125	0.118	17.8	4.07	1.00009	0.668
1000.0	0.01863	1240.0	3.60	50.0	0.00111	0.128	19.1	4.97	1.00008	0.667
1200.0	0.01593	1490.0	3.60	50.0	0.00100	0.137	20.5	5.94	1.00007	0.667
1400.0	0.01331	1740.0	3.60	50.0	0.000833	0.156	23.3	8.18	1.00006	0.667
1600.0	0.01165	1990.0	3.60	50.0	0.000714	0.174	26.0	10.5	1.00005	0.667
1800.0	0.01036	2240.0	3.60	50.0	0.000625	0.191	28.5	13.2	1.00004	0.666
2000.0	0.009321	2490.0	3.60	50.0	0.000595	0.208	31.0	16.2	1.00004	0.666
2500.0	0.007458	3100.0	3.60	50.0	0.000500	0.224	33.4	19.4	1.00004	0.666
					0.000400	0.263	39.2	28.4	1.00003	0.666
3000.0	0.006215	3720.0	3.60	50.0	0.000333	0.299	44.6	30.8	1.00002	0.666

* TWO-PHASE BOUNDARY

1ṻ PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	3TU/LB-R	BTU / LB -R		FT/SEC
4.0	0.1017	182.0	12.0	1.378	3.254	0.3772	0.4855	0.4916	923.5
5.0	0.1029	168.0	25.5	1.758	3.655	0.4703	0.4089	0.4468	921.8
6.3	0.1049	146.0	33.0	2.188	4.130	0.5590	0.4649	0.5559	980.5
7.0	0.1078	123.0	37.3	2.725	4.722	0.6513	0.5027	0.6740	873.0
8.0	0.1121	98.5	38.6	3.386	5.461	0.7499	0.5439	0.8253	832.2
9.0	0.1182	74.8	37.2	4.214	6.402	0.8590	0.5939	1.023	772.7
10.0	0.1267	55.0	34.0	5.204	7.550	0.9785	0.6075	1.231	718.6
11.0	0.1391	37.1	29.7	6.361	8.936	1.111	0.6283	1.564	653.9
12.0	0.1596	23.8	24.4	7.609	10.76	1.270	0.6608	2.076	589.1
13.0	0.1931	18.3	19.0	9.568	13.14	1.460	0.6987	2.470	547.8
14.0	0.2356	19.6	14.9	11.32	15.68	1.649	0.7253	2.347	541.8
15.0	0.2773	22.6	12.1	12.78	17.91	1.803	0.7327	2.119	550.4
16.0	0.3177	26.2	10.3	14.05	19.94	1.933	0.7359	1.940	565.7
17.0	0.3566	30.0	8.96	15.21	21.81	2.047	0.7376	1.807	583.7
18.6	0.3936	33.9	7.98	16.27	23.56	2.147	0.7388	1.709	602.6
19.0	0.4292	37.7	7.23	17.26	25.21	2.237	0.7392	1.637	622.1
20.0	0.4638	41.5	6.63	18.20	26.79	2.318	0.7398	1.583	641.3
22.0	0.5386	48.8	5.71	20.01	29.83	2.463	0.7414	1.508	678.4
24.0	0.5952	56.0	5.05	21.74	32.76	2.591	0.7432	1.460	713.5
26.0	0.6562	62.9	4.53	23.43	35.61	2.705	0.7448	1.425	746.7
28.0	0.7280	69.7	4.11	25.09	38.42	2.809	0.7461	1.398	777.7
30.0	0.7807	76.3	3.76	26.74	41.20	2.905	0.7470	1.376	806.7
32.0	0.8404	82.7	3.47	28.37	43.93	2.993	0.7476	1.358	834.5
34.0	0.8993	89.1	3.23	29.98	46.63	3.075	0.7481	1.344	861.1
36.0	0.9576	95.3	3.02	31.58	49.31	3.152	0.7483	1.332	886.6
38.0	1.015	101.0	2.83	33.16	51.96	3.223	0.7485	1.322	911.3
40.0	1.073	108.0	2.67	34.73	54.60	3.291	0.7486	1.314	935.1
45.0	1.215	122.0	2.34	38.63	61.13	3.445	0.7487	1.298	991.7
50.0	1.355	137.0	2.08	42.50	67.59	3.581	0.7486	1.287	1045.0
55.0	1.494	151.0	1.88	46.34	74.00	3.703	0.7484	1.279	1095.0
60.0	1.632	166.0	1.71	50.16	80.38	3.814	0.7482	1.272	1142.0
70.0	1.906	194.8	1.46	57.76	93.06	4.010	0.7479	1.264	1231.0
80.0	2.179	221.0	1.27	65.32	105.7	4.178	0.7475	1.258	1314.0
90.0	2.450	249.0	1.12	72.85	118.2	4.326	0.7472	1.254	1391.0
100.0	2.721	276.0	1.01	80.37	130.4	4.458	0.7470	1.252	1464.0
120.0	3.261	330.0	0.838	95.37	155.7	4.686	0.7466	1.248	1600.0
140.0	3.799	384.8	0.717	110.3	180.7	4.878	0.7463	1.246	1724.0
160.0	4.337	438.0	0.626	125.3	205.6	5.044	0.7461	1.245	1841.0
180.0	4.874	492.8	0.556	140.2	230.5	5.191	0.7455	1.244	1950.0
200.0	5.411	546.0	0.500	155.2	255.4	5.322	0.7458	1.243	2053.0
250.0	6.752	680.0	0.400	192.5	317.5	5.599	0.7455	1.242	2291.0
300.0	8.093	814.0	0.333	229.7	379.6	5.826	0.7454	1.242	2507.0
350.0	9.433	948.0	0.286	267.0	441.7	6.017	0.7453	1.242	2705.0
400.0	10.77	1080.0	0.250	304.2	503.7	6.183	0.7452	1.241	2890.0
450.0	12.11	1220.0	0.222	341.5	565.8	6.329	0.7452	1.241	3064.0
500.0	13.45	1350.0	0.200	378.7	627.9	6.468	0.7451	1.241	3228.0
600.0	16.13	1620.0	0.167	453.2	752.0	6.686	0.7451	1.241	3534.0
700.0	18.81	1890.0	0.143	527.7	876.1	6.878	0.7450	1.241	3815.0
800.0	21.49	2150.0	0.125	602.2	1000.0	7.043	0.7450	1.241	4077.0
900.0	24.17	2420.0	0.111	676.7	1124.0	7.189	0.7450	1.241	4323.0
1000.0	26.85	2690.0	0.100	751.2	1248.0	7.320	0.7449	1.241	4556.0
1200.0	32.22	3230.0	0.0833	900.1	1497.0	7.547	0.7449	1.241	4990.0
1400.0	37.58	3760.0	0.0714	1049.0	1745.0	7.738	0.7449	1.241	5388.0
1600.0	42.94	4300.3	0.0625	1198.0	1993.0	7.904	0.7449	1.241	5759.0
1800.0	48.30	4830.0	0.0555	1347.8	2241.0	8.050	0.7449	1.241	6108.0
2000.0	53.66	5370.0	0.0500	1496.0	2490.0	8.181	0.7449	1.241	6438.0
2500.0	67.06	6710.0	0.0400	1868.0	3110.0	8.457	0.7448	1.241	7196.0
3000.0	80.46	8050.0	0.0333	2241.0	3731.0	8.684	0.7448	1.241	7862.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

100 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	9.830	73.0	2.52	1790.3	6.30673	0.06946	3.42	0.00196	1.02077	0.641
5.0	9.720	28.6	6.41	1630.0	0.0156	0.3112	3.44	0.00258	1.02073	0.495
6.0	9.535	23.5	7.45	1400.0	0.0237	0.0121	3.28	0.00229	1.02064	0.542
7.0	9.273	20.5	8.01	1140.3	0.0328	0.0129	3.07	0.00207	1.02049	0.576
8.0	8.923	18.8	7.95	879.0	0.0439	0.0136	2.85	0.00185	1.02025	0.622
9.0	8.463	17.4	7.39	633.0	0.3587	0.0140	2.62	0.00162	1.01988	0.690
10.0	7.894	15.7	7.08	434.3	0.0782	0.0141	2.42	0.00145	1.01932	0.759
11.0	7.193	14.1	6.57	267.0	0.111	0.0140	2.24	0.00125	1.01846	0.898
12.0	6.267	12.7	5.90	149.3	0.163	0.0137	2.06	0.00105	1.01708	1.13
13.0	5.178	12.3	5.26	94.9	0.200	0.0131	1.92	0.00102	1.01507	1.30
14.0	4.245	13.1	4.83	83.1	0.179	0.0124	1.84	0.00125	1.01303	1.25
15.0	3.605	14.3	4.59	81.5	0.149	0.0121	1.81	0.00159	1.01146	1.14
16.0	3.147	15.6	4.43	82.5	0.125	0.0120	1.82	0.00197	1.01024	1.05
17.0	2.805	17.0	4.33	94.2	0.106	0.0121	1.84	0.00238	1.00929	0.989
18.0	2.540	18.4	4.25	86.1	0.0927	0.0122	1.86	0.00281	1.00853	0.939
19.0	2.333	19.9	4.20	87.9	0.3822	0.0124	1.89	0.00325	1.00790	0.902
20.0	2.156	21.4	4.15	89.5	0.0741	0.0126	1.93	0.00369	1.00737	0.873
22.0	1.885	24.3	4.09	92.0	0.0621	0.0131	2.00	0.00459	1.30653	0.834
24.0	1.680	27.2	4.04	94.0	0.0537	0.0136	2.08	0.00588	1.00588	0.808
26.0	1.519	30.1	4.00	95.6	0.0474	0.0141	2.16	0.00649	1.00536	0.790
28.0	1.389	32.9	3.97	96.8	0.0425	0.0146	2.25	0.00750	1.00493	0.776
30.0	1.281	35.7	3.93	97.7	0.0385	0.0151	2.33	0.00855	1.00457	0.765
32.0	1.190	38.5	3.91	98.5	0.3393	0.0156	2.41	0.00962	1.00426	0.756
34.0	1.112	41.2	3.88	99.1	0.0326	0.0160	2.49	0.0107	1.00480	0.758
36.0	1.044	44.0	3.86	100.0	0.0303	0.0165	2.56	0.0119	1.00376	0.745
38.0	0.9848	46.6	3.84	100.0	0.3283	0.0170	2.64	0.0130	1.00356	0.740
40.0	0.9321	49.3	3.83	130.0	0.3266	0.0174	2.72	0.0142	1.00338	0.737
45.0	0.8213	55.9	3.80	131.0	0.0232	0.0186	2.90	0.0174	1.00300	0.731
50.0	0.7361	62.5	3.77	101.0	0.0206	0.0197	3.08	0.0207	1.00270	0.726
55.0	0.6694	69.0	3.75	131.0	0.3185	0.0207	3.26	0.0242	1.00245	0.723
60.0	0.6128	75.4	3.74	101.0	0.0169	0.0218	3.43	0.0279	1.00225	0.721
70.0	0.5246	88.2	3.71	102.0	0.3143	0.0238	3.75	0.0359	1.00194	0.717
80.0	0.4590	101.0	3.70	102.0	0.0125	0.0257	4.06	0.0446	1.00170	0.714
90.0	0.4081	113.0	3.68	102.0	0.0111	0.0276	4.35	0.0540	1.00151	0.711
100.0	0.3675	126.0	3.67	101.0	0.00993	0.0295	4.63	0.0640	1.00137	0.708
120.0	0.3067	151.0	3.66	101.5	0.30826	0.0330	5.17	0.0862	1.00114	0.703
140.0	0.2632	176.0	3.65	101.0	0.00708	0.0364	5.67	0.111	1.00098	0.699
160.0	0.2306	201.0	3.64	101.3	0.00620	0.0397	6.16	0.130	1.00086	0.695
180.0	0.2052	226.0	3.64	101.0	0.00551	0.0429	6.62	0.168	1.00077	0.691
200.0	0.1848	251.0	3.63	101.0	0.00496	0.0460	6.94	0.200	1.00069	0.675
250.0	0.1481	313.0	3.62	101.0	0.00397	0.0535	8.03	0.291	1.00056	0.671
300.0	0.1236	375.0	3.62	101.3	0.30331	0.0605	9.04	0.394	1.00046	0.668
350.0	0.1060	437.0	3.62	101.0	0.00284	0.0672	10.0	0.510	1.00040	0.667
400.0	0.09282	499.0	3.61	100.0	0.00249	0.3735	10.9	0.638	1.00035	0.666
450.0	0.08255	561.0	3.61	100.0	0.00221	0.0795	11.8	0.776	1.00031	0.666
500.0	0.07433	623.0	3.61	100.0	0.00199	0.0852	12.7	0.924	1.00028	0.667
600.0	0.06190	747.0	3.61	100.0	0.00166	0.0964	14.4	1.25	1.00023	0.668
700.0	0.05315	871.0	3.61	100.0	0.00142	0.107	16.0	1.62	1.00020	0.668
800.0	0.04652	1000.0	3.61	100.0	0.00125	0.118	17.0	2.04	1.00018	0.667
900.0	0.04137	1120.0	3.60	100.3	0.00111	0.128	19.1	2.49	1.00016	0.667
1000.0	0.03724	1240.0	3.60	100.0	0.00100	0.137	20.5	2.97	1.00014	0.667
1200.0	0.03104	1490.0	3.60	100.5	0.000832	0.156	23.3	4.06	1.00012	0.667
1400.0	0.02661	1740.0	3.60	100.0	0.000713	0.174	26.0	5.27	1.00010	0.667
1600.0	0.02329	1990.0	3.60	130.3	0.000624	0.191	28.5	6.62	1.00009	0.666
1800.0	0.02373	2240.0	3.60	130.3	0.000555	0.208	31.0	8.18	1.00008	0.666
2000.0	0.01864	2480.0	3.60	130.0	0.000508	0.224	33.4	9.69	1.00007	0.666
2500.0	0.01491	3110.0	3.60	100.0	0.000486	0.263	39.2	14.2	1.00006	0.666
3000.0	0.01243	3730.0	3.60	100.0	0.000333	0.299	44.6	19.4	1.00005	0.666

* TWO-PHASE BOUNDARY

15. PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.09912	212.0	11.3	1.394	4.147	0.3682	0.4196	0.4240	995.0
5.0	0.1000	206.0	24.8	1.728	4.506	0.4526	0.3934	0.4220	996.0
6.0	0.1015	179.0	33.6	2.125	4.945	0.5358	0.4507	0.5229	982.1
7.0	0.1038	157.0	39.2	2.609	5.493	0.6215	0.4879	0.6244	964.5
8.0	0.1070	134.0	41.5	3.196	6.166	0.7115	0.5287	0.7469	935.7
9.0	0.1112	111.0	41.2	3.916	7.304	0.8083	0.5777	0.8920	891.5
10.0	0.1165	91.9	39.3	4.743	7.978	0.9093	0.5882	1.009	854.8
11.0	0.1231	73.6	36.5	5.640	9.358	1.112	0.6026	1.160	810.0
12.0	0.1318	57.6	33.0	6.654	10.31	1.122	0.6230	1.355	761.6
13.0	0.1435	44.8	29.2	7.812	11.40	1.241	0.6465	1.592	714.6
14.0	0.1593	36.2	25.2	9.118	13.54	1.371	0.6712	1.831	675.9
15.0	0.1796	32.2	21.5	10.53	15.52	1.508	0.6941	1.978	652.3
16.0	0.2030	32.2	18.3	11.95	17.59	1.642	0.7123	1.986	644.8
17.0	0.2276	34.5	15.8	13.32	19.64	1.766	0.7250	1.909	648.4
18.0	0.2514	37.1	13.9	14.54	21.52	1.874	0.7306	1.826	655.3
19.0	0.2740	39.9	12.4	15.65	23.28	1.976	0.7328	1.752	665.0
20.0	0.2980	42.9	11.2	16.70	24.98	2.057	0.7346	1.692	677.0
22.0	0.3433	49.3	9.43	18.68	28.21	2.212	0.7376	1.604	704.7
24.0	0.3877	55.9	8.23	20.53	31.30	2.346	0.7404	1.543	734.7
26.0	0.4313	62.7	7.27	22.32	34.30	2.466	0.7430	1.499	765.2
28.0	0.4740	69.5	6.54	24.07	37.24	2.575	0.7453	1.463	794.8
30.0	0.5160	76.2	5.95	25.80	40.13	2.675	0.7470	1.433	823.0
32.0	0.5572	82.9	5.46	27.50	42.98	2.767	0.7481	1.409	850.3
34.0	0.5978	89.4	5.04	29.17	45.77	2.852	0.7489	1.389	876.5
36.0	0.6379	95.9	4.69	30.82	48.53	2.931	0.7495	1.389	876.5
38.0	0.6775	102.0	4.39	32.45	51.27	3.005	0.7499	1.359	926.4
40.0	0.7167	109.0	4.13	34.06	53.97	3.074	0.7501	1.347	950.2
45.0	0.8135	124.0	3.59	38.05	60.65	3.231	0.7503	1.324	1007.0
50.0	0.9087	139.0	3.18	41.99	67.23	3.370	0.7503	1.308	1059.0
55.0	1.003	154.0	2.86	45.88	73.74	3.494	0.7501	1.296	1109.0
60.0	1.096	168.0	2.60	49.75	80.19	3.606	0.7498	1.287	1157.0
70.0	1.281	197.0	2.20	57.42	93.00	3.804	0.7493	1.275	1245.0
80.0	1.464	225.0	1.91	65.04	105.7	3.973	0.7488	1.266	1327.0
90.0	1.646	253.0	1.69	72.62	118.3	4.122	0.7484	1.261	1404.0
100.0	1.827	280.0	1.52	80.17	130.9	4.255	0.7480	1.257	1477.0
120.0	2.188	335.3	1.26	95.22	156.0	4.483	0.7475	1.252	1611.0
140.0	2.548	389.0	1.08	110.2	181.0	4.676	0.7471	1.248	1736.0
160.0	2.907	443.0	0.941	125.2	205.9	4.843	0.7467	1.246	1851.0
180.0	3.265	497.0	0.835	140.2	230.9	4.989	0.7465	1.245	1960.0
200.0	3.623	551.0	0.751	155.1	255.8	5.120	0.7463	1.244	2063.0
250.0	4.518	685.0	0.600	192.4	317.9	5.398	0.7460	1.243	2300.0
300.0	5.412	819.0	0.506	229.7	380.0	5.624	0.7457	1.242	2516.0
350.0	6.305	953.0	0.428	267.0	442.1	5.816	0.7456	1.242	2712.0
400.0	7.193	1090.0	0.375	304.3	504.2	5.982	0.7455	1.242	2896.0
450.0	8.092	1220.0	0.333	341.5	566.3	6.128	0.7454	1.241	3069.0
500.0	8.983	1360.0	0.300	378.8	628.4	6.253	0.7453	1.241	3233.0
600.0	10.77	1620.0	0.250	453.3	752.5	6.485	0.7452	1.241	3538.0
700.0	12.56	1890.0	0.214	527.8	876.6	6.676	0.7452	1.241	3819.0
800.0	14.34	2160.0	0.187	602.3	1001.0	6.842	0.7451	1.241	4081.0
900.0	16.13	2430.0	0.167	676.8	1125.0	6.988	0.7451	1.241	4327.0
1000.0	17.92	2694.0	0.150	751.2	1249.0	7.119	0.7451	1.241	4559.0
1200.0	21.49	3230.0	0.125	900.2	1497.0	7.345	0.7450	1.241	4992.0
1400.0	25.06	3778.0	0.107	1049.0	1745.0	7.537	0.7450	1.241	5391.0
1600.0	28.64	4300.0	0.0937	1198.0	1994.0	7.702	0.7450	1.241	5761.0
1800.0	32.21	4840.0	0.0833	1347.0	2242.0	7.849	0.7450	1.241	6110.0
2000.0	35.78	5370.0	0.0758	1496.0	2490.0	7.979	0.7449	1.241	6439.0
2500.0	44.72	6716.0	0.0603	1868.0	3111.0	8.256	0.7449	1.241	7198.0
3000.0	53.65	8050.0	0.0500	2241.0	3731.0	8.482	0.7449	1.241	7883.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

150 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_P$	V(DP/DU)$_V$	-V(DP/DV)$_T$	(DV/DT)/V	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	L3/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR		
4.0	10.09	30.1	2.67	2130.3	0.00530	0.00976	3.91	0.00228	1.32387	0.611
5.0	10.03	33.9	6.36	2030.0	0.0124	0.0116	3.90	0.00276	1.02984	0.508
6.3	9.848	27.5	7.55	1770.6	0.3190	0.0127	3.70	0.00246	1.02078	0.550
7.0	9.632	24.1	8.33	1510.3	0.3259	0.0136	3.46	0.00226	1.02368	0.572
8.0	9.343	22.5	8.40	1250.0	0.0332	0.0144	3.21	0.00206	1.02053	0.600
9.0	8.995	21.6	7.92	1030.0	0.3412	0.0150	2.98	0.00187	1.02030	0.638
10.0	8.586	20.3	7.77	749.3	0.3497	0.0154	2.78	0.00178	1.01999	0.656
11.0	8.125	19.0	7.45	598.0	0.3610	0.0155	2.62	0.00166	1.01956	0.699
12.0	7.553	17.9	6.93	437.3	0.3757	0.0156	2.47	0.00152	1.01897	0.773
13.0	6.903	17.6	6.43	312.3	0.3937	0.0154	2.34	0.00139	1.01816	0.870
14.0	6.277	16.5	5.99	227.0	0.111	0.0151	2.23	0.00131	1.01710	0.975
15.3	5.563	16.5	5.56	190.0	0.120	0.0147	2.15	0.00133	1.01584	1.04
16.0	4.927	17.2	5.22	159.3	0.116	0.0143	2.13	0.00146	1.01455	1.05
17.0	4.394	18.3	4.97	152.0	0.114	0.0141	2.06	0.00168	1.01338	1.02
18.0	3.978	19.4	4.78	147.0	0.0942	0.0140	2.08	0.00192	1.01239	0.980
19.0	3.633	20.6	4.64	145.3	0.3852	0.0140	2.10	0.00219	1.01154	0.946
20.0	3.356	21.8	4.54	144.3	0.3776	0.0140	2.11	0.00247	1.01080	0.918
22.0	2.913	24.4	4.39	144.3	0.3657	0.0143	2.17	0.00336	1.00959	0.876
24.0	2.373	27.2	4.29	144.3	0.3568	0.0146	2.23	0.00368	1.00864	0.845
26.0	2.313	29.9	4.22	145.0	0.0501	0.0150	2.29	0.00433	1.00787	0.823
28.0	2.113	32.8	4.16	147.3	0.3447	0.0155	2.36	0.00501	1.30723	0.806
30.0	1.938	35.6	4.11	148.0	0.0403	0.0159	2.44	0.00572	1.00670	0.791
32.0	1.795	38.4	4.06	149.0	0.3367	0.0163	2.51	0.00645	1.00625	0.780
34.0	1.673	41.2	4.03	150.0	0.0337	0.0168	2.59	0.00721	1.00586	0.771
36.0	1.565	44.0	3.99	150.3	0.3312	0.0172	2.65	0.00799	1.00552	0.763
38.0	1.476	46.7	3.97	151.3	0.3291	0.0176	2.73	0.00879	1.30522	0.757
40.0	1.335	49.4	3.94	151.0	0.0273	0.0181	2.80	0.00961	1.00495	0.752
45.0	1.229	56.2	3.89	152.0	0.0236	0.0191	2.98	0.0118	1.00439	0.742
50.0	1.103	62.8	3.86	153.0	0.0209	0.0202	3.15	0.0143	1.00396	0.735
55.0	0.997	69.4	3.83	153.0	0.3187	0.0212	3.32	0.0164	1.00360	0.730
60.0	0.9123	75.9	3.80	153.0	0.3170	0.0222	3.48	0.0189	1.00331	0.726
70.0	0.7807	88.8	3.77	154.0	0.3144	0.0242	3.80	0.0243	1.00285	0.721
80.0	0.6831	102.0	3.74	154.0	0.0125	0.0261	4.13	0.0302	1.00250	0.717
90.0	0.6076	114.0	3.72	153.0	0.0110	0.0280	4.39	0.0365	1.00223	0.713
100.0	0.5473	127.0	3.71	153.3	0.30993	0.0298	4.67	0.0433	1.00202	0.710
120.0	0.4570	152.8	3.69	153.0	0.00823	0.0333	5.20	0.0582	1.00169	0.704
140.0	0.3925	177.6	3.67	153.0	0.00705	0.0367	5.71	0.0749	1.00146	0.699
160.0	0.3440	202.0	3.66	152.0	0.00617	0.0400	6.19	0.0932	1.00128	0.695
180.0	0.3063	227.0	3.65	152.3	0.00549	0.0431	6.65	0.113	1.00114	0.691
200.0	0.2760	252.0	3.65	152.0	0.00494	0.0462	6.97	0.135	1.00103	0.675
250.0	0.2213	314.0	3.64	152.0	0.00396	0.0537	8.05	0.195	1.00083	0.671
300.0	0.1848	376.3	3.63	151.0	0.03330	0.0607	9.06	0.264	1.00069	0.668
350.0	0.1586	438.0	3.62	151.0	0.00283	0.0673	10.0	0.342	1.00059	0.666
400.0	0.1399	500.0	3.62	151.8	0.00248	0.0736	11.6	0.427	1.00052	0.666
450.0	0.1236	562.0	3.62	151.0	0.00221	0.0796	11.9	0.519	1.00046	0.666
500.0	0.1113	624.0	3.61	151.0	0.00199	0.0853	12.7	0.618	1.00042	0.666
600.0	0.09284	748.0	3.61	151.3	0.00166	0.0965	14.4	0.837	1.00035	0.668
700.0	0.07963	872.8	3.61	151.8	0.03142	0.107	16.0	1.09	1.00030	0.668
800.0	0.06971	1000.8	3.61	150.9	0.00125	0.118	17.6	1.36	1.00026	0.667
900.0	0.06199	1120.0	3.61	150.0	0.00111	0.128	19.1	1.66	1.00323	0.667
1000.0	0.05501	1240.0	3.61	150.8	0.00100	0.138	20.5	1.99	1.00021	0.667
1200.0	0.04653	1490.0	3.60	150.0	0.300831	0.156	23.3	2.71	1.00018	0.667
1400.0	0.03990	1740.0	3.60	150.0	0.000713	0.174	26.0	3.52	1.00015	0.666
1600.0	0.03492	1990.0	3.60	150.3	0.000624	0.191	28.5	4.42	1.00013	0.666
1800.0	0.03105	2240.0	3.60	150.0	0.000555	0.208	31.0	5.40	1.00012	0.666
2000.0	0.02795	2490.0	3.60	150.0	0.000499	0.224	33.4	6.47	1.00011	0.666
2500.0	0.02236	3110.0	3.60	150.3	0.000408	0.263	39.2	9.47	1.00008	0.666
3000.0	0.01864	3730.0	3.60	150.0	0.000333	0.299	44.6	12.9	1.00007	0.666

* TWO-PHASE BOUNDARY

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200 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.03695	238.0	11.1	1.435	5.025	6.3628	0.3684	0.3720	1054.0
5.0	0.09765	228.0	24.2	1.734	5.350	0.4386	0.3787	0.4014	1058.0
6.0	0.09691	210.0	34.0	2.099	5.762	0.5173	0.4365	0.4965	1051.0
7.0	0.1308	188.0	40.5	2.543	6.275	0.5981	0.4739	0.5888	1040.0
8.0	0.1033	166.0	43.6	3.080	6.906	0.6824	0.5158	0.6976	1019.0
9.0	0.1066	144.0	44.1	3.737	7.684	0.7719	0.5655	0.8213	983.3
10.0	0.1105	125.0	42.9	4.480	8.572	0.8638	0.5760	0.9089	955.5
11.0	0.1151	106.0	40.8	5.265	9.529	0.9553	0.5895	1.012	920.2
12.0	0.1238	89.7	38.2	6.127	10.60	1.049	0.6077	1.136	881.3
13.0	0.1277	75.0	35.3	7.077	11.61	1.146	0.6277	1.279	841.5
14.0	0.1363	62.9	32.1	8.123	13.17	1.248	0.6480	1.436	803.7
15.0	0.1470	53.9	24.8	9.263	14.71	1.355	0.6676	1.591	771.2
16.0	0.1599	48.1	25.6	10.48	16.40	1.464	0.6857	1.717	747.0
17.0	0.1747	45.4	22.7	11.74	15.21	1.575	0.7014	1.789	732.7
18.0	0.1910	45.3	20.1	13.01	20.08	1.682	0.7142	1.801	727.7
19.0	0.2079	47.0	17.9	14.24	21.94	1.783	0.7227	1.763	728.6
20.0	0.2248	49.5	16.1	15.40	23.77	1.975	0.7262	1.712	733.9
22.0	0.2574	54.3	13.5	17.49	27.03	2.033	0.7331	1.634	748.8
24.0	0.2899	59.6	11.6	19.44	30.17	2.171	0.7369	1.580	769.5
26.0	0.3223	65.4	10.2	21.29	33.23	2.293	0.7403	1.540	793.5
28.0	0.3545	71.6	9.15	23.12	36.25	2.405	0.7436	1.505	819.3
30.0	0.3864	78.0	8.28	24.91	39.22	2.508	0.7462	1.474	845.1
32.0	0.4179	84.6	7.56	26.67	42.14	2.602	0.7480	1.448	870.7
34.0	0.4469	91.1	6.97	28.39	45.02	2.689	0.7493	1.425	895.8
36.0	0.4795	97.5	6.45	30.09	47.85	2.770	0.7502	1.406	920.2
38.0	0.5398	104.0	6.03	31.76	50.64	2.845	0.7508	1.390	944.1
40.0	0.5330	110.0	5.65	33.42	53.41	2.916	0.7512	1.375	967.3
45.0	0.6136	126.0	4.89	37.49	60.21	3.077	0.7517	1.348	1023.0
50.0	0.6861	141.0	4.32	41.49	66.90	3.218	0.7517	1.328	1075.0
55.0	0.7577	156.0	3.87	45.44	73.50	3.343	0.7516	1.312	1124.0
60.0	0.8284	171.0	3.51	49.35	80.03	3.457	0.7513	1.301	1171.0
70.0	0.9683	200.0	2.97	57.09	92.95	3.656	0.7507	1.285	1259.0
80.0	1.107	228.0	2.57	64.76	105.7	3.827	0.7501	1.274	1341.0
90.0	1.246	257.0	2.27	72.38	118.4	3.977	0.7496	1.267	1417.0
100.0	1.384	284.0	2.03	79.97	131.1	4.110	0.7491	1.262	1489.0
120.0	1.652	339.0	1.68	95.07	156.2	4.339	0.7484	1.255	1623.0
140.0	1.922	394.0	1.44	110.1	181.3	4.532	0.7478	1.251	1747.0
160.0	2.192	448.0	1.26	125.1	206.3	4.699	0.7474	1.248	1861.0
180.0	2.461	502.0	1.11	140.1	231.2	4.846	0.7471	1.246	1969.0
200.0	2.730	556.0	1.00	155.1	256.2	4.977	0.7468	1.245	2072.0
250.0	3.401	690.0	0.800	192.4	318.4	5.255	0.7464	1.243	2300.0
300.0	4.071	824.0	0.667	229.7	380.5	5.482	0.7461	1.242	2522.0
350.0	4.741	958.0	0.571	267.0	442.6	5.673	0.7459	1.242	2719.0
400.0	5.411	1090.0	0.500	304.3	504.7	5.839	0.7457	1.242	2902.0
450.0	6.081	1230.0	0.444	341.6	566.8	5.985	0.7457	1.242	3075.0
500.0	6.751	1360.0	0.400	378.8	628.9	6.116	0.7456	1.241	3238.0
600.0	8.093	1638.0	0.333	453.4	753.2	6.342	0.7454	1.241	3543.0
700.0	9.430	1900.0	0.286	527.9	877.1	6.534	0.7453	1.241	3823.0
800.0	10.77	2160.0	0.250	602.3	1001.0	6.699	0.7453	1.241	4085.0
900.0	12.11	2430.0	0.222	676.8	1125.0	6.846	0.7452	1.241	4330.0
1000.0	13.45	2700.0	0.200	751.3	1249.0	6.976	0.7452	1.241	4563.0
1200.0	16.13	3230.0	0.167	900.3	1498.0	7.203	0.7451	1.241	4995.0
1400.0	18.81	3770.0	0.143	1049.0	1746.0	7.394	0.7451	1.241	5393.0
1600.0	21.49	4310.0	0.125	1198.0	1994.0	7.560	0.7451	1.241	5764.0
1800.0	24.17	4840.0	0.111	1347.0	2242.0	7.706	0.7451	1.241	6112.0
2000.0	26.85	5380.0	0.100	1496.0	2490.0	7.837	0.7450	1.241	6441.0
2500.0	33.55	6720.0	0.0800	1869.0	3111.0	8.113	0.7450	1.241	7199.0
3000.0	40.25	8060.0	0.0666	2241.0	3732.0	8.340	0.7450	1.241	7885.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

200 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V $_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	10.31	82.3	2.91	2450.0	0.00452	0.0100	4.40	0.00262	1.02093	0.507
5.0	10.24	30.8	6.24	2340.0	0.0184	0.0120	4.35	0.00293	1.02091	0.522
6.0	10.11	30.9	7.71	2120.0	0.0161	0.0131	4.11	0.00262	1.02087	0.559
7.0	9.922	27.1	8.61	1870.0	0.0217	0.0141	3.83	0.00242	1.02081	0.574
8.0	9.680	25.6	8.74	1600.0	0.0272	0.0150	3.55	0.00223	1.02071	0.593
9.0	9.383	25.1	8.30	1350.0	0.0327	0.0158	3.30	0.00205	1.02055	0.618
10.0	9.050	24.0	8.23	1130.0	0.0379	0.0164	3.09	0.00199	1.02034	0.618
11.0	8.686	22.9	7.97	925.0	0.0442	0.0168	2.92	0.00191	1.02007	0.634
12.0	8.263	22.1	7.60	743.0	0.0515	0.0170	2.77	0.00180	1.01971	0.668
13.0	7.830	21.3	7.18	588.0	0.0600	0.0170	2.65	0.00178	1.01925	0.717
14.0	7.334	20.7	6.75	462.0	0.0695	0.0169	2.54	0.00160	1.01865	0.777
15.0	6.803	20.3	6.34	366.0	0.0786	0.0167	2.45	0.00154	1.01792	0.842
16.0	6.255	20.2	5.97	301.0	0.0851	0.0164	2.38	0.00153	1.01706	0.898
17.0	5.724	20.5	5.65	260.0	0.0872	0.0161	2.33	0.00157	1.01613	0.933
18.0	5.236	21.2	5.38	237.0	0.0848	0.0159	2.31	0.00168	1.01519	0.942
19.0	4.810	22.2	5.16	226.0	0.0794	0.0157	2.29	0.00185	1.01430	0.920
20.0	4.449	23.4	4.98	220.0	0.0733	0.0156	2.29	0.00205	1.01350	0.907
22.0	3.884	25.6	4.73	211.0	0.0639	0.0156	2.32	0.00246	1.01216	0.874
24.0	3.449	28.0	4.56	206.0	0.0564	0.0158	2.37	0.00290	1.01105	0.851
26.0	3.103	30.6	4.45	203.0	0.0504	0.0161	2.42	0.00357	1.01012	0.834
28.0	2.821	33.2	4.36	202.0	0.0453	0.0164	2.48	0.00387	1.00933	0.819
30.0	2.588	36.0	4.29	202.3	0.0410	0.0168	2.54	0.00440	1.00866	0.805
32.0	2.393	38.7	4.22	202.5	0.0374	0.0171	2.61	0.00495	1.00809	0.793
34.0	2.228	41.5	4.17	203.3	0.0343	0.0175	2.68	0.00552	1.00759	0.784
36.0	2.085	44.3	4.13	203.0	0.0318	0.0179	2.74	0.00611	1.00716	0.784
38.0	1.961	47.0	4.09	204.0	0.0296	0.0183	2.81	0.00672	1.00677	0.775
40.0	1.852	49.8	4.06	204.3	0.0276	0.0187	2.88	0.00735	1.00643	0.762
45.0	1.638	56.6	3.99	205.0	0.0238	0.0197	3.05	0.00898	1.00572	0.750
50.0	1.457	63.3	3.94	206.0	0.0210	0.0207	3.22	0.0107	1.00515	0.742
55.0	1.320	69.9	3.90	206.0	0.0188	0.0217	3.38	0.0125	1.00470	0.736
60.0	1.207	76.5	3.87	207.0	0.0170	0.0227	3.54	0.0144	1.00432	0.731
70.0	1.033	89.5	3.82	207.0	0.0144	0.0246	3.85	0.0185	1.00373	0.724
80.0	0.9037	102.0	3.79	206.0	0.0124	0.0265	4.15	0.0230	1.00328	0.719
90.0	0.8048	115.0	3.76	206.0	0.0110	0.0283	4.44	0.0278	1.00293	0.715
100.0	0.7245	128.0	3.74	206.3	0.00987	0.0301	4.71	0.0329	1.00265	0.711
120.0	0.6054	153.0	3.72	205.0	0.00820	0.0336	5.24	0.0442	1.00223	0.705
140.0	0.5202	178.0	3.70	205.0	0.00792	0.0369	5.74	0.0568	1.00192	0.700
160.0	0.4563	203.0	3.68	204.0	0.00614	0.0402	6.22	0.0706	1.00169	0.695
180.0	0.4064	228.0	3.67	204.0	0.00546	0.0434	6.68	0.0856	1.00151	0.691
200.0	0.3664	253.0	3.66	204.0	0.00492	0.0465	7.00	0.102	1.00136	0.675
250.0	0.2941	315.0	3.65	203.0	0.00394	0.0539	8.07	0.147	1.00110	0.671
300.0	0.2456	377.0	3.64	202.0	0.00329	0.0600	9.08	0.199	1.00092	0.668
350.0	0.2109	439.0	3.63	202.0	0.00283	0.0675	10.1	0.250	1.00079	0.666
400.0	0.1840	501.0	3.63	202.0	0.00248	0.0730	11.0	0.321	1.00069	0.666
450.0	0.1644	564.0	3.62	202.0	0.00228	0.0797	11.9	0.391	1.00062	0.665
500.0	0.1481	626.0	3.62	201.0	0.00198	0.0855	12.7	0.465	1.00056	0.666
600.0	0.1236	750.0	3.62	201.0	0.00166	0.0965	14.4	0.629	1.00046	0.667
700.0	0.1060	874.0	3.61	201.0	0.00142	0.107	16.0	0.816	1.00040	0.667
800.0	0.09285	1000.0	3.61	201.0	0.00124	0.118	17.6	1.02	1.00035	0.667
900.0	0.08258	1120.0	3.61	201.0	0.00111	0.128	19.1	1.25	1.00031	0.667
1000.0	0.07436	1250.0	3.61	201.0	0.00100	0.138	20.5	1.49	1.00028	0.667
1200.0	0.06200	1490.0	3.61	201.0	0.000831	0.156	23.3	2.03	1.00023	0.667
1400.0	0.05317	1740.0	3.60	200.0	0.000712	0.174	26.0	2.64	1.00020	0.666
1600.0	0.04654	1990.0	3.60	200.0	0.000624	0.191	28.6	3.32	1.00018	0.666
1800.0	0.04138	2240.0	3.60	200.0	0.000554	0.208	31.0	4.05	1.00016	0.666
2000.0	0.03725	2490.0	3.60	200.0	0.000499	0.224	33.4	4.85	1.00014	0.666
2500.0	0.02981	3110.0	3.60	200.0	0.000399	0.263	39.2	7.10	1.00011	0.666
3000.0	0.02485	3730.0	3.60	200.3	0.000333	0.299	44.6	9.71	1.00009	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

