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# Tables for the Thermophysical Properties of Ethane

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## LIST OF SYMBOLS AND UNITS

| Symbol | Description | SI Units (used in text) | REFERENCE |
|---|---|---|---|
| Roman | | | |
| $A$ | Molar Helmholtz energy | $J \cdot mol^{-1}$ [a] | eq (4) |
| $B$ | Second virial coefficient | $dm^3 \cdot mol^{-1}$ | table 7 |
| $C_i$ | Coefficients in $\Omega^{(2,2)*}$ | - | eq (10), table 8 |
| $C_P$ | Molar isobaric heat capacity | $J \cdot mol^{-1} \cdot K^{-1}$ | table 7 |
| $C_V$ | Molar isochoric heat capacity | $J \cdot mol^{-1} \cdot K^{-1}$ | table 7 |
| $F$ | Crossover function in $\lambda_{cr}$ | - | eqs (15,17) |
| $f_{int}, f_i$ | Contribution from internal modes | - | eqs (11,12), table 8 |
| $G$ | Molar Gibbs energy | $J \cdot mol^{-1}$ | table 7 |
| $G_i$ | Coefficients in $\rho_{\sigma L}$ | - | eq (2), table 2 |
| $g_i$ | Coefficients in $\eta_{ex}$ | - | eq (13), table 9 |
| $H$ | Molar enthalpy | $J \cdot mol^{-1}$ | tables 1,7 |
| $H_i$ | Coefficients in $P_\sigma$ | - | eq (1), table 2 |
| $J_i$ | Coefficients in $\rho_{\sigma V}$ | - | eq (3), table 2 |
| $j_i$ | Coefficients in $\lambda_{ex}$ | - | eq (14), table 9 |
| $k$ | Boltzmann constant | $J \cdot K^{-1}$ | table 1 |
| $M_r$ | Relative molecular mass | - | table 1 |
| $N_A$ | Avogadro constant | $mol^{-1}$ | table 1 |
| $n_i$ | Coefficients in $\phi^r$ | - | eq (6), table 4 |
| $P$ | Pressure | MPa | - |
| $Q_i$ | Coefficients in $\phi^{id}$ | - | eq (5), table 3 |
| $q_D$ | Wavenumber cutoff | $nm^{-1}$ | eq (17) |
| $R$ | Gas constant | $J \cdot mol^{-1} \cdot K^{-1}$ | table 1 |
| $r_i$ | Exponent of $\delta$ | - | eqs (6,13,14), tables 2, 9 |
| $S$ | Molar entropy | $J \cdot mol^{-1} \cdot K^{-1}$ | table 7 |

LIST OF SYMBOLS AND UNITS (CONT'D)

| Symbol | Description | SI Units (used in text) | REFERENCE |
|---|---|---|---|
| $s_i$ | Exponent of $\tau$ | - | eqs (6,13,14) tables 2, 9 |
| t | Reduced temperature, $kT/\epsilon$ | - | eqs (9,10,12) |
| T | Temperature, IPTS-68 | K | - |
| $T^*$ | Reduced temperature, $(T_c-T)/T_c$ | - | eqs (1-3) |
| U | Molar internal energy | $J \cdot mol^{-1}$ | table 7 |
| u | Unified atomic mass unit | kg | table 1 |
| w | Speed of sound | $m \cdot s^{-1}$ | table 7 |
| Z | Compressibility factor, $P/RT\rho$ | - | eq (3) |
| **Greek** | | | |
| $\beta$ | Scaling exponent in $\rho_{\sigma L}, \rho_{\sigma v}$ | - | eqs (2,3), table(2) |
| $\gamma$ | Potential parameter | - | Ref. [13] |
| $\delta$ | Reduced density, $\rho/\rho_c$ | - | - |
| $\epsilon$ | Scaling exponent in $P_\sigma$, $2-\alpha$ | - | eq (1),table 2) |
| $\epsilon$ | Energy parameter | J | See $\epsilon/k$ |
| $\epsilon/k$ | Energy parameter | K | table(1) |
| $\eta$ | Shear viscosity | $\mu Pa \cdot s$ | eq (7) |
| $\lambda$ | Thermal conductivity | $mW \cdot m^{-1} \cdot K^{-1}$ | eq (8) |
| $\xi$ | Correlation length | nm | eqs (15,16) |
| $\rho$ | Molar density | $mol \cdot dm^{-3}$ | - |
| $\sigma$ | Distance parameter | nm | table 1 |
| $\tau$ | Reduced inverse temperature, $T_c/T$ | - | - |
| $\phi$ | Reduced Helmholtz energy, A/RT | - | eqs (4-6) |
| $\Omega^{(2,2)*}$ | Reduced collision integral | - | eqs (9,10) |
| **Superscripts** | | | |
| id | Ideal gas contribution | | eq (4), table 1 |
| r | Residual contribution | | eq (4) |

## LIST OF SYMBOLS AND UNITS (CONT'D)

| Symbol | Description | SI Units (used in text) | REFERENCE |
|---|---|---|---|
| **Subscripts** | | | |
| c | Value at critical point | | table 1 |
| cr | Critical contribution | | eqs (8,15) |
| ex | Excess contribution | | eqs (7,8,13,14) |
| t | Value at triple point | | table 1 |
| tL,tV | Value at triple point in liquid,vapor | | table 1 |
| $\sigma$ | Value at saturation boundary | | eq (1) |
| $\sigma$L,$\sigma$V | Value in saturated liquid, vapor | | eqs (2,3) |
| $\delta$ | Partial derivative with respect to $\delta$ | | tables 5-7 |
| $\tau$ | Partial derivative with respect to $\tau$ | | tables 5-7 |
| 0 | Value at zero density | | eqs (7-9,11) |

[a] Throughout this paper, extensive physical quantities are given on a molar basis. The elementary entities are the ethane ($C_2H_6$) molecules.

# TABLES FOR THE THERMOPHYSICAL PROPERTIES OF ETHANE

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The thermophysical properties of ethane are tabulated for a large range of the fluid state based on recently formulated correlations. For the thermodynamic properties, temperatures from 90 to 625 K at pressures less than 70 MPa are included; for the viscosity, the corresponding range is 90-500 K with pressures to 60 MPa; for the thermal conductivity the range is 90-600 K with pressures to 70 MPa. In addition to the tables of properties, algebraic expressions and associated tables of coefficients are given to allow additional property calculations. Graphical comparisons between experimental property determinations and the correlation are also given both for primary data used in the formulation of the correlations and for additional data. A listing of a FORTRAN program for the evaluation of ethane thermophysical properties is included.

Key words:

correlation; density; equation of state; heat capacity; ethane; phase boundary; pressure; speed of sound; thermal conductivity; thermophysical properties; transport properties; virial coefficients; viscosity.

# 1. INTRODUCTION

We have recently developed correlations for several of the thermophysical properties of ethane [1], including an equation of state analogous to that proposed by Schmidt and Wagner [2], equations for the liquid-vapor phase boundary, and correlations for the fluid viscosity and thermal conductivity. Details of the development and error analysis of the formulations have been presented elsewhere [1]; in this paper, we summarize our equations and present extensive graphical comparisons of the correlations with experimental data and tables of properties based on these correlations. We have also included the listing for a FORTRAN program which can be used interactively to calculate properties of ethane. The correlations are similar in form to those published previously for methane [3], and this report is analogous to the earlier Technical Note on the properties of methane [4]. A separate Internal Report [5] gives a full tabular listing of experimental data considered in the development of the ethane correlations.

The rationale for these new correlations and the present set of tables was discussed in Ref. [1]. Briefly summarized, earlier extensive works include those of Goodwin et al. [6], Sychev et al. [7], and Younglove and Ely [8]. Our correlations account for some new experimental measurements, and more important, the form of the residual Helmholtz free energy correlation, first proposed by Schmidt and Wagner [2], gives an excellent description of the thermodynamic surface and describes the critical region extremely well for a classical equation of state. The new ancillary equations for the phase boundary incorporate the results of lowest order scaling theory, and both viscosity and thermal conductivity correlations improve the description of the fluid properties when compared to previous correlations. Our current description of the enhancement of the thermal conductivity is based on the very recent mode-coupling work of Olchowy and Sengers [9]. The economic importance of ethane, as a major constituent of natural gas, makes the use of improved thermophysical properties correlations especially desireable. Also, the present correlations should prove useful as reference equations for corresponding-states models for mixtures and other pure fluids. These equations, together with the similar study of methane, will assist in the development of corresponding-states formalisms.

The next two sections give the algebraic forms for the fluid property correlations of thermodynamic and transport properties, with brief narrative. The List of Symbols and Units given above is a useful adjunct to the equations, and tables of needed coefficients and constants are interspersed throughout the text. Extensive discussion of the development of the equations and evaluation of fitted coefficients was given in Ref. [1]. Figures which follow, in Appendix A, give the comparisons between the correlations and experimental data; these include both primary data, used in the determination of the coefficients in the equation, and secondary data, which were not explicitly used for any of a number of reasons as discussed in Ref. [1]. The next set of tables, in Appendix B, gives values of the thermophysical properties for convenient values of the temperature, density, or pressure. Finally, this report concludes with a listing of a FORTRAN 77 program, in Appendix C, which allows interactive evaluation of many thermophysical properties for any state point within the range of the correlations.

## 2. THERMODYNAMIC PROPERTIES AND THEIR ALGEBRAIC REPRESENTATION

### 2.1 Fixed Point Constants

Values for the critical and triple-point constants, intermolecular potential parameters (for transport properties using the 11-6-8, $\gamma = 3$ potential), reference values for ideal gas properties, and miscellaneous constants are given in table 1. Details of the selection process and quoted uncertainties are given in Ref. [1]. The values of the critical constants, including all the quoted digits and disregarding the associated uncertainties, are needed for evaluating the correlating equations below. The fundamental constants in table 1 agree with the values most recently recommended by CODATA [10].

Table 1. Fixed point constants and other parameters used in the correlations

| | |
|---|---|
| Triple Point: | $T_t$ = 90.352 ± 0.005 K [a]<br>$P_t$ = 1.130 ± 0.005 Pa<br>$\rho_{tL}$ = 21.667 ± 0.01 mol·dm$^{-3}$<br>$\rho_{tv}$ = 1.504 ± 0.02 mol·dam$^{-3}$ |
| Critical Point: | $T_c$ = 305.33 ± 0.04 K [b]<br>$P_c$ = 4.8718 ± 0.005 MPa<br>$\rho_c$ = 6.87 ± 0.1 mol·dm$^{-3}$<br>$Z_c$ = 0.279 34 ± 0.005 |
| Intermolecular Potential Parameters: | $\epsilon/k$ = 245.0 K $\sigma$ = 0.436 82 nm |
| Ideal Gas Reference Point Values: | (at 298.15 K and 0.101 325 MPa)<br>$S^{id}$ = 229.12 J·K$^{-1}$·mol$^{-1}$<br>$H^{id}$ = 11.874 kJ·mol$^{-1}$ |
| Miscellaneous: | Relative molecular mass...$M_r$ = 30.070<br>Universal gas constant...R = 8.314 510 J·mol$^{-1}$·K$^{-1}$<br>Boltzmann constant...k = 1.380 658 x 10$^{-23}$ J·K$^{-1}$<br>Avogadro constant...$N_A$ = 6.022 136 7 x 10$^{23}$ mol$^{-1}$<br>Unified atomic mass unit..u = 1.660 540 2 x 10$^{-27}$ kg |

[a] This corresponds to 90.360 K on ITS-90 scale.
[b] This corresponds to 305.32 K on ITS-90 scale.

## 2.2 Liquid-Vapor Saturation Boundary

Three ancillary equations for the pressure, liquid density, and vapor density along the two-phase boundary are described in this section. Although the full equation of state can be used with the Maxwell construction method to evaluate these quantities, these equations include theoretically inspired scaling terms and therefore are more accurate in the critical region. The development of the equations was discussed in Ref. [1].

For the saturated vapor pressure $P_\sigma$ the equation

$$P_\sigma(T) = P_c \exp [ H_1 T^*/(1-T^*) + H_2 T^* + H_3 T^{*\varepsilon} + H_4 T^{*2} + H_5 T^{*3} ], \quad (1)$$

where $T^*=(T_c-T)/T_c$, is used. The necessary constants and critical exponent are given in table 2.

The densities of the saturated liquid $\rho_{\sigma L}$ and saturated vapor $\rho_{\sigma v}$ are given by

$$\rho_{\sigma L}(T) = \rho_c \left[ 1 + \frac{G_1 T^{*\beta} + G_2 T^{*2} + G_3 T^{*3} + G_5 T^{*4}}{1 + G_4 T^{*(1-\beta)}} \right], \quad (2)$$

and

$$\rho_{\sigma v}(T) = \frac{P_\sigma(T)}{R\,T} \left\{ 1 + P_\sigma(T) \tau^8 \frac{Z_c - 1}{P_c} \left[ 1 + \frac{J_0 T^{*\beta} + J_1 T^{*2\beta} + J_2 (T^* + T^{*4}) + J_3 T^{*2}}{1 + J_4 T^*} \right] \right\}^{-1} \quad (3)$$

respectively. In eq (3), $Z_c = P_c/(RT_c\rho_c)$ is the critical compressibility factor given in table 1, $\tau = T_c/T$, and $P_\sigma(T)$ must be evaluated from eq (1). The constants are again found in table 2. Figures A1, A2, and A3 in Appendix A give comparisons between experimental phase boundary measurements and the quantities calculated by eqs (1-3).

Table 2. Coefficients for liquid-vapor boundary correlations

| Saturated Vapor Pressure eq (1) | Saturated Liquid Density eq (2) | Saturated Vapor Density eq (3) |
|---|---|---|
| $\epsilon$ = 1.90 | $\beta$ = 0.355 | $\beta$ = 0.355 |
| $H_1$ = -7.955 315 | $G_1$ = 1.930 740 | $J_0$ = -0.748 371 9 |
| $H_2$ = 1.532 827 | $G_2$ = -0.653 985 6 | $J_1$ = -1.372 895 |
| $H_3$ = 14.780 68 | $G_3$ = 0.814 136 2 | $J_2$ = -1.192 597 |
| $H_4$ =-13.431 79 | $G_4$ = -0.339 743 0 | $J_3$ = 1.861 505 |
| $H_5$ = 4.704 891 | $G_5$ = -0.383 814 1 | $J_4$ = 1.313 649 |

## 2.3 Ideal Gas Equation

The thermodynamic surface is described by an equation for the molar Helmholtz energy, A. Thus, the important derived properties can be obtained by simple, analytical differentiation. The Helmholtz energy is divided into ideal gas and residual constituents according to

$$A(\rho,T) = A^{id} + A^{r} = RT\phi = RT(\phi^{id} + \phi^{r}). \qquad (4)$$

All the derived thermodynamic properties can similarly be divided into ideal and residual contributions as discussed below.

Our ideal gas correlation is based on the spectroscopically derived data of Chao et al. [11]. With the definitions $\delta = \rho/\rho_c$ and $\tau = T_c/T$, the dimensionless ideal gas contribution to the Helmholtz energy is written as

$$\begin{aligned}\phi^{id}(\delta,\tau) &= A^{id} / RT \\ &= Q_1 + \ln \delta + Q_2 \ln \tau + Q_3 \tau^{-1/3} + \\ &\quad Q_4 \tau^{-2/3} + Q_5 \tau^{-1} + Q_6 \ln (1 - e^{Q_7\tau}) \end{aligned} \qquad (5)$$

with the coefficients $Q_i$ given in table 3. Equation (5) must be evaluated at the experimental density and temperature, although for many thermodynamic properties, there is no density (or pressure) dependence in the required derivatives, as discussed below. The constants in table 3 incorporate integration constants necessary to give the standard values of the entropy and enthalpy reported in table 1. A figure comparing the spectroscopic data and the correlations is given in Appendix A.

Table 3. Coefficients for ideal gas Helmholtz energy, eq (5)

| | |
|---|---|
| $Q_0$ = -28.594 991 | $Q_4$ = -3.307 573 5 |
| $Q_1$ = -23.446 765 | $Q_5$ = -0.559 566 78 |
| $Q_2$ = 3.815 947 6 | $Q_6$ = 5.072 226 7 |
| $Q_3$ = 8.602 129 9 | $Q_7$ = -5.507 487 4 |

## 2.4 Residual Helmholtz Energy

The residual term in eq (4) for the Helmholtz energy was correlated by a 32-term function introduced by Schmidt and Wagner [2]. The resulting equation of state has been called the SWEOS, and the coefficients for the ethane fluid were obtained by a multiproperty least-squares regression as described in Ref. [1]. Explicitly, we write

$$\phi^r = \sum_{i=1}^{13} n_i \, \delta^{r_i} \tau^{s_i} + e^{-\delta^2} \sum_{i=14}^{24} n_i \, \delta^{r_i} \tau^{s_i} + e^{-\delta^4} \sum_{i=25}^{32} n_i \, \delta^{r_i} \tau^{s_i} \qquad (6)$$

with $\delta = \rho/\rho_c$ and $\tau = T_c/T$, as before. The coefficients $n_i$ and the exponents $r_i$ and $s_i$ are given in table 4.

## 2.5 Derived Property Equations

One can evaluate many of the thermodynamic properties of ethane by taking the appropriate derivatives of the Helmholtz energy as given in eqs (4-6). In tables 5 and 6 we have collected the coefficients necessary to calculate the six lowest order derivatives for the ideal gas and residual contributions to the Helmholtz energy. In our notation, the first isothermal (reduced) density derivative of the (reduced) residual free energy is denoted

$$\phi^r_\delta = \left. \frac{\partial \phi^r(\delta,\tau)}{\partial \delta} \right|_\tau = \left. \frac{\rho_c}{RT} \frac{\partial A^r(\rho,T)}{\partial \rho} \right|_T .$$

and similarly for other derivatives.

Table 4. Exponents and coefficients for the residual Helmholtz energy $\phi^r$, eq (6)

| | i | $r_i$ | $s_i$ | $n_i$ |
|---|---|---|---|---|
| $\delta^{r_i} \tau^{s_i}$ | 1 | 1 | 0 | 0.462 154 305 60 |
| | 2 | 1 | 1.5 | $-0.192\ 369\ 363\ 87 \times 10$ |
| | 3 | 1 | 2.5 | 0.398 786 040 03 |
| | 4 | 2 | -0.5 | $0.160\ 545\ 323\ 72 \times 10^{-1}$ |
| | 5 | 2 | 1.5 | 0.128 952 422 19 |
| | 6 | 2 | 2 | $0.354\ 583\ 204\ 91 \times 10^{-1}$ |
| | 7 | 3 | 0 | $0.349\ 278\ 445\ 40 \times 10^{-1}$ |
| | 8 | 3 | 1 | $-0.113\ 061\ 833\ 80 \times 10^{-1}$ |
| | 9 | 3 | 2.5 | $-0.398\ 090\ 327\ 79 \times 10^{-1}$ |
| | 10 | 6 | 0 | $0.830\ 319\ 368\ 34 \times 10^{-3}$ |
| | 11 | 7 | 2 | $0.459\ 215\ 751\ 83 \times 10^{-3}$ |
| | 12 | 7 | 5 | $0.175\ 302\ 879\ 17 \times 10^{-6}$ |
| | 13 | 8 | 2 | $-0.709\ 195\ 161\ 26 \times 10^{-4}$ |
| $e^{-\delta^2} \delta^{r_i} \tau^{s_i}$ | 14 | 1 | 5 | -0.234 361 622 49 |
| | 15 | 1 | 6 | $0.845\ 746\ 976\ 45 \times 10^{-1}$ |
| | 16 | 2 | 3.5 | 0.148 610 520 10 |
| | 17 | 2 | 5.5 | -0.100 168 578 67 |
| | 18 | 3 | 3 | $-0.592\ 648\ 243\ 88 \times 10^{-1}$ |
| | 19 | 3 | 7 | $-0.412\ 635\ 142\ 17 \times 10^{-1}$ |
| | 20 | 5 | 6 | $0.218\ 551\ 618\ 69 \times 10^{-1}$ |
| | 21 | 6 | 8.5 | $-0.745\ 527\ 209\ 58 \times 10^{-4}$ |
| | 22 | 7 | 4 | $-0.988\ 590\ 855\ 72 \times 10^{-2}$ |
| | 23 | 8 | 6.5 | $0.102\ 084\ 164\ 99 \times 10^{-2}$ |
| | 24 | 10 | 5.5 | $-0.521\ 896\ 558\ 47 \times 10^{-3}$ |
| $e^{-\delta^4} \delta^{r_i} \tau^{s_i}$ | 25 | 2 | 22 | $0.985\ 921\ 620\ 30 \times 10^{-4}$ |
| | 26 | 3 | 11 | $0.468\ 651\ 408\ 56 \times 10^{-1}$ |
| | 27 | 3 | 18 | $-0.195\ 580\ 116\ 46 \times 10^{-1}$ |
| | 28 | 4 | 11 | $-0.465\ 571\ 616\ 51 \times 10^{-1}$ |
| | 29 | 4 | 23 | $0.328\ 779\ 053\ 76 \times 10^{-2}$ |
| | 30 | 5 | 17 | 0.135 720 901 85 |
| | 31 | 5 | 18 | -0.108 464 714 55 |
| | 32 | 5 | 23 | $-0.675\ 028\ 369\ 03 \times 10^{-2}$ |

To calculate derivatives of the ideal gas contribution to the free energy, one is guided by the form of eq (5). The left-most column of table 5 lists the factors necessary for the various derivatives, and the remaining columns give the coefficients of these factors directly beneath the heading which indicates the quantity to be calculated. The resulting terms are to be added as in eq (5). The values of the $Q_i$ parameters are obtained from table 3.

Table 5. Ideal gas Helmholtz energy and its derivatives

| | $\phi^{id}$ eq (5) | $\delta\phi^{id}_{\delta}$ ( =1 ) | $\tau\phi^{id}_{\tau}$ | $\delta^2\phi^{id}_{\delta\delta}$ ( =-1 ) | $\tau^2\phi^{id}_{\tau\tau}$ | $\delta\tau\phi^{id}_{\delta\tau}$ ( =0 ) |
|---|---|---|---|---|---|---|
| 1 | $Q_1$ | 1 | $Q_2$ | -1 | $-Q_2$ | 0 |
| $\ln \delta$ | 1 | 0 | 0 | 0 | 0 | 0 |
| $\ln \tau$ | $Q_2$ | 0 | 0 | 0 | 0 | 0 |
| $\tau^{-1/3}$ | $Q_3$ | 0 | $-Q_3/3$ | 0 | $4Q_3/9$ | 0 |
| $\tau^{-2/3}$ | $Q_4$ | 0 | $-2Q_4/3$ | 0 | $10Q_4/9$ | 0 |
| $\tau^{-1}$ | $Q_5$ | 0 | $-Q_5$ | 0 | $2Q_5$ | 0 |
| $\ln (1 - e^{Q_7\tau})$ | $Q_6$ | 0 | 0 | 0 | 0 | 0 |
| $(e^{-Q_7\tau}-1)^{-1}$ | 0 | 0 | $-Q_6Q_7\tau$ | 0 | 0 | 0 |
| $e^{Q_7\tau}\ (e^{Q_7\tau}-1)^{-2}$ | 0 | 0 | 0 | 0 | $-Q_6Q_7{}^2\tau^2$ | 0 |

For derivatives of the residual Helmholtz energy, eq (6) and tables 4 and 6 can be used. As in eq (6), the derivatives are obtained by summing 32 terms of three general types. Each of the terms has factors consisting of powers of the reduced density and temperature with the explicit exponents $r_i$ and $s_i$ and coefficients $n_i$ given for each value of i in table 4. The additional exponential factor, with its argument either the second or fourth power of the density, is indicated in the column heading of table 6 where appropriate. The remaining coefficients relevant to the derivative being calculated are given in the appropriate row in that table.

Table 6. Residual Helmholtz energy and its derivatives

| | $n_i \delta^{r_i} \tau^{s_i}$ (i = 1 to 13) | $e^{-\delta^2} n_i \delta^{r_i} \tau^{s_i}$ (i = 14 to 24) | $e^{-\delta^4} n_i \delta^{r_i} \tau^{s_i}$ (i = 25 to 32) |
|---|---|---|---|
| $\phi^r$ | 1 | 1 | 1 |
| $\delta\phi^r_\delta$ | $r_i$ | $r_i - 2\delta^2$ | $r_i - 4\delta^4$ |
| $\tau\phi^r_\tau$ | $s_i$ | $s_i$ | $s_i$ |
| $\delta^2\phi^r_{\delta\delta}$ | $r_i(r_i-1)$ | $[r_i(r_i-1) -2(2r_i+1)\delta^2 +4\delta^4]$ | $[r_i(r_i-1) -4(2r_i+3)\delta^4 +16\delta^8]$ |
| $\tau^2\phi^r_{\tau\tau}$ | $s_i(s_i-1)$ | $s_i(s_i-1)$ | $s_i(s_i-1)$ |
| $\delta\tau\phi^r_{\delta\tau}$ | $r_i s_i$ | $s_i(r_i-2\delta^2)$ | $s_i(r_i-4\delta^4)$ |

In table 7, the most common thermodynamic properties of interest have been expressed in terms of the reduced derivatives of the Helmholtz energy as discussed above. All nominally extensive quantities (that is, the various thermodynamic potentials and heat capacities) are given per mole. It is straightforward to calculate, by using these tables, the most useful thermodynamic properties of ethane. In Figures A4-9 of Appendix A, we give comparisons of experimental data and correlated values for the PVT surface, second virial coefficient, isochoric heat capacity, isobaric heat capacity, heat capacity of the liquid along the saturation boundary, and speed of sound.

Table 7. Thermodynamic property equations

| | |
|---|---|
| Pressure: | $P(\rho,T) = \rho RT \left( 1 + \delta\phi_\delta^r \right)$ |
| Internal Energy: | $U(\rho,T) = RT \left( \tau\phi_\tau^{id} + \tau\phi_\tau^r \right)$ |
| Enthalpy: | $H(\rho,T) = RT \left( 1 + \tau\phi_\tau^{id} + \tau\phi_\tau^r + \delta\phi_\delta^r \right)$ |
| Gibbs Energy: | $G(\rho,T) = RT \left( 1 + \phi^{id} + \phi^r + \delta\phi_\delta^r \right)$ |
| Helmholtz Energy: | $A(\rho,T) = RT \left( \phi^{id} + \phi^r \right)$ |
| Entropy: | $S(\rho,T) = -R \left( \phi^{id} + \phi^r - \tau\phi_\tau^{id} - \tau\phi_\tau^r \right)$ |
| Isochoric Heat Capacity: | $C_v(\rho,T) = -R \left( \tau^2\phi_{\tau\tau}^{id} + \tau^2\phi_{\tau\tau}^r \right)$ |
| Isobaric Heat Capacity: | $C_p(\rho,T) = C_v(\rho,T) + R \dfrac{\left( 1 + \delta\phi_\delta^r - \delta\tau\phi_{\delta\tau}^r \right)^2}{1 + 2\delta\phi_\delta^r + \delta^2\phi_{\delta\delta}^r}$ |
| Saturated Liquid Heat Capacity: | $C_{\sigma L}(T) = C_v(\rho_{\sigma L},T) - R \left( 1 + \delta\phi_\delta^r - \delta\tau\phi_{\delta\tau}^r \right) \dfrac{T}{\rho_{\sigma L}} \dfrac{d\rho_{\sigma L}}{dT}$ |
| Speed of Sound: | $w^2(\rho,T) = \dfrac{RT}{uN_A M_r} \dfrac{C_p(\rho,T)}{C_v(\rho,T)} (1+2\delta\phi_\delta^r+\delta^2\phi_{\delta\delta}^r)$ |
| Second Virial Coefficient: | $B(T) = \dfrac{1}{\rho_c} \lim_{\delta\to 0} \phi_\delta^r$ |

## 3. TRANSPORT PROPERTIES AND THEIR ALGEBRAIC REPRESENTATION

The viscosity and thermal conductivity are correlated as the sum of terms representing the temperature dependent dilute gas contribution, a temperature and density dependent excess contribution and, for the thermal conductivity, a contribution from the critical enhancement. The viscosity is given by

$$\eta(\rho,T) = \eta_0(T) + \eta_{ex}(\rho,T), \tag{7}$$

and the expression for thermal conductivity is

$$\lambda(\rho,T) = \lambda_0(T) + \lambda_{ex}(\rho,T) + \lambda_{cr}(\rho,T). \tag{8}$$

These terms are explicitly described in this section.

### 3.1 Dilute Gas Correlation

Our expression for the dilute gas viscosity is from the Chapman-Enskog theory [12]. Using the appropriate constants from table 1, we find

$$\eta_0(T) = 12.0085\ \sqrt{t}\ /\ \Omega^{(2,2)*}(t)\ \mu Pa\cdot s, \tag{9}$$

where the reduced temperature $t = kT/\epsilon$. The collision integral $\Omega^{(2,2)*}$ has been approximated for the 11-6-8, $\gamma = 3$ intermolecular potential function [13];

$$\Omega^{(2,2)*} = \left[ \sum_{i=1}^{9} C_i\ t^{[(i-1)/3\ -\ 1]} \right]^{-1} \tag{10}$$

with coefficients $C_i$ listed in table 8. The collision integrals tabulated in Ref. [13] were compared to eq (10) in table A10 of Ref. [4]; experimental values of $\eta_0$ are compared to values calculated from eq (9) in Figure A10.

Table 8. Coefficients for dilute gas transport properties

| $\Omega^{(2,2)*}$, eq (10) | | $f_{int}$, eq (12) | |
|---|---|---|---|
| $c_1$ | -3.032 813 828 1 | | |
| $c_2$ | 16.918 880 086 | $f_1$ | 1.710 414 7 |
| $c_3$ | -37.189 364 917 | | |
| $c_4$ | 41.288 861 858 | $f_2$ | -0.693 648 2 |
| $c_5$ | -24.615 921 140 | | |
| $c_6$ | 8.948 843 095 9 | | |
| $c_7$ | -1.873 924 504 2 | | |
| $c_8$ | 0.209 661 013 90 | | |
| $c_9$ | $-9.657\ 043\ 707\ 4 \times 10^{-3}$ | | |

For the thermal conductivity $\lambda_0$ of the dilute gas, we have chosen a modified Eucken model [14] with resulting equation

$$\lambda_0(T) = 0.276\ 505\ \eta_0(T)[\ 3.75 - f_{int}(\tau^2 \phi^{id}_{\tau\tau} + 1.5)\ ]\ \text{mW}\cdot\text{m}^{-1}\cdot\text{K}^{-1}. \quad (11)$$

In eq (11), $f_{int}$ is the dimensionless function defined by

$$f_{int} = f_1 + (f_2 / t) \quad (12)$$

with the fitted coefficients f also given in table 8, and the viscosity should be expressed in $\mu$Pa·s, as in eq (9). The quantity $\tau^2 \phi^{id}_{\tau\tau}$ in eq (11) can be evaluated from tables 3 and 5. Figure A12 of Appendix A gives comparisons between experimental values for the dilute gas thermal conductivity and values calculated from eq (11).

## 3.2 Excess Property Correlations

For the excess viscosity, we use the rational polynomial

$$\eta_{ex}(\rho,T) = 15.977 \left[ \sum_{i=1}^{9} g_i\ \delta^{r_i}\ \tau^{s_i} \right] \left[ 1 + \sum_{i=10}^{11} g_i\ \delta^{r_i}\ \tau^{s_i} \right]^{-1} \mu\text{Pa}\cdot\text{s}, \quad (13)$$

where the exponents $r_i$ and $s_i$ and the dimensionless fitted coefficients $g_i$ are given in table 9. Comparisons between experimental viscosities and viscosities calculated using eq (7) with eqs (9) and (13) are given in Figure A13 of Appendix A.

The excess thermal conductivity $\lambda_{ex}$ has been correlated to a polynomial in $\delta$ and $\tau$;

$$\lambda_{ex}(\rho,T) = 4.417\ 86 \left[ \sum_{i=1}^{7} j_i\ \delta^{r_i} \tau^{s_i} \right] \text{ mW} \cdot \text{m}^{-1} \cdot \text{K}^{-1}. \qquad (14)$$

The exponents and dimensionless fitting coefficients for eq (14) are included in table 9.

Table 9. Coefficients for excess transport properties

| | $\eta_{ex}$, eq (13) | | | $\lambda_{ex}$, eq (14) | | |
|---|---|---|---|---|---|---|
| i | $r_i$ | $s_i$ | $g_i$ | $r_i$ | $s_i$ | $j_i$ |
| 1 | 1 | 0 | 0.471 770 03 | 1 | 0 | 0.960 843 22 |
| 2 | 1 | 1 | -0.239 503 11 | 2 | 0 | 2.750 023 5 |
| 3 | 2 | 0 | 0.398 083 01 | 3 | 0 | -0.026 609 289 |
| 4 | 2 | 1 | -0.273 433 35 | 4 | 0 | -0.078 146 729 |
| 5 | 2 | 1.5 | 0.351 922 60 | 5 | 0 | 0.218 813 39 |
| 6 | 3 | 0 | -0.211 013 08 | 1 | 1.5 | 2.384 956 3 |
| 7 | 3 | 2 | -0.004 785 79 | 3 | 1 | -0.751 139 71 |
| 8 | 4 | 0 | 0.073 781 29 | | | |
| 9 | 4 | 1 | -0.030 425 255 | | | |
| 10 | 1 | 0 | -0.304 352 86 | | | |
| 11 | 1 | 1 | 0.001 215 675 | | | |

### 3.3 Critical Enhancement Correlation

The remaining term in eq (8) is the critical enhancement of the thermal conductivity which is easily observed in a broad region around the critical point. We have correlated this using a simplified mode coupling model developed by Olchowy and Sengers [9]. After evaluating the universal, fluid dependent, and correlated constants, we write

$$\lambda_{cr}(\rho,T) = 1.55 \frac{\delta}{\tau} \frac{C_P}{\eta \xi} F(\delta,\tau) \quad mW \cdot m^{-1} \cdot K^{-1}, \tag{15}$$

where the molar isobaric heat capacity is measured in $J \cdot mol^{-1} \cdot K^{-1}$, the correlation length, $\xi$ defined below, is in nm, and the viscosity is expressed in $\mu Pa \cdot s$ in eq (15).

The correlation length used in eq (15) is calculated from

$$\xi = 0.428 (\delta\tau)^{0.507} [(1+2\delta\phi_{\delta}^{r}+\delta^2\phi_{\delta\delta}^{r})^{-1} - (1+2\delta\phi_{\delta}^{r}(1/2) + \delta^2\phi_{\delta\delta}^{r}(1/2))^{-1}]^{0.507} \text{ nm}. \tag{16}$$

The dimensionless crossover or damping function in eq (15) is given by

$$F = \frac{2}{\pi}\left[ e^{-q_D\xi} [1+(q_D\xi)^3/(3\delta^2)]^{-1} - 1 + \frac{C_P-C_V}{C_P}\left[\tan^{-1}(q_D\xi) + \frac{C_V}{C_P-C_V} q_D\xi\right]\right] \tag{17}$$

and $q_D^{-1} = 0.545$ nm is the only adjustable parameter in the theory. Because we are using a classical equation of state to evaluate the heat capacities in eqs (15) and (17) and the derivatives in eq (16), the damping function will not extrapolate well in the asymptotically critical region.

## 4. SUMMARY OF UNCERTAINTIES ASSOCIATED WITH THE CORRELATIONS

The examination of the deviations of our correlations from experimental data using deviation plots such as included in Appendix A and in Ref. [1], tabular comparisons between the data and the correlations such as in Ref. [5], the assessment of the experiments themselves and their reported accuracies, and comparisons of these correlations with previously published equations have allowed us to estimate the uncertainties associated with the correlations in various regions of the phase diagram. In this section, we will summarize the results of our assessment so that the equations and the tables in Appendix B can be used appropriately; details concerning the establishment of these uncertainties are given in Ref. [1].

### 4.1 Two-Phase Boundary

First, for the pressure along the liquid-vapor saturation boundary, we have considered the uncertainties of both the triple point and critical point pressures (table 1) and the quality of both the primary and other experimental data. We estimate that either the ancillary eq (1) or the SWEOS will provide values of the saturation pressures accurate within 0.1% above T = 165 K, within 1% between 130 and 165 K, and within 5% for temperatures from the triple point to 130 K where the vapor pressure is less than 0.003 MPa.

The coexistence densities can also be calculated from the ancillary equations, eqs (2) and (3), or using the SWEOS. In the critical region, the ancillary equations express the theoretically described behavior with a critical exponent of 0.355. The SWEOS, while approximating this flattened coexistence dome quite well, approaches the critical point with the mean field exponent of 0.5, and thus cannot accurately describe this region. Both equations are constrained to give the reported critical density at the critical temperature. For the density of the saturated liquid, either the ancillary equation or the value of the density from the

SWEOS can be used with an estimated uncertainty of 0.1% from the triple point to 200 K, of 0.3% from 200 K to 304 K, and about 1.5% between 304 K and the critical point at 305.33 K.

At temperatures below 250 K, the density of the saturated vapor is less than 1 $mol \cdot dm^{-3}$, and direct measurements are sparse and uncertain. In the critical region, there is a large scatter in the data. Our analysis indicates that either the ancillary equation or the SWEOS will generate values for the density of the saturated vapor with uncertainties as follows: from $T_t$ to 130 K, 5%; from 130 to 240 K, 1.5%; from 240 to 303 K, 0.3%; and from 303 to $T_c$, 5%.

## 4.2 Ideal Gas Properties

The disagreement between thermodynamic extrapolations of the ideal gas isobaric heat capacity [43] and the spectroscopically derived data [11] has not been satisfactorily resolved. We estimate the uncertainty in the ideal gas correlation as follows: for the enthalpy, 1.5%; for the isobaric heat capacity, 1.5%; and for the entropy, 1.0%; all from the triple-point temperature to 700 K.

## 4.3 Thermodynamic Properties

In this section, we discuss the uncertainties associated with the full equation of state. We begin with the second virial coefficient and note that there are no data below 150 K. The SWEOS has not been constrained to provide physically reasonable values of B in this region and cannot be used to evaluate the virial series below 150 K. The Boyle temperature of ethane is well above the maximum temperature considered in this study; extrapolation of our SWEOS correlation gives a value near 747 K. Our assessment of the data and correlation leads to an estimate of the uncertainty in second virial coefficients calculated from the SWEOS as follows. At temperatures from 150 to 200 K, there is an uncertainty of

10%; from 200 to 250 K, this decreases to 3%; from 250-500 K, 1%; and from 500 to 600 K, the maximum temperature considered, the estimated uncertainty is 2%.

The PVT surface is considered next, and both the calculation of pressure with temperature and density as independent variables and the calculation of density with temperature and pressure as independent variables are discussed. There are problems when calculating pressures from the SWEOS (or using any equation of state) in regions where the isotherms are very steep (as in a pressure versus density plot in the low temperature liquid region). Also, when the PV isotherms are very flat, in the critical region, it is difficult to calculate accurate fluid densities.

Our examination of both primary and other experimental data, including the experimental technique, reported uncertainty of the data, purity of the fluid ethane, and deviations from the SWEOS and other equations of state, have led us to these guidelines concerning the uncertainty of a PVT surface generated from the SWEOS. For the vapor at temperatures below 250 K, where the vapor pressure is about 1.3 MPa and the vapor density is about 0.8 $mol \cdot dm^{-3}$, calculations of both density and pressure from the SWEOS have uncertainties of about 0.1%. Liquid densities in this temperature range also have uncertainties of 0.1%; the calculation of pressure from a liquid density at these low temperatures is much more difficult. For pressures less than 10 MPa, the percent deviation in pressure may be very large, and it increases near the saturation boundary. Typically, the absolute deviation is within about 1 MPa. For higher pressures, the uncertainty ranges from 5% at temperatures below 200 K down to 1% for temperatures from 200 to 250 K.

Temperatures from 250 K to 300 K are still far enough from the critical point that accurate density calculations from the SWEOS are possible. For the vapor in this range, we estimate an uncertainty of 0.2% for both density and pressure calculations. For the liquid state near the saturation boundary at the lower temperatures of this range, to 265 K, large percentage deviations are possible. For pressures greater than 5 MPa or temperatures from 265 to 300 K, we estimate the uncertainty in the pressure calculation as 3%. Critical phenomena evidently do not lead to

problems for the SWEOS for calculations at subcritical temperatures below 305.3 K: at 305.3 K, the reduced temperature, $(T_C-T)/T_C$, is about $10^{-4}$, but the two-phase region excludes densities between about 6.4 and 7.4 $mol \cdot dm^{-3}$, that is, within about 7% of the critical density. For the vapor at temperatures between 300 and 305.3 K, we estimate the uncertainty in both density and pressure calculations as less than 0.5%. For the liquid in this temperature range, uncertainties in both density and pressure calculations are estimated as 0.5% at pressures to 10 MPa, but the density uncertainty drops to 0.1% above 10 MPa.

When conditions are very close to the critical point, that is, with temperatures from 305.3 to 307 K with pressures between 4.6 and 5.2 MPa, the uncertainty in calculated densities may be 5%; the uncertainty in pressure in this region is 0.2%. Outside this critical region, from 305.3 to 315 K, the uncertainty in density is estimated at 0.3% and the uncertainty in pressure is 1% for pressures below 40 MPa and 3% for pressures above 40 MPa. For the higher supercritical temperatures, we estimate the uncertainty in density as 0.2% for pressures below 40 MPa and 0.5% for higher pressures. The pressure uncertainties are 0.5% for pressures below 40 MPa and 3% for higher pressures.

Theoretical and observational evidence indicates a divergence in the isochoric heat capacity described by $C_V \sim (T-T_c)^{-\alpha}$ along the critical isochore; $\alpha \approx 0.11$. This critical exponent is not approximated well by the SWEOS, which gives the classical value, $\alpha = 0$. Calculation of the isochoric heat capacity using the SWEOS is not recommended for temperatures from 305 to 306 K with densities between 5.5 and 8.0 $mol \cdot dm^{-3}$. Uncertainties of 10%, in $C_V$ calculations, are estimated for temperatures from 305 to 307 K with densities between 5 and 8.5 $mol \cdot dm^{-3}$. Outside this general critical region, we estimate the uncertainty in calculation of the isochoric heat capacity as 2.5%.

We estimate the uncertainty in calculations of the isobaric heat capacity from the SWEOS as 1.5% throughout the liquid and vapor states at temperatures below 290 K and in the supercritical region above 320 K. An exception is made for the compressed liquid with densities above 20 $mol \cdot dm^{-3}$, where the uncertainty increases to 4%. At points closer to the

critical point, but outside a region bounded by 305 and 307 K and by 5 and 8.5 $mol \cdot dm^{-3}$, the uncertainty is 6%. At points within this boundary, we note that $C_P$ as calculated by the classical SWEOS diverges along the critical isochore with the mean field exponent of 1 rather than the observed exponent of about 1.2; in addition, roundoff error causes the finite value of $C_P \approx 4 \times 10^{12}$ $J \cdot mol^{-1} \cdot K^{-1}$ at the critical point. Thus, percent errors can be very large in this region, but physical measurements of these extremely large heat capacities are exceedingly difficult.

We estimate the uncertainty in calculations of the heat capacity of the saturated liquid, $C_{\sigma L}$, from our SWEOS as 3.5% from the triple point to 145 K and 0.6% from 145 to 280 K. Closer to the critical point, the usual problems with the classical equation of state occur; the uncertainty increases to 5% for temperatures from 280 to 303 K. For temperatures between 303 and $T_C$, very large errors are possible.

It is difficult to correlate the sound speed to within the reported experimental accuracies while obtaining good agreement with other data and using the classical SWEOS formulation. The problems are most serious at high densities and near the critical point. We can summarize our observations by the following guidelines for the use of the SWEOS in calculating the speed of sound in ethane. Below 100 K, in the saturated or compressed liquid, we estimate the uncertainty as 1%. Between 100 and 225 K, the liquid-phase sound speed has an uncertainty of 0.6%. Between 225 K and 290 K and above 310 K, the uncertainty increases to about 1%. Between 290 and 310 K, for densities outside the range 5 to 10 $mol \cdot dm^{-3}$, a 2% uncertainty is estimated. Closer to the critical point, the uncertainty ranges to 10%; at points between 305 and 306 K, with densities from 5.5 to 8 $mol \cdot dm^{-3}$, the classical SWEOS cannot be used: rather than vanishing at the critical point, the calculated sound speed is about 181 $m \cdot s^{-1}$. For the gas below 290 K, we estimate an uncertainty of 0.6%. For pressures above 35 MPa at subcritical temperatures and above 12 MPa for supercritical temperatures, there are no data and we estimate an uncertainty of 2%.

The comparisons with experimental data (and the process of determining the coefficients of the SWEOS), only probe four derivatives of the dimensionless, residual Helmholtz energy, namely $\phi^r_\delta$, $\phi^r_{\delta\delta}$, $\phi^r_{\tau\tau}$, and $\phi^r_{\delta\tau}$.

While this SWEOS should describe the actual thermodynamic surface quite well, additional uncertainties will enter any calculation which requires other derivatives of $\phi^r$ or integrals of the Helmholtz function. We hesitate to make any quantitative estimates of the errors involved in calculating any thermodynamic quantities not discussed in this section, but we conjecture that these errors will be comparable to those found with any other precise equation of state for ethane.

## 4.4 Transport Properties

### 4.4.1 Viscosity

From the dispersion of the data and correlations, the quoted experimental accuracies associated with the data, and a study of the use of the 11-6-8 intermolecular potential in the Chapman-Enskog dilute gas theory, we estimate that the correlation of eqs (9) and (10) will give dilute gas viscosities for ethane with associated uncertainties of 1% from 300 K to 375 K and 1.5 % above that range. In the region from 250 K to 300 K, the estimated uncertainty is 1.5%. For lower temperatures, data are extremely sparse or nonexistent. We anticipate that the theory, with this potential function, will extrapolate well, but we increase our error estimate to 5% for temperatures from the triple point to 250 K.

We next examine the viscosity of ethane at elevated pressures. From the triple-point temperature to 250 K, we estimate the uncertainty in the correlation for the vapor phase as 5%. We estimate a 2.5% uncertainty for the vapor viscosity at temperatures from 250 K to the critical point. Our correlation does not account for any critical enhancement in the viscosity; therefore, the critical region, 305-306 K and 6-7.5 $mol \cdot dm^{-3}$, should be excluded when making calculations with this viscosity correlation. For the liquid from the triple point to the critical point for pressures from the saturation boundary to 30 MPa, we estimate the uncertainty of the correlation as 2%. For higher pressures, the uncertainty increases to about 5%. We estimate the uncertainty of the viscosity correlation in the

supercritical region as generally 2%. At pressures greater than 50 MPa, the uncertainty increases to 5%, and in the critical region, from 305 to 307 K and 5 to 8.5 $mol \cdot dm^{-3}$ (but excluding the region 305 to 306 K and 6 to 7.5 $mol \cdot dm^{-3}$ as indicated above), the uncertainty is also 5%. The viscosity correlation can have a zero in the denominator, corresponding to a singularity, within the fluid region; this occurs well outside the range of any data and the stated range of the correlation. In addition to the usual warnings concerning extrapolation beyond the range of the correlating equation, any user is cautioned about this singularity, which can be a problem only at pressures exceeding 220 MPa.

### 4.4.2 Thermal Conductivity

There are few data for the dilute gas thermal conductivity at very low temperatures. At the lowest temperatures, between the triple point and 200 K, where the vapor pressure is about 0.2 MPa, the correlation for the dilute gas thermal conductivity could give errors in excess of 10%. In the range 200 to 350 K, the uncertainty in the correlation is about 3%, and between 350 K and 600 K we estimate the uncertainty as 4%.

We have estimated the uncertainty associated with our correlation for the thermal conductivity of ethane at elevated pressures. In the gas phase, the large uncertainty in the dilute gas contribution dominates at temperatures below 200 K; the uncertainty in the total thermal conductivity is 10% for the gas at these low temperatures. For temperatures from 200 K to $T_C$, the uncertainty in the gas phase thermal conductivity is about 3%. For the compressed liquid, we estimate uncertainties of 2% to the upper pressure limit of 70 MPa. The asymptotically critical region extending from 305 to 306 K with densities between 6 and 7.5 $mol \cdot dm^{-3}$ can still give large errors; our value of the thermal conductivity at the critical point is about 1.5 $kW \cdot m^{-1} \cdot K^{-1}$, not infinity. In the more general critical region bounded by 305 and 307 K from 5 to 8.5 $mol \cdot dm^{-3}$, we estimate the uncertainty as 10%. At supercritical temperatures, the uncertainty is 4% for densities less than 2 $mol \cdot dm^{-3}$ and 2% for higher densities. For temperatures between 307 and 360 K, and densities between 5 and 8.5 $mol \cdot dm^{-3}$, the critical enhancement contribution remains substantial, and an uncertainty of 5% is estimated.

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*Appendix A*

*Comparisons between experimental data and the correlations*

This appendix contains graphical and statistical comparisons for the experimental data and correlations used in our study of the thermophysical properties of ethane. We have included both primary data, used to determine the final coefficients in the correlating equations, and other data. The complete set of data has been tabulated in Ref.[5].

The deviation plots are given on a percentage basis according to Dev = 100 (Cal - Exp)/Exp where Cal is the value calculated from the correlation and Exp is the value from experiment. With only a few exceptions, the experimental values for both independent and dependent variables used for these comparisons were taken directly from the cited literature source. Those exceptions include conversion to SI units (and, in a few cases, to IPTS-68), correction of obvious typographical errors, and adjustments as described in the notes. A few data from the cited sources were omitted because the correction for obvious typographical errors was not clear, they lay outside the range of state variables which we considered, or they lay inside the solid, metastable, or two-phase region according to our correlations. These comparisons include some, especially older, data which were not included in the statistical summaries or in the figures of Ref.[1]. The values of the independent variables are indicated on the abcissa and in the figure headings.

Summary statistics are given for each reference and are defined as follows:

$$AAD = \frac{1}{N} \sum_{i} |Cal_i - Exp_i|,$$

$$BIAS = \frac{1}{N} \sum_i (Cal_i - Exp_i),$$

and

$$RMS = \left[ \frac{1}{N} \sum_i (Cal_i - Exp_i)^2 - BIAS^2 \right]^{1/2}.$$

The quantity N above represents the number of points in the data set, and the summation over the index i is over all N points. These statistics give dimensioned quantities; the analogously defined dimensionless statistics are based on percentage deviations. Thus, AAD-%, BIAS-%, and RMS-% are defined as above, but with the quantity $(Cal_i - Exp_i)$ replaced by $100\ (Cal_i - Exp_i)/\ Exp_i$.

For each property illustrated in the figures, we list the references from which primary data were obtained. In some instances, data from a single reference were included in both the primary and secondary (not used to determine the final coefficients in the correlations) categories. In this case, the figure legend indicates "2nd" for the secondary data and a separate entry and different symbol are used for the primary data; also, two sets of statistics are given: for the primary data and for the entire data set. Details concerning data selection were given in Ref. [1]. Only the first author is given in the figure legends and captions; the full bibliographic reference is given in the numbered reference list of Sec. 6.

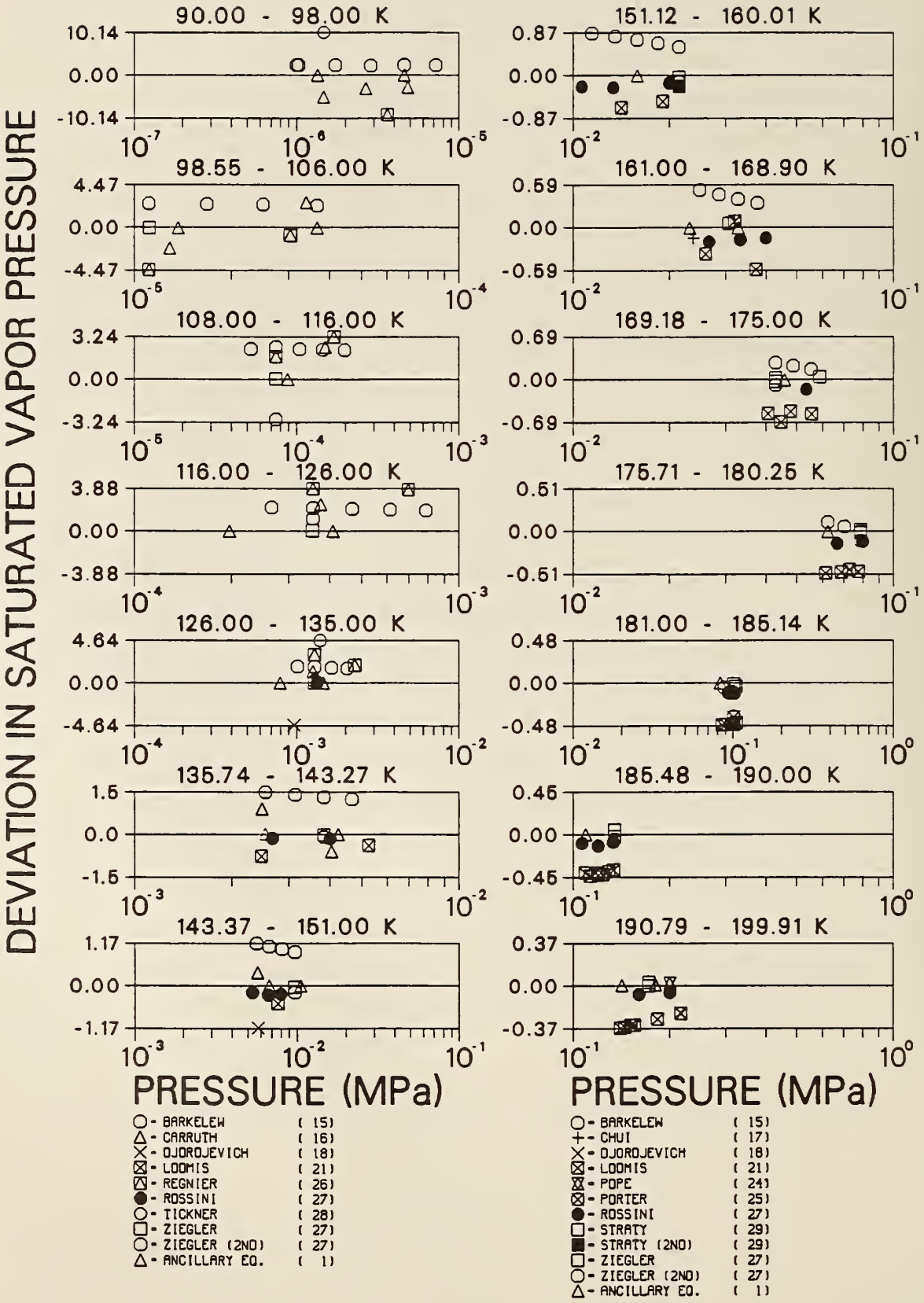


Figure A1. Saturated vapor pressure. (Statistical comparisions begin on page 32.)