3uJ PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
4.0	0.09341	281.0	12.7	1.548	6.738	0.3486	0.2974	0.3011	1149.0
5.0	0.09395	278.0	23.6	1.795	7.014	0.4163	0.3522	0.3685	1161.0
6.0	0.09488	263.0	34.7	2.111	7.382	0.4885	0.4092	0.4549	1164.0
7.0	0.09627	244.0	42.5	2.496	7.844	0.5620	0.4483	0.5375	1164.0
8.0	0.09811	223.0	46.8	2.966	8.416	0.6385	0.4938	0.6339	1152.0
9.0	0.1004	202.0	48.2	3.543	9.122	0.7192	0.5466	0.7398	1126.0
10.0	0.1031	184.0	47.9	4.192	9.917	0.8011	0.5592	0.8049	1107.0
11.0	0.1060	165.0	46.7	4.863	10.75	0.8812	0.5738	0.8762	1082.0
12.0	0.1094	148.0	45.0	5.585	11.66	0.9611	0.5921	0.9563	1053.0
13.0	0.1134	132.0	43.0	6.362	12.66	1.041	0.6111	1.043	1022.0
14.0	0.1179	118.0	40.6	7.198	13.75	1.123	0.6296	1.134	991.3
15.0	0.1230	105.0	39.1	8.092	14.93	1.205	0.6469	1.229	961.5
16.0	0.1290	94.2	35.6	9.044	16.21	1.289	0.6628	1.324	934.0
17.0	0.1358	85.5	33.0	10.05	17.59	1.373	0.6772	1.415	909.9
18.0	0.1434	78.9	30.5	11.10	19.07	1.458	0.6901	1.496	890.1
19.0	0.1521	74.3	27.9	12.22	20.67	1.546	0.7019	1.556	873.3
20.0	0.1613	71.7	25.6	13.35	22.31	1.631	0.7108	1.591	862.4
22.0	0.1811	71.2	21.6	15.55	25.61	1.789	0.7226	1.600	854.8
24.0	0.2012	74.0	18.6	17.64	28.82	1.930	0.7297	1.573	859.3
26.0	0.2214	77.7	16.3	19.60	31.90	2.054	0.7346	1.544	869.9
28.0	0.2418	82.0	14.6	21.49	34.93	2.166	0.7392	1.524	885.1
30.0	0.2626	87.2	13.2	23.36	37.95	2.271	0.7433	1.503	903.8
32.0	0.2834	92.7	12.0	25.19	40.94	2.367	0.7464	1.483	923.9
34.0	0.3041	98.5	11.0	26.99	43.89	2.456	0.7487	1.464	944.7
36.0	0.3247	104.0	10.2	28.76	46.80	2.539	0.7504	1.446	965.8
38.0	0.3452	111.0	9.46	30.50	49.67	2.617	0.7516	1.430	987.0
40.0	0.3655	117.0	8.84	32.21	52.52	2.690	0.7525	1.415	1008.0
45.0	0.4156	132.0	7.60	36.42	59.51	2.855	0.7537	1.383	1060.0
50.0	0.4649	147.0	6.58	40.53	66.36	2.999	0.7541	1.359	1109.0
55.0	0.5135	163.0	5.96	44.58	73.10	3.128	0.7541	1.340	1157.0
60.0	0.5615	178.0	5.38	48.57	79.76	3.244	0.7539	1.325	1203.0
70.0	0.6561	207.0	4.52	56.45	92.90	3.446	0.7532	1.303	1289.0
80.0	0.7495	236.0	3.90	64.22	105.9	3.619	0.7525	1.289	1369.0
90.0	0.8418	265.0	3.44	71.92	118.7	3.770	0.7518	1.279	1444.0
100.0	0.9336	293.0	3.07	79.57	131.4	3.905	0.7511	1.271	1515.0
120.0	1.116	348.0	2.54	94.77	156.7	4.136	0.7501	1.261	1647.0
140.0	1.297	403.0	2.16	109.9	181.9	4.329	0.7493	1.255	1769.0
160.0	1.477	457.0	1.89	124.9	207.0	4.497	0.7487	1.252	1882.0
180.0	1.656	512.0	1.67	140.0	232.0	4.644	0.7483	1.249	1989.0
200.0	1.836	566.0	1.50	155.0	256.9	4.776	0.7479	1.247	2098.0
250.0	2.283	700.0	1.20	192.4	319.2	5.054	0.7472	1.245	2324.0
300.0	2.730	834.0	1.00	229.7	381.4	5.280	0.7468	1.243	2536.0
350.0	3.177	968.0	0.857	267.1	443.6	5.472	0.7465	1.242	2732.0
400.0	3.624	1100.0	0.749	304.4	505.7	5.638	0.7463	1.242	2914.0
450.0	4.070	1240.0	0.666	341.7	567.8	5.784	0.7461	1.242	3086.0
500.0	4.517	1378.0	0.599	378.9	629.8	5.915	0.7460	1.241	3249.0
600.0	5.409	1648.0	0.499	453.5	754.0	6.141	0.7458	1.241	3552.0
700.0	6.302	1900.0	0.428	528.0	878.1	6.333	0.7457	1.241	3832.0
800.0	7.195	2170.0	0.375	602.5	1002.0	6.498	0.7456	1.241	4092.0
900.0	8.388	2440.0	0.333	677.0	1126.0	6.644	0.7455	1.241	4337.8
1000.0	8.980	2710.0	0.308	751.5	1250.0	6.775	0.7455	1.241	4569.8
1200.0	10.77	3240.0	0.258	900.5	1499.0	7.001	0.7454	1.241	5001.0
1400.0	12.55	3780.0	0.214	1049.0	1747.0	7.193	0.7453	1.241	5398.0
1600.0	14.34	4310.0	0.187	1198.0	1995.0	7.356	0.7493	1.241	5768.0
1800.0	16.12	4850.0	0.167	1347.0	2243.0	7.505	0.7492	1.241	6118.0
2000.0	17.91	5380.0	0.150	1496.0	2491.0	7.635	0.7492	1.241	6445.0
2500.0	22.38	6720.0	0.128	1869.0	3112.0	7.912	0.7451	1.241	7202.0
3000.0	26.84	8060.0	0.108	2241.0	3732.0	8.139	0.7451	1.241	7887.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

300 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_v$ PSIA-CU FT/BTU	$V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	10.71	71.3	3.99	3010.0	0.00422	0.0105	5.44	0.00326	1.02100	0.561
5.0	10.64	46.3	6.29	2960.0	0.00796	0.0128	5.29	0.00326	1.02099	0.549
6.0	10.54	36.4	8.04	2770.0	0.0125	0.0143	4.93	0.00231	1.02098	0.579
7.0	10.39	32.0	9.13	2530.0	0.0168	0.0151	4.56	0.00270	1.02095	0.585
8.0	10.19	30.8	9.30	2270.0	0.0206	0.0161	4.21	0.00250	1.02090	0.595
9.0	9.95	30.9	8.86	2010.0	0.0239	0.0173	3.90	0.00231	1.02082	0.609
10.0	9.703	30.0	8.83	1780.3	0.0269	0.0178	3.65	0.00228	1.02072	0.593
11.0	9.431	29.3	8.64	1560.0	0.0300	0.0185	3.45	0.00224	1.02058	0.589
12.0	9.137	28.7	8.32	1350.0	0.0333	0.0189	3.28	0.00217	1.02040	0.596
13.0	8.822	28.3	7.97	1170.0	0.0368	0.0193	3.14	0.00209	1.02018	0.612
14.0	8.485	27.9	7.61	1030.0	0.0407	0.0194	3.02	0.00202	1.01990	0.635
15.0	8.128	27.5	7.25	854.0	0.0447	0.0195	2.92	0.00195	1.01956	0.665
16.0	7.753	27.2	6.92	731.7	0.0487	0.0194	2.84	0.00189	1.01916	0.698
17.0	7.366	27.0	6.61	630.0	0.0524	0.0193	2.77	0.00185	1.01869	0.733
18.0	6.972	27.0	6.33	550.0	0.0554	0.0191	2.72	0.00183	1.01816	0.767
19.0	6.577	27.2	6.05	488.0	0.0572	0.0189	2.68	0.00185	1.01758	0.794
20.0	6.193	27.6	5.81	445.3	0.0575	0.0187	2.65	0.00190	1.01697	0.811
22.0	5.523	29.1	5.42	393.0	0.0550	0.0184	2.63	0.00208	1.01575	0.822
24.0	4.969	31.1	5.13	368.0	0.0508	0.0183	2.64	0.00235	1.01464	0.815
26.0	4.517	33.2	4.92	351.0	0.0465	0.0184	2.67	0.00264	1.01366	0.807
28.0	4.135	35.5	4.77	339.0	0.0429	0.0185	2.71	0.00294	1.01277	0.803
30.0	3.807	38.0	4.65	332.0	0.0396	0.0187	2.75	0.00326	1.01197	0.798
32.0	3.528	40.5	4.55	327.0	0.0366	0.0189	2.81	0.00361	1.01126	0.792
34.0	3.288	43.1	4.47	324.0	0.0340	0.0192	2.86	0.00398	1.01062	0.787
36.0	3.080	45.8	4.40	322.0	0.0316	0.0195	2.92	0.00437	1.01006	0.781
38.0	2.897	48.4	4.34	320.0	0.0295	0.0198	2.98	0.00477	1.00955	0.775
40.0	2.736	51.1	4.29	319.0	0.0277	0.0201	3.04	0.00519	1.00909	0.770
45.0	2.436	57.8	4.19	318.0	0.0239	0.0209	3.19	0.00629	1.00813	0.759
50.0	2.151	64.6	4.12	317.0	0.0210	0.0218	3.35	0.00747	1.00736	0.750
55.0	1.947	71.3	4.05	317.0	0.0188	0.0227	3.50	0.00871	1.00673	0.743
60.0	1.781	77.9	4.01	316.0	0.0170	0.0236	3.65	0.0100	1.00620	0.738
70.0	1.524	91.1	3.94	316.0	0.0143	0.0254	3.95	0.0128	1.00537	0.729
80.0	1.334	104.0	3.89	315.0	0.0124	0.0272	4.24	0.0158	1.00475	0.723
90.0	1.188	117.0	3.85	314.0	0.0109	0.0290	4.52	0.0191	1.00425	0.718
100.0	1.071	130.0	3.82	314.0	0.00980	0.0307	4.79	0.0226	1.00386	0.713
120.0	0.8964	155.0	3.77	312.0	0.00813	0.0342	5.31	0.0302	1.00325	0.706
140.0	0.7713	180.0	3.74	311.0	0.00696	0.0375	5.81	0.0387	1.00282	0.700
160.0	0.6772	205.0	3.72	310.0	0.00609	0.0407	6.28	0.0480	1.00248	0.695
180.0	0.6037	230.0	3.71	309.0	0.00542	0.0438	6.74	0.0581	1.00222	0.691
200.0	0.5447	255.0	3.69	308.0	0.00488	0.0469	7.05	0.0690	1.00201	0.675
250.0	0.4379	310.0	3.67	307.0	0.00392	0.0542	8.12	0.0995	1.00162	0.671
300.0	0.3662	380.0	3.66	305.0	0.00327	0.0612	9.12	0.134	1.00136	0.668
350.0	0.3147	442.0	3.65	305.0	0.00281	0.0678	10.1	0.173	1.00117	0.666
400.0	0.2760	504.0	3.64	304.0	0.00246	0.0740	11.0	0.216	1.00103	0.665
450.0	0.2457	566.0	3.63	304.0	0.00219	0.0800	11.9	0.262	1.00092	0.665
500.0	0.2214	628.0	3.63	303.0	0.00198	0.0857	12.8	0.312	1.00083	0.666
600.0	0.1849	752.0	3.62	303.0	0.00165	0.0967	14.4	0.422	1.00069	0.667
700.0	0.1587	876.0	3.62	302.0	0.00142	0.108	16.0	0.546	1.00060	0.667
800.0	0.1390	1000.0	3.61	302.5	0.00124	0.118	17.6	0.683	1.00052	0.667
900.0	0.1236	1120.0	3.61	302.0	0.00110	0.128	19.1	0.834	1.00046	0.667
1000.0	0.1114	1250.0	3.61	301.0	0.000994	0.138	20.5	1.00	1.00042	0.667
1200.0	0.07967	1740.0	3.61	301.0	0.000929	0.156	23.3	1.36	1.00035	0.666
1400.0	0.08974	1990.0	3.61	301.3	0.000711	0.174	26.0	1.76	1.00030	0.666
1600.0	0.08202	2240.0	3.60	301.0	0.000623	0.192	28.6	2.21	1.00026	0.666
1800.0	0.05583	2490.0	3.60	301.0	0.000554	0.208	31.0	2.70	1.00023	0.666
2000.0	0.06469	3110.0	3.60	300.8	0.000499	0.224	33.4	3.24	1.00021	0.666
2500.0					0.000399	0.263	39.2	4.74	1.00017	0.666
3000.0	0.03726	3736.0	3.60	300.0	0.000333	0.299	44.6	6.47	1.00014	0.666

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

400 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.0	0.09055	316.0	17.9	1.687	8.394	0.3370	0.2596	0.2657	1224.0
5.0	0.09134	321.0	24.2	1.897	8.641	0.3999	0.3304	0.3444	1245.0
6.0	0.09181	310.0	35.6	2.174	8.975	0.4661	0.3841	0.4224	1257.0
7.0	0.09294	294.0	44.3	2.516	9.400	0.5341	0.4235	0.5003	1266.0
8.0	0.09441	274.0	49.2	2.938	9.931	0.6052	0.4756	0.5916	1258.0
9.0	0.09621	255.0	51.2	3.465	10.59	0.6864	0.5315	0.6906	1238.0
10.0	0.09824	237.0	51.5	4.057	11.33	0.7566	0.5469	0.7478	1224.0
11.0	0.1005	219.0	50.8	4.664	12.12	0.8306	0.5634	0.8064	1204.0
12.0	0.1029	201.0	49.6	5.313	12.94	0.9037	0.5828	0.8713	1180.0
13.0	0.1057	185.0	48.1	6.007	13.84	0.9764	0.6024	0.9393	1154.0
14.0	0.1088	169.0	46.3	6.746	14.80	1.049	0.6210	1.009	1128.0
15.0	0.1122	155.0	44.3	7.531	15.84	1.122	0.6382	1.080	1102.0
16.0	0.1160	142.0	42.1	8.360	16.96	1.194	0.6537	1.151	1078.0
17.0	0.1203	131.0	39.9	9.233	18.14	1.267	0.6677	1.221	1054.0
18.0	0.1249	121.0	37.7	10.14	19.40	1.340	0.6801	1.289	1033.0
19.0	0.1302	113.0	35.4	11.14	20.78	1.415	0.6923	1.353	1011.0
20.0	0.1359	106.0	33.1	12.16	22.23	1.490	0.7019	1.406	993.7
22.0	0.1484	98.2	28.9	14.25	25.24	1.636	0.7155	1.477	969.3
24.0	0.1620	95.5	25.3	16.32	28.31	1.771	0.7243	1.503	958.3
26.0	0.1760	96.2	22.3	18.32	31.36	1.893	0.7303	1.501	957.0
28.0	0.1914	98.5	19.9	20.25	34.35	2.005	0.7357	1.495	962.9
30.0	0.2053	102.0	18.1	22.13	37.34	2.108	0.7406	1.489	974.0
32.0	0.2203	106.0	16.5	23.99	40.31	2.203	0.7445	1.480	987.9
34.0	0.2354	111.0	15.1	25.82	43.26	2.293	0.7475	1.469	1003.0
36.0	0.2506	116.0	14.0	27.62	46.18	2.376	0.7498	1.456	1020.0
38.0	0.2657	121.0	13.0	29.40	49.08	2.455	0.7516	1.444	1038.0
40.0	0.2809	127.0	12.1	31.15	51.96	2.529	0.7529	1.432	1056.0
45.0	0.3185	141.0	10.4	35.46	59.06	2.695	0.7550	1.404	1102.0
50.0	0.3557	156.0	9.11	39.66	66.00	2.842	0.7559	1.380	1144.0
55.0	0.3925	171.0	8.11	43.78	72.85	2.973	0.7561	1.360	1193.0
60.0	0.4288	186.0	7.31	47.44	79.61	3.090	0.7560	1.344	1236.0
70.0	0.5006	215.0	6.11	55.83	92.91	3.295	0.7554	1.319	1319.0
80.0	0.5712	244.0	5.26	63.70	106.0	3.470	0.7546	1.301	1397.0
90.0	0.6410	273.0	4.62	71.47	119.0	3.623	0.7538	1.289	1471.0
100.0	0.7133	301.0	4.12	79.19	131.8	3.758	0.7531	1.280	1540.0
120.0	0.8475	357.0	3.40	94.48	157.3	3.990	0.7518	1.268	1670.0
140.0	0.9837	412.0	2.89	109.7	182.5	4.185	0.7508	1.260	1791.0
160.0	1.119	467.0	2.52	124.8	207.7	4.353	0.7501	1.255	1903.0
180.0	1.254	521.0	2.23	139.8	232.7	4.501	0.7495	1.252	2008.0
200.0	1.383	575.0	2.01	154.9	257.7	4.632	0.7490	1.249	2109.0
250.0	1.725	710.0	1.60	192.4	320.1	4.911	0.7481	1.246	2340.0
300.0	2.063	844.0	1.33	229.8	382.3	5.138	0.7475	1.244	2551.0
350.0	2.395	978.0	1.14	267.1	444.5	5.329	0.7471	1.243	2745.0
400.0	2.730	1110.0	1.00	304.4	506.5	5.495	0.7468	1.242	2927.0
450.0	3.065	1250.0	0.888	341.7	568.7	5.641	0.7466	1.242	3098.0
500.0	3.399	1380.0	0.799	379.0	630.8	5.772	0.7464	1.242	3260.0
600.0	4.069	1650.0	0.666	453.6	754.9	5.999	0.7462	1.241	3562.0
700.0	4.738	1910.0	0.571	528.1	879.0	6.198	0.7460	1.241	3844.0
800.0	5.407	2180.0	0.499	602.6	1003.0	6.356	0.7459	1.241	4108.0
900.0	6.077	2450.0	0.444	677.1	1127.0	6.502	0.7458	1.241	4344.0
1000.0	6.746	2720.0	0.399	751.6	1251.0	6.632	0.7457	1.241	4575.0
1200.0	8.085	3250.0	0.333	900.7	1500.0	6.859	0.7456	1.241	5006.0
1400.0	9.424	3790.0	0.285	1050.0	1748.0	7.058	0.7455	1.241	5403.0
1600.0	10.76	4320.0	0.250	1199.0	1996.0	7.216	0.7455	1.241	5772.0
1800.0	12.10	4860.0	0.222	1348.0	2244.0	7.362	0.7454	1.241	6119.0
2000.0	13.44	5390.0	0.200	1497.0	2492.0	7.493	0.7454	1.241	6448.0
2500.0	16.79	6730.0	0.160	1869.0	3113.0	7.770	0.7453	1.241	7204.0
3000.0	20.14	8070.0	0.133	2242.0	3733.0	7.996	0.7453	1.241	7809.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

400 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DM/DV)$_p$ BTU/LB	V(DP/DU)$_v$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	11.04	51.9	6.23	3490.0	0.00512	0.0110	6.63	0.00373	1.02102	0.576
5.0	10.90	50.1	6.68	3530.0	0.00687	0.0134	6.29	0.00355	1.02102	0.591
6.0	10.83	40.0	8.52	3340.0	0.0105	0.0147	5.80	0.00319	1.02101	0.600
7.0	10.76	35.7	9.67	3160.0	0.0140	0.0159	5.30	0.00295	1.02101	0.601
8.0	10.59	34.9	9.79	2910.0	0.0169	0.0170	4.86	0.00272	1.02099	0.608
9.0	10.39	35.7	9.27	2650.0	0.0194	0.0181	4.48	0.00252	1.02095	0.616
10.0	10.18	35.0	9.25	2410.0	0.0214	0.0190	4.18	0.00250	1.02090	0.591
11.0	9.95	34.5	9.07	2180.0	0.0234	0.0198	3.94	0.00247	1.02082	0.577
12.0	9.714	34.3	8.77	1950.8	0.0254	0.0204	3.74	0.00242	1.02072	0.574
13.0	9.463	34.1	8.44	1750.0	0.0275	0.0209	3.57	0.00236	1.02060	0.578
14.0	9.192	33.9	8.10	1550.0	0.0298	0.0213	3.44	0.00229	1.02044	0.587
15.0	8.911	33.7	7.78	1380.0	0.0320	0.0215	3.32	0.00223	1.02024	0.601
16.0	8.618	33.5	7.48	1230.0	0.0343	0.0216	3.23	0.00218	1.92001	0.619
17.0	8.315	33.4	7.19	1090.0	0.0366	0.0216	3.15	0.00213	1.01974	0.640
18.0	8.004	33.2	6.93	972.0	0.0388	0.0216	3.08	0.00209	1.01943	0.663
19.0	7.682	33.2	6.65	868.0	0.0407	0.0214	3.02	0.00206	1.01908	0.686
20.0	7.360	33.3	6.41	783.0	0.0423	0.0213	2.98	0.00206	1.01868	0.708
22.0	6.738	33.9	5.99	662.0	0.0436	0.0210	2.92	0.00211	1.01782	0.740
24.0	6.173	35.1	5.65	590.0	0.0428	0.0209	2.90	0.00224	1.01692	0.755
26.0	5.680	36.8	5.37	546.0	0.0408	0.0208	2.90	0.00242	1.01605	0.760
28.0	5.251	38.8	5.16	517.0	0.0386	0.0206	2.93	0.00263	1.01522	0.764
30.0	4.872	40.9	5.00	496.0	0.0364	0.0207	2.96	0.00285	1.01444	0.768
32.0	4.540	43.2	4.87	481.0	0.0342	0.0207	3.00	0.00309	1.01371	0.769
34.0	4.248	45.6	4.76	470.0	0.0322	0.0209	3.04	0.00335	1.01304	0.769
36.0	3.991	48.1	4.67	462.0	0.0303	0.0211	3.09	0.00363	1.01242	0.768
38.0	3.763	50.6	4.59	455.0	0.0285	0.0213	3.14	0.00392	1.01186	0.767
40.0	3.561	53.2	4.52	451.0	0.0269	0.0215	3.19	0.00422	1.01134	0.764
45.0	3.143	59.7	4.39	443.0	0.0235	0.0222	3.33	0.00504	1.01022	0.758
50.0	2.812	66.3	4.29	438.0	0.0208	0.0230	3.46	0.00592	1.00931	0.752
55.0	2.548	73.0	4.21	435.0	0.0186	0.0238	3.62	0.00646	1.00855	0.746
60.0	2.332	79.6	4.14	433.0	0.0169	0.0246	3.77	0.00785	1.00791	0.740
70.0	1.998	92.8	4.05	430.0	0.0142	0.0263	4.05	0.0100	1.00689	0.732
80.0	1.751	106.0	3.98	428.0	0.0123	0.0280	4.33	0.0123	1.00611	0.725
90.0	1.560	119.0	3.93	426.0	0.0108	0.0297	4.61	0.0148	1.00549	0.719
100.0	1.408	132.0	3.89	424.0	0.00971	0.0314	4.87	0.0174	1.00499	0.715
120.0	1.180	157.0	3.83	422.0	0.00806	0.0347	5.38	0.0232	1.00423	0.707
140.0	1.017	183.0	3.79	419.0	0.00690	0.0380	5.87	0.0297	1.00367	0.701
160.0	0.8935	208.0	3.76	417.0	0.00604	0.0412	6.34	0.0367	1.00324	0.696
180.0	0.7973	233.0	3.74	416.0	0.00538	0.0443	6.79	0.0444	1.00291	0.691
200.0	0.7200	258.0	3.72	414.0	0.00485	0.0473	7.11	0.0526	1.00263	0.675
250.0	0.5798	320.0	3.69	412.0	0.00389	0.0546	8.16	0.0796	1.00213	0.671
300.0	0.4854	382.0	3.67	410.0	0.00325	0.0615	9.16	0.102	1.00179	0.667
350.0	0.4175	444.0	3.66	408.0	0.00288	0.0681	10.1	0.131	1.00155	0.665
400.0	0.3663	506.0	3.65	407.0	0.00265	0.0743	11.0	0.163	1.00136	0.664
450.0	0.3263	568.0	3.64	406.0	0.00218	0.0802	11.9	0.190	1.00122	0.664
500.0	0.2942	631.0	3.64	406.0	0.00197	0.0859	12.8	0.235	1.00110	0.665
600.0	0.2458	755.0	3.63	405.0	0.00165	0.0969	14.5	0.310	1.00092	0.666
700.0	0.2111	679.0	3.62	404.0	0.00141	0.108	16.1	0.411	1.00079	0.666
800.0	0.1849	1000.0	3.62	403.0	0.00124	0.118	17.6	0.514	1.00069	0.666
900.0	0.1646	1130.0	3.62	403.0	0.00110	0.128	19.1	0.627	1.00062	0.666
1000.0	0.1482	1250.0	3.61	403.0	0.000992	0.138	20.5	0.749	1.00056	0.666
1200.0	0.1237	1500.0	3.61	402.0	0.000828	0.156	23.3	1.02	1.00046	0.666
1400.0	0.1061	1750.0	3.61	402.0	0.000710	0.174	26.0	1.32	1.00040	0.666
1600.0	0.09291	1990.0	3.61	401.0	0.000622	0.192	28.6	1.66	1.00039	0.666
1800.0	0.08263	2240.0	3.60	401.0	0.000553	0.208	31.0	2.03	1.00031	0.666
2000.0	0.07439	2490.0	3.60	401.0	0.000490	0.224	33.4	2.43	1.00028	0.666
2500.0	0.05956	3110.0	3.60	401.0	0.000399	0.263	39.2	3.56	1.00022	0.666
3000.0	0.04965	3730.0	3.60	401.0	0.000333	0.299	44.6	4.86	1.00019	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

500 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
4.3	0.08810	342.0	27.3	1.837	9.99	8.3238	0.2511	0.2636	1290.0
5.0	0.08863	358.0	26.5	2.024	10.23	0.3851	0.3144	0.3287	1317.0
6.0	0.08931	353.0	37.2	2.269	10.54	0.4473	0.3619	0.3967	1338.0
7.0	0.09028	339.0	46.1	2.575	10.93	0.5110	0.4053	0.4714	1351.0
8.0	0.09152	321.0	51.4	2.961	11.43	0.5781	0.4587	0.5605	1349.0
9.0	0.09301	303.0	53.7	3.450	12.06	0.6493	0.5188	0.6561	1332.0
10.0	0.09467	286.0	54.3	4.002	12.77	0.7216	0.5369	0.7082	1321.0
11.0	0.09646	268.0	54.0	4.567	13.50	0.7916	0.5553	0.7616	1304.0
12.0	0.09843	250.0	53.1	5.168	14.28	0.8605	0.5759	0.8190	1283.0
13.0	0.1016	233.0	51.9	5.809	15.12	0.9286	0.5964	0.8779	1261.0
14.0	0.1029	217.0	50.4	6.489	16.02	0.996	0.6155	0.9373	1238.0
15.0	0.1055	202.0	48.8	7.209	16.98	1.063	0.6330	0.997	1215.0
16.0	0.1083	189.0	47.0	7.967	18.00	1.130	0.6487	1.056	1193.0
17.0	0.1114	176.0	45.1	8.761	19.08	1.196	0.6627	1.114	1172.0
18.0	0.1148	165.0	43.2	9.590	20.21	1.262	0.6751	1.171	1151.0
19.0	0.1184	155.0	41.0	10.51	21.47	1.331	0.6876	1.225	1129.0
20.0	0.1224	145.0	38.9	11.45	22.79	1.399	0.6975	1.276	1110.0
22.0	0.1311	132.0	34.9	13.41	25.55	1.533	0.7120	1.359	1079.0
24.0	0.1408	123.0	31.1	15.40	28.44	1.660	0.7216	1.413	1058.0
26.0	0.1512	120.0	27.8	17.38	31.38	1.778	0.7283	1.438	1047.0
28.0	0.1619	119.8	25.1	19.30	34.30	1.887	0.7339	1.450	1045.0
30.0	0.1731	120.0	22.0	21.17	37.20	1.987	0.7390	1.457	1049.0
32.0	0.1846	123.0	20.9	23.03	40.12	2.081	0.7431	1.458	1057.0
34.0	0.1962	126.0	19.2	24.86	43.03	2.169	0.7465	1.455	1067.0
36.0	0.2080	130.0	17.8	26.68	45.94	2.252	0.7492	1.449	1080.0
38.0	0.2199	134.0	16.5	28.47	48.83	2.331	0.7513	1.442	1093.0
40.0	0.2318	139.0	15.4	30.25	51.70	2.404	0.7530	1.434	1108.0
45.0	0.2615	152.8	13.2	34.60	58.82	2.572	0.7557	1.412	1148.0
50.0	0.2912	166.0	11.6	38.87	65.83	2.720	0.7571	1.392	1189.8
55.0	0.3207	180.0	10.3	43.05	72.74	2.852	0.7577	1.373	1231.0
60.0	0.3499	195.0	9.27	47.17	79.56	2.970	0.7578	1.357	1272.0
70.0	0.4076	224.0	7.73	55.26	93.00	3.177	0.7574	1.331	1351.0
80.0	0.4645	253.0	6.64	63.20	106.2	3.354	0.7566	1.312	1427.0
90.0	0.5207	282.0	5.82	71.04	119.3	3.508	0.7557	1.298	1498.0
100.0	0.5764	311.0	5.19	78.81	132.2	3.644	0.7549	1.288	1566.0
120.0	0.6867	367.0	4.26	94.20	157.8	3.877	0.7535	1.273	1694.0
140.0	0.7968	422.0	3.63	109.5	183.2	4.073	0.7523	1.264	1813.0
160.0	0.9046	477.0	3.16	124.6	208.4	4.241	0.7514	1.258	1923.0
180.0	1.013	531.0	2.80	139.7	233.5	4.389	0.7506	1.254	2028.0
200.0	1.121	585.0	2.51	154.8	258.5	4.521	0.7500	1.251	2127.0
250.0	1.390	720.0	2.00	192.3	321.0	4.800	0.7489	1.247	2356.0
300.0	1.658	854.0	1.67	229.8	343.3	5.027	0.7482	1.245	2565.0
350.0	1.926	988.0	1.43	267.1	445.4	5.219	0.7477	1.243	2758.0
400.0	2.194	1120.0	1.25	304.5	507.6	5.384	0.7474	1.242	2939.0
450.0	2.461	1260.0	1.11	341.8	569.7	5.531	0.7471	1.242	3109.0
500.0	2.729	1390.0	1.00	379.1	631.5	5.662	0.7469	1.242	3270.0
600.0	3.264	1660.8	0.832	453.7	755.9	5.888	0.7465	1.241	3571.0
700.0	3.800	1920.0	0.713	528.2	880.0	6.079	0.7463	1.241	3849.0
800.0	4.335	2190.8	0.624	602.8	1004.0	6.245	0.7462	1.241	4107.0
900.0	4.870	2460.0	0.555	677.3	1128.0	6.391	0.7461	1.241	4351.0
1000.0	5.406	2720.0	0.499	751.8	1252.0	6.522	0.7460	1.241	4582.0
1200.0	6.476	3260.0	0.416	900.8	1500.0	6.748	0.7458	1.241	5012.0
1400.0	7.547	3790.0	0.357	1050.0	1749.0	6.939	0.7457	1.241	5408.0
1600.0	8.618	4330.0	0.312	1199.0	1997.0	7.105	0.7456	1.241	5776.0
1800.0	9.689	4860.0	0.277	1348.0	2245.0	7.251	0.7456	1.241	6123.0
2000.0	10.76	5400.0	0.250	1497.0	2493.0	7.382	0.7455	1.241	6452.0
2500.0	13.44	6740.0	0.200	1869.0	3114.0	7.659	0.7454	1.241	7287.0
3000.0	16.12	8070.0	0.167	2242.0	3734.0	7.885	0.7454	1.241	7891.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

500 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_P$	V(DP/DU)$_V$	-V(DP/DV)$_T$	(DV/DT)/V$_P$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR		
4.0	11.35	37.5	9.59	3880.0	0.00704	0.0114	7.91	0.00388	1.02100	0.660
5.0	11.28	50.2	7.47	4040.0	0.00655	0.0140	7.39	0.00378	1.02100	0.624
6.0	11.20	42.1	9.18	3950.0	0.00942	0.0153	6.72	0.00345	1.02101	0.625
7.0	11.08	38.4	10.3	3750.0	0.0123	0.0166	6.08	0.00318	1.02102	0.621
8.0	10.93	38.3	10.2	3510.0	0.0146	0.0179	5.53	0.00292	1.02102	0.625
9.0	10.75	39.8	9.63	3260.0	0.0165	0.0190	5.07	0.00270	1.02101	0.630
10.0	10.56	39.4	9.58	3020.3	0.0180	0.0201	4.71	0.00268	1.02098	0.598
11.0	10.37	39.1	9.38	2770.3	0.0195	0.0210	4.42	0.00266	1.02094	0.578
12.0	10.16	39.2	9.08	2540.0	0.0209	0.0217	4.18	0.00261	1.02089	0.568
13.0	9.942	39.2	8.76	2320.0	0.0224	0.0223	3.99	0.00256	1.02082	0.565
14.0	9.714	39.2	8.44	2110.0	0.0239	0.0228	3.83	0.00250	1.02072	0.567
15.0	9.476	39.2	8.14	1920.0	0.0254	0.0231	3.69	0.00245	1.02360	0.573
16.0	9.230	39.1	7.85	1740.0	0.0270	0.0234	3.58	0.00240	1.02046	0.582
17.0	8.975	39.1	7.58	1580.0	0.0285	0.0235	3.48	0.00235	1.02029	0.595
18.0	8.714	39.0	7.34	1440.0	0.0300	0.0235	3.40	0.00231	1.02009	0.609
19.0	8.444	39.0	7.07	1300.0	0.0315	0.0235	3.34	0.00227	1.01986	0.626
20.0	8.171	38.9	6.83	1190.0	0.0328	0.0235	3.28	0.00225	1.01960	0.642
22.0	7.625	39.1	6.42	1000.0	0.0347	0.0232	3.20	0.00224	1.01901	0.674
24.0	7.100	39.8	6.07	877.0	0.0355	0.0230	3.15	0.00229	1.01834	0.697
26.0	6.615	41.0	5.77	793.0	0.0351	0.0228	3.13	0.00240	1.01764	0.712
28.0	6.175	42.6	5.53	737.0	0.0340	0.0227	3.14	0.00253	1.01693	0.723
30.0	5.776	44.5	5.34	696.0	0.0328	0.0226	3.15	0.00268	1.01623	0.732
32.0	5.417	46.5	5.18	666.0	0.0313	0.0226	3.18	0.00286	1.01555	0.739
34.0	5.096	48.7	5.05	643.0	0.0299	0.0226	3.21	0.00305	1.01491	0.744
36.0	4.807	51.0	4.93	625.0	0.0284	0.0227	3.25	0.00326	1.01430	0.747
38.0	4.549	53.4	4.84	612.0	0.0270	0.0228	3.33	0.00348	1.01373	0.749
40.0	4.315	55.8	4.75	601.0	0.0257	0.0230	3.34	0.00372	1.01319	0.750
45.0	3.823	62.1	4.58	582.0	0.0228	0.0235	3.47	0.00435	1.01201	0.750
50.0	3.434	68.5	4.46	570.0	0.0203	0.0241	3.60	0.00505	1.01101	0.747
55.0	3.118	75.0	4.36	562.0	0.0183	0.0248	3.74	0.00580	1.01016	0.744
60.0	2.858	81.6	4.28	557.0	0.0166	0.0255	3.87	0.00660	1.00944	0.740
70.0	2.453	94.7	4.16	550.0	0.0141	0.0272	4.15	0.00832	1.00827	0.732
80.0	2.153	108.0	4.07	545.0	0.0122	0.0288	4.42	0.0102	1.00736	0.726
90.0	1.920	121.0	4.01	542.0	0.0137	0.0304	4.69	0.0122	1.00664	0.721
100.0	1.735	134.0	3.96	539.0	0.00963	0.0321	4.95	0.0144	1.00606	0.716
120.0	1.456	159.0	3.89	534.0	0.00799	0.0353	5.45	0.0190	1.00515	0.708
140.0	1.256	185.0	3.84	530.0	0.00684	0.0385	5.94	0.0243	1.00448	0.701
160.0	1.105	210.0	3.80	527.0	0.00599	0.0417	6.40	0.0300	1.00397	0.696
180.0	0.9874	235.0	3.77	525.0	0.00533	0.0447	6.85	0.0361	1.00357	0.691
200.0	0.8923	260.0	3.75	522.0	0.00481	0.0477	7.16	0.0428	1.00324	0.675
250.0	0.7196	323.0	3.72	518.0	0.00386	0.0550	8.21	0.0613	1.00263	0.670
300.0	0.6032	385.0	3.69	515.0	0.00323	0.0618	9.20	0.0824	1.00222	0.667
350.0	0.5193	447.0	3.68	513.0	0.00278	0.0684	10.2	0.106	1.00192	0.665
400.0	0.4559	509.0	3.66	511.0	0.00244	0.0746	11.1	0.132	1.00169	0.664
450.0	0.4063	571.0	3.65	510.0	0.00218	0.0805	11.9	0.159	1.00151	0.664
500.0	0.3664	633.0	3.65	509.0	0.00196	0.0861	12.8	0.189	1.00136	0.664
600.0	0.3063	757.0	3.64	507.0	0.00164	0.0971	14.5	0.255	1.00114	0.666
700.0	0.2632	881.0	3.63	506.0	0.00141	0.108	16.1	0.330	1.00098	0.666
800.0	0.2307	1003.0	3.62	505.0	0.00123	0.118	17.6	0.413	1.00086	0.666
900.0	0.2053	1130.0	3.62	505.0	0.00110	0.128	19.1	0.503	1.00077	0.666
1000.0	0.1850	1250.0	3.62	504.0	0.000990	0.138	20.6	0.601	1.00069	0.666
1200.0	0.1544	1500.0	3.61	503.0	0.000827	0.157	23.3	0.817	1.00058	0.666
1400.0	0.1325	1750.0	3.61	503.0	0.000710	0.174	26.0	1.06	1.00050	0.666
1600.0	0.1166	2000.0	3.61	502.0	0.000621	0.192	28.6	1.33	1.00044	0.666
1800.0	0.1032	2240.0	3.61	502.0	0.000553	0.208	31.0	1.63	1.00039	0.666
2000.0	0.09293	2490.0	3.60	502.0	0.000498	0.224	33.4	1.95	1.00035	0.666
2500.0	0.07441	3110.0	3.60	501.0	0.000399	0.263	39.2	2.85	1.00028	0.666
3000.0	0.06204	3730.0	3.60	501.0	0.000332	0.299	44.6	3.89	1.00023	0.665

* TWO-PHASE BOUNDARY

600 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
4.0	0.08593	361.0	42.0	1.992	11.54	0.3072	0.2719	0.2987	1355.0
5.0	0.08665	391.0	30.6	2.165	11.78	0.3712	0.3050	0.3216	1381.0
6.0	0.08720	391.0	39.5	2.384	12.07	0.4307	3.3432	0.3769	1410.0
7.0	0.08807	381.0	48.1	2.660	12.44	0.4913	0.3877	0.4487	1428.0
8.0	0.08915	365.0	53.4	3.016	12.92	0.5549	0.4447	0.5366	1429.0
9.0	0.09044	348.0	55.8	3.476	13.52	0.6232	0.5080	0.6383	1414.0
10.0	0.09185	331.0	56.6	3.998	14.20	0.6926	0.5286	0.6799	1405.1
11.0	0.09336	314.0	56.5	4.531	14.90	0.7597	0.5487	0.7296	1390.0
12.0	0.09499	296.0	55.9	5.098	15.65	0.8256	0.5705	0.7824	1371.0
13.0	0.09677	279.0	55.0	5.701	16.45	0.8905	0.5917	0.8359	1351.0
14.0	0.09870	263.0	53.8	6.340	17.31	0.9546	0.6113	0.8892	1331.0
15.0	0.1038	248.0	52.4	7.015	18.21	1.018	0.6292	0.9420	1310.0
16.0	0.1038	233.0	50.9	7.724	19.17	1.081	0.6451	0.9939	1290.0
17.0	0.1054	220.0	49.2	8.466	20.18	1.143	0.6594	1.045	1270.0
18.0	0.1388	208.0	47.5	9.239	21.24	1.205	0.6720	1.094	1252.0
19.0	0.1108	196.0	45.6	10.10	22.42	1.269	0.5847	1.143	1231.0
20.0	0.1139	185.0	43.6	10.99	23.64	1.333	0.6945	1.188	1212.0
22.0	0.1205	168.0	39.8	12.85	26.23	1.458	0.7101	1.268	1178.0
24.0	0.1278	155.0	36.1	14.76	28.96	1.578	0.7204	1.331	1153.0
26.0	0.1357	148.0	32.7	16.70	31.78	1.692	0.7275	1.372	1135.0
28.0	0.1441	144.0	29.8	18.58	34.59	1.797	0.7333	1.398	1127.0
30.0	0.1529	142.0	27.3	20.42	37.41	1.894	0.7383	1.417	1125.0
32.0	0.1620	143.0	25.1	22.26	40.26	1.986	0.7426	1.427	1127.0
34.0	0.1713	144.0	23.2	24.08	43.12	2.072	0.7460	1.432	1133.0
36.0	0.1808	147.0	21.5	25.89	45.98	2.154	0.7488	1.432	1141.0
38.0	0.1904	150.0	20.0	27.69	48.84	2.232	0.7512	1.430	1152.0
40.0	0.2001	154.0	18.7	29.47	51.70	2.305	0.7530	1.427	1163.0
45.0	0.2245	165.0	16.1	33.86	58.80	2.472	0.7553	1.413	1196.0
50.0	0.2490	178.0	14.1	38.16	65.82	2.620	0.7580	1.397	1233.0
55.0	0.2735	192.0	12.5	42.38	72.77	2.793	0.7589	1.381	1278.0
60.0	0.2978	206.0	11.2	46.54	79.63	2.872	0.7593	1.366	1309.0
70.0	0.3460	234.0	9.36	54.71	93.16	3.081	0.7591	1.341	1384.0
80.0	0.3937	263.0	8.03	62.73	106.5	3.258	0.7584	1.321	1457.0
90.0	0.4437	292.0	7.03	70.63	119.6	3.413	0.7575	1.306	1526.0
100.0	0.4873	320.0	6.26	78.45	132.6	3.550	0.7566	1.295	1593.0
120.0	0.5796	376.0	5.14	93.92	158.3	3.704	0.7550	1.279	1718.0
140.0	0.6709	432.0	4.36	109.2	183.8	3.901	0.7537	1.268	1835.0
160.0	0.7616	487.0	3.80	124.5	209.1	4.150	0.7527	1.261	1944.0
180.0	0.8519	541.0	3.36	139.6	234.2	4.298	0.7518	1.257	2047.0
200.0	0.9419	595.0	3.02	154.7	259.3	4.430	0.7511	1.253	2145.0
250.0	1.166	730.0	2.40	192.3	321.9	4.709	0.7498	1.248	2372.0
300.0	1.390	864.0	2.00	229.8	384.2	4.936	0.7489	1.245	2580.0
350.0	1.613	1000.0	1.71	267.2	446.4	5.128	0.7483	1.244	2772.0
400.0	1.836	1130.0	1.50	304.5	508.5	5.294	0.7479	1.243	2951.0
450.0	2.059	1260.0	1.33	341.9	570.7	5.440	0.7476	1.242	3120.0
500.0	2.282	1400.0	1.20	379.2	632.7	5.571	0.7473	1.242	3281.0
600.0	2.728	1670.0	1.00	453.8	756.9	5.798	0.7469	1.241	3588.0
700.0	3.174	1930.0	0.855	528.4	881.0	5.989	0.7467	1.241	3857.0
800.0	3.620	2200.0	0.748	602.9	1005.0	6.155	0.7465	1.241	4115.0
900.0	4.066	2470.0	0.665	677.4	1129.0	6.301	0.7463	1.241	4350.0
1000.0	4.512	2730.0	0.599	752.0	1253.0	6.431	0.7462	1.241	4588.0
1200.0	5.404	3270.0	0.499	901.8	1501.0	6.658	0.7460	1.241	5017.0
1400.0	6.296	3800.0	0.428	1050.0	1750.0	6.849	0.7459	1.241	5412.0
1600.0	7.188	4340.0	0.374	1199.0	1998.0	7.015	0.7458	1.241	5781.0
1800.0	8.081	4870.0	0.333	1348.0	2246.0	7.161	0.7458	1.241	6127.0
2000.0	8.973	5410.0	0.300	1497.0	2494.0	7.292	0.7457	1.241	6455.0
2500.0	11.20	6740.0	0.246	1870.0	3114.0	7.568	0.7456	1.241	7210.0
3000.0	13.44	8080.0	0.206	2242.0	3735.0	7.795	0.7455	1.241	7893.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

600 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
4.0	11.64	29.8	13.3	4200.0	0.0100	0.0118	9.42	0.00338	1.02095	0.661
5.0	11.55	47.5	8.67	4510.0	0.00677	0.0146	8.60	0.00393	1.02097	0.683
6.0	11.47	42.8	10.8	4480.0	0.00861	0.0160	7.71	0.00369	1.02098	0.655
7.0	11.35	40.3	10.9	4320.0	0.0111	0.0173	6.90	0.00339	1.02100	0.645
8.0	11.22	41.2	10.7	4100.0	0.0130	0.0186	6.23	0.00389	1.02101	0.647
9.0	11.06	43.4	9.94	3840.0	0.0145	0.0199	5.66	0.00205	1.02102	0.649
10.0	10.89	43.3	9.84	3610.0	0.0157	0.0210	5.25	0.00284	1.02101	0.612
11.0	10.71	43.3	9.62	3360.0	0.0168	0.0220	4.90	0.00281	1.02100	0.585
12.0	10.53	43.6	9.31	3120.0	0.0179	0.0228	4.63	0.00277	1.02098	0.570
13.0	10.33	43.8	8.99	2800.0	0.0191	0.0236	4.48	0.00273	1.02094	0.562
14.0	10.13	44.8	8.68	2668.0	0.0202	0.0241	4.21	0.00268	1.02088	0.559
15.0	9.923	44.2	8.39	2460.0	0.0213	0.0245	4.05	0.00263	1.02081	0.560
16.0	9.707	44.2	8.12	2260.0	0.0225	0.0249	3.92	0.00258	1.02072	0.564
17.0	9.485	44.3	7.87	2090.0	0.0236	0.0251	3.81	0.00253	1.02061	0.571
18.0	9.257	44.3	7.63	1920.0	0.0247	0.0252	3.71	0.00249	1.02048	0.580
19.0	9.022	44.3	7.38	1770.0	0.0258	0.0253	3.63	0.00245	1.02032	0.591
20.0	8.783	44.3	7.15	1630.0	0.0268	0.0253	3.56	0.00242	1.02015	0.603
22.0	8.301	44.4	6.75	1390.0	0.0286	0.0252	3.45	0.00239	1.01973	0.628
24.0	7.825	44.8	6.41	1220.0	0.0297	0.0250	3.39	0.00240	1.01924	0.651
26.0	7.368	45.6	6.11	1090.0	0.0301	0.0248	3.36	0.00245	1.01869	0.670
28.0	6.939	46.8	5.85	1000.0	0.0299	0.0246	3.34	0.00253	1.01812	0.685
30.0	6.548	48.4	5.65	931.0	0.0293	0.0244	3.34	0.00264	1.01752	0.698
32.0	6.173	50.2	5.47	881.0	0.0285	0.0243	3.36	0.00276	1.01692	0.709
34.0	5.837	52.1	5.32	843.0	0.0275	0.0243	3.38	0.00291	1.01634	0.717
36.0	5.531	54.2	5.19	813.0	0.0264	0.0243	3.41	0.00307	1.01577	0.724
38.0	5.252	56.5	5.07	790.0	0.0253	0.0244	3.45	0.00324	1.01522	0.729
40.0	4.996	58.7	4.97	771.0	0.0243	0.0245	3.49	0.00343	1.01470	0.732
45.0	4.454	64.7	4.77	737.0	0.0218	0.0248	3.60	0.00395	1.01351	0.737
50.0	4.016	71.0	4.62	715.0	0.0197	0.0253	3.72	0.00452	1.01248	0.739
55.0	3.656	77.3	4.51	700.0	0.0179	0.0259	3.85	0.00514	1.01159	0.738
60.0	3.358	83.8	4.41	690.0	0.0163	0.0266	3.98	0.00580	1.01081	0.736
70.0	2.890	96.8	4.27	677.0	0.0138	0.0283	4.25	0.00723	1.00953	0.731
80.0	2.543	110.0	4.17	668.0	0.0120	0.0296	4.51	0.00881	1.00853	0.726
90.0	2.269	123.0	4.09	662.0	0.0106	0.0311	4.77	0.0105	1.00772	0.721
100.0	2.052	136.0	4.03	657.0	0.00953	0.0327	5.03	0.0123	1.00705	0.716
120.0	1.725	162.0	3.94	649.0	0.00791	0.0359	5.52	0.0163	1.00603	0.708
140.0	1.491	187.0	3.88	644.0	0.00678	0.0391	6.00	0.0207	1.00526	0.701
160.0	1.313	212.0	3.84	639.0	0.00594	0.0422	6.46	0.0255	1.00468	0.696
180.0	1.174	236.0	3.81	635.0	0.00529	0.0452	6.90	0.0306	1.00421	0.691
200.0	1.062	263.0	3.78	632.0	0.00477	0.0482	7.21	0.0362	1.00382	0.675
250.0	0.8976	325.0	3.74	626.0	0.00384	0.0554	8.25	0.0517	1.00312	0.670
300.0	0.7196	387.0	3.71	622.0	0.00322	0.0622	9.24	0.0694	1.00263	0.666
350.0	0.6208	449.0	3.69	519.0	0.00277	0.0687	10.2	0.0891	1.00228	0.664
400.0	0.5446	511.0	3.68	615.0	0.00243	0.0748	11.1	0.111	1.00201	0.663
450.0	0.4856	573.0	3.66	614.0	0.00217	0.0807	12.0	0.134	1.00180	0.663
500.0	0.4382	635.0	3.66	613.0	0.00195	0.0865	12.8	0.159	1.00162	0.664
600.0	0.3666	759.0	3.64	610.0	0.00163	0.0973	14.5	0.214	1.00136	0.665
700.0	0.3151	883.0	3.64	609.0	0.00148	0.108	16.1	0.276	1.00117	0.665
800.0	0.2763	1010.0	3.63	608.0	0.00123	0.118	17.6	0.345	1.00103	0.666
900.0	0.2468	1130.0	3.62	607.0	0.00110	0.128	19.1	0.420	1.00092	0.666
1000.0	0.2216	1260.0	3.62	606.0	0.000989	0.138	20.6	0.502	1.00083	0.666
1200.0	0.1851	1500.0	3.62	605.0	0.000825	0.157	23.3	0.682	1.00069	0.666
1400.0	0.1586	1750.0	3.61	604.0	0.000709	0.175	26.0	0.886	1.00069	0.666
1600.0	0.1391	2000.0	3.61	603.0	0.000621	0.192	28.6	1.11	1.00052	0.666
1800.0	0.1230	2250.0	3.61	603.0	0.000552	0.208	31.0	1.36	1.00046	0.666
2000.0	0.1114	2500.0	3.61	602.0	0.000497	0.224	33.4	1.62	1.00042	0.666
2500.0	0.08929	3120.0	3.60	602.0	0.000398	0.263	39.2	2.37	1.00034	0.665
3000.0	0.07443	3740.0	3.60	601.0	0.000332	0.299	44.6	3.24	1.00028	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

700 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
5.0	0.08472	419.0	36.7	2.316	13.30	0.3571	0.3031	8.3244	1441.0
6.0	0.08537	426.0	42.7	2.512	13.58	0.4152	0.3282	8.3628	1477.0
7.0	0.08617	419.0	50.4	2.762	13.93	0.4731	0.3728	0.4311	1499.0
8.0	0.08715	406.0	55.4	3.094	14.39	0.5346	0.4327	0.5178	1500.0
9.0	0.08828	390.0	57.8	3.531	14.97	0.6003	0.4989	0.6103	1487.0
10.0	0.08952	374.0	58.7	4.029	15.63	0.6676	0.5215	0.6581	1479.0
11.0	0.09082	357.0	58.7	4.536	16.31	0.7326	0.5431	0.7053	1466.0
12.0	0.09223	340.0	58.3	5.076	17.03	0.7962	0.5659	0.7549	1449.0
13.0	0.09375	323.0	57.5	5.651	17.80	0.8587	0.5877	0.8048	1431.0
14.0	0.09537	306.0	56.5	6.259	18.62	0.9203	0.6078	0.8541	1412.0
15.0	0.09712	291.0	55.4	6.900	19.49	0.9812	0.6260	0.9025	1393.0
16.0	0.09898	276.0	54.1	7.573	20.40	1.041	0.6422	0.9498	1375.0
17.0	0.1010	262.0	52.6	8.277	21.57	1.101	0.6567	0.996	1357.0
18.0	0.1031	249.0	51.1	9.009	22.36	1.159	0.6696	1.041	1339.0
19.0	0.1054	237.0	49.3	9.834	23.49	1.221	0.6824	1.084	1319.0
20.0	0.1078	225.0	47.5	10.69	24.64	1.282	0.6929	1.125	1301.0
22.0	0.1131	205.0	44.0	12.46	27.12	1.400	0.7088	1.200	1268.0
24.8	0.1169	189.0	40.5	14.30	29.71	1.515	0.7197	1.263	1240.0
26.0	0.1252	178.0	37.1	16.19	32.42	1.624	0.7274	1.311	1219.0
28.0	0.1320	171.0	34.1	18.03	35.14	1.725	0.7333	1.347	1206.0
30.0	0.1391	167.0	31.4	19.83	37.86	1.819	0.7384	1.375	1200.0
32.0	0.1465	165.0	29.0	21.64	40.63	1.908	0.7426	1.393	1198.0
34.0	0.1542	165.0	26.9	23.44	43.43	1.993	0.7468	1.405	1199.0
36.0	0.1620	166.0	25.1	25.24	46.25	2.074	0.7489	1.411	1204.0
38.0	0.1700	166.0	23.4	27.03	49.07	2.150	0.7512	1.414	1211.0
40.0	0.1781	171.0	21.9	28.81	51.90	2.223	0.7532	1.414	1219.0
45.0	0.1987	180.0	18.9	33.21	58.96	2.389	0.7567	1.408	1246.0
50.0	0.2194	191.0	16.6	37.53	65.97	2.537	0.7588	1.397	1278.0
55.0	0.2402	204.0	14.7	41.78	72.92	2.669	0.7600	1.384	1312.0
60.0	0.2610	217.0	13.2	45.97	79.81	2.789	0.7605	1.371	1347.0
70.0	0.3023	245.0	11.0	54.20	93.39	2.998	0.7606	1.347	1418.0
80.0	0.3432	273.0	9.43	62.28	106.8	3.177	0.7600	1.328	1487.0
90.0	0.3837	302.0	8.25	70.24	120.0	3.333	0.7592	1.313	1555.0
100.0	0.4238	330.0	7.34	78.11	133.0	3.470	0.7583	1.301	1619.0
120.0	0.5031	386.0	6.02	93.65	158.9	3.706	0.7566	1.283	1742.0
140.0	0.5816	442.0	5.10	109.0	184.4	3.903	0.7551	1.272	1857.0
160.0	0.6595	497.0	4.44	124.3	209.8	4.072	0.7539	1.264	1964.0
180.0	0.7370	551.0	3.93	139.5	235.0	4.221	0.7529	1.259	2066.0
200.0	0.8142	606.0	3.52	154.6	260.1	4.353	0.7521	1.255	2163.0
250.0	1.006	748.0	2.80	192.3	322.7	4.632	0.7506	1.249	2389.0
300.0	1.198	874.0	2.33	229.8	385.1	4.860	0.7497	1.246	2594.0
350.0	1.389	1010.0	2.00	267.2	447.3	5.052	0.7490	1.244	2785.0
400.0	1.581	1140.0	1.75	304.6	509.5	5.218	0.7484	1.243	2963.0
450.0	1.772	1270.0	1.55	342.0	571.6	5.364	0.7481	1.242	3131.0
500.0	1.963	1410.0	1.40	379.3	633.7	5.495	0.7477	1.242	3291.0
600.0	2.345	1670.0	1.16	453.9	757.9	5.721	0.7473	1.241	3589.0
700.0	2.727	1940.0	1.00	528.5	882.0	5.913	0.7470	1.241	3865.0
800.0	3.109	2210.0	0.873	603.1	1006.0	6.078	0.7468	1.241	4122.0
900.0	3.491	2478.0	0.776	677.6	1130.0	6.224	0.7466	1.241	4365.0
1000.0	3.873	2740.0	0.698	752.1	1254.0	6.355	0.7465	1.241	4594.0
1200.0	4.638	3280.0	0.582	901.2	1502.0	6.581	0.7463	1.241	5023.0
1400.0	5.402	3818.0	0.499	1050.0	1750.0	6.773	0.7461	1.241	5417.0
1600.0	6.167	4348.0	0.437	1199.0	1999.0	6.938	0.7460	1.241	5785.0
1800.0	6.932	4880.0	0.388	1348.0	2247.0	7.084	0.7459	1.241	6131.8
2000.0	7.696	5410.0	0.349	1497.0	2495.0	7.215	0.7459	1.241	6458.0
2500.0	9.689	6758.0	0.280	1870.0	3115.0	7.492	0.7457	1.241	7213.0
3000.0	11.92	8098.0	0.233	2242.0	3736.0	7.718	0.7457	1.241	7895.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

700 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
5.0	11.80	43.7	10.3	4940.8	0.00742	0.0151	9.9	0.00395	1.02091	0.768
6.0	11.71	42.4	11.1	4990.0	0.00855	0.0166	8.78	0.00390	1.02093	0.693
7.0	11.60	41.6	11.7	4870.0	0.0104	0.0179	7.78	0.00358	1.02096	0.674
8.0	11.48	43.5	11.2	4660.0	0.0119	0.0193	6.97	0.00325	1.02098	0.672
9.0	11.33	46.6	10.2	4420.0	0.0131	0.0206	6.31	0.00299	1.02100	0.672
10.0	11.17	46.9	10.1	4188.0	0.0140	0.0219	5.80	0.00297	1.02101	0.628
11.0	11.01	47.2	9.82	3930.0	0.0149	0.0229	5.40	0.00295	1.32102	0.597
12.0	10.84	47.7	9.50	3680.0	0.0158	0.0239	5.07	0.00292	1.02101	0.577
13.0	10.67	48.1	9.18	3440.8	0.0167	0.0247	4.81	0.00287	1.02100	0.564
14.0	10.49	48.5	8.87	3210.0	0.0176	0.0253	4.59	0.00283	1.02097	0.557
15.0	10.30	48.8	8.59	2990.0	0.0185	0.0258	4.40	0.00278	1.02093	0.554
16.0	10.10	49.0	8.33	2790.3	0.0194	0.0262	4.25	0.00273	1.02087	0.554
17.0	9.903	49.1	8.09	2590.0	0.0203	0.0265	4.12	0.00269	1.02080	0.557
18.0	9.699	49.2	7.87	2410.0	0.0212	0.0267	4.01	0.00265	1.02072	0.563
19.0	9.488	49.3	7.61	2240.0	0.0220	0.0268	3.92	0.00261	1.02061	0.569
20.0	9.275	49.4	7.39	2090.0	0.0228	0.0269	3.84	0.00258	1.02049	0.578
22.0	8.843	49.5	7.01	1810.0	0.0243	0.0269	3.71	0.00253	1.02019	0.597
24.0	8.410	49.7	6.68	1590.0	0.0254	0.0267	3.63	0.00252	1.01983	0.617
26.0	7.985	50.2	6.39	1420.0	0.0261	0.0266	3.58	0.00254	1.01941	0.636
28.0	7.577	51.2	6.13	1308.0	0.0263	0.0264	3.55	0.00258	1.01895	0.652
30.0	7.189	52.5	5.92	1200.0	0.0262	0.0262	3.53	0.00265	1.01846	0.668
32.0	6.825	54.8	5.73	1130.0	0.0258	0.0260	3.54	0.00274	1.01795	0.681
34.0	6.485	55.8	5.57	1070.0	0.0252	0.0259	3.55	0.00285	1.01744	0.692
36.0	6.171	57.7	5.42	1020.8	0.0245	0.0259	3.57	0.00297	1.01692	0.700
38.0	5.881	59.7	5.30	989.0	0.0237	0.0259	3.60	0.00311	1.01642	0.708
40.0	5.614	61.9	5.18	960.0	0.0228	0.0259	3.63	0.00326	1.01593	0.713
45.0	5.034	67.6	4.96	907.0	0.0208	0.0261	3.73	0.00369	1.01478	0.723
50.0	4.557	73.6	4.79	873.0	0.0199	0.0265	3.84	0.00417	1.01379	0.728
55.0	4.163	79.9	4.65	849.0	0.0173	0.0270	3.96	0.00469	1.01263	0.731
60.0	3.831	86.2	4.54	832.0	0.0159	0.0276	4.09	0.00525	1.01203	0.731
70.0	3.307	99.1	4.38	810.0	0.0136	0.0289	4.34	0.00640	1.01067	0.729
80.0	2.913	112.0	4.26	796.0	0.0118	0.0303	4.60	0.00784	1.00960	0.725
90.0	2.606	125.0	4.17	786.0	0.0105	0.0318	4.85	0.00931	1.00872	0.720
100.0	2.360	138.0	4.10	779.0	0.00942	0.0334	5.10	0.0109	1.00799	0.716
120.0	1.986	164.0	4.00	768.0	0.00783	0.0365	5.59	0.0143	1.00685	0.708
140.0	1.719	189.0	3.93	760.0	0.00672	0.0396	6.06	0.0181	1.00601	0.701
160.0	1.516	215.0	3.88	753.0	0.00589	0.0426	6.52	0.0222	1.00535	0.696
180.0	1.357	240.0	3.84	748.0	0.00525	0.0456	6.96	0.0267	1.00482	0.691
200.0	1.228	265.0	3.81	744.0	0.00474	0.0486	7.28	0.0315	1.00439	0.675
250.0	0.9936	320.0	3.76	735.0	0.00381	0.0557	8.30	0.0449	1.00399	0.670
300.0	0.8346	390.0	3.73	730.0	0.00326	0.0625	9.28	0.0601	1.00304	0.668
350.0	0.7197	452.0	3.70	725.0	0.00275	0.0698	10.2	0.0770	1.00263	0.664
400.0	0.6326	514.0	3.69	722.0	0.00242	0.0751	11.1	0.0955	1.00232	0.663
450.0	0.5644	576.0	3.68	719.0	0.00216	0.0810	12.0	0.115	1.00208	0.662
500.0	0.5095	638.0	3.67	717.0	0.00195	0.0865	12.0	0.137	1.00108	0.663
600.0	0.4265	762.0	3.65	714.0	0.00163	0.0974	14.5	0.184	1.00150	0.665
700.0	0.3667	886.0	3.64	712.0	0.00140	0.108	16.1	0.238	1.00136	0.665
800.0	0.3216	1010.0	3.63	710.0	0.00123	0.118	17.6	0.297	1.00120	0.665
900.0	0.2864	1130.0	3.63	709.0	0.00109	0.128	19.1	0.361	1.00107	0.665
1000.0	0.2582	1260.0	3.62	708.0	0.000907	0.138	20.6	0.431	1.00096	0.665
1200.0	0.2196	1510.0	3.62	706.0	0.000824	0.157	23.4	0.586	1.00081	0.665
1400.0	0.1891	1750.0	3.61	705.0	0.000708	0.175	26.0	0.768	1.00069	0.665
1600.0	0.1622	2000.0	3.61	704.0	0.000620	0.192	28.6	0.953	1.00061	0.665
1800.0	0.1443	2250.0	3.61	704.0	0.000552	0.208	31.1	1.16	1.00054	0.665
2000.0	0.1299	2500.0	3.61	703.0	0.000497	0.225	33.5	1.39	1.00049	0.665
2500.0	0.1041	3120.0	3.60	702.0	0.000398	0.263	39.2	2.04	1.00039	0.665
3000.0	0.08688	3740.0	3.60	702.0	0.000332	0.299	44.8	2.78	1.00033	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

800 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV (BTU / LB -R)	CP (BTU / LB -R)	VELOCITY OF SOUND FT/SEC
5.0	0.08306	443.0	45.1	2.471	14.78	0.3423	0.3094	0.3388	1498.0
6.0	0.08374	450.0	46.8	2.658	15.05	0.4006	0.3172	0.3544	1548.0
7.0	0.08450	456.0	53.1	2.878	15.40	0.4566	0.3605	0.4178	1566.0
8.0	0.08540	445.0	57.6	3.189	15.84	0.5162	0.4227	0.5032	1556.0
9.0	0.08643	430.0	59.8	3.606	16.41	0.5803	0.4912	0.5945	1553.2
10.0	0.08753	415.0	60.6	4.084	17.05	0.6457	0.5156	0.6409	1547.0
11.0	0.08869	398.0	60.6	4.572	17.71	0.7089	0.5384	0.6862	1534.0
12.0	0.08993	381.0	60.3	5.090	18.41	0.7707	0.5619	0.7334	1518.0
13.0	0.09125	364.0	59.7	5.642	19.16	0.8314	0.5843	0.7885	1501.9
14.0	0.09266	348.0	58.9	6.225	19.95	0.8911	0.6048	0.8268	1484.0
15.0	0.09417	332.0	57.9	6.840	20.75	0.9499	0.6232	0.8725	1467.0
16.0	0.09577	317.0	56.8	7.484	21.57	1.008	0.6397	0.9162	1450.0
17.0	0.09747	303.0	55.5	8.158	22.60	1.065	0.6544	0.9592	1433.0
18.0	0.09927	289.0	54.2	8.858	23.56	1.121	0.6675	1.001	1417.0
19.0	0.1012	276.0	52.5	9.653	24.65	1.181	0.6805	1.040	1398.0
20.0	0.1032	264.0	50.9	10.47	25.77	1.239	0.6912	1.076	1381.0
22.0	0.1076	242.0	47.5	12.19	28.13	1.353	0.7077	1.148	1349.0
24.0	0.1124	224.0	44.2	13.97	30.62	1.463	0.7193	1.209	1321.0
26.0	0.1176	210.0	41.0	15.81	33.23	1.569	0.7275	1.260	1298.0
28.0	0.1232	200.0	38.0	17.61	35.86	1.667	0.7337	1.300	1282.0
30.0	0.1291	196.0	35.3	19.37	38.49	1.757	0.7386	1.334	1272.0
32.0	0.1353	189.0	32.8	21.14	41.19	1.844	0.7430	1.358	1266.0
34.0	0.1418	187.0	30.5	22.92	43.92	1.927	0.7464	1.375	1265.0
36.0	0.1484	187.0	28.5	24.70	46.66	2.006	0.7492	1.387	1266.0
38.0	0.1552	188.0	26.7	26.48	49.47	2.081	0.7516	1.394	1270.0
40.0	0.1621	189.0	25.0	28.25	52.26	2.153	0.7535	1.398	1275.0
45.0	0.1797	196.0	21.6	32.64	59.26	2.318	0.7572	1.399	1296.0
50.0	0.1976	206.0	19.0	36.97	66.24	2.465	0.7595	1.393	1323.0
55.0	0.2156	218.0	16.9	41.24	73.18	2.597	0.7608	1.384	1354.0
60.0	0.2337	230.0	15.2	45.45	80.07	2.717	0.7616	1.373	1386.0
70.0	0.2698	256.0	12.7	53.73	93.70	2.927	0.7619	1.352	1452.0
80.0	0.3056	284.0	10.6	61.86	107.1	3.107	0.7615	1.334	1518.0
90.0	0.3411	312.0	9.48	69.86	120.4	3.263	0.7607	1.319	1583.0
100.0	0.3762	340.0	8.42	77.77	133.5	3.401	0.7598	1.306	1646.0
125.0	0.4458	396.0	6.90	93.39	159.4	3.637	0.7581	1.288	1766.0
140.0	0.5146	452.0	5.85	108.0	185.1	3.835	0.7565	1.276	1879.0
160.0	0.5829	507.0	5.08	124.1	210.5	4.005	0.7552	1.267	1985.0
180.0	0.6508	561.0	4.49	139.4	235.8	4.154	0.7541	1.261	2085.0
200.0	0.7184	616.0	4.03	154.5	260.9	4.288	0.7532	1.257	2182.0
250.0	0.8867	750.0	3.21	192.2	323.6	4.566	0.7515	1.251	2465.0
300.0	1.054	884.0	2.67	229.8	386.0	4.793	0.7504	1.246	2689.0
350.0	1.222	1020.0	2.28	267.3	448.3	4.985	0.7496	1.246	2798.0
400.0	1.389	1150.0	2.00	304.7	510.4	5.152	0.7490	1.243	2975.0
450.0	1.556	1280.0	1.77	342.0	572.6	5.298	0.7485	1.242	3142.0
500.0	1.723	1420.0	1.60	379.4	634.7	5.429	0.7482	1.242	3301.0
600.0	2.058	1680.0	1.33	454.0	758.0	5.655	0.7477	1.241	3599.0
700.0	2.392	1950.0	1.14	528.6	882.9	5.846	0.7473	1.241	3873.0
800.0	2.726	2220.0	1.00	603.2	1007.0	6.012	0.7471	1.241	4138.0
900.0	3.060	2480.0	0.886	677.8	1131.0	6.158	0.7469	1.241	4372.0
1000.0	3.395	2750.0	0.798	752.3	1255.0	6.289	0.7467	1.241	4601.0
1200.0	4.063	3200.0	0.665	901.4	1503.0	6.515	0.7465	1.241	5028.0
1400.0	4.732	3620.0	0.570	1050.4	1751.0	6.706	0.7463	1.241	5422.0
1600.0	5.401	4350.0	0.499	1199.0	2000.0	6.872	0.7462	1.241	5789.0
1800.0	6.070	4890.0	0.444	1348.0	2248.0	7.010	0.7461	1.241	6135.0
2000.0	6.739	5420.0	0.399	1498.0	2496.0	7.149	0.7460	1.241	6462.0
2500.0	8.412	6760.0	0.319	1870.0	3116.0	7.426	0.7459	1.241	7215.0
3000.0	10.00	8890.0	0.266	2243.0	3737.0	7.692	0.7458	1.241	7897.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

800 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
5.0	12.04	46.1	12.1	5330.0	0.00846	0.0157	11.5	0.00385	1.02063	0.893
6.0	11.94	41.5	12.4	5470.0	0.00855	0.0171	10.0	0.00405	1.02007	0.742
7.0	11.83	42.4	12.5	5390.0	0.00985	0.0185	8.72	0.00375	1.02098	0.708
8.0	11.71	45.5	11.6	5210.0	0.0111	0.0208	7.74	0.00333	1.02093	0.702
9.0	11.57	49.5	10.5	4980.0	0.0120	0.0214	6.97	0.00311	1.02096	0.698
10.0	11.42	50.2	10.3	4750.0	0.0128	0.0227	6.37	0.00310	1.02099	0.648
11.0	11.28	50.8	10.0	4490.0	0.0135	0.0238	5.90	0.00308	1.02101	0.612
12.0	11.12	51.6	9.65	4240.0	0.0142	0.0248	5.53	0.00305	1.02102	0.537
13.0	10.96	52.2	9.32	3990.0	0.0150	0.0257	5.22	0.00300	1.02102	0.571
14.0	10.79	52.7	9.02	3750.0	0.0157	0.0264	4.97	0.00296	1.02101	0.560
15.0	10.62	53.1	8.75	3520.0	0.0164	0.0270	4.76	0.00291	1.02099	0.553
16.0	10.44	53.4	8.50	3310.0	0.0172	0.0275	4.58	0.00287	1.02096	0.550
17.0	10.26	53.6	8.27	3100.0	0.0179	0.0278	4.43	0.00283	1.02892	0.550
18.0	10.07	53.8	8.05	2910.0	0.0186	0.0281	4.30	0.00278	1.02086	0.592
19.0	9.881	54.1	7.81	2730.0	0.0192	0.0282	4.19	0.00275	1.02079	0.556
20.0	9.687	54.2	7.59	2560.0	0.0199	0.0284	4.10	0.00272	1.02071	0.562
22.0	9.293	54.3	7.23	2250.8	0.0211	0.0284	3.96	0.00266	1.02050	0.575
24.0	8.896	54.5	6.91	1990.0	0.0222	0.0284	3.86	0.00264	1.02023	0.592
26.0	8.503	54.9	6.62	1790.0	0.0229	0.0282	3.79	0.00263	1.01992	0.609
28.0	8.118	55.6	6.37	1620.0	0.0234	0.0283	3.74	0.00265	1.01955	0.626
30.0	7.746	56.7	6.16	1500.0	0.0235	0.0278	3.72	0.00269	1.01915	0.642
32.0	7.390	58.0	5.97	1400.0	0.0234	0.0277	3.71	0.00276	1.01872	0.656
34.0	7.054	59.6	5.80	1320.0	0.0231	0.0275	3.71	0.00284	1.01828	0.668
36.0	6.739	61.3	5.64	1260.0	0.0226	0.0274	3.73	0.00293	1.01782	0.678
38.0	6.445	63.2	5.51	1210.0	0.0221	0.0274	3.75	0.00304	1.01737	0.687
40.0	6.170	65.2	5.39	1170.0	0.0214	0.0273	3.77	0.00317	1.01692	0.695
45.0	5.565	70.6	5.14	1090.0	0.0198	0.0274	3.86	0.00352	1.01584	0.708
50.0	5.061	76.5	4.95	1040.0	0.0182	0.0277	3.96	0.00393	1.01483	0.717
55.0	4.637	82.5	4.79	1010.0	0.0168	0.0281	4.07	0.00438	1.01393	0.722
60.0	4.279	88.8	4.67	984.0	0.0155	0.0246	4.19	0.00487	1.01311	0.724
70.0	3.737	101.0	4.49	951.0	0.0133	0.0293	4.43	0.00594	1.01171	0.725
80.0	3.272	114.0	4.35	930.0	0.0117	0.0311	4.68	0.00713	1.01050	0.722
90.0	2.932	127.0	4.25	916.0	0.0104	0.0326	4.93	0.00842	1.00965	0.719
100.0	2.658	140.0	4.17	905.0	0.00931	0.0340	5.18	0.00980	1.00887	0.715
120.0	2.243	166.0	4.06	889.0	0.00775	0.0371	5.66	0.0128	1.00764	0.708
140.0	1.943	192.0	3.98	870.0	0.00666	0.0401	6.12	0.0162	1.00672	0.701
160.0	1.716	217.0	3.92	870.0	0.00584	0.0431	6.57	0.0198	1.00599	0.695
180.0	1.537	242.0	3.84	863.0	0.00521	0.0461	7.01	0.0238	1.00541	0.691
200.0	1.392	267.0	3.84	857.0	0.00478	0.0493	7.31	0.0280	1.00494	0.675
250.0	1.128	330.0	3.78	846.0	0.00379	0.0541	8.34	0.0398	1.00405	0.669
300.0	0.9464	392.0	3.74	839.0	0.00310	0.0628	9.32	0.0532	1.00343	0.665
350.0	0.8146	454.0	3.72	833.0	0.00274	0.0693	10.3	0.0668	1.00298	0.663
400.0	0.7199	516.0	3.70	829.0	0.00241	0.0754	11.1	0.0842	1.00263	0.662
450.0	0.6426	578.0	3.69	825.3	0.00215	0.0812	12.0	0.102	1.00236	0.662
500.0	0.5802	640.0	3.67	823.0	0.00194	0.0860	12.9	0.120	1.00214	0.663
600.0	0.4860	764.0	3.66	810.0	0.00162	0.0976	14.5	0.162	1.00180	0.664
700.0	0.4181	888.0	3.65	815.3	0.00140	0.108	16.1	0.209	1.00155	0.664
800.0	0.3668	1010.0	3.64	813.0	0.00123	0.119	17.6	0.260	1.00136	0.665
900.0	0.3268	1140.0	3.63	812.0	0.00109	0.129	19.1	0.317	1.00122	0.665
1000.0	0.2946	1260.0	3.63	810.0	0.000985	0.138	20.6	0.378	1.00110	0.665
1200.0	0.2461	1510.0	3.62	808.0	0.000823	0.157	23.4	0.514	1.00092	0.665
1400.0	0.2113	1760.0	3.62	807.0	0.000707	0.175	26.0	0.666	1.00079	0.665
1600.0	0.1852	2000.0	3.61	806.0	0.000619	0.192	28.6	0.835	1.00069	0.665
1800.0	0.1647	2250.0	3.61	805.0	0.000551	0.208	31.1	1.02	1.00062	0.665
2000.0	0.1484	2500.0	3.61	804.0	0.000496	0.225	33.5	1.22	1.00056	0.665
2500.0	0.1189	3120.0	3.60	803.0	0.000398	0.263	39.2	1.78	1.00045	0.665
3000.0	0.09916	3740.0	3.60	802.0	0.000332	0.299	44.6	2.43	1.00137	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

900 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
5.0	0.08155	463.0	56.0	2.627	16.22	0.3268	0.3251	0.3668	1556.0
6.0	0.08227	488.0	51.9	2.793	16.50	0.3861	0.3104	0.3520	1601.0
7.0	0.08302	490.0	56.3	3.003	16.84	0.4411	0.3510	0.4087	1626.0
8.0	0.08386	482.0	59.9	3.296	17.27	0.4993	0.4145	0.4921	1627.0
9.0	0.08481	468.0	61.7	3.697	17.83	0.5620	0.4848	0.5822	1614.0
10.0	0.08580	455.0	62.3	4.159	18.46	0.6260	0.5107	0.6272	1608.0
11.0	0.08585	438.0	62.4	4.630	19.10	0.6878	0.5344	0.6708	1596.0
12.0	0.08795	421.0	62.1	5.130	19.79	0.7482	0.5585	0.7159	1581.0
13.0	0.08913	404.8	61.6	5.663	20.52	0.8074	0.5813	0.7608	1566.0
14.0	0.09038	388.0	60.9	6.226	21.29	0.8655	0.6020	0.8048	1550.0
15.0	0.09170	372.0	60.1	6.819	22.10	0.9227	0.6206	0.8477	1534.0
16.0	0.09311	356.0	59.1	7.440	22.96	0.9789	0.6373	0.8894	1518.0
17.0	0.09459	342.0	58.0	8.089	23.85	1.034	0.6522	0.9299	1502.0
18.0	0.09616	328.0	56.8	8.763	24.79	1.089	0.6656	0.9691	1487.0
19.0	0.09783	315.0	55.3	9.535	25.84	1.147	0.6786	1.006	1476.0
20.0	0.0996	302.0	53.8	10.33	26.93	1.203	0.6896	1.041	1453.0
22.0	0.1033	279.0	50.6	11.99	29.21	1.314	0.7066	1.107	1422.0
24.0	0.1074	259.0	47.5	13.73	31.63	1.420	0.7188	1.165	1395.0
26.0	0.1118	243.0	44.4	15.52	34.15	1.523	0.7275	1.216	1371.0
28.0	0.1165	231.0	41.5	17.29	36.70	1.618	0.7340	1.259	1353.0
30.0	0.1215	222.0	38.8	19.00	39.26	1.706	0.7394	1.295	1341.0
32.0	0.1268	215.0	36.2	20.74	41.88	1.790	0.7436	1.324	1333.0
34.0	0.1323	211.0	33.9	22.49	44.55	1.871	0.7470	1.346	1328.0
36.0	0.1380	209.0	31.8	24.25	47.26	1.949	0.7498	1.362	1327.0
38.0	0.1439	209.0	29.8	25.01	49.99	2.022	0.7521	1.373	1328.0
40.0	0.1499	209.0	28.1	27.77	52.74	2.093	0.7540	1.380	1331.0
45.0	0.1652	214.0	24.3	32.14	59.67	2.256	0.7577	1.388	1347.0
50.0	0.1809	222.0	21.4	36.47	66.61	2.403	0.7601	1.387	1369.0
55.0	0.1968	232.0	19.1	40.75	73.54	2.534	0.7616	1.381	1396.0
60.0	0.2127	244.0	17.2	44.97	80.42	2.654	0.7625	1.373	1425.0
70.0	0.2447	269.0	14.3	53.29	94.06	2.865	0.7632	1.355	1487.0
80.0	0.2764	296.0	12.3	61.46	107.5	3.044	0.7629	1.338	1550.0
90.0	0.3080	323.8	10.7	69.50	120.8	3.201	0.7622	1.323	1612.0
100.0	0.3393	351.0	9.51	77.45	134.0	3.340	0.7613	1.311	1673.0
120.0	0.4012	407.0	7.78	93.14	160.0	3.577	0.7595	1.292	1791.0
140.0	0.4625	462.0	6.59	108.6	185.7	3.775	0.7578	1.279	1901.0
160.0	0.5233	517.0	5.72	124.0	211.2	3.945	0.7564	1.270	2005.0
180.0	0.5837	572.0	5.06	139.2	236.5	4.095	0.7552	1.263	2105.0
200.0	0.6439	626.0	4.53	154.4	261.7	4.227	0.7542	1.259	2200.0
250.0	0.7936	761.0	3.61	192.2	324.5	4.507	0.7524	1.251	2428.0
300.0	0.9427	894.0	3.03	229.8	386.9	4.735	0.7511	1.247	2623.0
350.0	1.091	1038.0	2.57	267.3	449.2	4.927	0.7502	1.245	2811.0
400.0	1.240	1168.0	2.24	304.7	511.4	5.093	0.7495	1.243	2987.0
450.0	1.389	1290.0	1.99	342.1	573.5	5.240	0.7490	1.243	3154.0
500.0	1.537	1438.0	1.79	379.5	635.7	5.370	0.7486	1.242	3312.0
600.0	1.834	1698.0	1.49	454.1	759.8	5.597	0.7481	1.241	3608.0
700.0	2.131	1960.0	1.28	528.8	883.9	5.788	0.7477	1.241	3881.0
800.0	2.428	2238.0	1.12	603.3	1008.0	5.954	0.7474	1.241	4137.0
900.0	2.725	2490.0	1.00	677.9	1132.0	6.100	0.7471	1.241	4378.0
1000.0	3.022	2760.0	0.897	752.5	1256.0	6.231	0.7470	1.241	4607.0
1200.0	3.616	3298.0	0.748	901.5	1504.0	6.457	0.7467	1.241	5033.0
1400.0	4.211	3838.0	0.641	1051.0	1752.0	6.648	0.7465	1.241	5427.0
1600.0	4.805	4388.0	0.561	1200.0	2000.0	6.814	0.7464	1.241	5793.0
1800.0	5.400	4898.0	0.499	1349.0	2249.0	6.968	0.7463	1.241	6138.0
2000.0	5.994	5438.0	0.449	1498.0	2497.0	7.091	0.7462	1.241	6465.0
2500.0	7.481	6768.0	0.359	1870.0	3117.0	7.367	0.7460	1.241	7218.0
3000.0	8.966	8100.0	0.299	2243.0	3737.0	7.594	0.7459	1.241	7899.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