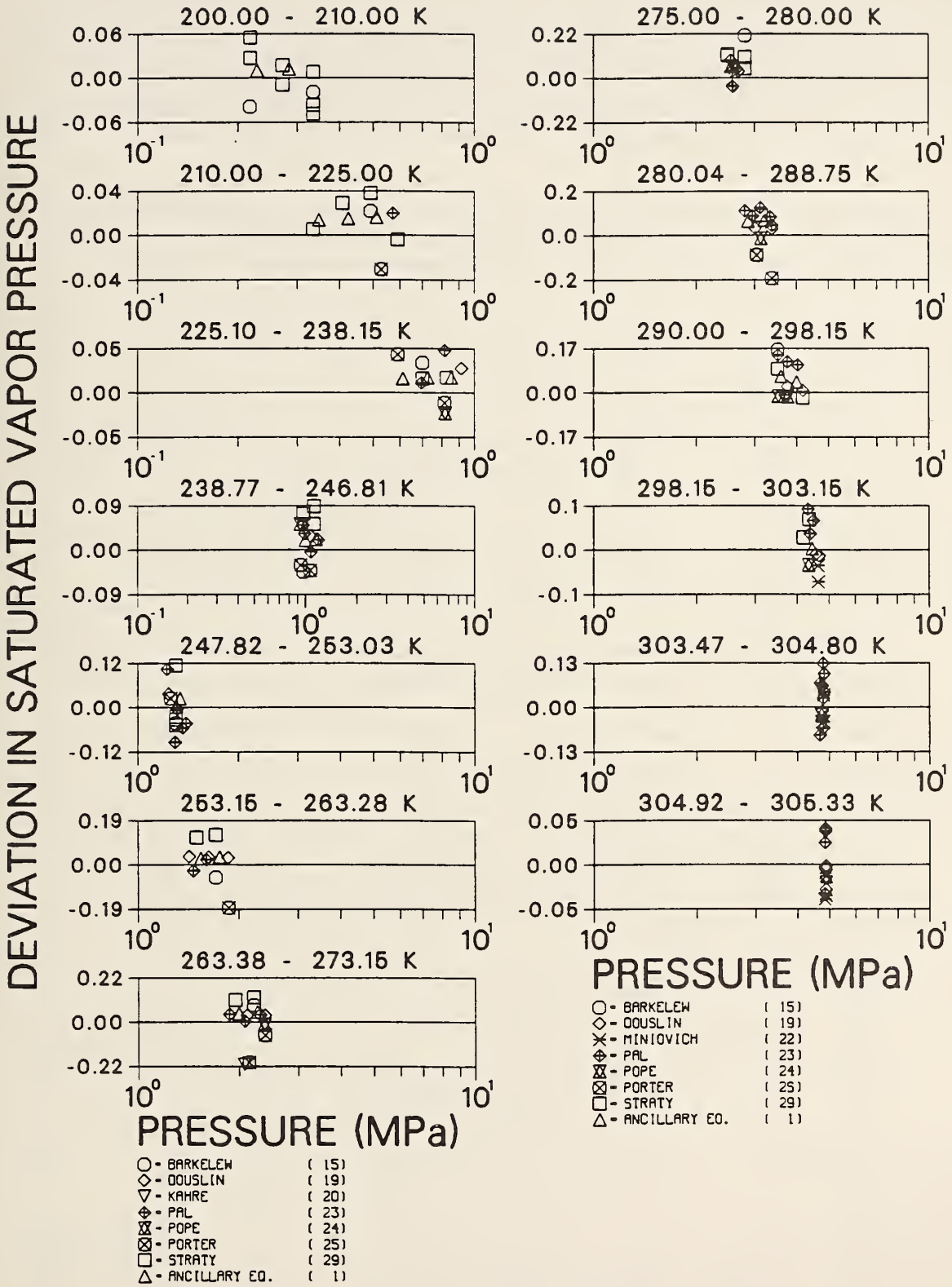


Figure A1. (continued)

Figure A1. Saturated vapor pressure.

The comparisons are based on the Maxwell construction using the full SWEOS. Primary data for the SWEOS were obtained from the ancillary eq (1) and are indicated in the plots. Primary data for eq (1) were obtained from Douslin [19], Pal [23], Pope [24], Straty [29] and Ziegler [27]. Points out of range were from Tickner [28]: 91.35 K, 10.1%; 94.45 K, 19.1%; 98.55 K, 21.9%; 101.85 K, 22.2%; 105.35 K, 21.3%; 110.55 K, 23.1%; 114.65 K, 20.1%.

Statistical comparisons between experimental saturated vapor pressures and the ancillary eq (1) are given first; comparisons between the data and the SWEOS are given next with the suffix "2" on each statistical category.

Data from Barkelew [15]
Number of Points: 20

| | | |
|---|---|---|
| AAD% = 0.292 | BIAS% = -0.127 | RMS% = 0.717 |
| AAD2% = 0.300 | BIAS2% = -0.111 | RMS2% = 0.724 |
| Absolute Deviations: | | |
| AAD = 1.101 | BIAS = -0.242 | RMS = 2.578 kPa |
| AAD2 = 1.289 | BIAS2 = 0.099 | RMS2 = 2.870 kPa |

Data from Carruth [16]
Number of Points: 6

| | | |
|---|---|---|
| AAD% = 2.173 | BIAS% = -0.351 | RMS% = 2.512 |
| AAD2% = 2.177 | BIAS2% = -0.352 | RMS2% = 2.512 |
| Absolute Deviations: | | |
| AAD = 0.009 | BIAS = 0.004 | RMS = 0.012 kPa |
| AAD2 = 0.009 | BIAS2 = 0.004 | RMS2 = 0.012 kPa |

Data from Chui [17]
Number of Points: 2

| | | |
|---|---|---|
| AAD% =36.078 | BIAS% =-36.078 | RMS% =35.936 |
| AAD2% =36.080 | BIAS2% =-36.080 | RMS2% =35.932 |
| Absolute Deviations: | | |
| AAD = 0.262 | BIAS = -0.262 | RMS = 0.228 kPa |
| AAD2 = 0.262 | BIAS2 = -0.262 | RMS2 = 0.227 kPa |

Data from Djordjevich [18]
Number of Points: 6

| | | |
|---|---|---|
| AAD% = 1.384 | BIAS% = -0.615 | RMS% = 1.921 |
| AAD2% = 1.385 | BIAS2% = -0.604 | RMS2% = 1.920 |
| Absolute Deviations: | | |
| AAD = 2.400 | BIAS = 2.189 | RMS = 3.345 kPa |
| AAD2 = 2.481 | BIAS2 = 2.277 | RMS2 = 3.484 kPa |

Data from Douslin [19]
Number of Points: 18
Weighted Data:
Number of Points: 18

| | | |
|---|---|---|
| AAD% = 0.013 | BIAS% = -0.007 | RMS% = 0.016 |
| AAD2% = 0.024 | BIAS2% = 0.019 | RMS2% = 0.018 |
| Absolute Deviations: | | |
| AAD = 0.369 | BIAS = -0.279 | RMS = 0.464 kPa |
| AAD2 = 0.567 | BIAS2 = 0.361 | RMS2 = 0.519 kPa |

```
Data from Kahre [20]
Number of Points: 5
 AAD%  = 0.558   BIAS%  =  0.456   RMS%  = 0.402
 AAD2% = 0.587   BIAS2% =  0.503   RMS2% = 0.397
           Absolute Deviations:
 AAD   =19.916   BIAS   = 17.798   RMS  =15.129 kPa
 AAD2  =20.998   BIAS2  = 19.241   RMS2 =15.103 kPa

Data from Loomis [21]
Number of Points: 34
 AAD%  = 0.450   BIAS%  = -0.444   RMS%  = 0.140
 AAD2% = 0.449   BIAS2% = -0.444   RMS2% = 0.141
           Absolute Deviations:
 AAD   = 0.353   BIAS   = -0.351   RMS  = 0.182 kPa
 AAD2  = 0.350   BIAS2  = -0.349   RMS2 = 0.179 kPa

Data from Miniovich [22]
Number of Points: 11
 AAD%  = 0.028   BIAS%  = -0.019   RMS%  = 0.025
 AAD2% = 0.034   BIAS2% = -0.028   RMS2% = 0.026
           Absolute Deviations:
 AAD   = 1.312   BIAS   = -0.908   RMS  = 1.198 kPa
 AAD2  = 1.621   BIAS2  = -1.316   RMS2 = 1.213 kPa

Data from Pal [23]
Number of Points: 50
 AAD%  = 0.066   BIAS%  =  0.001   RMS%  = 0.103
 AAD2% = 0.073   BIAS2% =  0.025   RMS2% = 0.103
           Absolute Deviations:
 AAD   = 1.863   BIAS   =  0.837   RMS  = 2.476 kPa
 AAD2  = 2.076   BIAS2  =  1.385   RMS2 = 2.449 kPa

Weighted Data:
Number of Points: 47
 AAD%  = 0.051   BIAS%  =  0.013   RMS%  = 0.060
 AAD2% = 0.058   BIAS2% =  0.037   RMS2% = 0.058
           Absolute Deviations:
 AAD   = 1.720   BIAS   =  0.778   RMS  = 2.201 kPa
 AAD2  = 1.943   BIAS2  =  1.352   RMS2 = 2.162 kPa

Data from Pope [24]
Number of Points: 11
 AAD%  = 0.115   BIAS%  = -0.007   RMS%  = 0.191
 AAD2% = 0.093   BIAS2% =  0.022   RMS2% = 0.185
           Absolute Deviations:
 AAD   = 1.692   BIAS   = -1.306   RMS  = 1.663 kPa
 AAD2  = 0.981   BIAS2  = -0.554   RMS2 = 1.323 kPa

Weighted Data:
Number of Points: 9
 AAD%  = 0.049   BIAS%  = -0.038   RMS%  = 0.040
 AAD2% = 0.024   BIAS2% = -0.007   RMS2% = 0.026
           Absolute Deviations:
 AAD   = 1.399   BIAS   = -1.322   RMS  = 1.170 kPa
 AAD2  = 0.569   BIAS2  = -0.450   RMS2 = 0.544 kPa
```

Data from Porter [25]
Number of Points: 20
AAD% = 0.211 BIAS% = -0.035 RMS% = 0.259
AAD2% = 0.198 BIAS2% = -0.007 RMS2% = 0.256
Absolute Deviations:
AAD = 2.808 BIAS = -1.209 RMS = 4.114 kPa
AAD2 = 2.482 BIAS2 = -0.659 RMS2 = 4.015 kPa

Data from Regnier [26]
Number of Points: 9
AAD% = 3.563 BIAS% = 0.337 RMS% = 4.232
AAD2% = 3.578 BIAS2% = 0.334 RMS2% = 4.247
Absolute Deviations:
AAD = 0.014 BIAS = 0.014 RMS = 0.016 kPa
AAD2 = 0.014 BIAS2 = 0.014 RMS2 = 0.016 kPa

Data from Rossini (via Ziegler [27])
Number of Points: 22
AAD% = 0.147 BIAS% = -0.142 RMS% = 0.067
AAD2% = 0.148 BIAS2% = -0.141 RMS2% = 0.071
Absolute Deviations:
AAD = 0.065 BIAS = -0.065 RMS = 0.048 kPa
AAD2 = 0.064 BIAS2 = -0.064 RMS2 = 0.045 kPa

Data from Tickner [28]
Number of Points: 10
AAD% =17.099 BIAS% = 17.099 RMS% = 5.890
AAD2% =17.094 BIAS2% = 17.094 RMS2% = 5.868
Absolute Deviations:
AAD = 0.024 BIAS = 0.024 RMS = 0.027 kPa
AAD2 = 0.024 BIAS2 = 0.024 RMS2 = 0.028 kPa

Data from Straty [29]
Number of Points: 44
AAD% = 0.043 BIAS% = 0.010 RMS% = 0.056
AAD2% = 0.055 BIAS2% = 0.031 RMS2% = 0.064
Absolute Deviations:
AAD = 0.526 BIAS = 0.280 RMS = 0.791 kPa
AAD2 = 0.830 BIAS2 = 0.707 RMS2 = 1.158 kPa

Weighted Data:
Number of Points: 43
AAD% = 0.039 BIAS% = 0.016 RMS% = 0.044
AAD2% = 0.051 BIAS2% = 0.037 RMS2% = 0.052
Absolute Deviations:
AAD = 0.537 BIAS = 0.288 RMS = 0.799 kPa
AAD2 = 0.848 BIAS2 = 0.724 RMS2 = 1.166 kPa

Data from Ziegler [27]
These data were adjusted by Goodwin [30].
Number of Points: 10
Weighted Data:
Number of Points: 10
AAD% = 0.028 BIAS% = -0.013 RMS% = 0.028
AAD2% = 0.033 BIAS2% = -0.016 RMS2% = 0.034
Absolute Deviations:
AAD = 0.005 BIAS = -0.005 RMS = 0.006 kPa
AAD2 = 0.006 BIAS2 = -0.005 RMS2 = 0.006 kPa

Data from Ziegler (unadj) [27]
Number of Points: 50
AAD% = 1.371 BIAS% = 1.361 RMS% = 0.889
AAD2% = 1.372 BIAS2% = 1.362 RMS2% = 0.891
Absolute Deviations:
AAD = 0.049 BIAS = 0.038 RMS = 0.057 kPa
AAD2 = 0.048 BIAS2 = 0.038 RMS2 = 0.056 kPa

Data from ancillary equation [1]
Number of Points: 43
AAD2% = 0.020 BIAS2% = 0.015 RMS2% = 0.023
Absolute Deviations:
AAD2 = 0.321 BIAS2 = 0.321 RMS2 = 0.617 kPa

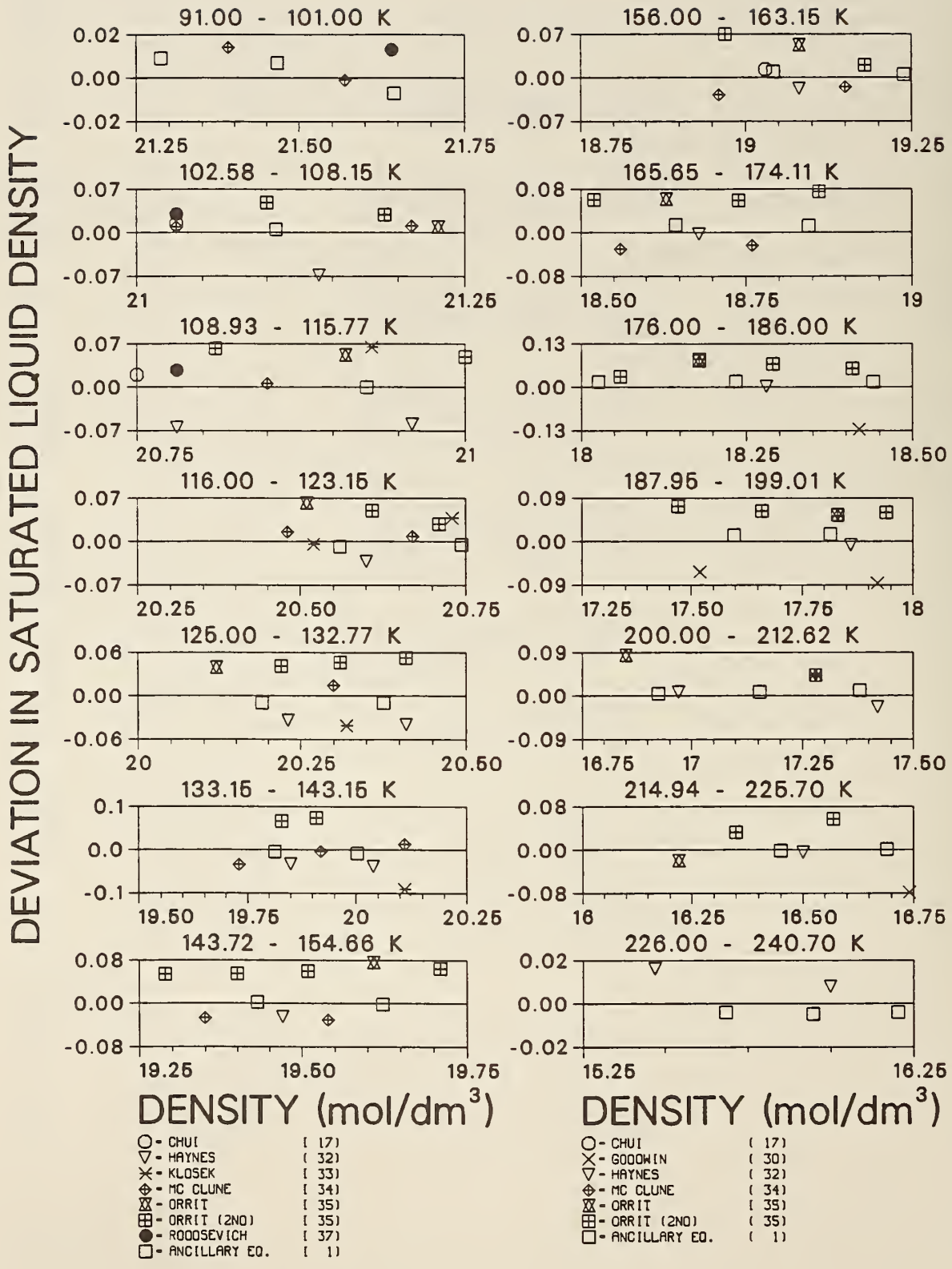


Figure A2. Saturated liquid density. (Statistical comparisions begin on page 38.)

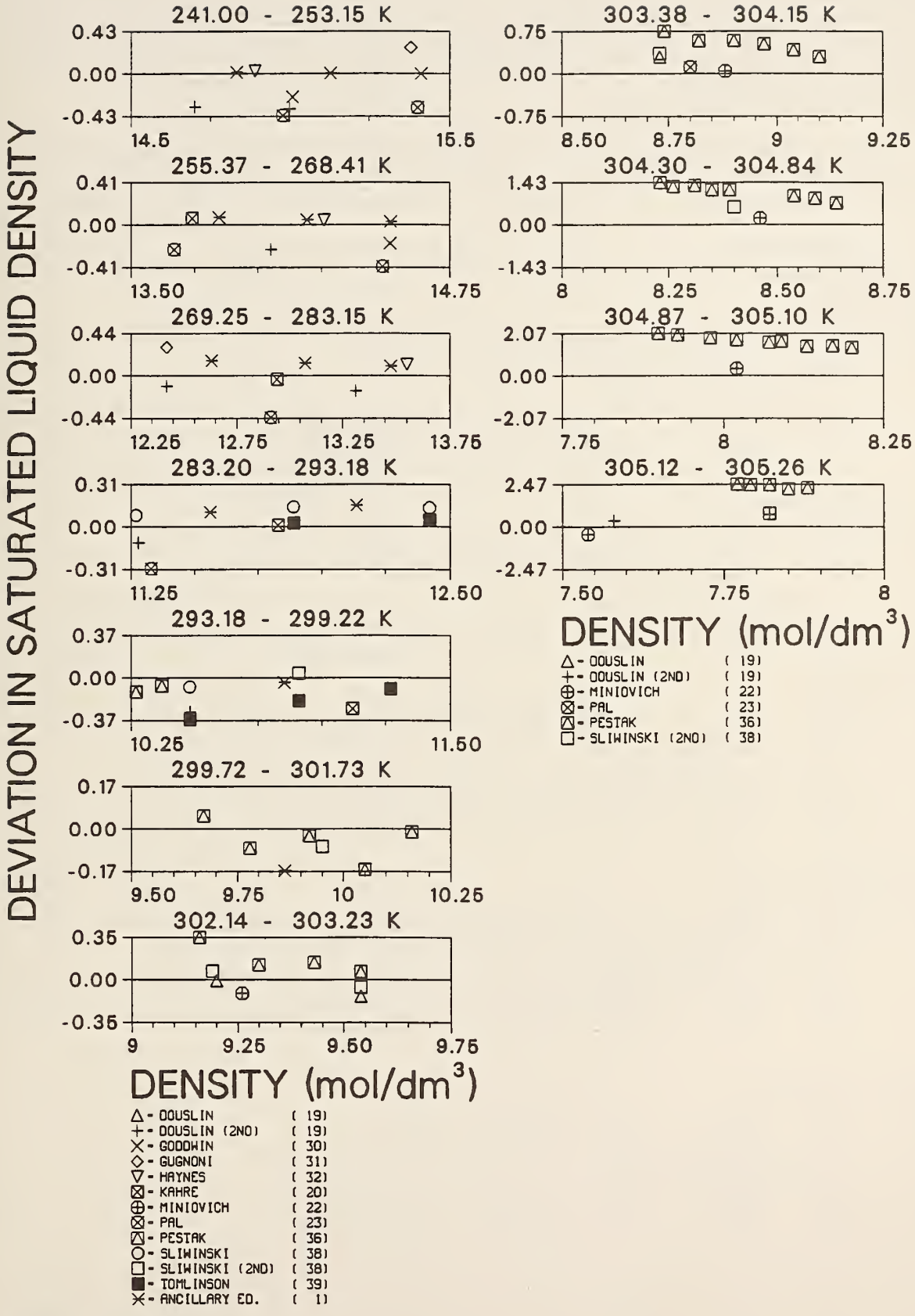


**Figure A2. (continued)**

Figure A2. Saturated liquid density.

The comparisons are based on the Maxwell construction using the full SWEOS. Primary data for the SWEOS were obtained from the ancillary eq (2) and are indicated in the plots. Primary data for eq (2) were obtained from Douslin [19], Sliwinski [38], Chui [17], Rodosevich [37], Haynes [32], McClune [34], and Orrit [35].

Statistical comparisons between experimental saturated liquid densities and the ancillary eq (2) are given first; comparisons between the data and the SWEOS are given next with the suffix "2" on each statistical category.

Data from Chui [17]
Number of Points: 3
Weighted Data:
Number of Points: 3

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.013 | BIAS% | = 0.013 | RMS% | = 0.009 |
| AAD2% | = 0.015 | BIAS2% | = 0.015 | RMS2% | = 0.003 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.00 | BIAS | = 0.00 | RMS | = 0.00 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.00 | BIAS2 | = 0.00 | RMS2 | = 0.00 $mol \cdot dm^{-3}$ |

Data from Douslin [19]
Number of Points: 12

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.201 | BIAS% | = -0.201 | RMS% | = 0.114 |
| AAD2% | = 0.260 | BIAS2% | = -0.032 | RMS2% | = 0.313 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.02 | BIAS | = -0.02 | RMS | = 0.02 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.03 | BIAS2 | = -0.01 | RMS2 | = 0.03 $mol \cdot dm^{-3}$ |

Weighted Data:
Number of Points: 3

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.039 | BIAS% | = -0.039 | RMS% | = 0.007 |
| AAD2% | = 0.145 | BIAS2% | = 0.049 | RMS2% | = 0.178 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.00 | BIAS | = 0.00 | RMS | = 0.00 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.01 | BIAS2 | = 0.00 | RMS2 | = 0.02 $mol \cdot dm^{-3}$ |

Data from Goodwin [30]
Number of Points: 12

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.183 | BIAS% | = -0.183 | RMS% | = 0.084 |
| AAD2% | = 0.175 | BIAS2% | = -0.175 | RMS2% | = 0.087 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.03 | BIAS | = -0.03 | RMS | = 0.01 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.03 | BIAS2 | = -0.03 | RMS2 | = 0.01 $mol \cdot dm^{-3}$ |

Data from Gugnoni [31]
Number of Points: 4

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.596 | BIAS% | = -0.092 | RMS% | = 0.762 |
| AAD2% | = 0.621 | BIAS2% | = -0.022 | RMS2% | = 0.745 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.08 | BIAS | = -0.01 | RMS | = 0.11 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.09 | BIAS2 | = 0.00 | RMS2 | = 0.10 $mol \cdot dm^{-3}$ |

Data from Haynes [32]
Weighted Data:
Number of Points: 22
AAD% = 0.028 BIAS% = -0.023 RMS% = 0.028
AAD2% = 0.034 BIAS2% = -0.014 RMS2% = 0.041
Absolute Deviations:
AAD = 0.01 BIAS = 0.00 RMS = 0.01 $mol \cdot dm^{-3}$
AAD2 = 0.01 BIAS2 = 0.00 RMS2 = 0.01 $mol \cdot dm^{-3}$

Data from Kahre [20]
Number of Points: 5
AAD% = 0.224 BIAS% = -0.224 RMS% = 0.165
AAD2% = 0.210 BIAS2% = -0.181 RMS2% = 0.270
Absolute Deviations:
AAD = 0.02 BIAS = -0.02 RMS = 0.02 $mol \cdot dm^{-3}$
AAD2 = 0.02 BIAS2 = -0.02 RMS2 = 0.03 $mol \cdot dm^{-3}$

Data from Klosek [33]
Number of Points: 8
AAD% = 0.084 BIAS% = 0.055 RMS% = 0.084
AAD2% = 0.087 BIAS2% = 0.053 RMS2% = 0.090
Absolute Deviations:
AAD = 0.02 BIAS = 0.01 RMS = 0.02 $mol \cdot dm^{-3}$
AAD2 = 0.02 BIAS2 = 0.01 RMS2 = 0.02 $mol \cdot dm^{-3}$

Data from McClune [34]
Number of Points: 17
Weighted Data:
Number of Points: 17
AAD% = 0.020 BIAS% = -0.007 RMS% = 0.023
AAD2% = 0.017 BIAS2% = -0.006 RMS2% = 0.018
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 $mol \cdot dm^{-3}$
AAD2 = 0.00 BIAS2 = 0.00 RMS2 = 0.00 $mol \cdot dm^{-3}$

Data from Miniovich [22]
Number of Points: 5
AAD% = 0.426 BIAS% = -0.426 RMS% = 0.343
AAD2% = 0.234 BIAS2% = 0.018 RMS2% = 0.274
Absolute Deviations:
AAD = 0.03 BIAS = -0.03 RMS = 0.03 $mol \cdot dm^{-3}$
AAD2 = 0.02 BIAS2 = 0.00 RMS2 = 0.02 $mol \cdot dm^{-3}$

Data from Orrit [35]
Number of Points: 46
AAD% = 0.052 BIAS% = 0.048 RMS% = 0.031
AAD2% = 0.057 BIAS2% = 0.052 RMS2% = 0.032
Absolute Deviations:
AAD = 0.01 BIAS = 0.01 RMS = 0.01 $mol \cdot dm^{-3}$
AAD2 = 0.01 BIAS2 = 0.01 RMS2 = 0.01 $mol \cdot dm^{-3}$

Weighted Data:
Number of Points: 13
AAD% = 0.051 BIAS% = 0.035 RMS% = 0.044
AAD2% = 0.056 BIAS2% = 0.038 RMS2% = 0.047
Absolute Deviations:
AAD = 0.01 BIAS = 0.01 RMS = 0.01 $mol \cdot dm^{-3}$
AAD2 = 0.01 BIAS2 = 0.01 RMS2 = 0.01 $mol \cdot dm^{-3}$

Data from Pal [23]
Number of Points: 11
AAD% = 0.376 BIAS% = -0.376 RMS% = 0.121
AAD2% = 0.353 BIAS2% = -0.332 RMS2% = 0.166
Absolute Deviations:
AAD = 0.05 BIAS = -0.05 RMS = 0.02 $mol \cdot dm^{-3}$
AAD2 = 0.05 BIAS2 = -0.05 RMS2 = 0.02 $mol \cdot dm^{-3}$

Data from Pestak [36]
Number of Points: 39
AAD% = 0.598 BIAS% = 0.598 RMS% = 0.461
AAD2% = 1.033 BIAS2% = 1.008 RMS2% = 0.827
Absolute Deviations:
AAD = 0.05 BIAS = 0.05 RMS = 0.03 $mol \cdot dm^{-3}$
AAD2 = 0.08 BIAS2 = 0.08 RMS2 = 0.06 $mol \cdot dm^{-3}$

Data from Rodosevich [37]
Number of Points: 4
Weighted Data:
Number of Points: 4
AAD% = 0.030 BIAS% = 0.030 RMS% = 0.008
AAD2% = 0.030 BIAS2% = 0.030 RMS2% = 0.014
Absolute Deviations:
AAD = 0.01 BIAS = 0.01 RMS = 0.00 $mol \cdot dm^{-3}$
AAD2 = 0.01 BIAS2 = 0.01 RMS2 = 0.00 $mol \cdot dm^{-3}$

Data from Sliwinski [38]
Number of Points: 11
AAD% = 0.043 BIAS% = 0.019 RMS% = 0.051
AAD2% = 0.217 BIAS2% = 0.179 RMS2% = 0.263
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 $mol \cdot dm^{-3}$
AAD2 = 0.02 BIAS2 = 0.02 RMS2 = 0.02 $mol \cdot dm^{-3}$
Weighted Data:
Number of Points: 4
AAD% = 0.024 BIAS% = 0.011 RMS% = 0.026
AAD2% = 0.111 BIAS2% = 0.071 RMS2% = 0.090
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 $mol \cdot dm^{-3}$
AAD2 = 0.01 BIAS2 = 0.01 RMS2 = 0.01 $mol \cdot dm^{-3}$

Data from Tomlinson [39]
Number of Points: 7

| | | |
|---|---|---|
| AAD% = 0.220 | BIAS% = -0.220 | RMS% = 0.107 |
| AAD2% = 0.251 | BIAS2% = -0.230 | RMS2% = 0.221 |

Absolute Deviations:

| | | |
|---|---|---|
| AAD = 0.02 | BIAS = -0.02 | RMS = 0.01 $mol \cdot dm^{-3}$ |
| AAD2 = 0.03 | BIAS2 = -0.02 | RMS2 = 0.02 $mol \cdot dm^{-3}$ |

Data from ancillary equation [1]
Number of Points: 43

| | | |
|---|---|---|
| AAD2% = 0.030 | BIAS2% = 0.017 | RMS2% = 0.052 |

Absolute Deviations:

| | | |
|---|---|---|
| AAD2 = 0.004 | BIAS2 = 0.002 | RMS2 = 0.006 $mol \cdot dm^{-3}$ |

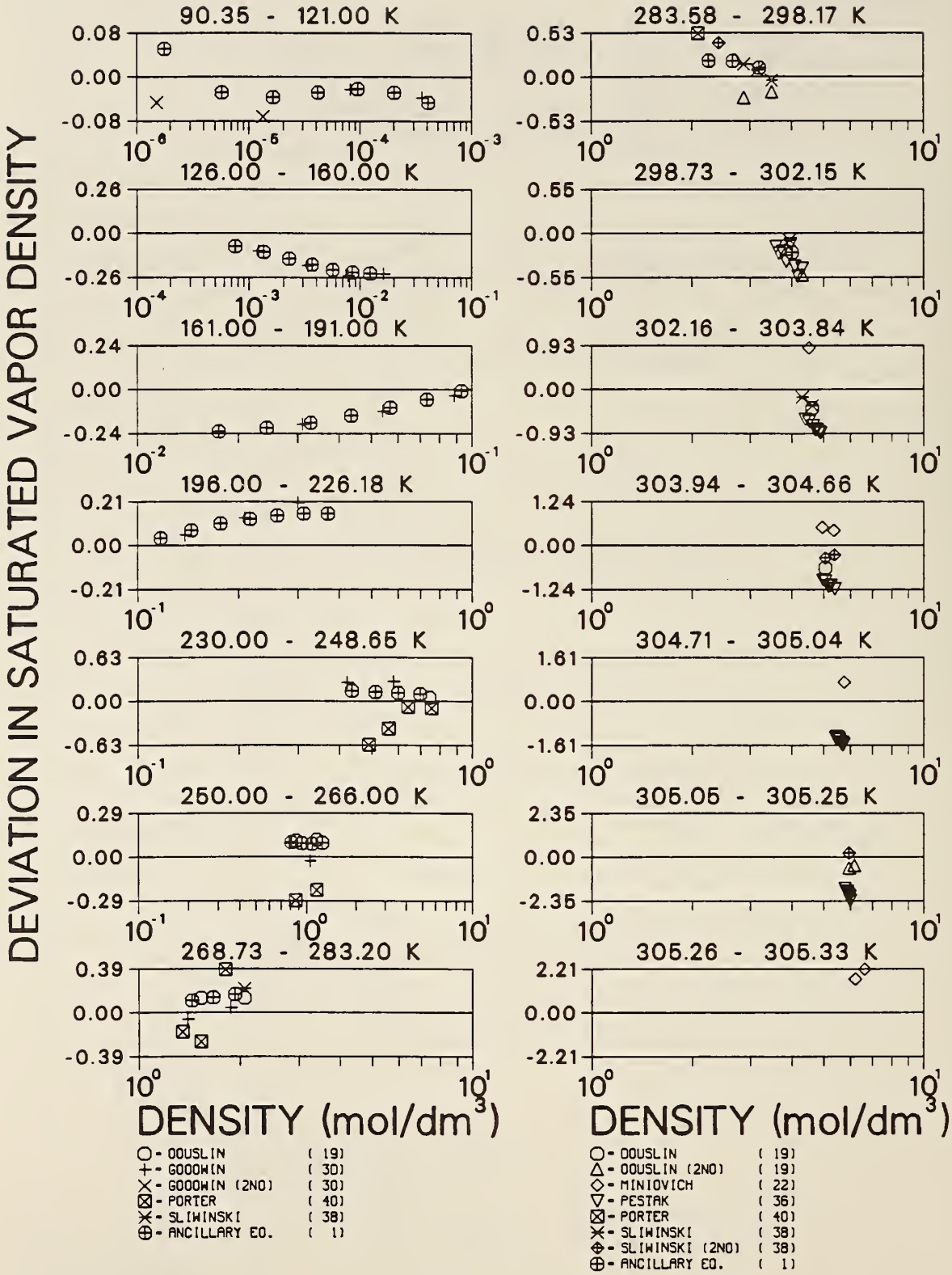


Figure A3. Saturated vapor density. (Statistical comparisons begin on page 43.)

Figure A3. Saturated vapor density.

The comparisons are based on the Maxwell construction using the full SWEOS. Primary data for the SWEOS were obtained from the ancillary eq (3) and are indicated in the plots. Primary data for eq (3) were obtained from Goodwin [30], Douslin [19], and Sliwinski [38].

Statistical comparisons between experimental saturated vapor densities and the ancillary eq (3) are given first; comparisons between the data and the SWEOS are given next with the suffix "2" on each statistical category.

Data from Douslin [19]
Number of Points: 12

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.146 | BIAS% | = 0.010 | RMS% | = 0.188 |
| AAD2% | = 0.296 | BIAS2% | = -0.207 | RMS2% | = 0.291 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.006 | BIAS | = 0.002 | RMS | = 0.008 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.013 | BIAS2 | = -0.012 | RMS2 | = 0.014 $mol \cdot dm^{-3}$ |

Weighted Data:
Number of Points: 7

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.084 | BIAS% | = 0.055 | RMS% | = 0.106 |
| AAD2% | = 0.223 | BIAS2% | = -0.071 | RMS2% | = 0.289 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.003 | BIAS | = 0.003 | RMS | = 0.005 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.008 | BIAS2 | = -0.006 | RMS2 | = 0.013 $mol \cdot dm^{-3}$ |

Data from Goodwin [30]
Number of Points: 20

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.050 | BIAS% | = -0.015 | RMS% | = 0.074 |
| AAD2% | = 0.124 | BIAS2% | = -0.016 | RMS2% | = 0.151 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.000 | BIAS | = 0.000 | RMS | = 0.001 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.000 | BIAS2 | = 0.000 | RMS2 | = 0.001 $mol \cdot dm^{-3}$ |

Weighted Data:
Number of Points: 18

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 0.047 | BIAS% | = -0.008 | RMS% | = 0.074 |
| AAD2% | = 0.131 | BIAS2% | = -0.011 | RMS2% | = 0.158 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.000 | BIAS | = 0.000 | RMS | = 0.001 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.000 | BIAS2 | = 0.000 | RMS2 | = 0.001 $mol \cdot dm^{-3}$ |

Data from Miniovich [22]
Number of Points: 6

| | | | | | |
|---|---|---|---|---|---|
| AAD% | = 2.115 | BIAS% | = 2.115 | RMS% | = 1.138 |
| AAD2% | = 1.071 | BIAS2% | = 1.071 | RMS2% | = 0.653 |

Absolute Deviations:

| | | | | | |
|---|---|---|---|---|---|
| AAD | = 0.121 | BIAS | = 0.121 | RMS | = 0.079 $mol \cdot dm^{-3}$ |
| AAD2 | = 0.061 | BIAS2 | = 0.061 | RMS2 | = 0.044 $mol \cdot dm^{-3}$ |

Data from Pestak [36]
Number of Points: 39
AAD% = 0.437 BIAS% = -0.433 RMS% = 0.391
AAD2% = 1.162 BIAS2% = -1.162 RMS2% = 0.591
Absolute Deviations:
AAD = 0.024 BIAS = -0.024 RMS = 0.024 $mol \cdot dm^{-3}$
AAD2 = 0.064 BIAS2 = -0.064 RMS2 = 0.038 $mol \cdot dm^{-3}$

Data from Porter [40]
Number of Points: 14
AAD% = 0.598 BIAS% = -0.427 RMS% = 0.606
AAD2% = 0.560 BIAS2% = -0.314 RMS2% = 0.642
Absolute Deviations:
AAD = 0.005 BIAS = -0.001 RMS = 0.007 $mol \cdot dm^{-3}$
AAD2 = 0.005 BIAS2 = 0.000 RMS2 = 0.008 $mol \cdot dm^{-3}$

Data from Sliwinski [38]
Number of Points: 11
AAD% = 0.295 BIAS% = 0.276 RMS% = 0.333
AAD2% = 0.210 BIAS2% = -0.018 RMS2% = 0.238
Absolute Deviations:
AAD = 0.015 BIAS = 0.014 RMS = 0.019 $mol \cdot dm^{-3}$
AAD2 = 0.008 BIAS2 = -0.002 RMS2 = 0.010 $mol \cdot dm^{-3}$

Weighted Data:
Number of Points: 7
AAD% = 0.109 BIAS% = 0.080 RMS% = 0.122
AAD2% = 0.155 BIAS2% = -0.029 RMS2% = 0.180
Absolute Deviations:
AAD = 0.004 BIAS = 0.004 RMS = 0.005 $mol \cdot dm^{-3}$
AAD2 = 0.006 BIAS2 = -0.002 RMS2 = 0.007 $mol \cdot dm^{-3}$

Data from ancillary equation [1]
Number of Points: 43
AAD2% = 0.120 BIAS2% = 0.001 RMS2% = 0.137
Absolute Deviations:
AAD2 = 0.001 BIAS2 = 0.000 RMS2 = 0.002 $mol \cdot dm^{-3}$

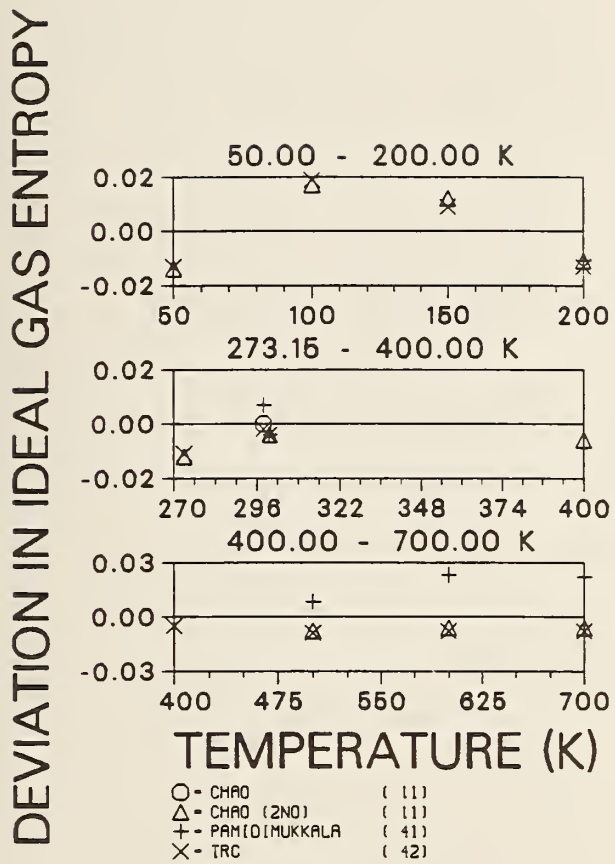


Figure A4A. Ideal gas entropy. (Statistical comparisions begin on page 46.)

Figure A4A. Ideal gas entropy.

The comparisons are based on entropies calculated from eq (5) at 0.101 325 MPa (1 atm). The point from Chao [11] at 298.15 K was used as a primary datum for the ideal gas correlation to fix an integration constant.

Statistical comparisons between tabulated ideal gas entropies and the ideal gas correlation of eq (5) are given.

Data from Chao [11]
Number of Points: 11
AAD% = 0.009 BIAS% = -0.004 RMS% = 0.009
Absolute Deviations:
AAD = 0.019 BIAS = -0.009 RMS = 0.019 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Pamidimukkala [41]
Number of Points: 8
AAD% = 0.020 BIAS% = 0.011 RMS% = 0.025
Absolute Deviations:
AAD = 0.046 BIAS = 0.024 RMS = 0.052 $J \cdot mol^{-1} \cdot K^{-1}$

Data from TRC [42]
Number of Points: 11
AAD% = 0.009 BIAS% = -0.004 RMS% = 0.010
Absolute Deviations:
AAD = 0.020 BIAS = -0.010 RMS = 0.019 $J \cdot mol^{-1} \cdot K^{-1}$

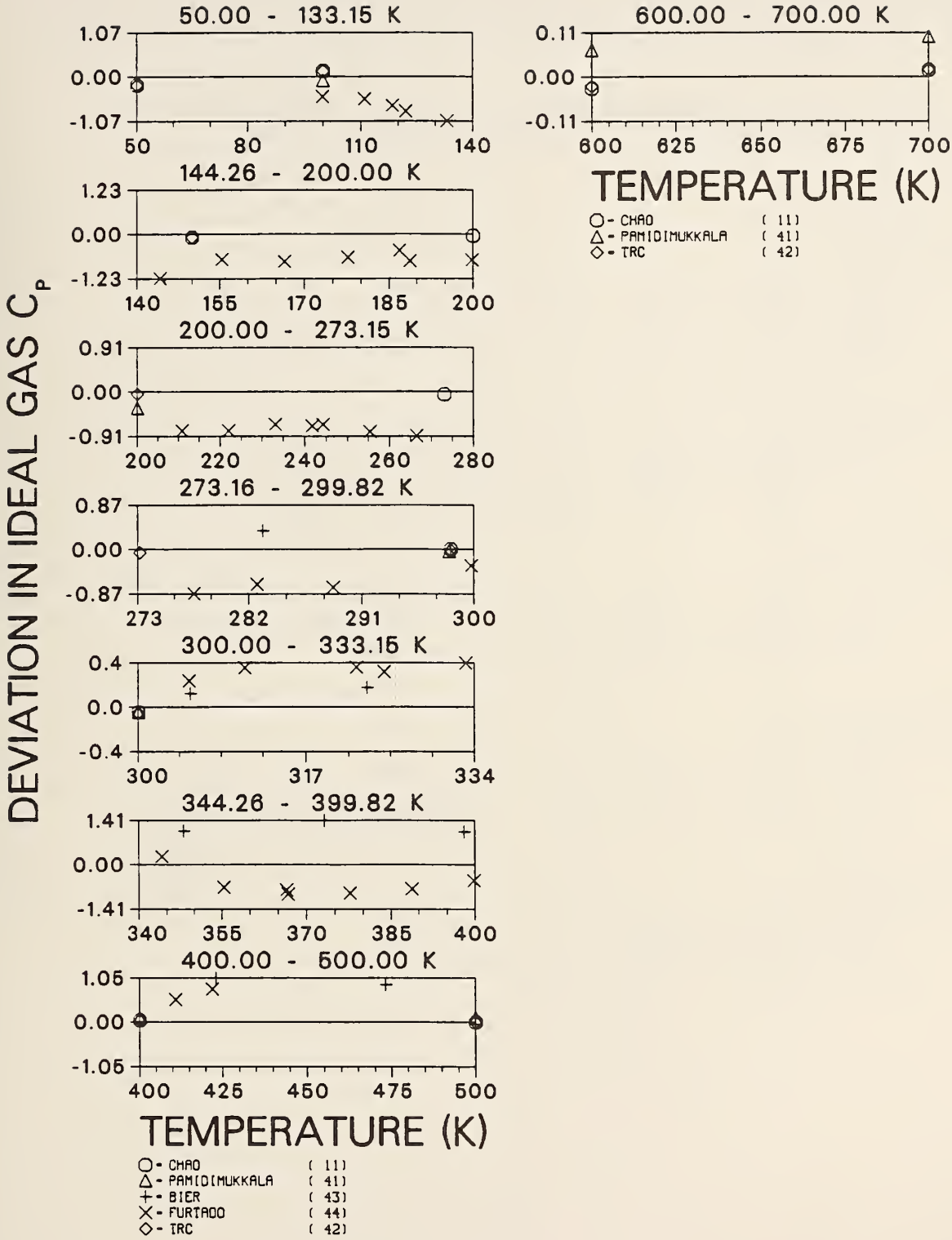


Figure A4B. Ideal gas isobaric heat capacity. (Statistical comparisions begin on page 48.)

Figure A4B. Ideal gas isobaric heat capacity.

The comparisons are based on isobaric heat capacities calculated from eq (5). Primary data for the ideal gas correlation were obtained from Chao [11].

Statistical comparisons between tabulated ideal gas isobaric heat capacities and the ideal gas correlation of eq (5) are given.

Data from Chao [11]
Number of Points: 11
Weighted Data:
Number of Points: 11
AAD% = 0.060 BIAS% = -0.024 RMS% = 0.080
Absolute Deviations:
AAD = 0.026 BIAS = -0.009 RMS = 0.031 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Pamidimukkala [41]
Number of Points: 8
AAD% = 0.111 BIAS% = -0.017 RMS% = 0.140
Absolute Deviations:
AAD = 0.066 BIAS = 0.011 RMS = 0.076 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Bier [43]
Number of Points: 9
AAD% = 0.681 BIAS% = 0.680 RMS% = 0.486
Absolute Deviations:
AAD = 0.431 BIAS = 0.430 RMS = 0.317 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Furtado [44]
Number of Points: 37
AAD% = 0.666 BIAS% = -0.490 RMS% = 0.503
Absolute Deviations:
AAD = 0.327 BIAS = -0.221 RMS = 0.269 $J \cdot mol^{-1} \cdot K^{-1}$

Data from TRC [42]
Number of Points: 11
AAD% = 0.060 BIAS% = -0.025 RMS% = 0.080
Absolute Deviations:
AAD = 0.027 BIAS = -0.010 RMS = 0.031 $J \cdot mol^{-1} \cdot K^{-1}$

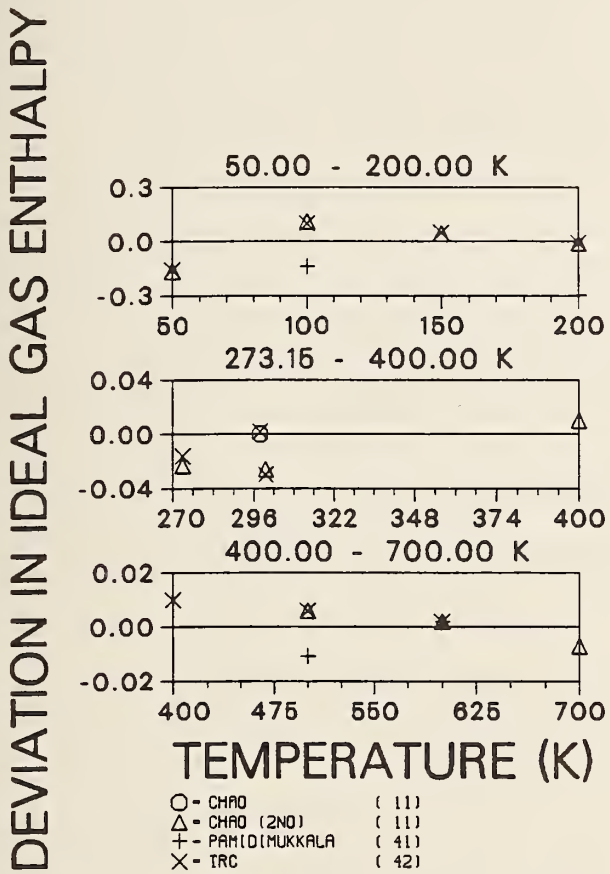


Figure A4C. Ideal gas enthalpy. (Statistical comparisions begin on page 50.)

Figure A4C. Ideal gas enthalpy.

The comparisons are based on enthalpies calculated from eq (5). The point from Chao [11] at 298.15 K was used as a primary datum for the ideal gas correlation to fix an integration constant.

Statistical comparisons between tabulated ideal gas enthalpies and the ideal gas correlation of eq (5) are given.

Data from Chao [11]
Number of Points: 11
AAD% = 0.037 BIAS% = -0.006 RMS% = 0.063
Absolute Deviations:
AAD = 1.999 BIAS = -0.238 RMS = 2.284 $J \cdot mol^{-1}$

Data from Pamidimukkala [41]
Number of Points: 8
AAD% = 0.139 BIAS% = -0.128 RMS% = 0.124
Absolute Deviations:
AAD =16.528 BIAS =-11.933 RMS =16.929 $J \cdot mol^{-1}$

Data from TRC [42]
Number of Points: 11
AAD% = 0.039 BIAS% = 0.001 RMS% = 0.061
Absolute Deviations:
AAD = 3.683 BIAS = 2.162 RMS = 6.607 $J \cdot mol^{-1}$

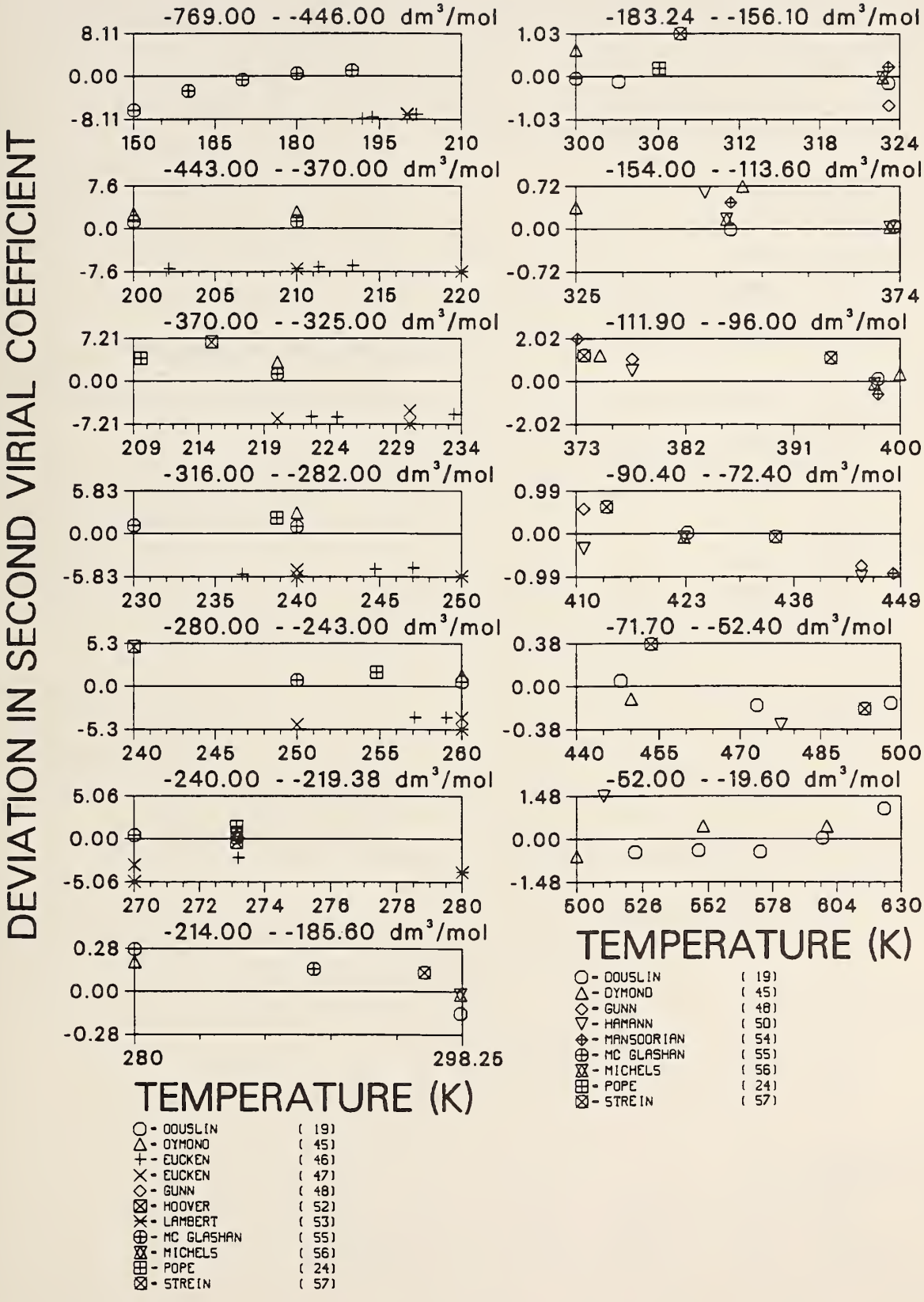


Figure A5. Second virial coefficient. (Statistical comparisons begin on page 52.)

Figure A5. Second virial coefficient.

The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Douslin [19], Mansoorian [54], Michels [56], and Pope [24].

Statistical comparisons between tabulated second virial coefficients and values calculated from the SWEOS are given.