900 PSIA ISOBAR

TEMPERATURE	DENSITY	V(DH/DV)$_P$	V(DP/DU)$_V$	-V(DP/DV)$_T$	(DV/DT)/V	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR		
5.0	12.26	37.2	14.1	5680.0	0.00987	0.0162	13.2	0.00361	1.02074	1.07
6.0	12.15	40.2	13.8	5930.0	0.00876	0.0177	11.2	0.00413	1.02079	0.806
7.0	12.05	42.8	13.3	5900.0	0.00954	0.0191	9.73	0.00388	1.02083	0.749
8.0	11.92	47.2	12.1	5740.0	0.0104	0.0206	8.57	0.00351	1.02087	0.736
9.0	11.79	52.1	10.8	5520.0	0.0112	0.0221	7.66	0.00322	1.02091	0.727
10.0	11.65	53.3	10.5	5300.0	0.0118	0.0234	6.96	0.00321	1.02095	0.671
11.0	11.51	54.3	10.1	5040.0	0.0124	0.0247	6.42	0.00319	1.02097	0.629
12.0	11.37	55.2	9.78	4790.0	0.0130	0.0257	5.99	0.00316	1.02099	0.600
13.0	11.22	56.0	9.45	4540.0	0.0136	0.0267	5.64	0.00312	1.02101	0.579
14.0	11.06	56.7	9.15	4290.0	0.0142	0.0274	5.35	0.00308	1.02102	0.565
15.0	10.90	57.2	8.88	4050.0	0.0148	0.0281	5.11	0.00304	1.02102	0.555
16.0	10.74	57.6	8.64	3830.0	0.0155	0.0286	4.91	0.00299	1.02100	0.550
17.0	10.57	57.9	8.42	3610.0	0.0161	0.0293	4.74	0.00295	1.02098	0.547
18.0	10.40	58.2	8.21	3410.0	0.0167	0.0293	4.63	0.00291	1.02095	0.547
19.0	10.22	58.5	7.97	3220.0	0.0172	0.0295	4.47	0.00287	1.02091	0.548
20.0	10.04	58.7	7.76	3030.0	0.0177	0.0297	4.37	0.00284	1.02085	0.551
22.0	9.679	59.0	7.40	2700.0	0.0188	0.0299	4.20	0.00279	1.02071	0.561
24.0	9.312	59.2	7.10	2410.0	0.0197	0.0298	4.08	0.00275	1.02051	0.574
26.0	8.946	59.5	6.82	2170.0	0.0204	0.0297	4.00	0.00273	1.02027	0.588
28.0	8.583	60.1	6.58	1980.0	0.0210	0.0296	3.94	0.00274	1.01998	0.604
30.0	8.228	61.0	6.37	1820.0	0.0212	0.0294	3.90	0.00276	1.01966	0.619
32.0	7.885	62.1	6.18	1700.0	0.0213	0.0292	3.88	0.00280	1.01931	0.634
34.0	7.557	63.5	6.00	1600.0	0.0212	0.0290	3.87	0.00285	1.01893	0.647
36.0	7.245	65.0	5.84	1520.0	0.0209	0.0289	3.88	0.00293	1.01853	0.658
38.0	6.950	66.8	5.70	1450.0	0.0206	0.0288	3.89	0.00302	1.01813	0.668
40.0	6.673	68.6	5.58	1390.0	0.0201	0.0287	3.91	0.00312	1.01773	0.677
45.0	6.054	73.8	5.31	1290.0	0.0188	0.0287	3.98	0.00341	1.01672	0.694
50.0	5.529	79.4	5.10	1230.0	0.0175	0.0289	4.07	0.00376	1.01577	0.705
55.0	5.083	85.3	4.93	1180.0	0.0162	0.0292	4.18	0.00416	1.01488	0.712
60.0	4.701	91.4	4.80	1140.0	0.0150	0.0296	4.29	0.00458	1.01407	0.717
70.0	4.087	104.0	4.59	1100.0	0.0130	0.0307	4.53	0.00553	1.01265	0.720
80.0	3.617	117.0	4.44	1070.0	0.0115	0.0319	4.77	0.00659	1.01149	0.719
90.0	3.247	130.0	4.33	1050.0	0.0102	0.0333	5.01	0.00775	1.01051	0.717
100.0	2.947	143.0	4.24	1030.0	0.00919	0.0347	5.25	0.00898	1.00969	0.714
120.0	2.492	168.0	4.11	1010.0	0.00767	0.0376	5.72	0.0117	1.00838	0.707
140.0	2.162	194.0	4.02	1000.0	0.00659	0.0406	6.18	0.0147	1.00739	0.701
160.0	1.911	219.0	3.96	988.0	0.00579	0.0436	6.63	0.0180	1.00661	0.695
180.0	1.713	245.0	3.91	979.0	0.00516	0.0466	7.06	0.0215	1.00599	0.698
200.0	1.553	270.0	3.87	972.0	0.00466	0.0495	7.36	0.0253	1.00547	0.674
250.0	1.260	332.0	3.80	958.0	0.00376	0.0565	8.39	0.0358	1.00450	0.669
300.0	1.061	395.0	3.76	949.0	0.00316	0.0632	9.36	0.0478	1.00382	0.665
350.0	0.9162	457.0	3.73	942.0	0.00272	0.0695	10.3	0.0610	1.00332	0.663
400.0	0.8064	519.0	3.71	936.0	0.00240	0.0756	11.2	0.0754	1.00294	0.661
450.0	0.7201	581.0	3.70	932.0	0.00214	0.0814	12.0	0.0910	1.00263	0.661
500.0	0.6505	643.0	3.68	929.0	0.00193	0.0873	12.9	0.108	1.00239	0.662
600.0	0.5452	767.0	3.67	923.0	0.00162	0.0978	14.5	0.145	1.00201	0.663
700.0	0.4692	891.0	3.65	920.0	0.00139	0.108	16.1	0.186	1.00174	0.664
800.0	0.4119	1010.0	3.64	917.0	0.00122	0.119	17.7	0.232	1.00153	0.664
900.0	0.3670	1140.0	3.64	915.0	0.00109	0.129	19.1	0.283	1.00136	0.665
1000.0	0.3339	1260.0	3.63	913.0	0.000903	0.138	20.6	0.337	1.00123	0.665
1200.0	0.2765	1510.0	3.62	910.0	0.000822	0.157	23.4	0.457	1.00103	0.565
1400.0	0.2375	1760.0	3.62	909.0	0.000706	0.175	26.0	0.593	1.00089	0.665
1600.0	0.2081	2010.0	3.61	907.0	0.000619	0.192	28.6	0.743	1.00078	0.665
1800.0	0.1852	2250.0	3.61	906.0	0.000551	0.209	31.1	0.908	1.00069	0.665
2000.0	0.1668	2500.0	3.61	905.0	0.000496	0.225	33.5	1.09	1.00063	0.665
2500.0	0.1337	3120.0	3.60	904.0	0.000398	0.263	39.2	1.59	1.00050	0.665
3000.0	0.1115	3740.0	3.60	903.0	0.000332	0.300	44.6	2.16	1.00042	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

1000 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
6.0	0.08094	515.0	58.2	2.940	17.93	0.3715	0.3082	0.3560	16f J.0
7.0	0.08168	522.0	59.9	3.136	18.26	0.4263	0.3441	0.4037	1764.0
8.0	0.08248	516.0	62.4	3.413	18.69	0.4836	0.4083	0.4842	684.0
9.0	0.08336	505.0	63.6	3.800	19.24	0.5452	0.4798	0.5726	1671.0
10.0	0.08428	492.0	64.0	4.249	19.85	0.6081	0.5067	0.6162	1665.0
11.0	0.08523	476.0	64.0	4.705	20.49	0.6688	0.5311	0.6582	1653.0
12.0	0.08623	460.0	63.7	5.191	21.16	0.7280	0.5556	0.701f	1639.0
13.0	0.08729	443.0	63.3	5.707	21.87	0.7853	0.5786	0.74f5	1625.0
14.0	0.08841	426.0	62.7	6.253	22.62	0.8428	0.5994	0.865	1610.0
15.0	0.08960	410.0	62.1	6.828	23.42	0.8986	0.6102	0.8275	1595.0
16.0	0.09085	395.0	61.2	7.430	24.25	0.9535	0.6350	0.8673	1580.0
17.0	0.09216	380.0	60.3	8.058	25.12	1.007	0.6501	0.9059	1566.0
18.0	0.09355	366.0	59.2	8.711	26.03	1.061	0.6636	0.9432	1552.0
19.0	0.09503	352.0	57.8	9.463	26.06	1.061	0.6768	0.9780	1535.0
20.0	0.09658	339.0	56.3	10.24	27.06	1.117	0.6879	1.011	1520.0
22.0	0.0:38	315.0	53.4	11.86	30.35	1.260	0.7054	1.073	1490.0
24.0	0.1034	294.0	50.4	13.56	32.69	1.384	0.7182	1.129	1463.0
26.0	0.1072	276.0	47.5	15.31	35.15	1.483	0.727.	1.179	1439.0
28.0	0.1112	262.0	44.6	17.04	37.63	1.576	0.7363	1.222	1421.0
30.0	0.1156	251.0	42.0	18.71	40.12	1.661	0.7399	1.261	1407.0
32.0	0.1202	243.0	39.4	20.42	42.67	1.744	0.7443	1.292	1397.0
34.0	0.1249	237.0	37.0	22.14	45.28	1.823	0.7477	1.317	1390.0
36.0	0.1299	233.0	34.8	23.88	47.93	1.899	0.7505	1.336	1386.0
38.0	0.1350	231.0	32.0	25.62	50.62	1.971	0.7528	1.351	1385.0
40.0	0.1403	230.0	30.9	27.36	53.34	2.041	0.7547	1.362	1386.0
45.0	0.1538	232.0	27.0	31.71	60.19	2.202	0.7563	1.376	1397.0
50.0	0.1677	236.0	23.8	36.03	67.08	2.347	0.7607	1.380	1415.0
55.0	0.1818	247.0	21.3	40.31	73.97	2.473	0.7624	1.377	1439.0
60.0	0.1961	256.0	19.2	44.54	80.85	2.598	0.7634	1.372	1465.0
70.0	0.2247	282.0	16.0	52.88	94.49	2.889	0.7643	1.357	1522.0
80.0	0.2532	308.0	13.7	61.08	108.0	.989	0.7642	1.341	1582.0
90.0	0.2816	335.0	11.9	69.17	121.3	3.146	0.7636	1.327	1642.0
100.0	0.3098	362.0	10.6	77.15	134.5	3.285	0.7628	1.315	1701.0
120.0	0.3657	418.0	8.67	92.90	160.6	3.523	0.7609	1.295	1815.0
140.0	0.4209	473.0	7.34	108.4	186.4	3.722	0.7592	1.282	1923.0
160.0	0.4756	528.0	6.37	123.0	211.9	3.892	0.7577	1.272	2026.0
180.0	0.5301	582.0	5.62	139.1	237.3	4.042	0.7564	1.265	2124.0
200.0	0.5843	636.0	5.04	154.3	262.5	4.175	0.7553	1.260	2218.0
250.0	0.7190	771.0	4.01	192.2	325.3	4.455	0.7532	1.252	2436.0
300.0	0.8532	905.0	3.33	229.0	387.8	4.683	0.7518	1.248	2637.0
350.0	0.9872	1040.0	2.85	267.3	450.1	4.875	0.7508	1.245	2826.0
400.0	1.121	1170.0	2.49	304.0	512.4	5.041	0.7501	1.244	2999.0
450.0	1.255	1300.0	2.21	342.2	574.5	5.107	0.7495	1.243	3165.0
500.0	1.300	1440.0	1.99	379.6	636.6	5.310	0.7491	1.242	3322.0
600.0	1.655	1700.0	1.66	454.3	760.0	5.545	0.7484	1.241	3617.0
700.0	1.923	1970.0	1.42	528.9	884.7	5.736	0.7480	1.241	3890.0
800.0	2.190	2230.0	1.25	603.5	1009.0	5.982	0.7477	1.241	4145.0
900.0	2.457	2500.0	1.11	678.1	1133.0	6.040	0.7474	1.241	4385.0
1000.0	2.724	2770.0	1.00	752.6	1257.0	6.179	0.7472	1.241	4613.0
1200.0	3.259	3300.0	0.831	901.7	1506.0	6.405	0.7469	1.240	5039.0
1400.0	3.793	3830.0	0.712	1051.0	1773.0	6.596	0.7467	1.241	5431.0
1600.0	4.328	4370.0	0.623	1200.0	2011.0	6.762	0.7466	1.241	5798.0
1800.0	4.863	4900.0	0.554	1349.0	2149.0	6.908	0.7465	1.241	6142.0
2000.0	5.390	5430.0	0.499	1498.0	7498.0	7.038	0.7464	1.241	6468.0
2500.0	6.736	6770.0	0.399	1871.0	.118.0	7.315	0.7462	1.241	7228.0
3000.0	8.074	8100.0	0.333	2243.0	3738.0	7.541	0.7461	1.241	7901.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

1000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_p$ BTU/LB	$V(DP/DU)_v$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_p$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
6.0	12.36	38.9	15.3	6360.0	0.00914	0.0182	12.7	0.00415	1.02070	0.898
7.0	12.24	43.8	14.2	6390.0	0.00938	0.0197	10.8	0.00399	1.02075	0.798
8.0	12.12	48.6	12.6	6260.0	0.0100	0.0212	9.44	0.00362	1.02080	0.775
9.0	12.00	54.5	11.1	6068.0	0.0105	0.0228	8.39	0.00331	1.02085	0.760
10.0	11.87	56.2	10.6	5840.0	0.0110	0.0242	7.58	0.00331	1.02089	0.696
11.0	11.73	57.5	10.3	5590.0	0.0114	0.0255	6.97	0.00330	1.02093	0.648
12.0	11.60	58.7	9.89	5330.0	0.0120	0.0266	6.47	0.00327	1.02096	0.614
13.0	11.46	59.7	9.55	5070.0	0.0125	0.0276	6.07	0.00324	1.02098	0.598
14.0	11.31	60.4	9.25	4820.0	0.0130	0.0284	5.75	0.00320	1.02100	0.572
15.0	11.16	61.0	8.99	4580.0	0.0136	0.0291	5.47	0.00315	1.02101	0.560
16.0	11.01	61.5	8.76	4340.3	0.0141	0.0297	5.25	0.00311	1.02102	0.552
17.0	10.85	61.9	8.55	4120.0	0.0146	0.0301	5.05	0.00307	1.02101	0.547
18.0	10.69	62.3	8.35	3910.0	0.0151	0.0305	4.89	0.00303	1.02100	0.544
19.0	10.52	62.7	8.11	3710.0	0.0156	0.0308	4.75	0.00299	1.02098	0.543
20.0	10.36	63.0	7.91	3510.0	0.0160	0.0310	4.63	0.00296	1.02094	0.544
22.0	10.02	63.4	7.56	3160.0	0.0169	0.0312	4.44	0.00290	1.02084	0.550
24.0	9.675	63.7	7.26	2840.0	0.1177	0.0312	4.33	0.00286	1.2070	0.560
26.0	9.332	64.8	6.99	2580.0	0.0184	0.0312	4.20	0.00283	1.02052	0.572
28.0	8.990	64.5	6.76	2350.0	0.0190	0.0310	4.13	0.00282	1.02030	0.586
30.0	8.652	65.2	6.55	2170.0	0.0193	0.0308	4.08	0.00283	1.02004	0.601
32.0	8.322	66.2	6.36	2020.0	0.0195	0.0306	4.05	0.00285	1.01975	0.615
34.0	8.003	67.4	6.19	1900.0	0.0195	0.0365	4.03	0.00289	1.01943	0.628
36.0	7.698	68.8	6.03	1790.0	0.0194	0.0303	4.03	0.00294	1.01910	0.640
38.0	7.406	70.4	5.88	1710.0	0.0192	0.0302	4.04	0.00301	1.01874	0.651
40.0	7.129	72.1	5.75	1640.0	0.0189	0.0301	4.05	0.00310	1.01838	0.660
45.0	6.503	77.0	5.47	1510.0	0.0179	0.0299	4.11	0.00335	1.01746	0.680
50.0	5.964	82.4	5.25	1420.0	0.0167	0.0300	4.19	0.00365	1.01656	0.693
55.0	5.500	88.2	5.07	1360.0	0.0156	0.0302	4.28	0.00399	1.01572	0.702
60.0	5.108	94.1	4.92	1320.0	0.0146	0.0306	4.39	0.00437	1.01492	0.709
70.0	4.451	107.0	4.70	1250.0	0.0127	0.0315	4.62	0.00522	1.01351	0.715
80.0	3.949	119.0	4.53	1220.0	0.0112	0.0327	4.85	0.00617	1.01232	0.716
90.0	3.551	132.0	4.41	1190.0	0.0100	0.0340	5.09	0.00721	1.01131	0.715
100.0	3.228	145.0	4.31	1170.0	0.00907	0.0354	5.32	0.00833	1.01046	0.712
120.0	2.735	171.0	4.17	1140.0	0.00759	0.0382	5.79	0.0108	1.00909	0.706
140.0	2.376	196.0	4.07	1120.0	0.00653	0.0412	6.24	0.0135	1.00804	0.708
160.0	2.102	222.0	4.00	1110.0	0.00574	0.0441	6.69	0.0165	1.00721	0.695
180.0	1.887	247.0	3.94	1130.0	0.00512	0.0470	7.12	0.0197	1.00654	0.690
200.0	1.712	272.0	3.90	1090.0	0.00463	0.0499	7.41	0.0231	1.00598	0.674
250.0	1.391	335.0	3.83	1070.0	0.00374	0.0568	8.43	0.0326	1.00493	0.668
300.0	1.172	397.0	3.78	1060.0	0.00314	0.0635	9.39	0.0434	1.00420	0.664
350.0	1.013	459.0	3.75	1050.0	0.00271	0.0699	10.3	0.0554	1.00366	0.662
400.0	0.8921	521.0	3.72	1040.0	0.00239	0.0759	11.2	0.0684	1.00324	0.661
450.0	0.7971	583.0	3.71	1040.0	0.00213	0.0817	12.1	0.0825	1.00291	0.661
500.0	0.7204	645.0	3.69	1040.0	0.00192	0.0872	12.9	0.0975	1.00264	0.661
600.0	0.6041	769.0	3.67	1030.0	0.00161	0.0988	14.5	0.131	1.00222	0.663
700.0	0.5202	893.0	3.66	1020.0	0.00139	0.109	16.1	0.160	1.00192	0.664
800.0	0.4567	1020.0	3.65	1020.0	0.00122	0.119	17.7	0.210	1.00169	0.664
900.0	0.4078	1140.0	3.64	1020.0	0.00109	0.129	19.2	0.255	1.00151	0.664
1000.0	0.3671	1260.0	3.63	1020.0	0.000981	0.138	20.6	0.304	1.00136	0.665
1200.0	0.3069	1510.0	3.62	1010.0	0.000820	0.157	23.4	0.413	1.00114	0.665
1400.0	0.2636	1760.0	3.62	1010.0	0.000705	0.175	26.0	0.535	1.00098	0.665
1600.0	0.2310	2010.0	3.61	1010.0	0.000618	0.192	28.6	0.670	1.00086	0.665
1800.0	0.2056	2260.0	3.61	1010.0	0.000550	0.209	31.1	0.818	1.00077	0.665
2000.0	0.1852	2500.0	3.61	1010.0	0.000496	0.225	33.5	0.978	1.00069	0.665
2500.0	0.1485	3120.0	3.60	1000.0	0.000397	0.263	39.2	1.43	1.00056	0.665
3000.0	0.1239	3740.0	3.60	1000.0	0.000331	0.300	44.6	1.95	1.00047	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

1200 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
6.0	0.07857	563.0	74.2	3.238	20.70	0.3408	0.3181	0.3852	1777.0
7.0	0.07933	581.0	68.8	3.411	21.04	0.3976	0.3388	0.4053	1795.0
8.0	0.08008	582.0	68.1	3.667	21.46	0.4544	0.4012	0.4769	1790.0
9.0	0.08087	574.0	67.7	4.033	22.00	0.5149	0.4736	0.5607	1774.0
10.0	0.08166	563.0	67.3	4.461	22.61	0.5763	0.5014	0.6008	1768.0
11.0	0.08248	549.0	66.9	4.895	23.22	0.6354	0.5263	0.6394	1757.0
12.0	0.08333	533.0	66.6	5.358	23.87	0.6928	0.5510	0.6794	1744.0
13.0	0.08422	516.0	66.2	5.849	24.56	0.7485	0.5740	0.7190	1731.0
14.0	0.08515	500.0	65.8	6.367	25.29	0.8036	0.5948	0.7578	1717.0
15.0	0.08613	484.0	65.4	6.912	26.05	0.8573	0.6136	0.7955	1704.0
16.0	0.08716	468.0	64.8	7.482	26.85	0.9100	0.6305	0.8323	1692.0
17.0	0.08824	453.0	64.1	8.077	27.68	0.9617	0.6456	0.8681	1679.0
18.0	0.08937	438.0	63.3	8.695	28.55	1.013	0.6597	0.9028	1667.0
19.0	0.09057	424.0	62.0	9.417	29.54	1.067	0.6729	0.9346	1652.0
20.0	0.09181	411.0	60.8	10.16	30.56	1.120	0.6843	0.9648	1638.0
22.0	0.09442	386.0	58.2	11.72	32.70	1.224	0.7028	1.022	1612.0
24.0	0.09721	363.0	55.5	13.35	34.95	1.323	0.7167	1.073	1586.0
26.0	0.1002	342.0	52.8	15.04	37.30	1.418	0.7268	1.120	1563.0
28.0	0.1034	325.0	50.2	16.70	39.67	1.507	0.7345	1.163	1545.0
30.0	0.1068	311.0	47.6	18.31	42.03	1.588	0.7407	1.202	1530.0
32.0	0.1103	300.0	45.1	19.96	44.47	1.667	0.7454	1.236	1517.0
34.0	0.1141	291.0	42.8	21.62	46.97	1.743	0.7491	1.265	1507.0
36.0	0.1180	284.0	40.5	23.31	49.53	1.816	0.7519	1.288	1500.0
38.0	0.1220	278.0	38.4	25.01	52.13	1.886	0.7542	1.308	1496.0
40.0	0.1262	275.0	36.4	26.72	54.76	1.953	0.7561	1.323	1493.0
45.0	0.1370	272.0	32.0	31.00	61.45	2.111	0.7596	1.349	1495.0
50.0	0.1482	274.0	28.4	35.29	68.23	2.254	0.7621	1.362	1506.0
55.0	0.1597	280.0	25.5	39.55	75.05	2.384	0.7638	1.366	1523.0
60.0	0.1714	288.0	23.0	43.79	81.88	2.503	0.7650	1.365	1544.0
70.0	0.1950	309.0	19.2	52.16	95.49	2.712	0.7653	1.357	1593.0
80.0	0.2187	333.0	16.5	60.41	109.0	2.893	0.7665	1.344	1646.0
90.0	0.2423	359.0	14.4	68.54	122.4	3.050	0.7661	1.332	1701.0
100.0	0.2658	386.0	12.8	76.58	135.6	3.190	0.7654	1.321	1756.0
120.0	0.3124	440.0	10.4	92.44	161.8	3.429	0.7636	1.302	1864.0
140.0	0.3585	495.0	8.83	108.1	187.7	3.629	0.7618	1.287	1968.0
160.0	0.4042	549.0	7.66	123.6	213.4	3.800	0.7601	1.277	2067.0
180.0	0.4496	603.0	6.76	138.9	238.8	3.950	0.7586	1.269	2162.0
200.0	0.4949	657.0	6.06	154.2	264.2	4.083	0.7574	1.263	2254.0
250.0	0.6072	792.0	4.81	192.1	327.1	4.364	0.7558	1.254	2468.0
300.0	0.7191	925.0	4.00	229.8	389.6	4.592	0.7533	1.249	2665.0
350.0	0.8307	1060.0	3.42	267.4	452.3	4.785	0.7521	1.246	2849.0
400.0	0.9421	1190.0	2.99	304.9	514.2	4.951	0.7512	1.244	3023.0
450.0	1.053	1320.0	2.65	342.4	576.4	5.097	0.7505	1.243	3186.0
500.0	1.165	1460.0	2.39	379.8	638.6	5.228	0.7500	1.242	3342.0
600.0	1.387	1720.0	1.99	454.5	762.7	5.455	0.7492	1.241	3635.0
700.0	1.610	1990.0	1.71	529.1	886.8	5.646	0.7487	1.241	3906.0
800.0	1.832	2250.0	1.49	603.8	1011.0	5.812	0.7483	1.241	4159.0
900.0	2.055	2520.0	1.33	678.4	1135.0	5.958	0.7480	1.240	4399.0
1000.0	2.277	2780.0	1.20	753.0	1259.0	6.088	0.7477	1.240	4626.0
1200.0	2.722	3320.0	1.00	902.1	1507.0	6.314	0.7474	1.240	5049.0
1400.0	3.168	3850.0	0.854	1051.0	1755.0	6.506	0.7471	1.240	5441.0
1600.0	3.613	4380.0	0.748	1200.0	2003.0	6.671	0.7470	1.240	5806.0
1800.0	4.059	4920.0	0.665	1349.0	2251.0	6.817	0.7468	1.240	6150.0
2000.0	4.504	5450.0	0.598	1498.0	2499.0	6.948	0.7467	1.240	6475.0
2500.0	5.619	6780.0	0.479	1871.0	3120.0	7.225	0.7465	1.241	7226.0
3000.0	6.733	8120.0	0.399	2244.0	3740.0	7.451	0.7464	1.241	7986.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

1200 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
6.0	12.73	37.2	18.3	7160.0	0.0104	0.0193	15.9	0.00394	1.02050	1.15
7.0	12.61	43.1	16.1	7330.0	0.00939	0.0208	13.3	0.00407	1.02057	0.931
8.0	12.49	50.9	13.6	7260.0	0.00937	0.0224	11.4	0.00377	1.02064	0.871
9.0	12.37	58.7	11.6	7100.0	0.00955	0.0240	10.0	0.00347	1.02070	0.837
10.0	12.25	61.5	11.0	6900.0	0.00976	0.0256	8.91	0.00348	1.02075	0.754
11.0	12.12	63.5	10.5	6650.0	0.0101	0.0270	8.11	0.00348	1.02080	0.692
12.0	12.00	65.2	10.1	6390.0	0.0104	0.0282	7.48	0.00346	1.02085	0.648
13.0	11.87	66.6	9.72	6130.0	0.0108	0.0293	6.98	0.00344	1.02089	0.616
14.0	11.74	67.6	9.42	5870.0	0.0112	0.0303	6.56	0.00340	1.02092	0.592
15.0	11.61	68.4	9.17	5620.0	0.0116	0.0311	6.22	0.00336	1.02095	0.574
16.0	11.47	69.0	8.95	5370.0	0.0121	0.0317	5.93	0.00332	1.02098	0.561
17.0	11.33	69.5	8.76	5130.0	0.0125	0.0323	5.69	0.00328	1.02100	0.551
18.0	11.19	70.0	8.57	4900.0	0.0129	0.0327	5.49	0.00324	1.02101	0.545
19.0	11.04	70.6	8.35	4690.0	0.0132	0.0330	5.31	0.00320	1.02102	0.541
20.0	10.85	71.1	8.15	4480.0	0.0136	0.0333	5.16	0.00317	1.02101	0.538
22.0	10.59	71.7	7.82	4090.0	0.0142	0.0336	4.92	0.00311	1.02099	0.538
24.0	10.29	72.2	7.53	3730.3	0.0149	0.0338	4.74	0.00306	1.02093	0.542
26.0	9.98	72.5	7.28	3420.0	0.0154	0.0338	4.61	0.00302	1.02083	0.550
28.0	9.674	73.0	7.06	3150.0	0.0159	0.0337	4.51	0.00299	1.02370	0.560
30.0	9.367	73.6	6.86	2910.0	0.0163	0.0335	4.43	0.00298	1.02054	0.573
32.0	9.063	74.4	6.68	2720.0	0.0166	0.0333	4.38	0.00298	1.02035	0.585
34.0	8.765	75.3	6.51	2550.0	0.0168	0.0331	4.35	0.00299	1.82013	0.598
36.3	8.475	76.5	6.35	2400.3	0.0168	0.0329	4.33	0.00332	1.01989	0.609
38.0	8.194	77.8	6.21	2280.0	0.0168	0.0328	4.32	0.00306	1.01963	0.621
40.0	7.924	79.3	6.07	2180.0	0.0167	0.0326	4.32	0.00311	1.01935	0.631
45.0	7.299	83.6	5.77	1980.0	0.0161	0.0323	4.35	0.00328	1.01861	0.653
50.0	6.746	88.6	5.53	1850.0	0.0154	0.0323	4.41	0.00351	1.01784	0.670
55.0	6.260	94.0	5.33	1750.0	0.0145	0.0323	4.49	0.00378	1.01707	0.683
60.0	5.834	100.0	5.16	1680.0	0.0137	0.0326	4.59	0.00409	1.01633	0.692
70.0	5.128	112.0	4.90	1590.0	0.0121	0.0333	4.79	0.00478	1.01497	0.703
80.0	4.573	124.0	4.70	1520.0	0.0108	0.0343	5.01	0.00557	1.01378	0.708
90.0	4.128	137.0	4.56	1480.3	0.00972	0.0354	5.24	0.00644	1.01275	0.799
100.0	3.763	150.0	4.44	1450.0	0.00882	0.0367	5.46	0.00738	1.01186	0.708
120.0	3.201	175.0	4.27	1410.0	0.00742	0.0394	5.92	0.00945	1.01039	0.704
140.0	2.790	201.8	4.16	1380.0	0.00640	0.0422	6.36	0.0118	1.00925	0.698
160.0	2.474	227.0	4.07	1360.0	0.00564	0.0451	6.80	0.0143	1.00833	0.693
180.0	2.224	252.0	4.01	1340.0	0.00504	0.0479	7.22	0.0170	1.00758	0.689
200.0	2.021	277.0	3.96	1330.0	0.00456	0.0507	7.51	0.0139	1.00696	0.673
250.0	1.647	340.0	3.87	1300.0	0.00369	0.0576	8.51	0.0279	1.00577	0.667
300.0	1.391	402.0	3.81	1290.0	0.00311	0.0642	9.47	0.0369	1.00493	0.663
350.0	1.204	464.0	3.78	1270.0	0.00268	0.0704	10.4	0.0470	1.30431	0.661
400.0	1.062	526.0	3.75	1260.0	0.00236	0.0766	11.3	0.0579	1.80382	0.660
450.0	0.9493	588.0	3.73	1260.0	0.00211	0.0822	12.1	0.0696	1.00344	0.659
500.0	0.8586	650.0	3.71	1250.0	0.00191	0.0876	12.9	0.0822	1.00312	0.660
600.0	0.7239	774.0	3.69	1240.0	0.00160	0.0983	14.6	0.110	1.00264	0.662
700.0	0.6213	898.0	3.67	1230.0	0.00138	0.109	16.2	0.141	1.00228	0.663
800.0	0.5458	1020.0	3.66	1230.0	0.00121	0.119	17.7	0.176	1.00201	0.663
900.0	0.4867	1150.0	3.65	1230.0	0.00108	0.129	19.2	0.214	1.30180	0.664
1000.0	0.4391	1270.0	3.64	1220.0	0.000977	0.139	20.6	0.255	1.00163	0.664
1200.0	0.3673	1520.0	3.53	1220.0	0.000818	0.157	23.4	0.345	1.00137	0.664
1400.0	0.3157	1760.0	3.62	1220.0	0.000703	0.175	26.0	0.447	1.00118	0.665
1600.0	0.2768	2010.0	3.62	1210.3	0.000616	0.192	28.6	0.560	1.00103	0.665
1800.0	0.2464	2260.0	3.61	1210.0	0.000549	0.209	31.1	0.683	1.00092	0.665
2000.0	0.2220	2510.0	3.61	1210.0	0.000495	0.225	33.5	0.816	1.00083	0.665
2500.0	0.1780	3130.0	3.60	1210.0	0.000397	0.263	39.2	1.19	1.00067	0.665
3000.0	0.1485	3750.0	3.60	1210.0	0.000331	0.300	44.6	1.63	1.00056	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

1400 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
7.0	0.07731	635.0	80.0	3.698	23.74	0.3693	0.3449	0.4230	1899.0
8.0	0.07804	642.0	74.9	3.940	24.17	0.4274	0.4013	0.4801	1886.0
9.0	0.07877	630.0	72.3	4.292	24.71	0.4877	0.4721	0.5568	1867.0
10.0	0.07949	630.0	70.7	4.706	25.31	0.5464	0.4994	0.5923	1860.0
11.0	0.08028	616.0	69.7	5.124	25.92	0.6065	0.5238	0.6271	1849.0
12.0	0.08094	601.0	69.1	5.569	26.55	0.6627	0.5488	0.6636	1837.0
13.0	0.08171	586.0	68.7	6.040	27.22	0.7173	0.5784	0.7001	1925.0
14.0	0.08252	569.0	68.4	6.537	27.93	0.7786	0.5908	0.7359	1813.0
15.0	0.08335	553.0	68.1	7.059	28.67	0.8227	0.6093	0.7711	1801.0
16.0	0.08423	538.0	67.7	7.605	29.44	0.8737	0.6261	0.8055	1790.0
17.0	0.08514	522.0	67.3	8.173	30.25	0.923 *	0.6415	0.8392	1779.0
18.0	0.08610	507.0	66.7	8.763	31.08	0.9727	0.6556	0.8720	1768.0
19.0	0.08711	493.0	65.6	9.462	32.05	1.026	0.6688	0.9017	1755.0
20.0	0.08816	440.0	64.5	10.18	33.04	1.077	0.6804	0.9301	1743.0
22.0	0.09034	454.0	62.2	11.69	35.11	1.178	0.6998	0.9833	1719.0
24.0	0.09265	430.0	59.8	13.27	37.29	1.274	0.7147	1.032	1696.0
26.0	0.09509	408.0	57.3	14.91	39.56	1.366	0.7257	1.076	1674.0
28.0	0.09769	389.0	54.9	16.52	41.94	1.452	0.7341	1.117	1656.0
30.0	0.1005	372.0	52.5	18.07	44.12	1.530	0.7410	1.156	1640.0
32.0	0.1034	358.0	50.1	19.66	46.46	1.606	0.7462	1.198	1627.0
34.0	0.1064	346.0	47.8	21.28	48.87	1.679	0.7502	1.220	1616.0
36.0	0.1096	337.0	45.5	22.92	51.34	1.749	0.7532	1.246	1607.0
38.0	0.1129	329.0	43.4	24.58	53.86	1.817	0.7556	1.268	1600.0
40.0	0.1163	323.0	41.3	26.25	56.41	1.883	0.7575	1.287	1595.0
45.0	0.1253	314.0	36.7	30.47	62.94	2.036	0.7618	1.321	1590.0
50.0	0.1346	313.0	32.8	34.70	69.60	2.177	0.7635	1.341	1595.0
55.0	0.1442	315.0	29.5	38.94	76.33	2.305	0.7653	1.351	1606.0
60.0	0.1541	321.0	26.4	43.16	83.10	2.423	0.7666	1.355	1622.0
70.0	0.1740	339.0	22.5	51.56	96.65	2.632	0.7681	1.353	1663.0
80.0	0.1942	361.0	19.3	59.81	110.1	2.812	0.7686	1.345	1710.0
90.0	0.2143	385.0	16.9	67.99	123.5	2.970	0.7685	1.335	1760.0
100.0	0.2344	410.0	15.0	76.07	136.8	3.110	0.7679	1.325	1811.0
120.0	0.2744	463.0	12.2	92.02	163.1	3.350	0.7662	1.306	1913.0
140.0	0.3140	517.0	10.3	107.7	189.1	3.558	0.7642	1.292	2012.0
160.0	0.3532	571.0	8.95	123.3	214.9	3.722	0.7624	1.281	2108.0
180.0	0.3922	625.0	7.90	138.7	240.4	3.872	0.7608	1.273	2201.0
200.0	0.4310	679.0	7.37	154.0	265.8	4.006	0.7594	1.266	2290.0
250.0	0.5274	812.0	5.61	192.1	328.8	4.287	0.7567	1.256	2499.0
300.0	0.6233	946.0	4.66	229.9	391.4	4.516	0.7548	1.250	2694.0
350.0	0.7200	1080.0	3.99	267.5	453.9	4.708	0.7534	1.247	2875.0
400.0	0.8043	1210.0	3.48	305.0	516.1	4.875	0.7524	1.245	3046.0
450.0	0.9090	1340.0	3.09	342.5	578.3	5.021	0.7516	1.243	3208.0
500.0	1.015	1480.0	2.78	380.0	640.5	5.152	0.7509	1.242	3363.0
600.0	1.196	1740.0	2.32	454.7	764.7	5.376	0.7508	1.241	3693.0
700.0	1.386	2010.0	1.99	529.4	888.7	5.570	0.7494	1.241	3922.0
800.0	1.577	2270.0	1.74	604.1	1013.0	5.735	0.7489	1.240	4174.0
900.0	1.767	2540.0	1.55	678.7	1137.0	5.881	0.7485	1.240	4412.0
1000.0	1.958	2800.0	1.39	753.3	1261.0	6.012	0.7483	1.240	4638.0
1200.0	2.339	3330.0	1.16	902.5	1509.0	6.238	0.7478	1.240	5060.0
1400.0	2.721	3860.0	1.00	1052.0	1757.0	6.429	0.7478	1.240	5450.0
1600.0	3.103	4400.0	0.872	1201.0	2005.0	6.595	0.7473	1.240	5814.0
1800.0	3.484	4930.0	0.775	1350.0	2253.0	6.741	0.7472	1.240	6157.0
2000.0	3.866	5460.0	0.690	1499.0	2501.0	6.872	0.7470	1.240	6482.0
2500.0	4.821	6800.0	0.558	1872.0	3121.0	7.149	0.7460	1.240	7231.0
3000.0	5.776	8130.0	0.465	2244.0	3742.0	7.375	0.7466	1.241	7910.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

1400 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
7.0	12.93	43.4	17.9	8210.0	0.00974	0.0219	16.1	0.00400	1.02037	1.12
8.0	12.81	52.7	14.6	8230.0	0.00910	0.0236	13.6	0.00383	1.02045	1.00
9.0	12.70	62.4	12.1	8100.0	0.00893	0.0253	11.7	0.00357	1.02052	0.931
10.0	12.58	66.3	11.3	7920.0	0.00893	0.0269	10.4	0.00361	1.02059	0.823
11.0	12.47	69.1	10.7	7690.0	0.00907	0.0284	9.37	0.00363	1.02065	0.744
12.0	12.35	71.3	10.2	7430.0	0.00930	0.0298	8.57	0.00363	1.02078	0.688
13.0	12.24	73.0	9.84	7170.0	0.00959	0.0310	7.94	0.00361	1.02075	0.647
14.0	12.12	74.2	9.55	6900.0	0.00991	0.0328	7.43	0.00359	1.02088	0.615
15.0	12.00	75.2	9.32	6640.0	0.0103	0.0329	7.00	0.00355	1.02085	0.592
16.0	11.87	75.9	9.11	6380.0	0.0106	0.0336	6.65	0.00351	1.02089	0.574
17.0	11.74	76.5	8.93	6130.0	0.0110	0.0342	6.35	0.00347	1.02092	0.561
18.0	11.61	77.1	8.76	5890.0	0.0113	0.0347	6.10	0.00343	1.02095	0.552
19.0	11.48	77.8	8.54	5660.0	0.0116	0.0351	5.88	0.00339	1.02098	0.544
20.0	11.34	78.4	8.36	5440.0	0.0119	0.0354	5.69	0.00336	1.02100	0.538
22.0	11.07	79.4	8.03	5020.0	0.0124	0.0359	5.39	0.00329	1.02102	0.533
24.0	10.79	80.1	7.75	4640.0	0.0129	0.0361	5.17	0.00324	1.02101	0.513
26.0	10.52	80.6	7.51	4290.0	0.0133	0.0361	5.01	0.00319	1.02097	0.537
28.0	10.24	81.0	7.30	3980.0	0.0136	0.0361	4.88	0.00316	1.02091	0.544
30.0	9.95	81.6	7.12	3710.0	0.0142	0.0360	4.74	0.00313	1.02082	0.553
32.0	9.673	82.3	6.94	3470.0	0.0145	0.0358	4.71	0.00311	1.02070	0.564
34.0	9.395	83.1	6.78	3260.0	0.0147	0.0356	4.66	0.00311	1.02056	0.575
36.0	9.122	84.1	6.63	3070.0	0.0148	0.0354	4.62	0.00311	1.02039	0.586
38.0	8.855	85.2	6.48	2910.0	0.0149	0.0352	4.62	0.00311	1.02039	0.586
40.0	8.595	86.5	6.34	2780.0	0.0149	0.0350	4.59	0.00317	1.01999	0.607
45.0	7.983	90.4	6.04	2510.0	0.0146	0.0346	4.59	0.00328	1.01941	0.630
50.0	7.429	94.9	5.78	2320.0	0.0141	0.0344	4.63	0.00346	1.01877	0.649
55.0	6.933	100.0	5.57	2190.0	0.0135	0.0344	4.70	0.00367	1.01811	0.665
60.0	6.491	106.0	5.38	2090.0	0.0128	0.0345	4.78	0.00392	1.01744	0.676
70.0	5.746	117.0	5.09	1950.0	0.0115	0.0350	4.96	0.00450	1.01617	0.691
80.0	5.150	129.0	4.87	1860.0	0.0104	0.0355	5.17	0.00517	1.01502	0.699
90.0	4.666	142.0	4.71	1800.0	0.00940	0.0365	5.39	0.00591	1.01399	0.703
100.0	4.266	155.0	4.57	1750.0	0.00856	0.0380	5.60	0.00672	1.01308	0.703
120.0	3.645	180.0	4.39	1690.0	0.00724	0.0405	6.04	0.00852	1.01156	0.701
140.0	3.185	206.0	4.24	1650.0	0.00627	0.0433	6.49	0.0105	1.01035	0.696
160.0	2.831	231.0	4.15	1620.0	0.00554	0.0463	6.90	0.0127	1.00936	0.692
180.0	2.550	257.0	4.07	1590.0	0.00496	0.0488	7.32	0.0150	1.00855	0.687
200.0	2.320	282.0	4.01	1570.0	0.00449	0.0515	7.60	0.0175	1.00787	0.672
250.0	1.896	345.0	3.91	1540.0	0.00364	0.0583	8.59	0.0245	1.00657	0.666
300.0	1.604	407.0	3.85	1520.0	0.00307	0.0645	9.54	0.0323	1.00564	0.662
350.0	1.391	469.0	3.80	1500.0	0.00266	0.0710	10.4	0.0410	1.00494	0.662
400.0	1.228	531.0	3.77	1490.0	0.00234	0.0773	11.3	0.0504	1.00494	0.660
450.0	1.099	593.0	3.75	1480.0	0.00210	0.0826	12.2	0.0605	1.00395	0.658
500.0	0.995	655.0	3.73	1470.0	0.00190	0.0881	13.0	0.0712	1.00365	0.659
600.0	0.8365	779.0	3.70	1460.0	0.00159	0.0987	14.6	0.0950	1.00304	0.660
700.0	0.7215	902.0	3.68	1450.0	0.00137	0.109	16.2	0.122	1.00264	0.662
800.0	0.6342	1018.0	3.67	1440.0	0.00121	0.119	17.7	0.152	1.00233	0.662
900.0	0.5658	1150.0	3.65	1430.0	0.00108	0.129	19.7	0.184	1.00208	0.663
1000.0	0.5107	1271.0	3.65	1430.0	0.000974	0.139	20.6	0.219	1.00189	0.663
1200.0	0.4275	1520.0	3.63	1420.0	0.000815	0.157	23.4	0.297	1.00158	0.663
1400.0	0.3675	1770.0	3.63	1420.0	0.000701	0.175	26.1	0.384	1.00137	0.664
1600.0	0.3223	2020.0	3.67	1420.0	0.000615	0.192	28.6	0.481	1.00120	0.664
1800.0	0.2870	2260.0	3.61	1410.0	0.000548	0.209	31.1	0.587	1.00107	0.664
2000.0	0.2597	2510.0	3.61	1410.0	0.000494	0.225	33.5	0.701	1.00097	0.665
2500.0	0.2074	3130.0	3.60	1410.0	0.000396	0.263	39.2	1.02	1.00078	0.665
3000.0	0.1731	3750.0	3.60	1410.0	0.000339	0.300	44.6	1.40	1.00065	0.665

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

1600 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
7.0	0.07554	683.0	93.6	3.987	26.37	0.3403	0.3627	0.4576	1998.0
8.0	0.07627	690.0	82.8	4.224	26.82	0.4014	0.4085	0.4932	1976.0
9.0	0.07696	690.0	77.4	4.569	27.37	0.4626	0.4754	0.5600	1952.0
10.0	0.07762	693.0	74.3	4.973	27.97	0.5233	0.5005	0.5894	1944.0
11.0	0.07827	681.0	72.5	5.379	28.57	0.5809	0.5234	0.6197	1932.0
12.0	0.07893	667.0	71.5	5.811	29.20	0.6363	0.5464	0.6525	1921.0
13.0	0.07961	651.0	71.0	6.268	29.85	0.6899	0.5678	0.6857	1909.0
14.0	0.08031	636.0	70.7	6.748	30.54	0.7420	0.5874	0.7188	1898.0
15.0	0.08104	620.0	70.5	7.251	31.26	0.7928	0.6053	0.7515	1888.0
16.0	0.08181	604.0	70.3	7.776	32.01	0.8424	0.6218	0.7839	1878.0
17.0	0.08260	589.0	70.0	8.323	32.80	0.8911	0.6371	0.8158	1869.0
18.0	0.08343	574.0	69.6	8.890	33.61	0.9387	0.6513	0.8471	1859.0
19.0	0.08431	559.0	68.7	9.570	34.55	0.9905	0.6644	0.8753	1848.0
20.0	0.08522	546.0	67.7	10.27	35.52	1.041	0.6762	0.9024	1836.0
22.0	0.08709	519.0	65.7	11.74	37.54	1.139	0.6964	0.9533	1815.0
24.0	0.08907	495.0	63.5	13.27	39.66	1.233	0.7124	1.000	1794.0
26.0	0.09115	472.0	61.2	14.88	41.88	1.323	0.7241	1.041	1773.0
28.0	0.09335	452.0	59.0	16.44	44.10	1.406	0.7332	1.081	1756.0
30.0	0.09568	433.0	56.7	17.95	46.30	1.482	0.7409	1.113	1741.0
32.0	0.09814	417.0	54.5	19.49	48.57	1.555	0.7466	1.153	1728.0
34.0	0.1007	403.0	52.2	21.07	50.90	1.626	0.7509	1.183	1716.0
36.0	0.1034	392.0	50.0	22.67	53.30	1.694	0.7543	1.210	1706.0
38.0	0.1062	382.0	47.9	24.28	55.74	1.760	0.7568	1.233	1697.0
40.0	0.1090	373.0	45.8	25.92	58.23	1.824	0.7588	1.254	1691.0
45.0	0.1166	360.0	41.1	30.06	64.60	1.974	0.7624	1.294	1681.0
50.0	0.1245	354.0	37.0	34.25	71.14	2.112	0.7649	1.319	1681.0
55.0	0.1328	353.0	33.4	38.45	77.78	2.236	0.7667	1.335	1587.0
60.0	0.1412	356.0	30.4	42.65	84.48	2.355	0.7681	1.344	1699.0
70.0	0.1584	370.0	25.6	51.01	97.95	2.563	0.7698	1.348	1732.0
80.0	0.1759	389.0	22.1	59.29	111.4	2.742	0.7706	1.344	1773.0
90.0	0.1935	412.0	19.3	67.49	124.8	2.900	0.7706	1.336	1818.0
100.0	0.2110	436.0	17.2	75.61	138.1	3.041	0.7702	1.327	1865.0
120.0	0.2460	487.0	14.0	91.63	164.5	3.281	0.7686	1.310	1961.0
140.0	0.2806	540.0	11.8	107.4	190.6	3.482	0.7667	1.296	2056.0
160.0	0.3150	594.0	10.2	123.0	216.4	3.654	0.7648	1.285	2149.0
180.0	0.3491	647.0	9.04	138.5	242.0	3.805	0.7630	1.276	2239.0
200.0	0.3831	700.0	8.09	153.9	267.4	3.939	0.7615	1.269	2325.0
250.0	0.4675	834.0	6.41	192.0	330.5	4.221	0.7585	1.258	2531.0
300.0	0.5514	966.0	5.32	229.9	393.3	4.449	0.7563	1.251	2721.0
350.0	0.6350	1100.0	4.55	267.6	455.7	4.642	0.7547	1.248	2900.0
400.0	0.7184	1230.0	3.98	305.2	518.0	4.808	0.7535	1.245	3069.0
450.0	0.8018	1360.0	3.53	342.7	580.3	4.955	0.7526	1.244	3230.0
500.0	0.8852	1490.0	3.18	380.1	642.4	5.086	0.7519	1.243	3383.0
600.0	1.052	1760.0	2.65	455.0	766.6	5.312	0.7508	1.241	3671.0
700.0	1.218	2028.0	2.27	529.7	890.7	5.504	0.7501	1.241	3938.0
800.0	1.385	2290.0	1.99	604.4	1015.0	5.669	0.7495	1.240	4188.0
900.0	1.552	2598.0	1.77	679.0	1139.0	5.815	0.7491	1.240	4425.0
1000.0	1.718	2820.0	1.59	753.6	1263.0	5.946	0.7488	1.240	4650.0
1200.0	2.052	3350.0	1.33	902.8	1511.0	6.172	0.7483	1.240	5071.0
1400.0	2.386	3880.0	1.14	1052.0	1759.0	6.363	0.7480	1.240	5459.0
1600.0	2.719	4410.0	1.00	1201.0	2007.0	6.529	0.7477	1.240	5822.0
1800.0	3.053	4940.0	0.885	1350.0	2255.0	6.675	0.7475	1.240	6164.0
2000.0	3.387	5480.0	0.797	1499.0	2503.0	6.806	0.7474	1.240	6488.0
2500.0	4.222	6810.0	0.638	1872.0	3123.0	7.082	0.7471	1.240	7236.0
3000.0	5.058	8140.0	0.532	2245.0	3743.0	7.309	0.7469	1.240	7914.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

1600 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
7.0	13.24	44.2	19.5	9040.8		0.0229	19.5	0.00378	1.02015	1.40
8.0	13.11	54.5	15.5	9158.0	0.0104	0.0247	16.1	0.00381	1.02025	1.16
9.0	12.99	65.7	12.5	9070.0	0.00905	0.0264	13.7	0.00363	1.02033	1.05
10.0	12.88	70.8	11.5	8920.0	0.0C833	0.0282	12.0	0.00371	1.02040	0.904
11.0	12.78	74.4	10.8	8700.0	3.00833	0.0298	10.7	0.00376	1.02047	0.804
12.0	12.67	77.1	10.3	8450.0	G.00846	0.0312	9.75	0.00378	1.02054	0.734
13.0	12.56	79.1	9.95	8180.0	0.00467	0.0325	8.98	0.00377	1.02060	0.682
14.0	12.45	80.5	9.66	7910.0	0.00893	0.0336	8.35	0.00376	1.02065	0.643
15.0	12.34	81.5	9.43	7650.0	0.00922	0.0346	7.83	0.00373	1.92071	0.613
16.0	12.22	82.4	9.24	7380.0	0.00952	0.0354	7.40	0.00369	1.02076	0.591
17.0	12.11	83.1	9.07	7130.0	0.00982	0.0361	7.04	0.00365	1.02081	0.574
18.0	11.99	83.7	8.92	6880.0	0.0101	0.0366	6.74	0.00361	1.02085	0.561
19.0	11.86	84.6	8.71	6630.0	0.0104	0.0371	6.47	0.00357	1.02089	0.550
20.0	11.74	85.3	8.54	6400.0	0.0106	0.0374	6.24	0.00353	1.02093	0.542
22.0	11.48	86.5	8.22	5960.0	0.0110	0.0379	5.88	0.00346	1.02098	0.532
24.0	11.23	87.5	7.94	5560.0	0.0114	0.0382	5.61	0.00340	1.02101	0.529
26.0	10.97	88.2	7.70	5180.0	0.0118	0.0383	5.41	0.00336	1.02102	0.529
28.0	10.71	88.7	7.51	4840.0	0.0122	0.0383	5.25	0.00331	1.02100	0.529
30.0	10.45	89.3	7.33	4530.0	0.0125	0.0382	5.13	0.00327	1.02096	0.540
32.0	10.19	90.0	7.16	4250.0	0.0128	0.0381	5.04	0.00324	1.02090	0.549
34.0	9.929	90.7	7.01	4010.0	0.0130	0.0379	4.96	0.00323	1.02081	0.558
36.0	9.672	91.6	6.86	3790.0	0.0132	0.0377	4.91	0.00322	1.0207C	0.567
38.0	9.419	92.6	6.72	3590.0	0.0133	0.0375	4.87	0.00323	1.020C7	0.577
40.0	9.171	93.7	6.58	3420.0	0.0134	0.0373	4.85	0.00324	1.02042	0.587
45.0	8.578	97.2	6.28	3090.0	0.0133	0.0368	4.83	0.00332	1.01998	0.611
50.0	8.031	101.0	6.02	2840.0	0.0130	0.0365	4.85	0.00345	1.01946	0.631
55.0	7.533	106.0	5.79	2660.0	0.0126	0.0364	4.90	0.00361	1.01890	0.647
60.0	7.082	111.0	5.59	2520.0	0.0121	0.0363	4.96	0.00382	1.01832	0.661
70.0	6.311	123.0	5.28	2330.0	0.0118	0.0367	5.13	0.00431	1.01716	0.679
80.0	5.684	139.0	5.04	2210.0	0.0108	0.0373	5.32	0.00489	1.01606	0.690
90.0	5.168	147.0	4.85	2130.0	0.00988	0.0382	5.53	0.00554	1.01505	0.696
100.0	4.738	160.0	4.70	2070.0	0.00831	0.0393	5.74	0.00625	1.01415	0.698
120.0	4.066	185.0	4.48	1980.0	0.00707	0.0417	6.17	0.00783	1.01260	0.697
140.0	3.564	211.0	4.33	1920.0	0.00615	0.0443	6.59	0.00959	1.01135	0.694
160.0	3.175	236.0	4.22	1880.0	0.00544	0.0470	7.01	0.0115	1.01032	0.690
180.0	2.864	262.0	4.13	1850.0	0.00488	0.0497	7.42	0.0136	1.00946	0.686
200.0	2.610	287.0	4.07	1830.0	0.00442	0.0524	7.69	0.0158	1.00873	0.671
250.0	2.139	350.0	3.95	1780.0	0.00360	0.0591	8.67	0.0220	1.00732	0.665
300.0	1.814	412.0	3.88	1750.0	0.00304	0.0655	9.61	0.0289	1.00631	0.661
350.0	1.575	474.0	3.83	1730.0	0.00263	0.0716	10.5	0.0365	1.00554	0.658
400.0	1.392	536.0	3.79	1710.0	0.00232	0.0775	11.4	0.0447	1.00494	0.657
450.0	1.247	598.0	3.77	1700.0	0.00208	0.0831	12.2	0.0536	1.00445	0.657
500.0	1.130	660.0	3.74	1690.0	0.00188	0.0885	13.0	0.0630	1.00406	0.657
600.0	0.9508	784.0	3.71	1670.0	0.00158	0.0990	14.6	0.0839	1.00344	0.659
700.0	0.8207	907.0	3.69	1660.0	0.00137	0.109	16.2	0.106	1.00299	0.661
800.0	0.7228	1030.0	3.67	1650.0	0.00120	0.120	17.7	0.134	1.00264	0.662
900.0	0.6444	1150.0	3.66	1650.0	0.00107	0.129	19.2	0.162	1.00237	0.662
1000.0	0.5819	1280.0	3.65	1640.0	0.000970	0.139	20.6	0.193	1.00214	0.662
1200.0	0.4873	1530.0	3.64	1630.0	0.000813	0.158	23.4	0.251	1.00180	0.663
1400.0	0.4192	1770.0	3.63	1630.0	0.000699	0.175	26.1	0.337	1.00155	0.664
1600.0	0.3677	2020.0	3.62	1620.0	0.000614	0.192	28.6	0.422	1.00137	0.664
1800.0	0.3275	2270.0	3.62	1620.0	0.000547	0.209	31.1	0.514	1.00122	0.664
2000.0	0.2952	2520.0	3.61	1620.0	0.000493	0.225	33.5	0.615	1.00110	0.664
2500.0	0.2368	3140.0	3.61	1610.0	0.000396	0.263	39.2	0.897	1.00089	0.665
3000.0	0.1977	3750.0	3.60	1610.0	0.000330	0.300	44.6	1.22	1.00074	0.665

* TWO-PHASE BOUNDARY

1800 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY RTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
7.0	0.07395	727.0	110.0	4.274	28.92	0.3100	0.3928	0.5102	2091.0
8.0	0.07478	750.0	91.9	4.514	29.41	0.3759	0.4229	0.5160	2059.0
9.0	0.07537	755.8	83.1	4.856	29.98	0.4390	0.4831	0.5696	2031.0
10.0	0.07599	752.0	78.1	5.255	30.58	0.5003	0.5046	0.5914	2021.0
11.0	0.07658	742.0	75.3	5.655	31.18	0.5578	0.5251	0.6164	2009.0
12.0	0.07718	729.0	73.8	6.077	31.80	0.6127	0.5461	0.6450	1997.0
13.0	0.07779	715.0	73.0	6.522	32.45	0.6655	0.5661	0.6748	1985.0
14.0	0.07842	699.0	72.7	6.988	33.13	0.7167	0.5845	0.7051	1976.0
15.0	0.07907	683.0	72.6	7.476	33.83	0.7665	0.6017	0.7355	1967.0
16.0	0.07975	668.0	72.5	7.983	34.57	0.8150	0.6177	0.7659	1959.0
17.0	0.08046	652.0	72.4	8.512	35.33	0.8625	0.6327	0.7963	1950.0
18.0	0.08119	637.0	72.2	9.060	36.12	0.9089	0.6468	0.8263	1942.0
19.0	0.08197	623.0	71.4	9.723	37.04	0.9597	0.6599	0.8533	1932.0
20.0	0.08276	609.0	70.6	10.41	37.99	1.009	0.6718	0.8794	1922.0
22.0	0.08442	583.0	68.8	11.84	39.97	1.106	0.6927	0.9287	1902.0
24.0	0.08615	558.0	66.8	13.34	42.06	1.198	0.7097	0.9735	1883.0
26.0	0.08796	535.0	64.7	14.91	44.23	1.286	0.7222	1.013	1864.0
28.0	0.08986	513.0	62.6	16.44	46.79	1.367	0.7320	1.052	1845.0
30.0	0.09188	494.0	60.5	17.90	48.53	1.440	0.7403	1.089	1834.0
32.0	0.09408	476.0	58.4	19.41	50.74	1.512	0.7466	1.122	1820.0
34.0	0.09622	461.0	56.2	20.94	53.01	1.581	0.7514	1.152	1808.0
36.0	0.09852	447.0	54.1	22.51	55.35	1.647	0.7550	1.179	1798.0
38.0	0.1009	435.0	52.0	24.09	57.73	1.712	0.7577	1.203	1789.0
40.0	0.1034	425.0	49.9	25.69	60.15	1.774	0.7599	1.224	1781.0
45.0	0.1099	407.0	45.1	29.76	66.39	1.921	0.7637	1.268	1768.0
50.0	0.1168	396.0	40.9	33.89	72.81	2.056	0.7662	1.298	1764.0
55.0	0.1239	392.0	37.2	38.05	79.35	2.181	0.7680	1.318	1766.0
60.0	0.1313	393.0	33.9	42.22	85.98	2.296	0.7695	1.331	1774.0
70.0	0.1464	402.0	28.7	50.56	99.36	2.502	0.7715	1.342	1800.0
80.0	0.1618	419.0	24.8	58.84	112.8	2.681	0.7725	1.341	1836.0
90.0	0.1774	440.0	21.7	67.05	126.2	2.839	0.7727	1.336	1876.0
100.0	0.1929	463.0	19.2	75.19	139.5	2.979	0.7724	1.329	1928.0
120.0	0.2239	512.0	15.8	91.27	165.9	3.220	0.7709	1.313	2010.0
140.0	0.2547	564.0	13.3	107.1	192.9	3.422	0.7690	1.299	2101.0
160.0	0.2853	617.0	11.5	122.8	217.9	3.594	0.7670	1.288	2190.0
180.0	0.3156	669.0	10.2	138.3	243.5	3.745	0.7652	1.279	2277.0
200.0	0.3459	723.0	9.18	153.8	269.0	3.880	0.7635	1.272	2361.0
250.0	0.4209	855.0	7.22	192.0	332.3	4.162	0.7602	1.260	2562.0
300.0	0.4954	987.0	5.90	229.9	395.1	4.391	0.7578	1.253	2749.0
350.0	0.5697	1120.0	5.12	267.7	457.6	4.594	0.7568	1.248	2926.0
400.0	0.6439	1250.0	4.47	305.3	519.9	4.750	0.7547	1.246	3092.0
450.0	0.7179	1380.0	3.97	342.9	582.?	4.897	0.7536	1.244	3251.0
500.0	0.7920	1510.0	3.57	380.3	644.3	5.028	0.7528	1.243	3403.0
600.0	0.9400	1780.0	2.98	455.2	768.5	5.254	0.7516	1.241	3688.0
700.0	1.088	2040.0	2.55	530.0	892.6	5.446	0.7507	1.241	3954.0
800.0	1.236	2310.0	2.23	604.7	1017.0	5.611	0.7501	1.240	4203.0
900.0	1.384	2570.0	1.99	679.3	1141.0	5.757	0.7497	1.240	4438.0
1000.0	1.532	2840.0	1.79	754.0	1265.0	5.888	0.7493	1.240	4662.0
1200.0	1.828	3370.0	1.49	903.2	1513.0	6.114	0.7488	1.240	5081.0
1400.0	2.125	3900.0	1.28	1052.0	1761.0	6.305	0.7484	1.240	5468.0
1600.0	2.421	4430.0	1.12	1202.0	2009.0	6.471	0.7481	1.240	5830.0
1800.0	2.718	4960.0	1.00	1351.0	2257.0	6.617	0.7479	1.240	6171.0
2000.0	3.015	5490.0	0.896	1500.0	2505.0	6.747	0.7477	1.240	6495.0
2500.0	3.757	6820.0	0.717	1873.0	3125.0	7.024	0.7474	1.240	7241.0
3000.0	4.499	8150.0	0.598	2245.0	3745.0	7.259	0.7472	1.240	7918.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

1000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 18E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
7.0	13.52	45.7	20.7	9830.0	3.0112	0.0240	23.5	0.00347	1.01991	1.00
8.0	13.39	56.4	16.2	10000.0	0.00915	0.0257	19.0	0.00372	1.02003	1.37
9.0	13.27	60.7	13.0	10000.0	0.00029	0.0276	15.9	0.00365	1.02013	1.10
10.0	13.16	74.9	11.0	9900.0	0.00789	0.0294	13.8	0.00378	1.02021	1.00
11.0	13.06	79.3	11.0	9690.0	0.00777	0.0311	12.2	0.00386	1.02028	0.873
12.0	12.96	82.6	10.4	9450.0	0.08781	0.0326	11.0	0.00390	1.02036	0.785
13.0	12.85	84.9	10.0	9190.0	0.00795	0.0340	10.1	0.00392	1.02042	0.721
14.0	12.75	86.5	9.75	8910.0	0.00015	0.0352	9.33	0.00391	1.02049	0.673
15.0	12.65	87.6	9.54	8640.0	0.00040	0.0362	8.71	0.00389	1.02055	0.637
16.0	12.54	88.5	9.36	8370.0	0.00866	0.0371	8.28	0.00386	1.02061	0.610
17.0	12.43	89.2	9.20	8110.0	0.00892	0.0378	7.77	0.00382	1.02067	0.589
18.0	12.32	89.9	9.06	7850.0	0.00919	0.0384	7.40	0.00378	1.02072	0.573
19.0	12.28	90.0	8.07	7600.0	0.00939	0.0389	7.08	0.00374	1.02077	0.559
20.0	12.00	91.7	8.70	7300.0	0.00959	0.0393	6.81	0.00370	1.02082	0.549
22.0	11.85	93.2	8.39	6900.0	0.0108	0.0399	6.38	0.00363	1.02090	0.535
24.0	11.61	94.4	8.11	6400.0	0.0103	0.0402	6.06	0.00356	1.02096	0.528
26.0	11.37	95.3	7.87	6080.0	0.0106	0.0404	5.82	0.00351	1.02100	0.525
28.0	11.13	95.9	7.68	5710.0	0.0110	0.0404	5.63	0.00346	1.02102	0.527
30.0	10.89	96.6	7.51	5370.0	0.0113	0.0404	5.48	0.00341	1.02101	0.531
32.0	10.64	97.3	7.35	5070.0	0.0115	0.0402	5.36	0.00337	1.02099	0.530
34.0	10.39	98.0	7.20	4790.0	0.0117	0.0401	5.27	0.00335	1.02095	0.545
36.0	10.15	98.0	7.06	4540.0	0.0119	0.0398	5.20	0.00333	1.02009	0.554
38.0	9.909	100.0	6.92	4310.0	0.0121	0.0396	5.15	0.00332	1.02080	0.562
40.0	9.672	101.0	6.79	4110.0	0.0121	0.0394	5.11	0.00333	1.02078	0.571
45.0	9.101	104.0	6.49	3700.0	0.0127	0.0389	5.06	0.00337	1.02038	0.594
50.0	8.565	100.0	6.23	3390.0	0.0124	0.0385	5.06	0.00346	1.01997	0.614
55.0	8.070	112.0	5.99	3160.0	0.0117	0.0303	5.10	0.00368	1.01950	0.632
60.0	7.617	117.0	5.79	2990.0	0.0113	0.0302	5.15	0.00376	1.01900	0.647
70.0	6.830	120.0	5.45	2750.0	0.0105	0.0303	5.30	0.00410	1.01796	0.668
80.0	6.179	140.0	5.19	2590.0	0.00957	0.0308	5.48	0.00469	1.01694	0.681
90.0	5.638	152.0	4.99	2480.0	0.08877	0.0390	5.67	0.00526	1.01597	0.688
100.0	5.184	165.0	4.83	2400.0	0.00086	0.0405	5.07	0.00589	1.01509	0.692
125.0	4.446	190.0	4.58	2290.0	0.00690	0.0423	6.29	0.00738	1.01394	0.694
140.0	3.926	216.0	4.42	2210.0	0.00602	0.0453	6.70	0.00089	1.01226	0.691
160.0	3.585	241.0	4.29	2160.0	0.00534	0.0479	7.11	0.0106	1.01120	0.688
180.0	3.160	267.0	4.20	2120.0	0.00480	0.0506	7.51	0.0125	1.01030	0.684
200.0	2.091	292.0	4.12	2090.0	0.00436	0.0532	7.70	0.0145	1.00953	0.669
250.0	2.376	355.0	3.99	2030.0	0.00355	0.0590	8.75	0.0200	1.00004	0.664
300.0	2.019	417.0	3.91	1990.0	0.00300	0.0661	9.67	0.0262	1.00695	0.660
350.0	1.755	479.0	3.86	1960.0	0.00261	0.0722	10.6	0.0330	1.00612	0.657
400.0	1.553	541.0	3.82	1940.0	0.00238	0.0788	11.4	0.0403	1.00547	0.656
450.0	1.393	603.0	3.78	1930.0	0.00286	0.0836	12.2	0.0483	1.00494	0.655
500.0	1.263	665.0	3.76	1910.0	0.00187	0.0889	13.0	0.0567	1.00451	0.656
600.0	1.064	788.0	3.72	1890.0	0.00197	0.0994	14.6	0.0753	1.00383	0.658
700.0	0.9291	912.0	3.70	1880.0	0.00136	0.110	16.2	0.0963	1.00333	0.660
800.0	0.8090	1040.0	3.68	1870.0	0.00120	0.120	17.7	0.119	1.00295	0.661
900.0	0.7225	1100.0	3.67	1860.0	0.00107	0.130	19.2	0.145	1.00264	0.662
1000.0	0.6527	1200.0	3.66	1850.0	0.000967	0.139	20.7	0.172	1.00240	0.662
1200.0	0.5469	1530.0	3.64	1840.0	0.000810	0.158	23.4	0.233	1.00202	0.663
1400.0	0.4708	1700.0	3.63	1830.0	0.000696	0.175	26.1	0.361	1.00174	0.664
1600.0	0.4130	2020.0	3.62	1830.0	0.000612	0.193	28.6	0.376	1.00153	0.664
1800.0	0.3679	2270.0	3.62	1820.0	0.000546	0.209	31.1	0.450	1.00137	0.664
2000.0	0.3317	2920.0	3.61	1820.0	0.000492	0.225	33.5	0.567	1.00123	0.664
2500.0	0.2662	3140.0	3.61	1820.0	0.000399	0.264	39.2	0.798	1.00099	0.664
3000.0	0.2223	3760.0	3.60	1810.0	0.000330	0.300	44.6	1.09	1.00083	0.665

* TWO-PHASE BOUNDARY

2000 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
8.0	0.07329	799.0	102.0	4.806	31.95	0.3505	0.4444	0.5486	2138.0
9.0	0.07394	809.0	89.4	5.152	32.54	0.4163	0.4954	0.5853	2105.0
10.0	0.37454	809.0	82.2	5.550	33.15	0.4787	0.5118	0.5978	2092.0
11.0	0.07509	831.0	78.2	5.945	33.75	0.5365	0.5288	0.6165	2080.0
12.0	0.07564	789.0	76.1	6.360	34.37	0.5912	0.5473	0.6405	2068.0
13.0	0.07620	775.0	75.0	6.796	35.02	0.6435	0.5652	0.6667	2058.0
14.0	0.07677	760.0	74.6	7.251	35.64	0.6940	0.5822	0.6940	2049.0
15.0	0.07736	745.0	74.5	7.725	36.37	0.7429	0.5983	0.7220	2040.0
16.0	0.07797	729.0	74.5	8.216	37.09	0.7905	0.6136	0.7506	2033.0
17.0	0.07860	714.0	74.5	8.750	37.84	0.8370	0.6282	0.7795	2026.0
18.0	0.07926	699.0	74.5	9.261	38.61	0.8825	0.6422	0.8084	2019.0
19.0	0.07996	685.0	73.9	9.810	39.52	0.9324	0.6551	0.8344	2010.0
20.0	0.08067	671.0	73.2	10.58	40.46	0.9813	0.6672	0.8598	2001.0
22.0	0.08215	644.0	71.7	11.99	42.41	1.076	0.6889	0.9081	1983.0
24.0	0.08369	619.0	69.4	13.46	44.45	1.167	0.7067	0.9518	1965.0
26.0	0.08530	596.0	67.8	15.00	46.59	1.253	0.7201	0.9904	1948.0
28.0	0.08698	573.0	65.9	16.49	48.70	1.332	0.7304	1.027	1933.0
30.0	0.08876	553.0	64.0	17.92	50.79	1.404	0.7395	1.063	1919.0
32.0	0.09063	534.0	62.0	19.39	52.95	1.474	0.7463	1.096	1907.0
34.0	0.09257	518.0	59.9	20.89	55.18	1.541	0.7515	1.125	1895.0
36.0	0.09459	502.0	57.8	22.42	57.45	1.607	0.7554	1.152	1884.0
38.0	0.09669	489.0	55.7	23.97	59.78	1.669	0.7584	1.176	1875.0
40.0	0.09885	477.0	53.7	25.55	62.16	1.730	0.7608	1.198	1866.0
45.0	0.1045	455.0	48.9	29.55	68.27	1.874	0.7648	1.244	1851.0
50.0	0.1106	441.0	44.6	33.62	74.57	2.007	0.7674	1.277	1843.0
55.0	0.1169	433.0	40.7	37.74	81.02	2.130	0.7694	1.302	1842.0
60.0	0.1234	430.0	37.3	41.86	87.58	2.244	0.7709	1.318	1846.0
70.0	0.1368	436.0	31.7	50.17	100.9	2.449	0.7730	1.334	1867.0
80.0	0.1506	450.0	27.5	58.44	114.2	2.627	0.7742	1.338	1897.0
90.0	0.1645	468.0	24.1	66.66	127.6	2.785	0.7747	1.335	1934.0
100.0	0.1784	490.8	21.5	74.82	140.9	2.925	0.7745	1.329	1974.0
120.0	0.2063	538.0	17.6	90.95	167.4	3.166	0.7732	1.315	2058.0
140.0	0.2340	588.0	14.8	106.9	193.5	3.368	0.7713	1.302	2144.0
160.0	0.2615	640.0	12.8	122.6	219.4	3.541	0.7693	1.290	2230.0
180.0	0.2889	692.0	11.3	138.2	245.1	3.692	0.7673	1.281	2314.0
200.0	0.3161	745.0	10.1	153.6	270.7	3.827	0.7656	1.274	2396.0
250.0	0.3836	877.8	8.02	192.8	334.0	4.110	0.7619	1.261	2593.0
300.0	0.4507	1010.0	6.65	230.0	396.9	4.339	0.7593	1.254	2777.0
350.0	0.5175	1140.0	5.68	267.8	459.4	4.532	0.7573	1.249	2951.0
400.0	0.5842	1270.0	.96	305.5	521.8	4.698	0.7558	1.246	3115.0
450.0	0.6508	1400.0	4.41	343.0	584.1	4.845	0.7547	1.244	3272.0
500.0	0.7174	1530.0	3.97	380.5	646.2	4.976	0.7537	1.243	3423.0
600.0	0.8535	1800.0	3.31	455.4	770.4	5.202	0.7524	1.241	3706.0
700.0	0.9836	2060.0	2.83	530.2	894.5	5.394	0.7514	1.241	3969.0
800.0	1.117	2320.0	2.48	605.0	1019.0	5.559	0.7508	1.240	4217.0
900.0	1.250	2590.0	2.21	679.6	1143.0	5.705	0.7502	1.240	4451.0
1000.0	1.383	2850.0	1.99	754.3	1267.0	5.836	0.7498	1.240	4674.0
1200.0	1.650	3380.0	1.66	903.6	1515.0	6.062	0.7492	1.240	5091.0
1400.0	1.916	3910.0	1.42	1053.0	1762.0	6.253	0.7488	1.240	5477.0
1600.0	2.183	4440.0	1.24	1202.0	2010.0	6.419	0.7485	1.240	5838.0
1800.0	2.450	4970.0	1.11	1351.0	2258.0	6.565	0.7482	1.240	6179.0
2000.0	2.717	5500.0	1.00	1500.0	2506.0	6.695	0.7481	1.240	6501.0
2500.0	3.384	6830.0	0.797	1873.0	3126.0	6.972	0.7477	1.240	7246.0
3000.0	4.052	8160.0	0.664	2246.0	3747.0	7.198	0.7475	1.240	7922.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

2000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)_P BTU/LB	V(DP/DU)_V PSIA-CU FT/BTU	-V(DP/DV)_T PSIA	(DV/DT)/V P 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
8.0	13.64	58.5	16.9	10900.0	0.00938	0.0268	22.3	0.00358	1.01988	1.64
9.0	13.52	71.7	13.3	10900.0	0.00816	0.0287	18.4	0.00362	1.01991	1.35
10.0	13.42	78.9	12.0	10900.0	0.00758	0.0306	15.8	0.00381	1.02001	1.11
11.0	13.32	84.1	11.1	10700.0	0.00733	0.0324	13.9	0.00394	1.02009	0.951
12.0	13.22	87.8	10.5	10400.0	0.00729	0.0340	12.4	0.00401	1.02016	0.843
13.0	13.12	90.4	10.1	10200.0	0.00737	0.0354	11.3	0.00405	1.02024	0.765
14.0	13.03	92.2	9.83	9900.0	0.00753	0.0367	10.4	0.00406	1.02031	0.707
15.0	12.93	93.4	9.63	9630.0	0.00773	0.0378	9.65	0.00405	1.02038	0.664
16.0	12.83	94.3	9.46	9350.0	0.00796	0.0387	9.04	0.00402	1.02044	0.631
17.0	12.72	95.0	9.32	9080.0	0.00820	0.0395	8.53	0.00398	1.02051	0.606
18.0	12.62	95.7	9.19	8820.0	0.00844	0.0402	8.18	0.00394	1.02057	0.587
19.0	12.51	96.7	9.02	8560.0	0.00863	0.0407	7.73	0.00390	1.02063	0.570
20.0	12.40	97.6	8.85	8310.0	0.00881	0.0411	7.41	0.00386	1.02068	0.558
22.0	12.17	99.4	8.55	7840.0	0.00914	0.0418	6.90	0.00378	1.02078	0.540
24.0	11.95	101.0	8.27	7400.0	0.00944	0.0422	6.52	0.00371	1.02086	0.530
26.0	11.72	102.0	8.03	6980.0	0.00971	0.0424	6.23	0.00365	1.02093	0.524
28.0	11.50	103.0	7.84	6590.0	0.0100	0.0424	6.00	0.00359	1.02098	0.523
30.0	11.27	104.0	7.69	6230.0	0.0103	0.0424	5.82	0.00354	1.02101	0.526
32.0	11.03	104.0	7.52	5900.0	0.0105	0.0423	5.68	0.00350	1.02102	0.530
34.0	10.80	105.0	7.38	5590.0	0.0107	0.0421	5.57	0.00346	1.02101	0.536
36.0	10.57	106.0	7.24	5310.0	0.0109	0.0419	5.49	0.00344	1.02098	0.543
38.0	10.34	107.0	7.11	5060.0	0.0110	0.0417	5.42	0.00342	1.02094	0.551
40.0	10.12	108.0	6.98	4830.0	0.0111	0.0414	5.37	0.00342	1.02088	0.559
45.0	9.565	111.0	6.68	4350.0	0.0112	0.0409	5.29	0.00344	1.02065	0.580
50.0	9.043	114.0	6.42	3990.0	0.0112	0.0404	5.27	0.00350	1.02034	0.600
55.0	8.555	118.0	6.18	3700.0	0.0110	0.0401	5.29	0.00360	1.01996	0.618
60.0	8.104	123.0	5.97	3490.0	0.0107	0.0399	5.33	0.00374	1.01954	0.633
70.0	7.308	134.0	5.62	3180.0	0.0100	0.0399	5.46	0.00410	1.01862	0.657
80.0	6.640	145.0	5.34	2990.0	0.00920	0.0403	5.63	0.00454	1.01768	0.672
90.0	6.079	158.0	5.12	2850.0	0.00847	0.0410	5.81	0.00505	1.01676	0.681
100.0	5.604	170.0	4.95	2750.0	0.00782	0.0418	6.00	0.00562	1.01591	0.686
120.0	4.847	195.0	4.68	2610.0	0.00674	0.0440	6.40	0.00689	1.01438	0.690
140.0	4.273	221.0	4.50	2510.0	0.00590	0.0463	6.81	0.00833	1.01310	0.688
160.0	3.824	246.0	4.36	2450.0	0.00524	0.0489	7.21	0.00990	1.01201	0.685
180.0	3.462	272.0	4.26	2400.0	0.00472	0.0515	7.61	0.0116	1.01108	0.682
200.0	3.164	297.0	4.18	2360.0	0.00429	0.0541	7.87	0.0134	1.01029	0.668
250.0	2.607	360.0	4.04	2290.0	0.00351	0.0605	8.83	0.0184	1.00872	0.662
300.0	2.219	422.0	3.94	2240.0	0.00297	0.0668	9.74	0.0248	1.00757	0.658
350.0	1.932	484.0	3.88	2200.0	0.00258	0.0728	10.6	0.0302	1.00668	0.656
400.0	1.712	546.0	3.84	2180.0	0.00228	0.0786	11.5	0.0368	1.00598	0.654
450.0	1.537	608.0	3.80	2150.0	0.00205	0.0841	12.3	0.0440	1.00541	0.654
500.0	1.394	670.0	3.78	2140.0	0.00186	0.0893	13.1	0.0516	1.00494	0.655
600.0	1.176	793.0	3.74	2110.0	0.00156	0.100	14.7	0.0683	1.00421	0.657
700.0	1.017	917.0	3.71	2090.0	0.00135	0.110	16.2	0.0873	1.00367	0.659
800.0	0.8954	1040.0	3.69	2080.0	0.00119	0.120	17.8	0.108	1.00325	0.660
900.0	0.8000	1160.0	3.68	2070.0	0.00107	0.130	19.2	0.131	1.00292	0.661
1000.0	0.7238	1290.0	3.66	2060.0	0.000961	0.139	20.7	0.156	1.00264	0.662
1200.0	0.6062	1530.0	3.65	2050.0	0.000808	0.158	23.4	0.210	1.00223	0.662
1400.0	0.5210	1780.0	3.64	2040.0	0.000696	0.176	26.1	0.271	1.00193	0.663
1600.0	0.4581	2030.0	3.63	2030.0	0.000611	0.193	28.6	0.339	1.00170	0.664
1800.0	0.4082	2280.0	3.62	2030.0	0.000545	0.209	31.1	0.413	1.00151	0.664
2000.0	0.3681	2520.0	3.61	2030.0	0.000491	0.225	33.5	0.493	1.00137	0.664
2500.0	0.2955	3140.0	3.61	2020.0	0.000395	0.264	39.2	0.719	1.00110	0.664
3000.0	0.2468	3760.0	3.60	2010.0	0.000338	0.300	44.6	0.980	1.00092	0.664

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

2500 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
9.0	0.07094	935.0	100.0	5.907	38.75	0.3617	0.5452	0.6500	2272.0
10.0	0.07149	942.0	94.0	6.310	39.41	0.4292	0.5420	0.6309	2254.0
11.0	0.07198	939.0	86.2	6.714	40.04	0.4891	0.5463	0.6298	2239.0
12.0	0.07245	930.0	83.9	7.122	40.66	0.5444	0.5556	0.6398	2227.0
13.0	0.07291	910.0	79.7	7.544	41.30	0.5962	0.5669	0.6555	2217.0
14.0	0.07338	904.0	78.8	7.979	41.95	0.6455	0.5789	0.6748	2209.0
15.0	0.07385	889.0	78.6	8.428	42.62	0.6929	0.5913	0.6966	2203.0
16.0	0.07434	874.0	78.8	8.891	43.31	0.7376	0.6041	0.7203	2198.0
17.0	0.07485	860.0	79.1	9.370	44.02	0.7831	0.6172	0.7456	2193.0
18.0	0.07538	845.0	79.4	9.865	44.76	0.8266	0.6305	0.7720	2189.0
19.0	0.07593	830.0	79.2	10.48	45.64	0.8749	0.6429	0.7961	2132.0
20.0	0.07651	816.0	78.9	11.42	46.54	0.9222	0.6552	0.8204	2175.0
22.0	0.07766	790.0	77.9	12.46	48.43	1.014	0.6786	0.8673	2162.3
24.0	0.07891	765.0	76.4	13.88	50.41	1.102	0.6988	0.9099	2148.0
26.0	0.08017	741.0	74.7	15.36	52.47	1.186	0.7139	0.9466	2134.0
28.0	0.08148	718.0	73.0	16.79	54.51	1.262	0.7258	0.9813	2121.0
30.0	0.08286	697.0	71.4	18.15	56.51	1.331	0.7364	1.016	2110.0
32.0	0.08429	676.0	69.7	19.55	58.57	1.397	0.7445	1.047	2099.0
34.0	0.08579	657.0	67.8	20.98	60.69	1.461	0.7507	1.075	2088.0
36.0	0.08733	640.0	65.9	22.44	62.87	1.524	0.7555	1.108	2078.0
38.0	0.08893	624.0	64.0	23.92	65.09	1.584	0.7591	1.124	2060.0
40.0	0.09057	609.0	62.0	25.43	67.36	1.642	0.7620	1.146	2060.0
45.0	0.09469	579.0	57.3	29.28	73.21	1.788	0.7669	1.193	2042.0
50.0	0.09948	556.0	52.9	33.22	79.28	1.907	0.7700	1.231	2029.0
55.0	0.1043	540.0	48.8	37.23	85.51	2.026	0.7723	1.261	2022.0
60.0	0.1093	531.0	45.2	41.28	91.80	2.137	0.7741	1.284	2020.0
70.0	0.1197	525.0	38.9	49.46	104.9	2.337	0.7767	1.313	2027.0
80.0	0.1305	531.0	33.9	57.67	118.1	2.514	0.7784	1.326	2046.0
90.0	0.1415	544.0	29.9	65.88	131.4	2.670	0.7792	1.329	2073.0
100.0	0.1525	561.0	26.7	74.05	144.6	2.810	0.7795	1.328	2105.0
120.0	0.1747	604.0	21.9	90.25	171.1	3.051	0.7786	1.318	2176.0
140.0	0.1968	651.0	18.5	106.3	197.4	3.254	0.7768	1.307	2252.0
160.0	0.2188	700.0	16.0	122.1	223.4	3.428	0.7747	1.296	2330.0
180.0	0.2407	751.0	14.1	137.8	249.2	3.580	0.7726	1.287	2407.0
200.0	0.2624	802.0	12.6	153.4	274.9	3.715	0.7705	1.279	2484.0
250.0	0.3164	932.0	10.0	191.9	338.4	3.998	0.7663	1.265	2669.0
300.0	0.3701	1066.0	8.29	230.1	401.4	4.228	0.7631	1.256	2845.0
350.0	0.4235	1190.0	7.09	268.1	464.1	4.421	0.7606	1.251	3012.0
400.0	0.4768	1320.0	6.19	305.8	526.5	4.588	0.7588	1.247	3172.0
450.0	0.5300	1450.0	5.50	343.5	588.8	4.735	0.7573	1.245	3325.0
500.0	0.5831	1580.0	4.95	381.1	651.5	4.868	0.7561	1.243	3471.0
600.0	0.6894	1840.0	4.12	456.1	775.2	5.092	0.7544	1.241	3749.0
700.0	0.7957	2110.0	3.54	530.9	899.3	5.284	0.7532	1.240	4008.0
800.0	0.9021	2370.0	3.09	605.7	1023.0	5.449	0.7523	1.240	4252.0
900.0	1.008	2630.0	2.75	680.5	1147.0	5.595	0.7517	1.240	4483.0
1000.0	1.115	2890.0	2.48	755.2	1271.0	5.726	0.7511	1.240	4704.0
1200.0	1.328	3420.0	2.07	904.5	1519.0	5.952	0.7504	1.239	5117.0
1400.0	1.541	3950.0	1.77	1054.0	1767.0	6.143	0.7498	1.240	5500.0
1600.0	1.754	4480.0	1.55	1203.0	2015.0	6.308	0.7494	1.240	5858.0
1800.0	1.967	5010.0	1.38	1352.0	2263.0	6.454	0.7491	1.240	6196.0
2000.0	2.180	5540.0	1.24	1501.0	2511.0	6.585	0.7489	1.240	6517.0
2500.0	2.714	6870.0	0.995	1874.0	3131.0	6.862	0.7485	1.240	7259.0
3000.0	3.248	8190.0	0.829	2247.0	3751.9	7.088	0.7482	1.240	7932.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