Data from Douslin [19]
Number of Points: 16
Weighted Data:
Number of Points: 16
AAD% = 0.22 BIAS% = -0.04 RMS% = 0.33
Absolute Deviations:
AAD = 0.13 BIAS = 0.04 RMS = 0.16 $cm^3 \cdot mol^{-1}$

Data from Dymond [45]
Number of Points: 15
AAD% = 1.20 BIAS% = 1.10 RMS% = 1.17
Absolute Deviations:
AAD = 3.27 BIAS = -3.22 RMS = 4.27 $cm^3 \cdot mol^{-1}$

Data from Eucken [46]
Number of Points: 15
AAD% = 5.75 BIAS% = -5.75 RMS% = 1.58
Absolute Deviations:
AAD = 21.78 BIAS = 21.78 RMS = 10.23 $cm^3 \cdot mol^{-1}$

Data from Eucken via Tester [47]
Number of Points: 9
AAD% = 4.80 BIAS% = -4.80 RMS% = 1.82
Absolute Deviations:
AAD = 16.54 BIAS = 16.54 RMS = 9.37 $cm^3 \cdot mol^{-1}$

Data from Gunn [48] reported by Huff [49]
Number of Points: 8
AAD% = 1.58 BIAS% = -1.15 RMS% = 2.06
Absolute Deviations:
AAD = 1.22 BIAS = 0.75 RMS = 1.26 $cm^3 \cdot mol^{-1}$

Data from Hamann [50]
Number of Points: 7
AAD% = 1.04 BIAS% = 0.56 RMS% = 1.24
Absolute Deviations:
AAD = 1.18 BIAS = -0.83 RMS = 1.76 $cm^3 \cdot mol^{-1}$

Data from Hoover [52]
Number of Points: 3
AAD% = 3.98 BIAS% = 3.71 RMS% = 2.99
Absolute Deviations:
AAD = 12.35 BIAS = -11.74 RMS = 9.67 $cm^3 \cdot mol^{-1}$

Data from Lambert [53]; reported by Tester [47]
Number of Points: 11
AAD% = 5.70 BIAS% = -5.70 RMS% = 1.38
Absolute Deviations:
AAD = 18.10 BIAS = 18.10 RMS = 8.87 $cm^3 \cdot mol^{-1}$

Data from Mansoorian [54]
Number of Points: 7
Weighted Data:
Number of Points: 7
AAD% = 1.18 BIAS% = -0.41 RMS% = 1.35
Absolute Deviations:
AAD = 1.07 BIAS = 0.16 RMS = 1.28 $cm^3 \cdot mol^{-1}$

Data from McGlashan [55]; reported by Goodwin [30]
Number of Points: 16
AAD% = 1.22 BIAS% = -0.02 RMS% = 1.93
Absolute Deviations:
AAD = 6.57 BIAS = 2.42 RMS = 13.38 $cm^3 \cdot mol^{-1}$

Data from Michels [56]
Number of Points: 7
Weighted Data:
Number of Points: 7
AAD% = 0.13 BIAS% = 0.06 RMS% = 0.19
Absolute Deviations:
AAD = 0.22 BIAS = -0.15 RMS = 0.38 $cm^3 \cdot mol^{-1}$

Data from Pope [24]
Number of Points: 5
Weighted Data:
Number of Points: 5
AAD% = 1.86 BIAS% = 1.86 RMS% = 1.18
Absolute Deviations:
AAD = 5.60 BIAS = -5.60 RMS = 4.65 $cm^3 \cdot mol^{-1}$

Data from Strein [57]
Number of Points: 11
AAD% = 0.93 BIAS% = 0.46 RMS% = 1.07
Absolute Deviations:
AAD = 1.01 BIAS = -0.71 RMS = 1.05 $cm^3 \cdot mol^{-1}$

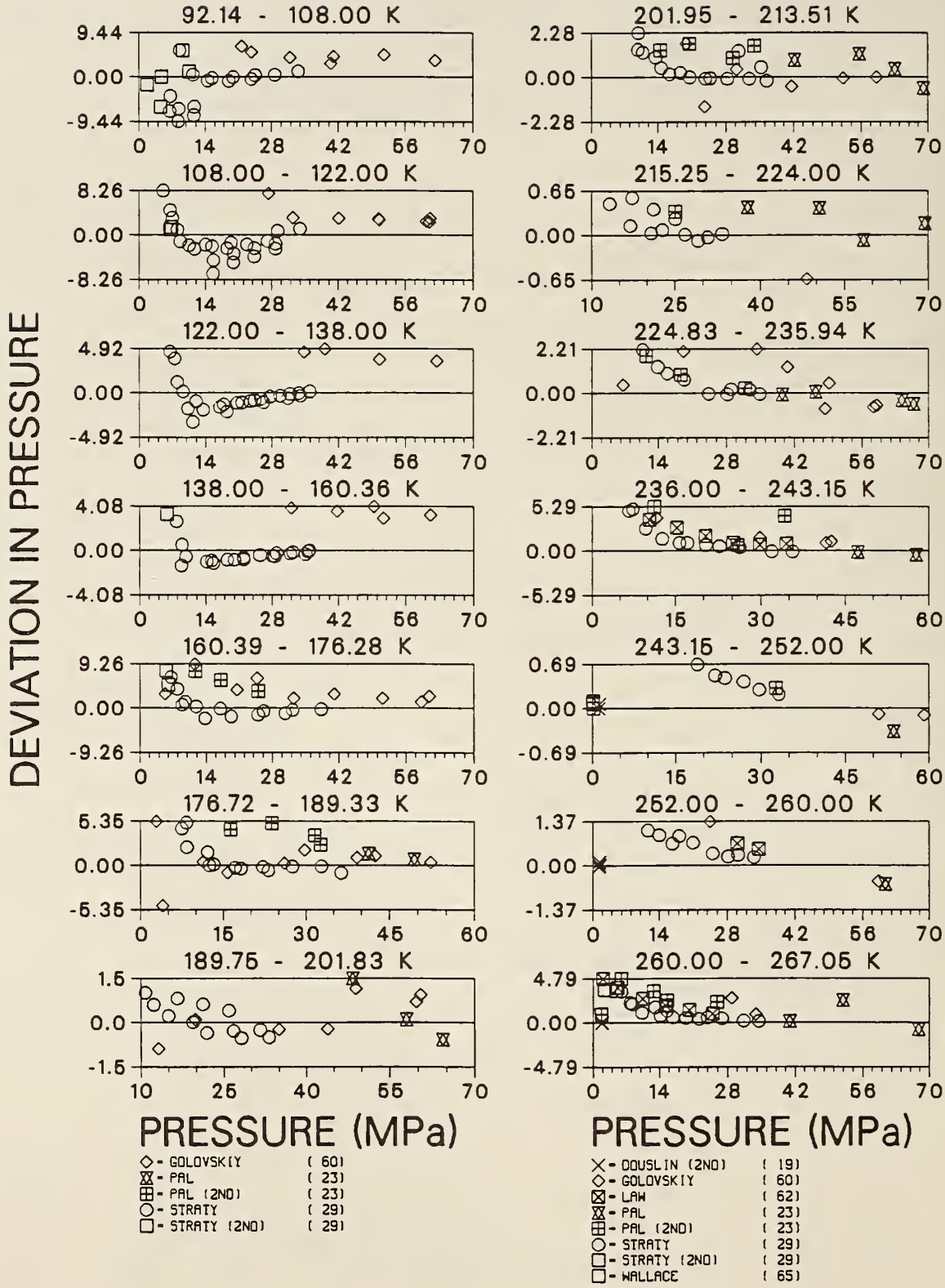


Figure A6A. PVT data--pressure deviations. (Statistical comparisions begin on page 58.)

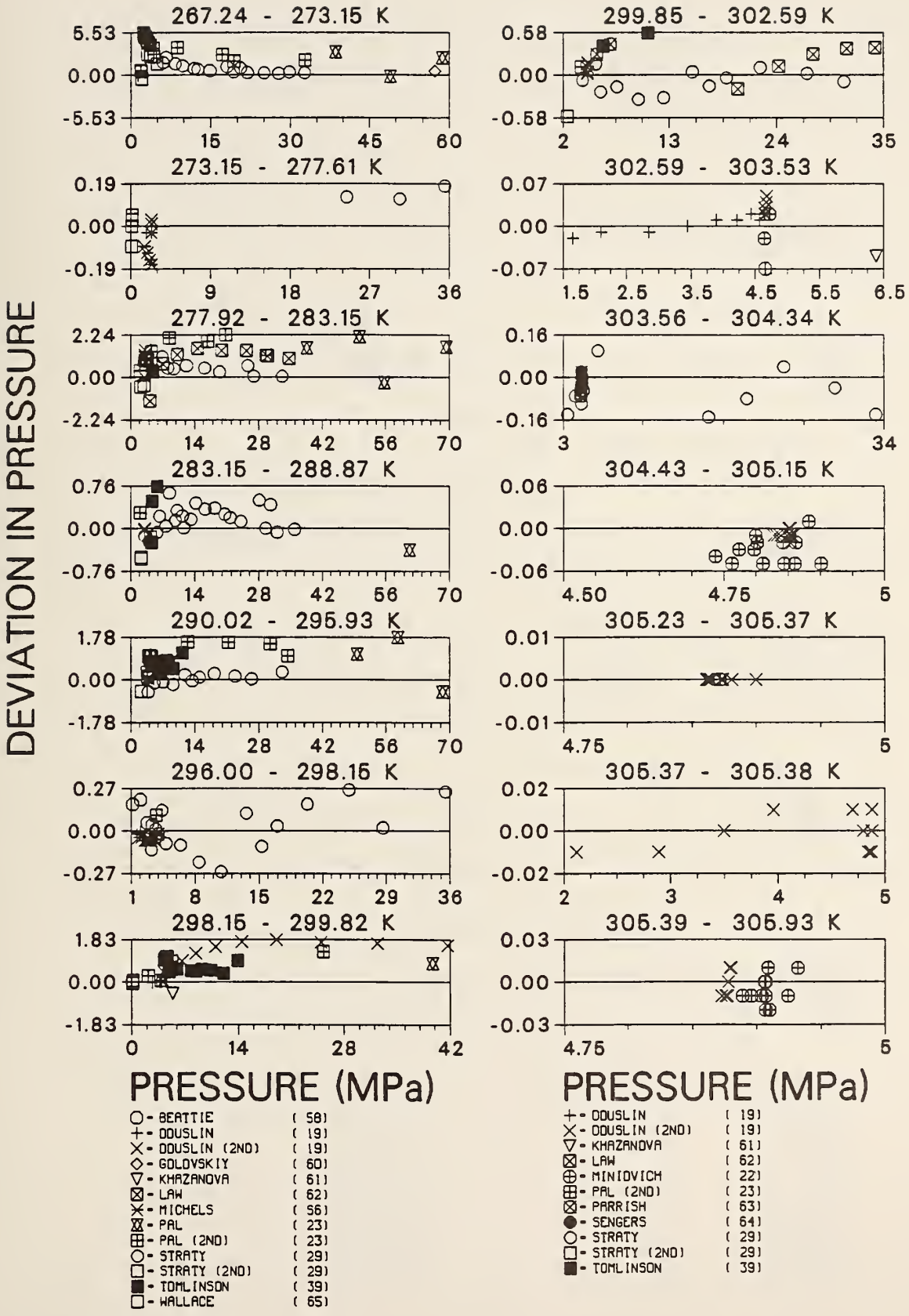


Figure A6A. (continued)

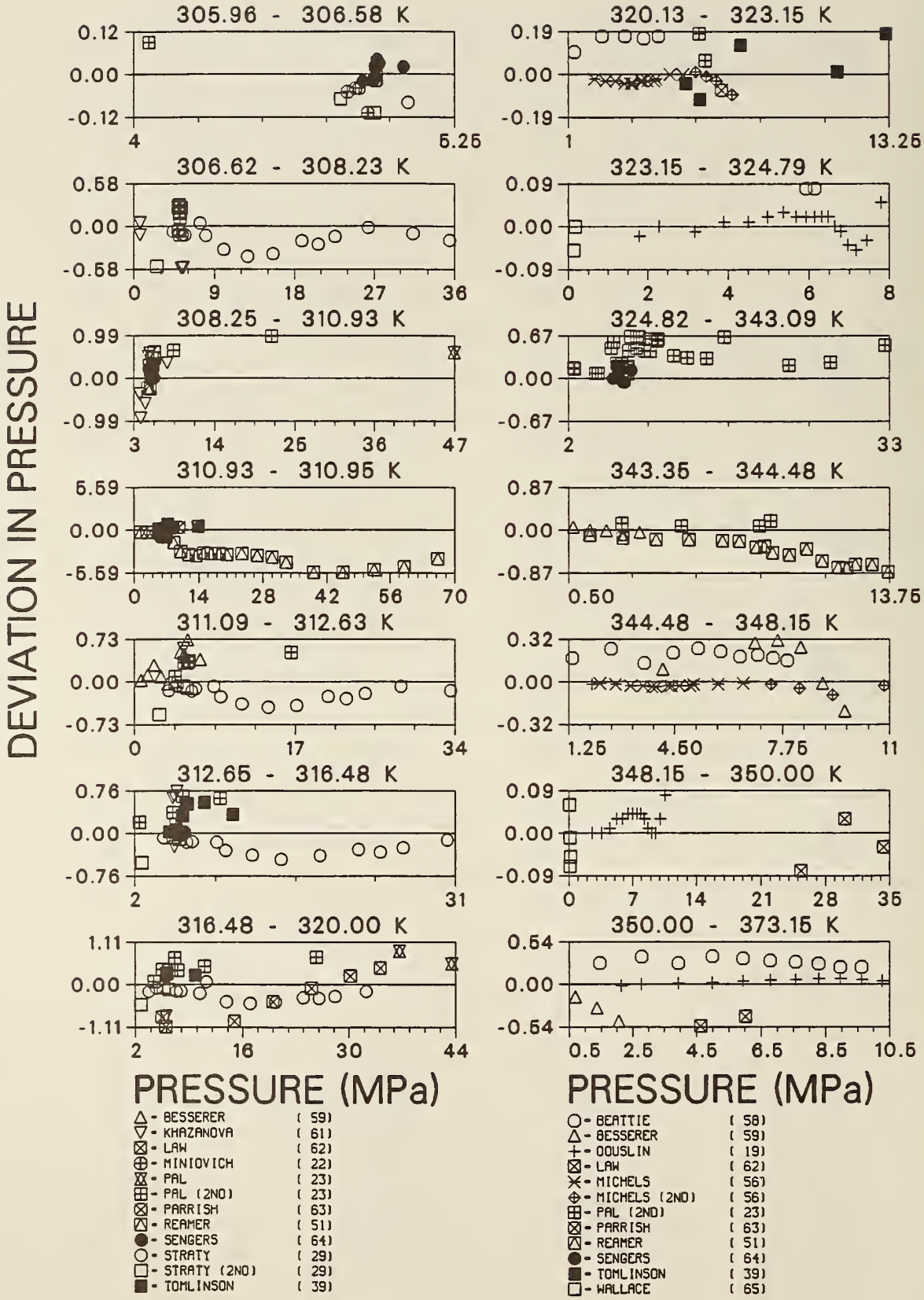


Figure A6A. (continued)

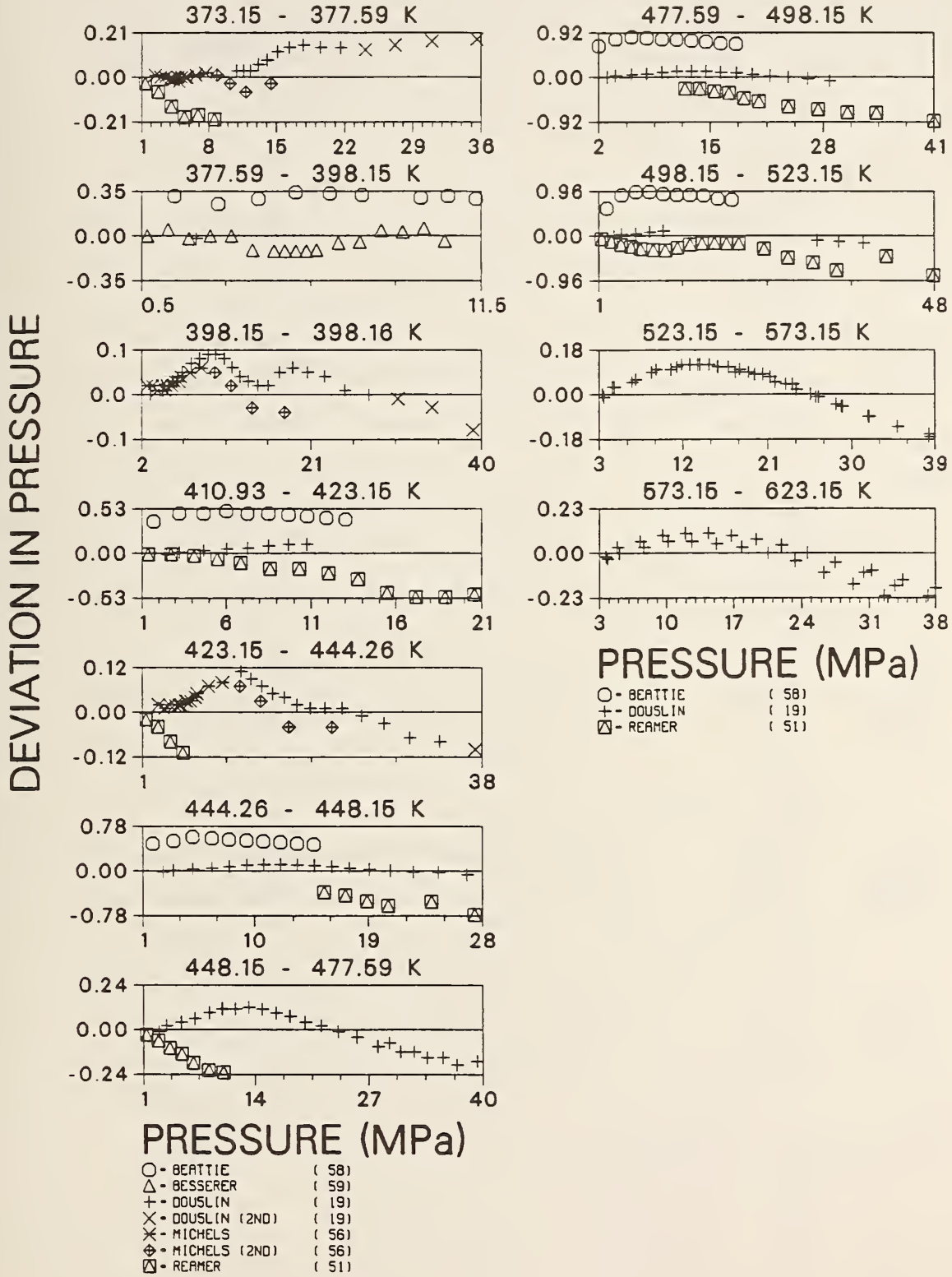


Figure A6A. (continued)

Figure A6A. PVT data--pressure deviations.

The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Douslin [19], Michels [56], Pal [23], Parrish [63], Sengers [64], and Straty [29]. Points out of range were

| Author | Temperature, K | Pressure, MPa | Deviation, % |
|---|---|---|---|
| Douslin [19] | 243.15 | 1.31 | 63 |
| | 243.15 | 1.13 | 62 |
| | 243.15 | 1.23 | 62 |
| | 263.15 | 2.06 | 12 |
| | 263.15 | 1.98 | 12 |
| | 263.15 | 1.91 | 12 |
| Golovskiy [60] | 92.45 | 59.52 | 66 |
| | 92.14 | 12.10 | 115 |
| | 144.57 | 1.92 | 89 |
| | 162.11 | 1.93 | 61 |
| Khazanova [61] | 305.56 | 0.99 | 8.3 |
| | 305.71 | 0.49 | 9.8 |
| | 306.22 | 1.85 | 7.4 |
| | 308.32 | 1.89 | 7.2 |
| | 308.23 | 1.00 | 8.4 |
| | 308.76 | 0.50 | 9.7 |
| Pal [23] | 157.20 | 0.52 | 186 |
| | 168.03 | 1.00 | 125 |
| | 168.48 | 1.66 | 75 |
| | 176.72 | 0.35 | 228 |
| | 177.38 | 1.23 | 65 |
| | 188.91 | 0.67 | 72 |
| | 208.45 | 0.81 | 161 |
| | 209.05 | 1.41 | 93 |
| | 222.88 | 0.76 | 122 |
| | 223.26 | 1.08 | 87 |
| | 223.57 | 1.35 | 70 |
| | 230.05 | 0.81 | 64 |
| | 230.29 | 1.00 | 52 |
| | 240.74 | 1.01 | 33 |
| | 240.89 | 1.11 | 31 |

Statistical comparisons follow Figure A6B.

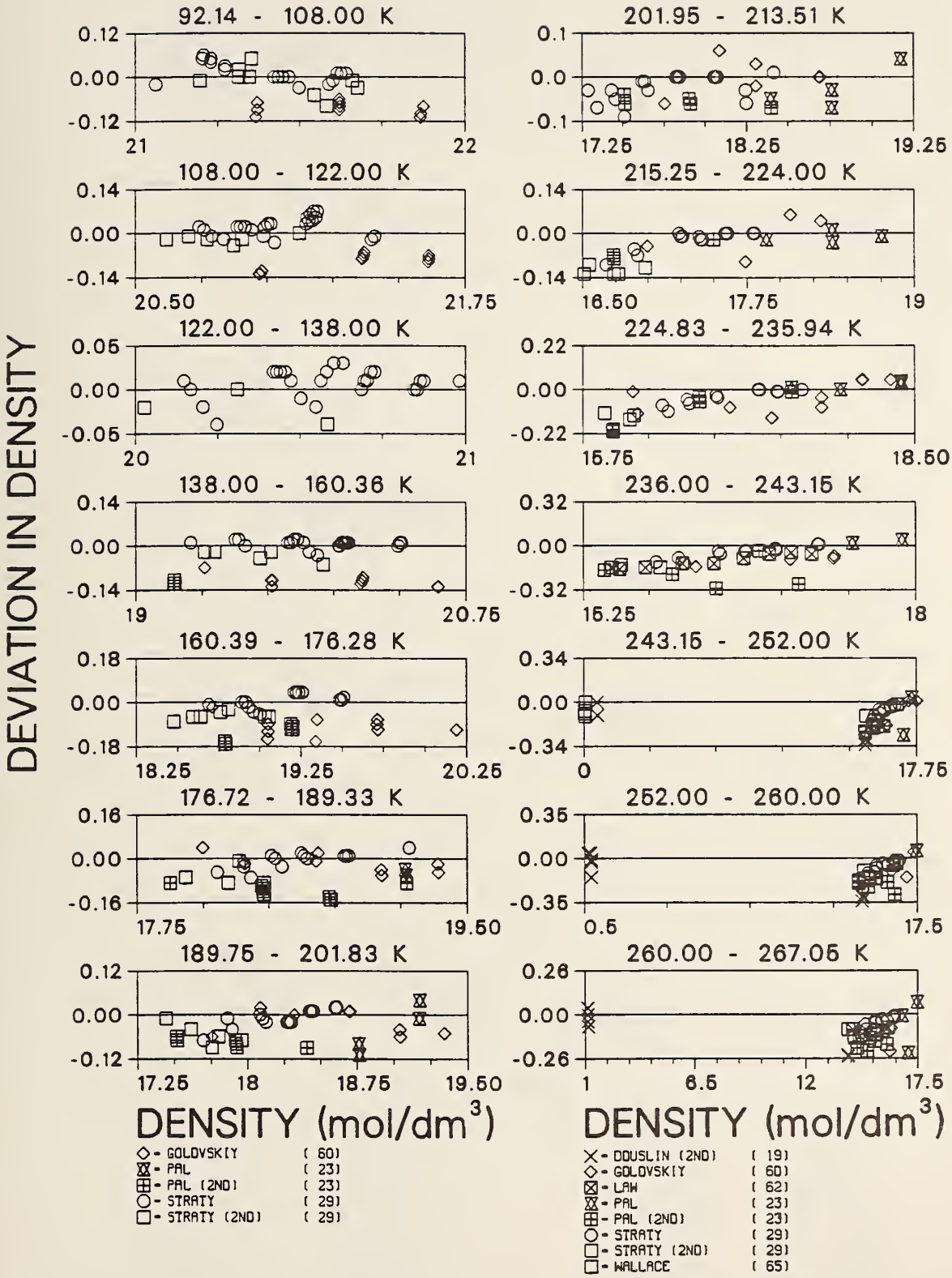


Figure A68. PVT data--density deviations. (Statistical comparisions begin on page 83.)

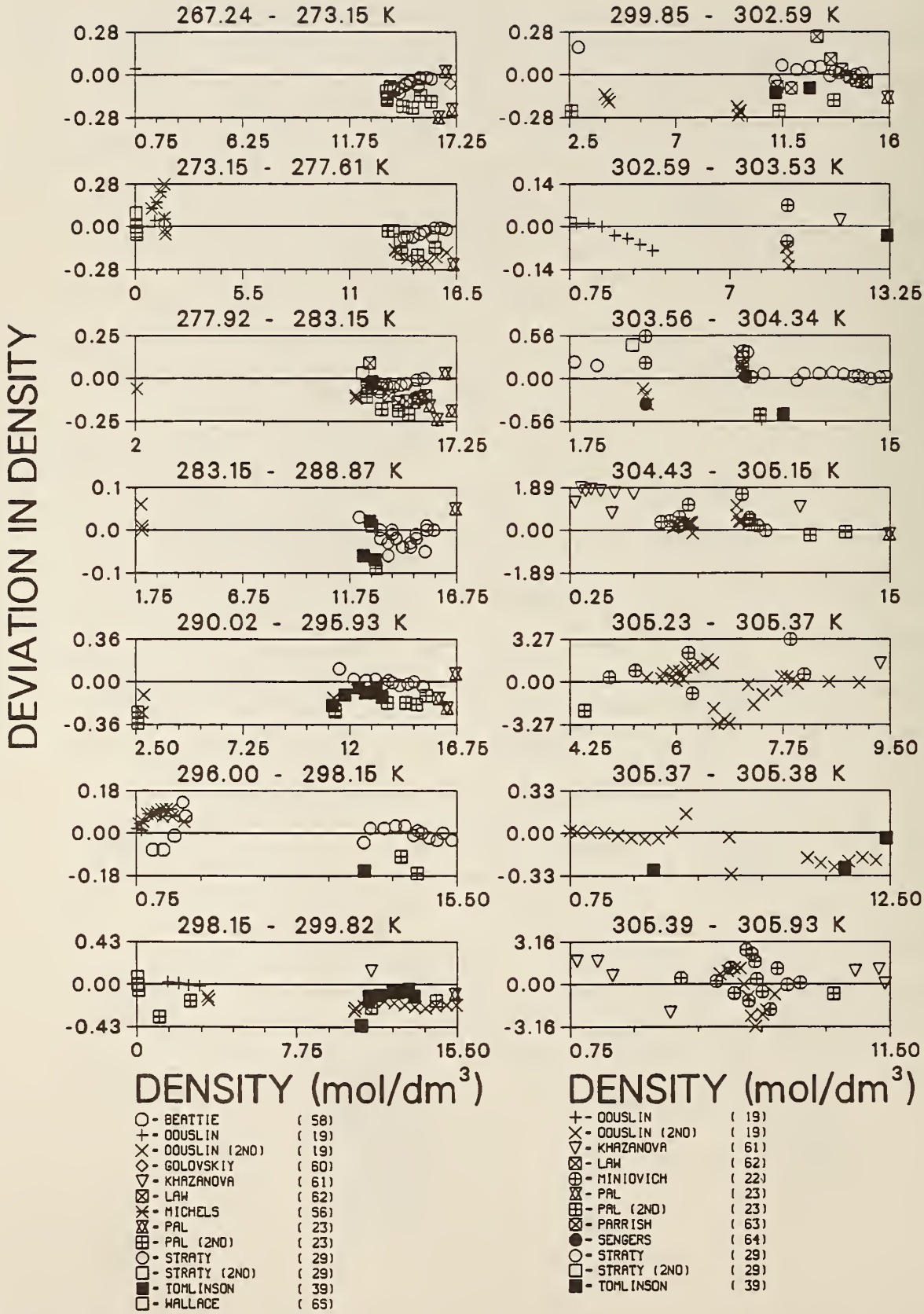


Figure A6B. (continued)

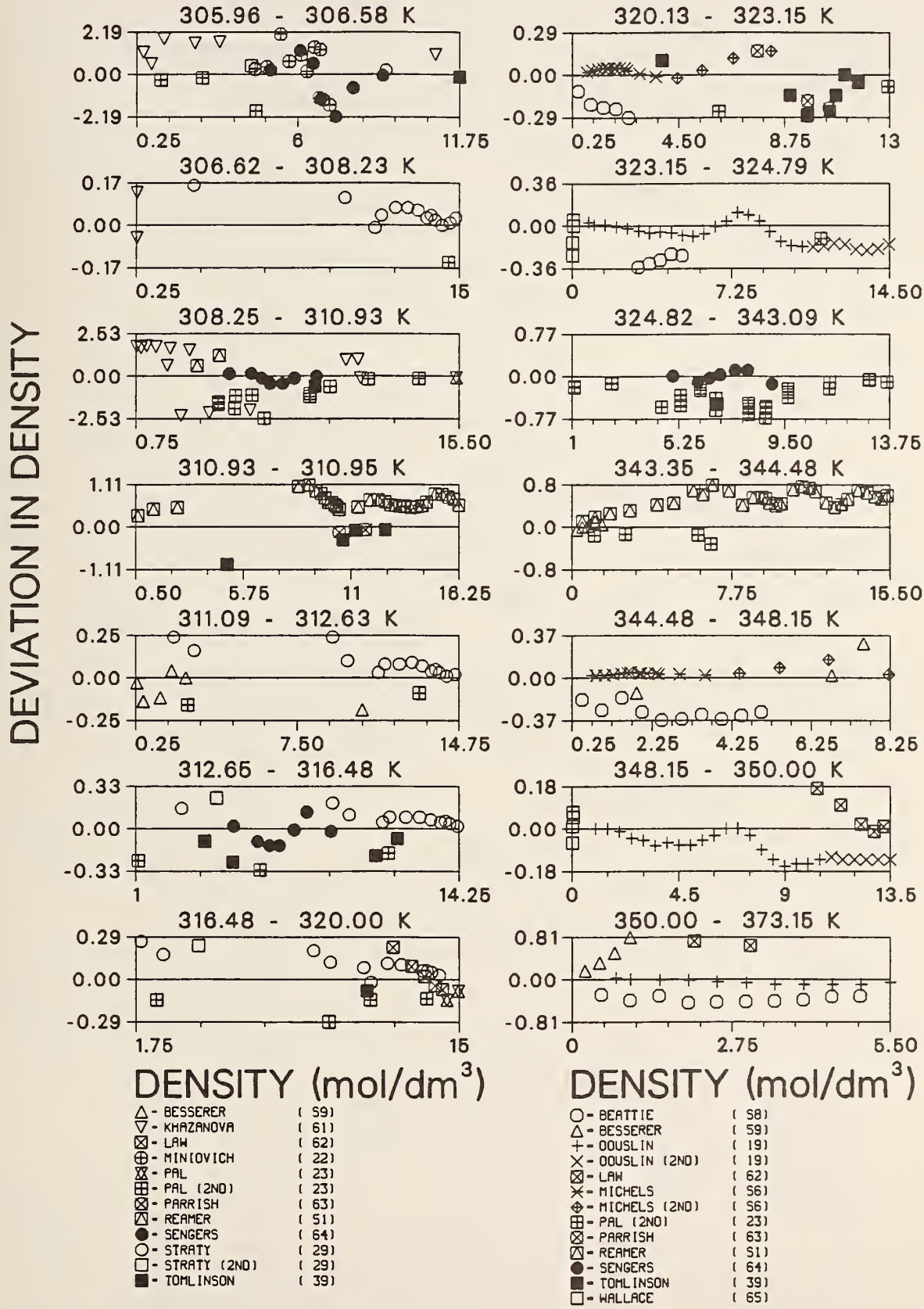


Figure A6B. (continued)

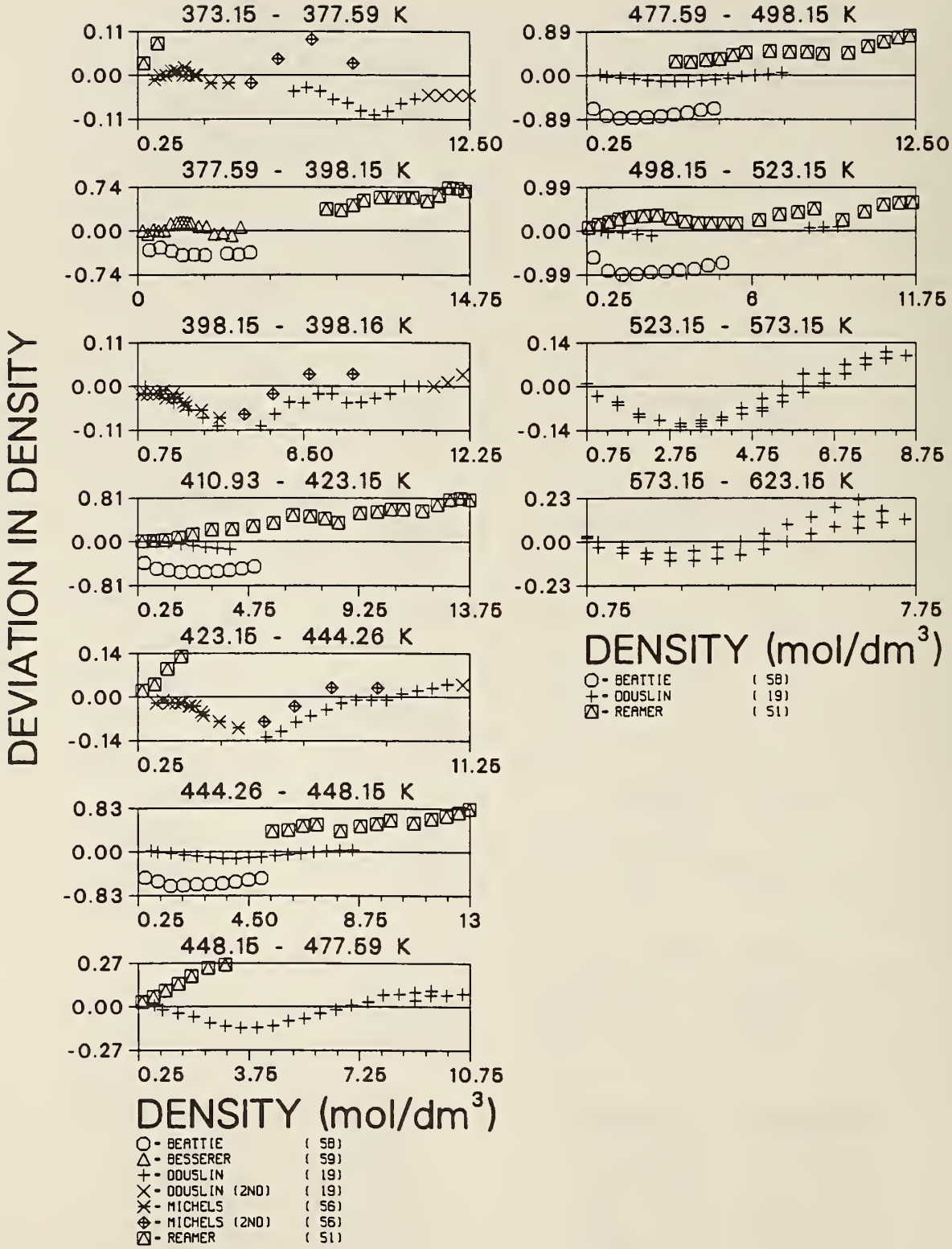


Figure A6B. (continued)

Figure A6B. PVT data--density deviations.

The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Douslin [19], Michels [56], Pal [23], Parrish [63], Sengers [64], and Straty [29]. Points out of range were

| Author | Temperature, K | Density, mol•dm$^{-3}$ | Deviation, % |
|---|---|---|---|
| Khazanova [61] | 303.25 | 9.21 | 6.6 |
| | 303.97 | 0.92 | -8.2 |
| | 303.16 | 0.92 | -8.1 |
| | 303.17 | 0.46 | -8.3 |
| | 303.60 | 0.46 | -8.3 |
| | 303.56 | 0.22 | -9.5 |
| | 303.26 | 0.22 | -9.4 |
| | 305.79 | 5.45 | -10.8 |
| | 318.01 | 2.87 | -12.4 |
| Law [62] | 300.00 | 10.27 | 2.8 |
| | 320.00 | 6.78 | 5.7 |
| Miniovich [22] | 305.36 | 6.70 | 12.7 |
| | 305.38 | 6.51 | 15.9 |
| Pal [23] | 305.42 | 6.79 | -11.5 |
| | 305.74 | 6.79 | -16.1 |
| | 305.63 | 8.10 | -24.9 |

Statistical comparisons between experimental PVT data and the SWEOS correlation. Statistics for the calculation of pressure are given first; comparisons for the calculation of density are given next with the suffix "2" on each statistical category.

Data from Beattie [58]
Number of Points: 96
AAD% = 0.43 BIAS% = 0.43 RMS% = 0.25
AAD2% = 0.49 BIAS2% = -0.49 RMS2% = 0.23
Absolute Deviations:
AAD = 0.04 BIAS = 0.04 RMS = 0.04 MPa
AAD2 = 0.013 BIAS2 = -0.013 RMS2 = 0.009 mol•dm$^{-3}$

Data from Besserer [59]
Number of Points: 68
AAD% = 0.67 BIAS% = -0.43 RMS% = 1.00
AAD2% = 0.83 BIAS2% = 0.32 RMS2% = 1.37
Absolute Deviations:
AAD = 0.05 BIAS = -0.04 RMS = 0.09 MPa
AAD2 = 0.039 BIAS2 = 0.009 RMS2 = 0.075 mol•dm$^{-3}$

Data from Douslin [19]
Number of Points: 449
AAD% = 1.10 BIAS% = 1.07 RMS% = 6.20
AAD2% = 0.24 BIAS2% = -0.10 RMS2% = 0.55
Absolute Deviations:
AAD = 0.04 BIAS = 0.03 RMS = 0.12 MPa
AAD2 = 0.017 BIAS2 = -0.008 RMS2 = 0.040 mol•dm$^{-3}$

Weighted Data:
Number of Points: 257
AAD% = 0.07 BIAS% = 0.02 RMS% = 0.09
AAD2% = 0.06 BIAS2% = -0.03 RMS2% = 0.07
Absolute Deviations:
AAD = 0.01 BIAS = 0.00 RMS = 0.02 MPa
AAD2 = 0.003 BIAS2 = -0.001 RMS2 = 0.005 $mol \cdot dm^{-3}$

Data from Golovskiy [60]
Number of Points: 111
AAD% = 8.88 BIAS% = 8.64 RMS% = 17.72
AAD2% = 0.10 BIAS2% = -0.09 RMS2% = 0.09
Absolute Deviations:
AAD = 1.15 BIAS = 1.09 RMS = 1.68 MPa
AAD2 = 0.019 BIAS2 = -0.017 RMS2 = 0.020 $mol \cdot dm^{-3}$

Data from Khazanova [61]
Number of Points: 86
AAD% = 2.23 BIAS% = 0.55 RMS% = 3.51
AAD2% = 3.02 BIAS2% = -1.05 RMS2% = 4.26
Absolute Deviations:
AAD = 0.06 BIAS = -0.01 RMS = 0.08 MPa
AAD2 = 0.093 BIAS2 = 0.001 RMS2 = 0.170 $mol \cdot dm^{-3}$

Data from Law [62]
Number of Points: 56
AAD% = 2.03 BIAS% = 1.16 RMS% = 4.57
AAD2% = 0.49 BIAS2% = 0.38 RMS2% = 1.08
Absolute Deviations:
AAD = 0.16 BIAS = 0.09 RMS = 0.18 MPa
AAD2 = 0.038 BIAS2 = 0.023 RMS2 = 0.077 $mol \cdot dm^{-3}$

Data from Michels [56]
Number of Points: 101
AAD% = 0.03 BIAS% = -0.01 RMS% = 0.04
AAD2% = 0.05 BIAS2% = 0.02 RMS2% = 0.06
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 MPa
AAD2 = 0.001 BIAS2 = 0.001 RMS2 = 0.002 $mol \cdot dm^{-3}$

Weighted Data:
Number of Points: 81
AAD% = 0.03 BIAS% = -0.01 RMS% = 0.04
AAD2% = 0.04 BIAS2% = 0.02 RMS2% = 0.06
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 MPa
AAD2 = 0.001 BIAS2 = 0.000 RMS2 = 0.001 $mol \cdot dm^{-3}$

Data from Miniovich [22]
Number of Points: 63
AAD% = 0.03 BIAS% = -0.03 RMS% = 0.03
AAD2% = 1.41 BIAS2% = 1.11 RMS2% = 2.85
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 MPa
AAD2 = 0.093 BIAS2 = 0.072 RMS2 = 0.191 $mol \cdot dm^{-3}$

Data from Pal [23]
Number of Points: 309
AAD% = 8.38 BIAS% = 8.34 RMS% = 24.68
AAD2% = 0.78 BIAS2% = -0.78 RMS2% = 2.32
Absolute Deviations:
AAD = 0.30 BIAS = 0.27 RMS = 0.38 MPa
AAD2 = 0.061 BIAS2 = -0.060 RMS2 = 0.169 $mol \cdot dm^{-3}$

Weighted Data:
Number of Points: 45
AAD% = 0.96 BIAS% = 0.70 RMS% = 1.05
AAD2% = 0.09 BIAS2% = -0.07 RMS2% = 0.10
Absolute Deviations:
AAD = 0.47 BIAS = 0.30 RMS = 0.51 MPa
AAD2 = 0.015 BIAS2 = -0.011 RMS2 = 0.017 $mol \cdot dm^{-3}$

Data from Parrish [63]
Weighted Data:
Number of Points: 9
AAD% = 0.32 BIAS% = 0.21 RMS% = 0.26
AAD2% = 0.23 BIAS2% = 0.03 RMS2% = 0.35
Absolute Deviations:
AAD = 0.02 BIAS = 0.02 RMS = 0.02 MPa
AAD2 = 0.016 BIAS2 = -0.005 RMS2 = 0.018 $mol \cdot dm^{-3}$

Data from Reamer [51]
Number of Points: 176
AAD% = 1.13 BIAS% = -1.13 RMS% = 1.22
AAD2% = 0.50 BIAS2% = 0.50 RMS2% = 0.40
Absolute Deviations:
AAD = 0.41 BIAS = -0.41 RMS = 0.65 MPa
AAD2 = 0.047 BIAS2 = 0.047 RMS2 = 0.040 $mol \cdot dm^{-3}$

Data from Sengers [64]
Weighted Data:
Number of Points: 30
AAD% = 0.03 BIAS% = 0.01 RMS% = 0.03
AAD2% = 0.30 BIAS2% = -0.12 RMS2% = 0.55
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 MPa
AAD2 = 0.021 BIAS2 = -0.010 RMS2 = 0.039 $mol \cdot dm^{-3}$

Data from Straty [29]
Number of Points: 477
AAD% = 2.73 BIAS% = 1.84 RMS% = 6.23
AAD2% = 0.10 BIAS2% = 0.05 RMS2% = 0.47
Absolute Deviations:
AAD = 0.15 BIAS = 0.04 RMS = 0.25 MPa
AAD2 = 0.009 BIAS2 = 0.000 RMS2 = 0.031 $mol \cdot dm^{-3}$
Weighted Data:
Number of Points: 381
AAD% = 1.07 BIAS% = 0.23 RMS% = 2.07
AAD2% = 0.04 BIAS2% = 0.00 RMS2% = 0.06
Absolute Deviations:
AAD = 0.13 BIAS = -0.01 RMS = 0.22 MPa
AAD2 = 0.006 BIAS2 = -0.001 RMS2 = 0.007 $mol \cdot dm^{-3}$

Data from Tomlinson [39]
Number of Points: 61
AAD% = 0.48 BIAS% = 0.47 RMS% = 0.33
AAD2% = 0.51 BIAS2% = -0.49 RMS2% = 1.61
Absolute Deviations:
AAD = 0.03 BIAS = 0.03 RMS = 0.03 MPa
AAD2 = 0.040 BIAS2 = -0.039 RMS2 = 0.110 $mol \cdot dm^{-3}$

Data from Wallace [65]
Number of Points: 20
AAD% = 0.06 BIAS% = 0.03 RMS% = 0.08
AAD2% = 0.06 BIAS2% = -0.03 RMS2% = 0.08
Absolute Deviations:
AAD = 0.00 BIAS = 0.00 RMS = 0.00 MPa
AAD2 = 0.000 BIAS2 = 0.000 RMS2 = 0.000 $mol \cdot dm^{-3}$

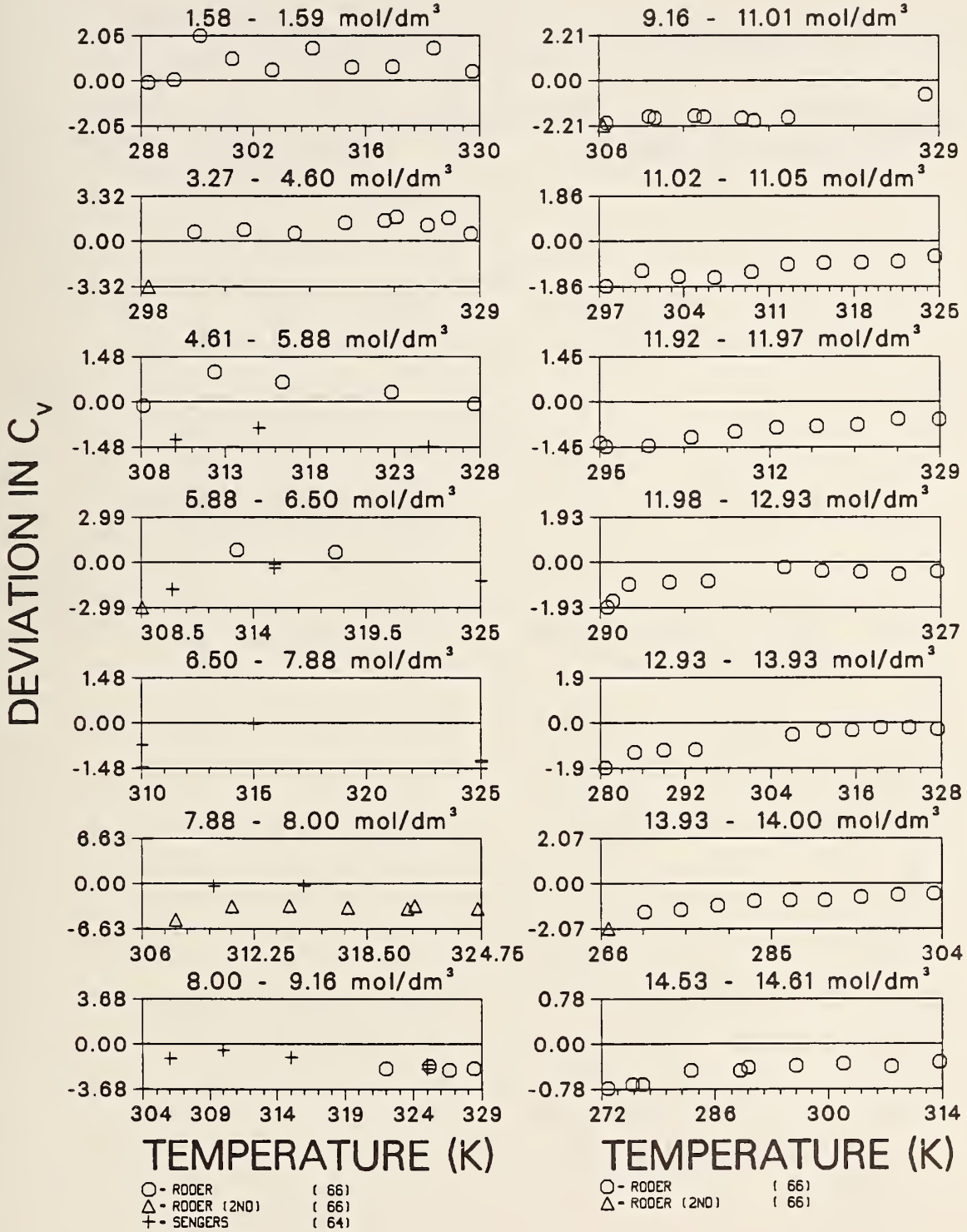


Figure A7. Isochoric molar heat capacity. (Statistical comparisions begin on page 69.)

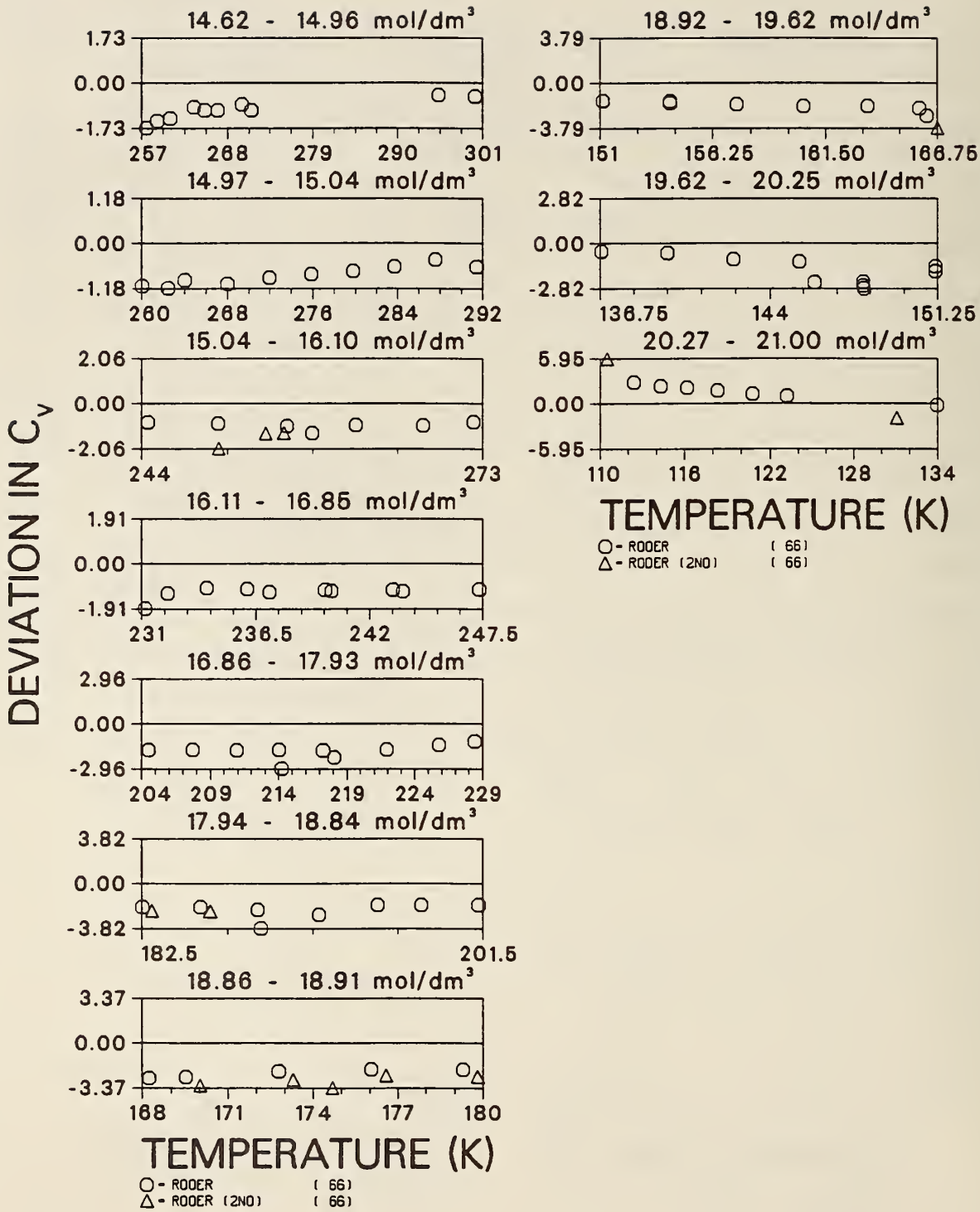


Figure A7. (continued)

Figure A7. Isochoric molar heat capacity.

The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Roder [66] and Sengers [64].

Statistical comparisons between tabulated isochoric molar heat capacities and values calculated from the SWEOS using the reported experimental densities are given.

Data from Roder [66]
Number of Points: 209
AAD% = 1.32 BIAS% = -0.93 RMS% = 1.27
Absolute Deviations:
AAD = 0.66 BIAS = -0.46 RMS = 0.63 $J \cdot mol^{-1} \cdot K^{-1}$

Weighted Data:
Number of Points: 184
AAD% = 1.16 BIAS% = -0.78 RMS% = 1.09
Absolute Deviations:
AAD = 0.56 BIAS = -0.36 RMS = 0.52 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Sengers [64]
Weighted Data:
Number of Points: 30
AAD% = 3.51 BIAS% = -3.51 RMS% = 4.82
Absolute Deviations:
AAD = 2.64 BIAS = -2.64 RMS = 4.01 $J \cdot mol^{-1} \cdot K^{-1}$

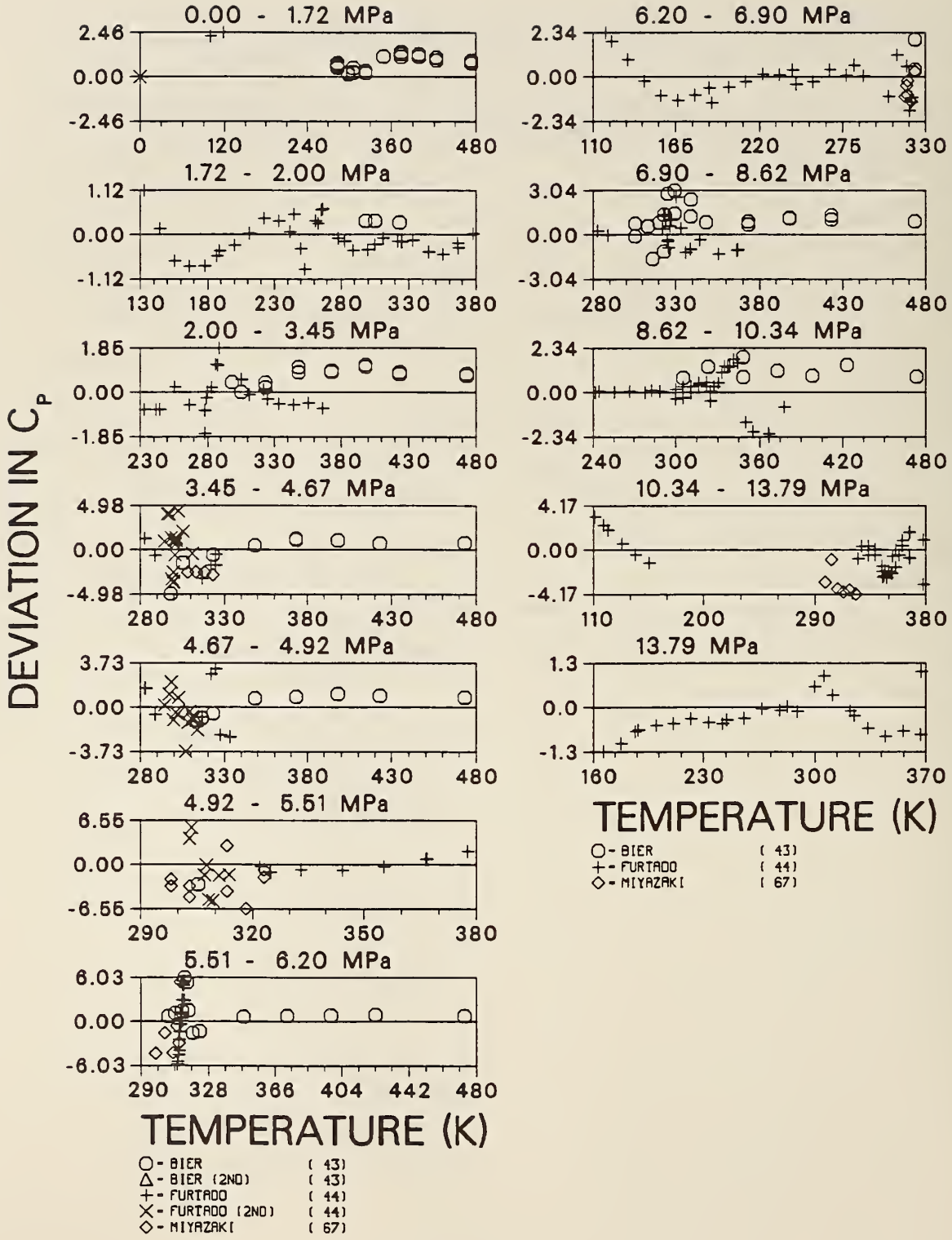


Figure A8. Isobaric molar heat capacity. (Statistical comparisons begin on page 71.)

Figure A8. Isobaric molar heat capacity.

The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Bier [43] and Furtado [44]. Points out of range were

| Author | Temperature, K | Pressure, MPa | Deviation, % |
|---|---|---|---|
| Furtado [44] | 302.87 | 4.67 | 20.3 |
| | 303.15 | 4.67 | 34.2 |
| | 304.26 | 4.92 | -39.2 |
| | 304.82 | 4.92 | -34.2 |
| | 305.26 | 4.92 | -29.6 |
| | 305.26 | 4.92 | -37.4 |
| | 306.48 | 4.92 | 31.2 |
| | 299.82 | 6.90 | 8.7 |
| Miyazaki [67] | 308.15 | 5.17 | 20.7 |
| | 307.15 | 5.17 | -15.9 |
| | 307.55 | 5.17 | -20.7 |
| | 308.55 | 5.17 | 46.9 |
| | 309.15 | 5.17 | 70.6 |
| | 313.15 | 6.20 | -10.1 |

Statistical comparisons between tabulated isobaric molar heat capacities and values calculated from the SWEOS are given.

Data from Bier [43]
Number of Points: 121
AAD% = 1.25 BIAS% = 0.56 RMS% = 2.06
Absolute Deviations:
AAD = 2.29 BIAS = 0.52 RMS = 6.17 $J \cdot mol^{-1} \cdot K^{-1}$

Weighted Data:
Number of Points: 118
AAD% = 1.08 BIAS% = 0.78 RMS% = 1.18
Absolute Deviations:
AAD = 1.72 BIAS = 1.16 RMS = 3.80 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Furtado [44]
Number of Points: 299
AAD% = 2.22 BIAS% = -0.11 RMS% = 5.59
Absolute Deviations:
AAD = 8.32 BIAS = -2.27 RMS = 38.37 $J \cdot mol^{-1} \cdot K^{-1}$

Weighted Data:
Number of Points: 241
AAD% = 1.09 BIAS% = -0.02 RMS% = 1.63
Absolute Deviations:
AAD = 2.19 BIAS = 0.12 RMS = 5.15 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Miyazaki [67]
Number of Points: 45
AAD% = 7.92 BIAS% = -1.39 RMS% = 14.64
Absolute Deviations:
AAD = 46.67 BIAS = 2.97 RMS =107.38 $J \cdot mol^{-1} \cdot K^{-1}$

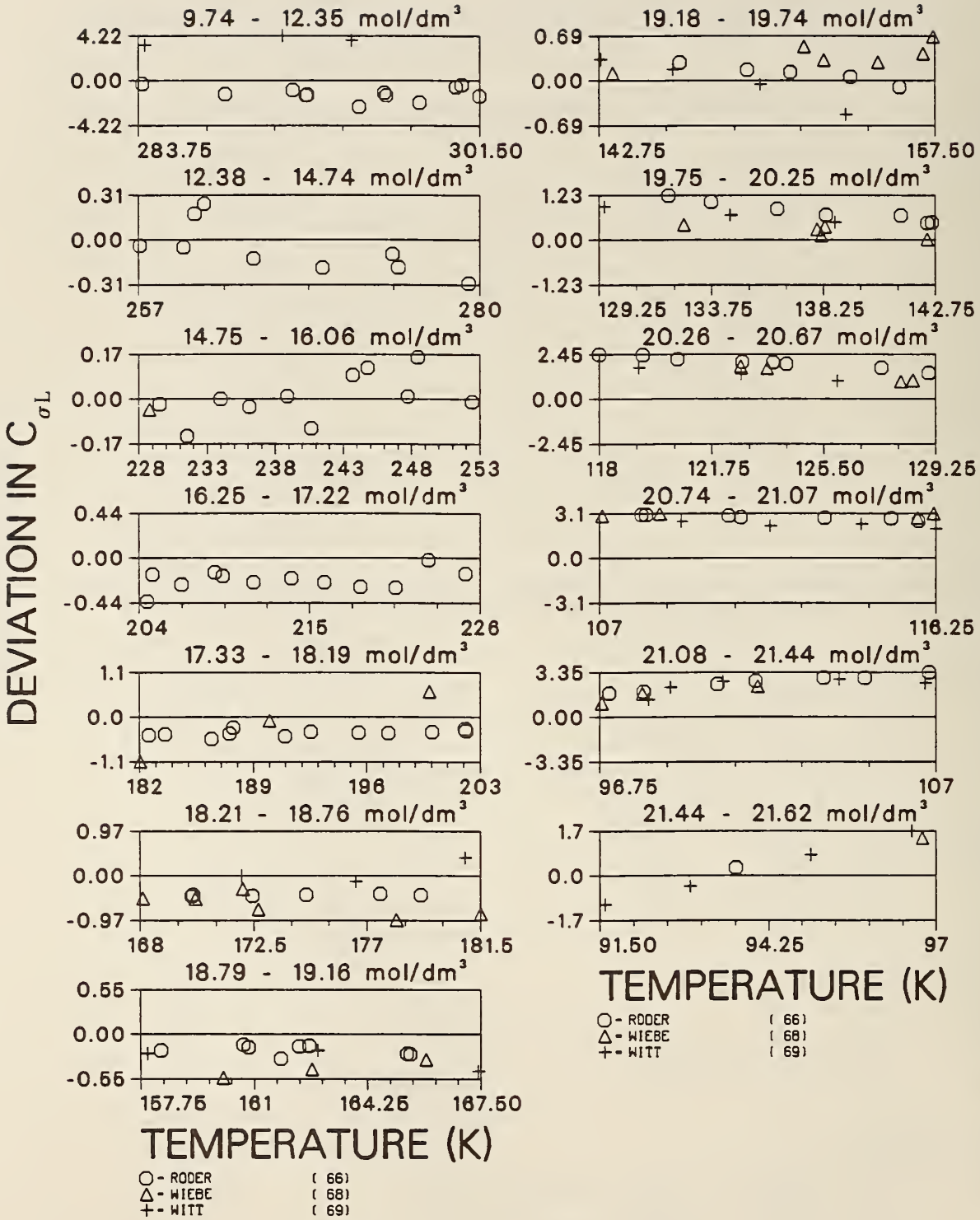


Figure A8. Molar heat capacity of the saturated liquid. (Statistical comparisons begin on page 73.)

Figure A9. Molar heat capacity of the saturated liquid.

The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Roder [66].

Statistical comparisons between tabulated molar heat capacities of the saturated liquid and values calculated from the SWEOS are given.

Data from Roder [66]
Weighted Data:
Number of Points: 106
AAD% = 0.84 BIAS% = 0.31 RMS% = 1.23
Absolute Deviations:
AAD = 0.71 BIAS = 0.09 RMS = 1.08 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Wiebe [68]
Number of Points: 41
AAD% = 0.95 BIAS% = 0.60 RMS% = 1.13
Absolute Deviations:
AAD = 0.67 BIAS = 0.41 RMS = 0.79 $J \cdot mol^{-1} \cdot K^{-1}$

Data from Witt [69]
Number of Points: 39
AAD% = 1.54 BIAS% = 1.38 RMS% = 1.36
Absolute Deviations:
AAD = 1.31 BIAS = 1.20 RMS = 1.40 $J \cdot mol^{-1} \cdot K^{-1}$

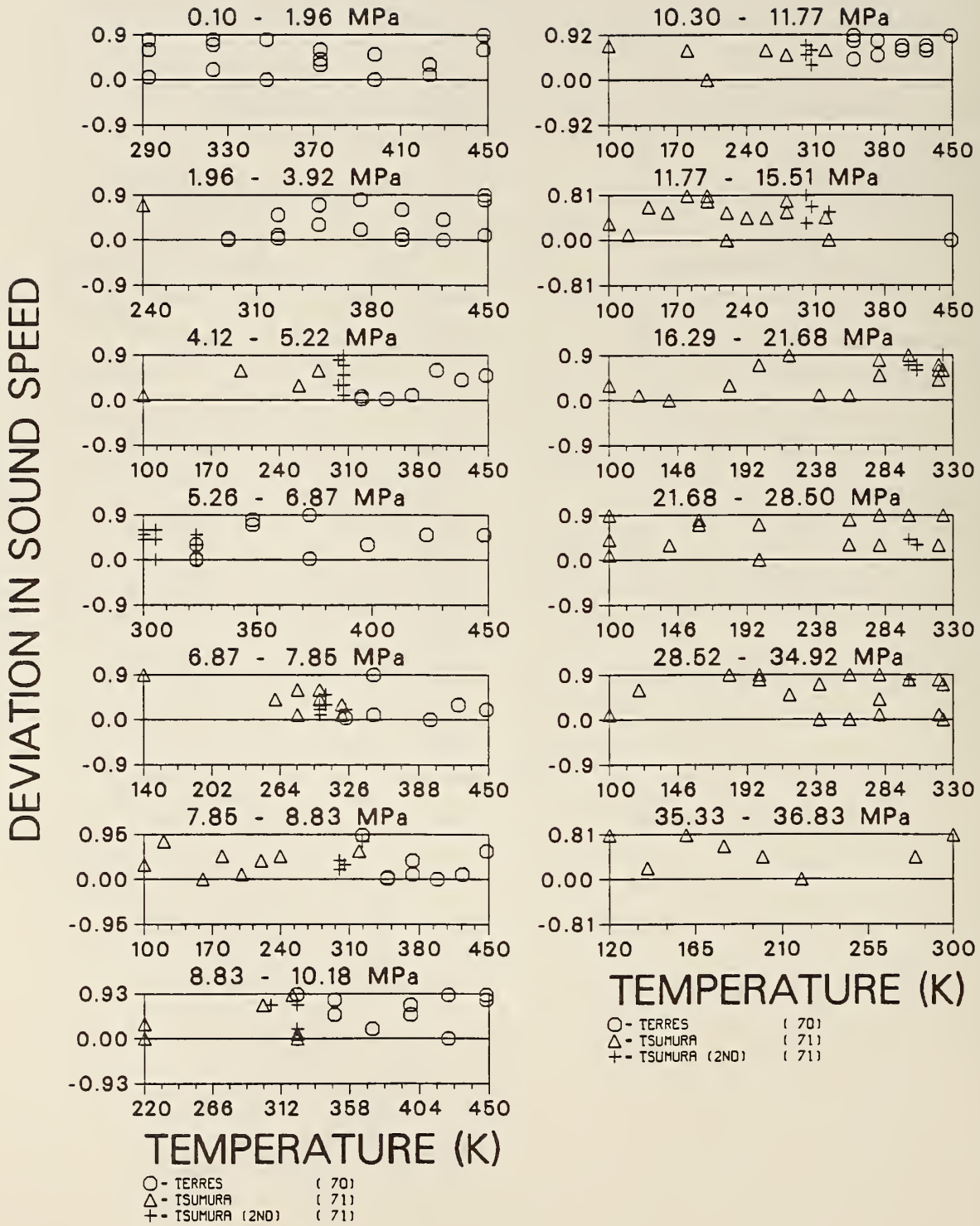


Figure A10. Sound speed in the single-phase fluid. (Statistical comparisions begin on page 75.)

Figure A10. Sound speed in the single-phase fluid.
The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Terres [70] and Tsumura [71].

Statistical comparisons between tabulated sound speeds and values calculated from the SWEOS are given.

Data from Terres [70]
Weighted Data:
Number of Points: 92
AAD% = 0.79 BIAS% = -0.40 RMS% = 1.00
Absolute Deviations:
AAD = 2.35 BIAS = -1.11 RMS = 2.98 $m \cdot s^{-1}$

Data from Tsumura [71]
Number of Points: 156
AAD% = 0.31 BIAS% = -0.09 RMS% = 0.36
Absolute Deviations:
AAD = 3.29 BIAS = -1.13 RMS = 4.38 $m \cdot s^{-1}$

Weighted Data:
Number of Points: 109
AAD% = 0.36 BIAS% = -0.16 RMS% = 0.38
Absolute Deviations:
AAD = 4.29 BIAS = -1.70 RMS = 5.07 $m \cdot s^{-1}$

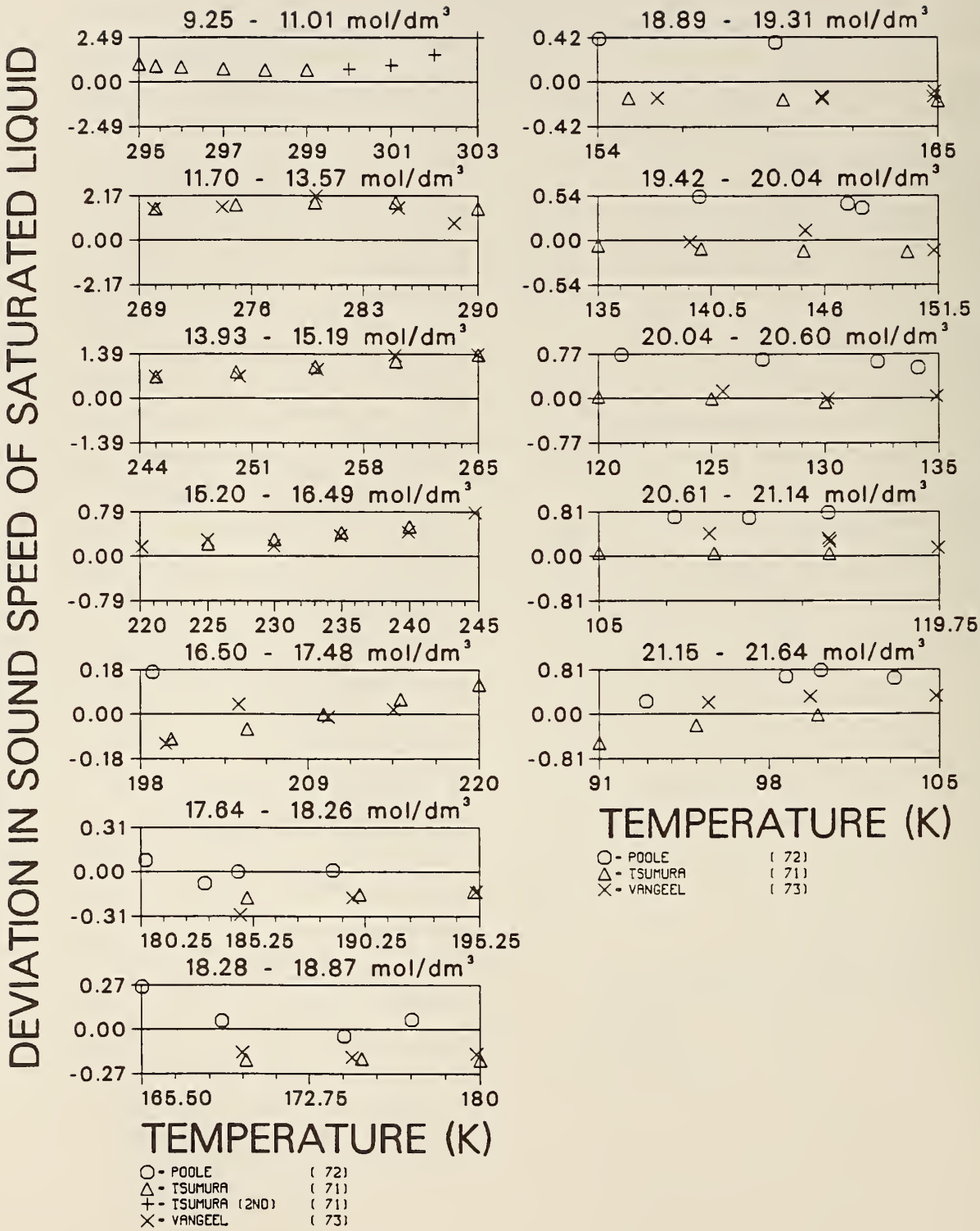


Figure A11. Sound speed in the saturated liquid. (Statistical comparisons begin on page 77.)

Figure A11. Sound speed in the saturated liquid.
The comparisons are based on the SWEOS, using expression from table 7. Primary data for the SWEOS were from Tsumura [71].

Statistical comparisons between tabulated sound speeds and values calculated from the SWEOS are given.

Data from Poole [72]
Number of Points: 25
AAD% = 0.40 BIAS% = 0.39 RMS% = 0.29
Absolute Deviations:
AAD = 7.01 BIAS = 6.88 RMS = 5.39 $m \cdot s^{-1}$

Data from Tsumura [71]
Number of Points: 51
AAD% = 0.56 BIAS% = 0.45 RMS% = 0.70
Absolute Deviations:
AAD = 3.42 BIAS = 1.59 RMS = 4.15 $m \cdot s^{-1}$

Weighted Data:
Number of Points: 47
AAD% = 0.49 BIAS% = 0.37 RMS% = 0.63
Absolute Deviations:
AAD = 3.42 BIAS = 1.43 RMS = 4.26 $m \cdot s^{-1}$

Data from Vangeel [73]
These unpublished data were tabulated in Ref.[6].
Number of Points: 44
AAD% = 0.44 BIAS% = 0.35 RMS% = 0.59
Absolute Deviations:
AAD = 3.86 BIAS = 2.56 RMS = 4.09 $m \cdot s^{-1}$

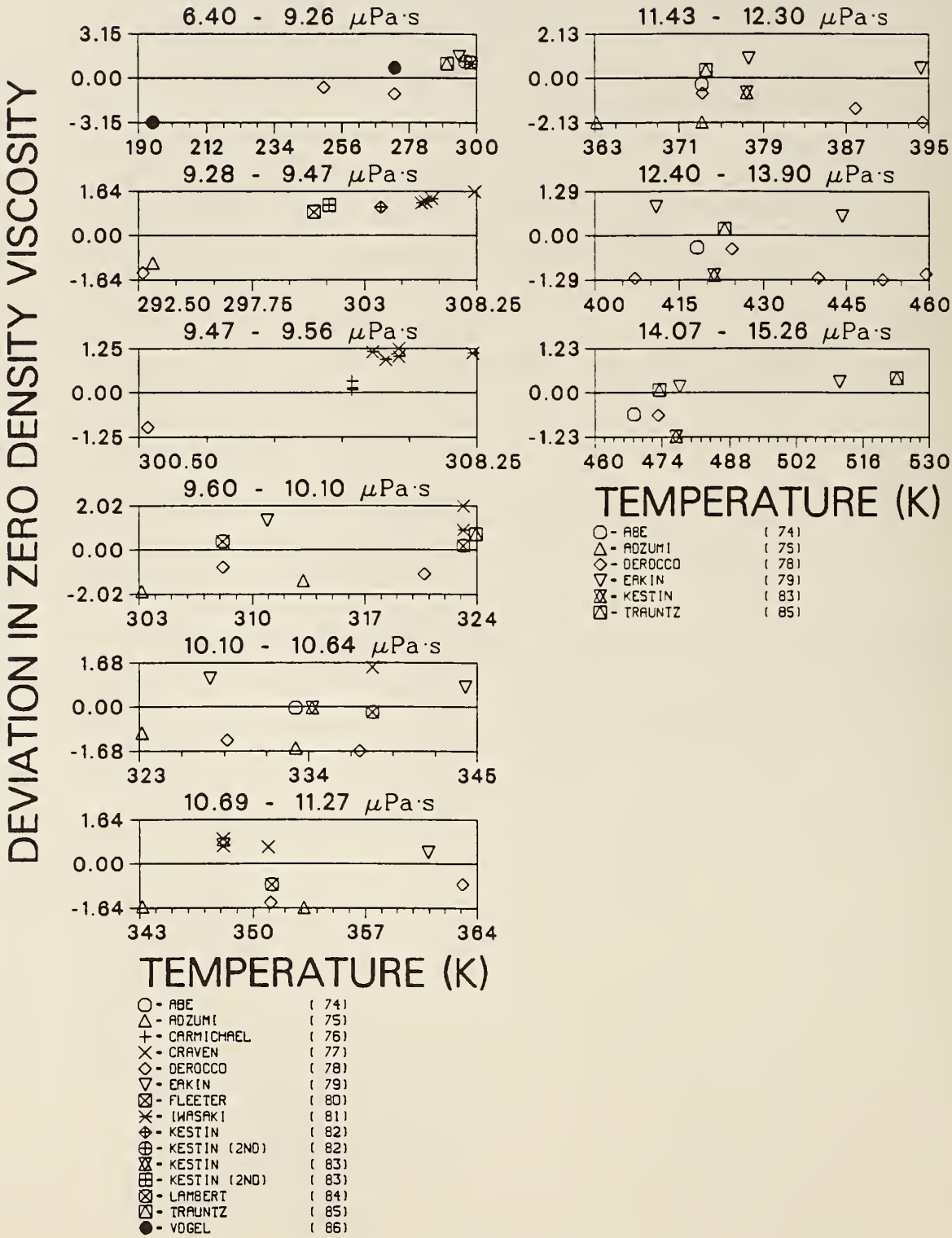


Figure A12. Viscosity at zero density. (Statistical comparisions begin on page 79.)

Figure A12. Viscosity at zero density.

The comparisons are based on eq (9), and data have been adjusted (slightly) to zero density using the correlation of eq (13) as appropriate. Primary data were from Fleeter [80] and Kestin [82,83].

Statistical comparisons between tabulated (adjusted) values of the dilute gas viscosity and values calculated from eq (9) are given.

Data from Abe [74]
Number of Points: 5
AAD% = 0.49 BIAS% = -0.04 RMS% = 0.61
AAD = 0.05 BIAS = -0.01 RMS = 0.06 μPa•s

Data from Adzumi [75]
Number of Points: 9
AAD% = 1.60 BIAS% = -1.60 RMS% = 0.38
AAD = 0.17 BIAS = -0.17 RMS = 0.05 μPa•s

Data from Carmichael [76]
Number of Points: 3
AAD% = 0.18 BIAS% = 0.18 RMS% = 0.11
AAD = 0.02 BIAS = 0.02 RMS = 0.01 μPa•s

Data from Craven [77]
Number of Points: 4
AAD% = 1.44 BIAS% = 1.44 RMS% = 0.51
AAD = 0.14 BIAS = 0.14 RMS = 0.05 μPa•s

Data from Derocco [78]
Number of Points: 19
AAD% = 1.12 BIAS% = -1.12 RMS% = 0.40
AAD = 0.13 BIAS = -0.13 RMS = 0.05 μPa•s

Data from Eakin [79]
Number of Points: 11
AAD% = 0.77 BIAS% = 0.77 RMS% = 0.41
AAD = 0.08 BIAS = 0.08 RMS = 0.04 μPa•s

Data from Fleeter [80]
Weighted Data:
Number of Points: 1
AAD% = 0.88 BIAS% = 0.88 RMS% = 0.00
AAD = 0.08 BIAS = 0.08 RMS = 0.00 μPa•s

Data from Iwasaki [81]
Number of Points: 16
AAD% = 1.07 BIAS% = 1.07 RMS% = 0.17
AAD = 0.10 BIAS = 0.10 RMS = 0.01 μPa•s

Data from Kestin [82]
Number of Points: 2
AAD% = 1.13 BIAS% = 1.13 RMS% = 0.07
AAD = 0.10 BIAS = 0.10 RMS = 0.01 μPa•s

Weighted Data:
Number of Points: 1
AAD% = 1.05 BIAS% = 1.05 RMS% = 0.00
AAD = 0.10 BIAS = 0.10 RMS = 0.00 μPa•s

Data from Kestin [83]
Number of Points: 5
AAD% = 0.86 BIAS% = -0.40 RMS% = 0.88
AAD = 0.10 BIAS = -0.06 RMS = 0.10 μPa•s

Weighted Data:
Number of Points: 4
AAD% = 0.79 BIAS% = -0.79 RMS% = 0.48
AAD = 0.10 BIAS = -0.10 RMS = 0.07 μPa•s

Data from Lambert [84]
Number of Points: 4
AAD% = 0.39 BIAS% = -0.10 RMS% = 0.45
AAD = 0.04 BIAS = -0.01 RMS = 0.05 μPa•s

Data from Trautz [85]
Number of Points: 6
AAD% = 0.47 BIAS% = 0.47 RMS% = 0.32
AAD = 0.05 BIAS = 0.05 RMS = 0.03 μPa•s

Data from Vogel [86]
Number of Points: 2
AAD% = 1.93 BIAS% = -1.21 RMS% = 1.93
AAD = 0.13 BIAS = -0.07 RMS = 0.13 μPa•s

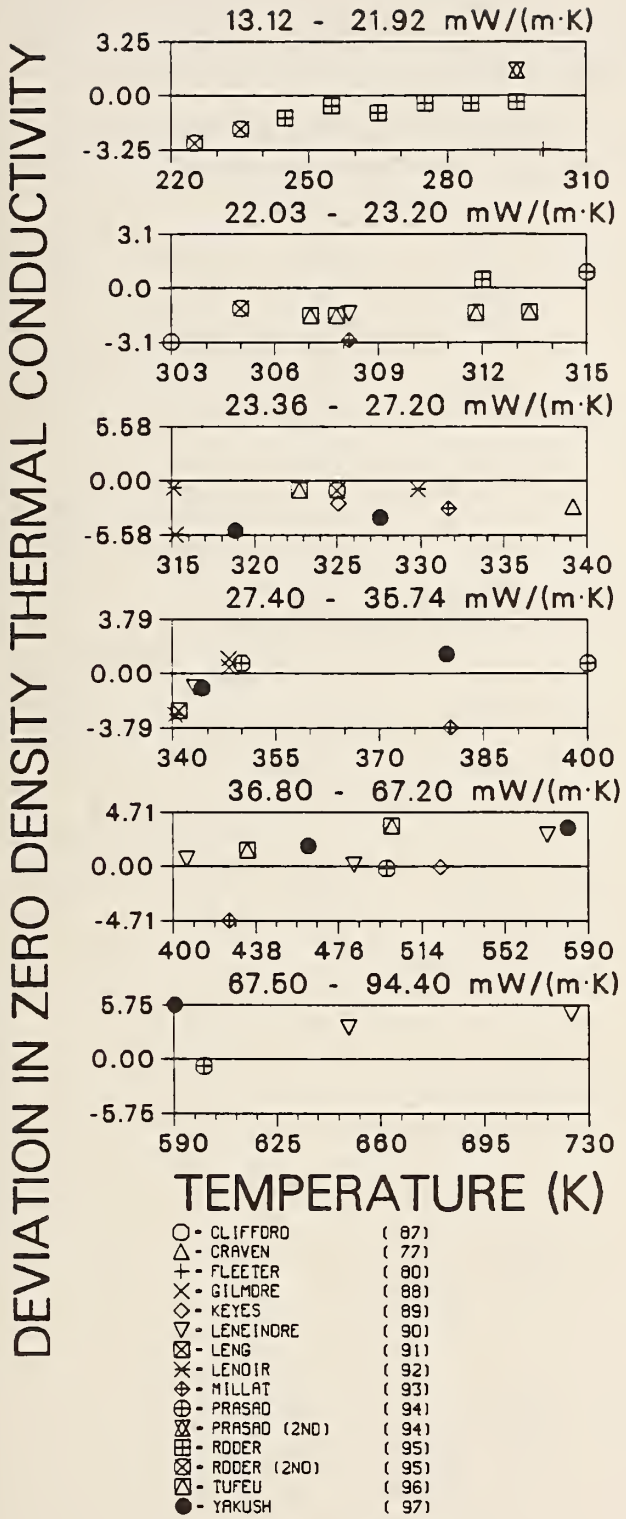


Figure A13. Thermal conductivity at zero density. (Statistical comparisons begin on page 82.)

Figure A13. Thermal conductivity at zero density.

The comparisons are based on eq (11), and data have been adjusted (slightly) to zero density using the correlation of eq (14) as appropriate. Primary data were from Prasad [94] and Roder [95].

Statistical comparisons between tabulated (adjusted) values of the dilute gas viscosity and values calculated from eq (11) are given.

Data from Clifford [87]
Number of Points: 1
AAD% = 3.09 BIAS% = -3.09 RMS% = 0.00
AAD = 0.69 BIAS = -0.69 RMS = 0.00 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Craven [77]
Number of Points: 1
AAD% = 2.66 BIAS% = -2.66 RMS% = 0.00
AAD = 0.72 BIAS = -0.72 RMS = 0.00 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Fleeter [80]
Number of Points: 1
AAD% = 3.24 BIAS% = -3.24 RMS% = 0.00
AAD = 0.71 BIAS = -0.71 RMS = 0.00 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Gilmore [88]
Number of Points: 2
AAD% = 0.75 BIAS% = 0.75 RMS% = 0.31
AAD = 0.21 BIAS = 0.21 RMS = 0.08 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Keyes [89]
Number of Points: 2
AAD% = 1.21 BIAS% = -1.21 RMS% = 1.13
AAD = 0.32 BIAS = -0.32 RMS = 0.27 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Le Neindre [90]
Number of Points: 7
AAD% = 2.02 BIAS% = 1.32 RMS% = 2.19
AAD = 1.43 BIAS = 1.25 RMS = 1.73 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Leng [91]
Number of Points: 1
AAD% = 2.60 BIAS% = -2.60 RMS% = 0.00
AAD = 0.71 BIAS = -0.71 RMS = 0.00 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Lenoir [92]
Number of Points: 4
AAD% = 2.52 BIAS% = -2.52 RMS% = 1.96
AAD = 0.64 BIAS = -0.64 RMS = 0.49 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Millat [93]
Number of Points: 4
AAD% = 3.57 BIAS% = -3.57 RMS% = 0.75
AAD = 1.17 BIAS = -1.17 RMS = 0.53 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Prasad [94]
Number of Points: 6

| | | | | | | |
|---|---|---|---|---|---|---|
| AAD% | = 0.79 | BIAS% | = 0.49 | RMS% | = 0.73 | |
| AAD | = 0.27 | BIAS | = 0.06 | RMS | = 0.29 | $mW \cdot m^{-1} \cdot K^{-1}$ |

Weighted Data:
Number of Points: 5

| | | | | | | |
|---|---|---|---|---|---|---|
| AAD% | = 0.65 | BIAS% | = 0.29 | RMS% | = 0.63 | |
| AAD | = 0.26 | BIAS | = 0.01 | RMS | = 0.30 | $mW \cdot m^{-1} \cdot K^{-1}$ |

Data from Roder [95]
Number of Points: 11

| | | | | | | |
|---|---|---|---|---|---|---|
| AAD% | = 1.07 | BIAS% | = -0.99 | RMS% | = 0.84 | |
| AAD | = 0.18 | BIAS | = -0.16 | RMS | = 0.12 | $mW \cdot m^{-1} \cdot K^{-1}$ |

Weighted Data:
Number of Points: 7

| | | | | | | |
|---|---|---|---|---|---|---|
| AAD% | = 0.69 | BIAS% | = -0.55 | RMS% | = 0.53 | |
| AAD | = 0.12 | BIAS | = -0.09 | RMS | = 0.09 | $mW \cdot m^{-1} \cdot K^{-1}$ |

Data from Tufeu [96]
Number of Points: 7

| | | | | | | |
|---|---|---|---|---|---|---|
| AAD% | = 1.71 | BIAS% | = -0.30 | RMS% | = 1.85 | |
| AAD | = 0.58 | BIAS | = 0.12 | RMS | = 0.77 | $mW \cdot m^{-1} \cdot K^{-1}$ |

Data from Yakush [97]
Number of Points: 7

| | | | | | | |
|---|---|---|---|---|---|---|
| AAD% | = 3.17 | BIAS% | = 0.32 | RMS% | = 3.59 | |
| AAD | = 1.42 | BIAS | = 0.69 | RMS | = 1.70 | $mW \cdot m^{-1} \cdot K^{-1}$ |

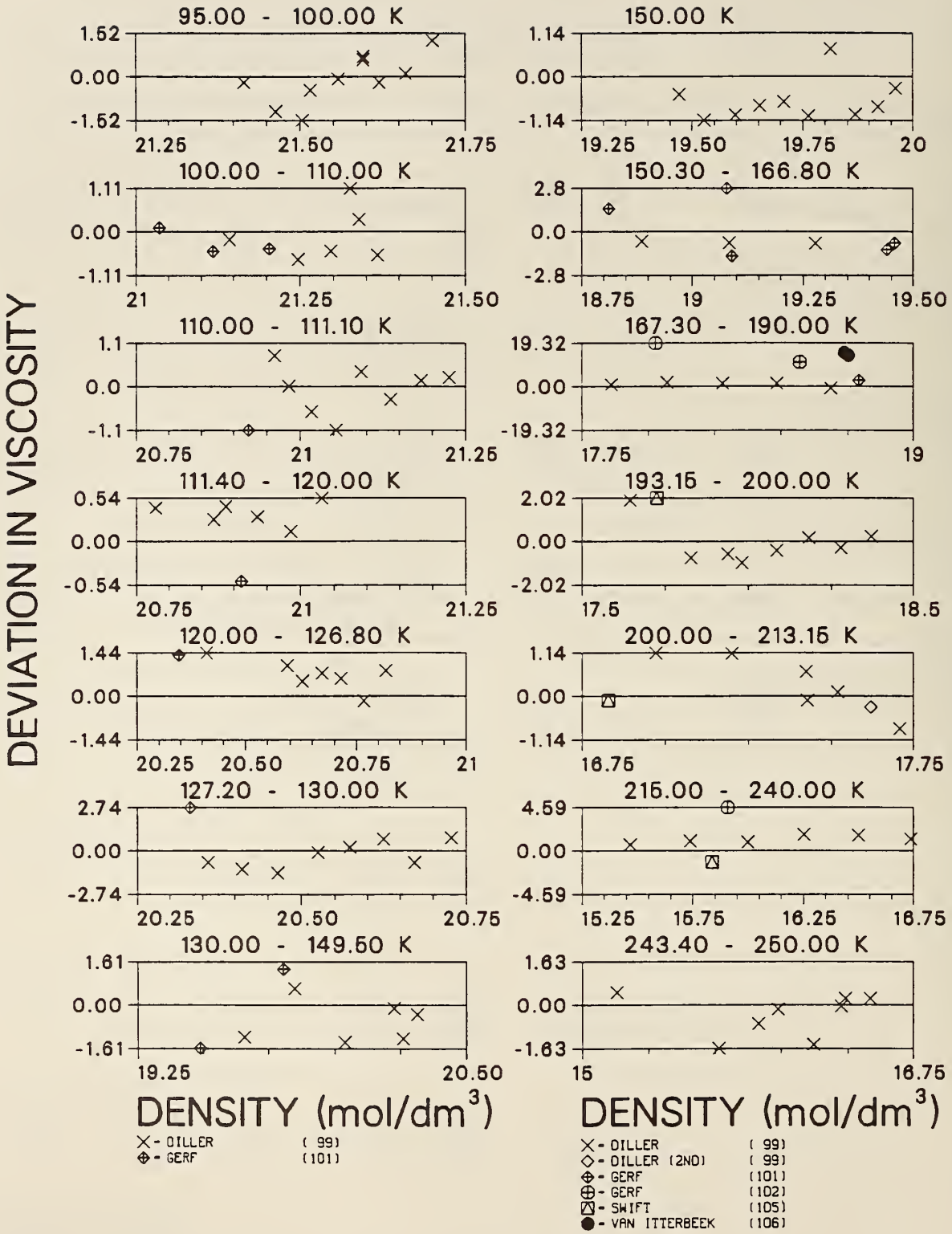


Figure A14. Viscosity at elevated pressures. (Statistical comparisions begin on page 94.)

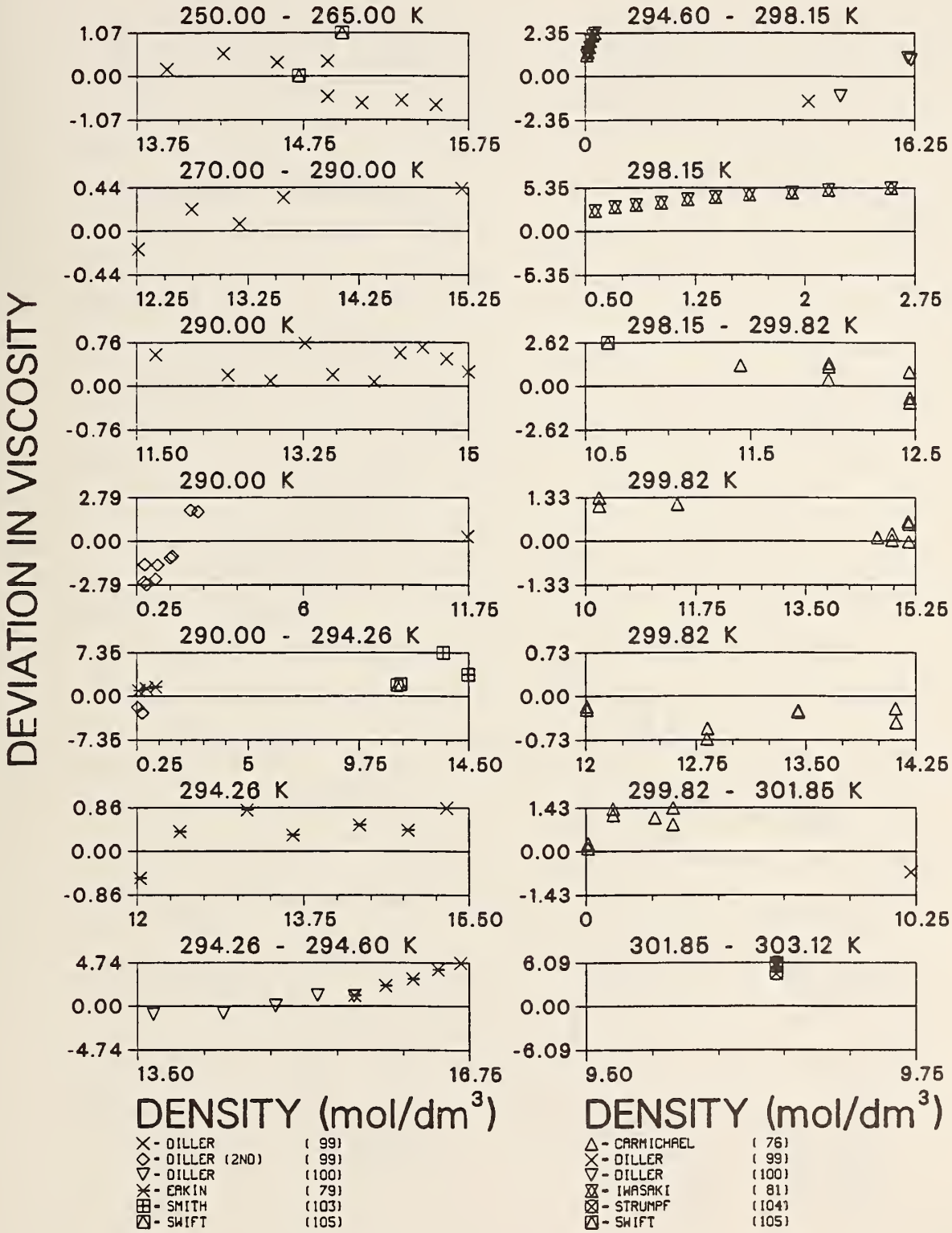


Figure A14. (continued)

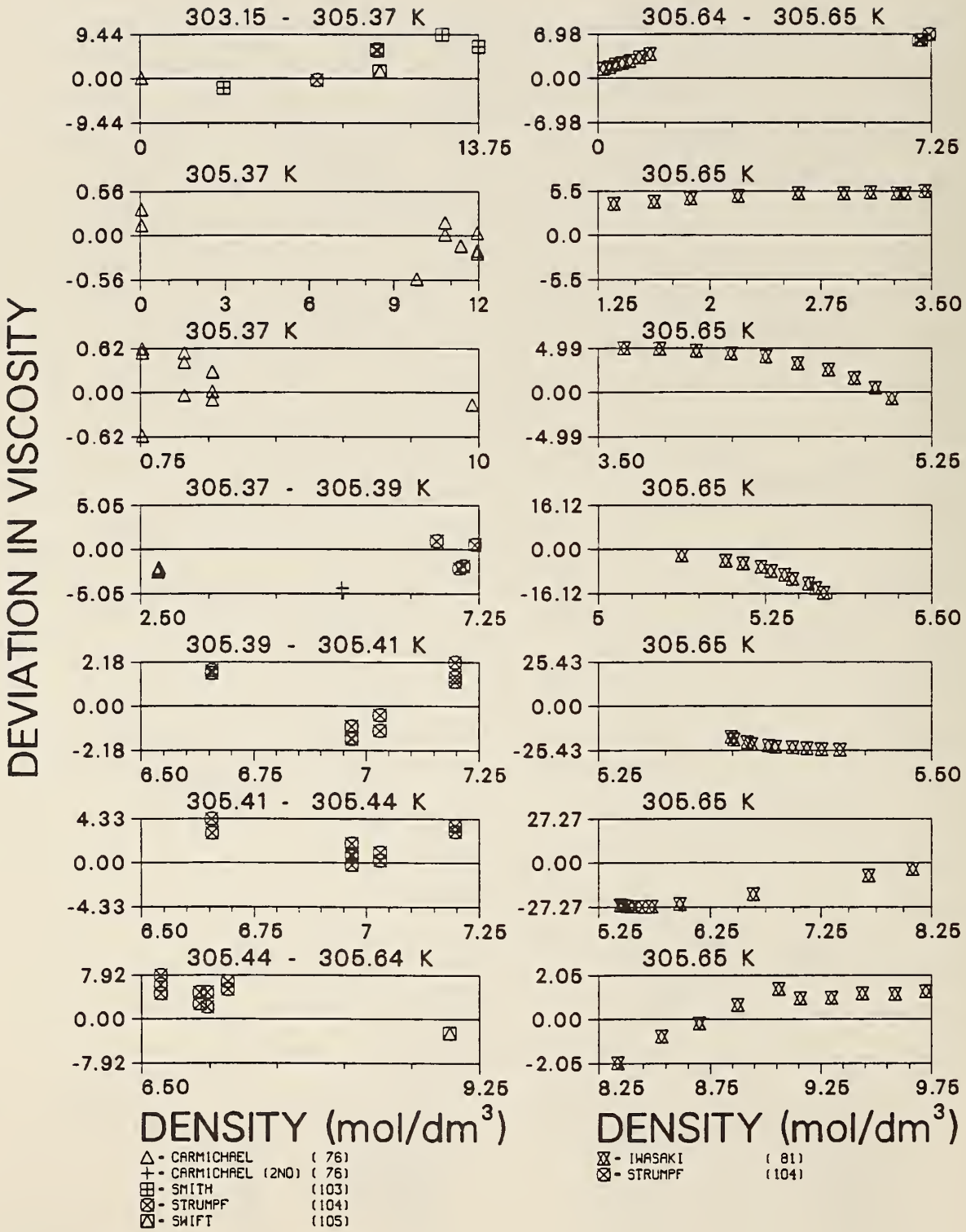


Figure A14. (continued)

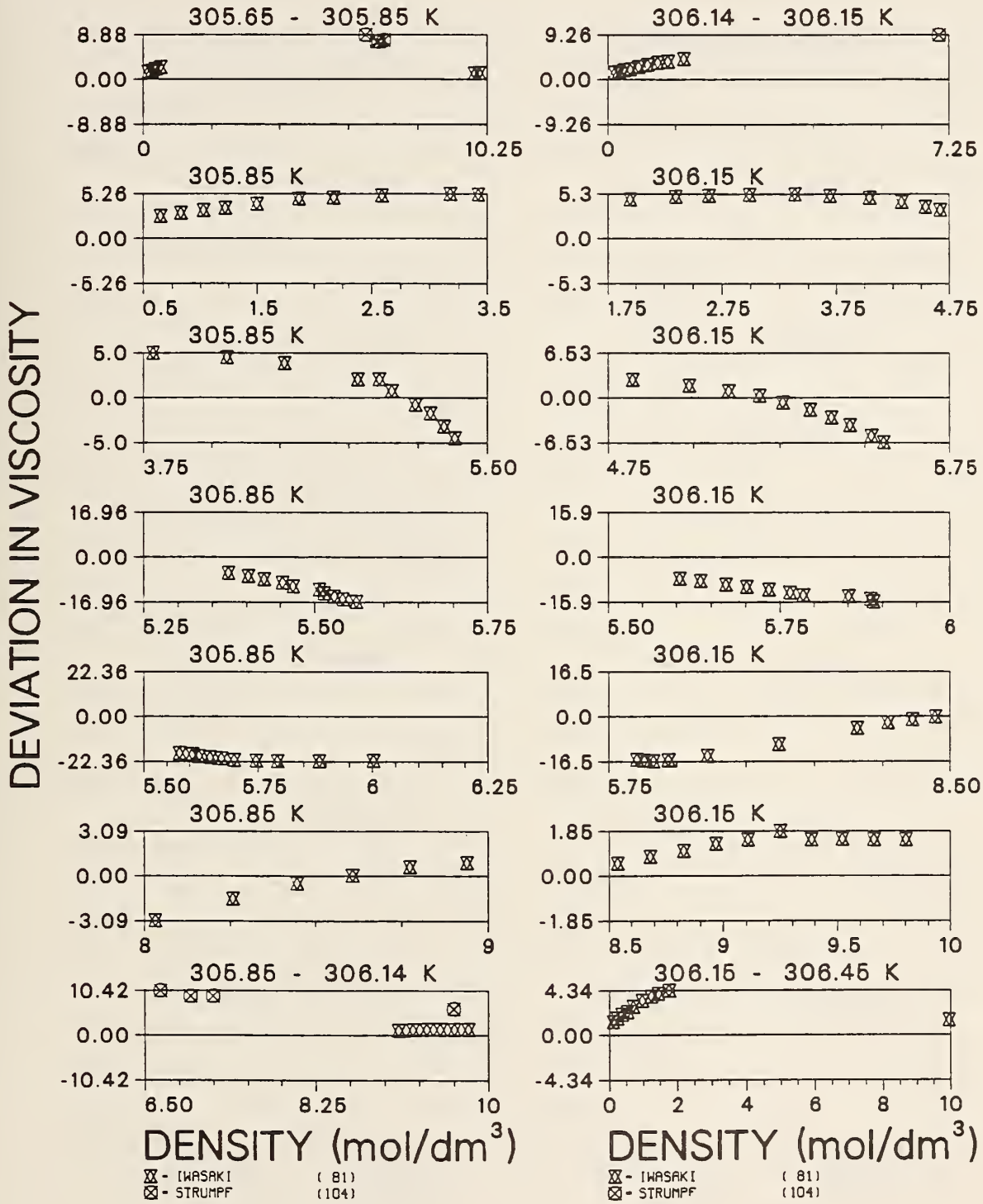


Figure A14. (continued)

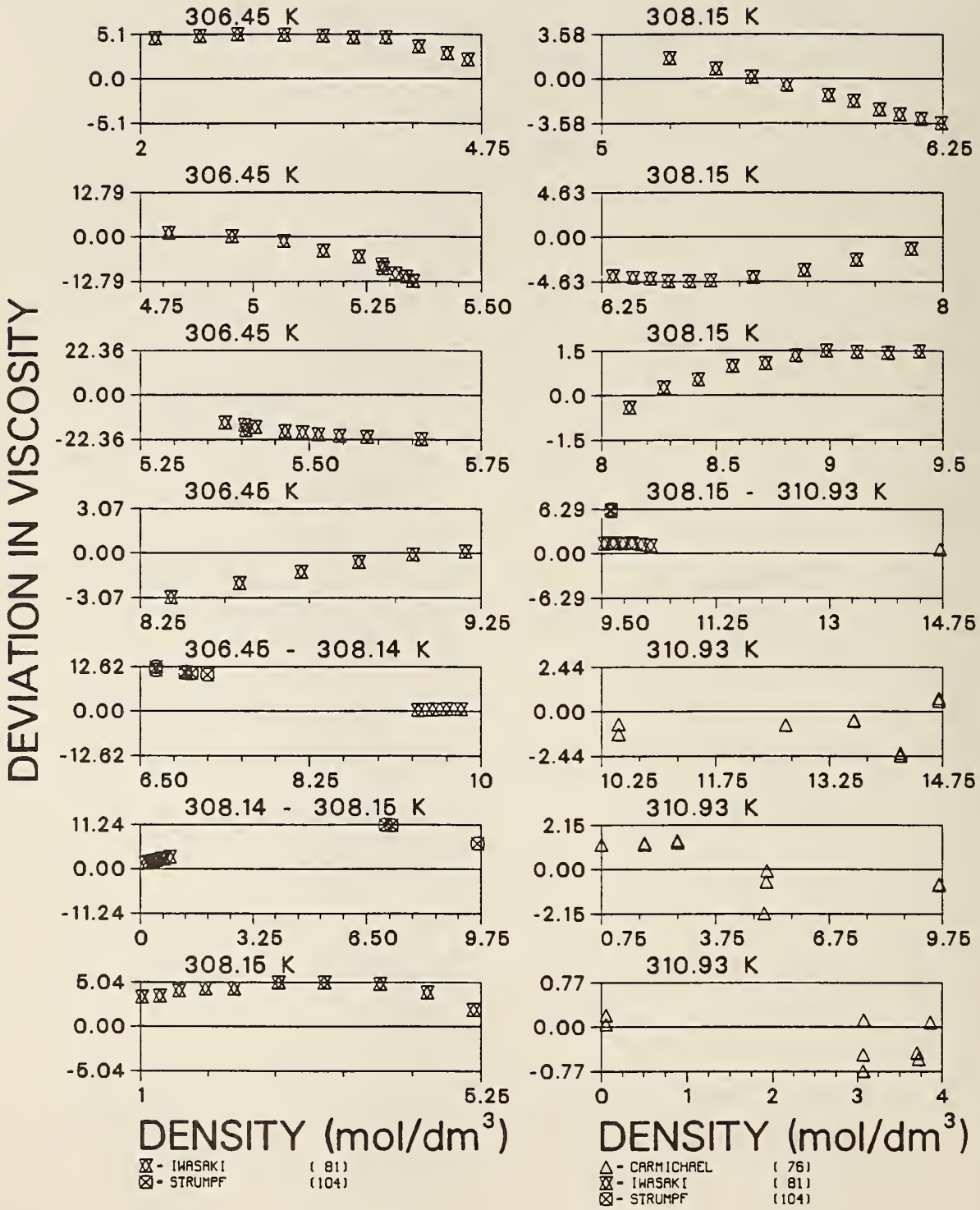


Figure A14. (continued)

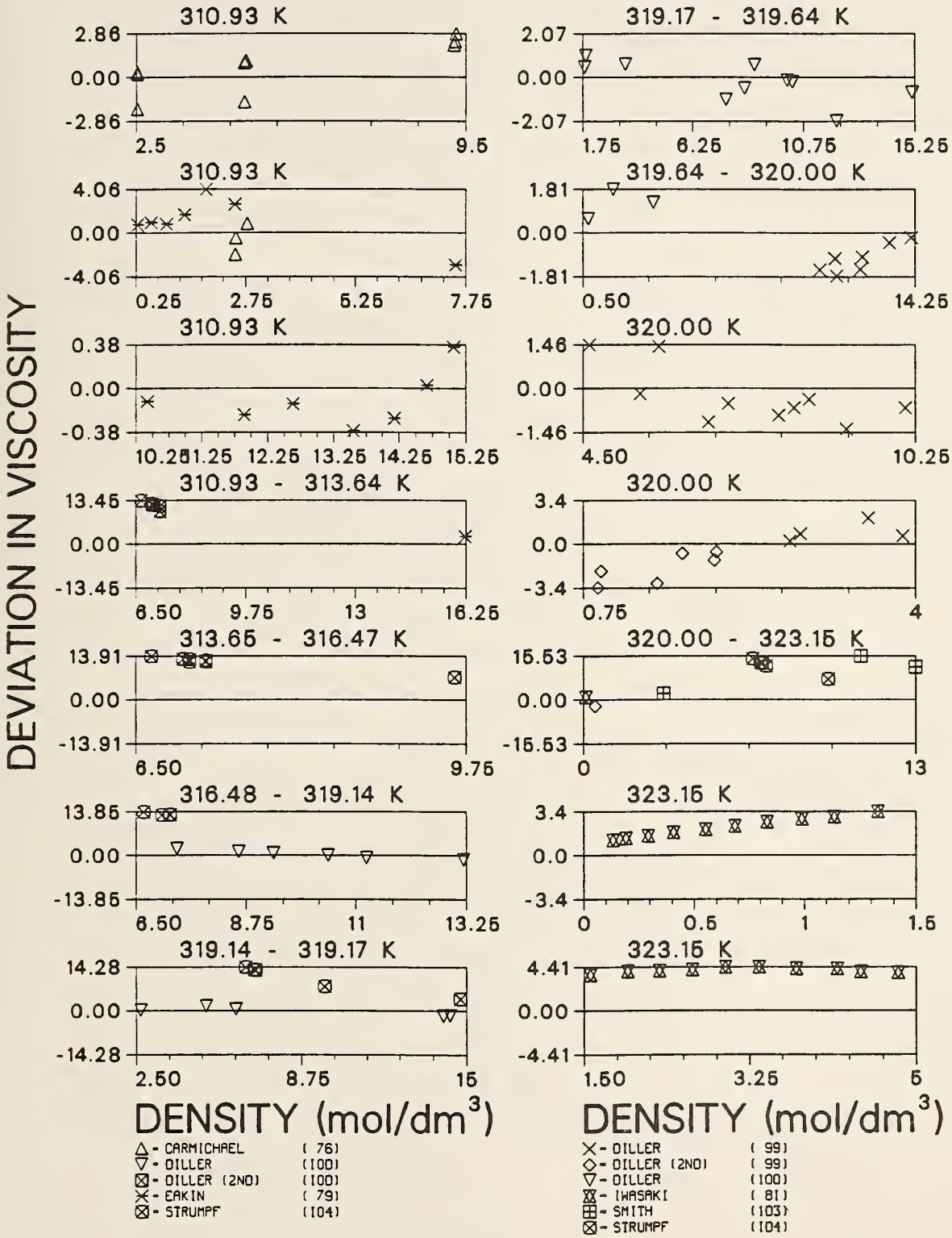


Figure A14. (continued)

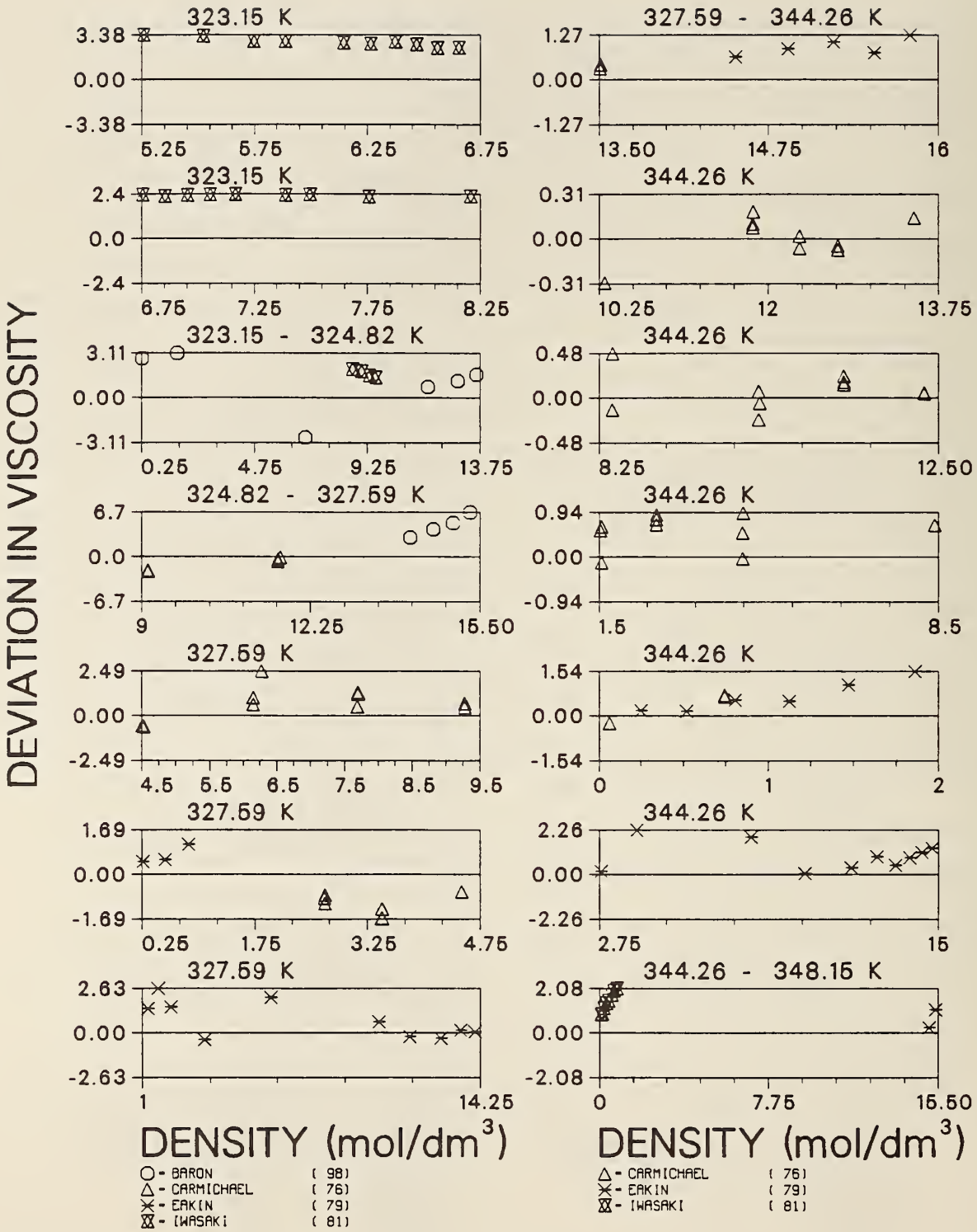


Figure A14. (continued)

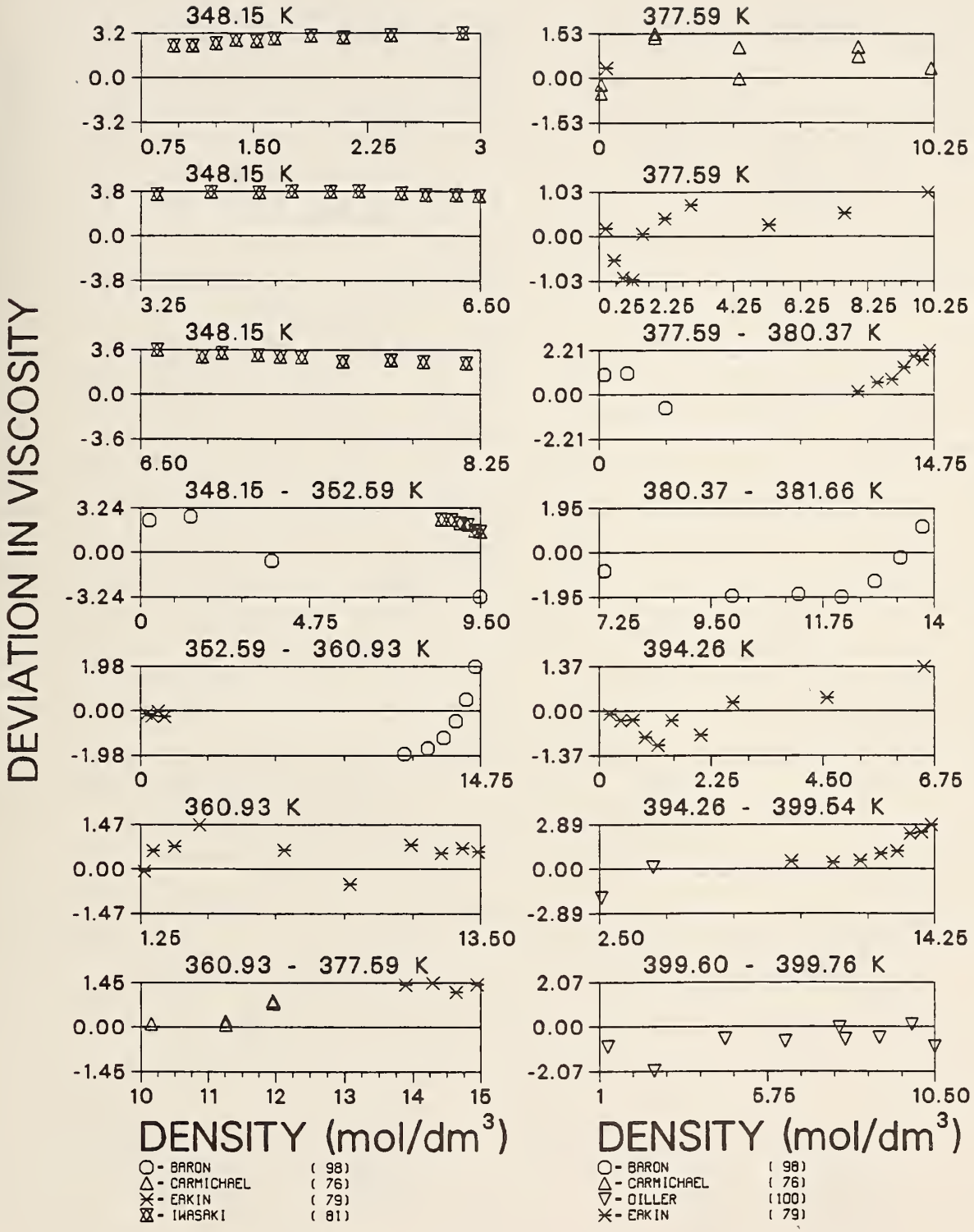


Figure A14. (continued)

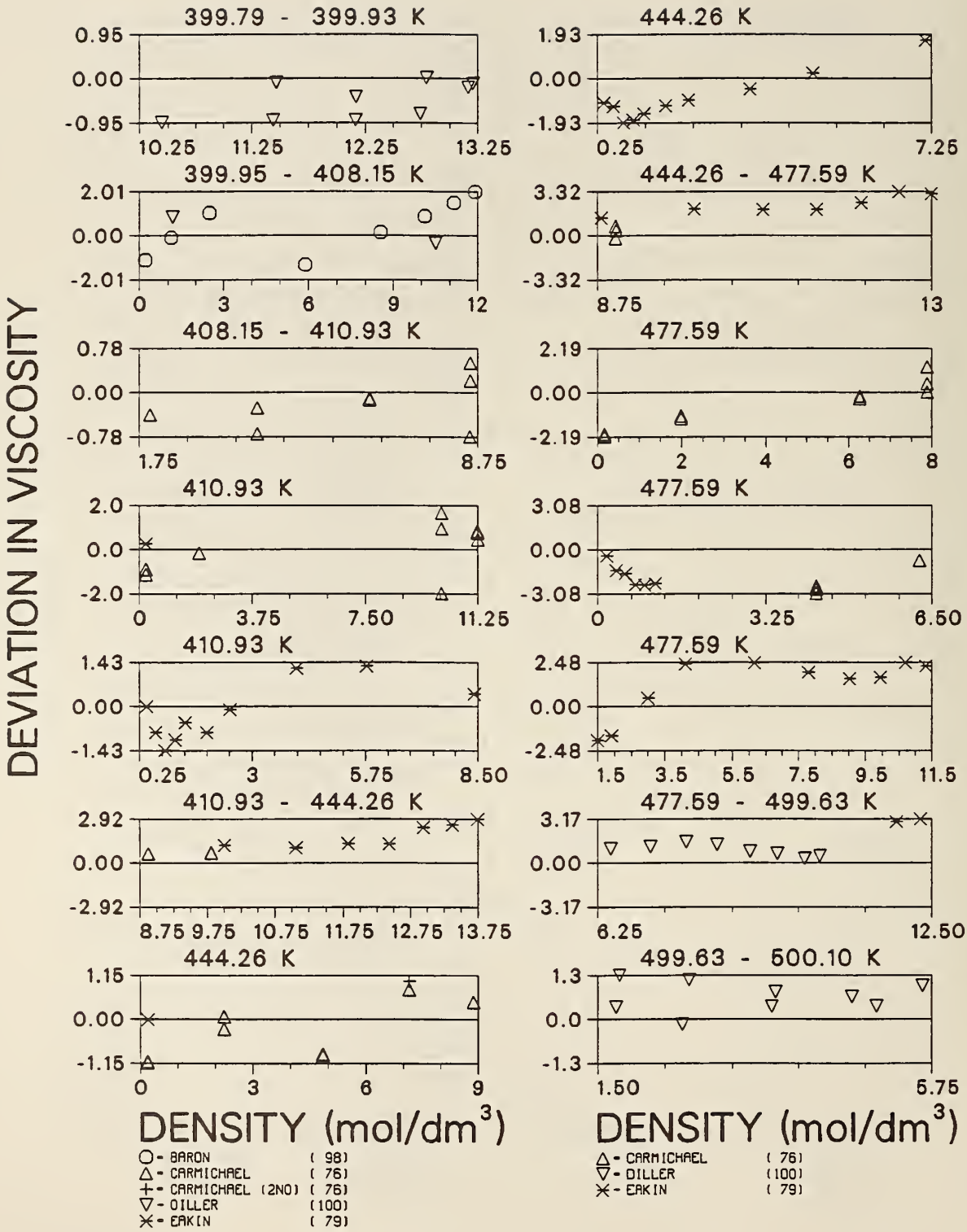


Figure A14. (continued)

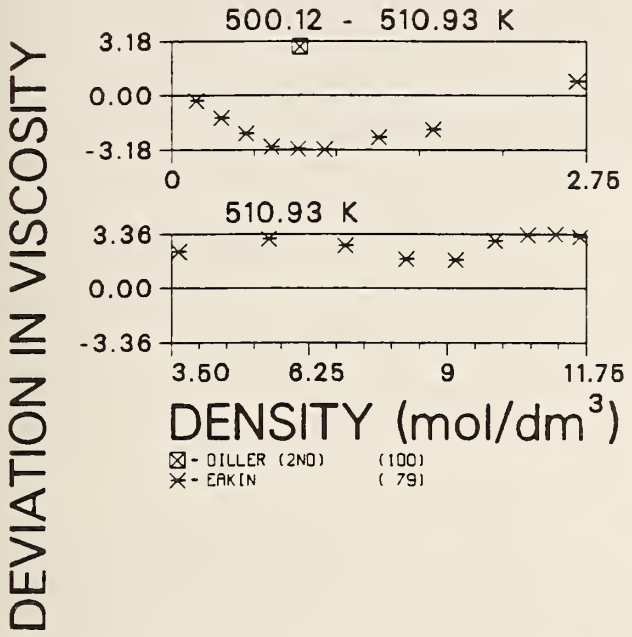


Figure A14. (continued)

Figure A14. Viscosity at elevated pressures.
The comparisons are based on eqs (7), (9), and (13). Primary data were from Carmichael [76] and Diller [99,100].