2500 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_v$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
9.0	14.10	79.2	14.1	13200.0	0.00820	0.0314	26.2	0.00343	1.01935	1.95
10.0	13.99	88.4	12.4	13200.0	0.00714	0.0335	21.8	0.00379	1.01947	1.48
11.0	13.89	95.3	11.4	13000.0	0.00661	0.0354	18.7	0.00405	1.01957	1.20
12.0	13.80	100.0	10.7	12800.0	0.00638	0.0372	16.5	0.00422	1.01965	1.02
13.0	13.72	103.0	10.3	12600.0	0.00633	0.0389	14.7	0.00432	1.01974	0.894
14.0	13.63	105.0	10.0	12300.0	0.00640	0.0403	13.4	0.00438	1.01982	0.806
15.0	13.54	107.0	9.82	12000.0	0.00653	0.0415	12.3	0.00440	1.01990	0.741
16.0	13.45	108.0	9.69	11800.0	0.00670	0.0426	11.4	0.00440	1.01998	0.692
17.0	13.36	108.0	9.59	11500.0	0.00669	0.0435	10.6	0.00437	1.02005	0.656
18.0	13.27	109.0	9.50	11200.0	0.00709	0.0443	10.0	0.00432	1.02013	0.628
19.0	13.17	110.0	9.35	10900.0	0.00724	0.0449	9.46	0.00428	1.02020	0.604
20.0	13.07	111.0	9.21	10700.0	0.00739	0.0454	9.00	0.00424	1.02028	0.585
22.0	12.87	113.0	8.91	10200.0	0.00766	0.0462	8.27	0.00414	1.02041	0.559
24.0	12.67	115.0	8.67	9700.0	0.00788	0.0467	7.72	0.00405	1.02053	0.542
26.0	12.47	117.0	8.39	9250.0	0.00807	0.0469	7.30	0.00398	1.02064	0.530
28.0	12.27	118.0	8.20	8820.0	0.00828	0.0471	6.97	0.00391	1.02074	0.523
30.0	12.07	120.0	8.04	8410.0	0.00849	0.0471	6.71	0.00384	1.02082	0.521
32.0	11.86	121.0	7.89	8020.0	0.00868	0.0470	6.50	0.00378	1.02089	0.522
34.0	11.66	121.0	7.75	7660.0	0.00885	0.0468	6.34	0.00374	1.02094	0.524
36.0	11.45	122.0	7.62	7330.0	0.00899	0.0466	6.20	0.00370	1.02098	0.527
38.0	11.25	123.0	7.49	7010.0	0.00912	0.0464	6.09	0.00367	1.02101	0.532
40.0	11.04	124.0	7.37	6730.0	0.00922	0.0461	6.01	0.00365	1.02102	0.537
45.0	10.54	127.0	7.09	6100.0	0.00940	0.0455	5.86	0.00362	1.02098	0.553
50.0	10.05	130.0	6.83	5590.0	0.00947	0.0448	5.79	0.00363	1.02086	0.571
55.0	9.588	134.0	6.60	5180.0	0.00943	0.0445	5.77	0.00368	1.02066	0.589
60.0	9.149	138.0	6.38	4860.0	0.00930	0.0441	5.78	0.00376	1.02041	0.605
70.0	8.353	148.0	6.00	4380.0	0.00888	0.0438	5.86	0.00400	1.01978	0.632
80.0	7.664	159.0	5.69	4070.0	0.00834	0.0439	5.99	0.00432	1.01906	0.651
90.0	7.070	171.0	5.44	3840.0	0.00779	0.0443	6.15	0.00472	1.01830	0.664
100.0	6.557	183.0	5.23	3680.0	0.00726	0.0450	6.32	0.00516	1.01755	0.672
120.0	5.725	208.0	4.92	3460.0	0.00634	0.0467	6.69	0.00619	1.01613	0.679
140.0	5.081	233.0	4.70	3310.0	0.00560	0.0489	7.07	0.00736	1.01480	0.681
160.0	4.571	259.0	4.53	3200.0	0.00501	0.0512	7.45	0.00854	1.01378	0.679
180.0	4.155	284.0	4.41	3120.0	0.00453	0.0536	7.83	0.00100	1.01202	0.676
200.0	3.811	309.0	4.31	3060.0	0.00414	0.0561	8.08	0.0115	1.01198	0.663
250.0	3.160	372.0	4.13	2940.0	0.00340	0.0623	9.01	0.0156	1.01020	0.658
300.0	2.702	434.0	4.02	2870.0	0.00289	0.0686	9.90	0.0201	1.00900	0.655
350.0	2.361	496.0	3.96	2810.0	0.00252	0.0743	10.8	0.0251	1.00800	0.652
400.0	2.098	558.0	3.89	2770.0	0.00223	0.0799	11.6	0.0305	1.00719	0.651
450.0	1.887	620.0	3.85	2748.0	0.00201	0.0852	12.4	0.0363	1.00654	0.651
500.0	1.715	682.0	3.82	2710.0	0.00182	0.0904	13.2	0.0424	1.00599	0.651
600.0	1.450	805.0	3.77	2670.0	0.00154	0.101	14.7	0.0559	1.00513	0.654
700.0	1.257	928.0	3.73	2650.0	0.00134	0.111	16.3	0.0711	1.00449	0.658
800.0	1.109	1050.0	3.71	2630.0	0.00118	0.121	17.8	0.0879	1.00398	0.658
900.0	0.9916	1180.0	3.69	2610.0	0.00105	0.131	19.3	0.106	1.00358	0.659
1000.0	0.8978	1300.0	3.68	2600.0	0.000955	0.140	20.7	0.126	1.00326	0.660
1200.0	0.7532	1550.0	3.66	2590.0	0.000802	0.158	23.5	0.170	1.00275	0.662
1400.0	0.6490	1790.0	3.64	2560.0	0.000691	0.176	26.1	0.219	1.00238	0.662
1600.0	0.5702	2040.0	3.63	2550.0	0.000608	0.193	28.7	0.273	1.00210	0.663
1800.0	0.5084	2290.0	3.62	2550.0	0.000542	0.210	31.1	0.332	1.00188	0.663
2000.0	0.4586	2530.0	3.62	2540.0	0.000489	0.226	33.5	0.397	1.00170	0.664
2500.0	0.3685	3150.0	3.61	2530.0	0.000393	0.264	39.2	0.577	1.00137	0.664
3000.0	0.3079	3770.0	3.60	2520.0	0.000329	0.300	44.6	0.786	1.00115	0.664

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

3000 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
10.0	0.06903	1060.0	108.0	7.188	45.46	0.3833	0.5894	0.6861	2396.0
11.0	0.06948	1070.0	95.3	7.520	46.12	0.4472	0.5752	0.6589	2379.0
12.0	0.06990	1060.0	88.2	7.933	46.76	0.5041	0.5717	0.6514	2366.0
13.0	0.07030	1050.0	84.5	8.350	47.40	0.5564	0.5737	0.6545	2356.0
14.0	0.07078	1040.0	82.8	8.773	48.05	0.6052	0.5789	0.6644	2349.0
15.0	0.07110	1020.0	82.3	9.204	48.70	0.6516	0.5864	0.6792	2344.0
16.0	0.07151	1010.0	82.5	9.645	49.37	0.6961	0.5958	0.6979	2341.0
17.0	0.07194	1000.0	83.0	10.10	50.06	0.7391	0.6067	0.7194	2338.0
18.0	0.07238	991.0	83.6	10.56	50.77	0.7809	0.6188	0.7432	2336.0
19.0	0.07285	966.0	83.7	11.16	51.63	0.8280	0.6304	0.7658	2332.0
20.0	0.07333	952.0	83.7	11.77	52.51	0.8740	0.6428	0.7894	2328.0
22.0	0.07431	926.0	83.3	13.06	54.34	0.9631	0.6678	0.8362	2318.0
24.0	0.07533	902.0	82.1	14.43	56.28	1.049	0.6903	0.8789	2307.0
26.0	0.07638	879.0	80.6	15.87	58.30	1.131	0.7073	0.9149	2294.0
28.0	0.07746	856.0	79.2	17.24	60.27	1.205	0.7206	0.9484	2284.0
30.0	0.07859	834.0	77.8	18.54	62.21	1.272	0.7326	0.9817	2275.0
32.0	0.07977	812.0	76.2	19.89	64.20	1.336	0.7418	1.012	2265.0
34.0	0.08098	792.0	74.6	21.26	66.25	1.398	0.7490	1.039	2256.0
36.0	0.08224	774.0	72.8	22.67	68.35	1.455	0.7545	1.063	2247.0
38.0	0.08353	756.0	71.0	24.10	70.50	1.516	0.7588	1.086	2239.0
40.0	0.08486	739.0	69.2	25.56	72.70	1.573	0.7622	1.107	2230.0
45.0	0.08833	703.0	64.6	29.28	78.35	1.706	0.7681	1.154	2212.0
50.0	0.09282	674.0	60.2	33.10	84.22	1.829	0.7719	1.193	2197.0
55.0	0.09588	652.0	56.1	37.01	90.27	1.945	0.7746	1.226	2187.0
60.0	0.0999	636.0	52.2	40.97	96.47	2.053	0.7768	1.253	2180.0
70.0	0.1083	619.0	45.6	49.01	109.2	2.249	0.7808	1.290	2178.0
80.0	0.1171	616.0	40.0	57.15	122.2	2.423	0.7822	1.311	2188.0
90.0	0.1261	623.0	35.5	65.31	135.4	2.578	0.7835	1.321	2206.0
100.0	0.1352	636.0	31.8	73.48	148.6	2.717	0.7841	1.324	2230.0
120.0	0.1536	672.0	26.2	89.71	175.1	2.950	0.7836	1.319	2290.0
140.0	0.1728	716.0	22.2	105.8	201.4	3.161	0.7820	1.318	2357.0
160.0	0.1903	763.0	19.2	121.7	227.4	3.335	0.7799	1.308	2427.0
180.0	0.2085	811.0	17.8	137.5	253.4	3.488	0.7776	1.291	2498.0
200.0	0.2266	861.0	15.2	153.2	279.1	3.623	0.7754	1.283	2569.0
250.0	0.2716	988.0	12.0	191.9	342.8	3.908	0.7706	1.268	2744.0
300.0	0.3163	1120.0	9.93	230.3	406.5	4.138	0.7669	1.258	2912.0
350.0	0.3607	1240.0	8.49	268.3	468.7	4.331	0.7648	1.252	3073.0
400.0	0.4051	1370.0	7.41	306.2	531.2	4.498	0.7618	1.248	3228.0
450.0	0.4493	1500.0	6.58	343.9	593.6	4.645	0.7600	1.245	3376.0
500.0	0.4936	1630.0	5.92	381.6	655.8	4.776	0.7586	1.244	3519.0
600.0	0.5828	1890.0	4.94	456.7	780.0	5.003	0.7565	1.241	3791.0
700.0	0.6704	2150.0	4.23	531.6	904.1	5.194	0.7550	1.240	4046.0
800.0	0.7569	2410.0	3.71	606.5	1028.0	5.360	0.7539	1.240	4286.0
900.0	0.8473	2670.0	3.30	681.3	1152.0	5.586	0.7531	1.239	4515.0
1000.0	0.9359	2940.0	2.97	756.0	1276.0	5.636	0.7525	1.239	4733.0
1200.0	1.113	3460.0	2.48	905.4	1524.0	5.862	0.7515	1.239	5142.0
1400.0	1.290	3990.0	2.12	1055.0	1772.0	6.053	0.7509	1.239	5522.0
1600.0	1.468	4520.0	1.86	1204.0	2019.0	6.219	0.7504	1.239	5878.0
1800.0	1.645	5040.0	1.65	1353.0	2267.0	6.365	0.7500	1.239	6214.0
2000.0	1.823	5570.0	1.49	1503.0	2515.0	6.495	0.7497	1.239	6533.0
2500.0	2.267	6900.0	1.19	1876.0	3135.0	6.772	0.7492	1.240	7271.0
3000.0	2.711	8220.0	0.994	2249.0	3755.0	6.990	0.7488	1.240	7941.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

3000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
10.0	14.49	97.9	12.7	15400.0	0.00701	0.0363	29.5	0.00365	1.01891	2.01
11.0	14.39	106.0	11.5	15300.0	0.00621	0.0384	24.8	0.00405	1.01902	1.53
12.0	14.31	112.0	10.8	15200.0	0.00581	0.0404	21.4	0.00433	1.01912	1.25
13.0	14.22	116.0	10.4	14900.0	0.00565	0.0421	18.9	0.00453	1.01921	1.06
14.0	14.14	118.0	10.1	14700.0	0.00564	0.0437	16.9	0.00465	1.01930	0.926
15.0	14.06	119.0	10.0	14400.0	0.00571	0.0451	15.4	0.00472	1.01939	0.833
16.0	13.98	120.0	9.90	14100.0	0.00584	0.0463	14.1	0.00475	1.01947	0.765
17.0	13.90	120.0	9.84	13800.0	0.00600	0.0473	13.0	0.00473	1.01956	0.714
18.0	13.82	120.0	9.78	13600.0	0.00617	0.0482	12.2	0.00469	1.01964	0.676
19.0	13.73	121.0	9.67	13300.0	0.00631	0.0489	11.4	0.00465	1.01973	0.644
20.0	13.64	122.0	9.55	13000.0	0.00645	0.0495	10.8	0.00459	1.01981	0.620
22.0	13.46	125.0	9.27	12500.0	0.00668	0.0503	9.77	0.00447	1.01997	0.585
24.0	13.27	128.0	8.96	12000.0	0.00686	0.0509	9.02	0.00436	1.02012	0.561
26.0	13.09	131.0	8.70	11500.0	0.00701	0.0512	8.44	0.00427	1.02026	0.543
28.0	12.91	132.0	8.51	11000.0	0.00717	0.0514	7.99	0.00419	1.02039	0.531
30.0	12.72	134.0	8.35	10600.0	0.00733	0.0514	7.64	0.00411	1.02050	0.525
32.0	12.54	135.0	8.20	10200.0	0.00749	0.0513	7.35	0.00404	1.02061	0.522
34.0	12.35	136.0	8.06	9790.0	0.00762	0.0511	7.12	0.00399	1.02070	0.522
36.0	12.16	137.0	7.93	9410.0	0.00774	0.0509	6.93	0.00394	1.02079	0.521
38.0	11.97	138.0	7.81	9050.0	0.00784	0.0507	6.78	0.00390	1.02086	0.523
40.0	11.78	139.0	7.70	8710.0	0.00794	0.0504	6.65	0.00386	1.02091	0.526
45.0	11.32	142.0	7.43	7960.0	0.00811	0.0497	6.43	0.00381	1.02100	0.537
50.0	10.87	145.0	7.18	7330.0	0.00821	0.0491	6.30	0.00379	1.02101	0.552
55.0	10.43	149.0	6.94	6800.0	0.00824	0.0485	6.24	0.00380	1.02096	0.567
60.0	10.01	153.0	6.72	6370.0	0.00820	0.0481	6.21	0.00363	1.02084	0.583
70.0	9.230	162.0	6.33	5710.0	0.00797	0.0475	6.24	0.00399	1.02046	0.610
80.0	8.538	172.0	6.00	5260.0	0.00761	0.0473	6.34	0.00423	1.01995	0.632
90.0	7.928	184.0	5.72	4940.0	0.00719	0.0475	6.47	0.00452	1.01935	0.647
100.0	7.394	196.0	5.49	4700.0	0.00677	0.0480	6.62	0.00490	1.01873	0.658
120.0	6.510	220.0	5.14	4380.0	0.00599	0.0494	6.96	0.00576	1.01747	0.669
140.0	5.814	246.0	4.88	4160.0	0.00533	0.0513	7.32	0.00674	1.01630	0.672
160.0	5.255	271.0	4.69	4010.0	0.00480	0.0535	7.68	0.00783	1.01523	0.672
180.0	4.796	296.0	4.55	3890.0	0.00436	0.0558	8.05	0.00901	1.01427	0.671
200.0	4.412	322.0	4.43	3800.0	0.00399	0.0581	8.29	0.0103	1.01342	0.658
250.0	3.682	384.0	4.23	3640.0	0.00330	0.0641	9.19	0.0137	1.01165	0.654
300.0	3.162	447.0	4.10	3530.0	0.00282	0.0700	10.1	0.0176	1.01028	0.651
350.0	2.772	509.0	4.01	3450.0	0.00246	0.0757	10.9	0.0218	1.00920	0.649
400.0	2.469	571.0	3.94	3390.0	0.00219	0.0812	11.7	0.0263	1.00831	0.647
450.0	2.226	632.0	3.89	3340.0	0.00197	0.0864	12.5	0.0312	1.00759	0.647
500.0	2.026	694.0	3.85	3300.0	0.00179	0.0914	13.2	0.0363	1.00697	0.648
600.0	1.710	817.0	3.80	3250.0	0.00152	0.101	14.6	0.0476	1.00680	0.651
700.0	1.492	940.0	3.76	3210.0	0.00132	0.112	16.3	0.0603	1.00527	0.654
800.0	1.318	1060.0	3.73	3180.0	0.00117	0.121	17.9	0.0744	1.00469	0.656
900.0	1.180	1190.0	3.71	3160.0	0.00104	0.131	19.3	0.0897	1.00423	0.658
1000.0	1.069	1313.0	3.69	3140.0	0.000946	0.141	20.6	0.106	1.00385	0.659
1200.0	0.8904	1560.0	3.67	3110.0	0.000796	0.159	23.5	0.143	1.00326	0.660
1400.0	0.7750	1800.0	3.65	3090.0	0.000687	0.176	26.2	0.184	1.00283	0.661
1600.0	0.6813	2050.0	3.64	3000.0	0.000604	0.193	28.7	0.229	1.00250	0.661
1800.0	0.6078	2300.0	3.63	3070.0	0.000539	0.210	31.2	0.278	1.00224	0.662
2000.0	0.5486	2540.0	3.62	3060.0	0.000487	0.226	33.5	0.332	1.00202	0.663
2500.0	0.4411	3160.0	3.61	3040.0	0.000392	0.264	39.3	0.403	1.00163	0.663
3000.0	0.3688	3780.0	3.60	3030.0	0.000328	0.300	44.7	0.657	1.00137	0.664

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

3500 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
11.0	0.06740	1190.0	106.0	8.344	52.03	0.4085	0.6148	0.7016	2504.0
12.0	0.06779	1180.0	95.0	8.770	52.70	0.4682	0.5951	0.6729	2490.0
13.0	0.06815	1180.0	89.4	9.198	53.36	0.5215	0.5854	0.6614	2480.0
14.0	0.06850	1160.0	86.6	9.608	54.00	0.5705	0.5822	0.6606	2474.0
15.0	0.06885	1150.0	85.7	10.03	54.65	0.6163	0.5837	0.6677	2470.0
16.0	0.06921	1140.0	85.8	10.45	55.30	0.6599	0.5888	0.6806	2468.0
17.0	0.06957	1120.0	86.4	10.88	55.97	0.7017	0.5969	0.6981	2468.0
18.0	0.06995	1110.0	87.3	11.32	56.66	0.7422	0.6071	0.7191	2467.0
19.0	0.07036	1090.0	87.8	11.90	57.50	0.7881	0.6179	0.7404	2465.0
20.0	0.07077	1080.0	88.1	12.49	58.35	0.8330	0.6302	0.7635	2463.0
22.0	0.07162	1060.0	88.2	13.73	60.15	0.9202	0.6569	0.8189	2457.0
24.0	0.07250	1030.0	87.4	15.06	62.05	1.004	0.6816	0.8545	2448.0
26.0	0.07341	1010.0	86.0	16.46	64.03	1.085	0.7005	0.8906	2437.0
28.0	0.07433	986.0	84.7	17.79	65.97	1.158	0.7151	0.9234	2429.0
30.0	0.07530	964.0	83.5	19.05	67.85	1.223	0.7284	0.9561	2421.0
32.0	0.07630	943.0	82.1	20.34	69.79	1.285	0.7387	0.9853	2414.0
34.0	0.07733	923.0	80.6	21.67	71.79	1.346	0.7467	1.012	2406.0
36.0	0.07838	903.0	78.9	23.03	73.84	1.404	0.7529	1.035	2398.0
38.0	0.07947	884.0	77.2	24.42	75.93	1.461	0.7579	1.057	2391.0
40.0	0.08059	867.0	75.5	25.83	78.06	1.516	0.7618	1.078	2383.0
45.0	0.08350	827.0	71.0	29.45	83.57	1.645	0.7686	1.123	2366.0
50.0	0.08650	794.0	66.7	33.18	89.29	1.766	0.7731	1.162	2351.0
55.0	0.08980	766.0	62.6	36.98	95.18	1.870	0.7764	1.196	2339.0
60.0	0.09316	745.0	58.7	40.86	101.2	1.983	0.7790	1.225	2329.0
70.0	0.1002	718.0	51.7	48.77	113.7	2.176	0.7878	1.268	2320.0
80.0	0.1076	706.0	45.8	56.82	126.5	2.347	0.7857	1.295	2322.0
90.0	0.1152	706.0	40.9	64.93	139.6	2.500	0.7875	1.310	2333.0
100.0	0.1229	714.0	36.8	73.06	152.7	2.639	0.7384	1.318	2351.0
120.0	0.1386	743.0	30.4	89.30	179.1	2.879	0.7885	1.319	2400.0
140.0	0.1543	782.0	25.8	105.4	205.4	3.082	0.7871	1.312	2458.0
160.0	0.1699	826.0	22.4	121.4	231.6	3.257	0.7850	1.303	2521.0
180.0	0.1855	873.0	19.7	137.3	257.5	3.410	0.7826	1.294	2586.0
200.0	0.2011	921.0	17.6	153.0	283.4	3.546	0.7803	1.286	2652.0
250.0	0.2396	1040.0	14.0	192.0	347.3	3.831	0.7758	1.271	2817.0
300.0	0.2778	1170.0	11.6	230.5	418.5	4.062	0.7707	1.260	2977.0
350.0	0.3159	1300.0	9.87	268.6	473.4	4.255	0.7674	1.254	3133.0
400.0	0.3538	1420.0	8.62	306.6	535.9	4.423	0.7648	1.249	3283.0
450.0	0.3917	1550.0	7.66	344.4	598.3	4.569	0.7627	1.246	3427.0
500.0	0.4295	1680.0	6.89	382.1	660.5	4.701	0.7611	1.244	3567.0
600.0	0.5052	1940.0	5.74	457.3	784.8	4.927	0.7586	1.241	3833.0
700.0	0.5808	2200.0	4.93	532.4	908.8	5.118	0.7568	1.240	4083.0
800.0	0.6565	2460.0	4.31	607.3	1033.0	5.284	0.7556	1.239	4320.0
900.0	0.7322	2720.0	3.84	682.1	1157.0	5.430	0.7546	1.239	4546.0
1000.0	0.8080	2980.0	3.46	756.9	1281.0	5.560	0.7538	1.239	4761.0
1200.0	0.9596	3500.0	2.88	906.4	1528.0	5.786	0.7527	1.239	5166.0
1400.0	1.111	4030.0	2.47	1056.0	1776.0	5.977	0.7520	1.239	5543.0
1600.0	1.263	4550.0	2.17	1205.0	2024.0	6.143	0.7514	1.239	5897.0
1800.0	1.415	5080.0	1.93	1354.0	2272.0	6.289	0.7509	1.239	6231.0
2000.0	1.567	5610.0	1.74	1504.0	2520.0	6.419	0.7506	1.239	6548.0
2500.0	1.947	6930.0	1.39	1877.0	3139.0	6.696	0.7500	1.239	7283.0
3000.0	2.328	8250.0	1.16	2250.0	3759.0	6.922	0.7495	1.240	7951.0

* TWO-PHASE BOUNDARY

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THERMOPHYSICAL PROPERTIES OF HELIUM 4

3500 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R $_P$	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
11.0	14.84	117.0	11.6	17600.0	0.08600	0.0413	32.5	0.00397	1.01846	1.99
12.0	14.75	124.0	10.8	17580.0	0.08544	0.0434	27.6	0.00437	1.01857	1.54
13.0	14.67	128.0	10.4	17300.0	0.00518	0.0453	24.0	0.00467	1.01867	1.26
14.0	14.60	130.0	10.2	17000.0	0.00510	0.0471	21.2	0.00488	1.01877	1.07
15.0	14.52	130.0	10.1	16700.0	0.00512	0.0486	19.0	0.00501	1.01886	0.941
16.0	14.45	130.0	10.1	16400.0	0.00522	0.0499	17.3	0.00507	1.01895	0.848
17.0	14.37	131.0	10.1	16200.0	0.00535	0.0510	15.8	0.00508	1.01904	0.781
18.0	14.30	131.0	10.1	15900.0	0.08550	0.0515	14.7	0.00505	1.01913	0.730
19.0	14.21	131.0	10.0	15600.0	0.08564	0.0527	13.6	0.00501	1.01922	0.690
20.0	14.13	132.0	9.89	15300.0	0.00577	0.0533	12.8	0.00494	1.01932	0.659
22.0	13.96	135.0	9.61	14700.0	0.00598	0.0543	11.4	0.00479	1.01949	0.615
24.0	13.79	139.0	9.29	14200.0	0.00614	0.0549	10.4	0.00466	1.01966	0.585
26.0	13.62	142.0	9.01	13700.0	0.00626	0.0552	9.67	0.00455	1.01982	0.561
28.0	13.45	145.0	8.80	13300.0	0.08638	0.0554	9.08	0.00446	1.01997	0.545
30.0	13.28	147.0	8.63	12800.0	0.00652	0.0554	8.65	0.00437	1.02012	0.535
32.0	13.11	148.0	8.48	12480.0	0.00664	0.0553	8.73	0.00429	1.02025	0.528
34.0	12.93	150.0	8.34	11900.0	0.00675	0.0552	7.93	0.00422	1.02037	0.523
36.0	12.76	151.0	8.22	11500.0	0.00685	0.0549	7.68	0.00416	1.02048	0.521
38.0	12.58	152.0	8.10	11100.0	0.00694	0.0547	7.47	0.00411	1.02059	0.520
40.0	12.41	154.0	7.98	10800.0	0.00702	0.0544	7.30	0.00407	1.02068	0.521
45.0	11.98	157.0	7.72	9900.0	0.00717	0.0537	7.00	0.00399	1.02085	0.527
50.0	11.55	160.0	7.47	9170.0	0.00728	0.0529	6.81	0.00394	1.02097	0.538
55.0	11.14	163.0	7.24	8530.0	0.00733	0.0523	6.70	0.00393	1.02101	0.551
60.0	10.73	167.0	7.02	8000.0	0.00734	0.0518	6.64	0.00394	1.02108	0.566
70.0	9.98	176.0	6.62	7??0.0	0.00722	0.0510	6.62	0.00403	1.02083	0.593
80.0	9.295	186.0	6.27	6560.0	0.00698	0.0506	6.68	0.00421	1.02058	0.615
90.0	8.682	197.0	5.98	6130.0	0.00667	0.0506	6.79	0.00445	1.02007	0.632
100.0	8.136	208.0	5.73	5810.0	0.00633	0.0509	6.92	0.00475	1.01957	0.645
120.0	7.217	233.0	5.34	5360.0	0.00567	0.0521	7.22	0.00547	1.01850	0.659
140.0	6.402	258.0	5.06	5070.0	0.00509	0.0537	7.56	0.00632	1.01743	0.664
160.0	5.884	283.0	4.84	4860.0	0.00460	0.0557	7.91	0.00727	1.01642	0.666
180.0	5.390	309.0	4.68	4719.0	0.00419	0.0579	8.26	0.00838	1.01550	0.665
200.0	4.974	334.0	4.55	4580.0	0.00385	0.0601	8.68	0.00948	1.01465	0.653
250.0	4.174	397.0	4.32	4360.0	0.00320	0.0659	9.36	0.0124	1.01286	0.650
300.0	3.599	459.0	4.17	4210.0	0.00274	0.0716	10.2	0.0158	1.01144	0.647
350.0	3.166	521.0	4.06	4110.0	0.00241	0.0771	11.0	0.0194	1.01029	0.645
400.0	2.826	583.0	3.99	4030.0	0.00214	0.0825	11.8	0.0234	1.00935	0.644
450.0	2.553	645.0	3.93	3960.0	0.00193	0.0876	12.6	0.0275	1.00856	0.644
500.0	2.328	706.0	3.89	3910.0	0.00176	0.0925	13.3	0.0319	1.00790	0.644
600.0	1.979	829.0	3.82	3840.0	0.00150	0.102	14.0	0.0417	1.00683	0.648
700.0	1.722	952.0	3.78	3780.0	0.00130	0.112	16.4	0.0526	1.00601	0.652
800.0	1.523	1070.0	3.75	3740.0	0.00115	0.122	17.9	0.0647	1.00537	0.654
900.0	1.366	1200.0	3.72	3710.0	0.00103	0.132	19.4	0.0779	1.00485	0.656
1000.0	1.238	1320.0	3.70	3690.0	0.000938	0.141	20.8	0.0920	1.00442	0.657
1200.0	1.042	1570.0	3.68	3650.0	0.000790	0.159	23.5	0.123	1.00376	0.659
1400.0	0.8998	1810.0	3.66	3620.0	0.000603	0.177	26.2	0.159	1.00327	0.661
1600.0	0.7916	2060.0	3.64	3600.0	0.000601	0.194	28.7	0.197	1.00289	0.661
1800.0	0.7066	2310.0	3.63	3590.0	0.000937	0.210	31.2	0.240	1.00259	0.662
2000.0	0.6301	2550.0	3.62	3580.0	0.000485	0.226	33.6	0.286	1.00234	0.662
2500.0	0.5139	3170.0	3.61	3560.0	0.000391	0.264	39.3	0.415	1.00190	0.663
3000.0	0.4295	3790.0	3.68	3940.0	0.000327	0.300	44.7	0.564	1.00159	0.664

* TWO-PHASE BOUNDARY

4000 PSIA ISOBAR

THERMODYNAMIC PROPERTIES OF HELIUM 4

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
12.0	0.06599	1380.0	102.0	9.623	58.50	0.4352	0.6252	0.7032	2604.0
13.0	0.06632	1300.0	94.5	10.05	59.17	0.4902	0.6018	0.6748	2593.0
14.0	0.06663	1290.0	90.5	10.47	59.83	0.5397	0.5887	0.6621	2587.0
15.0	0.06695	1270.0	88.9	10.88	60.47	0.5853	0.5831	0.6604	2584.0
16.0	0.06726	1260.0	88.8	11.29	61.11	0.6282	0.5832	0.6671	2584.0
17.0	0.06759	1250.0	89.5	11.71	61.77	0.6690	0.5877	0.6802	2585.0
18.0	0.06792	1230.0	90.6	12.12	62.43	0.7085	0.5954	0.6982	2586.0
19.0	0.06827	1220.0	91.5	12.68	63.25	0.7433	0.6055	0.7182	2586.0
20.0	0.06864	1.00.0	92.2	13.25	64.09	0.7972	0.6177	0.7409	2586.0
22.0	0.06939	1180.0	92.8	14.45	65.85	0.8827	0.6459	0.7893	2582.0
24.0	0.07017	1150.0	92.3	15.74	67.72	0.9655	0.6730	0.8344	2576.0
26.0	0.07097	1130.0	91.0	17.11	69.68	1.045	0.6938	0.8712	2567.0
28.0	0.07179	1110.0	89.8	18.41	71.58	1.117	0.7097	0.9036	2560.0
30.0	0.07263	1098.0	88.8	19.62	73.42	1.180	0.7240	0.9360	2554.0
32.0	0.07351	1070.0	87.5	20.87	75.32	1.241	0.7353	0.9643	2548.0
34.0	0.07440	1050.0	86.1	22.17	77.28	1.301	0.7441	0.9905	2542.0
36.0	0.07532	1030.0	84.5	23.49	79.28	1.358	0.7510	1.014	2535.0
38.0	0.07627	1010.0	82.9	24.84	81.33	1.413	0.7565	1.035	2529.0
40.0	0.07724	991.0	81.2	26.21	83.42	1.467	0.7609	1.055	2522.0
45.0	0.07975	949.0	76.9	29.74	88.81	1.594	0.7688	1.099	2506.0
50.0	0.08239	912.0	72.6	33.38	94.40	1.712	0.7748	1.138	2492.0
55.0	0.08515	881.0	68.5	37.10	100.2	1.822	0.7778	1.171	2479.0
60.0	0.08802	855.0	64.6	40.91	106.1	1.925	0.7609	1.201	2468.0
70.0	0.09406	819.0	57.4	48.69	118.4	2.114	0.7857	1.247	2454.0
80.0	0.100	799.0	51.2	56.64	131.0	2.282	0.7890	1.279	2450.0
90.0	0.1061	792.0	45.9	64.68	143.9	2.434	0.7912	1.299	2455.0
100.0	0.1134	794.0	41.5	72.78	157.0	2.572	0.7925	1.318	2467.0
120.0	0.1277	816.0	34.5	89.01	183.3	2.812	0.7931	1.317	2505.0
140.0	0.1409	850.0	29.3	105.2	209.6	3.014	0.7919	1.313	2556.0
160.0	0.1546	891.0	25.5	121.2	235.8	3.189	0.7899	1.305	2612.0
180.0	0.1683	936.0	22.5	137.1	261.8	3.343	0.7875	1.297	2672.0
200.0	0.1818	982.0	20.1	152.9	287.6	3.479	0.7850	1.289	2733.0
250.0	0.2155	1100.0	15.9	192.0	351.7	3.765	0.7792	1.273	2888.0
300.0	0.2489	1230.0	13.2	230.7	415.1	3.996	0.7745	1.262	3042.0
350.0	0.2822	1350.0	11.3	269.0	478.0	4.190	0.7708	1.255	3191.0
400.0	0.3153	1480.0	9.83	307.0	540.6	4.357	0.7678	1.250	3336.0
450.0	0.3484	1600.0	8.73	344.9	603.0	4.504	0.7655	1.247	3477.0
500.0	0.3815	1730.0	7.85	382.7	665.3	4.635	0.7636	1.244	3613.0
600.0	0.4476	1980.0	6.55	458.0	789.5	4.862	0.7607	1.241	3873.0
700.0	0.5136	2240.0	5.62	533.1	913.6	5.053	0.7587	1.240	4119.0
800.0	0.5797	2500.0	4.92	608.1	1037.0	5.218	0.7572	1.239	4353.0
900.0	0.6453	2760.0	4.38	683.0	1161.0	5.364	0.7561	1.239	4576.0
1000.0	0.7121	3020.0	3.94	757.8	1285.0	5.495	0.7552	1.238	4789.0
1200.0	0.8445	3540.0	3.29	907.4	1533.0	5.721	0.7539	1.238	5190.0
1400.0	0.9771	4060.0	2.82	1057.0	1781.0	5.912	0.7530	1.239	5564.0
1600.0	1.110	4590.0	2.47	1206.0	2028.0	6.077	0.7524	1.239	5915.0
1800.0	1.243	5110.0	2.20	1356.0	2276.0	6.223	0.7518	1.239	6247.0
2000.0	1.376	5640.0	1.90	1505.0	2524.0	6.353	0.7514	1.239	6563.0
2500.0	1.708	6960.0	1.59	1878.0	3143.0	6.630	0.7507	1.239	7294.0
3000.0	2.041	8280.0	1.32	2252.0	3763.0	6.856	0.7502	1.239	7960.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

4000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
12.0	15.15	135.0	10.8	19700.0	0.00519	0.0464	35.2	0.00436	1.01802	1.92
13.0	15.08	139.8	10.4	19500.0	0.00484	0.0485	30.1	0.00477	1.01812	1.51
14.0	15.01	141.0	10.2	19300.0	0.00469	0.0503	26.3	0.00507	1.01823	1.25
15.0	14.94	141.0	10.2	19000.0	0.00468	0.0520	23.3	0.00527	1.01832	1.07
16.0	14.87	141.0	10.2	18700.0	0.00474	0.0534	21.0	0.00538	1.01842	0.944
17.0	14.80	140.0	10.3	18400.0	0.00486	0.0546	19.1	0.00542	1.01851	0.856
18.0	14.72	140.0	10.3	18100.0	0.00499	0.0556	17.5	0.00541	1.01861	0.791
19.0	14.65	140.0	10.3	17800.0	0.00513	0.0564	16.2	0.00537	1.01871	0.741
20.0	14.57	141.0	10.2	17500.0	0.00526	0.0571	15.1	0.00529	1.01880	0.703
22.0	14.41	144.0	10.0	17000.0	0.00546	0.0581	13.3	0.00511	1.01900	0.650
24.0	14.25	149.0	9.62	16500.0	0.00561	0.0588	12.0	0.00494	1.01918	0.613
26.0	14.09	153.0	9.31	16000.0	0.00570	0.0591	11.0	0.00482	1.01936	0.584
28.0	13.93	156.0	9.08	15500.0	0.00580	0.0593	10.2	0.00471	1.01953	0.562
30.0	13.77	158.0	8.91	15000.0	0.00592	0.0593	9.64	0.00460	1.01969	0.548
32.0	13.60	160.0	8.75	14500.0	0.00602	0.0592	9.16	0.00451	1.01984	0.537
34.0	13.44	162.0	8.60	14100.0	0.00611	0.0590	8.77	0.00443	1.01999	0.530
36.0	13.28	164.0	8.48	13600.0	0.00619	0.0588	8.45	0.00437	1.02012	0.524
38.0	13.11	165.0	8.35	13200.0	0.00626	0.0585	8.18	0.00431	1.02025	0.521
40.0	12.95	167.0	8.24	12800.0	0.00633	0.0582	7.97	0.00426	1.02036	0.520
45.0	12.54	170.0	7.98	11900.0	0.00647	0.0574	7.57	0.00416	1.02061	0.522
50.0	12.14	173.0	7.73	11100.0	0.00656	0.0566	7.32	0.00410	1.02080	0.529
55.0	11.74	177.0	7.50	10300.0	0.00662	0.0559	7.16	0.00406	1.02092	0.540
60.0	11.36	181.0	7.28	9720.0	0.00665	0.0552	7.06	0.00405	1.02100	0.552
70.0	10.63	189.0	6.87	8710.0	0.00659	0.0543	6.99	0.00410	1.02099	0.578
80.0	9.96	199.0	6.52	7960.0	0.00643	0.0538	7.01	0.00422	1.02082	0.600
90.0	9.353	209.0	6.21	7410.0	0.00620	0.0536	7.09	0.00441	1.02057	0.619
100.0	8.803	221.0	5.95	6990.0	0.00593	0.0537	7.20	0.00466	1.02016	0.632
120.0	7.859	245.0	5.53	6410.0	0.00538	0.0546	7.48	0.00528	1.01928	0.649
140.0	7.095	270.0	5.22	6030.0	0.00486	0.0561	7.79	0.00602	1.01833	0.657
160.0	6.467	295.0	4.99	5760.0	0.00442	0.0579	8.12	0.00686	1.01741	0.659
180.0	5.943	321.0	4.80	5560.0	0.00404	0.0599	8.46	0.00777	1.01653	0.659
200.0	5.499	346.0	4.66	5400.0	0.00372	0.0621	8.67	0.00875	1.01571	0.649
250.0	4.640	409.0	4.40	5110.0	0.00311	0.0676	9.52	0.0114	1.01393	0.646
300.0	4.017	472.0	4.24	4920.0	0.00268	0.0731	10.3	0.0144	1.01248	0.643
350.0	3.544	534.0	4.12	4790.0	0.00235	0.0785	11.1	0.0177	1.01130	0.641
400.0	3.171	595.0	4.04	4680.0	0.00210	0.0837	11.9	0.0211	1.01031	0.640
450.0	2.870	657.0	3.97	4600.0	0.00190	0.0887	12.7	0.0248	1.00947	0.640
500.0	2.621	718.0	3.92	4530.0	0.00173	0.0935	13.4	0.0287	1.00876	0.641
600.0	2.234	841.0	3.85	4440.0	0.00148	0.103	14.9	0.0372	1.00761	0.645
700.0	1.947	964.0	3.80	4360.0	0.00129	0.113	16.5	0.0469	1.00673	0.649
800.0	1.725	1090.0	3.77	4310.0	0.00114	0.123	18.0	0.0575	1.00602	0.652
900.0	1.548	1210.0	3.74	4270.0	0.00102	0.132	19.4	0.0690	1.00545	0.654
1000.0	1.404	1330.0	3.72	4240.0	0.000930	0.142	20.8	0.0814	1.00498	0.656
1200.0	1.184	1580.0	3.69	4190.0	0.000785	0.160	23.6	0.103	1.00424	0.658
1400.0	1.023	1820.0	3.66	4160.0	0.000679	0.177	26.2	0.140	1.00369	0.660
1600.0	0.9018	2070.0	3.65	4130.0	0.000598	0.194	28.7	0.174	1.00327	0.661
1800.0	0.8067	2320.0	3.64	4120.0	0.000534	0.210	31.2	0.211	1.00293	0.661
2000.0	0.7270	2560.0	3.63	4100.0	0.000483	0.226	33.6	0.251	1.00266	0.662
2500.0	0.5855	3180.0	3.61	4070.0	0.000389	0.264	39.3	0.364	1.00216	0.663
3000.0	0.4900	3880.0	3.60	4060.0	0.000326	0.301	44.7	0.495	1.00181	0.663