Statistical comparisons between tabulated values of the viscosity and values calculated from eqs (7), (9), and (13) are given.

Data from Baron [98]
Number of Points: 40
Comparisons based on experimental pressures:
AAD% = 1.85 BIAS% = 0.71 RMS% = 2.19
AAD = 0.88 BIAS = 0.44 RMS = 1.34 μPa•s
Comparisons based on experimental densities:
AAD% = 1.73 BIAS% = 0.39 RMS% = 2.07
AAD = 0.80 BIAS = 0.23 RMS = 1.22 μPa•s

Data from Carmichael [76]
Comparisons based on experimental pressures:
Number of Points: 226
AAD% = 0.81 BIAS% = -0.07 RMS% = 1.14
AAD = 0.21 BIAS = -0.01 RMS = 0.31 μPa•s

Weighted Data:
Number of Points: 222
AAD% = 0.76 BIAS% = -0.02 RMS% = 1.01
AAD = 0.20 BIAS = 0.00 RMS = 0.30 μPa•s

Data from Diller [99]
Number of Points: 164
Comparisons based on experimental pressures:
AAD% = 0.84 BIAS% = -0.17 RMS% = 1.05
AAD = 1.84 BIAS = 0.02 RMS = 3.40 μPa•s
Comparisons based on experimental densities:
AAD% = 0.87 BIAS% = -0.09 RMS% = 1.09
AAD = 1.85 BIAS = 0.24 RMS = 3.39 μPa•s

Weighted Data:
Number of Points: 144
Comparisons based on experimental pressures:
AAD% = 0.69 BIAS% = -0.02 RMS% = 0.84
AAD = 1.93 BIAS = -0.10 RMS = 3.18 μPa•s
Comparisons based on experimental densities:
AAD% = 0.73 BIAS% = 0.06 RMS% = 0.88
AAD = 1.94 BIAS = 0.15 RMS = 3.20 μPa•s

Data from Diller [100]
Number of Points: 76
Comparisons based on experimental pressures:
AAD% = 0.96 BIAS% = 0.11 RMS% = 1.23
AAD = 0.34 BIAS = 0.02 RMS = 0.53 μPa•s
Comparisons based on experimental densities:
AAD% = 1.02 BIAS% = 0.07 RMS% = 1.30
AAD = 0.37 BIAS = 0.00 RMS = 0.58 μPa•s

Weighted Data:
Number of Points: 72
Comparisons based on experimental pressures:
AAD% = 0.83 BIAS% = 0.03 RMS% = 1.00
AAD = 0.30 BIAS = -0.03 RMS = 0.42 μPa•s
Comparisons based on experimental densities:
AAD% = 0.89 BIAS% = -0.01 RMS% = 1.07
AAD = 0.33 BIAS = -0.04 RMS = 0.46 μPa•s

Data from Eakin [79]
Number of Points: 198
Comparisons based on experimental pressures:
AAD% = 1.33 BIAS% = 0.69 RMS% = 1.61
AAD = 0.53 BIAS = 0.41 RMS = 0.77 μPa•s
Comparisons based on experimental densities:
AAD% = 1.07 BIAS% = 0.41 RMS% = 1.46
AAD = 0.36 BIAS = 0.22 RMS = 0.61 μPa•s

Data from Gerf [101]
Number of Points: 20
Comparisons based on experimental pressures:
AAD% = 2.13 BIAS% = 0.95 RMS% = 2.46
AAD = 10.00 BIAS = 3.29 RMS = 14.03 μPa•s
Comparisons based on experimental densities:
AAD% = 21.17 BIAS% = -18.84 RMS% = 39.44
AAD = 51.25 BIAS = -39.63 RMS = 87.70 μPa•s

Data from Gerf [102]
Number of Points: 11
Comparisons based on experimental pressures:
AAD% = 11.24 BIAS% = 5.34 RMS% = 11.57
AAD = 11.36 BIAS = 7.80 RMS = 11.61 μPa•s
Comparisons based on experimental densities:
AAD% = 11.43 BIAS% = 5.58 RMS% = 11.64
AAD = 11.55 BIAS = 8.03 RMS = 11.69 μPa•s

Data from Iwasaki [81]
Number of Points: 402
Comparisons based on experimental pressures:
AAD% = 5.64 BIAS% = -2.03 RMS% = 8.30
AAD = 1.15 BIAS = -0.60 RMS = 1.84 μPa•s
Comparisons based on experimental densities:
AAD% = 2.42 BIAS% = 2.12 RMS% = 1.89
AAD = 0.40 BIAS = 0.33 RMS = 0.30 μPa•s

Data from Smith [103]
Number of Points: 15
Comparisons based on experimental pressures:
AAD% = 11.40 BIAS% = 11.13 RMS% = 6.39
AAD = 3.74 BIAS = 3.70 RMS = 2.00 μPa•s
Comparisons based on experimental densities:
AAD% = 11.46 BIAS% = 11.23 RMS% = 6.43
AAD = 3.75 BIAS = 3.72 RMS = 2.01 μPa•s

Data from Strumpf [104]
Number of Points: 105
Comparisons based on experimental densities:
AAD% = 7.35 BIAS% = 7.15 RMS% = 4.65
AAD = 1.63 BIAS = 1.59 RMS = 0.94 μPa•s

Data from Swift [105]
Number of Points: 14
Comparisons based on experimental pressures:
AAD% = 1.82 BIAS% = 1.27 RMS% = 1.67
AAD = 1.46 BIAS = 1.17 RMS = 1.83 μPa•s
Comparisons based on experimental densities:
AAD% = 6.62 BIAS% = -3.31 RMS% = 18.21
AAD = 3.04 BIAS = -0.06 RMS = 6.11 μPa•s

Data from Van Itterbeek [106]
Number of Points: 8
Comparisons based on experimental pressures:
AAD% = 11.52 BIAS% = 11.52 RMS% = 3.32
AAD = 28.76 BIAS = 28.76 RMS = 5.02 μPa•s
Comparisons based on experimental densities:
AAD% = 10.25 BIAS% = 10.25 RMS% = 4.57
AAD = 26.05 BIAS = 26.05 RMS = 9.47 μPa•s

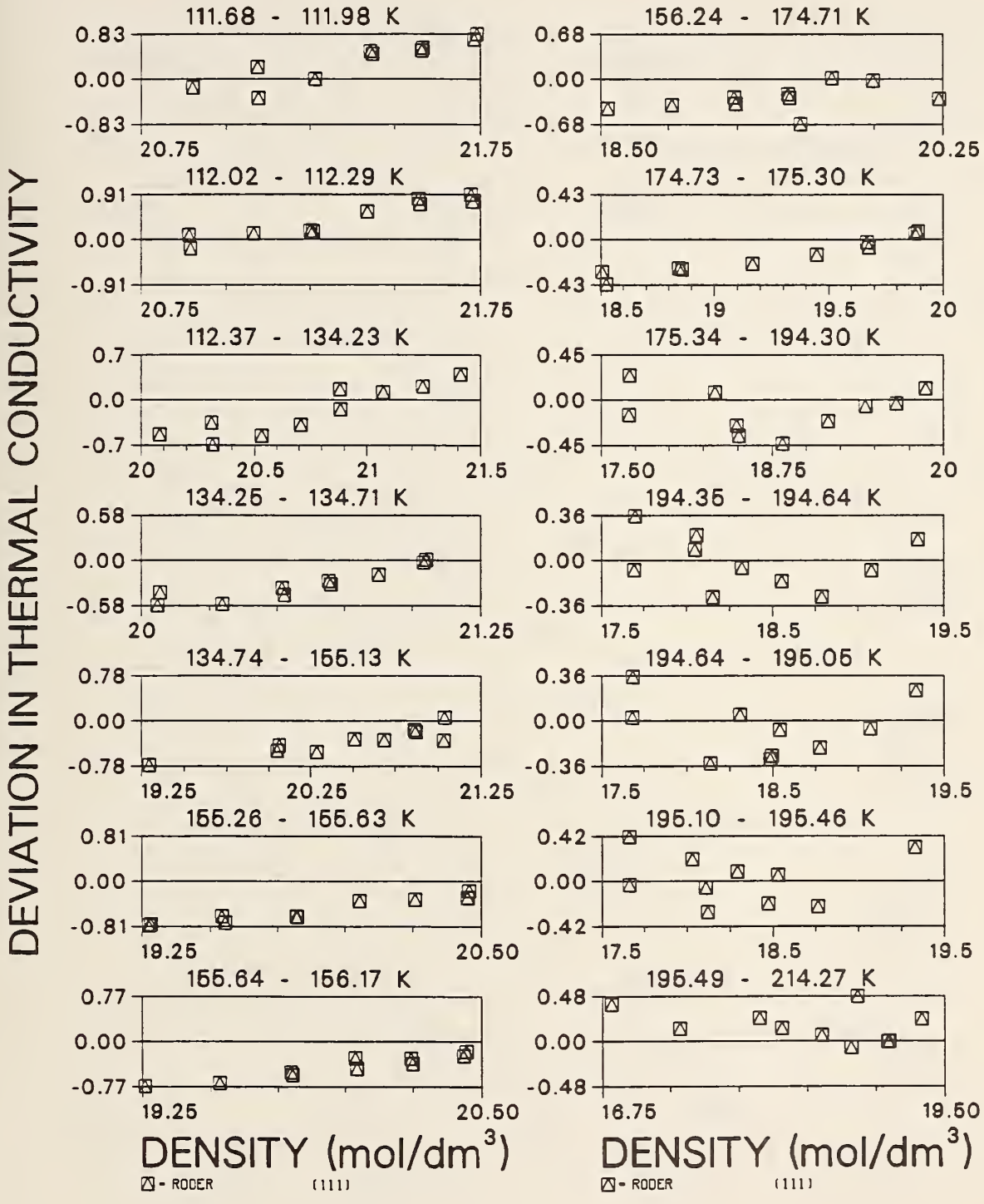


Figure A15. Thermal conductivity at elevated pressures. (Statistical comparisons begin on page 109.)

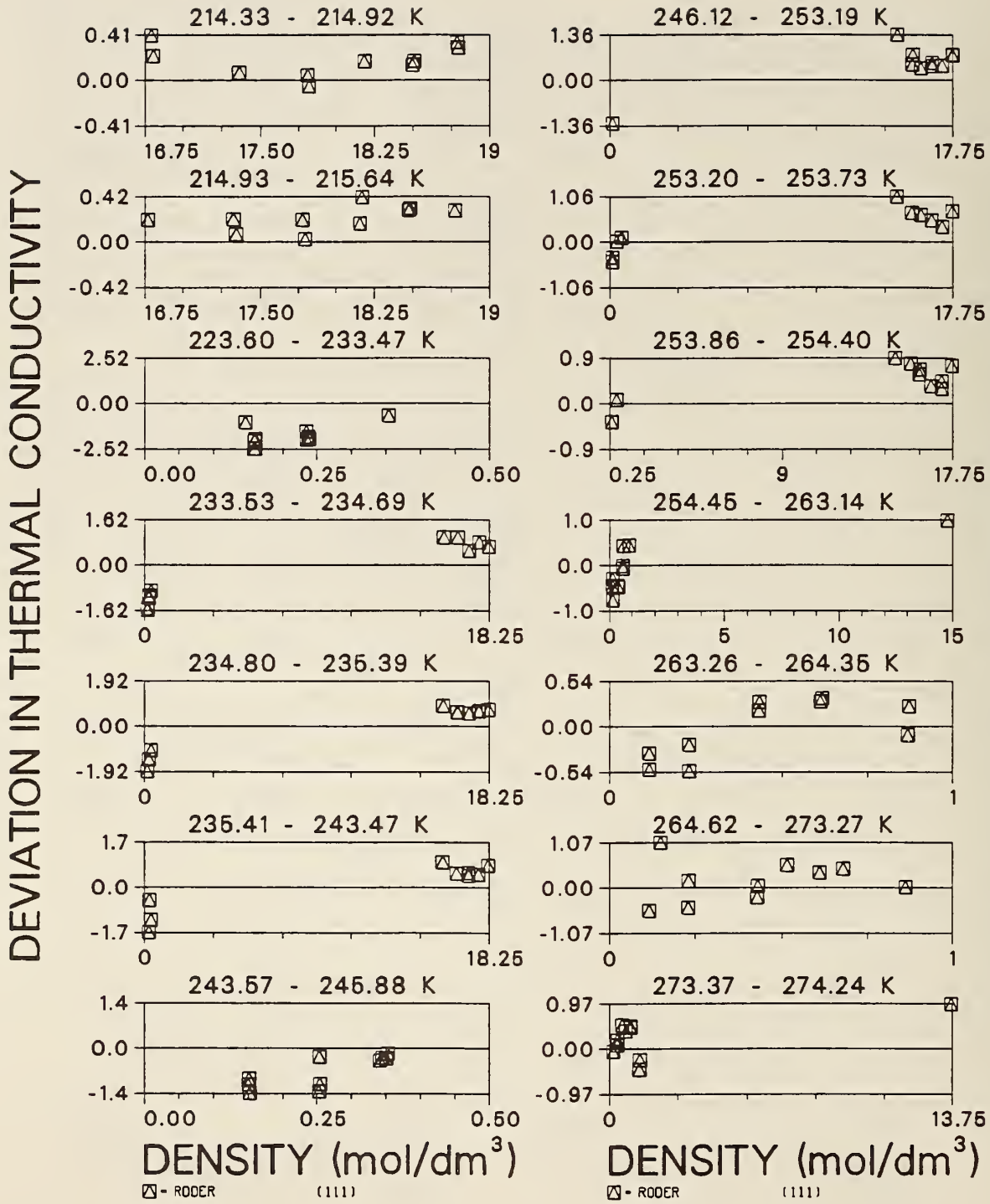


Figure A15. (continued)

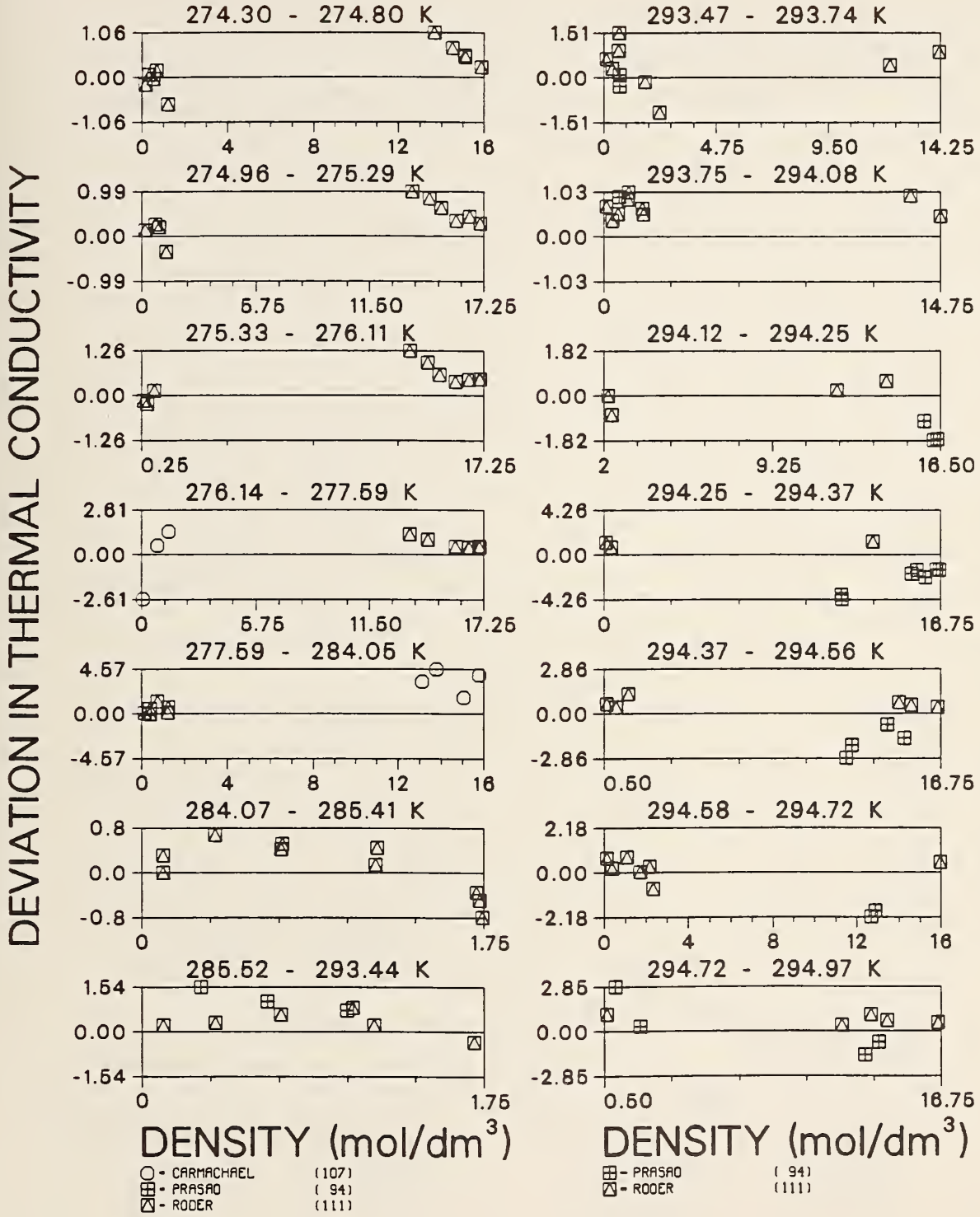


Figure A15. (continued)

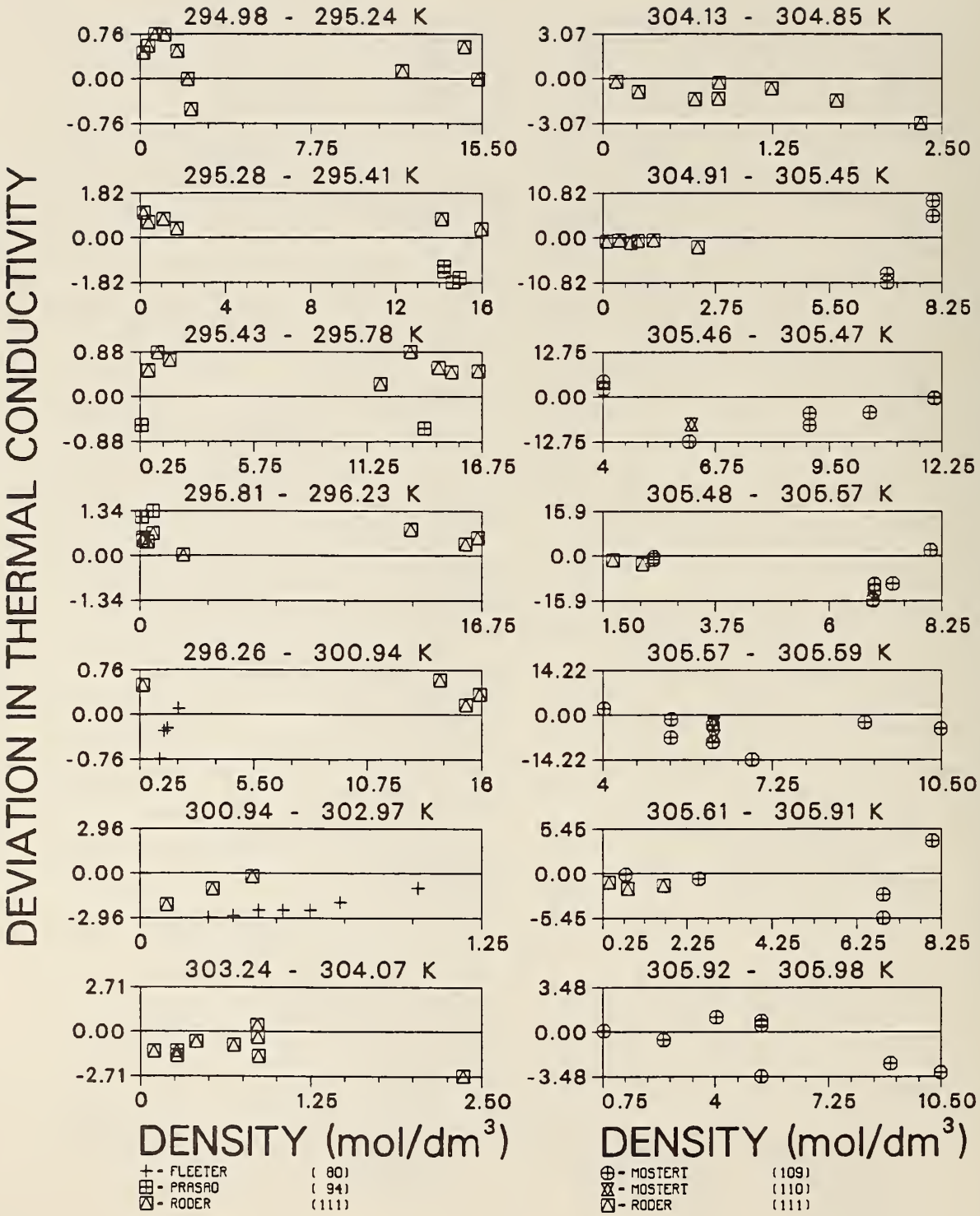


Figure A15. (continued)

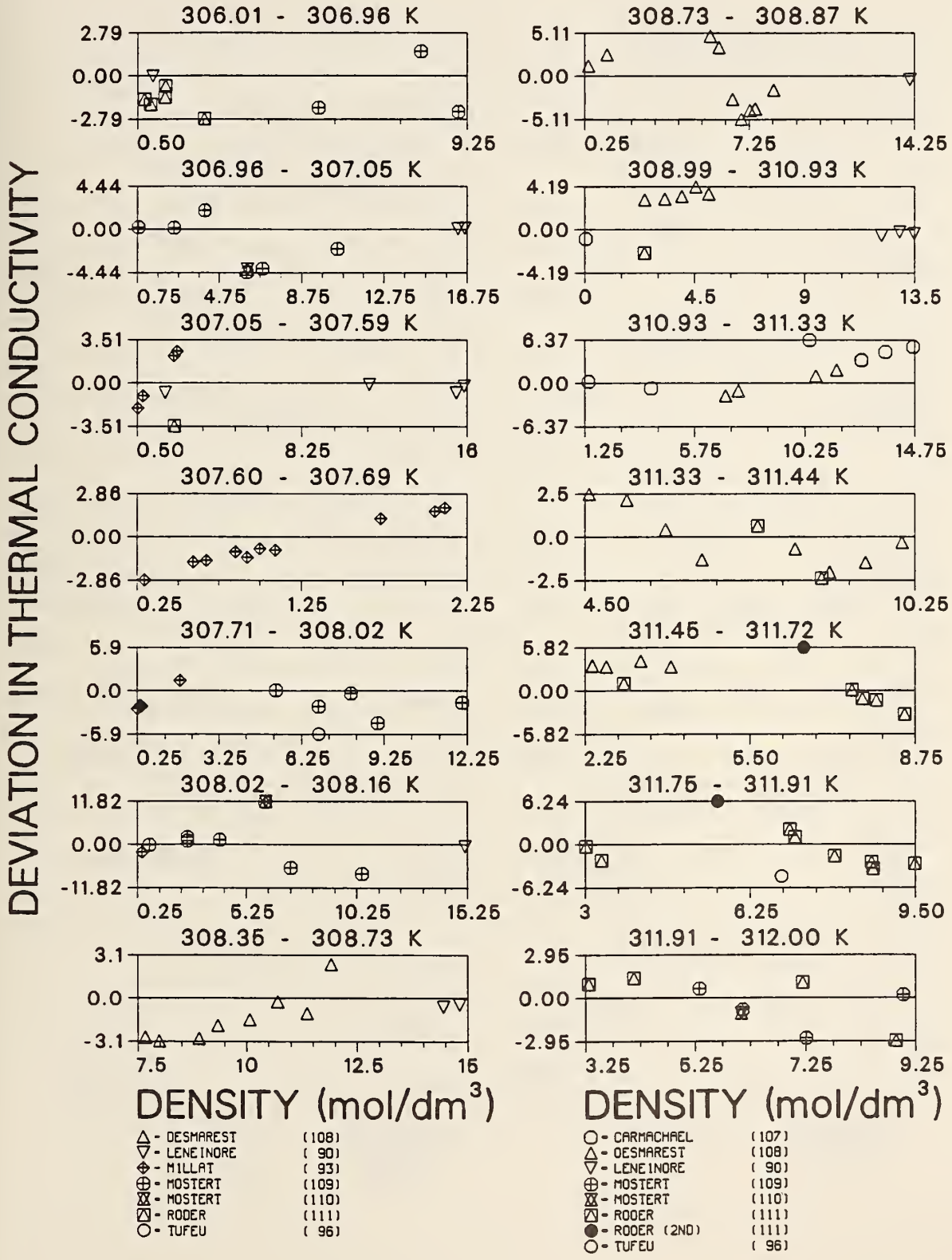


Figure A15. (continued)

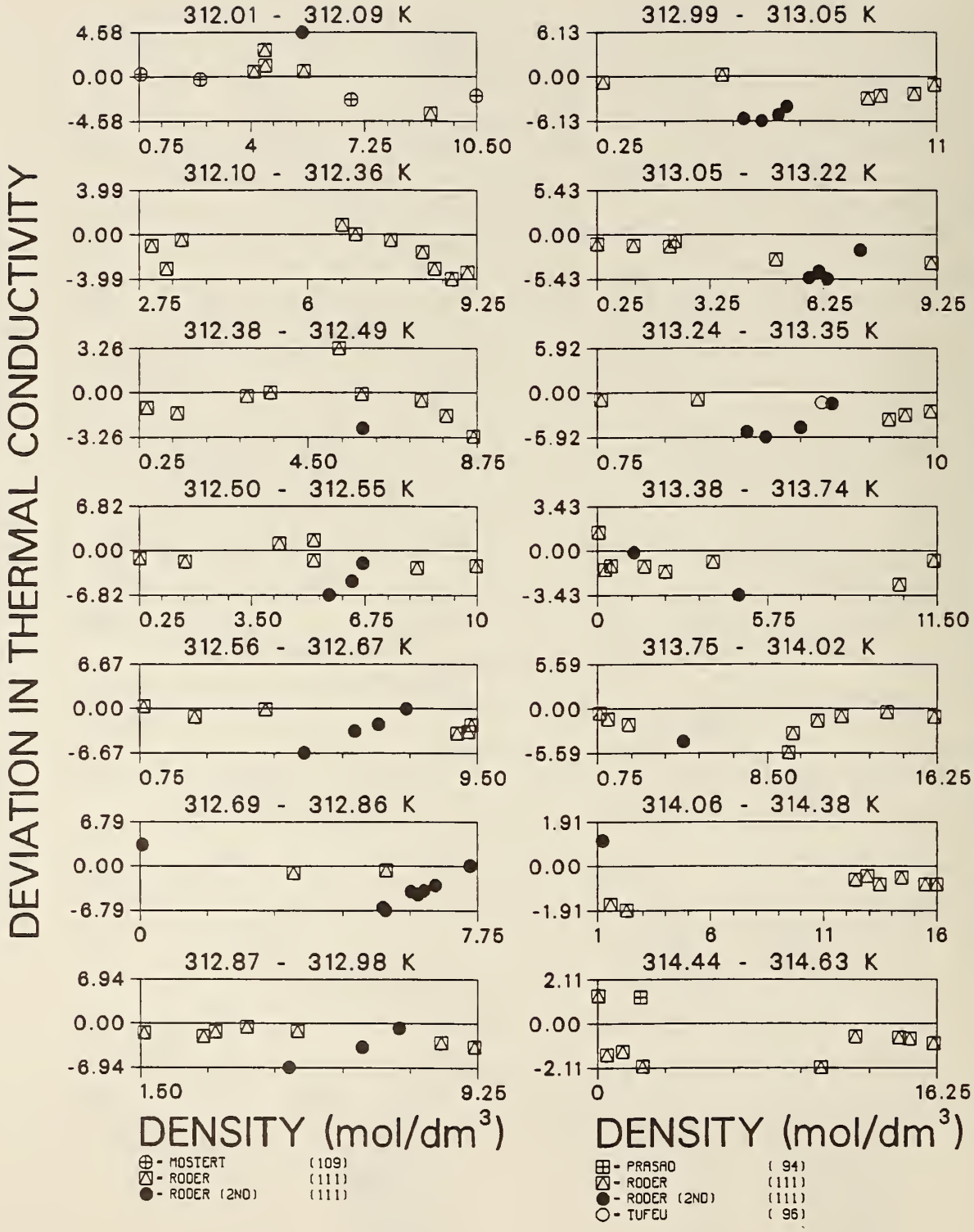


Figure A15. (continued)

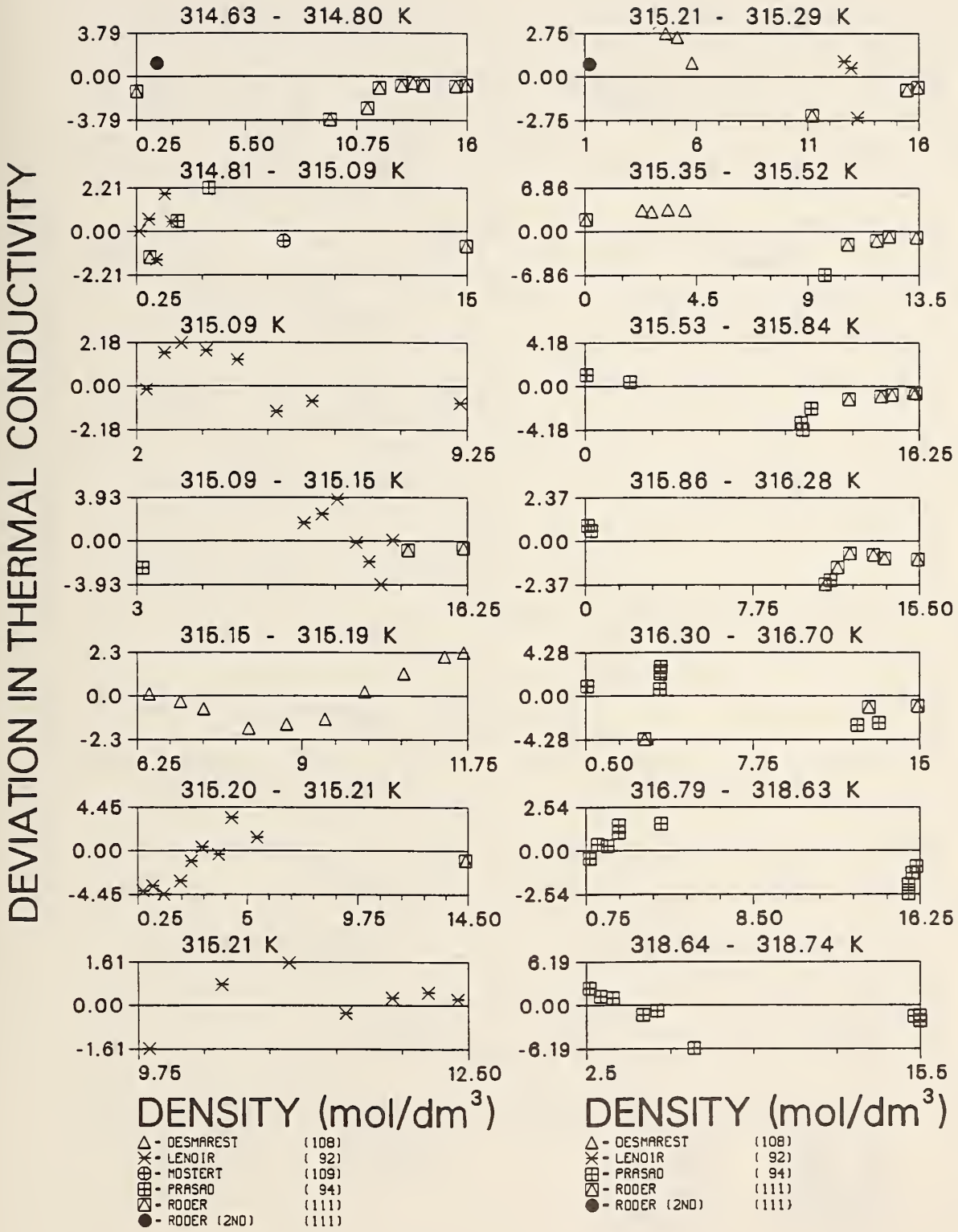


Figure A15. (continued)

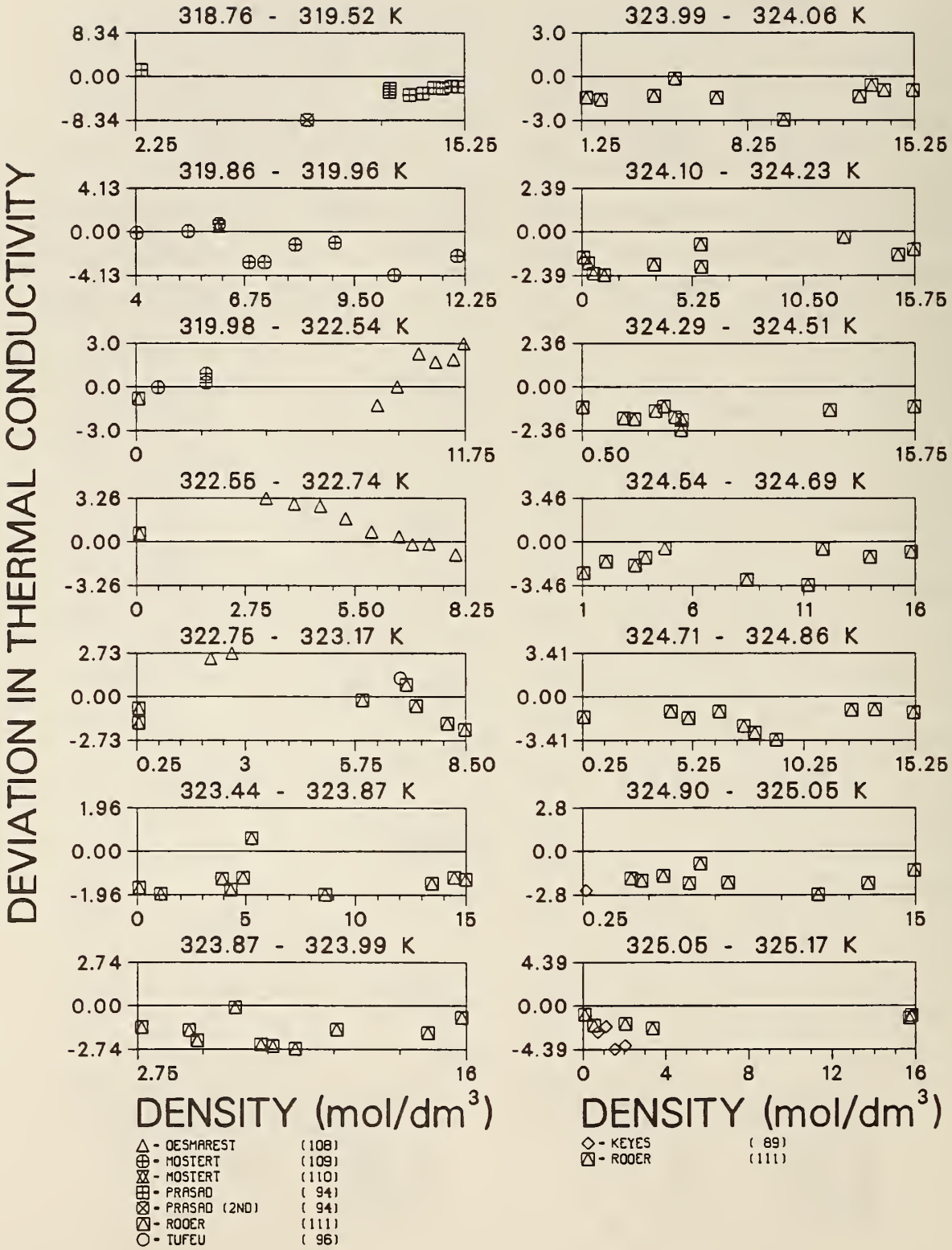


Figure A15. (continued)

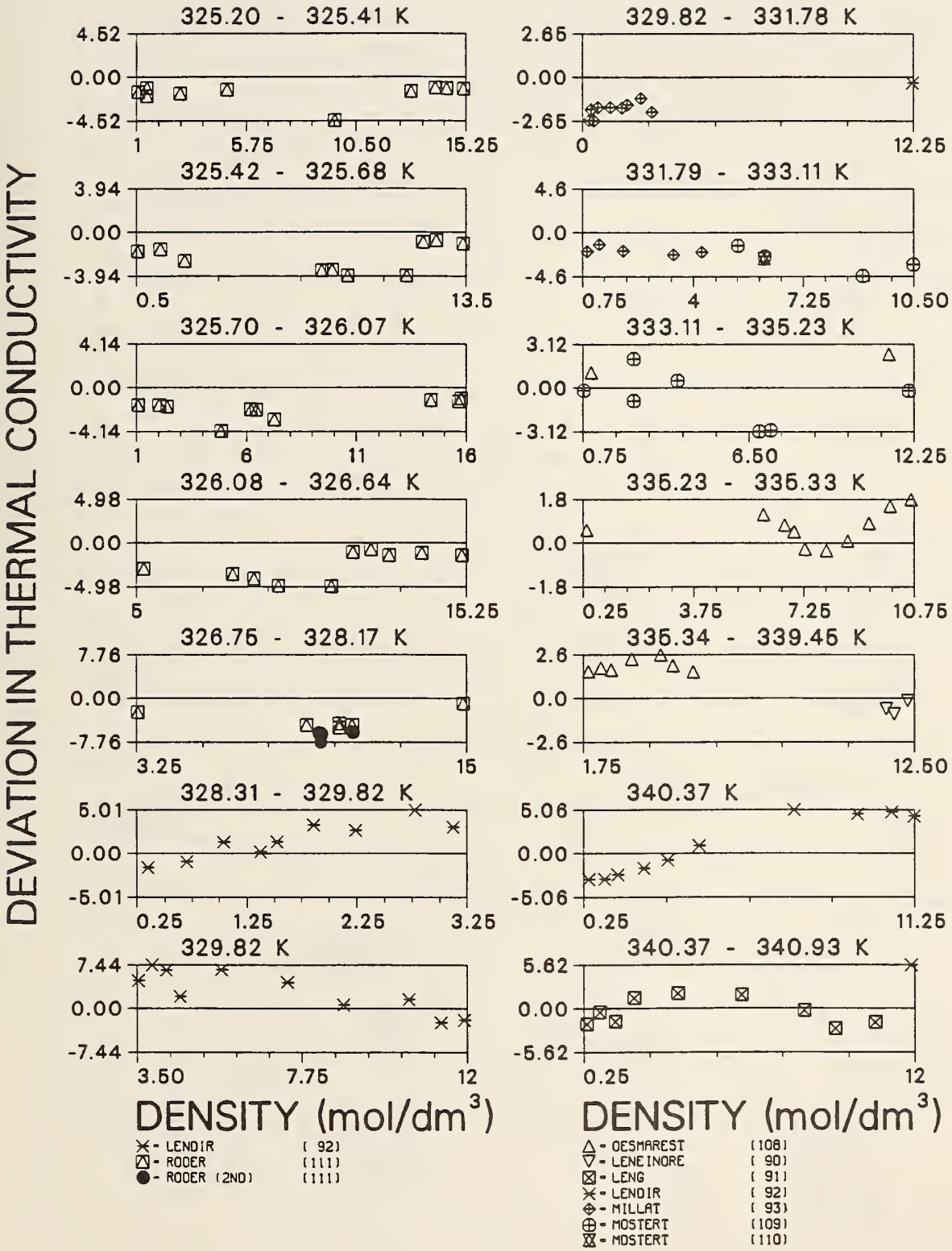


Figure A15. (continued)

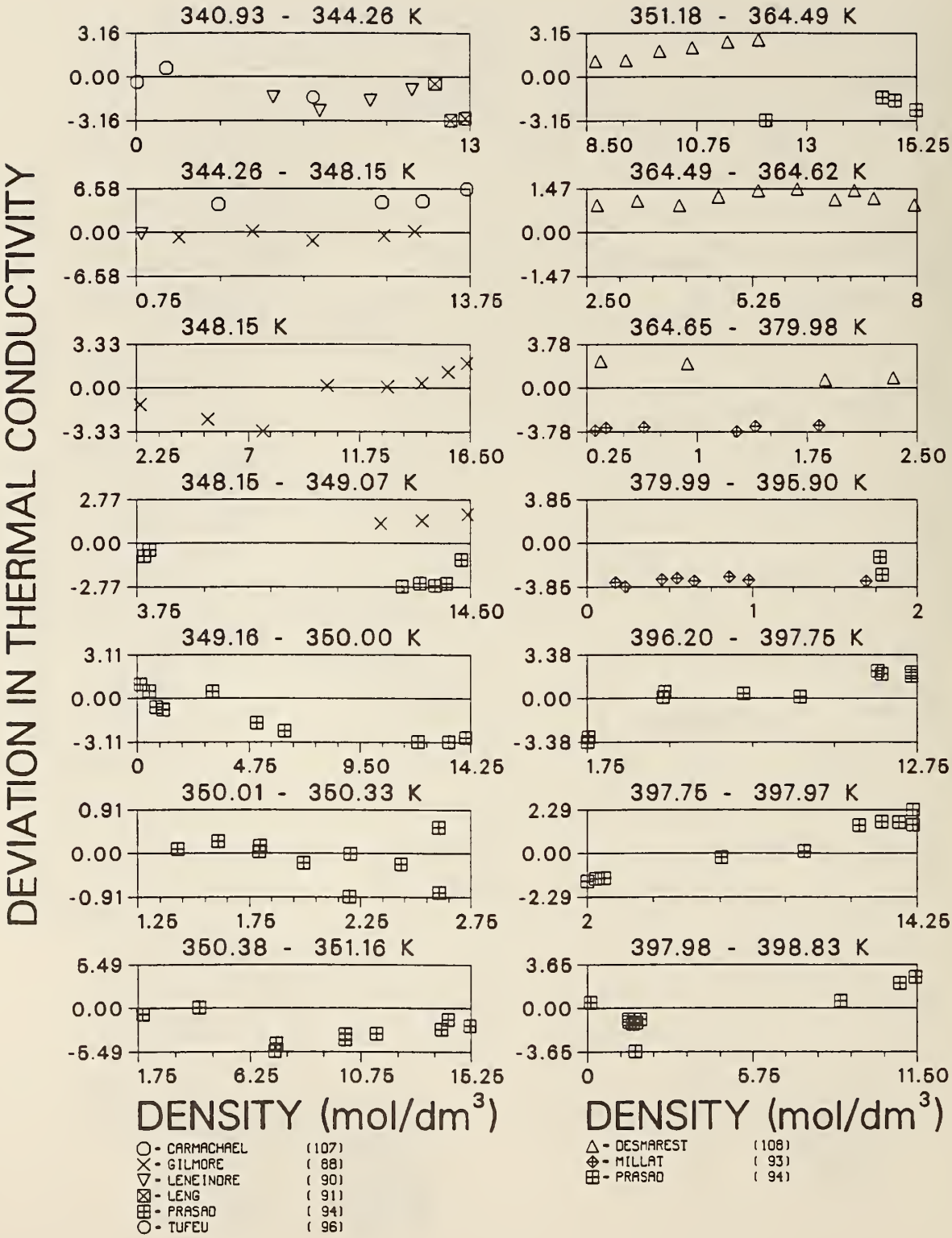


Figure A15. (continued)

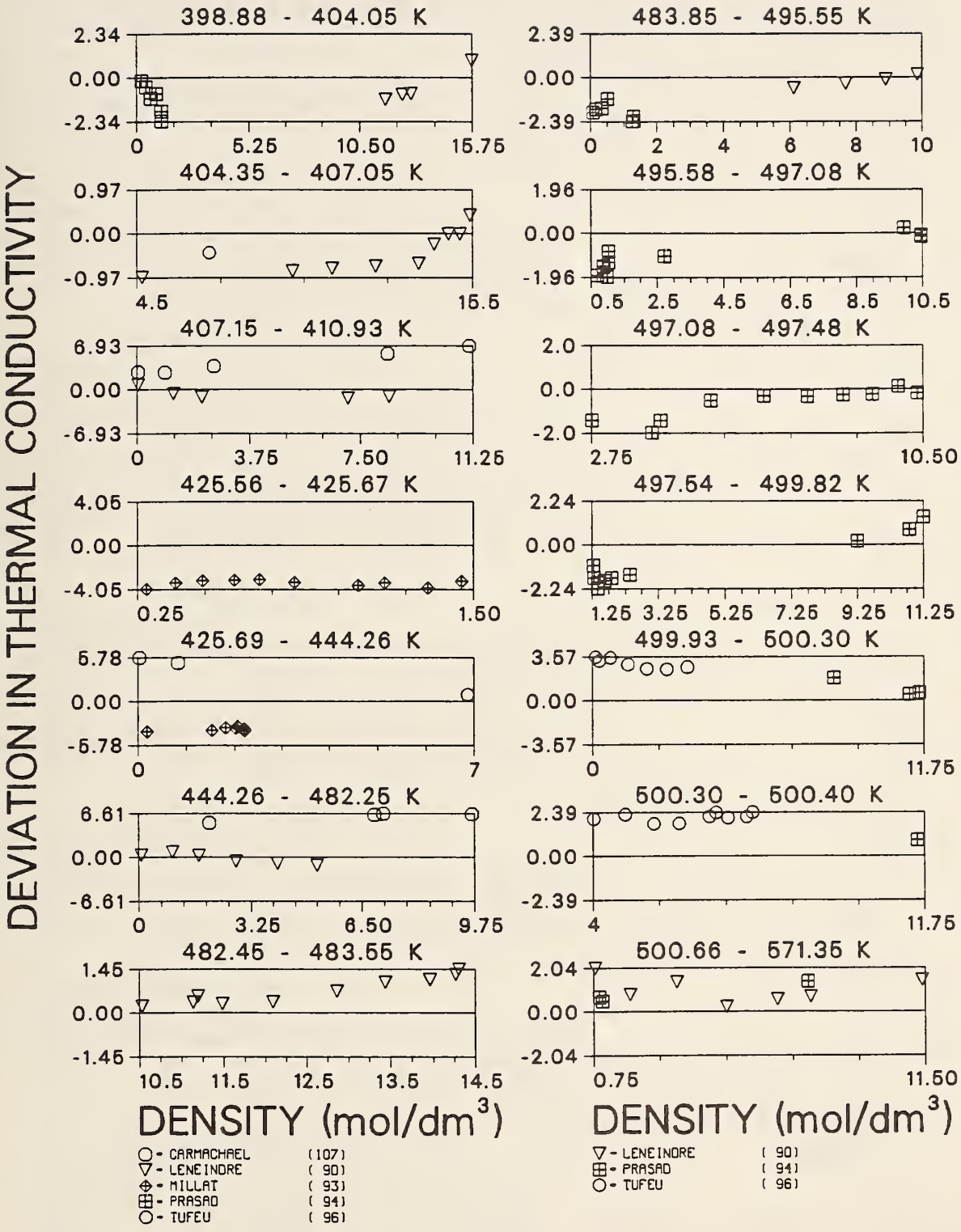


Figure A15. (continued)

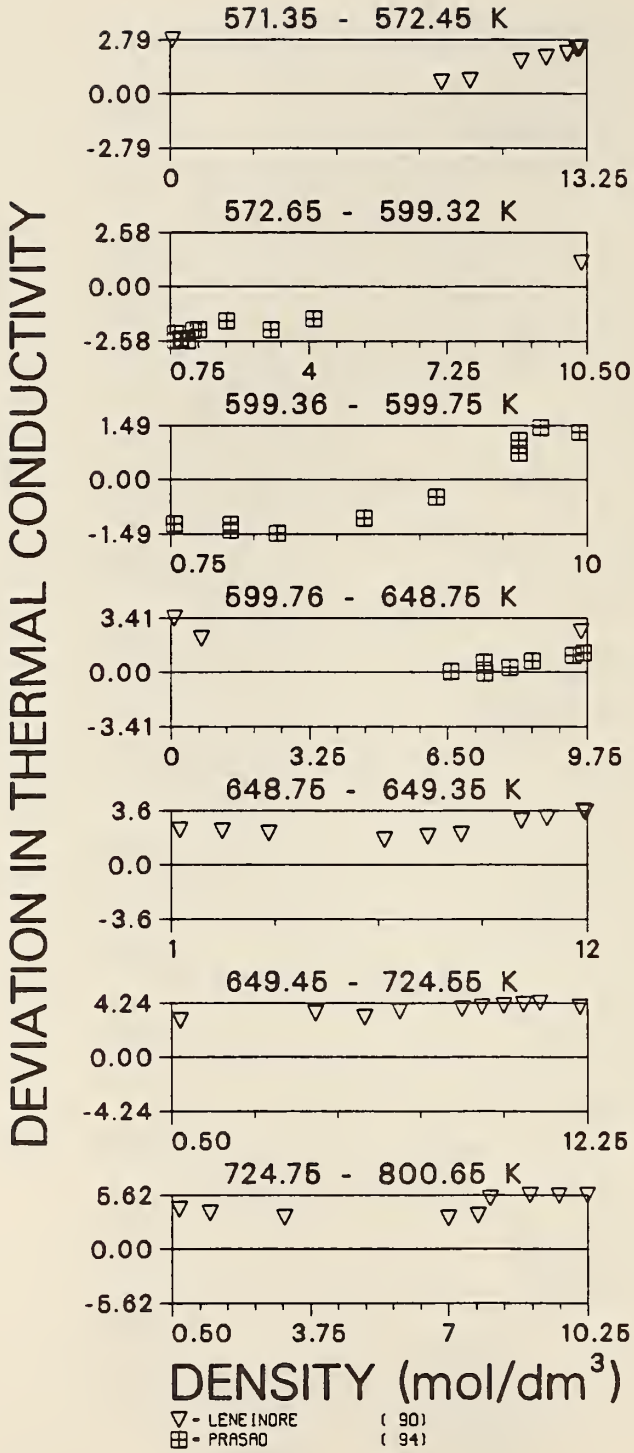


Figure A15. (continued)

Figure A15. Thermal conductivity at elevated pressures.
The comparisons are based on eqs (8), (11), (12), (14) and (15). Primary data were from Desmarest [108], Prasad [94], and Roder [111].