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

4500 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP	VELOCITY OF SOUND FT/SEC
12.0	0.06462	1410.0	110.0	10.40	64.16	0.4843	0.6617	0.7418	2709.0
13.0	0.06473	1415.0	100.0	10.93	64.87	0.4616	0.6226	0.6938	2698.0
14.0	0.06492	1400.0	94.3	11.35	65.53	0.5120	0.5982	0.6579	2692.0
15.0	0.06530	1390.0	92.1	11.76	66.17	0.5576	0.5845	0.6567	2689.0
16.0	0.06559	1380.0	91.7	12.16	66.81	0.6000	0.5758	0.6566	2690.0
17.0	0.06588	1360.0	92.4	12.55	67.45	0.6400	0.5793	0.6649	2692.0
18.0	0.06618	1350.0	93.6	12.96	68.10	0.6785	0.5849	0.6797	2695.0
19.0	0.06649	1330.0	94.9	13.49	68.90	0.7223	0.5933	0.6982	2697.0
20.0	0.06682	1320.0	96.0	14.04	69.72	0.7653	0.6054	0.7207	2699.0
22.0	0.06750	1300.0	97.2	15.20	71.45	0.8492	0.6350	0.7783	2698.0
24.0	0.06823	1270.0	97.8	16.46	73.29	0.9308	0.6645	0.8172	2693.0
26.0	0.06892	1255.0	95.8	17.80	75.23	1.010	0.6873	0.8590	2686.0
28.0	0.06965	1230.0	94.7	19.06	77.10	1.080	0.7043	0.8875	2680.0
30.0	0.07041	1210.0	93.7	20.24	78.91	1.142	0.7197	0.9198	2676.0
32.0	0.07119	1190.0	92.6	21.46	80.75	1.203	0.7319	0.9482	2671.0
34.0	0.07199	1170.0	91.2	22.72	82.70	1.261	0.7414	0.9736	2666.0
36.0	0.07280	1150.0	89.7	24.01	84.67	1.317	0.7490	0.996	2661.0
38.0	0.07364	1130.0	88.1	25.32	86.68	1.372	0.7550	1.017	2656.0
40.0	0.07450	1118.0	86.5	26.66	88.74	1.424	0.7598	1.037	2650.0
45.0	0.07671	1070.0	82.3	30.11	94.03	1.549	0.7686	1.080	2636.0
50.0	0.07903	1030.0	78.1	33.67	99.5	1.665	0.7745	1.117	2622.0
55.0	0.08145	995.0	74.0	37.33	105.2	1.773	0.7789	1.151	2609.0
60.0	0.08396	966.0	70.0	41.06	111.0	1.874	0.7825	1.181	2597.0
70.0	0.08923	922.0	62.7	48.73	123.1	2.060	0.7880	1.229	2580.0
80.0	0.09477	895.0	56.3	56.58	135.6	2.227	0.7920	1.264	2571.0
90.0	0.1005	881.0	50.8	64.56	148.3	2.377	0.7948	1.280	2571.0
100.0	0.1064	877.0	46.0	72.61	161.3	2.513	0.7965	1.302	2578.0
120.0	0.1184	891.0	38.4	88.80	187.5	2.752	0.7976	1.314	2607.0
140.0	0.1305	920.0	32.8	105.0	213.8	2.955	0.7966	1.313	2650.0
160.0	0.1427	957.0	28.5	121.1	240.0	3.130	0.7947	1.307	2700.0
180.0	0.1548	1000.0	25.2	137.0	266.0	3.283	0.7922	1.300	2755.0
200.0	0.1669	1040.0	22.3	152.9	291.9	3.420	0.7897	1.292	2812.0
250.0	0.1968	1160.0	17.8	192.1	356.1	3.706	0.7835	1.276	2958.0
300.0	0.2265	1280.0	14.8	230.9	419.6	3.938	0.7783	1.264	3105.0
350.0	0.2560	1400.0	12.6	269.3	482.6	4.132	0.7742	1.256	3249.0
400.0	0.2854	1530.0	11.0	307.5	545.3	4.299	0.7709	1.251	3389.0
450.0	0.3147	1650.0	9.79	345.4	607.7	4.446	0.7683	1.247	3526.0
500.0	0.3441	1780.0	8.81	383.3	670.0	4.578	0.7661	1.244	3659.0
600.0	0.4027	2030.0	7.35	458.7	794.2	4.804	0.7629	1.241	3914.0
700.0	0.4613	2290.0	6.30	533.9	918.3	4.995	0.7606	1.240	4195.0
800.0	0.5208	2540.0	5.52	608.9	1042.0	5.161	0.7589	1.239	4386.0
900.0	0.5787	2800.0	4.91	683.8	1166.0	5.307	0.7576	1.238	4606.0
1000.0	0.6374	3060.0	4.43	758.7	1290.0	5.437	0.7566	1.238	4816.0
1200.0	0.7550	3500.0	3.69	908.3	1537.0	5.663	0.7551	1.238	5214.0
1400.0	0.8727	4100.0	3.17	1058.0	1785.0	5.854	0.7541	1.238	5585.0
1600.0	0.9905	4620.0	2.78	1207.0	2033.0	6.019	0.7533	1.238	5934.0
1800.0	1.108	5150.0	2.47	1357.0	2280.0	6.165	0.7528	1.239	6264.0
2000.0	1.226	5670.0	2.23	1506.0	2528.0	6.295	0.7523	1.239	6578.0
2500.0	1.522	6990.0	1.78	1880.0	3148.0	6.572	0.7515	1.239	7336.0
3000.0	1.817	8310.0	1.49	2253.0	3767.0	6.798	0.7509	1.239	7969.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

4500 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
12.0	15.52	148.0	10.7	22000.0	0.00502	0.0494	44.6	0.00429	1.01746	2.41
13.0	15.45	151.0	10.4	21500.0	0.00458	0.0516	37.6	0.00481	1.01758	1.82
14.0	15.38	153.0	10.3	21500.0	0.00438	0.0536	32.4	0.00522	1.01768	1.45
15.0	15.31	152.0	10.3	21300.0	0.00433	0.0553	28.4	0.00550	1.01778	1.22
16.0	15.25	150.0	10.4	21000.0	0.00437	0.0568	25.3	0.00560	1.01788	1.05
17.0	15.18	149.0	10.5	20700.0	0.00446	0.0581	22.8	0.00576	1.01798	0.940
18.0	15.11	148.0	10.6	20400.0	0.00459	0.0592	20.8	0.00576	1.01808	0.858
19.0	15.04	148.0	10.6	20100.0	0.00473	0.0601	19.0	0.00572	1.01818	0.797
20.0	14.97	148.0	10.6	19800.0	0.00486	0.0608	17.6	0.00564	1.01828	0.751
22.0	14.82	152.0	10.3	19200.0	0.00506	0.0619	15.3	0.00542	1.01649	0.688
24.0	14.66	157.0	10.0	18700.0	0.00520	0.0626	13.7	0.00522	1.01869	0.644
26.0	14.51	162.0	9.61	18200.0	0.00528	0.0629	12.5	0.00507	1.01888	0.609
28.0	14.36	166.0	9.36	17700.0	0.00536	0.0631	11.5	0.00495	1.01906	0.582
30.0	14.20	169.0	9.17	17200.0	0.00546	0.0631	10.7	0.00483	1.01924	0.564
32.0	14.05	171.0	9.00	16700.0	0.00554	0.0630	10.1	0.00473	1.01940	0.550
34.0	13.89	173.0	8.85	16200.0	0.00562	0.0628	9.65	0.00464	1.01957	0.539
36.0	13.74	175.0	8.72	15800.0	0.00568	0.0625	9.25	0.00457	1.01972	0.531
38.0	13.58	177.0	8.60	15300.0	0.00575	0.0622	8.92	0.00450	1.01986	0.526
40.0	13.42	179.0	8.48	14900.0	0.00580	0.0618	8.65	0.00444	1.02000	0.522
45.0	13.04	183.0	8.21	13900.0	0.00591	0.0669	8.15	0.00433	1.02030	0.520
50.0	12.65	186.0	7.97	13000.0	0.00600	0.0601	7.83	0.00425	1.02055	0.524
55.0	12.28	190.0	7.77	12200.0	0.00606	0.0593	7.61	0.00420	1.02074	0.532
60.0	11.91	194.0	7.51	11500.0	0.00609	0.0586	7.48	0.00417	1.02080	0.532
70.0	11.21	202.0	7.10	10300.0	0.00607	0.0575	7.35	0.00418	1.02101	0.542
80.0	10.55	212.0	6.74	9440.0	0.00597	0.0565	7.34	0.00426	1.02090	0.566
90.0	9.949	222.0	6.42	8760.0	0.00579	0.0565	7.39	0.00441	1.02082	0.580
100.0	9.398	233.0	6.15	8240.0	0.00558	0.0565	7.48	0.00462	1.02056	0.621
120.0	8.445	257.0	5.70	7520.0	0.00511	0.0572	7.73	0.00515	1.01986	0.640
140.0	7.660	282.0	5.37	7040.0	0.00465	0.0584	8.02	0.00581	1.01905	0.649
160.0	7.008	307.0	5.12	6710.0	0.00425	0.0601	8.33	0.00656	1.01821	0.653
180.0	6.460	333.0	4.92	6450.0	0.00390	0.0620	8.66	0.00730	1.01739	0.653
200.0	5.997	358.0	4.76	6250.0	0.00361	0.0640	8.85	0.00826	1.01662	0.644
250.0	5.082	421.0	4.48	5900.0	0.00303	0.0693	9.68	0.0107	1.01488	0.641
300.0	4.416	484.0	4.30	5680.0	0.0026	0.0747	10.5	0.0134	1.01343	0.639
350.0	3.907	546.0	4.17	5490.0	0.00223	0.0799	11.3	0.0163	1.01221	0.637
400.0	3.594	607.0	4.08	5350.0	0.00200	0.0858	12.0	0.0194	1.01119	0.636
450.0	3.177	669.0	4.01	5250.0	0.00182	0.0859	12.7	0.0227	1.01032	0.637
500.0	2.906	730.0	3.96	5170.0	0.00170	0.0946	13.5	0.0261	1.00958	0.637
600.0	2.483	853.0	3.38	5050.0	0.00146	0.104	15.8	0.0338	1.00836	0.642
700.0	2.168	975.0	3.82	4960.0	0.00127	0.114	16.5	0.0424	1.00741	0.647
800.0	1.923	1100.0	3.78	4890.0	0.00113	0.123	18.0	0.0518	1.00669	0.650
900.0	1.728	1220.0	3.75	4840.0	0.00101	0.133	19.5	0.0621	1.00603	0.652
1000.0	1.569	1340.0	3.73	4800.0	0.000922	0.142	20.9	0.0732	1.00603	0.654
1200.0	1.325	1590.0	3.69	4740.0	0.000779	0.160	23.6	0.0977	1.00471	0.657
1400.0	1.146	1838.0	3.67	4700.0	0.000675	0.178	26.2	0.125	1.00411	0.659
1600.0	1.010	2088.0	3.65	4670.0	0.000595	0.194	28.8	0.155	1.00365	0.666
1800.0	0.9022	2330.0	3.64	4640.0	0.000532	0.211	31.2	0.184	1.00327	0.661
2000.0	0.8154	2570.0	3.63	4630.0	0.000481	0.227	33.6	0.224	1.00297	0.661
2500.0	0.6572	3190.0	3.61	4590.0	0.000388	0.245	39.3	0.329	1.00241	0.662
3000.0	0.5503	3810.0	3.60	4570.0	0.000325	0.301	44.7	0.441	1.00283	0.663

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

5000 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV	CP (BTU / LB -R)	VELOCITY OF SOUND FT/SEC
13.0	0.06333	1520.0	105.0	11.81	70.45	0.4349	0.6474	0.7177	2795.0
14.0	0.06360	1510.0	98.2	12.24	71.13	0.4865	0.6105	0.6773	2788.0
15.0	0.06386	1500.0	95.1	12.65	71.77	0.5324	0.5877	0.6559	2786.0
16.0	0.06412	1490.0	94.3	13.04	72.41	0.5745	0.5756	0.6484	2787.0
17.0	0.06438	1480.0	95.0	13.42	73.03	0.6139	0.5717	0.6515	2791.0
18.0	0.06465	1468.0	96.4	13.81	73.67	0.6515	0.5743	0.6629	2796.0
19.0	0.06494	1450.0	98.1	14.32	74.45	0.6944	0.5813	0.6799	2800.0
20.0	0.06523	1430.0	100.0	14.86	75.25	0.7364	0.5931	0.7021	2804.0
22.0	0.06585	1410.0	101.0	15.98	76.95	0.8188	0.6243	0.7532	2806.0
24.0	0.06650	1390.0	102.0	17.20	78.77	0.8994	0.6561	0.8022	2803.0
26.0	0.06715	1370.0	100.0	18.51	80.69	0.9777	0.6811	0.8414	2797.0
28.0	0.06782	1350.0	99.4	19.75	82.54	1.047	0.6992	0.8741	2792.0
30.0	0.06850	1330.0	98.5	20.90	84.32	1.109	0.7155	0.9063	2789.0
32.0	0.06921	1310.0	97.4	22.08	86.16	1.168	0.7285	0.9346	2786.0
34.0	0.06993	1290.0	96.1	23.31	88.06	1.225	0.7387	0.9597	2782.0
36.0	0.07067	1270.0	94.6	24.57	90.00	1.281	0.7468	0.9823	2778.0
38.0	0.07143	1250.0	93.1	25.86	91.99	1.335	0.7533	1.003	2773.0
40.0	0.07220	1230.0	91.5	27.17	94.01	1.387	0.7586	1.022	2768.0
45.0	0.07418	1180.0	87.4	30.55	99.23	1.509	0.7682	1.064	2756.0
50.0	0.07625	1140.0	83.2	34.04	104.6	1.623	0.7748	1.101	2743.0
55.0	0.07841	1110.0	79.1	37.63	110.2	1.730	0.7798	1.133	2731.0
60.0	0.08064	1080.0	75.1	41.30	116.0	1.830	0.7838	1.163	2719.0
70.0	0.08532	1030.0	67.7	48.86	127.9	2.013	0.7902	1.212	2699.0
80.0	0.09023	992.0	61.1	56.62	140.2	2.177	0.7948	1.249	2687.0
90.0	0.09534	971.0	55.4	64.53	152.8	2.326	0.7981	1.276	2682.0
100.0	0.1006	962.0	50.4	72.53	165.7	2.461	0.8002	1.294	2684.0
120.0	0.1113	967.0	42.3	88.68	191.7	2.699	0.8019	1.311	2705.0
140.0	0.1222	990.0	36.2	104.9	218.0	2.901	0.8012	1.313	2741.0
160.0	0.1331	1020.0	31.5	121.0	244.2	3.076	0.7994	1.308	2786.0
180.0	0.1440	1060.0	27.9	137.0	270.3	3.230	0.7969	1.302	2836.0
200.0	0.1548	1110.0	25.0	152.9	296.3	3.367	0.7943	1.294	2889.0
250.0	0.1817	1220.0	19.8	192.3	369.5	3.654	0.7877	1.270	3026.0
300.0	0.2084	1340.0	16.4	231.1	424.1	3.886	0.7822	1.266	3166.0
350.0	0.2350	1460.0	14.0	269.7	487.2	4.080	0.7776	1.257	3305.0
400.0	0.2614	1580.0	12.2	307.9	549.9	4.248	0.7748	1.252	3441.0
450.0	0.2878	1700.0	10.8	346.0	612.4	4.395	0.7711	1.248	3574.0
500.0	0.3141	1830.0	9.76	383.9	674.7	4.526	0.7687	1.245	3703.0
600.0	0.3668	2080.0	8.14	459.4	799.0	4.753	0.7650	1.241	3953.0
700.0	0.4194	2330.0	6.98	534.6	923.0	4.944	0.7625	1.239	4191.0
800.0	0.4721	2590.0	6.12	609.7	1047.0	5.109	0.7606	1.238	4418.0
900.0	0.5249	2840.0	5.45	684.7	1171.0	5.255	0.7591	1.238	4635.0
1000.0	0.5776	3100.0	4.91	759.6	1294.0	5.386	0.7580	1.238	4843.0
1200.0	0.6833	3620.0	4.18	909.3	1542.0	5.611	0.7563	1.238	5237.0
1400.0	0.7891	4140.0	3.52	1059.0	1790.0	5.802	0.7552	1.238	5605.0
1600.0	0.8950	4660.0	3.08	1208.0	2037.0	5.967	0.7543	1.238	5952.0
1800.0	1.001	5180.0	2.74	1358.0	2285.0	6.113	0.7537	1.238	6280.0
2000.0	1.107	5710.0	2.47	1507.0	2532.0	6.244	0.7532	1.238	6592.0
2500.0	1.373	7020.0	1.90	1881.0	3152.0	6.520	0.7522	1.239	7317.0
3000.0	1.630	8330.0	1.65	2254.0	3771.0	6.746	0.7516	1.239	7978.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

5000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V $_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
13.0	15.79	164.0	10.3	24000.0	0.00438	0.0547	46.6	0.00483	1.01783	2.20
14.0	15.72	164.0	10.2	23000.0	0.00413	0.0568	39.7	0.00533	1.01714	1.75
15.0	15.66	162.0	10.3	23500.0	0.00404	0.0586	34.4	0.00571	1.01724	1.39
16.0	15.60	160.0	10.5	23200.0	0.00406	0.0602	30.4	0.00596	1.01734	1.18
17.0	15.53	157.0	10.7	22900.0	0.00414	0.0616	27.1	0.00609	1.01744	1.03
18.0	15.47	156.0	10.9	22600.0	0.00426	0.0628	24.5	0.00612	1.01755	0.931
19.0	15.40	155.0	11.0	22300.0	0.00440	0.0637	22.3	0.00609	1.01765	0.857
20.0	15.33	155.0	11.0	22000.0	0.00453	0.0645	20.5	0.00599	1.01776	0.803
22.0	15.19	159.0	10.7	21400.0	0.00474	0.0656	17.6	0.00574	1.01797	0.729
24.0	15.04	165.0	10.3	20900.0	0.00487	0.0663	15.6	0.00549	1.01818	0.678
26.0	14.89	170.0	9.91	20400.0	0.00494	0.0667	14.0	0.00532	1.01838	0.637
28.0	14.75	175.0	9.64	19900.0	0.00501	0.0668	12.8	0.00518	1.01858	0.695
30.0	14.60	178.0	9.43	19400.0	0.00509	0.0668	11.9	0.00505	1.01877	0.582
32.0	14.45	181.0	9.25	18900.0	0.00516	0.0666	11.2	0.00493	1.01895	0.564
34.0	14.30	184.0	9.13	18400.0	0.00523	0.0664	10.6	0.00484	1.01913	0.551
36.0	14.15	186.0	8.96	17900.0	0.00528	0.0661	10.1	0.00475	1.01929	0.540
38.0	14.00	188.0	8.83	17500.0	0.00533	0.0657	9.69	0.00468	1.01945	0.532
40.0	13.85	190.0	8.71	17000.0	0.00538	0.0653	9.36	0.00462	1.01961	0.527
45.0	13.48	194.0	8.44	16000.0	0.00547	0.0644	8.74	0.00449	1.01995	0.520
50.0	13.11	198.0	8.19	15000.0	0.00555	0.0634	8.34	0.00439	1.02024	0.521
55.0	12.75	202.0	7.95	14100.0	0.00560	0.0625	8.07	0.00433	1.02049	0.527
60.0	12.40	207.0	7.73	13300.0	0.00563	0.0618	7.90	0.00428	1.02068	0.535
70.0	11.72	215.0	7.31	12000.0	0.00563	0.0605	7.71	0.00426	1.02093	0.556
80.0	11.08	225.0	6.94	11000.0	0.00556	0.0597	7.66	0.00431	1.02102	0.577
90.0	10.49	235.0	6.61	13200.0	0.00543	0.0593	7.69	0.00443	1.02097	0.596
100.0	9.942	246.0	6.33	9570.0	0.00526	0.0592	7.76	0.00460	1.02082	0.611
120.0	8.904	269.0	5.87	8690.0	0.00487	0.0596	7.98	0.00506	1.02038	0.631
140.0	8.104	294.0	5.52	8100.0	0.00446	0.0607	8.24	0.00565	1.01962	0.642
160.0	7.513	319.0	5.25	7690.0	0.00410	0.0622	8.54	0.00633	1.01888	0.646
180.0	6.945	345.0	5.03	7300.0	0.00377	0.0640	8.85	0.00708	1.01812	0.648
200.0	6.459	370.0	4.86	7140.0	0.00349	0.0659	9.03	0.00708	1.01733	0.639
250.0	5.502	434.0	4.56	6710.0	0.00295	0.0710	9.83	0.00708	1.01571	0.637
300.0	4.798	496.0	4.36	6420.0	0.00255	0.0762	9.83	0.0101	1.01426	0.637
350.0	4.256	558.0	4.23	6210.0	0.00225	0.0813	10.6	0.0125	1.01306	0.635
400.0	3.826	620.0	4.12	6050.0	0.00202	0.0862	11.4	0.0132	1.01201	0.633
450.0	3.475	681.0	4.05	5920.0	0.00182	0.0962	12.1	0.0180	1.01112	0.633
500.0	3.104	742.0	3.99	5820.0	0.00161	0.0996	12.8	0.0210	1.01112	0.633
600.0	2.727	865.0	3.90	5670.0	0.00144	0.105	15.0	0.0310	1.00987	0.639
700.0	2.384	987.0	3.84	5560.0	0.00126	0.115	16.5	0.0300	1.00886	0.644
800.0	2.118	1110.0	3.80	5440.0	0.00112	0.124	18.0	0.0473	1.00726	0.648
900.0	1.905	1230.0	3.77	5420.0	0.00101	0.133	19.5	0.0566	1.00660	0.651
1000.0	1.731	1350.0	3.74	5370.0	0.000914	0.143	20.9	0.0666	1.00606	0.651
1200.0	1.463	1600.0	3.70	5300.0	0.000774	0.161	23.6	0.0807	1.00517	0.653
1400.0	1.267	1850.0	3.68	5240.0	0.000671	0.170	26.3	0.113	1.00452	0.654
1600.0	1.117	2090.0	3.66	5210.0	0.000592	0.181	28.0	0.141	1.00401	0.653
1800.0	0.999	2340.0	3.64	5180.0	0.000530	0.199	28.0	0.141	1.00401	0.659
2000.0	0.9033	2580.0	3.63	5150.0	0.000479	0.211	31.2	0.171	1.00361	0.660
2900.0	0.7266	3200.0	3.61	5110.0	0.000387	0.227	33.6	0.203	1.00328	0.661
3000.0	0.6104	3020.0	3.60	5090.0	0.000324	0.301	44.7	0.398	1.00224	0.663

* TWO-PHASE BOUNDARY

6000 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
15.0	0.06142	1720.0	101.0	14.46	82.70	0.4880	0.5994	0.6612	2962.0
16.0	0.06164	1700.0	99.0	14.84	83.13	0.5298	0.5727	0.6374	2964.0
17.0	0.06186	1690.0	100.0	15.21	83.94	0.5682	0.5586	0.6292	2970.0
18.0	0.06209	1680.0	101.0	15.56	84.54	0.6042	0.5543	0.6328	2978.0
19.0	0.06233	1660.0	104.0	16.04	85.29	0.6453	0.5581	0.6468	2987.0
20.0	0.06258	1650.0	106.0	16.53	86.06	0.6855	0.5692	0.6684	2994.0
22.0	0.06311	1620.0	109.0	17.58	87.70	0.7650	0.6032	0.7227	3003.0
24.0	0.06366	1600.0	110.0	18.74	89.47	0.8437	0.6400	0.7766	3003.0
26.0	0.06422	1590.0	109.0	20.01	91.36	0.9208	0.6693	0.8193	2999.0
28.0	0.06480	1570.0	108.0	21.19	93.18	0.9892	0.6898	0.8529	2996.0
30.0	0.06538	1550.0	108.0	22.28	94.92	1.049	0.7077	0.8852	2995.0
32.0	0.06598	1530.0	107.0	23.41	96.72	1.107	0.7220	0.9135	2993.0
34.0	0.06660	1510.0	105.0	24.58	98.57	1.163	0.7334	0.9384	2992.0
36.0	0.06722	1490.0	104.0	25.79	100.5	1.218	0.7425	0.9606	2989.0
38.0	0.06786	1470.0	102.0	27.02	102.4	1.270	0.7499	0.9807	2986.0
40.0	0.06850	1450.0	101.0	28.29	104.4	1.321	0.7560	0.999	2983.0
45.0	0.07016	1410.0	96.7	31.54	109.5	1.441	0.7672	1.040	2974.0
50.0	0.07188	1370.0	92.6	34.92	114.8	1.552	0.7751	1.075	2966.0
55.0	0.07366	1330.0	88.4	38.40	120.2	1.656	0.7811	1.106	2953.0
60.0	0.07549	1290.0	84.4	41.97	125.9	1.754	0.7861	1.135	2941.0
70.0	0.07931	1230.0	76.9	49.33	137.4	1.933	0.7940	1.184	2920.0
80.0	0.08332	1190.0	70.0	56.97	149.5	2.093	0.7999	1.224	2903.0
90.0	0.08748	1160.0	63.9	64.71	161.9	2.239	0.8042	1.254	2891.0
100.0	0.09176	1140.0	58.5	72.61	174.6	2.373	0.8072	1.277	2886.0
120.0	0.1006	1120.0	49.6	88.64	200.4	2.608	0.8101	1.302	2892.0
140.0	0.1096	1130.0	42.7	104.8	226.5	2.810	0.8101	1.310	2915.0
160.0	0.1186	1160.0	37.3	120.9	252.7	2.985	0.8085	1.309	2949.0
180.0	0.1277	1190.0	33.1	137.0	278.9	3.138	0.8060	1.305	2990.0
200.0	0.1367	1230.0	29.7	153.0	304.9	3.276	0.8032	1.298	3035.0
250.0	0.1591	1340.0	23.5	192.6	369.4	3.564	0.7961	1.282	3157.0
300.0	0.1813	1450.0	19.5	231.7	433.1	3.796	0.7898	1.269	3285.0
350.0	0.2034	1570.0	16.7	270.4	496.4	3.991	0.7845	1.260	3414.0
400.0	0.2253	1690.0	14.6	308.9	559.2	4.159	0.7802	1.253	3542.0
450.0	0.2472	1810.0	12.9	347.1	621.7	4.306	0.7767	1.249	3667.0
500.0	0.2691	1930.0	11.6	385.1	684.1	4.437	0.7738	1.245	3791.0
600.0	0.3128	2170.0	9.71	460.8	808.3	4.664	0.7694	1.241	4030.0
700.0	0.3565	2420.0	8.34	536.2	932.3	4.855	0.7663	1.239	4268.0
800.0	0.4003	2670.0	7.31	611.4	1056.0	5.021	0.7648	1.238	4480.0
900.0	0.4441	2930.0	6.50	686.5	1180.0	5.166	0.7622	1.237	4692.0
1000.0	0.4879	3180.0	5.86	761.5	1304.0	5.297	0.7608	1.237	4896.0
1200.0	0.5757	3690.0	4.90	911.3	1551.0	5.522	0.7597	1.237	5282.0
1400.0	0.6637	4210.0	4.21	1061.0	1798.0	5.713	0.7573	1.237	5645.0
1600.0	0.7517	4730.0	3.69	1211.0	2046.0	5.878	0.7563	1.237	5987.0
1800.0	0.8398	5250.0	3.28	1360.0	2293.0	6.024	0.7555	1.238	6311.0
2000.0	0.9280	5770.0	2.96	1510.3	2541.0	6.154	0.7549	1.238	6620.0
2500.0	1.149	7080.0	2.37	1884.0	3160.0	6.430	0.7538	1.238	7339.0
3000.0	1.370	8390.0	1.98	2257.0	3779.0	6.656	0.7530	1.239	7995.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

6000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	V(DH/DV)$_P$ BTU/LB	V(DP/DU)$_V$ PSIA-CU FT/BTU	-V(DP/DV)$_T$ PSIA	(DV/DT)/V$_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
15.8	16.28	184.0	10.3	28000.0	0.00368	0.0652	49.8	0.00606	1.01617	1.82
16.0	16.22	178.0	10.7	27600.0	0.00358	0.0670	43.1	0.00648	1.01627	1.48
17.0	16.17	173.0	11.0	27300.0	0.00364	0.0685	37.9	0.00674	1.01638	1.25
18.0	16.11	169.0	11.3	27000.0	0.00375	0.0698	33.7	0.00685	1.01648	1.10
19.0	16.04	166.0	11.6	26700.0	0.00389	0.0709	30.3	0.00683	1.01659	0.994
20.0	15.98	166.0	11.7	26300.0	0.00403	0.0717	27.4	0.00672	1.01670	0.920
22.0	15.85	170.0	11.4	25700.0	0.00425	0.0729	23.0	0.00637	1.01693	0.822
24.0	15.71	177.0	11.0	25200.0	0.00438	0.0736	19.9	0.00603	1.01716	0.756
26.0	15.57	185.0	10.5	24700.0	0.00443	0.0740	17.6	0.00588	1.01738	0.702
28.0	15.43	190.0	10.2	24200.0	0.00448	0.0740	15.9	0.00563	1.01760	0.658
30.0	15.29	195.0	9.94	23700.0	0.00454	0.0739	14.5	0.00546	1.01781	0.635
32.0	15.16	199.0	9.74	23200.0	0.00460	0.0737	13.4	0.00532	1.01802	0.600
34.0	15.02	202.0	9.56	22700.0	0.00464	0.0734	12.6	0.00521	1.01821	0.579
36.0	14.88	205.0	9.41	22200.0	0.00468	0.0730	11.9	0.00511	1.01841	0.563
38.0	14.74	208.0	9.27	21700.0	0.00472	0.0725	11.3	0.00502	1.01859	0.551
40.0	14.60	211.0	9.14	21200.0	0.00475	0.0721	10.8	0.00494	1.01877	0.541
45.0	14.25	216.0	8.85	20100.0	0.00482	0.0709	10.0	0.00479	1.01918	0.526
50.0	13.91	221.0	8.59	19000.0	0.00487	0.0698	9.39	0.00467	1.01955	0.521
55.0	13.58	226.0	8.34	18000.0	0.00490	0.0687	9.08	0.00458	1.01987	0.521
60.0	13.25	230.0	8.11	17100.0	0.00493	0.0678	8.73	0.00451	1.02014	0.526
70.0	12.61	240.0	7.68	15600.0	0.00494	0.0663	8.42	0.00444	1.02057	0.541
80.0	12.00	249.0	7.29	14300.0	0.00491	0.0653	8.29	0.00444	1.02085	0.560
90.0	11.43	260.0	6.95	13200.0	0.00483	0.0646	8.26	0.00451	1.02099	0.577
100.0	10.90	270.0	6.65	12400.0	0.00472	0.0643	8.29	0.00462	1.02102	0.593
120.0	9.943	293.0	6.16	11200.0	0.00444	0.0644	8.45	0.00497	1.02082	0.615
140.0	9.127	310.0	5.77	10400.0	0.00412	0.0651	8.68	0.00545	1.02040	0.628
160.0	8.431	343.0	5.48	9770.0	0.00382	0.0664	8.94	0.00601	1.01985	0.635
180.0	7.833	360.0	5.24	9340.0	0.00354	0.0679	9.22	0.00664	1.01925	0.637
200.0	7.316	394.0	5.05	9000.0	0.00330	0.0696	9.30	0.00733	1.01863	0.638
250.0	6.205	457.0	4.71	8400.0	0.00280	0.0743	10.1	0.00322	1.01711	0.638
300.0	5.516	520.0	4.48	8000.0	0.00244	0.0792	10.9	0.0113	1.01574	0.629
350.0	4.918	582.0	4.32	7700.0	0.00216	0.0840	11.6	0.0136	1.01453	0.627
400.0	4.438	644.0	4.21	7480.0	0.00195	0.0887	12.3	0.0160	1.01348	0.626
450.0	4.045	705.0	4.12	7310.0	0.00177	0.0933	13.0	0.0185	1.01255	0.626
500.0	3.716	766.0	4.05	7160.0	0.00163	0.0976	13.7	0.0211	1.01174	0.627
600.0	3.197	888.0	3.95	6950.0	0.00140	0.107	15.1	0.0269	1.01038	0.633
700.0	2.805	1010.0	3.88	6800.0	0.00123	0.116	16.6	0.0334	1.00929	0.639
800.0	2.490	1130.0	3.83	6680.0	0.00109	0.125	18.1	0.0406	1.00848	0.644
900.0	2.292	1250.0	3.79	6590.0	0.000987	0.135	19.6	0.0483	1.00767	0.647
1000.0	2.098	1380.0	3.76	6520.0	0.000899	0.144	21.0	0.0567	1.00705	0.650
1200.0	1.737	1620.0	3.72	6420.0	0.000763	0.162	23.7	0.0752	1.00606	0.650
1400.0	1.507	1870.0	3.69	6340.C	0.000663	0.179	26.3	0.0959	1.00522	0.654
1600.0	1.338	2110.0	3.66	6290.0	0.000586	0.195	28.8	0.119	1.00473	0.656
1800.0	1.191	2360.0	3.65	6250.0	0.000525	0.212	31.3	0.144	1.00426	0.658
2000.0	1.078	2600.0	3.63	6220.0	0.000675	0.227	33.7	0.170	1.00388	0.659
2500.0	0.8705	3220.0	3.61	6160.0	0.000385	0.265	39.4	0.246	1.00318	0.660
3000.0	0.7300	3840.0	3.60	6120.0	0.000323	0.301	44.7	0.333	1.00267	0.662

* TWO-PHASE BOUNDARY

7000 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
16.0	0.05960	1910.0	103.0	16.67	93.93	0.4915	0.5736	0.6317	3121.0
17.0	0.05980	1890.0	103.0	17.02	94.53	0.5291	0.5478	0.6108	3128.0
18.0	0.05999	1880.0	105.0	17.35	95.11	0.5639	0.5355	0.6058	3138.0
19.0	0.06020	1860.0	109.0	17.80	95.83	0.6031	0.5356	0.6164	3152.0
20.0	0.06042	1850.0	112.0	18.25	96.56	0.6416	0.5457	0.6374	3164.0
22.0	0.06088	1830.0	117.0	19.23	98.14	0.7182	0.5825	0.6953	3179.0
24.0	0.06137	1810.0	119.0	20.32	99.9	0.7950	0.6246	0.7548	3183.0
26.0	0.06187	1790.0	118.3	21.54	101.7	0.8713	0.6586	0.8018	3181.0
28.0	0.06238	1780.0	117.0	22.69	103.5	0.9387	0.6814	0.8368	3180.0
30.0	0.06289	1760.0	116.0	23.72	105.2	0.998	0.7006	0.8694	3180.0
32.0	0.06342	1740.0	115.0	24.81	107.0	1.055	0.7160	0.8978	3180.0
34.0	0.06396	1720.0	114.0	25.93	108.8	1.110	0.7285	0.9227	3179.0
36.0	0.06450	1700.0	113.0	27.09	110.7	1.163	0.7385	0.9448	3178.0
38.0	0.06506	1690.0	111.0	28.28	112.6	1.215	0.7467	0.9647	3177.0
40.0	0.06562	1670.0	110.0	29.50	114.6	1.265	0.7535	0.9828	3175.0
45.0	0.06706	1630.0	105.0	32.66	119.6	1.383	0.7662	1.022	3169.0
50.0	0.06854	1580.0	101.0	35.94	124.8	1.492	0.7751	1.057	3162.0
55.0	0.07006	1540.0	97.0	39.32	130.1	1.595	0.7821	1.087	3152.0
60.0	0.07162	1510.0	92.9	42.80	135.6	1.690	0.7879	1.115	3142.0
70.0	0.07486	1440.0	85.2	50.00	147.0	1.866	0.7973	1.163	3120.0
80.0	0.07825	1390.0	78.1	57.46	158.9	2.024	0.8044	1.204	3100.0
90.0	0.09175	1350.0	71.7	65.11	171.1	2.168	0.8098	1.236	3084.0
100.0	0.08536	1320.0	66.0	72.92	183.6	2.299	0.8137	1.261	3074.0
120.0	0.09281	1290.0	56.4	88.83	209.1	2.532	0.8178	1.292	3066.0
140.0	0.1004	1280.0	48.9	104.9	235.1	2.733	0.8185	1.306	3079.0
160.0	0.1082	1300.0	42.9	121.1	261.3	2.907	0.8172	1.309	3103.0
180.0	0.1159	1320.0	38.1	137.2	287.4	3.061	0.8149	1.306	3135.0
200.0	0.1236	1360.0	34.2	153.3	313.5	3.199	0.8120	1.301	3173.0
250.0	0.1423	1450.0	27.2	193.1	378.2	3.467	0.8043	1.286	3282.0
300.0	0.1618	1560.0	22.6	232.4	442.1	3.720	0.7973	1.272	3399.0
350.0	0.1807	1680.0	19.3	271.3	505.5	3.916	0.7914	1.262	3518.0
400.0	0.1995	1790.0	16.9	309.9	568.4	4.084	0.7864	1.255	3636.0
450.0	0.2182	1910.0	15.0	348.2	631.0	4.231	0.7824	1.250	3757.0
500.0	0.2369	2030.0	13.5	386.4	693.4	4.363	0.7790	1.246	3875.0
600.0	0.2742	2270.0	11.3	462.3	817.7	4.589	0.7739	1.241	4105.0
700.0	0.3115	2510.0	9.67	537.8	941.6	4.780	0.7702	1.238	4327.0
800.0	0.3489	2760.0	8.48	613.2	1065.0	4.946	0.7674	1.237	4541.0
900.0	0.3863	3010.0	7.55	688.4	1189.0	5.091	0.7653	1.237	4747.0
1000.0	0.4238	3260.0	6.81	763.4	1313.0	5.222	0.7636	1.236	4946.0
1200.0	0.4988	3770.0	5.69	913.4	1560.0	5.447	0.7612	1.236	5326.0
1400.0	0.5740	4280.0	4.89	1063.0	1807.0	5.638	0.7595	1.236	5683.0
1600.0	0.6492	4800.0	4.29	1213.0	2055.0	5.803	0.7583	1.237	6020.0
1800.0	0.7246	5310.0	3.82	1363.0	2302.0	5.948	0.7574	1.237	6341.0
2000.0	0.8001	5830.0	3.44	1512.0	2549.0	6.079	0.7566	1.237	6647.0
2500.0	0.9889	7130.0	2.76	1886.0	3168.0	6.355	0.7553	1.238	7360.0
3000.0	1.178	8440.0	2.30	2260.0	3787.0	6.581	0.7544	1.238	8011.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

7000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
16.0	16.78	197.0	10.7	32000.0	0.00321	0.0738	60.3	0.00696	1.01521	1.86
17.0	16.72	188.0	11.2	31700.0	0.00325	0.0754	52.2	0.00739	1.01532	1.52
18.0	16.67	181.0	11.8	31300.0	0.00335	0.0769	45.7	0.00761	1.01543	1.30
19.0	16.61	176.0	12.2	31000.0	0.00351	0.0780	40.5	0.00762	1.01554	1.15
20.0	16.55	174.0	12.4	30600.0	0.00366	0.0789	36.2	0.00748	1.01566	1.05
22.0	16.43	179.0	12.2	30000.0	0.00389	0.0802	29.7	0.00702	1.01590	0.928
24.0	16.29	188.0	11.7	29500.0	0.00402	0.0808	25.2	0.00657	1.01614	0.846
26.0	16.15	197.0	11.1	29000.0	0.00407	0.0811	21.8	0.00626	1.01638	0.777
28.0	16.03	204.0	10.7	28500.0	0.00411	0.0811	19.4	0.00605	1.01661	0.719
30.0	15.90	209.0	10.4	28000.0	0.00416	0.0810	17.5	0.00586	1.01684	0.676
32.0	15.77	214.0	10.2	27500.0	0.00420	0.0806	16.0	0.00569	1.01706	0.642
34.0	15.64	218.0	10.0	26900.0	0.00423	0.0802	14.8	0.00556	1.01728	0.614
36.0	15.50	222.0	9.84	26400.0	0.00426	0.0797	13.9	0.00544	1.01749	0.592
38.0	15.37	225.0	9.68	25900.0	0.00429	0.0791	13.1	0.00534	1.01770	0.575
40.0	15.24	228.0	9.54	25400.0	0.00431	0.0786	12.5	0.00525	1.01789	0.561
45.0	14.91	235.0	9.23	24200.0	0.00435	0.0772	11.3	0.00506	1.01836	0.537
50.0	14.59	241.0	8.95	23100.0	0.00438	0.0758	10.5	0.00492	1.01878	0.526
55.0	14.27	247.0	8.69	22000.0	0.00440	0.0746	9.95	0.00481	1.01916	0.522
60.0	13.96	252.0	8.45	21000.0	0.00442	0.0735	9.57	0.00472	1.01949	0.523
70.0	13.36	263.0	8.00	19200.0	0.00443	0.0718	9.13	0.00462	1.02005	0.533
80.0	12.78	273.0	7.60	17700.0	0.00441	0.0705	8.91	0.00458	1.02047	0.548
90.0	12.23	284.0	7.24	16500.0	0.00436	0.0697	8.82	0.00461	1.02076	0.563
100.0	11.71	294.0	6.93	15400.0	0.00428	0.0692	8.81	0.00468	1.02093	0.578
120.0	10.77	317.0	6.41	13900.0	0.00407	0.0689	8.91	0.00495	1.02101	0.601
140.0	9.96	341.0	6.00	12800.0	0.00383	0.0694	9.09	0.00534	1.02082	0.616
160.0	9.246	366.0	5.68	12000.0	0.00357	0.0704	9.32	0.00582	1.02047	0.624
180.0	8.629	391.0	5.42	11400.0	0.00334	0.0717	9.57	0.00636	1.02002	0.628
200.0	8.089	417.0	5.21	11000.0	0.00312	0.0732	9.71	0.00696	1.01952	0.621
250.0	7.002	481.0	4.84	10200.0	0.00267	0.0776	10.4	0.00862	1.01821	0.621
300.0	6.180	544.0	4.58	9660.0	0.00234	0.0821	11.1	0.0104	1.01694	0.620
350.0	5.535	606.0	4.41	9270.0	0.00208	0.0867	11.8	0.0124	1.01578	0.619
400.0	5.014	668.0	4.28	8980.0	0.00188	0.0912	12.5	0.0145	1.01474	0.619
450.0	4.584	729.0	4.18	8750.0	0.00171	0.0955	13.1	0.0167	1.01381	0.619
500.0	4.222	790.0	4.10	8560.0	0.00158	0.100	13.8	0.0189	1.01297	0.620
600.0	3.647	912.0	3.99	8270.0	0.00136	0.108	15.2	0.0239	1.01156	0.627
700.0	3.218	1030.0	3.91	8070.0	0.00120	0.118	16.7	0.0296	1.01041	0.634
800.0	2.866	1150.0	3.86	7910.0	0.00107	0.127	18.2	0.0357	1.00946	0.640
900.0	2.589	1280.0	3.81	7790.0	0.000969	0.136	19.6	0.0424	1.00867	0.644
1000.0	2.360	1400.0	3.78	7700.0	0.000884	0.145	21.0	0.0496	1.00799	0.647
1200.0	2.005	1640.0	3.73	7560.0	0.000753	0.162	23.8	0.0655	1.00691	0.651
1400.0	1.742	1890.0	3.70	7460.0	0.000655	0.179	26.4	0.0833	1.00608	0.654
1600.0	1.540	2130.0	3.67	7390.0	0.000580	0.196	28.9	0.103	1.00543	0.656
1800.0	1.380	2380.0	3.65	7330.0	0.000520	0.212	31.3	0.124	1.00490	0.658
2000.0	1.250	2620.0	3.64	7290.0	0.000472	0.228	33.7	0.147	1.00446	0.659
2500.0	1.011	3240.0	3.61	7210.0	0.000382	0.266	39.4	0.212	1.00365	0.660
3000.0	0.8489	3890.0	3.59	7170.0	0.000321	0.302	44.8	0.287	1.00309	0.661