Statistical comparisons between tabulated values of the thermal conductivity and values calculated from eqs (8), (11), (12), (14) and (15) are given.

Data from Carmichael [107]
Number of Points: 31
Comparisons based on experimental pressures:
AAD% = 3.81 BIAS% = 3.51 RMS% = 2.59
AAD = 2.59 BIAS = 2.52 RMS = 1.99 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Desmarest [108]
Weighted Data:
Number of Points: 111
Comparisons based on experimental pressures:
AAD% = 1.85 BIAS% = 0.98 RMS% = 1.93
AAD = 1.03 BIAS = 0.39 RMS = 1.22 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.88 BIAS% = 1.08 RMS% = 2.04
AAD = 1.05 BIAS = 0.46 RMS = 1.28 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Fleeter [80]
Number of Points: 12
Comparisons based on experimental pressures:
AAD% = 1.60 BIAS% = -1.59 RMS% = 1.05
AAD = 0.37 BIAS = -0.37 RMS = 0.24 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.68 BIAS% = -1.68 RMS% = 0.95
AAD = 0.40 BIAS = -0.40 RMS = 0.21 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Gilmore [88]
Number of Points: 18
Comparisons based on experimental pressures:
AAD% = 1.80 BIAS% = 0.76 RMS% = 2.74
AAD = 2.55 BIAS = 2.00 RMS = 5.29 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Keyes [89]
Number of Points: 5
Comparisons based on experimental pressures:
AAD% = 3.12 BIAS% = -3.12 RMS% = 0.89
AAD = 0.91 BIAS = -0.91 RMS = 0.32 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Le Neindre [90]
Number of Points: 113
Comparisons based on experimental pressures:
AAD% = 1.63 BIAS% = 1.07 RMS% = 1.88
AAD = 1.74 BIAS = 1.34 RMS = 2.17 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.82 BIAS% = 0.09 RMS% = 3.25
AAD = 1.89 BIAS = 0.22 RMS = 3.02 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Leng [91]
Number of Points: 12
Comparisons based on experimental pressures:
AAD% = 1.71 BIAS% = -0.87 RMS% = 1.73
AAD = 1.05 BIAS = -0.70 RMS = 1.20 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Lenoir [92]
Number of Points: 75
Comparisons based on experimental pressures:
AAD% = 2.53 BIAS% = 0.26 RMS% = 3.36
AAD = 1.36 BIAS = 0.05 RMS = 2.01 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Millat [93]
These data were not available during the development of the correlations.
Number of Points: 64
Comparisons based on experimental pressures:
AAD% = 2.62 BIAS% = -2.28 RMS% = 1.60
AAD = 0.95 BIAS = -0.85 RMS = 0.65 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 2.61 BIAS% = -2.24 RMS% = 1.62
AAD = 0.94 BIAS = -0.84 RMS = 0.65 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Mostert [109]
These data were not available during the development of the correlations.
Number of Points: 102
Comparisons based on experimental densities:
AAD% = 3.81 BIAS% = -2.69 RMS% = 4.89
AAD = 4.69 BIAS = -3.95 RMS = 8.15 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Mostert [110]
These data were not available during the development of the correlations.
Number of Points: 9
Comparisons based on experimental pressures:
AAD% = 5.09 BIAS% = -2.36 RMS% = 5.77
AAD = 5.64 BIAS = -3.72 RMS = 6.09 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 6.55 BIAS% = -3.92 RMS% = 7.00
AAD = 7.79 BIAS = -5.94 RMS = 8.64 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Prasad [94]
Number of Points: 239
Comparisons based on experimental pressures:
AAD% = 1.67 BIAS% = -0.76 RMS% = 2.01
AAD = 1.22 BIAS = -0.74 RMS = 1.43 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.89 BIAS% = -0.58 RMS% = 2.55
AAD = 1.30 BIAS = -0.67 RMS = 1.61 $mW \cdot m^{-1} \cdot K^{-1}$

Weighted Data:
Number of Points: 235
Comparisons based on experimental pressures:
AAD% = 1.58 BIAS% = -0.83 RMS% = 1.75
AAD = 1.19 BIAS = -0.75 RMS = 1.37 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.78 BIAS% = -0.65 RMS% = 2.32
AAD = 1.26 BIAS = -0.68 RMS = 1.54 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Roder [111]
Number of Points: 797
Comparisons based on experimental pressures:
AAD% = 1.19 BIAS% = -0.76 RMS% = 1.60
AAD = 0.81 BIAS = -0.44 RMS = 1.13 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.19 BIAS% = -0.69 RMS% = 1.59
AAD = 0.84 BIAS = -0.40 RMS = 1.17 $mW \cdot m^{-1} \cdot K^{-1}$

Weighted Data:
Number of Points: 752
Comparisons based on experimental pressures:
AAD% = 1.01 BIAS% = -0.61 RMS% = 1.25
AAD = 0.70 BIAS = -0.33 RMS = 0.92 $mW \cdot m^{-1} \cdot K^{-1}$
Comparisons based on experimental densities:
AAD% = 1.03 BIAS% = -0.56 RMS% = 1.28
AAD = 0.74 BIAS = -0.30 RMS = 0.99 $mW \cdot m^{-1} \cdot K^{-1}$

Data from Tufeu [96]
Number of Points: 24
Comparisons based on experimental densities:
AAD% = 2.58 BIAS% = 0.92 RMS% = 2.78
AAD = 1.80 BIAS = 0.39 RMS = 2.21 $mW \cdot m^{-1} \cdot K^{-1}$

Appendix B: Tables for the thermophysical properties of ethane

Table B1. Properties of ideal gas at 0.1 MPa and dilute gas transport properties

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 90.352 | -14.007 | 3.042 | 180.39 | 35.182 | 3.04 | 2.91 |
| 91. | -14.130 | 3.065 | 180.64 | 35.216 | 3.06 | 2.94 |
| 92. | -14.319 | 3.101 | 181.03 | 35.269 | 3.09 | 3.00 |
| 93. | -14.508 | 3.136 | 181.41 | 35.322 | 3.12 | 3.06 |
| 94. | -14.698 | 3.171 | 181.79 | 35.375 | 3.15 | 3.11 |
| 95. | -14.889 | 3.207 | 182.16 | 35.428 | 3.17 | 3.17 |
| 96. | -15.079 | 3.242 | 182.53 | 35.482 | 3.20 | 3.23 |
| 97. | -15.270 | 3.278 | 182.90 | 35.535 | 3.23 | 3.28 |
| 98. | -15.462 | 3.313 | 183.27 | 35.589 | 3.26 | 3.34 |
| 99. | -15.654 | 3.349 | 183.63 | 35.643 | 3.29 | 3.40 |
| 100. | -15.846 | 3.384 | 183.99 | 35.698 | 3.32 | 3.46 |
| 101. | -16.038 | 3.420 | 184.34 | 35.752 | 3.34 | 3.51 |
| 102. | -16.231 | 3.456 | 184.69 | 35.807 | 3.37 | 3.57 |
| 103. | -16.424 | 3.492 | 185.04 | 35.861 | 3.40 | 3.63 |
| 104. | -16.618 | 3.528 | 185.39 | 35.916 | 3.43 | 3.69 |
| 105. | -16.812 | 3.564 | 185.73 | 35.971 | 3.46 | 3.75 |
| 106. | -17.006 | 3.600 | 186.08 | 36.027 | 3.49 | 3.81 |
| 107. | -17.200 | 3.636 | 186.41 | 36.082 | 3.52 | 3.86 |
| 108. | -17.395 | 3.672 | 186.75 | 36.137 | 3.55 | 3.92 |
| 109. | -17.590 | 3.708 | 187.08 | 36.193 | 3.57 | 3.98 |
| 110. | -17.786 | 3.744 | 187.41 | 36.249 | 3.60 | 4.04 |
| 111. | -17.982 | 3.780 | 187.74 | 36.305 | 3.63 | 4.10 |
| 112. | -18.178 | 3.817 | 188.07 | 36.361 | 3.66 | 4.16 |
| 113. | -18.375 | 3.853 | 188.39 | 36.418 | 3.69 | 4.22 |
| 114. | -18.572 | 3.890 | 188.71 | 36.474 | 3.72 | 4.28 |
| 115. | -18.769 | 3.926 | 189.03 | 36.531 | 3.75 | 4.34 |
| 116. | -18.966 | 3.963 | 189.35 | 36.588 | 3.78 | 4.41 |
| 117. | -19.164 | 3.999 | 189.66 | 36.645 | 3.81 | 4.47 |
| 118. | -19.362 | 4.036 | 189.97 | 36.702 | 3.84 | 4.53 |
| 119. | -19.561 | 4.073 | 190.28 | 36.759 | 3.87 | 4.59 |
| 120. | -19.759 | 4.109 | 190.59 | 36.817 | 3.90 | 4.65 |
| 121. | -19.958 | 4.146 | 190.90 | 36.874 | 3.93 | 4.71 |
| 122. | -20.158 | 4.183 | 191.20 | 36.932 | 3.96 | 4.78 |
| 123. | -20.357 | 4.220 | 191.50 | 36.990 | 3.99 | 4.84 |
| 124. | -20.557 | 4.257 | 191.80 | 37.048 | 4.01 | 4.90 |
| 125. | -20.758 | 4.294 | 192.10 | 37.107 | 4.04 | 4.96 |
| 126. | -20.958 | 4.331 | 192.40 | 37.165 | 4.07 | 5.03 |
| 127. | -21.159 | 4.369 | 192.69 | 37.224 | 4.10 | 5.09 |
| 128. | -21.360 | 4.406 | 192.98 | 37.283 | 4.13 | 5.15 |
| 129. | -21.562 | 4.443 | 193.27 | 37.342 | 4.16 | 5.22 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 130. | -21.763 | 4.480 | 193.56 | 37.401 | 4.19 | 5.28 |
| 131. | -21.965 | 4.518 | 193.85 | 37.460 | 4.22 | 5.35 |
| 132. | -22.168 | 4.555 | 194.13 | 37.520 | 4.25 | 5.41 |
| 133. | -22.370 | 4.593 | 194.42 | 37.579 | 4.28 | 5.48 |
| 134. | -22.573 | 4.631 | 194.70 | 37.639 | 4.31 | 5.54 |
| 135. | -22.776 | 4.668 | 194.98 | 37.699 | 4.34 | 5.61 |
| 136. | -22.980 | 4.706 | 195.26 | 37.760 | 4.37 | 5.67 |
| 137. | -23.184 | 4.744 | 195.53 | 37.820 | 4.41 | 5.74 |
| 138. | -23.388 | 4.782 | 195.81 | 37.881 | 4.44 | 5.81 |
| 139. | -23.592 | 4.820 | 196.08 | 37.942 | 4.47 | 5.87 |
| 140. | -23.796 | 4.857 | 196.36 | 38.003 | 4.50 | 5.94 |
| 141. | -24.001 | 4.896 | 196.63 | 38.065 | 4.53 | 6.01 |
| 142. | -24.206 | 4.934 | 196.90 | 38.126 | 4.56 | 6.07 |
| 143. | -24.412 | 4.972 | 197.16 | 38.188 | 4.59 | 6.14 |
| 144. | -24.617 | 5.010 | 197.43 | 38.250 | 4.62 | 6.21 |
| 145. | -24.823 | 5.048 | 197.69 | 38.312 | 4.65 | 6.28 |
| 146. | -25.029 | 5.087 | 197.96 | 38.375 | 4.68 | 6.35 |
| 147. | -25.236 | 5.125 | 198.22 | 38.438 | 4.71 | 6.42 |
| 148. | -25.442 | 5.163 | 198.48 | 38.501 | 4.74 | 6.48 |
| 149. | -25.649 | 5.202 | 198.74 | 38.564 | 4.77 | 6.55 |
| 150. | -25.856 | 5.241 | 199.00 | 38.628 | 4.80 | 6.62 |
| 151. | -26.064 | 5.279 | 199.26 | 38.692 | 4.83 | 6.69 |
| 152. | -26.271 | 5.318 | 199.51 | 38.756 | 4.86 | 6.76 |
| 153. | -26.479 | 5.357 | 199.77 | 38.820 | 4.89 | 6.83 |
| 154. | -26.688 | 5.396 | 200.02 | 38.885 | 4.92 | 6.90 |
| 155. | -26.896 | 5.435 | 200.27 | 38.950 | 4.96 | 6.98 |
| 156. | -27.105 | 5.474 | 200.52 | 39.015 | 4.99 | 7.05 |
| 157. | -27.314 | 5.513 | 200.77 | 39.080 | 5.02 | 7.12 |
| 158. | -27.523 | 5.552 | 201.02 | 39.146 | 5.05 | 7.19 |
| 159. | -27.732 | 5.591 | 201.27 | 39.212 | 5.08 | 7.26 |
| 160. | -27.942 | 5.630 | 201.51 | 39.279 | 5.11 | 7.33 |
| 161. | -28.152 | 5.669 | 201.76 | 39.345 | 5.14 | 7.41 |
| 162. | -28.362 | 5.709 | 202.00 | 39.413 | 5.17 | 7.48 |
| 163. | -28.573 | 5.748 | 202.24 | 39.480 | 5.20 | 7.55 |
| 164. | -28.783 | 5.788 | 202.49 | 39.548 | 5.23 | 7.63 |
| 165. | -28.994 | 5.827 | 202.73 | 39.616 | 5.26 | 7.70 |
| 166. | -29.205 | 5.867 | 202.97 | 39.684 | 5.30 | 7.78 |
| 167. | -29.417 | 5.907 | 203.20 | 39.753 | 5.33 | 7.85 |
| 168. | -29.629 | 5.947 | 203.44 | 39.822 | 5.36 | 7.92 |
| 169. | -29.840 | 5.986 | 203.68 | 39.891 | 5.39 | 8.00 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 170. | -30.053 | 6.026 | 203.91 | 39.961 | 5.42 | 8.08 |
| 171. | -30.265 | 6.066 | 204.15 | 40.031 | 5.45 | 8.15 |
| 172. | -30.477 | 6.106 | 204.38 | 40.102 | 5.48 | 8.23 |
| 173. | -30.690 | 6.146 | 204.61 | 40.173 | 5.51 | 8.30 |
| 174. | -30.903 | 6.187 | 204.85 | 40.244 | 5.54 | 8.38 |
| 175. | -31.117 | 6.227 | 205.08 | 40.316 | 5.57 | 8.46 |
| 176. | -31.330 | 6.267 | 205.31 | 40.388 | 5.61 | 8.53 |
| 177. | -31.544 | 6.308 | 205.54 | 40.460 | 5.64 | 8.61 |
| 178. | -31.758 | 6.348 | 205.76 | 40.533 | 5.67 | 8.69 |
| 179. | -31.972 | 6.389 | 205.99 | 40.606 | 5.70 | 8.77 |
| 180. | -32.186 | 6.429 | 206.22 | 40.680 | 5.73 | 8.85 |
| 181. | -32.401 | 6.470 | 206.44 | 40.754 | 5.76 | 8.92 |
| 182. | -32.616 | 6.511 | 206.67 | 40.829 | 5.79 | 9.00 |
| 183. | -32.831 | 6.552 | 206.89 | 40.903 | 5.82 | 9.08 |
| 184. | -33.046 | 6.593 | 207.12 | 40.979 | 5.85 | 9.16 |
| 185. | -33.262 | 6.634 | 207.34 | 41.054 | 5.89 | 9.24 |
| 186. | -33.478 | 6.675 | 207.56 | 41.131 | 5.92 | 9.32 |
| 187. | -33.694 | 6.716 | 207.78 | 41.207 | 5.95 | 9.40 |
| 188. | -33.910 | 6.757 | 208.00 | 41.284 | 5.98 | 9.49 |
| 189. | -34.126 | 6.799 | 208.22 | 41.362 | 6.01 | 9.57 |
| 190. | -34.343 | 6.840 | 208.44 | 41.439 | 6.04 | 9.65 |
| 191. | -34.560 | 6.882 | 208.66 | 41.518 | 6.07 | 9.73 |
| 192. | -34.777 | 6.923 | 208.87 | 41.597 | 6.10 | 9.81 |
| 193. | -34.994 | 6.965 | 209.09 | 41.676 | 6.13 | 9.90 |
| 194. | -35.212 | 7.006 | 209.30 | 41.755 | 6.17 | 9.98 |
| 195. | -35.429 | 7.048 | 209.52 | 41.836 | 6.20 | 10.06 |
| 196. | -35.647 | 7.090 | 209.73 | 41.916 | 6.23 | 10.15 |
| 197. | -35.865 | 7.132 | 209.95 | 41.997 | 6.26 | 10.23 |
| 198. | -36.084 | 7.174 | 210.16 | 42.079 | 6.29 | 10.32 |
| 199. | -36.302 | 7.216 | 210.37 | 42.160 | 6.32 | 10.40 |
| 200. | -36.521 | 7.258 | 210.58 | 42.243 | 6.35 | 10.49 |
| 201. | -36.740 | 7.301 | 210.79 | 42.326 | 6.38 | 10.57 |
| 202. | -36.959 | 7.343 | 211.00 | 42.409 | 6.41 | 10.66 |
| 203. | -37.179 | 7.386 | 211.21 | 42.493 | 6.45 | 10.75 |
| 204. | -37.398 | 7.428 | 211.42 | 42.577 | 6.48 | 10.83 |
| 205. | -37.618 | 7.471 | 211.63 | 42.662 | 6.51 | 10.92 |
| 206. | -37.838 | 7.513 | 211.84 | 42.747 | 6.54 | 11.01 |
| 207. | -38.059 | 7.556 | 212.05 | 42.833 | 6.57 | 11.10 |
| 208. | -38.279 | 7.599 | 212.25 | 42.919 | 6.60 | 11.18 |
| 209. | -38.500 | 7.642 | 212.46 | 43.005 | 6.63 | 11.27 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 210. | -38.721 | 7.685 | 212.66 | 43.092 | 6.66 | 11.36 |
| 211. | -38.942 | 7.728 | 212.87 | 43.180 | 6.69 | 11.45 |
| 212. | -39.163 | 7.771 | 213.07 | 43.268 | 6.72 | 11.54 |
| 213. | -39.384 | 7.815 | 213.28 | 43.357 | 6.76 | 11.63 |
| 214. | -39.606 | 7.858 | 213.48 | 43.445 | 6.79 | 11.72 |
| 215. | -39.828 | 7.902 | 213.68 | 43.535 | 6.82 | 11.81 |
| 216. | -40.050 | 7.945 | 213.89 | 43.625 | 6.85 | 11.91 |
| 217. | -40.272 | 7.989 | 214.09 | 43.715 | 6.88 | 12.00 |
| 218. | -40.495 | 8.033 | 214.29 | 43.806 | 6.91 | 12.09 |
| 219. | -40.718 | 8.076 | 214.49 | 43.898 | 6.94 | 12.18 |
| 220. | -40.941 | 8.120 | 214.69 | 43.989 | 6.97 | 12.28 |
| 221. | -41.164 | 8.164 | 214.89 | 44.082 | 7.00 | 12.37 |
| 222. | -41.387 | 8.209 | 215.09 | 44.174 | 7.03 | 12.46 |
| 223. | -41.611 | 8.253 | 215.29 | 44.268 | 7.06 | 12.56 |
| 224. | -41.834 | 8.297 | 215.49 | 44.361 | 7.10 | 12.65 |
| 225. | -42.058 | 8.342 | 215.68 | 44.456 | 7.13 | 12.75 |
| 226. | -42.282 | 8.386 | 215.88 | 44.550 | 7.16 | 12.84 |
| 227. | -42.507 | 8.431 | 216.08 | 44.645 | 7.19 | 12.94 |
| 228. | -42.731 | 8.475 | 216.27 | 44.741 | 7.22 | 13.04 |
| 229. | -42.956 | 8.520 | 216.47 | 44.837 | 7.25 | 13.13 |
| 230. | -43.181 | 8.565 | 216.67 | 44.934 | 7.28 | 13.23 |
| 231. | -43.406 | 8.610 | 216.86 | 45.031 | 7.31 | 13.33 |
| 232. | -43.631 | 8.655 | 217.06 | 45.128 | 7.34 | 13.43 |
| 233. | -43.856 | 8.700 | 217.25 | 45.226 | 7.37 | 13.52 |
| 234. | -44.082 | 8.745 | 217.44 | 45.324 | 7.40 | 13.62 |
| 235. | -44.308 | 8.791 | 217.64 | 45.423 | 7.43 | 13.72 |
| 236. | -44.534 | 8.836 | 217.83 | 45.522 | 7.46 | 13.82 |
| 237. | -44.760 | 8.882 | 218.02 | 45.622 | 7.50 | 13.92 |
| 238. | -44.987 | 8.928 | 218.22 | 45.722 | 7.53 | 14.02 |
| 239. | -45.213 | 8.973 | 218.41 | 45.823 | 7.56 | 14.12 |
| 240. | -45.440 | 9.019 | 218.60 | 45.924 | 7.59 | 14.23 |
| 241. | -45.667 | 9.065 | 218.79 | 46.026 | 7.62 | 14.33 |
| 242. | -45.894 | 9.111 | 218.98 | 46.128 | 7.65 | 14.43 |
| 243. | -46.122 | 9.157 | 219.17 | 46.230 | 7.68 | 14.53 |
| 244. | -46.349 | 9.204 | 219.36 | 46.333 | 7.71 | 14.64 |
| 245. | -46.577 | 9.250 | 219.55 | 46.436 | 7.74 | 14.74 |
| 246. | -46.805 | 9.297 | 219.74 | 46.540 | 7.77 | 14.84 |
| 247. | -47.033 | 9.343 | 219.93 | 46.644 | 7.80 | 14.95 |
| 248. | -47.261 | 9.390 | 220.12 | 46.749 | 7.83 | 15.05 |
| 249. | -47.490 | 9.437 | 220.31 | 46.854 | 7.86 | 15.16 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 250. | -47.719 | 9.484 | 220.49 | 46.959 | 7.89 | 15.26 |
| 251. | -47.948 | 9.531 | 220.68 | 47.065 | 7.92 | 15.37 |
| 252. | -48.177 | 9.578 | 220.87 | 47.171 | 7.95 | 15.48 |
| 253. | -48.406 | 9.625 | 221.06 | 47.278 | 7.98 | 15.58 |
| 254. | -48.635 | 9.672 | 221.24 | 47.385 | 8.01 | 15.69 |
| 255. | -48.865 | 9.720 | 221.43 | 47.493 | 8.04 | 15.80 |
| 256. | -49.095 | 9.767 | 221.62 | 47.600 | 8.07 | 15.91 |
| 257. | -49.325 | 9.815 | 221.80 | 47.709 | 8.10 | 16.02 |
| 258. | -49.555 | 9.863 | 221.99 | 47.817 | 8.14 | 16.13 |
| 259. | -49.786 | 9.911 | 222.17 | 47.926 | 8.17 | 16.24 |
| 260. | -50.016 | 9.959 | 222.36 | 48.036 | 8.20 | 16.35 |
| 261. | -50.247 | 10.007 | 222.54 | 48.146 | 8.23 | 16.46 |
| 262. | -50.478 | 10.055 | 222.73 | 48.256 | 8.26 | 16.57 |
| 263. | -50.709 | 10.103 | 222.91 | 48.367 | 8.29 | 16.68 |
| 264. | -50.940 | 10.152 | 223.09 | 48.478 | 8.32 | 16.79 |
| 265. | -51.172 | 10.200 | 223.28 | 48.589 | 8.35 | 16.90 |
| 266. | -51.403 | 10.249 | 223.46 | 48.701 | 8.38 | 17.02 |
| 267. | -51.635 | 10.298 | 223.64 | 48.813 | 8.41 | 17.13 |
| 268. | -51.867 | 10.346 | 223.83 | 48.925 | 8.44 | 17.25 |
| 269. | -52.100 | 10.395 | 224.01 | 49.038 | 8.47 | 17.36 |
| 270. | -52.332 | 10.444 | 224.19 | 49.151 | 8.50 | 17.47 |
| 271. | -52.565 | 10.494 | 224.37 | 49.265 | 8.53 | 17.59 |
| 272. | -52.797 | 10.543 | 224.55 | 49.379 | 8.56 | 17.71 |
| 273. | -53.030 | 10.592 | 224.74 | 49.493 | 8.59 | 17.82 |
| 273.150 | -53.065 | 10.600 | 224.76 | 49.510 | 8.59 | 17.84 |
| 274. | -53.264 | 10.642 | 224.92 | 49.608 | 8.62 | 17.94 |
| 275. | -53.497 | 10.692 | 225.10 | 49.723 | 8.65 | 18.05 |
| 276. | -53.730 | 10.741 | 225.28 | 49.838 | 8.68 | 18.17 |
| 277. | -53.964 | 10.791 | 225.46 | 49.953 | 8.71 | 18.29 |
| 278. | -54.198 | 10.841 | 225.64 | 50.069 | 8.74 | 18.41 |
| 279. | -54.432 | 10.891 | 225.82 | 50.185 | 8.77 | 18.53 |
| 280. | -54.666 | 10.942 | 226.00 | 50.302 | 8.80 | 18.65 |
| 281. | -54.901 | 10.992 | 226.18 | 50.419 | 8.83 | 18.77 |
| 282. | -55.135 | 11.043 | 226.36 | 50.536 | 8.86 | 18.89 |
| 283. | -55.370 | 11.093 | 226.54 | 50.653 | 8.88 | 19.01 |
| 284. | -55.605 | 11.144 | 226.72 | 50.771 | 8.91 | 19.13 |
| 285. | -55.840 | 11.195 | 226.89 | 50.889 | 8.94 | 19.25 |
| 286. | -56.075 | 11.246 | 227.07 | 51.007 | 8.97 | 19.37 |
| 287. | -56.311 | 11.297 | 227.25 | 51.126 | 9.00 | 19.49 |
| 288. | -56.546 | 11.348 | 227.43 | 51.245 | 9.03 | 19.62 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 289. | -56.782 | 11.399 | 227.61 | 51.364 | 9.06 | 19.74 |
| 290. | -57.018 | 11.451 | 227.79 | 51.484 | 9.09 | 19.86 |
| 291. | -57.254 | 11.502 | 227.96 | 51.603 | 9.12 | 19.99 |
| 292. | -57.491 | 11.554 | 228.14 | 51.723 | 9.15 | 20.11 |
| 293. | -57.727 | 11.606 | 228.32 | 51.844 | 9.18 | 20.24 |
| 294. | -57.964 | 11.657 | 228.49 | 51.964 | 9.21 | 20.36 |
| 295. | -58.201 | 11.710 | 228.67 | 52.085 | 9.24 | 20.49 |
| 296. | -58.438 | 11.762 | 228.85 | 52.206 | 9.27 | 20.62 |
| 297. | -58.675 | 11.814 | 229.02 | 52.327 | 9.30 | 20.74 |
| 298. | -58.913 | 11.866 | 229.20 | 52.449 | 9.33 | 20.87 |
| 298.150 | -58.948 | 11.874 | 229.23 | 52.467 | 9.33 | 20.89 |
| 299. | -59.150 | 11.919 | 229.37 | 52.571 | 9.36 | 21.00 |
| 300. | -59.388 | 11.971 | 229.55 | 52.693 | 9.39 | 21.13 |
| 301. | -59.626 | 12.024 | 229.73 | 52.815 | 9.42 | 21.25 |
| 302. | -59.864 | 12.077 | 229.90 | 52.938 | 9.44 | 21.38 |
| 303. | -60.102 | 12.130 | 230.08 | 53.060 | 9.47 | 21.51 |
| 304. | -60.341 | 12.183 | 230.25 | 53.183 | 9.50 | 21.64 |
| 305. | -60.580 | 12.236 | 230.43 | 53.307 | 9.53 | 21.77 |
| 305.330 | -60.658 | 12.254 | 230.48 | 53.347 | 9.54 | 21.82 |
| 306. | -60.818 | 12.290 | 230.60 | 53.430 | 9.56 | 21.90 |
| 307. | -61.057 | 12.343 | 230.78 | 53.554 | 9.59 | 22.04 |
| 308. | -61.297 | 12.397 | 230.95 | 53.677 | 9.62 | 22.17 |
| 309. | -61.536 | 12.451 | 231.12 | 53.801 | 9.65 | 22.30 |
| 310. | -61.776 | 12.505 | 231.30 | 53.926 | 9.68 | 22.43 |
| 311. | -62.015 | 12.559 | 231.47 | 54.050 | 9.71 | 22.56 |
| 312. | -62.255 | 12.613 | 231.65 | 54.175 | 9.74 | 22.70 |
| 313. | -62.495 | 12.667 | 231.82 | 54.299 | 9.77 | 22.83 |
| 314. | -62.735 | 12.721 | 231.99 | 54.424 | 9.79 | 22.97 |
| 315. | -62.976 | 12.776 | 232.17 | 54.549 | 9.82 | 23.10 |
| 316. | -63.216 | 12.830 | 232.34 | 54.675 | 9.85 | 23.24 |
| 317. | -63.457 | 12.885 | 232.51 | 54.800 | 9.88 | 23.37 |
| 318. | -63.698 | 12.940 | 232.69 | 54.926 | 9.91 | 23.51 |
| 319. | -63.939 | 12.995 | 232.86 | 55.052 | 9.94 | 23.64 |
| 320. | -64.180 | 13.050 | 233.03 | 55.178 | 9.97 | 23.78 |
| 321. | -64.422 | 13.105 | 233.20 | 55.304 | 10.00 | 23.92 |
| 322. | -64.663 | 13.161 | 233.37 | 55.430 | 10.03 | 24.05 |
| 323. | -64.905 | 13.216 | 233.55 | 55.557 | 10.05 | 24.19 |
| 324. | -65.147 | 13.272 | 233.72 | 55.683 | 10.08 | 24.33 |
| 325. | -65.389 | 13.328 | 233.89 | 55.810 | 10.11 | 24.47 |
| 326. | -65.631 | 13.383 | 234.06 | 55.937 | 10.14 | 24.61 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 327. | -65.874 | 13.439 | 234.23 | 56.064 | 10.17 | 24.75 |
| 328. | -66.117 | 13.496 | 234.41 | 56.191 | 10.20 | 24.89 |
| 329. | -66.359 | 13.552 | 234.58 | 56.319 | 10.23 | 25.03 |
| 330. | -66.602 | 13.608 | 234.75 | 56.446 | 10.25 | 25.17 |
| 331. | -66.845 | 13.665 | 234.92 | 56.574 | 10.28 | 25.31 |
| 332. | -67.089 | 13.721 | 235.09 | 56.701 | 10.31 | 25.45 |
| 333. | -67.332 | 13.778 | 235.26 | 56.829 | 10.34 | 25.59 |
| 334. | -67.576 | 13.835 | 235.43 | 56.957 | 10.37 | 25.74 |
| 335. | -67.820 | 13.892 | 235.60 | 57.085 | 10.40 | 25.88 |
| 336. | -68.064 | 13.949 | 235.77 | 57.213 | 10.43 | 26.02 |
| 337. | -68.308 | 14.006 | 235.94 | 57.341 | 10.45 | 26.17 |
| 338. | -68.552 | 14.064 | 236.11 | 57.470 | 10.48 | 26.31 |
| 339. | -68.797 | 14.121 | 236.28 | 57.598 | 10.51 | 26.46 |
| 340. | -69.042 | 14.179 | 236.45 | 57.727 | 10.54 | 26.60 |
| 341. | -69.286 | 14.237 | 236.62 | 57.855 | 10.57 | 26.75 |
| 342. | -69.531 | 14.295 | 236.79 | 57.984 | 10.60 | 26.89 |
| 343. | -69.777 | 14.353 | 236.96 | 58.113 | 10.62 | 27.04 |
| 344. | -70.022 | 14.411 | 237.13 | 58.242 | 10.65 | 27.18 |
| 345. | -70.267 | 14.469 | 237.30 | 58.371 | 10.68 | 27.33 |
| 346. | -70.513 | 14.528 | 237.47 | 58.500 | 10.71 | 27.48 |
| 347. | -70.759 | 14.586 | 237.64 | 58.629 | 10.74 | 27.63 |
| 348. | -71.005 | 14.645 | 237.81 | 58.758 | 10.76 | 27.77 |
| 349. | -71.251 | 14.704 | 237.97 | 58.887 | 10.79 | 27.92 |
| 350. | -71.498 | 14.763 | 238.14 | 59.017 | 10.82 | 28.07 |
| 351. | -71.744 | 14.822 | 238.31 | 59.146 | 10.85 | 28.22 |
| 352. | -71.991 | 14.881 | 238.48 | 59.276 | 10.88 | 28.37 |
| 353. | -72.238 | 14.940 | 238.65 | 59.405 | 10.90 | 28.52 |
| 354. | -72.485 | 15.000 | 238.82 | 59.535 | 10.93 | 28.67 |
| 355. | -72.732 | 15.059 | 238.99 | 59.664 | 10.96 | 28.82 |
| 356. | -72.979 | 15.119 | 239.15 | 59.794 | 10.99 | 28.97 |
| 357. | -73.227 | 15.179 | 239.32 | 59.923 | 11.02 | 29.12 |
| 358. | -73.475 | 15.239 | 239.49 | 60.053 | 11.04 | 29.27 |
| 359. | -73.723 | 15.299 | 239.66 | 60.183 | 11.07 | 29.43 |
| 360. | -73.971 | 15.359 | 239.82 | 60.313 | 11.10 | 29.58 |
| 361. | -74.219 | 15.420 | 239.99 | 60.443 | 11.13 | 29.73 |
| 362. | -74.467 | 15.480 | 240.16 | 60.572 | 11.16 | 29.88 |
| 363. | -74.716 | 15.541 | 240.33 | 60.702 | 11.18 | 30.04 |
| 364. | -74.965 | 15.602 | 240.49 | 60.832 | 11.21 | 30.19 |
| 365. | -75.213 | 15.663 | 240.66 | 60.962 | 11.24 | 30.34 |
| 366. | -75.462 | 15.724 | 240.83 | 61.092 | 11.27 | 30.50 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 367. | -75.712 | 15.785 | 240.99 | 61.222 | 11.29 | 30.65 |
| 368. | -75.961 | 15.846 | 241.16 | 61.352 | 11.32 | 30.81 |
| 369. | -76.211 | 15.907 | 241.33 | 61.482 | 11.35 | 30.97 |
| 370. | -76.460 | 15.969 | 241.49 | 61.612 | 11.38 | 31.12 |
| 371. | -76.710 | 16.031 | 241.66 | 61.742 | 11.40 | 31.28 |
| 372. | -76.960 | 16.092 | 241.83 | 61.872 | 11.43 | 31.43 |
| 373. | -77.211 | 16.154 | 241.99 | 62.002 | 11.46 | 31.59 |
| 374. | -77.461 | 16.216 | 242.16 | 62.132 | 11.49 | 31.75 |
| 375. | -77.712 | 16.279 | 242.33 | 62.262 | 11.51 | 31.91 |
| 376. | -77.962 | 16.341 | 242.49 | 62.392 | 11.54 | 32.06 |
| 377. | -78.213 | 16.403 | 242.66 | 62.523 | 11.57 | 32.22 |
| 378. | -78.464 | 16.466 | 242.82 | 62.653 | 11.60 | 32.38 |
| 379. | -78.715 | 16.529 | 242.99 | 62.783 | 11.62 | 32.54 |
| 380. | -78.967 | 16.592 | 243.15 | 62.913 | 11.65 | 32.70 |
| 381. | -79.218 | 16.655 | 243.32 | 63.043 | 11.68 | 32.86 |
| 382. | -79.470 | 16.718 | 243.49 | 63.173 | 11.71 | 33.02 |
| 383. | -79.722 | 16.781 | 243.65 | 63.302 | 11.73 | 33.18 |
| 384. | -79.974 | 16.844 | 243.82 | 63.432 | 11.76 | 33.34 |
| 385. | -80.226 | 16.908 | 243.98 | 63.562 | 11.79 | 33.50 |
| 386. | -80.479 | 16.971 | 244.15 | 63.692 | 11.81 | 33.66 |
| 387. | -80.731 | 17.035 | 244.31 | 63.822 | 11.84 | 33.82 |
| 388. | -80.984 | 17.099 | 244.48 | 63.952 | 11.87 | 33.99 |
| 389. | -81.237 | 17.163 | 244.64 | 64.082 | 11.90 | 34.15 |
| 390. | -81.490 | 17.227 | 244.81 | 64.212 | 11.92 | 34.31 |
| 391. | -81.743 | 17.292 | 244.97 | 64.341 | 11.95 | 34.47 |
| 392. | -81.996 | 17.356 | 245.14 | 64.471 | 11.98 | 34.64 |
| 393. | -82.250 | 17.420 | 245.30 | 64.601 | 12.00 | 34.80 |
| 394. | -82.504 | 17.485 | 245.46 | 64.730 | 12.03 | 34.96 |
| 395. | -82.757 | 17.550 | 245.63 | 64.860 | 12.06 | 35.13 |
| 396. | -83.011 | 17.615 | 245.79 | 64.989 | 12.08 | 35.29 |
| 397. | -83.266 | 17.680 | 245.96 | 65.119 | 12.11 | 35.46 |
| 398. | -83.520 | 17.745 | 246.12 | 65.248 | 12.14 | 35.62 |
| 399. | -83.774 | 17.810 | 246.28 | 65.378 | 12.17 | 35.79 |
| 400. | -84.029 | 17.876 | 246.45 | 65.507 | 12.19 | 35.95 |
| 405. | -85.305 | 18.205 | 247.27 | 66.153 | 12.33 | 36.79 |
| 410. | -86.585 | 18.537 | 248.08 | 66.798 | 12.46 | 37.63 |
| 415. | -87.869 | 18.873 | 248.89 | 67.441 | 12.59 | 38.47 |
| 420. | -89.157 | 19.212 | 249.71 | 68.082 | 12.72 | 39.33 |
| 425. | -90.449 | 19.554 | 250.52 | 68.720 | 12.86 | 40.19 |
| 430. | -91.745 | 19.899 | 251.32 | 69.357 | 12.99 | 41.05 |

Table B1. Properties of ideal gas... (continued)

| T | $A^{id}$ | $H^{id}$ | $S^{id}$ | $C_p^{id}$ | $\eta_o$ | $\lambda_o$ |
|---|---|---|---|---|---|---|
| K | $kJ \cdot mol^{-1}$ | $kJ \cdot mol^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 435. | -93.046 | 20.247 | 252.13 | 69.992 | 13.12 | 41.93 |
| 440. | -94.350 | 20.599 | 252.93 | 70.624 | 13.25 | 42.81 |
| 445. | -95.658 | 20.954 | 253.73 | 71.254 | 13.38 | 43.69 |
| 450. | -96.970 | 21.311 | 254.53 | 71.880 | 13.50 | 44.58 |
| 455. | -98.286 | 21.672 | 255.33 | 72.505 | 13.63 | 45.48 |
| 460. | -99.607 | 22.036 | 256.13 | 73.126 | 13.76 | 46.38 |
| 465. | -100.931 | 22.404 | 256.92 | 73.744 | 13.89 | 47.29 |
| 470. | -102.259 | 22.774 | 257.71 | 74.360 | 14.01 | 48.20 |
| 475. | -103.591 | 23.147 | 258.50 | 74.972 | 14.14 | 49.12 |
| 480. | -104.927 | 23.524 | 259.29 | 75.582 | 14.26 | 50.04 |
| 485. | -106.267 | 23.903 | 260.08 | 76.188 | 14.39 | 50.97 |
| 490. | -107.611 | 24.285 | 260.86 | 76.791 | 14.51 | 51.90 |
| 495. | -108.959 | 24.671 | 261.64 | 77.391 | 14.64 | 52.84 |
| 500. | -110.311 | 25.059 | 262.43 | 77.987 | 14.76 | 53.78 |
| 505. | -111.666 | 25.451 | 263.20 | 78.580 | | 54.73 |
| 510. | -113.026 | 25.845 | 263.98 | 79.170 | | 55.68 |
| 515. | -114.389 | 26.242 | 264.76 | 79.757 | | 56.63 |
| 520. | -115.757 | 26.643 | 265.53 | 80.340 | | 57.59 |
| 525. | -117.128 | 27.046 | 266.30 | 80.920 | | 58.55 |
| 530. | -118.503 | 27.452 | 267.07 | 81.496 | | 59.51 |
| 535. | -119.882 | 27.861 | 267.84 | 82.070 | | 60.48 |
| 540. | -121.264 | 28.273 | 268.61 | 82.639 | | 61.45 |
| 545. | -122.651 | 28.687 | 269.37 | 83.206 | | 62.43 |
| 550. | -124.041 | 29.105 | 270.13 | 83.769 | | 63.41 |
| 555. | -125.435 | 29.525 | 270.89 | 84.329 | | 64.39 |
| 560. | -126.833 | 29.948 | 271.65 | 84.885 | | 65.37 |
| 565. | -128.235 | 30.374 | 272.41 | 85.438 | | 66.36 |
| 570. | -129.641 | 30.802 | 273.16 | 85.988 | | 67.35 |
| 575. | -131.050 | 31.234 | 273.92 | 86.535 | | 68.34 |
| 580. | -132.463 | 31.668 | 274.67 | 87.078 | | 69.34 |
| 585. | -133.880 | 32.104 | 275.42 | 87.618 | | 70.34 |
| 590. | -135.300 | 32.544 | 276.17 | 88.155 | | 71.34 |
| 595. | -136.724 | 32.986 | 276.91 | 88.689 | | 72.34 |
| 600. | -138.152 | 33.431 | 277.66 | 89.220 | | 73.35 |
| 605. | -139.584 | 33.878 | 278.40 | 89.747 | | |
| 610. | -141.020 | 34.328 | 279.14 | 90.272 | | |
| 615. | -142.459 | 34.781 | 279.88 | 90.793 | | |
| 620. | -143.902 | 35.236 | 280.62 | 91.311 | | |
| 625. | -145.348 | 35.694 | 281.35 | 91.827 | | |

Table B2. Properties along saturation boundary

| T | $P_\sigma$ | $\rho_{\sigma L}$ | $\rho_{\sigma v}$ | $C_{\sigma L}$ | $W_{\sigma L}$ | $\eta_{\sigma L}$ | $\lambda_{\sigma L}$ |
|---|---|---|---|---|---|---|---|
| K | MPa | $mol \cdot dm^{-3}$ | $mol \cdot dm^{-3}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 90.352 | 0.11E-05 | 21.67 | 0.150E-05 | 66.86 | 1995.9 | 1280.09 | 255.6 |
| 91. | 0.13E-05 | 21.64 | 0.177E-05 | 67.23 | 1992.6 | 1244.72 | 255.1 |
| 92. | 0.17E-05 | 21.61 | 0.227E-05 | 67.74 | 1987.2 | 1193.00 | 254.4 |
| 93. | 0.22E-05 | 21.57 | 0.288E-05 | 68.19 | 1981.6 | 1144.52 | 253.6 |
| 94. | 0.28E-05 | 21.54 | 0.364E-05 | 68.59 | 1975.7 | 1099.02 | 252.8 |
| 95. | 0.36E-05 | 21.50 | 0.458E-05 | 68.94 | 1969.7 | 1056.26 | 252.1 |
| 96. | 0.46E-05 | 21.47 | 0.573E-05 | 69.24 | 1963.5 | 1016.05 | 251.3 |
| 97. | 0.58E-05 | 21.43 | 0.713E-05 | 69.50 | 1957.2 | 978.18 | 250.5 |
| 98. | 0.72E-05 | 21.39 | 0.883E-05 | 69.73 | 1950.8 | 942.48 | 249.7 |
| 99. | 0.90E-05 | 21.36 | 0.109E-04 | 69.92 | 1944.3 | 908.79 | 248.9 |
| 100. | 0.11E-04 | 21.32 | 0.133E-04 | 70.09 | 1937.6 | 876.96 | 248.1 |
| 101. | 0.14E-04 | 21.29 | 0.163E-04 | 70.23 | 1930.9 | 846.87 | 247.3 |
| 102. | 0.17E-04 | 21.25 | 0.198E-04 | 70.34 | 1924.2 | 818.40 | 246.4 |
| 103. | 0.21E-04 | 21.22 | 0.240E-04 | 70.43 | 1917.3 | 791.42 | 245.6 |
| 104. | 0.25E-04 | 21.18 | 0.289E-04 | 70.51 | 1910.4 | 765.84 | 244.7 |
| 105. | 0.30E-04 | 21.14 | 0.347E-04 | 70.57 | 1903.5 | 741.57 | 243.9 |
| 106. | 0.37E-04 | 21.11 | 0.415E-04 | 70.61 | 1896.5 | 718.52 | 243.0 |
| 107. | 0.44E-04 | 21.07 | 0.494E-04 | 70.64 | 1889.5 | 696.60 | 242.2 |
| 108. | 0.53E-04 | 21.03 | 0.586E-04 | 70.66 | 1882.4 | 675.76 | 241.3 |
| 109. | 0.63E-04 | 21.00 | 0.693E-04 | 70.68 | 1875.3 | 655.91 | 240.4 |
| 110. | 0.75E-04 | 20.96 | 0.817E-04 | 70.68 | 1868.2 | 637.00 | 239.5 |
| 111. | 0.89E-04 | 20.93 | 0.959E-04 | 70.67 | 1861.1 | 618.96 | 238.6 |
| 112. | 0.10E-03 | 20.89 | 0.112E-03 | 70.66 | 1853.9 | 601.75 | 237.7 |
| 113. | 0.12E-03 | 20.85 | 0.131E-03 | 70.65 | 1846.7 | 585.32 | 236.8 |
| 114. | 0.14E-03 | 20.82 | 0.152E-03 | 70.63 | 1839.5 | 569.61 | 235.9 |
| 115. | 0.17E-03 | 20.78 | 0.177E-03 | 70.60 | 1832.3 | 554.60 | 235.0 |
| 116. | 0.20E-03 | 20.74 | 0.204E-03 | 70.58 | 1825.1 | 540.22 | 234.1 |
| 117. | 0.23E-03 | 20.71 | 0.236E-03 | 70.55 | 1817.8 | 526.46 | 233.2 |
| 118. | 0.27E-03 | 20.67 | 0.271E-03 | 70.52 | 1810.6 | 513.27 | 232.2 |
| 119. | 0.31E-03 | 20.63 | 0.311E-03 | 70.49 | 1803.3 | 500.63 | 231.3 |
| 120. | 0.35E-03 | 20.60 | 0.356E-03 | 70.46 | 1796.0 | 488.50 | 230.4 |
| 121. | 0.41E-03 | 20.56 | 0.406E-03 | 70.42 | 1788.7 | 476.85 | 229.4 |
| 122. | 0.47E-03 | 20.52 | 0.462E-03 | 70.39 | 1781.3 | 465.67 | 228.5 |
| 123. | 0.54E-03 | 20.49 | 0.524E-03 | 70.36 | 1774.0 | 454.91 | 227.5 |
| 124. | 0.61E-03 | 20.45 | 0.594E-03 | 70.33 | 1766.7 | 444.57 | 226.6 |
| 125. | 0.70E-03 | 20.41 | 0.671E-03 | 70.30 | 1759.3 | 434.62 | 225.6 |
| 126. | 0.79E-03 | 20.38 | 0.756E-03 | 70.27 | 1752.0 | 425.04 | 224.6 |
| 127. | 0.90E-03 | 20.34 | 0.851E-03 | 70.25 | 1744.6 | 415.81 | 223.7 |
| 128. | 0.10E-02 | 20.30 | 0.955E-03 | 70.22 | 1737.2 | 406.92 | 222.7 |
| 129. | 0.11E-02 | 20.26 | 0.107E-02 | 70.20 | 1729.8 | 398.34 | 221.7 |

Table B2. Properties along saturation boundary (continued)

| T | $P_\sigma$ | $\rho_{\sigma L}$ | $\rho_{\sigma v}$ | $C_{\sigma L}$ | $W_{\sigma L}$ | $\eta_{\sigma L}$ | $\lambda_{\sigma L}$ |
|---|---|---|---|---|---|---|---|
| K | MPa | mol•dm$^{-3}$ | mol•dm$^{-3}$ | J•mol$^{-1}$•K$^{-1}$ | m•s$^{-1}$ | μPa•s | mW•m$^{-1}$•K$^{-1}$ |
| 130. | 0.13E-02 | 20.23 | 0.120E-02 | 70.18 | 1722.4 | 390.06 | 220.8 |
| 131. | 0.15E-02 | 20.19 | 0.134E-02 | 70.16 | 1715.0 | 382.07 | 219.8 |
| 132. | 0.16E-02 | 20.15 | 0.149E-02 | 70.14 | 1707.6 | 374.36 | 218.8 |
| 133. | 0.18E-02 | 20.12 | 0.165E-02 | 70.13 | 1700.2 | 366.90 | 217.8 |
| 134. | 0.20E-02 | 20.08 | 0.183E-02 | 70.12 | 1692.8 | 359.69 | 216.9 |
| 135. | 0.23E-02 | 20.04 | 0.203E-02 | 70.11 | 1685.3 | 352.72 | 215.9 |
| 136. | 0.25E-02 | 20.00 | 0.225E-02 | 70.10 | 1677.9 | 345.98 | 214.9 |
| 137. | 0.28E-02 | 19.96 | 0.248E-02 | 70.09 | 1670.5 | 339.44 | 213.9 |
| 138. | 0.31E-02 | 19.93 | 0.273E-02 | 70.09 | 1663.0 | 333.12 | 212.9 |
| 139. | 0.35E-02 | 19.89 | 0.301E-02 | 70.09 | 1655.5 | 326.99 | 211.9 |
| 140. | 0.38E-02 | 19.85 | 0.330E-02 | 70.10 | 1648.1 | 321.05 | 210.9 |
| 141. | 0.42E-02 | 19.81 | 0.362E-02 | 70.10 | 1640.6 | 315.29 | 209.9 |
| 142. | 0.47E-02 | 19.78 | 0.397E-02 | 70.11 | 1633.2 | 309.70 | 209.0 |
| 143. | 0.51E-02 | 19.74 | 0.434E-02 | 70.12 | 1625.7 | 304.27 | 208.0 |
| 144. | 0.56E-02 | 19.70 | 0.474E-02 | 70.14 | 1618.2 | 299.00 | 207.0 |
| 145. | 0.62E-02 | 19.66 | 0.516E-02 | 70.15 | 1610.7 | 293.88 | 206.0 |
| 146. | 0.68E-02 | 19.62 | 0.562E-02 | 70.17 | 1603.2 | 288.91 | 205.0 |
| 147. | 0.74E-02 | 19.59 | 0.611E-02 | 70.19 | 1595.7 | 284.08 | 204.0 |
| 148. | 0.81E-02 | 19.55 | 0.664E-02 | 70.22 | 1588.2 | 279.38 | 203.0 |
| 149. | 0.89E-02 | 19.51 | 0.720E-02 | 70.24 | 1580.7 | 274.80 | 202.0 |
| 150. | 0.97E-02 | 19.47 | 0.780E-02 | 70.27 | 1573.2 | 270.35 | 201.0 |
| 151. | 0.11E-01 | 19.43 | 0.844E-02 | 70.31 | 1565.7 | 266.02 | 200.0 |
| 152. | 0.11E-01 | 19.39 | 0.912E-02 | 70.34 | 1558.2 | 261.80 | 199.0 |
| 153. | 0.12E-01 | 19.35 | 0.985E-02 | 70.38 | 1550.7 | 257.69 | 198.0 |
| 154. | 0.13E-01 | 19.32 | 0.011 | 70.42 | 1543.2 | 253.68 | 197.0 |
| 155. | 0.15E-01 | 19.28 | 0.011 | 70.46 | 1535.7 | 249.77 | 196.0 |
| 156. | 0.16E-01 | 19.24 | 0.012 | 70.51 | 1528.2 | 245.96 | 195.0 |
| 157. | 0.17E-01 | 19.20 | 0.013 | 70.55 | 1520.6 | 242.25 | 194.0 |
| 158. | 0.18E-01 | 19.16 | 0.014 | 70.60 | 1513.1 | 238.62 | 193.0 |
| 159. | 0.20E-01 | 19.12 | 0.015 | 70.66 | 1505.6 | 235.08 | 192.0 |
| 160. | 0.21E-01 | 19.08 | 0.016 | 70.71 | 1498.1 | 231.63 | 191.0 |
| 161. | 0.23E-01 | 19.04 | 0.017 | 70.77 | 1490.5 | 228.25 | 190.0 |
| 162. | 0.25E-01 | 19.00 | 0.019 | 70.83 | 1483.0 | 224.95 | 189.0 |
| 163. | 0.27E-01 | 18.96 | 0.020 | 70.89 | 1475.5 | 221.73 | 188.1 |
| 164. | 0.29E-01 | 18.92 | 0.021 | 70.95 | 1467.9 | 218.58 | 187.1 |
| 165. | 0.31E-01 | 18.88 | 0.023 | 71.02 | 1460.4 | 215.50 | 186.1 |
| 166. | 0.33E-01 | 18.84 | 0.024 | 71.09 | 1452.8 | 212.48 | 185.1 |
| 167. | 0.35E-01 | 18.80 | 0.026 | 71.16 | 1445.3 | 209.53 | 184.1 |
| 168. | 0.38E-01 | 18.76 | 0.027 | 71.24 | 1437.7 | 206.65 | 183.1 |
| 169. | 0.40E-01 | 18.72 | 0.029 | 71.31 | 1430.2 | 203.82 | 182.1 |

Table B2. Properties along saturation boundary (continued)

| T | $P_\sigma$ | $\rho_{\sigma L}$ | $\rho_{\sigma v}$ | $C_{\sigma L}$ | $W_{\sigma L}$ | $\eta_{\sigma L}$ | $\lambda_{\sigma L}$ |
|---|---|---|---|---|---|---|---|
| K | MPa | mol•dm$^{-3}$ | mol•dm$^{-3}$ | J•mol$^{-1}$•K$^{-1}$ | m•s$^{-1}$ | $\mu$Pa•s | mW•m$^{-1}$•K$^{-1}$ |
| 170. | 0.43E-01 | 18.68 | 0.031 | 71.39 | 1422.6 | 201.06 | 181.2 |
| 171. | 0.46E-01 | 18.64 | 0.033 | 71.47 | 1415.1 | 198.35 | 180.2 |
| 172. | 0.49E-01 | 18.60 | 0.035 | 71.56 | 1407.5 | 195.70 | 179.2 |
| 173. | 0.52E-01 | 18.56 | 0.037 | 71.64 | 1399.9 | 193.09 | 178.2 |
| 174. | 0.55E-01 | 18.52 | 0.039 | 71.73 | 1392.4 | 190.55 | 177.3 |
| 175. | 0.59E-01 | 18.48 | 0.041 | 71.82 | 1384.8 | 188.05 | 176.3 |
| 176. | 0.62E-01 | 18.44 | 0.044 | 71.91 | 1377.2 | 185.60 | 175.3 |
| 177. | 0.66E-01 | 18.40 | 0.046 | 72.01 | 1369.7 | 183.19 | 174.3 |
| 178. | 0.70E-01 | 18.36 | 0.049 | 72.11 | 1362.1 | 180.84 | 173.4 |
| 179. | 0.74E-01 | 18.32 | 0.051 | 72.21 | 1354.5 | 178.52 | 172.4 |
| 180. | 0.79E-01 | 18.28 | 0.054 | 72.31 | 1346.9 | 176.25 | 171.4 |
| 181. | 0.83E-01 | 18.24 | 0.057 | 72.41 | 1339.3 | 174.02 | 170.5 |
| 182. | 0.88E-01 | 18.19 | 0.060 | 72.52 | 1331.7 | 171.83 | 169.5 |
| 183. | 0.93E-01 | 18.15 | 0.063 | 72.63 | 1324.2 | 169.68 | 168.5 |
| 184. | 0.98E-01 | 18.11 | 0.066 | 72.74 | 1316.6 | 167.57 | 167.6 |
| 184.309 | 0.10 | 18.10 | 0.068 | 72.78 | 1314.2 | 166.93 | 167.3 |
| 184.552 | 0.101352 | 18.09 | 0.068 | 72.80 | 1312.4 | 166.42 | 167.1 |
| 185. | 0.10 | 18.07 | 0.070 | 72.85 | 1309.0 | 165.50 | 166.6 |
| 186. | 0.11 | 18.03 | 0.073 | 72.97 | 1301.4 | 163.46 | 165.7 |
| 187. | 0.12 | 17.98 | 0.077 | 73.09 | 1293.7 | 161.45 | 164.7 |
| 188. | 0.12 | 17.94 | 0.081 | 73.21 | 1286.1 | 159.48 | 163.8 |
| 189. | 0.13 | 17.90 | 0.085 | 73.33 | 1278.5 | 157.55 | 162.8 |
| 190. | 0.13 | 17.86 | 0.089 | 73.46 | 1270.9 | 155.64 | 161.9 |
| 191. | 0.14 | 17.81 | 0.093 | 73.59 | 1263.3 | 153.77 | 160.9 |
| 192. | 0.15 | 17.77 | 0.098 | 73.72 | 1255.6 | 151.92 | 160.0 |
| 193. | 0.16 | 17.73 | 0.102 | 73.85 | 1248.0 | 150.11 | 159.0 |
| 194. | 0.16 | 17.69 | 0.107 | 73.99 | 1240.4 | 148.32 | 158.1 |
| 195. | 0.17 | 17.64 | 0.112 | 74.13 | 1232.7 | 146.56 | 157.2 |
| 196. | 0.18 | 17.60 | 0.117 | 74.27 | 1225.1 | 144.83 | 156.2 |
| 197. | 0.19 | 17.55 | 0.122 | 74.41 | 1217.4 | 143.13 | 155.3 |
| 198. | 0.20 | 17.51 | 0.127 | 74.56 | 1209.7 | 141.45 | 154.4 |
| 199. | 0.21 | 17.47 | 0.133 | 74.71 | 1202.1 | 139.80 | 153.4 |
| 200. | 0.22 | 17.42 | 0.139 | 74.86 | 1194.4 | 138.17 | 152.5 |
| 201. | 0.23 | 17.38 | 0.145 | 75.02 | 1186.7 | 136.56 | 151.6 |
| 202. | 0.24 | 17.33 | 0.151 | 75.17 | 1179.0 | 134.98 | 150.7 |
| 203. | 0.25 | 17.29 | 0.157 | 75.33 | 1171.3 | 133.42 | 149.8 |
| 204. | 0.26 | 17.24 | 0.164 | 75.50 | 1163.6 | 131.89 | 148.8 |
| 205. | 0.27 | 17.20 | 0.170 | 75.66 | 1155.9 | 130.37 | 147.9 |
| 206. | 0.28 | 17.15 | 0.177 | 75.83 | 1148.2 | 128.88 | 147.0 |
| 207. | 0.29 | 17.11 | 0.185 | 76.00 | 1140.4 | 127.40 | 146.1 |

Table B2. Properties along saturation boundary (continued)

| T | $P_\sigma$ | $\rho_{\sigma L}$ | $\rho_{\sigma v}$ | $C_{\sigma L}$ | $W_{\sigma L}$ | $\eta_{\sigma L}$ | $\lambda_{\sigma L}$ |
|---|---|---|---|---|---|---|---|
| K | MPa | $mol \cdot dm^{-3}$ | $mol \cdot dm^{-3}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 208. | 0.31 | 17.06 | 0.192 | 76.18 | 1132.7 | 125.95 | 145.2 |
| 209. | 0.32 | 17.02 | 0.200 | 76.35 | 1125.0 | 124.51 | 144.3 |
| 210. | 0.33 | 16.97 | 0.208 | 76.53 | 1117.2 | 123.10 | 143.4 |
| 211. | 0.35 | 16.93 | 0.216 | 76.72 | 1109.4 | 121.70 | 142.5 |
| 212. | 0.36 | 16.88 | 0.224 | 76.90 | 1101.7 | 120.32 | 141.6 |
| 213. | 0.38 | 16.83 | 0.233 | 77.09 | 1093.9 | 118.96 | 140.7 |
| 214. | 0.39 | 16.78 | 0.241 | 77.29 | 1086.1 | 117.62 | 139.8 |
| 215. | 0.41 | 16.74 | 0.251 | 77.49 | 1078.3 | 116.29 | 138.9 |
| 216. | 0.42 | 16.69 | 0.260 | 77.69 | 1070.4 | 114.99 | 138.0 |
| 217. | 0.44 | 16.64 | 0.270 | 77.89 | 1062.6 | 113.69 | 137.1 |
| 218. | 0.46 | 16.59 | 0.279 | 78.10 | 1054.8 | 112.41 | 136.2 |
| 219. | 0.47 | 16.55 | 0.290 | 78.31 | 1046.9 | 111.15 | 135.4 |
| 220. | 0.49 | 16.50 | 0.300 | 78.52 | 1039.0 | 109.90 | 134.5 |
| 221. | 0.51 | 16.45 | 0.311 | 78.74 | 1031.2 | 108.67 | 133.6 |
| 222. | 0.53 | 16.40 | 0.322 | 78.96 | 1023.3 | 107.45 | 132.7 |
| 223. | 0.55 | 16.35 | 0.333 | 79.19 | 1015.4 | 106.25 | 131.9 |
| 224. | 0.57 | 16.30 | 0.345 | 79.42 | 1007.4 | 105.06 | 131.0 |
| 225. | 0.59 | 16.25 | 0.357 | 79.66 | 999.5 | 103.88 | 130.1 |
| 226. | 0.61 | 16.20 | 0.369 | 79.90 | 991.5 | 102.72 | 129.3 |
| 227. | 0.63 | 16.15 | 0.382 | 80.14 | 983.6 | 101.57 | 128.4 |
| 228. | 0.65 | 16.10 | 0.395 | 80.39 | 975.6 | 100.43 | 127.5 |
| 229. | 0.68 | 16.05 | 0.408 | 80.64 | 967.6 | 99.30 | 126.7 |
| 230. | 0.70 | 16.00 | 0.422 | 80.90 | 959.6 | 98.19 | 125.8 |
| 231. | 0.72 | 15.95 | 0.436 | 81.16 | 951.5 | 97.09 | 125.0 |
| 232. | 0.75 | 15.90 | 0.451 | 81.43 | 943.5 | 96.00 | 124.1 |
| 233. | 0.77 | 15.84 | 0.465 | 81.70 | 935.4 | 94.92 | 123.3 |
| 234. | 0.80 | 15.79 | 0.481 | 81.98 | 927.3 | 93.85 | 122.4 |
| 235. | 0.83 | 15.74 | 0.496 | 82.26 | 919.2 | 92.79 | 121.6 |
| 236. | 0.85 | 15.68 | 0.512 | 82.55 | 911.0 | 91.74 | 120.7 |
| 237. | 0.88 | 15.63 | 0.529 | 82.84 | 902.9 | 90.71 | 119.9 |
| 238. | 0.91 | 15.58 | 0.546 | 83.14 | 894.7 | 89.68 | 119.0 |
| 239. | 0.94 | 15.52 | 0.563 | 83.45 | 886.5 | 88.66 | 118.2 |
| 240. | 0.97 | 15.47 | 0.581 | 83.76 | 878.3 | 87.65 | 117.4 |
| 241. | 1.00 | 15.41 | 0.599 | 84.08 | 870.0 | 86.66 | 116.5 |
| 242. | 1.03 | 15.36 | 0.618 | 84.41 | 861.8 | 85.67 | 115.7 |
| 243. | 1.06 | 15.30 | 0.637 | 84.74 | 853.5 | 84.69 | 114.9 |
| 244. | 1.09 | 15.24 | 0.657 | 85.08 | 845.1 | 83.72 | 114.1 |
| 245. | 1.13 | 15.19 | 0.677 | 85.43 | 836.8 | 82.75 | 113.2 |
| 246. | 1.16 | 15.13 | 0.698 | 85.79 | 828.4 | 81.80 | 112.4 |
| 247. | 1.19 | 15.07 | 0.719 | 86.15 | 820.0 | 80.85 | 111.6 |

Table B2. Properties along saturation boundary (continued)

| T | $P_\sigma$ | $\rho_{\sigma L}$ | $\rho_{\sigma v}$ | $C_{\sigma L}$ | $W_{\sigma L}$ | $\eta_{\sigma L}$ | $\lambda_{\sigma L}$ |
|---|---|---|---|---|---|---|---|
| K | MPa | $mol \cdot dm^{-3}$ | $mol \cdot dm^{-3}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 248. | 1.23 | 15.01 | 0.741 | 86.52 | 811.6 | 79.91 | 110.8 |
| 249. | 1.26 | 14.95 | 0.764 | 86.90 | 803.1 | 78.98 | 110.0 |
| 250. | 1.30 | 14.89 | 0.787 | 87.29 | 794.6 | 78.06 | 109.1 |
| 251. | 1.34 | 14.83 | 0.810 | 87.70 | 786.1 | 77.14 | 108.3 |
| 252. | 1.38 | 14.77 | 0.835 | 88.11 | 777.5 | 76.23 | 107.5 |
| 253. | 1.42 | 14.71 | 0.859 | 88.53 | 768.9 | 75.33 | 106.7 |
| 254. | 1.46 | 14.65 | 0.885 | 88.96 | 760.3 | 74.43 | 105.9 |
| 255. | 1.50 | 14.58 | 0.911 | 89.40 | 751.6 | 73.54 | 105.1 |
| 256. | 1.54 | 14.52 | 0.938 | 89.86 | 742.9 | 72.66 | 104.3 |
| 257. | 1.58 | 14.46 | 0.966 | 90.33 | 734.1 | 71.79 | 103.5 |
| 258. | 1.62 | 14.39 | 0.994 | 90.81 | 725.4 | 70.91 | 102.7 |
| 259. | 1.67 | 14.33 | 1.023 | 91.31 | 716.5 | 70.05 | 101.9 |
| 260. | 1.71 | 14.26 | 1.053 | 91.82 | 707.7 | 69.19 | 101.1 |
| 261. | 1.76 | 14.19 | 1.084 | 92.34 | 698.7 | 68.34 | 100.3 |
| 262. | 1.80 | 14.13 | 1.116 | 92.89 | 689.8 | 67.49 | 99.5 |
| 263. | 1.85 | 14.06 | 1.148 | 93.45 | 680.8 | 66.64 | 98.7 |
| 264. | 1.90 | 13.99 | 1.182 | 94.03 | 671.7 | 65.80 | 97.9 |
| 265. | 1.95 | 13.92 | 1.216 | 94.63 | 662.6 | 64.97 | 97.1 |
| 266. | 2.00 | 13.85 | 1.252 | 95.25 | 653.4 | 64.14 | 96.3 |
| 267. | 2.05 | 13.77 | 1.288 | 95.89 | 644.2 | 63.31 | 95.5 |
| 268. | 2.10 | 13.70 | 1.325 | 96.55 | 634.9 | 62.48 | 94.8 |
| 269. | 2.16 | 13.63 | 1.364 | 97.24 | 625.6 | 61.66 | 94.0 |
| 270. | 2.21 | 13.55 | 1.404 | 97.96 | 616.2 | 60.85 | 93.2 |
| 271. | 2.26 | 13.47 | 1.445 | 98.71 | 606.7 | 60.03 | 92.4 |
| 272. | 2.32 | 13.40 | 1.487 | 99.49 | 597.2 | 59.22 | 91.6 |
| 273. | 2.38 | 13.32 | 1.530 | 100.30 | 587.5 | 58.41 | 90.8 |
| 273. | 2.39 | 13.31 | 1.537 | 100.30 | 587.5 | 58.41 | 90.8 |
| 274. | 2.44 | 13.24 | 1.575 | 101.15 | 577.9 | 57.61 | 90.0 |
| 275. | 2.49 | 13.16 | 1.622 | 102.04 | 568.1 | 56.80 | 89.3 |
| 276. | 2.55 | 13.07 | 1.670 | 102.97 | 558.2 | 56.00 | 88.5 |
| 277. | 2.62 | 12.99 | 1.719 | 103.95 | 548.3 | 55.19 | 87.7 |
| 278. | 2.68 | 12.90 | 1.771 | 104.98 | 538.3 | 54.39 | 86.9 |
| 279. | 2.74 | 12.81 | 1.824 | 106.07 | 528.1 | 53.59 | 86.1 |
| 280. | 2.81 | 12.72 | 1.879 | 107.22 | 517.9 | 52.79 | 85.4 |
| 281. | 2.87 | 12.63 | 1.936 | 108.44 | 507.5 | 51.98 | 84.6 |
| 282. | 2.94 | 12.54 | 1.995 | 109.73 | 497.1 | 51.18 | 83.8 |
| 283. | 3.01 | 12.44 | 2.057 | 111.11 | 486.5 | 50.37 | 83.0 |
| 284. | 3.07 | 12.34 | 2.121 | 112.58 | 475.8 | 49.56 | 82.2 |
| 285. | 3.14 | 12.24 | 2.187 | 114.17 | 465.0 | 48.75 | 81.5 |
| 286. | 3.22 | 12.13 | 2.257 | 115.87 | 454.0 | 47.93 | 80.7 |

Table B2. Properties along saturation boundary (continued)

| T | $P_\sigma$ | $\rho_{\sigma L}$ | $\rho_{\sigma v}$ | $C_{\sigma L}$ | $W_{\sigma L}$ | $\eta_{\sigma L}$ | $\lambda_{\sigma L}$ |
|---|---|---|---|---|---|---|---|
| K | MPa | $mol \cdot dm^{-3}$ | $mol \cdot dm^{-3}$ | $J \cdot mol^{-1} \cdot K^{-1}$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW \cdot m^{-1} \cdot K^{-1}$ |
| 287. | 3.29 | 12.03 | 2.330 | 117.71 | 442.9 | 47.11 | 79.9 |
| 288. | 3.36 | 11.92 | 2.406 | 119.72 | 431.6 | 46.28 | 79.1 |
| 289. | 3.44 | 11.80 | 2.486 | 121.91 | 420.1 | 45.44 | 78.4 |
| 290. | 3.51 | 11.68 | 2.570 | 124.32 | 408.5 | 44.60 | 77.6 |
| 291. | 3.59 | 11.56 | 2.659 | 126.99 | 396.7 | 43.74 | 76.8 |
| 292. | 3.67 | 11.43 | 2.753 | 129.97 | 384.7 | 42.87 | 76.1 |
| 293. | 3.75 | 11.30 | 2.852 | 133.32 | 372.5 | 41.99 | 75.3 |
| 294. | 3.83 | 11.16 | 2.959 | 137.15 | 360.1 | 41.09 | 74.6 |
| 295. | 3.92 | 11.01 | 3.072 | 141.56 | 347.4 | 40.17 | 73.9 |
| 296. | 4.00 | 10.85 | 3.195 | 146.73 | 334.4 | 39.22 | 73.2 |
| 297. | 4.09 | 10.69 | 3.327 | 152.89 | 321.1 | 38.24 | 72.6 |
| 298. | 4.18 | 10.51 | 3.472 | 160.40 | 307.4 | 37.22 | 72.0 |
| 298. | 4.19 | 10.48 | 3.495 | 160.40 | 307.4 | 37.22 | 72.0 |
| 299. | 4.27 | 10.31 | 3.633 | 169.81 | 293.2 | 36.15 | 71.6 |
| 300. | 4.36 | 10.10 | 3.813 | 182.06 | 278.4 | 35.01 | 71.3 |
| 301. | 4.45 | 9.86 | 4.019 | 198.85 | 262.9 | 33.79 | 71.4 |
| 302. | 4.54 | 9.59 | 4.262 | 223.66 | 246.4 | 32.44 | 72.0 |
| 303. | 4.64 | 9.25 | 4.562 | 265.26 | 228.7 | 30.89 | 73.8 |
| 304. | 4.74 | 8.82 | 4.968 | 354.78 | 209.4 | 28.97 | 79.0 |
| 305. | 4.84 | 8.05 | 5.703 | 803.05 | 188.0 | 25.91 | 109.2 |
| 305.33 | 4.8718 | 6.87 | 6.87 | | | | |