* TWO-PHASE BOUNDARY

8000 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
18.0	0.05022	2070.0	107.0	19.17	105.4	0.5200	0.5175	0.5005	3202.0
19.0	0.05040	2060.0	112.0	19.50	106.1	0.5661	0.5135	0.5072	3301.0
20.0	0.05060	2040.0	117.0	20.00	106.0	0.6027	0.5224	0.6076	3310.0
22.0	0.05901	2020.0	124.0	20.90	108.3	0.6764	0.5622	0.6694	3341.0
24.0	0.05946	2010.0	127.0	21.93	110.0	0.7515	0.6098	0.7351	3349.0
26.0	0.05991	1990.0	126.0	23.10	111.9	0.0269	0.6448	0.7072	3340.0
28.0	0.06037	1980.0	125.0	24.21	113.6	0.0938	0.6739	0.0238	3340.0
30.0	0.06004	1960.0	125.0	25.20	115.3	0.9510	0.6942	0.0560	3349.0
32.0	0.06131	1940.0	124.0	26.24	117.1	1.000	0.7107	0.0056	3350.0
34.0	0.06179	1930.0	122.0	27.32	118.9	1.062	0.7240	0.9107	3351.0
36.0	0.06228	1910.0	121.0	28.44	120.7	1.115	0.7349	0.9329	3351.0
38.0	0.06277	1890.0	119.0	29.60	122.6	1.166	0.7430	0.9528	3351.0
40.0	0.06327	1870.0	118.0	30.78	124.5	1.215	0.7512	0.9700	3350.0
45.0	0.06455	1830.0	114.0	33.85	129.5	1.332	0.7651	1.010	3347.0
50.0	0.06506	1790.0	109.0	37.04	134.6	1.440	0.7752	1.043	3341.0
55.0	0.06720	1750.0	105.0	40.35	139.9	1.541	0.7630	1.073	3333.0
60.0	0.06857	1710.0	101.0	43.75	145.3	1.636	0.7696	1.108	3324.0
70.0	0.07139	1640.0	92.9	50.01	156.6	1.809	0.0003	1.147	3303.0
80.0	0.07433	1500.0	85.6	58.14	168.2	1.965	0.0006	1.187	3202.0
90.0	0.07736	1540.0	79.0	65.69	100.3	2.106	0.0150	1.220	3263.0
100.0	0.00047	1500.0	73.0	73.41	192.6	2.236	0.0197	1.246	3249.0
120.0	0.00691	1450.0	62.9	89.19	217.9	2.467	0.0250	1.202	3233.0
140.0	0.09352	1440.0	54.7	105.2	243.8	2.666	0.0265	1.300	3234.0
160.0	0.1002	1448.0	48.2	121.4	269.9	2.040	0.0256	1.307	3249.0
180.0	0.1078	1460.0	43.0	137.5	296.9	2.994	0.0234	1.307	3273.0
200.0	0.1137	1400.0	30.7	153.6	322.1	3.132	0.0205	1.303	3305.0
250.0	0.1305	1570.0	30.8	193.6	386.9	3.421	0.0124	1.289	3400.0
300.0	0.1471	1600.0	25.6	233.1	451.0	3.655	0.0046	1.275	3507.0
350.0	0.1636	1700.0	21.9	272.2	514.5	3.051	0.7902	1.265	3618.0
400.0	0.1000	1900.0	19.1	310.9	577.5	4.019	0.7927	1.257	3731.0
450.0	0.1963	2010.0	17.0	349.4	640.2	4.167	0.7001	1.251	3844.0
900.0	0.2126	2130.0	15.3	307.7	702.6	4.290	0.7043	1.246	3956.0
600.0	0.2452	2360.0	12.0	463.0	026.9	4.525	0.770	1.241	4177.0
700.0	0.2777	2600.0	11.0	539.5	950.9	4.716	0.7741	1.238	4391.0
800.0	0.3103	2056.0	9.64	614.9	1075.0	4.001	0.7709	1.237	4599.0
900.0	0.3429	3090.0	8.59	690.2	1190.0	5.027	0.7605	1.236	4001.0
1000.0	0.3756	3340.0	7.75	765.4	1322.0	5.157	0.7665	1.235	4996.0
1200.0	0.4410	3050.0	6.48	915.5	1569.0	5.302	0.7637	1.235	5360.0
1400.0	0.5066	4350.0	5.57	1065.0	1016.0	5.573	0.7617	1.236	5720.0
1600.0	0.5723	4070.0	4.88	1215.0	2063.0	5.730	0.7603	1.236	6053.0
1800.0	0.6301	5300.0	4.35	1365.0	2310.0	5.003	0.7592	1.236	6370.0
2000.0	0.7060	5090.0	3.92	1515.0	2550.0	6.013	0.7506	1.237	6673.0
2500.0	0.0009	7190.0	3.14	1009.0	3176.0	6.209	0.7966	1.237	7300.0
3000.0	1.034	8490.0	2.62	2263.0	3795.0	6.515	0.7996	1.238	8027.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

8000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_V$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
18.0	17.18	192.0	12.1	35600.0	0.00302	0.0839	61.3	0.00842	1.01439	1.53
19.0	17.12	184.0	12.8	35290.0	0.00319	0.0852	53.6	0.00847	1.01450	1.37
20.0	17.07	181.0	13.1	34900.0	0.00335	0.0862	47.4	0.00831	1.01462	1.20
22.0	16.95	186.0	13.0	34300.0	0.00361	0.0874	38.0	0.00771	1.01487	1.05
24.0	16.82	196.0	12.3	33800.0	0.00375	0.0881	31.5	0.00712	1.01513	0.947
26.0	16.69	207.0	11.7	33300.0	0.00380	0.0883	26.9	0.00672	1.01538	0.863
28.0	16.56	216.0	11.2	32800.0	0.00382	0.0882	23.5	0.00646	1.01563	0.789
30.0	16.44	222.0	10.9	32200.0	0.00386	0.0879	20.9	0.00624	1.01587	0.734
32.0	16.31	227.0	10.7	31700.0	0.00390	0.0874	18.9	0.00605	1.01611	0.699
34.0	16.18	232.0	10.4	31200.0	0.00392	0.0869	17.3	0.00589	1.01634	0.654
36.0	16.06	237.0	10.2	30700.0	0.00394	0.0862	16.1	0.00576	1.01657	0.625
38.0	15.93	240.0	10.1	30100.0	0.00396	0.0856	15.0	0.00564	1.01679	0.603
40.0	15.80	244.0	9.92	29600.0	0.00398	0.0849	14.2	0.00553	1.01700	0.584
45.0	15.49	252.0	9.58	28400.0	0.00400	0.0832	12.6	0.00532	1.01751	0.552
50.0	15.18	259.0	9.29	27200.0	0.00402	0.0817	11.6	0.00516	1.01797	0.534
55.0	14.88	266.0	9.01	26100.0	0.00403	0.0803	10.9	0.00503	1.01840	0.526
60.0	14.58	272.0	8.76	25000.0	0.00404	0.0790	10.4	0.00493	1.01878	0.523
70.0	14.01	284.0	8.29	23000.0	0.00404	0.0770	9.83	0.00479	1.01945	0.528
80.0	13.45	296.0	7.87	21300.0	0.00402	0.0755	9.52	0.00473	1.01997	0.539
90.0	12.93	307.0	7.50	19900.0	0.00398	0.0745	9.37	0.00472	1.02038	0.553
100.0	12.43	318.0	7.17	18000.0	0.00392	0.0738	9.32	0.00476	1.02067	0.567
120.0	11.51	341.0	6.62	16700.0	0.00376	0.0733	9.36	0.00497	1.02097	0.583
140.0	10.69	364.0	6.20	15300.0	0.00357	0.0735	9.50	0.00529	1.02100	0.605
160.0	9.98	389.0	5.86	14400.0	0.00336	0.0743	9.69	0.00570	1.02083	0.614
180.0	9.348	414.0	5.58	13600.0	0.00315	0.0754	9.92	0.00618	1.02053	0.619
200.0	8.794	440.0	5.36	13100.0	0.00296	0.0764	10.0	0.00678	1.02016	0.613
250.0	7.663	504.0	4.95	12100.0	0.00256	0.0808	10.7	0.00818	1.01906	0.614
300.0	6.798	567.0	4.68	11400.0	0.00225	0.0850	11.3	0.00981	1.01791	0.613
350.0	6.113	630.0	4.49	10900.0	0.00201	0.0894	12.0	0.0115	1.01682	0.612
400.0	5.556	691.0	4.35	10500.0	0.00182	0.0936	12.7	0.0134	1.01582	0.612
450.0	5.094	753.0	4.24	10200.0	0.00166	0.0977	13.3	0.0153	1.01490	0.612
500.0	4.704	814.0	4.15	10000.0	0.00153	0.102	13.9	0.0173	1.01407	0.614
600.0	4.079	935.0	4.03	9640.0	0.00133	0.110	15.3	0.0217	1.01263	0.621
700.0	3.601	1060.0	3.94	9370.0	0.00117	0.119	16.8	0.0267	1.01144	0.630
800.0	3.223	1180.0	3.88	9180.0	0.00105	0.128	18.3	0.0321	1.01045	0.636
900.0	2.916	1300.0	3.83	9920.0	0.000952	0.137	19.7	0.0380	1.00960	0.640
1000.0	2.663	1428.0	3.80	8900.0	0.000870	0.146	21.1	0.0443	1.00888	0.644
1200.0	2.267	1660.0	3.74	8720.0	0.000743	0.163	23.8	0.0583	1.00771	0.649
1400.0	1.974	1910.0	3.70	8590.0	0.000648	0.180	26.4	0.0739	1.00681	0.652
1600.0	1.747	2150.0	3.68	8500.0	0.000574	0.197	28.9	0.0911	1.00610	0.654
1800.0	1.567	2400.0	3.66	8430.0	0.000516	0.213	31.4	0.110	1.00551	0.656
2000.0	1.420	2640.0	3.64	8370.0	0.000468	0.229	33.7	0.130	1.00503	0.658
2500.0	1.151	3260.0	3.61	8288.0	0.000380	0.266	39.4	0.187	1.00413	0.660
3000.0	0.9678	3870.0	3.59	8218.0	0.000320	0.302	44.8	0.252	1.00350	0.661

* TWO-PHASE BOUNDARY

9000 PSIA ISOBAR

TEMPERATURE DEG. R	VOLUME CU FT/LB	ISOTHERM DERIVATIVE CU FT-PSIA/LB	ISOCHORE DERIVATIVE PSIA/R	INTERNAL ENERGY BTU/LB	ENTHALPY BTU/LB	ENTROPY BTU/LB-R	CV BTU / LB -R	CP BTU / LB -R	VELOCITY OF SOUND FT/SEC
19.0	0.05686	2248.0	115.0	21.39	116.1	0.5333	0.4914	0.5582	3436.0
20.0	0.05703	2238.0	121.0	21.77	116.8	0.5581	0.4990	0.5778	3459.0
22.0	0.05741	2218.0	130.0	22.58	118.3	0.6387	0.5417	0.6439	3489.0
24.0	0.05782	2200.0	134.0	23.55	119.9	0.7120	0.5952	0.7164	3502.0
26.0	0.05824	2190.0	134.0	24.68	121.7	0.7866	0.6396	0.7741	3504.0
28.0	0.05867	2180.0	133.0	25.74	123.5	0.8530	0.6672	0.8128	3504.0
30.0	0.05909	2160.0	133.0	26.70	125.2	0.9102	0.6885	0.8464	3506.0
32.0	0.05952	2140.0	132.0	27.70	126.9	0.9658	0.7058	0.8756	3507.0
34.0	0.05996	2120.0	130.0	28.74	128.7	1.020	0.7200	0.9011	3509.0
36.0	0.06041	2110.0	129.0	29.83	130.5	1.072	0.7316	0.9235	3510.0
38.0	0.06085	2090.0	127.0	30.95	132.4	1.122	0.7411	0.9435	3510.0
40.0	0.06131	2070.0	126.0	32.10	134.3	1.171	0.7491	0.9615	3511.0
45.0	0.06246	2030.0	121.0	35.08	139.2	1.287	0.7643	1.000	3509.0
50.0	0.06364	1990.0	117.0	38.20	144.3	1.394	0.7753	1.033	3506.0
55.0	0.06484	1950.0	113.0	41.44	149.5	1.494	0.7839	1.062	3499.0
60.0	0.06607	1910.0	108.0	44.78	154.9	1.587	0.7912	1.088	3491.0
70.0	0.06858	1840.0	100.0	51.71	166.0	1.759	0.8032	1.135	3472.0
80.0	0.07118	1780.0	92.6	58.93	177.6	1.913	0.8126	1.174	3450.0
90.0	0.07385	1720.0	85.7	66.39	189.5	2.053	0.8199	1.207	3430.0
100.0	0.07659	1680.0	79.5	74.03	201.7	2.182	0.8254	1.234	3412.0
120.0	0.08225	1620.0	68.9	89.69	226.8	2.410	0.8320	1.272	3389.0
140.0	0.08807	1590.0	60.3	105.7	252.5	2.608	0.8342	1.294	3381.0
160.0	0.09399	1580.0	53.3	121.8	278.5	2.782	0.8338	1.304	3388.0
180.0	0.1000	1590.0	47.6	138.3	304.6	2.936	0.8317	1.306	3405.0
200.0	0.1059	1610.0	43.0	154.1	330.7	3.073	0.8289	1.304	3430.0
250.0	0.1208	1690.0	34.3	194.2	395.6	3.363	0.8204	1.292	3512.0
300.0	0.1356	1790.0	28.6	233.9	459.8	3.597	0.8122	1.278	3610.0
350.0	0.1502	1890.0	24.4	273.1	523.5	3.793	0.8050	1.267	3714.0
400.0	0.1647	2000.0	21.4	312.0	586.6	3.962	0.7989	1.258	3820.0
450.0	0.1792	2110.0	19.0	350.6	649.3	4.110	0.7939	1.252	3927.0
500.0	0.1937	2220.0	17.1	389.8	711.8	4.241	0.7896	1.247	4034.0
600.0	0.2225	2460.0	14.3	465.3	636.2	4.468	0.7838	1.241	4246.0
700.0	0.2513	2690.0	12.3	541.2	960.1	4.659	0.7781	1.238	4454.0
800.0	0.2802	2930.0	10.8	616.8	1084.0	4.824	0.7745	1.236	4656.0
900.0	0.3091	3180.0	9.61	692.1	1207.0	4.970	0.7717	1.235	4852.0
1000.0	0.3380	3420.0	8.67	767.4	1331.0	5.100	0.7695	1.235	5043.0
1200.0	0.3960	3920.0	7.26	917.6	1578.0	5.325	0.7662	1.235	5409.0
1400.0	0.4542	4420.0	6.24	1066.0	1825.0	5.515	0.7640	1.235	5755.0
1600.0	0.5125	4930.0	5.48	1218.0	2072.0	5.680	0.7623	1.235	6084.0
1800.0	0.5708	5440.0	4.88	1367.0	2319.0	5.826	0.7611	1.236	6398.0
2000.0	0.6292	5960.0	4.40	1517.0	2566.0	5.956	0.7601	1.236	6698.0
2500.0	0.7756	7250.0	3.53	1892.0	3184.0	6.232	0.7584	1.237	7399.0
3000.0	0.9222	8540.0	2.95	2266.0	3803.0	6.457	0.7572	1.237	8042.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

9000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_v$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRANDTL NUMBER
19.0	17.59	192.0	13.3	39500.0	0.00291	0.0924	70.5	0.00941	1.01347	1.53
20.0	17.53	187.0	13.8	39100.0	0.00309	A.0934	61.5	0.00922	1.01359	1.37
22.0	17.42	191.0	13.7	38500.0	0.00337	0.0947	48.2	0.00845	1.01386	1.18
24.0	17.29	203.0	13.0	38000.0	0.00352	0.0953	39.2	0.00769	1.01413	1.06
26.0	17.17	217.0	12.2	37600.0	0.00397	v.0954	32.0	0.00717	1.01440	0.959
28.0	17.05	226.0	11.7	37100.0	0.00359	0.0952	28.2	0.00687	1.01466	0.868
30.0	16.92	233.0	11.4	36500.0	0.00363	0.0947	24.8	0.00661	1.01492	0.798
32.0	16.80	239.0	11.1	36000.0	0.00366	0.0941	22.2	0.00640	1.01517	0.743
34.0	16.68	245.0	10.9	35400.0	0.00368	0.0935	20.1	0.00622	1.01541	0.698
36.0	16.55	250.0	10.6	34900.0	0.00279	0.0927	18.5	0.00606	1.01565	0.663
38.0	16.43	254.0	10.5	34300.0	0.00371	0.0919	17.2	0.00593	1.01588	0.634
40.0	16.31	259.0	10.3	33800.0	0.00372	0.0911	16.1	0.00581	1.01611	0.611
45.0	16.01	260.0	9.92	32500.0	0.00373	0.0892	14.1	0.00557	1.01665	0.570
50.0	15.71	276.0	9.60	31300.0	0.00374	0.0874	12.8	0.00538	1.01715	0.546
55.0	15.42	284.0	9.31	30100.0	0.00374	0.0857	11.9	0.00523	1.01762	0.532
60.0	15.14	291.0	9.04	29000.0	0.00374	0.0843	11.3	0.00512	1.01804	0.526
70.0	14.58	304.0	8.55	26900.0	0.00373	0.0820	10.5	0.00495	1.01879	0.525
80.0	14.05	317.0	8.11	25000.0	0.00370	0.0803	10.1	0.00487	1.01940	0.534
90.0	13.54	329.0	7.72	23400.0	0.00367	0.0791	9.92	0.00484	1.01990	0.545
100.0	13.06	341.0	7.30	219C0.0	0.00362	0.0783	9.81	0.00486	1.02029	0.557
120.0	12.16	364.0	6.81	19700.0	0.00350	0.0775	9.79	0.00501	1.02079	0.579
140.0	11.35	388.0	6.37	18100.0	0.00334	0.0775	9.89	0.00528	1.02100	0.595
160.0	10.64	412.0	6.01	16900.0	0.00316	0.0781	10.1	0.00563	1.02099	0.604
180.0	10.00	437.0	5.73	15900.0	0.00299	0.0791	10.3	0.00605	1.02084	0.610
200.0	9.440	462.0	5.49	15280.0	0.00282	0.0803	10.3	0.00652	1.02058	0.605
250.0	8.277	526.0	5.06	14000.0	0.00245	0.0839	10.9	0.00785	1.01971	0.607
300.0	7.376	590.0	4.77	13200.0	0.00217	0.0879	11.6	0.00932	1.01870	0.606
350.0	6.657	653.0	4.56	12600.0	0.00194	0.0920	12.2	0.0109	1.01770	0.605
400.0	6.078	715.0	4.41	12100.0	0.00176	0.0966	12.8	0.0126	1.01675	0.605
450.0	5.588	776.0	4.29	11800.0	0.00161	0.100	13.4	0.0143	1.01586	0.606
500.0	5.163	837.0	4.20	11500.0	0.00149	0.104	14.0	0.0161	1.01504	0.607
600.0	4.494	958.0	4.06	11880.0	0.00138	0.112	15.4	0.0200	1.01360	0.616
700.0	3.979	1080.0	3.97	10700.0	0.00115	0.120	16.9	0.0245	1.01239	0.625
800.0	3.569	1200.0	3.90	10500.0	0.00103	0.129	18.4	0.0293	1.01136	0.632
900.0	3.235	1320.0	3.85	10300.0	0.000936	0.138	19.8	0.0346	1.01048	0.637
1000.0	2.958	1440.0	3.81	10180.0	0.000857	0.147	21.2	0.0402	1.00972	0.641
1200.0	2.525	1680.0	3.75	9900.0	0.000733	0.164	23.9	0.0527	1.00848	0.646
1400.0	2.202	1930.0	3.71	9740.0	0.000641	0.181	26.5	0.0666	1.00751	0.650
1600.0	1.951	2170.0	3.68	9620.0	0.000569	0.197	29.0	0.0819	1.00674	0.653
1800.0	1.752	2420.0	3.66	9530.0	0.000512	0.213	31.4	0.0986	1.00611	0.655
2000.0	1.589	2660.0	3.64	9460.0	0.000465	0.229	33.0	0.117	1.00559	0.656
2500.0	1.289	3270.0	3.61	9340.0	0.000370	0.267	39.5	0.167	1.00468	0.659
3000.0	1.084	3890.0	3.59	9260.0	0.000318	0.302	44.0	0.225	1.00398	0.660

* TWO-PHASE BOUNDARY

10000 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
20.0	0.05566	2410.0	123.0	23.55	126.6	0.5369	0.4751	0.5475	3587.0
22.0	0.05601	2390.0	135.9	24.28	128.0	0.6044	0.5210	0.6180	3627.0
24.0	0.05648	2390.0	141.0	25.18	129.6	0.6757	0.5807	0.6979	3645.0
26.0	0.05688	2380.0	142.0	26.26	131.4	0.7496	0.6389	0.7619	3649.0
28.0	0.05719	2370.0	141.0	27.29	133.2	0.8155	0.6611	0.8030	3651.0
30.0	0.05758	2350.0	140.0	28.21	134.8	0.8721	0.6832	0.8373	3653.0
32.0	0.05798	2330.0	139.0	29.17	136.5	0.9271	0.7014	0.8671	3654.0
34.0	0.05838	2310.0	138.0	30.18	178.3	0.9805	0.7164	0.8930	3656.0
36.0	0.05879	2300.0	137.0	31.24	140.1	1.032	0.7286	0.9158	3658.0
38.0	0.05920	2280.0	135.0	32.32	142.0	1.082	0.7388	0.9360	3659.0
40.0	0.05962	2260.0	133.0	33.44	143.8	1.131	0.7473	0.9542	3660.0
45.0	0.06068	2220.0	129.0	36.36	148.7	1.245	0.7636	0.9930	3660.0
50.0	0.06176	2180.0	124.0	39.41	153.8	1.352	0.7755	1.026	3658.0
55.0	0.06285	2150.0	120.0	42.58	159.0	1.451	0.7849	1.054	3653.0
60.0	0.06396	2110.0	115.0	45.86	164.3	1.544	0.7929	1.080	3646.0
70.0	0.06623	2040.0	107.0	52.69	175.3	1.714	0.8060	1.125	3628.0
80.0	0.06857	1970.0	99.1	59.81	186.8	1.867	0.8164	1.164	3607.0
90.0	0.07097	1910.0	92.1	67.18	198.6	2.006	0.8246	1.197	3585.0
100.0	0.07342	1863.0	85.7	74.75	210.7	2.133	0.8309	1.224	3566.0
120.0	0.07847	1798.0	74.6	90.31	235.6	2.360	0.8386	1.264	3536.0
140.0	0.08366	1750.0	65.6	106.2	261.1	2.557	0.8416	1.288	3521.0
160.0	0.08895	1730.0	58.2	122.3	287.0	2.730	0.8416	1.300	3520.0
180.0	0.09429	1730.0	52.1	138.5	313.1	2.883	0.8398	1.305	3530.0
200.0	0.0996	1740.0	47.1	154.7	339.2	3.021	0.8370	1.305	3549.0
250.0	0.1130	1810.0	37.8	194.9	404.2	3.311	0.8282	1.294	3620.0
300.0	0.1263	1900.0	31.4	234.7	468.6	3.546	0.8195	1.281	3708.0
350.0	0.1394	2000.0	26.9	274.1	532.3	3.742	0.8118	1.269	3805.0
400.0	0.1525	2100.0	23.6	313.2	595.6	3.911	0.8052	1.260	3905.0
450.0	0.1655	2210.0	21.0	351.9	658.4	4.059	0.7996	1.253	4007.0
500.0	0.1785	2320.0	18.9	390.4	720.9	4.191	0.7949	1.248	4110.0
600.0	0.2043	2550.0	15.8	466.9	845.7	4.418	0.7875	1.241	4314.0
700.0	0.2302	2780.0	13.6	542.9	969.2	4.609	0.7821	1.237	4514.0
800.0	0.2561	3020.0	11.9	618.6	1093.0	4.774	0.7781	1.235	4711.0
900.0	0.2820	3260.0	10.6	694.1	1216.0	4.919	0.7749	1.234	4903.0
1000.0	0.3080	3508.0	9.59	769.4	1340.0	5.049	0.7724	1.234	5089.0
1200.0	0.3600	3990.0	8.03	919.8	1586.0	5.274	0.7688	1.234	5448.0
1400.0	0.4122	4490.0	6.91	1070.0	1833.0	5.464	0.7662	1.234	5790.0
1600.0	0.4645	5000.0	6.06	1220.0	2080.0	5.629	0.7644	1.235	6115.0
1800.0	0.5169	5500.0	5.40	1370.0	2327.0	5.775	0.7630	1.235	6425.0
2000.0	0.5694	6020.0	4.87	1520.0	2574.0	5.905	0.7619	1.236	6722.0
2500.0	0.7038	7300.0	3.91	1894.0	3192.0	6.181	0.7599	1.236	7417.0
3000.0	0.8325	8590.0	3.27	2269.0	3811.0	6.406	0.7586	1.237	8056.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

10000 PSIA ISOBAR

TEMPERATURE	DENSITY	$V(DH/DV)_P$	$V(DP/DU)_V$	$-V(DP/DV)_T$	$(DV/DT)/V_P$	THERMAL CONDUCTIVITY	VISCOSITY	THERMAL DIFFUSIVITY	DIELECTRIC CONSTANT	PRANDTL NUMBER
DEG. R	LB/CU FT	BTU/LB	PSIA-CU FT/BTU	PSIA	1/DEG. R	BTU/FT-HR-R	LB/FT-SEC X 10E+6	SQ FT/HR	CONSTANT	NUMBER
20.0	17.97	192.0	14.5	43300.0	0.00285	0.101	79.3	0.0139	1.01258	1.55
22.0	17.85	196.0	14.5	42700.0	0.00315	0.102	60.8	0.00925	1.01295	1.33
24.0	17.73	210.0	13.7	42300.0	0.00332	0.103	48.4	0.00829	1.01314	1.19
26.0	17.61	225.0	12.8	41900.0	0.00338	0.102	39.8	0.00764	1.01343	1.07
28.0	17.49	236.0	12.2	41400.0	0.00340	0.102	33.8	0.00727	1.01370	0.955
30.0	17.37	244.0	11.8	40800.0	0.00344	0.102	29.3	0.00699	1.01397	0.869
32.0	17.25	250.0	11.5	40200.0	0.00346	0.101	25.9	0.00674	1.01423	0.801
34.0	17.13	256.0	11.3	39600.0	0.00348	0.100	23.3	0.00654	1.01449	0.747
36.0	17.01	262.0	11.0	39100.0	0.00350	0.0991	21.2	0.00636	1.01474	0.704
38.0	16.89	267.0	10.8	38500.0	0.00351	0.0982	19.5	0.00621	1.01498	0.669
40.0	16.77	272.0	10.6	38000.0	0.00351	0.0973	18.1	0.00608	1.01522	0.641
45.0	16.48	282.0	10.2	36700.0	0.00352	0.0950	15.7	0.00581	1.01579	0.590
50.0	16.19	292.0	9.91	35400.0	0.00352	0.0929	14.1	0.00560	1.01633	0.559
55.0	15.91	300.0	9.59	34100.0	0.00351	0.0911	13.0	0.00543	1.01682	0.541
60.0	15.63	308.0	9.31	32900.0	0.00350	0.0895	12.2	0.00530	1.01728	0.531
70.0	15.10	323.0	8.79	30700.0	0.00348	0.0866	11.3	0.00511	1.01810	0.525
80.0	14.58	337.0	8.33	28700.0	0.00345	0.0849	10.7	0.00500	1.01879	0.530
90.0	14.09	350.0	7.92	26900.0	0.00342	0.0835	10.5	0.00495	1.01936	0.539
100.0	13.62	363.0	7.57	25400.0	0.00338	0.0825	10.3	0.00495	1.01983	0.550
120.0	12.74	387.0	6.98	22800.0	0.00327	0.0815	10.2	0.00506	1.02049	0.570
140.0	11.95	411.0	6.52	20900.0	0.00314	0.0814	10.3	0.00529	1.02086	0.586
160.0	11.24	435.0	6.15	19500.0	0.00299	0.0818	10.4	0.00560	1.02101	0.596
180.0	10.61	460.0	5.85	18400.0	0.00284	0.0826	10.6	0.00597	1.02099	0.602
200.0	10.04	485.0	5.61	17500.0	0.00269	0.0837	10.7	0.00639	1.02085	0.598
250.0	8.848	549.0	5.15	16000.0	0.00236	0.0870	11.2	0.00760	1.02020	0.601
300.0	7.919	612.0	4.85	15000.0	0.00209	0.0907	11.8	0.00894	1.01934	0.600
350.0	7.172	675.0	4.63	14300.0	0.00188	0.0945	12.4	0.0104	1.01844	0.599
400.0	6.557	737.0	4.46	13800.0	0.00171	0.0983	13.0	0.0119	1.01755	0.599
450.0	6.042	799.0	4.34	13400.0	0.00157	0.102	13.6	0.0135	1.01670	0.600
500.0	5.603	860.0	4.24	13000.0	0.00145	0.106	14.1	0.0151	1.01591	0.601
600.0	4.894	981.0	4.18	12500.0	0.00127	0.113	15.5	0.0187	1.01448	0.610
700.0	4.344	1100.0	4.00	12100.0	0.00112	0.122	17.0	0.0227	1.01326	0.620
800.0	3.905	1220.0	3.92	11800.0	0.00101	0.131	18.4	0.0271	1.01221	0.628
900.0	3.546	1340.0	3.87	11600.0	0.000920	0.139	19.9	0.0318	1.01130	0.633
1000.0	3.247	1460.0	3.82	11400.0	0.000844	0.148	21.2	0.0369	1.01051	0.638
1200.0	2.778	1700.0	3.76	11100.0	0.000724	0.165	23.9	0.0482	1.00921	0.644
1400.0	2.426	1950.0	3.72	10900.0	0.000634	0.182	26.5	0.0607	1.00819	0.648
1600.0	2.153	2190.0	3.68	10800.0	0.000564	0.198	29.0	0.0745	1.00736	0.651
1800.0	1.935	2430.0	3.66	10600.0	0.000507	0.214	31.5	0.0896	1.00669	0.654
2000.0	1.756	2680.0	3.64	10600.0	0.000461	0.230	33.8	0.106	1.00612	0.655
2500.0	1.427	3290.0	3.61	10400.0	0.000376	0.267	39.5	0.151	1.00505	0.658
3000.0	1.201	3910.0	3.59	10300.0	0.000317	0.303	44.9	0.204	1.00430	0.660

* TWO-PHASE BOUNDARY

THERMODYNAMIC PROPERTIES OF HELIUM 4

15000 PSIA ISOBAR

TEMPERATURE	VOLUME	ISOTHERM DERIVATIVE	ISOCHORE DERIVATIVE	INTERNAL ENERGY	ENTHALPY	ENTROPY	CV	CP	VELOCITY OF SOUND
DEG. R	CU FT/LB	CU FT-PSIA/LB	PSIA/R	BTU/LB	BTU/LB	BTU/LB-R	BTU / LB -R		FT/SEC
26.0	0.05160	3310.0	168.0	34.18	177.5	0.6001	0.5863	0.6957	4267.0
28.0	0.05191	3310.0	170.0	35.04	179.2	0.6636	0.6323	0.7544	4275.0
30.0	0.05219	3270.0	171.0	35.80	180.8	0.7170	0.6591	0.7944	4275.0
32.0	0.05248	3240.0	171.0	36.63	182.4	0.7694	0.6816	0.8293	4276.0
34.0	0.05277	3220.0	171.0	37.50	184.1	0.8206	0.7003	0.8596	4277.0
36.0	0.05307	3190.0	170.0	38.42	185.8	0.8705	0.7160	0.8861	4279.0
38.0	0.05337	3170.0	169.0	39.38	187.6	0.9191	0.7292	0.9093	4281.0
40.0	0.05368	3150.0	167.0	40.37	189.5	0.9662	0.7403	0.9299	4283.0
45.0	0.05445	3110.0	163.0	42.99	194.2	1.078	0.7621	0.9726	4288.0
50.0	0.05523	3070.0	158.0	45.78	199.2	1.183	0.7782	1.007	4291.0
55.0	0.05601	3040.0	152.0	48.70	204.3	1.280	0.7911	1.036	4291.0
60.0	0.05680	3000.0	147.0	51.75	209.5	1.371	0.8020	1.061	4288.0
70.0	0.05839	2930.0	137.0	58.17	220.4	1.538	0.8201	1.104	4276.0
80.0	0.06000	2870.0	128.0	64.95	231.6	1.688	0.8347	1.140	4258.0
90.0	0.06161	2800.0	120.0	72.01	243.1	1.824	0.8465	1.173	4237.0
100.0	0.06324	2740.0	112.0	79.32	255.0	1.949	0.8559	1.196	4214.0
120.0	0.06654	2640.0	99.2	94.49	279.3	2.170	0.8686	1.236	4169.0
140.0	0.06990	2550.0	88.5	110.2	304.3	2.363	0.8752	1.264	4131.0
160.0	0.07331	2490.0	79.5	126.2	329.8	2.533	0.8776	1.282	4104.0
180.0	0.07676	2450.0	72.0	142.3	355.6	2.685	0.8771	1.293	4087.0
200.0	0.08025	2420.0	65.6	158.6	381.5	2.421	0.8749	1.299	4080.0
250.0	0.08901	2410.0	53.4	199.3	446.5	3.112	0.8656	1.300	4095.0
300.0	0.09777	2450.0	44.9	239.7	511.7	3.348	0.8550	1.291	4143.0
350.0	0.1065	2520.0	38.6	279.8	575.6	3.546	0.8449	1.279	4208.0
400.0	0.1151	2610.0	33.9	319.5	639.3	3.716	0.8359	1.269	4282.0
450.0	0.1237	2700.0	30.2	358.8	702.5	3.865	0.8282	1.260	4362.0
500.0	0.1323	2800.0	27.3	397.9	765.3	3.997	0.8215	1.253	4445.0
600.0	0.1493	3000.0	22.9	475.3	890.0	4.225	0.8107	1.243	4616.0
700.0	0.1663	3210.0	19.7	552.1	1014.0	4.416	0.8026	1.236	4788.0
800.0	0.1832	3430.0	17.4	628.4	1137.0	4.581	0.7964	1.233	4960.0
900.0	0.2002	3650.0	15.5	704.4	1261.0	4.726	0.7915	1.231	5131.0
1000.0	0.2173	3880.0	14.0	780.1	1384.0	4.855	0.7876	1.230	5299.0
1200.0	0.2514	4350.0	11.8	931.2	1630.0	5.080	0.7818	1.230	5628.0
1400.0	0.2858	4820.0	10.2	1082.0	1876.0	5.269	0.7778	1.230	5945.0
1600.0	0.3202	5310.0	8.93	1232.0	2122.0	5.434	0.7748	1.231	6251.0
1800.0	0.3547	5800.0	7.97	1383.0	2368.0	5.579	0.7726	1.232	6545.0
2000.0	0.3894	6300.0	7.20	1533.0	2614.0	5.709	0.7708	1.233	6829.0
2500.0	0.4762	7550.0	5.79	1909.0	3231.0	5.984	0.7677	1.234	7498.0
3000.0	0.5632	8820.0	4.85	2284.0	3848.0	6.209	0.7657	1.235	8117.0

* TWO-PHASE BOUNDARY

THERMOPHYSICAL PROPERTIES OF HELIUM 4

15000 PSIA ISOBAR

TEMPERATURE DEG. R	DENSITY LB/CU FT	$V(DH/DV)_P$ BTU/LB	$V(DP/DU)_v$ PSIA-CU FT/BTU	$-V(DP/DV)_T$ PSIA	$(DV/DT)/V_P$ 1/DEG. R	THERMAL CONDUCTIVITY BTU/FT-HR-R	VISCOSITY LB/FT-SEC X 10E+6	THERMAL DIFFUSIVITY SQ FT/HR	DIELECTRIC CONSTANT	PRAND'L NUMBER
26.0	19.38	266.0	14.8	64200.0	0.00262	0.139	97.4	0.0103	1.00883	1.76
28.0	19.26	283.0	14.0	63700.0	0.00267	0.137	76.8	0.00945	1.00916	1.52
30.0	19.16	291.0	13.5	62700.0	0.00273	0.136	62.9	0.00893	1.00946	1.32
32.0	19.05	299.0	13.2	61800.0	0.00277	0.134	52.8	0.00851	1.00975	1.17
34.0	18.95	307.0	12.9	61000.0	0.00280	0.133	45.3	0.00815	1.01005	1.05
36.0	18.84	314.0	12.6	60200.0	0.00283	0.131	39.5	0.00785	1.01034	0.962
38.0	18.74	320.0	12.4	59400.0	0.00284	0.129	35.1	0.00760	1.01062	0.887
40.0	18.63	326.0	12.1	58700.0	0.00285	0.128	31.5	0.00737	1.01091	0.827
45.0	18.37	341.0	11.6	57100.0	0.00285	0.124	25.4	0.00692	1.01159	0.719
50.0	18.11	355.0	11.2	55600.0	0.00284	0.120	21.5	0.00659	1.01224	0.651
55.0	17.85	368.0	10.8	54200.0	0.00281	0.117	19.0	0.00632	1.01286	0.606
60.0	17.60	381.0	10.4	52800.0	0.00279	0.114	17.3	0.00611	1.01343	0.577
70.0	17.13	404.0	9.77	50200.0	0.00273	0.110	15.1	0.00580	1.01449	0.546
80.0	16.67	425.0	9.20	47800.0	0.00268	0.106	13.9	0.00561	1.01543	0.534
90.0	16.23	445.0	8.71	45500.0	0.00263	0.104	13.2	0.00548	1.01626	0.532
100.0	15.81	462.0	8.29	43400.0	0.00259	0.102	12.7	0.00542	1.01699	0.535
120.0	15.03	494.0	7.60	39600.0	0.00250	0.100	12.3	0.00540	1.01820	0.545
140.0	14.31	521.0	7.06	36500.0	0.00242	0.0993	12.1	0.00550	1.01912	0.556
160.0	13.64	547.0	6.64	33900.0	0.00234	0.0991	12.1	0.00567	1.01981	0.565
180.0	13.03	572.0	6.30	31900.0	0.00226	0.0993	12.2	0.00589	1.02031	0.571
200.0	12.46	597.0	6.02	30200.0	0.00218	0.100	12.1	0.00616	1.02065	0.569
250.0	11.23	659.0	5.49	27100.0	0.00197	0.102	12.5	0.00697	1.02161	0.573
300.0	10.23	722.0	5.13	25100.0	0.00179	0.104	12.9	0.00790	1.02091	0.573
350.0	9.391	785.0	4.87	23700.0	0.00163	0.107	13.3	0.00891	1.02056	0.572
400.0	8.686	848.0	4.67	22700.0	0.00150	0.110	13.7	0.0100	1.02007	0.572
450.0	8.083	910.0	4.52	21800.0	0.00139	0.112	14.2	0.0110	1.01952	0.573
500.0	7.560	971.0	4.39	21100.0	0.00129	0.115	14.6	0.0122	1.01893	0.574
600.0	6.698	1090.0	4.21	20100.0	0.00114	0.121	15.9	0.0146	1.01776	0.585
700.0	6.014	1210.0	4.09	19300.0	0.00102	0.129	17.4	0.0174	1.01665	0.598
800.0	5.457	1330.0	3.99	18700.0	0.000927	0.137	18.8	0.0204	1.01563	0.608
900.0	4.994	1450.0	3.92	18200.0	0.000850	0.145	20.2	0.0236	1.01469	0.616
1000.0	4.603	1570.0	3.87	17900.0	0.000785	0.153	21.5	0.0271	1.01385	0.622
1200.0	3.977	1810.0	3.79	17300.0	0.000681	0.170	24.2	0.0347	1.01239	0.632
1400.0	3.499	2050.0	3.73	16900.0	0.000602	0.186	26.8	0.0431	1.01118	0.638
1600.0	3.123	2290.0	3.69	16600.0	0.000539	0.202	29.2	0.0524	1.01018	0.643
1800.0	2.819	2530.0	3.66	16400.0	0.000487	0.217	31.7	0.0625	1.00933	0.647
2000.0	2.568	2770.0	3.64	16200.0	0.000445	0.232	34.0	0.0734	1.00861	0.649
2500.0	2.100	3380.0	3.59	15900.0	0.000365	0.269	39.6	0.104	1.00720	0.655
3000.0	1.775	3990.0	3.57	15700.0	0.000310	0.305	45.0	0.139	1.00619	0.656

* TWO-PHASE BOUNDARY