Table B3. Properties in the single-phase region along isobars

ETHANE ISOBAR AT P = $1.13 \cdot 10^{-6}$ MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 90.352 | 21.664 | 0.000 | -14.887 | 76.65 | 47.02 | 66.18 | 1995.0 | 1277.81 | 255.5 |
| 90.352 | 0.15E-05 | 1.000 | 3.043 | 275.09 | 26.86 | 35.17 | 180.9 | 3.04 | 2.9 |
| 95. | 0.14E-05 | 1.000 | 3.207 | 276.87 | 27.11 | 35.42 | 185.3 | 3.17 | 3.2 |
| 100. | 0.14E-05 | 1.000 | 3.384 | 278.69 | 27.38 | 35.70 | 189.9 | 3.32 | 3.5 |
| 105. | 0.13E-05 | 1.000 | 3.564 | 280.44 | 27.66 | 35.97 | 194.3 | 3.46 | 3.7 |
| 110. | 0.12E-05 | 1.000 | 3.744 | 282.12 | 27.93 | 36.25 | 198.7 | 3.60 | 4.0 |
| 115. | 0.12E-05 | 1.000 | 3.926 | 283.74 | 28.22 | 36.53 | 202.9 | 3.75 | 4.3 |
| 120. | 0.11E-05 | 1.000 | 4.109 | 285.30 | 28.50 | 36.82 | 207.0 | 3.90 | 4.7 |
| 125. | 0.11E-05 | 1.000 | 4.294 | 286.81 | 28.79 | 37.11 | 211.1 | 4.04 | 5.0 |
| 130. | 0.10E-05 | 1.000 | 4.480 | 288.27 | 29.09 | 37.40 | 215.0 | 4.19 | 5.3 |
| 135. | 0.10E-05 | 1.000 | 4.668 | 289.69 | 29.38 | 37.70 | 218.8 | 4.34 | 5.6 |
| 140. | 0.97E-06 | 1.000 | 4.857 | 291.06 | 29.69 | 38.00 | 222.6 | 4.50 | 5.9 |
| 145. | 0.94E-06 | 1.000 | 5.048 | 292.40 | 30.00 | 38.31 | 226.3 | 4.65 | 6.3 |
| 150. | 0.91E-06 | 1.000 | 5.241 | 293.71 | 30.31 | 38.63 | 229.9 | 4.80 | 6.6 |
| 155. | 0.88E-06 | 1.000 | 5.435 | 294.98 | 30.64 | 38.95 | 233.4 | 4.96 | 7.0 |
| 160. | 0.85E-06 | 1.000 | 5.630 | 296.22 | 30.96 | 39.28 | 236.9 | 5.11 | 7.3 |
| 165. | 0.82E-06 | 1.000 | 5.827 | 297.43 | 31.30 | 39.62 | 240.3 | 5.26 | 7.7 |
| 170. | 0.80E-06 | 1.000 | 6.026 | 298.62 | 31.65 | 39.96 | 243.6 | 5.42 | 8.1 |
| 175. | 0.78E-06 | 1.000 | 6.227 | 299.79 | 32.00 | 40.32 | 246.9 | 5.57 | 8.5 |
| 180. | 0.76E-06 | 1.000 | 6.429 | 300.93 | 32.37 | 40.68 | 250.1 | 5.73 | 8.8 |
| 185. | 0.73E-06 | 1.000 | 6.634 | 302.05 | 32.74 | 41.05 | 253.3 | 5.89 | 9.2 |
| 190. | 0.72E-06 | 1.000 | 6.840 | 303.15 | 33.12 | 41.44 | 256.4 | 6.04 | 9.6 |
| 195. | 0.70E-06 | 1.000 | 7.048 | 304.23 | 33.52 | 41.84 | 259.4 | 6.20 | 10.1 |
| 200. | 0.68E-06 | 1.000 | 7.258 | 305.29 | 33.93 | 42.24 | 262.4 | 6.35 | 10.5 |
| 205. | 0.66E-06 | 1.000 | 7.471 | 306.34 | 34.35 | 42.66 | 265.3 | 6.51 | 10.9 |
| 210. | 0.65E-06 | 1.000 | 7.685 | 307.37 | 34.78 | 43.09 | 268.2 | 6.66 | 11.4 |
| 215. | 0.63E-06 | 1.000 | 7.902 | 308.39 | 35.22 | 43.53 | 271.1 | 6.82 | 11.8 |
| 220. | 0.62E-06 | 1.000 | 8.120 | 309.40 | 35.67 | 43.99 | 273.9 | 6.97 | 12.3 |
| 225. | 0.60E-06 | 1.000 | 8.342 | 310.39 | 36.14 | 44.46 | 276.6 | 7.13 | 12.7 |
| 230. | 0.59E-06 | 1.000 | 8.565 | 311.37 | 36.62 | 44.93 | 279.3 | 7.28 | 13.2 |
| 235. | 0.58E-06 | 1.000 | 8.791 | 312.35 | 37.11 | 45.42 | 282.0 | 7.43 | 13.7 |
| 240. | 0.57E-06 | 1.000 | 9.019 | 313.31 | 37.61 | 45.92 | 284.7 | 7.59 | 14.2 |
| 245. | 0.55E-06 | 1.000 | 9.250 | 314.26 | 38.12 | 46.44 | 287.3 | 7.74 | 14.7 |
| 250. | 0.54E-06 | 1.000 | 9.484 | 315.20 | 38.64 | 46.96 | 289.8 | 7.89 | 15.3 |
| 255. | 0.53E-06 | 1.000 | 9.720 | 316.14 | 39.18 | 47.49 | 292.4 | 8.04 | 15.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = $1.13 \cdot 10^{-6}$ MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol·K) | J/(mol·K) | | $m \cdot s^{-1}$ | μPa·s | mW/(m·K) |
| 260. | 0.52E-06 | 1.000 | 9.959 | 317.07 | 39.72 | 48.04 | 294.9 | 8.20 | 16.3 |
| 265. | 0.51E-06 | 1.000 | 10.200 | 317.99 | 40.27 | 48.59 | 297.3 | 8.35 | 16.9 |
| 270. | 0.50E-06 | 1.000 | 10.444 | 318.90 | 40.84 | 49.15 | 299.8 | 8.50 | 17.5 |
| 275. | 0.49E-06 | 1.000 | 10.692 | 319.81 | 41.41 | 49.72 | 302.2 | 8.65 | 18.1 |
| 280. | 0.49E-06 | 1.000 | 10.942 | 320.71 | 41.99 | 50.30 | 304.6 | 8.80 | 18.6 |
| 285. | 0.48E-06 | 1.000 | 11.195 | 321.60 | 42.57 | 50.89 | 306.9 | 8.94 | 19.2 |
| 290. | 0.47E-06 | 1.000 | 11.451 | 322.49 | 43.17 | 51.48 | 309.2 | 9.09 | 19.9 |
| 295. | 0.46E-06 | 1.000 | 11.710 | 323.38 | 43.77 | 52.09 | 311.6 | 9.24 | 20.5 |
| 300. | 0.45E-06 | 1.000 | 11.971 | 324.26 | 44.38 | 52.69 | 313.8 | 9.39 | 21.1 |
| 310. | 0.44E-06 | 1.000 | 12.505 | 326.01 | 45.61 | 53.93 | 318.3 | 9.68 | 22.4 |
| 320. | 0.42E-06 | 1.000 | 13.050 | 327.74 | 46.86 | 55.18 | 322.8 | 9.97 | 23.8 |
| 330. | 0.41E-06 | 1.000 | 13.608 | 329.46 | 48.13 | 56.45 | 327.1 | 10.25 | 25.2 |
| 340. | 0.40E-06 | 1.000 | 14.179 | 331.16 | 49.41 | 57.73 | 331.4 | 10.54 | 26.6 |
| 350. | 0.39E-06 | 1.000 | 14.763 | 332.85 | 50.70 | 59.02 | 335.6 | 10.82 | 28.1 |
| 360. | 0.38E-06 | 1.000 | 15.359 | 334.53 | 52.00 | 60.31 | 339.8 | 11.10 | 29.6 |
| 370. | 0.37E-06 | 1.000 | 15.969 | 336.20 | 53.30 | 61.61 | 343.9 | 11.38 | 31.1 |
| 380. | 0.36E-06 | 1.000 | 16.592 | 337.86 | 54.60 | 62.91 | 348.0 | 11.65 | 32.7 |
| 390. | 0.35E-06 | 1.000 | 17.227 | 339.51 | 55.90 | 64.21 | 352.0 | 11.92 | 34.3 |
| 400. | 0.34E-06 | 1.000 | 17.876 | 341.16 | 57.19 | 65.51 | 355.9 | 12.19 | 36.0 |
| 410. | 0.33E-06 | 1.000 | 18.537 | 342.79 | 58.48 | 66.80 | 359.8 | 12.46 | 37.6 |
| 420. | 0.32E-06 | 1.000 | 19.212 | 344.41 | 59.77 | 68.08 | 363.7 | 12.72 | 39.3 |
| 430. | 0.32E-06 | 1.000 | 19.899 | 346.03 | 61.04 | 69.36 | 367.5 | 12.99 | 41.1 |
| 440. | 0.31E-06 | 1.000 | 20.599 | 347.64 | 62.31 | 70.62 | 371.3 | 13.25 | 42.8 |
| 450. | 0.30E-06 | 1.000 | 21.311 | 349.24 | 63.57 | 71.88 | 375.1 | 13.50 | 44.6 |
| 460. | 0.30E-06 | 1.000 | 22.036 | 350.84 | 64.81 | 73.13 | 378.8 | 13.76 | 46.4 |
| 470. | 0.29E-06 | 1.000 | 22.774 | 352.42 | 66.05 | 74.36 | 382.5 | 14.01 | 48.2 |
| 480. | 0.28E-06 | 1.000 | 23.524 | 354.00 | 67.27 | 75.58 | 386.2 | 14.26 | 50.0 |
| 490. | 0.28E-06 | 1.000 | 24.285 | 355.57 | 68.48 | 76.79 | 389.8 | 14.51 | 51.9 |
| 500. | 0.27E-06 | 1.000 | 25.059 | 357.13 | 69.67 | 77.99 | 393.4 | 14.76 | 53.8 |
| 520. | 0.26E-06 | 1.000 | 26.643 | 360.24 | 72.03 | 80.34 | 400.5 | | 57.6 |
| 540. | 0.25E-06 | 1.000 | 28.273 | 363.31 | 74.32 | 82.64 | 407.5 | | 61.5 |
| 560. | 0.24E-06 | 1.000 | 29.948 | 366.36 | 76.57 | 84.89 | 414.3 | | 65.4 |
| 580. | 0.23E-06 | 1.000 | 31.668 | 369.38 | 78.76 | 87.08 | 421.1 | | 69.3 |
| 600. | 0.23E-06 | 1.000 | 33.431 | 372.37 | 80.91 | 89.22 | 427.7 | | 73.3 |
| 625. | 0.22E-06 | 1.000 | 35.694 | 376.06 | 83.51 | 91.83 | 435.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0100 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 20.503 | 0.001 | -14.572 | 80.04 | 47.93 | 68.71 | 1970.2 | 1057.22 | 252.1 |
| 100. | 21.325 | 0.001 | -14.225 | 83.61 | 48.15 | 70.12 | 1938.3 | 878.06 | 248.2 |
| 105. | 21.144 | 0.001 | -13.873 | 87.04 | 47.89 | 70.70 | 1903.9 | 742.13 | 243.9 |
| 110. | 20.963 | 0.001 | -13.519 | 90.34 | 47.39 | 70.82 | 1868.3 | 637.08 | 239.5 |
| 115. | 20.780 | 0.001 | -13.165 | 93.48 | 46.78 | 70.72 | 1832.1 | 554.40 | 235.0 |
| 120. | 20.596 | 0.000 | -12.812 | 96.49 | 46.14 | 70.52 | 1795.5 | 488.19 | 230.3 |
| 125. | 20.411 | 0.000 | -12.460 | 99.36 | 45.53 | 70.32 | 1758.8 | 434.30 | 225.5 |
| 130. | 20.225 | 0.000 | -12.108 | 102.12 | 44.97 | 70.15 | 1721.9 | 389.79 | 220.7 |
| 135. | 20.039 | 0.000 | -11.758 | 104.76 | 44.47 | 70.05 | 1684.9 | 352.52 | 215.8 |
| 140. | 19.851 | 0.000 | -11.408 | 107.31 | 44.04 | 70.01 | 1647.8 | 320.93 | 210.9 |
| 145. | 19.661 | 0.000 | -11.058 | 109.77 | 43.68 | 70.06 | 1610.6 | 293.84 | 206.0 |
| 150. | 19.470 | 0.000 | -10.707 | 112.14 | 43.38 | 70.18 | 1573.3 | 270.37 | 201.0 |
| 150.393 | 19.455 | 0.000 | -10.679 | 112.33 | 43.36 | 70.20 | 1570.4 | 268.66 | 200.6 |
| 150.393 | 0.0080 | 0.996 | 5.261 | 218.32 | 27.15 | 35.03 | 230.8 | 4.81 | 6.7 |
| 155. | 0.0078 | 0.995 | 5.428 | 219.41 | 29.06 | 37.24 | 233.4 | 4.96 | 7.0 |
| 160. | 0.0076 | 0.995 | 5.618 | 220.62 | 30.22 | 38.55 | 236.5 | 5.11 | 7.4 |
| 165. | 0.0073 | 0.996 | 5.813 | 221.82 | 30.95 | 39.34 | 239.8 | 5.26 | 7.7 |
| 170. | 0.0071 | 0.996 | 6.011 | 223.00 | 31.49 | 39.90 | 243.1 | 5.42 | 8.1 |
| 175. | 0.0069 | 0.996 | 6.212 | 224.17 | 31.94 | 40.36 | 246.4 | 5.58 | 8.5 |
| 180. | 0.0067 | 0.997 | 6.414 | 225.31 | 32.35 | 40.77 | 249.6 | 5.73 | 8.9 |
| 185. | 0.0065 | 0.997 | 6.619 | 226.43 | 32.75 | 41.17 | 252.8 | 5.89 | 9.3 |
| 190. | 0.0063 | 0.997 | 6.826 | 227.53 | 33.15 | 41.56 | 255.9 | 6.04 | 9.7 |
| 195. | 0.0062 | 0.997 | 7.035 | 228.62 | 33.55 | 41.96 | 259.0 | 6.20 | 10.1 |
| 200. | 0.0060 | 0.997 | 7.246 | 229.69 | 33.96 | 42.36 | 262.0 | 6.35 | 10.5 |
| 205. | 0.0059 | 0.998 | 7.458 | 230.74 | 34.38 | 42.78 | 264.9 | 6.51 | 10.9 |
| 210. | 0.0057 | 0.998 | 7.673 | 231.77 | 34.81 | 43.20 | 267.8 | 6.66 | 11.4 |
| 215. | 0.0056 | 0.998 | 7.891 | 232.79 | 35.25 | 43.64 | 270.7 | 6.82 | 11.8 |
| 220. | 0.0055 | 0.998 | 8.110 | 233.80 | 35.71 | 44.09 | 273.5 | 6.97 | 12.3 |
| 225. | 0.0054 | 0.998 | 8.331 | 234.80 | 36.17 | 44.55 | 276.3 | 7.13 | 12.8 |
| 230. | 0.0052 | 0.998 | 8.555 | 235.78 | 36.65 | 45.02 | 279.0 | 7.28 | 13.2 |
| 235. | 0.0051 | 0.998 | 8.782 | 236.76 | 37.14 | 45.50 | 281.7 | 7.44 | 13.7 |
| 240. | 0.0050 | 0.999 | 9.010 | 237.72 | 37.64 | 46.00 | 284.4 | 7.59 | 14.2 |
| 245. | 0.0049 | 0.999 | 9.242 | 238.67 | 38.15 | 46.51 | 287.0 | 7.74 | 14.8 |
| 250. | 0.0048 | 0.999 | 9.475 | 239.62 | 38.67 | 47.03 | 289.6 | 7.89 | 15.3 |
| 255. | 0.0047 | 0.999 | 9.712 | 240.55 | 39.20 | 47.55 | 292.1 | 8.05 | 15.8 |
| 260. | 0.0046 | 0.999 | 9.951 | 241.48 | 39.74 | 48.09 | 294.6 | 8.20 | 16.4 |
| 265. | 0.0045 | 0.999 | 10.193 | 242.40 | 40.29 | 48.64 | 297.1 | 8.35 | 16.9 |
| 270. | 0.0045 | 0.999 | 10.437 | 243.32 | 40.85 | 49.20 | 299.6 | 8.50 | 17.5 |
| 275. | 0.0044 | 0.999 | 10.685 | 244.23 | 41.42 | 49.77 | 302.0 | 8.65 | 18.1 |
| 280. | 0.0043 | 0.999 | 10.935 | 245.13 | 42.00 | 50.35 | 304.4 | 8.80 | 18.7 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0100 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 285. | 0.0042 | 0.999 | 11.188 | 246.02 | 42.59 | 50.93 | 306.7 | 8.95 | 19.3 |
| 290. | 0.0042 | 0.999 | 11.445 | 246.92 | 43.18 | 51.52 | 309.1 | 9.09 | 19.9 |
| 295. | 0.0041 | 0.999 | 11.704 | 247.80 | 43.78 | 52.12 | 311.4 | 9.24 | 20.5 |
| 300. | 0.0040 | 0.999 | 11.966 | 248.68 | 44.39 | 52.73 | 313.7 | 9.39 | 21.1 |
| 310. | 0.0039 | 0.999 | 12.499 | 250.43 | 45.62 | 53.96 | 318.2 | 9.68 | 22.4 |
| 320. | 0.0038 | 0.999 | 13.045 | 252.16 | 46.87 | 55.21 | 322.6 | 9.97 | 23.8 |
| 330. | 0.0036 | 0.999 | 13.603 | 253.88 | 48.14 | 56.47 | 327.0 | 10.26 | 25.2 |
| 340. | 0.0035 | 0.000 | 14.175 | 255.59 | 49.42 | 57.75 | 331.3 | 10.54 | 26.6 |
| 350. | 0.0034 | 0.000 | 14.758 | 257.28 | 50.71 | 59.04 | 335.5 | 10.82 | 28.1 |
| 360. | 0.0033 | 0.000 | 15.355 | 258.96 | 52.00 | 60.33 | 339.7 | 11.10 | 29.6 |
| 370. | 0.0033 | 0.000 | 15.965 | 260.63 | 53.30 | 61.63 | 343.8 | 11.38 | 31.1 |
| 380. | 0.0032 | 0.000 | 16.588 | 262.29 | 54.60 | 62.93 | 347.9 | 11.65 | 32.7 |
| 390. | 0.0031 | 1.000 | 17.224 | 263.94 | 55.90 | 64.23 | 351.9 | 11.92 | 34.3 |
| 400. | 0.0030 | 1.000 | 17.873 | 265.59 | 57.20 | 65.52 | 355.9 | 12.19 | 36.0 |
| 410. | 0.0029 | 1.000 | 18.534 | 267.22 | 58.49 | 66.81 | 359.8 | 12.46 | 37.6 |
| 420. | 0.0029 | 1.000 | 19.209 | 268.85 | 59.77 | 68.09 | 363.7 | 12.73 | 39.3 |
| 430. | 0.0028 | 1.000 | 19.896 | 270.46 | 61.05 | 69.37 | 367.5 | 12.99 | 41.1 |
| 440. | 0.0027 | 1.000 | 20.596 | 272.07 | 62.31 | 70.64 | 371.3 | 13.25 | 42.8 |
| 450. | 0.0027 | 1.000 | 21.309 | 273.67 | 63.57 | 71.89 | 375.1 | 13.51 | 44.6 |
| 460. | 0.0026 | 1.000 | 22.034 | 275.27 | 64.81 | 73.14 | 378.8 | 13.76 | 46.4 |
| 470. | 0.0026 | 1.000 | 22.771 | 276.85 | 66.05 | 74.37 | 382.5 | 14.01 | 48.2 |
| 480. | 0.0025 | 1.000 | 23.521 | 278.43 | 67.27 | 75.59 | 386.1 | 14.27 | 50.0 |
| 490. | 0.0025 | 1.000 | 24.283 | 280.00 | 68.48 | 76.80 | 389.8 | 14.51 | 51.9 |
| 500. | 0.0024 | 1.000 | 25.057 | 281.57 | 69.67 | 78.00 | 393.4 | 14.76 | 53.8 |
| 520. | 0.0023 | 1.000 | 26.641 | 284.67 | 72.03 | 80.35 | 400.4 | | 57.6 |
| 540. | 0.0022 | 1.000 | 28.271 | 287.75 | 74.33 | 82.65 | 407.4 | | 61.5 |
| 560. | 0.0021 | 1.000 | 29.946 | 290.79 | 76.57 | 84.89 | 414.3 | | 65.4 |
| 580. | 0.0021 | 1.000 | 31.666 | 293.81 | 78.76 | 87.08 | 421.1 | | 69.3 |
| 600. | 0.0020 | 1.000 | 33.429 | 296.80 | 80.91 | 89.23 | 427.7 | | 73.4 |
| 625. | 0.0019 | 1.000 | 35.693 | 300.50 | 83.51 | 91.83 | 435.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0250 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.503 | 0.001 | -14.572 | 80.04 | 47.93 | 68.71 | 1970.3 | 1057.35 | 252.1 |
| 100. | 21.325 | 0.001 | -14.224 | 83.61 | 48.15 | 70.11 | 1938.4 | 878.16 | 248.2 |
| 105. | 21.145 | 0.001 | -13.872 | 87.04 | 47.89 | 70.70 | 1904.0 | 742.22 | 243.9 |
| 110. | 20.963 | 0.001 | -13.518 | 90.34 | 47.39 | 70.82 | 1868.4 | 637.15 | 239.5 |
| 115. | 20.780 | 0.001 | -13.164 | 93.48 | 46.78 | 70.72 | 1832.2 | 554.46 | 235.0 |
| 120. | 20.596 | 0.001 | -12.811 | 96.49 | 46.14 | 70.52 | 1795.6 | 488.24 | 230.3 |
| 125. | 20.411 | 0.001 | -12.459 | 99.36 | 45.53 | 70.32 | 1758.9 | 434.34 | 225.6 |
| 130. | 20.226 | 0.001 | -12.108 | 102.12 | 44.97 | 70.15 | 1722.0 | 389.83 | 220.7 |
| 135. | 20.039 | 0.001 | -11.757 | 104.76 | 44.47 | 70.05 | 1685.0 | 352.56 | 215.8 |
| 140. | 19.851 | 0.001 | -11.407 | 107.31 | 44.04 | 70.01 | 1647.9 | 320.96 | 210.9 |
| 145. | 19.662 | 0.001 | -11.057 | 109.77 | 43.68 | 70.06 | 1610.7 | 293.87 | 206.0 |
| 150. | 19.471 | 0.001 | -10.707 | 112.14 | 43.38 | 70.18 | 1573.4 | 270.40 | 201.0 |
| 155. | 19.278 | 0.001 | -10.355 | 114.45 | 43.14 | 70.38 | 1536.0 | 249.86 | 196.0 |
| 160. | 19.083 | 0.001 | -10.003 | 116.69 | 42.95 | 70.65 | 1498.5 | 231.74 | 191.1 |
| 162.094 | 19.001 | 0.001 | -9.854 | 117.61 | 42.88 | 70.79 | 1482.8 | 224.77 | 189.0 |
| 162.094 | 0.0187 | 0.990 | 5.694 | 213.53 | 27.90 | 35.99 | 238.1 | 5.18 | 7.6 |
| 165. | 0.0184 | 0.990 | 5.801 | 214.18 | 29.22 | 37.50 | 239.6 | 5.27 | 7.8 |
| 170. | 0.0179 | 0.990 | 5.992 | 215.33 | 30.66 | 39.12 | 242.5 | 5.42 | 8.2 |
| 175. | 0.0173 | 0.991 | 6.191 | 216.47 | 31.55 | 40.09 | 245.7 | 5.58 | 8.5 |
| 180. | 0.0168 | 0.991 | 6.393 | 217.61 | 32.18 | 40.74 | 248.9 | 5.73 | 8.9 |
| 185. | 0.0164 | 0.992 | 6.598 | 218.74 | 32.69 | 41.26 | 252.0 | 5.89 | 9.3 |
| 190. | 0.0159 | 0.993 | 6.805 | 219.84 | 33.15 | 41.70 | 255.2 | 6.04 | 9.7 |
| 195. | 0.0155 | 0.993 | 7.015 | 220.93 | 33.58 | 42.12 | 258.3 | 6.20 | 10.1 |
| 200. | 0.0151 | 0.994 | 7.227 | 222.00 | 34.00 | 42.53 | 261.3 | 6.36 | 10.5 |
| 205. | 0.0148 | 0.994 | 7.440 | 223.06 | 34.43 | 42.95 | 264.3 | 6.51 | 11.0 |
| 210. | 0.0144 | 0.995 | 7.656 | 224.10 | 34.86 | 43.37 | 267.3 | 6.67 | 11.4 |
| 215. | 0.0141 | 0.995 | 7.874 | 225.12 | 35.30 | 43.79 | 270.2 | 6.82 | 11.9 |
| 220. | 0.0137 | 0.995 | 8.094 | 226.14 | 35.76 | 44.23 | 273.0 | 6.98 | 12.3 |
| 225. | 0.0134 | 0.996 | 8.316 | 227.13 | 36.22 | 44.69 | 275.8 | 7.13 | 12.8 |
| 230. | 0.0131 | 0.996 | 8.541 | 228.12 | 36.69 | 45.15 | 278.6 | 7.29 | 13.3 |
| 235. | 0.0128 | 0.996 | 8.768 | 229.10 | 37.18 | 45.62 | 281.3 | 7.44 | 13.8 |
| 240. | 0.0126 | 0.996 | 8.997 | 230.06 | 37.67 | 46.11 | 284.0 | 7.59 | 14.3 |
| 245. | 0.0123 | 0.997 | 9.229 | 231.02 | 38.18 | 46.61 | 286.6 | 7.75 | 14.8 |
| 250. | 0.0121 | 0.997 | 9.463 | 231.97 | 38.70 | 47.13 | 289.2 | 7.90 | 15.3 |
| 255. | 0.0118 | 0.997 | 9.700 | 232.90 | 39.23 | 47.65 | 291.8 | 8.05 | 15.8 |
| 260. | 0.0116 | 0.997 | 9.940 | 233.84 | 39.77 | 48.18 | 294.3 | 8.20 | 16.4 |
| 265. | 0.0114 | 0.997 | 10.182 | 234.76 | 40.32 | 48.73 | 296.8 | 8.35 | 16.9 |
| 270. | 0.0112 | 0.997 | 10.427 | 235.67 | 40.88 | 49.28 | 299.2 | 8.50 | 17.5 |
| 275. | 0.0110 | 0.998 | 10.675 | 236.58 | 41.45 | 49.84 | 301.7 | 8.65 | 18.1 |
| 280. | 0.0108 | 0.998 | 10.925 | 237.49 | 42.02 | 50.42 | 304.1 | 8.80 | 18.7 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0250 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.0106 | 0.998 | 11.179 | 238.38 | 42.61 | 51.00 | 306.5 | 8.95 | 19.3 |
| 290. | 0.0104 | 0.998 | 11.435 | 239.28 | 43.20 | 51.59 | 308.8 | 9.10 | 19.9 |
| 295. | 0.0102 | 0.998 | 11.695 | 240.16 | 43.80 | 52.18 | 311.1 | 9.24 | 20.5 |
| 300. | 0.0100 | 0.998 | 11.957 | 241.05 | 44.41 | 52.78 | 313.4 | 9.39 | 21.1 |
| 310. | 0.0097 | 0.998 | 12.491 | 242.80 | 45.63 | 54.01 | 318.0 | 9.68 | 22.5 |
| 320. | 0.0094 | 0.998 | 13.037 | 244.53 | 46.88 | 55.25 | 322.4 | 9.97 | 23.8 |
| 330. | 0.0091 | 0.999 | 13.596 | 246.25 | 48.15 | 56.51 | 326.8 | 10.26 | 25.2 |
| 340. | 0.0089 | 0.999 | 14.168 | 247.96 | 49.43 | 57.79 | 331.1 | 10.54 | 26.6 |
| 350. | 0.0086 | 0.999 | 14.752 | 249.65 | 50.72 | 59.07 | 335.4 | 10.83 | 28.1 |
| 360. | 0.0084 | 0.999 | 15.349 | 251.33 | 52.01 | 60.36 | 339.5 | 11.11 | 29.6 |
| 370. | 0.0081 | 0.999 | 15.959 | 253.00 | 53.31 | 61.66 | 343.7 | 11.38 | 31.1 |
| 380. | 0.0079 | 0.999 | 16.582 | 254.66 | 54.61 | 62.96 | 347.7 | 11.66 | 32.7 |
| 390. | 0.0077 | 0.999 | 17.219 | 256.32 | 55.91 | 64.25 | 351.8 | 11.93 | 34.3 |
| 400. | 0.0075 | 0.999 | 17.868 | 257.96 | 57.20 | 65.55 | 355.7 | 12.20 | 36.0 |
| 410. | 0.0073 | 0.999 | 18.529 | 259.59 | 58.49 | 66.83 | 359.7 | 12.46 | 37.6 |
| 420. | 0.0072 | 0.999 | 19.204 | 261.22 | 59.77 | 68.11 | 363.6 | 12.73 | 39.3 |
| 430. | 0.0070 | 0.999 | 19.892 | 262.84 | 61.05 | 69.39 | 367.4 | 12.99 | 41.1 |
| 440. | 0.0068 | 0.999 | 20.592 | 264.45 | 62.32 | 70.65 | 371.2 | 13.25 | 42.8 |
| 450. | 0.0067 | 1.000 | 21.305 | 266.05 | 63.57 | 71.91 | 375.0 | 13.51 | 44.6 |
| 460. | 0.0065 | 1.000 | 22.030 | 267.64 | 64.82 | 73.15 | 378.7 | 13.76 | 46.4 |
| 470. | 0.0064 | 1.000 | 22.768 | 269.23 | 66.05 | 74.38 | 382.4 | 14.02 | 48.2 |
| 480. | 0.0063 | 1.000 | 23.518 | 270.81 | 67.27 | 75.60 | 386.1 | 14.27 | 50.1 |
| 490. | 0.0061 | 1.000 | 24.280 | 272.38 | 68.48 | 76.81 | 389.7 | 14.52 | 51.9 |
| 500. | 0.0060 | 1.000 | 25.054 | 273.94 | 69.68 | 78.01 | 393.3 | 14.76 | 53.8 |
| 520. | 0.0058 | 1.000 | 26.638 | 277.05 | 72.03 | 80.36 | 400.4 | | 57.6 |
| 540. | 0.0056 | 1.000 | 28.268 | 280.13 | 74.33 | 82.66 | 407.4 | | 61.5 |
| 560. | 0.0054 | 1.000 | 29.944 | 283.17 | 76.57 | 84.90 | 414.3 | | 65.4 |
| 580. | 0.0052 | 1.000 | 31.664 | 286.19 | 78.77 | 87.09 | 421.0 | | 69.3 |
| 600. | 0.0050 | 1.000 | 33.427 | 289.18 | 80.91 | 89.23 | 427.7 | | 73.4 |
| 625. | 0.0048 | 1.000 | 35.690 | 292.87 | 83.51 | 91.84 | 435.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.503 | 0.003 | -14.571 | 80.04 | 47.93 | 68.71 | 1970.4 | 1057.57 | 252.1 |
| 100. | 21.325 | 0.003 | -14.223 | 83.60 | 48.15 | 70.11 | 1938.5 | 878.34 | 248.2 |
| 105. | 21.145 | 0.003 | -13.871 | 87.04 | 47.89 | 70.70 | 1904.1 | 742.36 | 244.0 |
| 110. | 20.963 | 0.003 | -13.517 | 90.33 | 47.39 | 70.82 | 1868.5 | 637.27 | 239.6 |
| 115. | 20.780 | 0.003 | -13.163 | 93.48 | 46.78 | 70.72 | 1832.3 | 554.56 | 235.0 |
| 120. | 20.596 | 0.002 | -12.810 | 96.49 | 46.14 | 70.52 | 1795.7 | 488.32 | 230.3 |
| 125. | 20.412 | 0.002 | -12.458 | 99.36 | 45.53 | 70.32 | 1759.0 | 434.41 | 225.6 |
| 130. | 20.226 | 0.002 | -12.107 | 102.11 | 44.97 | 70.15 | 1722.1 | 389.89 | 220.7 |
| 135. | 20.039 | 0.002 | -11.756 | 104.76 | 44.48 | 70.04 | 1685.1 | 352.61 | 215.8 |
| 140. | 19.851 | 0.002 | -11.406 | 107.31 | 44.05 | 70.01 | 1648.0 | 321.01 | 210.9 |
| 145. | 19.662 | 0.002 | -11.056 | 109.76 | 43.68 | 70.06 | 1610.8 | 293.92 | 206.0 |
| 150. | 19.471 | 0.002 | -10.706 | 112.14 | 43.38 | 70.18 | 1573.5 | 270.44 | 201.0 |
| 155. | 19.278 | 0.002 | -10.354 | 114.45 | 43.14 | 70.38 | 1536.2 | 249.91 | 196.1 |
| 160. | 19.083 | 0.002 | -10.002 | 116.68 | 42.95 | 70.65 | 1498.7 | 231.78 | 191.1 |
| 165. | 18.886 | 0.002 | -9.648 | 118.86 | 42.81 | 70.99 | 1461.1 | 215.66 | 186.1 |
| 170. | 18.687 | 0.002 | -9.292 | 120.99 | 42.71 | 71.40 | 1423.3 | 201.22 | 181.2 |
| 172.410 | 18.589 | 0.002 | -9.119 | 121.99 | 42.68 | 71.62 | 1405.1 | 194.77 | 178.9 |
| 172.410 | 0.0355 | 0.981 | 6.063 | 210.05 | 29.12 | 37.58 | 243.5 | 5.50 | 8.4 |
| 175. | 0.0350 | 0.982 | 6.162 | 210.62 | 30.17 | 38.77 | 244.8 | 5.58 | 8.6 |
| 180. | 0.0340 | 0.983 | 6.360 | 211.74 | 31.54 | 40.27 | 247.8 | 5.74 | 9.0 |
| 185. | 0.0330 | 0.984 | 6.563 | 212.85 | 32.41 | 41.19 | 250.9 | 5.89 | 9.4 |
| 190. | 0.0321 | 0.985 | 6.771 | 213.96 | 33.05 | 41.84 | 254.0 | 6.05 | 9.8 |
| 195. | 0.0313 | 0.986 | 6.982 | 215.05 | 33.58 | 42.35 | 257.2 | 6.20 | 10.2 |
| 200. | 0.0305 | 0.987 | 7.194 | 216.13 | 34.05 | 42.80 | 260.3 | 6.36 | 10.6 |
| 205. | 0.0297 | 0.988 | 7.410 | 217.19 | 34.50 | 43.22 | 263.3 | 6.52 | 11.0 |
| 210. | 0.0290 | 0.989 | 7.627 | 218.24 | 34.94 | 43.64 | 266.3 | 6.67 | 11.5 |
| 215. | 0.0283 | 0.990 | 7.846 | 219.27 | 35.38 | 44.05 | 269.3 | 6.83 | 11.9 |
| 220. | 0.0276 | 0.990 | 8.067 | 220.29 | 35.84 | 44.48 | 272.1 | 6.98 | 12.4 |
| 225. | 0.0270 | 0.991 | 8.291 | 221.30 | 36.29 | 44.92 | 275.0 | 7.14 | 12.8 |
| 230. | 0.0264 | 0.992 | 8.516 | 222.29 | 36.76 | 45.37 | 277.8 | 7.29 | 13.3 |
| 235. | 0.0258 | 0.992 | 8.744 | 223.27 | 37.25 | 45.83 | 280.6 | 7.44 | 13.8 |
| 240. | 0.0252 | 0.993 | 8.975 | 224.24 | 37.74 | 46.31 | 283.3 | 7.60 | 14.3 |
| 245. | 0.0247 | 0.993 | 9.208 | 225.20 | 38.24 | 46.79 | 285.9 | 7.75 | 14.8 |
| 250. | 0.0242 | 0.994 | 9.443 | 226.15 | 38.76 | 47.29 | 288.6 | 7.90 | 15.3 |
| 255. | 0.0237 | 0.994 | 9.680 | 227.09 | 39.28 | 47.81 | 291.1 | 8.05 | 15.9 |
| 260. | 0.0233 | 0.994 | 9.921 | 228.02 | 39.82 | 48.33 | 293.7 | 8.21 | 16.4 |
| 265. | 0.0228 | 0.995 | 10.164 | 228.95 | 40.36 | 48.87 | 296.2 | 8.36 | 17.0 |
| 270. | 0.0224 | 0.995 | 10.409 | 229.87 | 40.92 | 49.41 | 298.7 | 8.51 | 17.5 |
| 275. | 0.0220 | 0.995 | 10.658 | 230.78 | 41.49 | 49.97 | 301.2 | 8.66 | 18.1 |
| 280. | 0.0216 | 0.995 | 10.909 | 231.68 | 42.06 | 50.53 | 303.6 | 8.81 | 18.7 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.0212 | 0.996 | 11.163 | 232.58 | 42.64 | 51.11 | 306.0 | 8.95 | 19.3 |
| 290. | 0.0208 | 0.996 | 11.420 | 233.48 | 43.23 | 51.69 | 308.4 | 9.10 | 19.9 |
| 295. | 0.0205 | 0.996 | 11.680 | 234.37 | 43.83 | 52.28 | 310.7 | 9.25 | 20.5 |
| 300. | 0.0201 | 0.996 | 11.943 | 235.25 | 44.43 | 52.88 | 313.0 | 9.40 | 21.2 |
| 310. | 0.0195 | 0.997 | 12.478 | 237.00 | 45.66 | 54.09 | 317.6 | 9.69 | 22.5 |
| 320. | 0.0188 | 0.997 | 13.025 | 238.74 | 46.90 | 55.33 | 322.1 | 9.98 | 23.8 |
| 330. | 0.0183 | 0.997 | 13.584 | 240.46 | 48.17 | 56.58 | 326.5 | 10.26 | 25.2 |
| 340. | 0.0177 | 0.998 | 14.157 | 242.17 | 49.44 | 57.85 | 330.8 | 10.55 | 26.6 |
| 350. | 0.0172 | 0.998 | 14.741 | 243.86 | 50.73 | 59.13 | 335.1 | 10.83 | 28.1 |
| 360. | 0.0167 | 0.998 | 15.339 | 245.55 | 52.02 | 60.42 | 339.3 | 11.11 | 29.6 |
| 370. | 0.0163 | 0.998 | 15.950 | 247.22 | 53.32 | 61.71 | 343.4 | 11.39 | 31.1 |
| 380. | 0.0159 | 0.998 | 16.573 | 248.88 | 54.62 | 63.00 | 347.5 | 11.66 | 32.7 |
| 390. | 0.0154 | 0.998 | 17.210 | 250.54 | 55.92 | 64.29 | 351.6 | 11.93 | 34.3 |
| 400. | 0.0151 | 0.999 | 17.859 | 252.18 | 57.21 | 65.58 | 355.6 | 12.20 | 36.0 |
| 410. | 0.0147 | 0.999 | 18.521 | 253.82 | 58.50 | 66.87 | 359.5 | 12.47 | 37.6 |
| 420. | 0.0143 | 0.999 | 19.197 | 255.44 | 59.78 | 68.15 | 363.4 | 12.73 | 39.3 |
| 430. | 0.0140 | 0.999 | 19.884 | 257.06 | 61.06 | 69.42 | 367.3 | 13.00 | 41.1 |
| 440. | 0.0137 | 0.999 | 20.585 | 258.67 | 62.32 | 70.68 | 371.1 | 13.26 | 42.8 |
| 450. | 0.0134 | 0.999 | 21.298 | 260.27 | 63.58 | 71.94 | 374.9 | 13.51 | 44.6 |
| 460. | 0.0131 | 0.999 | 22.024 | 261.87 | 64.82 | 73.18 | 378.6 | 13.77 | 46.4 |
| 470. | 0.0128 | 0.999 | 22.762 | 263.46 | 66.05 | 74.41 | 382.3 | 14.02 | 48.2 |
| 480. | 0.0125 | 0.999 | 23.512 | 265.04 | 67.28 | 75.63 | 386.0 | 14.27 | 50.1 |
| 490. | 0.0123 | 0.999 | 24.274 | 266.61 | 68.48 | 76.83 | 389.6 | 14.52 | 51.9 |
| 500. | 0.0120 | 0.999 | 25.048 | 268.17 | 69.68 | 78.03 | 393.2 | 14.77 | 53.8 |
| 520. | 0.0116 | 0.999 | 26.633 | 271.28 | 72.03 | 80.38 | 400.3 | | 57.6 |
| 540. | 0.0111 | 1.000 | 28.263 | 274.36 | 74.33 | 82.67 | 407.3 | | 61.5 |
| 560. | 0.0107 | 1.000 | 29.939 | 277.40 | 76.58 | 84.92 | 414.2 | | 65.4 |
| 580. | 0.0104 | 1.000 | 31.659 | 280.42 | 78.77 | 87.11 | 421.0 | | 69.4 |
| 600. | 0.0100 | 1.000 | 33.423 | 283.41 | 80.91 | 89.25 | 427.7 | | 73.4 |
| 625. | 0.0096 | 1.000 | 35.687 | 287.11 | 83.52 | 91.85 | 435.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0750 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 95. | 21.504 | 0.004 | -14.570 | 80.04 | 47.93 | 68.71 | 1970.5 | 1057.80 | 252.1 |
| 100. | 21.326 | 0.004 | -14.222 | 83.60 | 48.15 | 70.11 | 1938.6 | 878.51 | 248.2 |
| 105. | 21.145 | 0.004 | -13.870 | 87.04 | 47.89 | 70.69 | 1904.2 | 742.50 | 244.0 |
| 110. | 20.963 | 0.004 | -13.516 | 90.33 | 47.39 | 70.82 | 1868.6 | 637.38 | 239.6 |
| 115. | 20.780 | 0.004 | -13.162 | 93.48 | 46.78 | 70.71 | 1832.4 | 554.65 | 235.0 |
| 120. | 20.597 | 0.004 | -12.809 | 96.48 | 46.15 | 70.52 | 1795.8 | 488.40 | 230.3 |
| 125. | 20.412 | 0.004 | -12.457 | 99.36 | 45.53 | 70.31 | 1759.1 | 434.49 | 225.6 |
| 130. | 20.226 | 0.003 | -12.106 | 102.11 | 44.97 | 70.15 | 1722.2 | 389.96 | 220.7 |
| 135. | 20.040 | 0.003 | -11.755 | 104.76 | 44.48 | 70.04 | 1685.2 | 352.67 | 215.9 |
| 140. | 19.852 | 0.003 | -11.405 | 107.30 | 44.05 | 70.01 | 1648.1 | 321.07 | 210.9 |
| 145. | 19.663 | 0.003 | -11.055 | 109.76 | 43.68 | 70.06 | 1611.0 | 293.97 | 206.0 |
| 150. | 19.472 | 0.003 | -10.705 | 112.14 | 43.38 | 70.18 | 1573.7 | 270.49 | 201.0 |
| 155. | 19.279 | 0.003 | -10.353 | 114.44 | 43.14 | 70.38 | 1536.3 | 249.95 | 196.1 |
| 160. | 19.084 | 0.003 | -10.001 | 116.68 | 42.95 | 70.65 | 1498.8 | 231.83 | 191.1 |
| 165. | 18.887 | 0.003 | -9.647 | 118.86 | 42.81 | 70.99 | 1461.2 | 215.70 | 186.2 |
| 170. | 18.687 | 0.003 | -9.291 | 120.99 | 42.72 | 71.40 | 1423.5 | 201.26 | 181.3 |
| 175. | 18.485 | 0.003 | -8.933 | 123.06 | 42.66 | 71.87 | 1385.7 | 188.22 | 176.4 |
| 179.155 | 18.314 | 0.003 | -8.633 | 124.75 | 42.65 | 72.32 | 1354.1 | 178.31 | 172.3 |
| 179.155 | 0.0517 | 0.974 | 6.296 | 208.08 | 30.13 | 38.95 | 246.5 | 5.71 | 9.0 |
| 180. | 0.0514 | 0.974 | 6.329 | 208.27 | 30.46 | 39.32 | 246.9 | 5.74 | 9.1 |
| 185. | 0.0500 | 0.976 | 6.530 | 209.37 | 31.92 | 40.90 | 249.8 | 5.89 | 9.4 |
| 190. | 0.0486 | 0.978 | 6.737 | 210.47 | 32.85 | 41.86 | 252.9 | 6.05 | 9.8 |
| 195. | 0.0472 | 0.979 | 6.948 | 211.57 | 33.52 | 42.52 | 256.0 | 6.21 | 10.2 |
| 200. | 0.0460 | 0.981 | 7.162 | 212.65 | 34.06 | 43.04 | 259.2 | 6.36 | 10.7 |
| 205. | 0.0448 | 0.982 | 7.379 | 213.72 | 34.55 | 43.49 | 262.3 | 6.52 | 11.1 |
| 210. | 0.0437 | 0.983 | 7.597 | 214.78 | 35.01 | 43.91 | 265.3 | 6.68 | 11.5 |
| 215. | 0.0426 | 0.985 | 7.818 | 215.81 | 35.46 | 44.32 | 268.3 | 6.83 | 12.0 |
| 220. | 0.0416 | 0.986 | 8.040 | 216.84 | 35.91 | 44.73 | 271.3 | 6.99 | 12.4 |
| 225. | 0.0406 | 0.987 | 8.265 | 217.85 | 36.37 | 45.16 | 274.2 | 7.14 | 12.9 |
| 230. | 0.0397 | 0.987 | 8.492 | 218.84 | 36.84 | 45.59 | 277.0 | 7.30 | 13.3 |
| 235. | 0.0388 | 0.988 | 8.721 | 219.83 | 37.31 | 46.04 | 279.8 | 7.45 | 13.8 |
| 240. | 0.0380 | 0.989 | 8.952 | 220.80 | 37.80 | 46.50 | 282.6 | 7.60 | 14.3 |
| 245. | 0.0372 | 0.990 | 9.186 | 221.77 | 38.30 | 46.98 | 285.3 | 7.76 | 14.8 |
| 250. | 0.0364 | 0.990 | 9.422 | 222.72 | 38.81 | 47.47 | 287.9 | 7.91 | 15.4 |
| 255. | 0.0357 | 0.991 | 9.661 | 223.67 | 39.33 | 47.97 | 290.5 | 8.06 | 15.9 |
| 260. | 0.0350 | 0.991 | 9.902 | 224.60 | 39.87 | 48.48 | 293.1 | 8.21 | 16.4 |
| 265. | 0.0343 | 0.992 | 10.145 | 225.53 | 40.41 | 49.01 | 295.7 | 8.36 | 17.0 |
| 270. | 0.0337 | 0.992 | 10.392 | 226.45 | 40.96 | 49.54 | 298.2 | 8.51 | 17.6 |
| 275. | 0.0330 | 0.993 | 10.641 | 227.37 | 41.52 | 50.09 | 300.7 | 8.66 | 18.1 |
| 280. | 0.0324 | 0.993 | 10.893 | 228.27 | 42.10 | 50.65 | 303.1 | 8.81 | 18.7 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.0750 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 285. | 0.0319 | 0.994 | 11.147 | 229.17 | 42.68 | 51.22 | 305.5 | 8.96 | 19.3 |
| 290. | 0.0313 | 0.994 | 11.405 | 230.07 | 43.26 | 51.79 | 307.9 | 9.11 | 19.9 |
| 295. | 0.0308 | 0.994 | 11.665 | 230.96 | 43.86 | 52.38 | 310.3 | 9.26 | 20.6 |
| 300. | 0.0302 | 0.994 | 11.929 | 231.85 | 44.46 | 52.97 | 312.6 | 9.40 | 21.2 |
| 310. | 0.0292 | 0.995 | 12.464 | 233.60 | 45.68 | 54.17 | 317.2 | 9.69 | 22.5 |
| 320. | 0.0283 | 0.995 | 13.012 | 235.34 | 46.93 | 55.40 | 321.7 | 9.98 | 23.8 |
| 330. | 0.0274 | 0.996 | 13.573 | 237.07 | 48.19 | 56.65 | 326.2 | 10.27 | 25.2 |
| 340. | 0.0266 | 0.996 | 14.145 | 238.78 | 49.46 | 57.91 | 330.5 | 10.55 | 26.7 |
| 350. | 0.0259 | 0.997 | 14.731 | 240.47 | 50.74 | 59.19 | 334.8 | 10.84 | 28.1 |
| 360. | 0.0251 | 0.997 | 15.329 | 242.16 | 52.04 | 60.47 | 339.1 | 11.12 | 29.6 |
| 370. | 0.0244 | 0.997 | 15.940 | 243.83 | 53.33 | 61.76 | 343.2 | 11.39 | 31.2 |
| 380. | 0.0238 | 0.997 | 16.564 | 245.50 | 54.63 | 63.04 | 347.3 | 11.67 | 32.7 |
| 390. | 0.0232 | 0.998 | 17.201 | 247.15 | 55.92 | 64.33 | 351.4 | 11.94 | 34.3 |
| 400. | 0.0226 | 0.998 | 17.851 | 248.80 | 57.22 | 65.62 | 355.4 | 12.21 | 36.0 |
| 410. | 0.0220 | 0.998 | 18.514 | 250.43 | 58.51 | 66.90 | 359.3 | 12.47 | 37.7 |
| 420. | 0.0215 | 0.998 | 19.189 | 252.06 | 59.79 | 68.18 | 363.2 | 12.74 | 39.4 |
| 430. | 0.0210 | 0.998 | 19.877 | 253.68 | 61.06 | 69.45 | 367.1 | 13.00 | 41.1 |
| 440. | 0.0205 | 0.998 | 20.578 | 255.29 | 62.33 | 70.71 | 370.9 | 13.26 | 42.8 |
| 450. | 0.0201 | 0.999 | 21.291 | 256.89 | 63.58 | 71.96 | 374.7 | 13.52 | 44.6 |
| 460. | 0.0196 | 0.999 | 22.017 | 258.49 | 64.83 | 73.20 | 378.5 | 13.77 | 46.4 |
| 470. | 0.0192 | 0.999 | 22.755 | 260.08 | 66.06 | 74.43 | 382.2 | 14.03 | 48.2 |
| 480. | 0.0188 | 0.999 | 23.506 | 261.66 | 67.28 | 75.65 | 385.9 | 14.28 | 50.1 |
| 490. | 0.0184 | 0.999 | 24.268 | 263.23 | 68.49 | 76.86 | 389.5 | 14.53 | 51.9 |
| 500. | 0.0181 | 0.999 | 25.043 | 264.79 | 69.68 | 78.05 | 393.1 | 14.77 | 53.8 |
| 520. | 0.0174 | 0.999 | 26.627 | 267.90 | 72.04 | 80.40 | 400.3 | | 57.6 |
| 540. | 0.0167 | 0.999 | 28.258 | 270.98 | 74.33 | 82.69 | 407.3 | | 61.5 |
| 560. | 0.0161 | 0.999 | 29.935 | 274.02 | 76.58 | 84.93 | 414.2 | | 65.4 |
| 580. | 0.0156 | 1.000 | 31.655 | 277.04 | 78.77 | 87.12 | 421.0 | | 69.4 |
| 600. | 0.0150 | 1.000 | 33.419 | 280.03 | 80.91 | 89.26 | 427.6 | | 73.4 |
| 625. | 0.0144 | 1.000 | 35.683 | 283.73 | 83.52 | 91.86 | 435.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.1000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.504 | 0.006 | -14.569 | 80.04 | 47.93 | 68.71 | 1970.6 | 1058.02 | 252.2 |
| 100. | 21.326 | 0.006 | -14.221 | 83.60 | 48.15 | 70.11 | 1938.7 | 878.69 | 248.2 |
| 105. | 21.146 | 0.005 | -13.869 | 87.04 | 47.90 | 70.69 | 1904.3 | 742.64 | 244.0 |
| 110. | 20.964 | 0.005 | -13.515 | 90.33 | 47.39 | 70.82 | 1868.7 | 637.50 | 239.6 |
| 115. | 20.781 | 0.005 | -13.161 | 93.48 | 46.78 | 70.71 | 1832.5 | 554.75 | 235.0 |
| 120. | 20.597 | 0.005 | -12.808 | 96.48 | 46.15 | 70.52 | 1796.0 | 488.49 | 230.4 |
| 125. | 20.412 | 0.005 | -12.456 | 99.36 | 45.54 | 70.31 | 1759.2 | 434.56 | 225.6 |
| 130. | 20.227 | 0.005 | -12.105 | 102.11 | 44.98 | 70.15 | 1722.3 | 390.02 | 220.8 |
| 135. | 20.040 | 0.004 | -11.755 | 104.76 | 44.48 | 70.04 | 1685.4 | 352.73 | 215.9 |
| 140. | 19.852 | 0.004 | -11.404 | 107.30 | 44.05 | 70.01 | 1648.3 | 321.12 | 211.0 |
| 145. | 19.663 | 0.004 | -11.054 | 109.76 | 43.68 | 70.05 | 1611.1 | 294.02 | 206.0 |
| 150. | 19.472 | 0.004 | -10.704 | 112.14 | 43.38 | 70.18 | 1573.8 | 270.54 | 201.1 |
| 155. | 19.279 | 0.004 | -10.352 | 114.44 | 43.14 | 70.37 | 1536.5 | 250.00 | 196.1 |
| 160. | 19.085 | 0.004 | -10.000 | 116.68 | 42.95 | 70.65 | 1499.0 | 231.87 | 191.1 |
| 165. | 18.888 | 0.004 | -9.646 | 118.86 | 42.81 | 70.99 | 1461.4 | 215.75 | 186.2 |
| 170. | 18.688 | 0.004 | -9.290 | 120.98 | 42.72 | 71.40 | 1423.7 | 201.30 | 181.3 |
| 175. | 18.486 | 0.004 | -8.932 | 123.06 | 42.67 | 71.87 | 1385.9 | 188.26 | 176.4 |
| 180. | 18.280 | 0.004 | -8.571 | 125.09 | 42.65 | 72.41 | 1347.8 | 176.42 | 171.5 |
| 184.309 | 18.100 | 0.004 | -8.258 | 126.81 | 42.67 | 72.93 | 1315.0 | 167.06 | 167.4 |
| 184.309 | 0.0675 | 0.967 | 6.470 | 206.72 | 30.99 | 40.15 | 248.5 | 5.88 | 9.5 |
| 185. | 0.0672 | 0.968 | 6.498 | 206.87 | 31.23 | 40.41 | 248.8 | 5.90 | 9.5 |
| 190. | 0.0653 | 0.970 | 6.704 | 207.97 | 32.55 | 41.80 | 251.8 | 6.06 | 9.9 |
| 195. | 0.0634 | 0.972 | 6.915 | 209.06 | 33.41 | 42.66 | 254.9 | 6.21 | 10.3 |
| 200. | 0.0617 | 0.974 | 7.130 | 210.15 | 34.06 | 43.27 | 258.1 | 6.37 | 10.7 |
| 205. | 0.0601 | 0.976 | 7.347 | 211.23 | 34.59 | 43.75 | 261.2 | 6.52 | 11.1 |
| 210. | 0.0586 | 0.978 | 7.567 | 212.29 | 35.08 | 44.18 | 264.3 | 6.68 | 11.6 |
| 215. | 0.0571 | 0.979 | 7.789 | 213.33 | 35.54 | 44.59 | 267.4 | 6.84 | 12.0 |
| 220. | 0.0557 | 0.981 | 8.013 | 214.36 | 35.99 | 44.99 | 270.4 | 6.99 | 12.5 |
| 225. | 0.0544 | 0.982 | 8.239 | 215.38 | 36.45 | 45.40 | 273.3 | 7.15 | 12.9 |
| 230. | 0.0532 | 0.983 | 8.467 | 216.38 | 36.91 | 45.82 | 276.2 | 7.30 | 13.4 |
| 235. | 0.0520 | 0.984 | 8.697 | 217.37 | 37.38 | 46.25 | 279.1 | 7.45 | 13.9 |
| 240. | 0.0509 | 0.985 | 8.930 | 218.35 | 37.87 | 46.70 | 281.8 | 7.61 | 14.4 |
| 245. | 0.0498 | 0.986 | 9.164 | 219.32 | 38.36 | 47.16 | 284.6 | 7.76 | 14.9 |
| 250. | 0.0487 | 0.987 | 9.401 | 220.27 | 38.87 | 47.64 | 287.3 | 7.91 | 15.4 |
| 255. | 0.0477 | 0.988 | 9.641 | 221.22 | 39.39 | 48.13 | 289.9 | 8.07 | 15.9 |
| 260. | 0.0468 | 0.989 | 9.883 | 222.16 | 39.92 | 48.63 | 292.5 | 8.22 | 16.5 |
| 265. | 0.0459 | 0.989 | 10.127 | 223.09 | 40.46 | 49.15 | 295.1 | 8.37 | 17.0 |
| 270. | 0.0450 | 0.990 | 10.374 | 224.02 | 41.00 | 49.68 | 297.7 | 8.52 | 17.6 |
| 275. | 0.0442 | 0.990 | 10.624 | 224.93 | 41.56 | 50.22 | 300.2 | 8.67 | 18.2 |
| 280. | 0.0434 | 0.991 | 10.876 | 225.84 | 42.13 | 50.77 | 302.6 | 8.82 | 18.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.1000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.0426 | 0.991 | 11.132 | 226.75 | 42.71 | 51.33 | 305.1 | 8.97 | 19.3 |
| 290. | 0.0418 | 0.992 | 11.390 | 227.64 | 43.29 | 51.90 | 307.5 | 9.11 | 20.0 |
| 295. | 0.0411 | 0.992 | 11.651 | 228.53 | 43.89 | 52.48 | 309.9 | 9.26 | 20.6 |
| 300. | 0.0404 | 0.993 | 11.914 | 229.42 | 44.49 | 53.06 | 312.2 | 9.41 | 21.2 |
| 310. | 0.0391 | 0.993 | 12.451 | 231.18 | 45.71 | 54.26 | 316.9 | 9.70 | 22.5 |
| 320. | 0.0378 | 0.994 | 13.000 | 232.92 | 46.95 | 55.48 | 321.4 | 9.99 | 23.9 |
| 330. | 0.0366 | 0.995 | 13.561 | 234.65 | 48.20 | 56.72 | 325.9 | 10.28 | 25.2 |
| 340. | 0.0356 | 0.995 | 14.134 | 236.36 | 49.48 | 57.97 | 330.3 | 10.56 | 26.7 |
| 350. | 0.0345 | 0.995 | 14.720 | 238.06 | 50.76 | 59.24 | 334.6 | 10.84 | 28.1 |
| 360. | 0.0335 | 0.996 | 15.319 | 239.75 | 52.05 | 60.52 | 338.8 | 11.12 | 29.6 |
| 370. | 0.0326 | 0.996 | 15.931 | 241.42 | 53.34 | 61.80 | 343.0 | 11.40 | 31.2 |
| 380. | 0.0318 | 0.997 | 16.555 | 243.09 | 54.64 | 63.09 | 347.1 | 11.67 | 32.8 |
| 390. | 0.0309 | 0.997 | 17.192 | 244.74 | 55.93 | 64.38 | 351.2 | 11.94 | 34.4 |
| 400. | 0.0302 | 0.997 | 17.843 | 246.39 | 57.23 | 65.66 | 355.2 | 12.21 | 36.0 |
| 410. | 0.0294 | 0.997 | 18.506 | 248.03 | 58.51 | 66.94 | 359.2 | 12.48 | 37.7 |
| 420. | 0.0287 | 0.998 | 19.181 | 249.65 | 59.79 | 68.21 | 363.1 | 12.74 | 39.4 |
| 430. | 0.0280 | 0.998 | 19.870 | 251.27 | 61.07 | 69.48 | 367.0 | 13.01 | 41.1 |
| 440. | 0.0274 | 0.998 | 20.571 | 252.89 | 62.33 | 70.74 | 370.8 | 13.27 | 42.8 |
| 450. | 0.0268 | 0.998 | 21.285 | 254.49 | 63.59 | 71.99 | 374.6 | 13.52 | 44.6 |
| 460. | 0.0262 | 0.998 | 22.011 | 256.09 | 64.83 | 73.23 | 378.4 | 13.78 | 46.4 |
| 470. | 0.0256 | 0.998 | 22.749 | 257.67 | 66.06 | 74.46 | 382.1 | 14.03 | 48.2 |
| 480. | 0.0251 | 0.999 | 23.500 | 259.25 | 67.28 | 75.67 | 385.8 | 14.28 | 50.1 |
| 490. | 0.0246 | 0.999 | 24.263 | 260.83 | 68.49 | 76.88 | 389.4 | 14.53 | 51.9 |
| 500. | 0.0241 | 0.999 | 25.037 | 262.39 | 69.69 | 78.07 | 393.1 | 14.78 | 53.8 |
| 520. | 0.0232 | 0.999 | 26.622 | 265.50 | 72.04 | 80.41 | 400.2 | | 57.6 |
| 540. | 0.0223 | 0.999 | 28.254 | 268.58 | 74.34 | 82.71 | 407.2 | | 61.5 |
| 560. | 0.0215 | 0.999 | 29.930 | 271.63 | 76.58 | 84.95 | 414.1 | | 65.4 |
| 580. | 0.0207 | 0.999 | 31.651 | 274.65 | 78.77 | 87.14 | 420.9 | | 69.4 |
| 600. | 0.0201 | 1.000 | 33.415 | 277.64 | 80.91 | 89.27 | 427.6 | | 73.4 |
| 625. | 0.0193 | 1.000 | 35.680 | 281.33 | 83.52 | 91.87 | 435.8 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.101 325 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.504 | 0.006 | -14.569 | 80.03 | 47.93 | 68.71 | 1970.6 | 1058.03 | 252.2 |
| 100. | 21.326 | 0.006 | -14.221 | 83.60 | 48.15 | 70.11 | 1938.7 | 878.69 | 248.2 |
| 105. | 21.146 | 0.005 | -13.869 | 87.04 | 47.90 | 70.69 | 1904.3 | 742.64 | 244.0 |
| 110. | 20.964 | 0.005 | -13.515 | 90.33 | 47.39 | 70.82 | 1868.7 | 637.50 | 239.6 |
| 115. | 20.781 | 0.005 | -13.161 | 93.48 | 46.78 | 70.71 | 1832.5 | 554.76 | 235.0 |
| 120. | 20.597 | 0.005 | -12.808 | 96.48 | 46.15 | 70.52 | 1796.0 | 488.49 | 230.4 |
| 125. | 20.412 | 0.005 | -12.456 | 99.36 | 45.54 | 70.31 | 1759.2 | 434.57 | 225.6 |
| 130. | 20.227 | 0.005 | -12.105 | 102.11 | 44.98 | 70.15 | 1722.4 | 390.03 | 220.8 |
| 135. | 20.040 | 0.005 | -11.755 | 104.76 | 44.48 | 70.04 | 1685.4 | 352.74 | 215.9 |
| 140. | 19.852 | 0.004 | -11.404 | 107.30 | 44.05 | 70.01 | 1648.3 | 321.13 | 211.0 |
| 145. | 19.663 | 0.004 | -11.054 | 109.76 | 43.68 | 70.05 | 1611.1 | 294.02 | 206.0 |
| 150. | 19.472 | 0.004 | -10.704 | 112.14 | 43.38 | 70.18 | 1573.8 | 270.54 | 201.1 |
| 155. | 19.279 | 0.004 | -10.352 | 114.44 | 43.14 | 70.37 | 1536.5 | 250.00 | 196.1 |
| 160. | 19.085 | 0.004 | -10.000 | 116.68 | 42.95 | 70.65 | 1499.0 | 231.87 | 191.1 |
| 165. | 18.888 | 0.004 | -9.646 | 118.86 | 42.81 | 70.99 | 1461.4 | 215.75 | 186.2 |
| 170. | 18.688 | 0.004 | -9.290 | 120.98 | 42.72 | 71.40 | 1423.7 | 201.30 | 181.3 |
| 175. | 18.486 | 0.004 | -8.932 | 123.06 | 42.67 | 71.87 | 1385.9 | 188.26 | 176.4 |
| 180. | 18.280 | 0.004 | -8.571 | 125.09 | 42.65 | 72.41 | 1347.9 | 176.43 | 171.5 |
| 184.552 | 18.090 | 0.004 | -8.240 | 126.91 | 42.67 | 72.96 | 1313.1 | 166.55 | 167.1 |
| 184.552 | 0.0683 | 0.967 | 6.478 | 206.66 | 31.03 | 40.21 | 248.6 | 5.88 | 9.5 |
| 185. | 0.0681 | 0.967 | 6.496 | 206.75 | 31.19 | 40.38 | 248.8 | 5.90 | 9.5 |
| 190. | 0.0662 | 0.969 | 6.702 | 207.85 | 32.53 | 41.79 | 251.8 | 6.06 | 9.9 |
| 195. | 0.0643 | 0.972 | 6.913 | 208.95 | 33.41 | 42.67 | 254.9 | 6.21 | 10.3 |
| 200. | 0.0626 | 0.974 | 7.128 | 210.04 | 34.06 | 43.28 | 258.0 | 6.37 | 10.7 |
| 205. | 0.0609 | 0.976 | 7.346 | 211.11 | 34.60 | 43.77 | 261.2 | 6.52 | 11.1 |
| 210. | 0.0594 | 0.977 | 7.566 | 212.17 | 35.08 | 44.19 | 264.3 | 6.68 | 11.6 |
| 215. | 0.0579 | 0.979 | 7.788 | 213.22 | 35.54 | 44.60 | 267.3 | 6.84 | 12.0 |
| 220. | 0.0565 | 0.980 | 8.012 | 214.25 | 36.00 | 45.00 | 270.3 | 6.99 | 12.5 |
| 225. | 0.0552 | 0.982 | 8.238 | 215.26 | 36.45 | 45.41 | 273.3 | 7.15 | 12.9 |
| 230. | 0.0539 | 0.983 | 8.466 | 216.27 | 36.92 | 45.83 | 276.2 | 7.30 | 13.4 |
| 235. | 0.0527 | 0.984 | 8.696 | 217.26 | 37.39 | 46.27 | 279.0 | 7.45 | 13.9 |
| 240. | 0.0515 | 0.985 | 8.928 | 218.23 | 37.87 | 46.71 | 281.8 | 7.61 | 14.4 |
| 245. | 0.0504 | 0.986 | 9.163 | 219.20 | 38.37 | 47.17 | 284.5 | 7.76 | 14.9 |
| 250. | 0.0494 | 0.987 | 9.400 | 220.16 | 38.87 | 47.65 | 287.2 | 7.91 | 15.4 |
| 255. | 0.0484 | 0.988 | 9.640 | 221.11 | 39.39 | 48.14 | 289.9 | 8.07 | 15.9 |
| 260. | 0.0474 | 0.988 | 9.882 | 222.05 | 39.92 | 48.64 | 292.5 | 8.22 | 16.5 |
| 265. | 0.0465 | 0.989 | 10.126 | 222.98 | 40.46 | 49.16 | 295.1 | 8.37 | 17.0 |
| 270. | 0.0456 | 0.990 | 10.373 | 223.90 | 41.01 | 49.69 | 297.6 | 8.52 | 17.6 |
| 275. | 0.0448 | 0.990 | 10.623 | 224.82 | 41.57 | 50.22 | 300.1 | 8.67 | 18.2 |
| 280. | 0.0439 | 0.991 | 10.875 | 225.73 | 42.13 | 50.77 | 302.6 | 8.82 | 18.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.101 325 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.0431 | 0.991 | 11.131 | 226.63 | 42.71 | 51.33 | 305.0 | 8.97 | 19.4 |
| 290. | 0.0424 | 0.992 | 11.389 | 227.53 | 43.30 | 51.90 | 307.5 | 9.11 | 20.0 |
| 295. | 0.0416 | 0.992 | 11.650 | 228.42 | 43.89 | 52.48 | 309.8 | 9.26 | 20.6 |
| 300. | 0.0409 | 0.993 | 11.914 | 229.31 | 44.49 | 53.07 | 312.2 | 9.41 | 21.2 |
| 310. | 0.0396 | 0.993 | 12.450 | 231.07 | 45.71 | 54.26 | 316.8 | 9.70 | 22.5 |
| 320. | 0.0383 | 0.994 | 12.999 | 232.81 | 46.95 | 55.48 | 321.4 | 9.99 | 23.9 |
| 330. | 0.0371 | 0.994 | 13.560 | 234.54 | 48.21 | 56.72 | 325.9 | 10.28 | 25.2 |
| 340. | 0.0360 | 0.995 | 14.133 | 236.25 | 49.48 | 57.98 | 330.2 | 10.56 | 26.7 |
| 350. | 0.0350 | 0.995 | 14.720 | 237.95 | 50.76 | 59.25 | 334.5 | 10.84 | 28.1 |
| 360. | 0.0340 | 0.996 | 15.318 | 239.64 | 52.05 | 60.52 | 338.8 | 11.12 | 29.6 |
| 370. | 0.0331 | 0.996 | 15.930 | 241.31 | 53.34 | 61.81 | 343.0 | 11.40 | 31.2 |
| 380. | 0.0322 | 0.997 | 16.555 | 242.98 | 54.64 | 63.09 | 347.1 | 11.67 | 32.8 |
| 390. | 0.0313 | 0.997 | 17.192 | 244.63 | 55.93 | 64.38 | 351.2 | 11.94 | 34.4 |
| 400. | 0.0306 | 0.997 | 17.842 | 246.28 | 57.23 | 65.66 | 355.2 | 12.21 | 36.0 |
| 410. | 0.0298 | 0.997 | 18.505 | 247.92 | 58.51 | 66.94 | 359.2 | 12.48 | 37.7 |
| 420. | 0.0291 | 0.998 | 19.181 | 249.54 | 59.80 | 68.22 | 363.1 | 12.74 | 39.4 |
| 430. | 0.0284 | 0.998 | 19.869 | 251.16 | 61.07 | 69.48 | 367.0 | 13.01 | 41.1 |
| 440. | 0.0278 | 0.998 | 20.571 | 252.78 | 62.33 | 70.74 | 370.8 | 13.27 | 42.8 |
| 450. | 0.0271 | 0.998 | 21.284 | 254.38 | 63.59 | 71.99 | 374.6 | 13.52 | 44.6 |
| 460. | 0.0265 | 0.998 | 22.010 | 255.98 | 64.83 | 73.23 | 378.4 | 13.78 | 46.4 |
| 470. | 0.0260 | 0.998 | 22.749 | 257.56 | 66.06 | 74.46 | 382.1 | 14.03 | 48.2 |
| 480. | 0.0254 | 0.999 | 23.499 | 259.14 | 67.28 | 75.68 | 385.8 | 14.28 | 50.1 |
| 490. | 0.0249 | 0.999 | 24.262 | 260.72 | 68.49 | 76.88 | 389.4 | 14.53 | 51.9 |
| 500. | 0.0244 | 0.999 | 25.037 | 262.28 | 69.69 | 78.07 | 393.1 | 14.78 | 53.8 |
| 520. | 0.0235 | 0.999 | 26.622 | 265.39 | 72.04 | 80.42 | 400.2 | | 57.6 |
| 540. | 0.0226 | 0.999 | 28.253 | 268.47 | 74.34 | 82.71 | 407.2 | | 61.5 |
| 560. | 0.0218 | 0.999 | 29.930 | 271.52 | 76.58 | 84.95 | 414.1 | | 65.4 |
| 580. | 0.0210 | 0.999 | 31.651 | 274.54 | 78.77 | 87.14 | 420.9 | | 69.4 |
| 600. | 0.0203 | 1.000 | 33.415 | 277.53 | 80.91 | 89.27 | 427.6 | | 73.4 |
| 625. | 0.0195 | 1.000 | 35.680 | 281.22 | 83.52 | 91.87 | 435.8 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.1500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.505 | 0.009 | -14.567 | 80.03 | 47.93 | 68.70 | 1970.8 | 1058.47 | 252.2 |
| 100. | 21.327 | 0.008 | -14.219 | 83.60 | 48.15 | 70.11 | 1938.9 | 879.03 | 248.2 |
| 105. | 21.146 | 0.008 | -13.867 | 87.03 | 47.90 | 70.69 | 1904.5 | 742.91 | 244.0 |
| 110. | 20.965 | 0.008 | -13.513 | 90.33 | 47.39 | 70.82 | 1868.9 | 637.73 | 239.6 |
| 115. | 20.782 | 0.008 | -13.159 | 93.47 | 46.78 | 70.71 | 1832.7 | 554.95 | 235.1 |
| 120. | 20.598 | 0.007 | -12.806 | 96.48 | 46.15 | 70.52 | 1796.2 | 488.65 | 230.4 |
| 125. | 20.413 | 0.007 | -12.454 | 99.35 | 45.54 | 70.31 | 1759.5 | 434.71 | 225.6 |
| 130. | 20.228 | 0.007 | -12.103 | 102.11 | 44.98 | 70.14 | 1722.6 | 390.15 | 220.8 |
| 135. | 20.041 | 0.007 | -11.753 | 104.75 | 44.48 | 70.04 | 1685.6 | 352.85 | 215.9 |
| 140. | 19.853 | 0.006 | -11.403 | 107.30 | 44.05 | 70.00 | 1648.5 | 321.23 | 211.0 |
| 145. | 19.664 | 0.006 | -11.053 | 109.75 | 43.69 | 70.05 | 1611.4 | 294.12 | 206.0 |
| 150. | 19.473 | 0.006 | -10.702 | 112.13 | 43.38 | 70.17 | 1574.1 | 270.63 | 201.1 |
| 155. | 19.281 | 0.006 | -10.351 | 114.43 | 43.14 | 70.37 | 1536.8 | 250.09 | 196.1 |
| 160. | 19.086 | 0.006 | -9.998 | 116.67 | 42.95 | 70.64 | 1499.3 | 231.95 | 191.2 |
| 165. | 18.889 | 0.006 | -9.644 | 118.85 | 42.81 | 70.98 | 1461.7 | 215.83 | 186.2 |
| 170. | 18.689 | 0.006 | -9.288 | 120.98 | 42.72 | 71.39 | 1424.1 | 201.37 | 181.3 |
| 175. | 18.487 | 0.006 | -8.930 | 123.05 | 42.67 | 71.86 | 1386.2 | 188.33 | 176.4 |
| 180. | 18.282 | 0.005 | -8.570 | 125.08 | 42.65 | 72.40 | 1348.2 | 176.50 | 171.6 |
| 185. | 18.073 | 0.005 | -8.206 | 127.08 | 42.68 | 73.01 | 1310.1 | 165.69 | 166.7 |
| 190. | 17.860 | 0.005 | -7.839 | 129.03 | 42.73 | 73.68 | 1271.7 | 155.77 | 162.0 |
| 192.154 | 17.767 | 0.005 | -7.680 | 129.86 | 42.77 | 74.00 | 1255.1 | 151.74 | 159.9 |
| 192.154 | 0.0983 | 0.956 | 6.726 | 204.83 | 32.41 | 42.20 | 251.0 | 6.13 | 10.2 |
| 195. | 0.0966 | 0.957 | 6.847 | 205.46 | 33.11 | 42.89 | 252.8 | 6.22 | 10.4 |
| 200. | 0.0939 | 0.961 | 7.063 | 206.56 | 34.00 | 43.73 | 255.9 | 6.38 | 10.8 |
| 205. | 0.0913 | 0.964 | 7.284 | 207.65 | 34.66 | 44.30 | 259.2 | 6.53 | 11.2 |
| 210. | 0.0889 | 0.966 | 7.506 | 208.72 | 35.20 | 44.75 | 262.3 | 6.69 | 11.7 |
| 215. | 0.0866 | 0.969 | 7.731 | 209.78 | 35.69 | 45.15 | 265.5 | 6.85 | 12.1 |
| 220. | 0.0845 | 0.971 | 7.958 | 210.82 | 36.15 | 45.53 | 268.6 | 7.00 | 12.5 |
| 225. | 0.0824 | 0.973 | 8.186 | 211.85 | 36.60 | 45.91 | 271.6 | 7.16 | 13.0 |
| 230. | 0.0805 | 0.975 | 8.417 | 212.86 | 37.06 | 46.30 | 274.6 | 7.31 | 13.5 |
| 235. | 0.0786 | 0.976 | 8.649 | 213.86 | 37.53 | 46.70 | 277.5 | 7.46 | 14.0 |
| 240. | 0.0769 | 0.978 | 8.884 | 214.85 | 38.00 | 47.12 | 280.4 | 7.62 | 14.4 |
| 245. | 0.0752 | 0.979 | 9.120 | 215.82 | 38.49 | 47.55 | 283.2 | 7.77 | 14.9 |
| 250. | 0.0736 | 0.980 | 9.359 | 216.79 | 38.99 | 48.00 | 286.0 | 7.92 | 15.5 |
| 255. | 0.0721 | 0.982 | 9.600 | 217.74 | 39.49 | 48.47 | 288.7 | 8.08 | 16.0 |
| 260. | 0.0706 | 0.983 | 9.844 | 218.69 | 40.02 | 48.95 | 291.4 | 8.23 | 16.5 |
| 265. | 0.0692 | 0.984 | 10.090 | 219.63 | 40.55 | 49.44 | 294.0 | 8.38 | 17.1 |
| 270. | 0.0679 | 0.985 | 10.338 | 220.55 | 41.09 | 49.95 | 296.6 | 8.53 | 17.6 |
| 275. | 0.0666 | 0.985 | 10.590 | 221.48 | 41.64 | 50.47 | 299.1 | 8.68 | 18.2 |
| 280. | 0.0653 | 0.986 | 10.843 | 222.39 | 42.21 | 51.01 | 301.7 | 8.83 | 18.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.1500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.0641 | 0.987 | 11.100 | 223.30 | 42.78 | 51.56 | 304.1 | 8.98 | 19.4 |
| 290. | 0.0630 | 0.988 | 11.359 | 224.20 | 43.36 | 52.11 | 306.6 | 9.13 | 20.0 |
| 295. | 0.0619 | 0.988 | 11.621 | 225.09 | 43.95 | 52.68 | 309.0 | 9.27 | 20.6 |
| 300. | 0.0608 | 0.989 | 11.886 | 225.99 | 44.54 | 53.25 | 311.4 | 9.42 | 21.3 |
| 310. | 0.0588 | 0.990 | 12.424 | 227.75 | 45.75 | 54.43 | 316.1 | 9.71 | 22.6 |
| 320. | 0.0569 | 0.991 | 12.974 | 229.50 | 46.99 | 55.63 | 320.7 | 10.00 | 23.9 |
| 330. | 0.0551 | 0.992 | 13.537 | 231.23 | 48.24 | 56.86 | 325.2 | 10.29 | 25.3 |
| 340. | 0.0535 | 0.993 | 14.111 | 232.94 | 49.51 | 58.10 | 329.7 | 10.57 | 26.7 |
| 350. | 0.0519 | 0.993 | 14.699 | 234.65 | 50.79 | 59.36 | 334.0 | 10.85 | 28.2 |
| 360. | 0.0504 | 0.994 | 15.299 | 236.34 | 52.07 | 60.63 | 338.3 | 11.13 | 29.7 |
| 370. | 0.0490 | 0.994 | 15.911 | 238.01 | 53.37 | 61.90 | 342.5 | 11.41 | 31.2 |
| 380. | 0.0477 | 0.995 | 16.537 | 239.68 | 54.66 | 63.18 | 346.7 | 11.68 | 32.8 |
| 390. | 0.0465 | 0.995 | 17.175 | 241.34 | 55.95 | 64.46 | 350.8 | 11.95 | 34.4 |
| 400. | 0.0453 | 0.996 | 17.826 | 242.99 | 57.24 | 65.74 | 354.8 | 12.22 | 36.0 |
| 410. | 0.0442 | 0.996 | 18.490 | 244.63 | 58.53 | 67.01 | 358.8 | 12.49 | 37.7 |
| 420. | 0.0431 | 0.996 | 19.166 | 246.26 | 59.81 | 68.28 | 362.8 | 12.75 | 39.4 |
| 430. | 0.0421 | 0.997 | 19.855 | 247.88 | 61.08 | 69.54 | 366.7 | 13.02 | 41.1 |
| 440. | 0.0411 | 0.997 | 20.557 | 249.49 | 62.34 | 70.80 | 370.6 | 13.28 | 42.9 |
| 450. | 0.0402 | 0.997 | 21.271 | 251.10 | 63.60 | 72.05 | 374.4 | 13.53 | 44.6 |
| 460. | 0.0393 | 0.997 | 21.998 | 252.69 | 64.84 | 73.28 | 378.2 | 13.79 | 46.4 |
| 470. | 0.0385 | 0.998 | 22.737 | 254.28 | 66.07 | 74.51 | 381.9 | 14.04 | 48.3 |
| 480. | 0.0377 | 0.998 | 23.488 | 255.86 | 67.29 | 75.72 | 385.6 | 14.29 | 50.1 |
| 490. | 0.0369 | 0.998 | 24.251 | 257.44 | 68.50 | 76.92 | 389.3 | 14.54 | 52.0 |
| 500. | 0.0361 | 0.998 | 25.026 | 259.00 | 69.70 | 78.11 | 392.9 | 14.79 | 53.8 |
| 520. | 0.0347 | 0.998 | 26.612 | 262.11 | 72.05 | 80.45 | 400.1 | | 57.6 |
| 540. | 0.0335 | 0.999 | 28.244 | 265.19 | 74.34 | 82.74 | 407.1 | | 61.5 |
| 560. | 0.0323 | 0.999 | 29.921 | 268.24 | 76.59 | 84.98 | 414.0 | | 65.4 |
| 580. | 0.0311 | 0.999 | 31.643 | 271.26 | 78.78 | 87.16 | 420.9 | | 69.4 |
| 600. | 0.0301 | 0.999 | 33.408 | 274.25 | 80.92 | 89.30 | 427.6 | | 73.4 |
| 625. | 0.0289 | 0.999 | 35.673 | 277.95 | 83.52 | 91.90 | 435.8 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.2000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.505 | 0.012 | -14.565 | 80.03 | 47.93 | 68.70 | 1971.0 | 1058.91 | 252.2 |
| 100. | 21.327 | 0.011 | -14.217 | 83.59 | 48.15 | 70.11 | 1939.2 | 879.38 | 248.2 |
| 105. | 21.147 | 0.011 | -13.865 | 87.03 | 47.90 | 70.69 | 1904.8 | 743.19 | 244.0 |
| 110. | 20.965 | 0.010 | -13.511 | 90.32 | 47.40 | 70.81 | 1869.2 | 637.96 | 239.6 |
| 115. | 20.782 | 0.010 | -13.157 | 93.47 | 46.79 | 70.71 | 1833.0 | 555.14 | 235.1 |
| 120. | 20.599 | 0.010 | -12.804 | 96.47 | 46.15 | 70.51 | 1796.4 | 488.82 | 230.4 |
| 125. | 20.414 | 0.009 | -12.452 | 99.35 | 45.54 | 70.31 | 1759.7 | 434.86 | 225.7 |
| 130. | 20.229 | 0.009 | -12.101 | 102.10 | 44.98 | 70.14 | 1722.8 | 390.29 | 220.8 |
| 135. | 20.042 | 0.009 | -11.751 | 104.75 | 44.48 | 70.03 | 1685.9 | 352.97 | 215.9 |
| 140. | 19.854 | 0.009 | -11.401 | 107.29 | 44.05 | 70.00 | 1648.8 | 321.34 | 211.0 |
| 145. | 19.665 | 0.008 | -11.051 | 109.75 | 43.69 | 70.05 | 1611.7 | 294.22 | 206.1 |
| 150. | 19.474 | 0.008 | -10.700 | 112.13 | 43.39 | 70.17 | 1574.4 | 270.73 | 201.1 |
| 155. | 19.282 | 0.008 | -10.349 | 114.43 | 43.14 | 70.36 | 1537.1 | 250.17 | 196.2 |
| 160. | 19.087 | 0.008 | -9.996 | 116.67 | 42.95 | 70.63 | 1499.6 | 232.04 | 191.2 |
| 165. | 18.890 | 0.008 | -9.642 | 118.85 | 42.82 | 70.97 | 1462.1 | 215.91 | 186.3 |
| 170. | 18.691 | 0.008 | -9.287 | 120.97 | 42.72 | 71.38 | 1424.4 | 201.45 | 181.4 |
| 175. | 18.488 | 0.007 | -8.928 | 123.05 | 42.67 | 71.85 | 1386.6 | 188.41 | 176.5 |
| 180. | 18.283 | 0.007 | -8.568 | 125.08 | 42.66 | 72.39 | 1348.6 | 176.57 | 171.6 |
| 185. | 18.074 | 0.007 | -8.204 | 127.07 | 42.68 | 73.00 | 1310.5 | 165.76 | 166.8 |
| 190. | 17.862 | 0.007 | -7.838 | 129.03 | 42.74 | 73.67 | 1272.1 | 155.84 | 162.0 |
| 195. | 17.645 | 0.007 | -7.468 | 130.95 | 42.82 | 74.42 | 1233.5 | 146.69 | 157.3 |
| 198.179 | 17.505 | 0.007 | -7.230 | 132.16 | 42.90 | 74.93 | 1208.9 | 141.23 | 154.3 |
| 198.179 | 0.1284 | 0.945 | 6.914 | 203.53 | 33.56 | 43.93 | 252.6 | 6.33 | 10.8 |
| 200. | 0.1271 | 0.947 | 6.994 | 203.93 | 33.94 | 44.26 | 253.7 | 6.39 | 11.0 |
| 205. | 0.1234 | 0.951 | 7.218 | 205.03 | 34.73 | 44.92 | 257.0 | 6.54 | 11.4 |
| 210. | 0.1200 | 0.954 | 7.443 | 206.12 | 35.34 | 45.39 | 260.3 | 6.70 | 11.8 |
| 215. | 0.1168 | 0.958 | 7.671 | 207.19 | 35.85 | 45.77 | 263.6 | 6.86 | 12.2 |
| 220. | 0.1138 | 0.961 | 7.901 | 208.25 | 36.32 | 46.11 | 266.8 | 7.01 | 12.6 |
| 225. | 0.1110 | 0.963 | 8.132 | 209.29 | 36.77 | 46.45 | 269.9 | 7.17 | 13.1 |
| 230. | 0.1083 | 0.966 | 8.366 | 210.32 | 37.22 | 46.80 | 273.0 | 7.32 | 13.6 |
| 235. | 0.1057 | 0.968 | 8.600 | 211.33 | 37.68 | 47.17 | 276.0 | 7.48 | 14.0 |
| 240. | 0.1033 | 0.970 | 8.837 | 212.32 | 38.14 | 47.55 | 278.9 | 7.63 | 14.5 |
| 245. | 0.1010 | 0.972 | 9.076 | 213.31 | 38.62 | 47.95 | 281.8 | 7.78 | 15.0 |
| 250. | 0.0988 | 0.974 | 9.317 | 214.28 | 39.10 | 48.37 | 284.7 | 7.94 | 15.5 |
| 255. | 0.0967 | 0.975 | 9.560 | 215.24 | 39.61 | 48.81 | 287.4 | 8.09 | 16.1 |
| 260. | 0.0947 | 0.977 | 9.805 | 216.19 | 40.12 | 49.27 | 290.2 | 8.24 | 16.6 |
| 265. | 0.0928 | 0.978 | 10.052 | 217.14 | 40.64 | 49.75 | 292.9 | 8.39 | 17.1 |
| 270. | 0.0910 | 0.979 | 10.302 | 218.07 | 41.18 | 50.23 | 295.5 | 8.54 | 17.7 |
| 275. | 0.0892 | 0.981 | 10.555 | 219.00 | 41.72 | 50.74 | 298.1 | 8.69 | 18.3 |
| 280. | 0.0875 | 0.982 | 10.810 | 219.92 | 42.28 | 51.26 | 300.7 | 8.84 | 18.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.2000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol·K) | J/(mol·K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m·K) |
| 285. | 0.0859 | 0.983 | 11.067 | 220.83 | 42.85 | 51.79 | 303.2 | 8.99 | 19.5 |
| 290. | 0.0843 | 0.983 | 11.328 | 221.73 | 43.42 | 52.33 | 305.7 | 9.14 | 20.1 |
| 295. | 0.0828 | 0.984 | 11.591 | 222.63 | 44.01 | 52.88 | 308.2 | 9.28 | 20.7 |
| 300. | 0.0814 | 0.985 | 11.857 | 223.53 | 44.60 | 53.45 | 310.6 | 9.43 | 21.3 |
| 310. | 0.0786 | 0.987 | 12.397 | 225.30 | 45.80 | 54.60 | 315.4 | 9.72 | 22.6 |
| 320. | 0.0761 | 0.988 | 12.949 | 227.05 | 47.03 | 55.79 | 320.0 | 10.01 | 23.9 |
| 330. | 0.0737 | 0.989 | 13.513 | 228.79 | 48.28 | 57.00 | 324.6 | 10.30 | 25.3 |
| 340. | 0.0715 | 0.990 | 14.089 | 230.51 | 49.54 | 58.23 | 329.1 | 10.58 | 26.7 |
| 350. | 0.0694 | 0.991 | 14.677 | 232.21 | 50.82 | 59.47 | 333.5 | 10.86 | 28.2 |
| 360. | 0.0674 | 0.992 | 15.278 | 233.90 | 52.10 | 60.73 | 337.8 | 11.14 | 29.7 |
| 370. | 0.0655 | 0.992 | 15.892 | 235.59 | 53.39 | 62.00 | 342.1 | 11.42 | 31.2 |
| 380. | 0.0637 | 0.993 | 16.518 | 237.26 | 54.68 | 63.27 | 346.3 | 11.69 | 32.8 |
| 390. | 0.0621 | 0.994 | 17.157 | 238.92 | 55.97 | 64.54 | 350.4 | 11.96 | 34.4 |
| 400. | 0.0605 | 0.994 | 17.809 | 240.57 | 57.26 | 65.81 | 354.5 | 12.23 | 36.1 |
| 410. | 0.0590 | 0.995 | 18.474 | 242.21 | 58.54 | 67.08 | 358.5 | 12.50 | 37.7 |
| 420. | 0.0576 | 0.995 | 19.151 | 243.84 | 59.82 | 68.35 | 362.5 | 12.76 | 39.4 |
| 430. | 0.0562 | 0.996 | 19.841 | 245.46 | 61.09 | 69.61 | 366.4 | 13.03 | 41.1 |
| 440. | 0.0549 | 0.996 | 20.543 | 247.08 | 62.36 | 70.86 | 370.3 | 13.29 | 42.9 |
| 450. | 0.0537 | 0.996 | 21.258 | 248.68 | 63.61 | 72.10 | 374.1 | 13.54 | 44.7 |
| 460. | 0.0525 | 0.997 | 21.985 | 250.28 | 64.85 | 73.33 | 377.9 | 13.80 | 46.5 |
| 470. | 0.0513 | 0.997 | 22.724 | 251.87 | 66.08 | 74.56 | 381.7 | 14.05 | 48.3 |
| 480. | 0.0503 | 0.997 | 23.476 | 253.45 | 67.30 | 75.77 | 385.4 | 14.30 | 50.1 |
| 490. | 0.0492 | 0.997 | 24.240 | 255.03 | 68.51 | 76.97 | 389.1 | 14.55 | 52.0 |
| 500. | 0.0482 | 0.998 | 25.015 | 256.59 | 69.70 | 78.15 | 392.7 | 14.80 | 53.8 |
| 520. | 0.0464 | 0.998 | 26.602 | 259.71 | 72.05 | 80.49 | 399.9 | | 57.6 |
| 540. | 0.0446 | 0.998 | 28.235 | 262.79 | 74.35 | 82.78 | 407.0 | | 61.5 |
| 560. | 0.0430 | 0.999 | 29.912 | 265.84 | 76.59 | 85.01 | 414.0 | | 65.4 |
| 580. | 0.0415 | 0.999 | 31.635 | 268.86 | 78.78 | 87.19 | 420.8 | | 69.4 |
| 600. | 0.0401 | 0.999 | 33.400 | 271.85 | 80.92 | 89.32 | 427.5 | | 73.4 |
| 625. | 0.0385 | 0.999 | 35.666 | 275.55 | 83.53 | 91.92 | 435.8 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.2500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.506 | 0.015 | -14.563 | 80.02 | 47.93 | 68.70 | 1971.2 | 1059.36 | 252.2 |
| 100. | 21.328 | 0.014 | -14.216 | 83.59 | 48.15 | 70.10 | 1939.4 | 879.73 | 248.3 |
| 105. | 21.148 | 0.014 | -13.863 | 87.02 | 47.90 | 70.69 | 1905.0 | 743.47 | 244.1 |
| 110. | 20.966 | 0.013 | -13.509 | 90.32 | 47.40 | 70.81 | 1869.4 | 638.19 | 239.7 |
| 115. | 20.783 | 0.013 | -13.156 | 93.46 | 46.79 | 70.71 | 1833.2 | 555.34 | 235.1 |
| 120. | 20.599 | 0.012 | -12.802 | 96.47 | 46.15 | 70.51 | 1796.7 | 488.99 | 230.4 |
| 125. | 20.415 | 0.012 | -12.450 | 99.34 | 45.54 | 70.31 | 1759.9 | 435.00 | 225.7 |
| 130. | 20.229 | 0.011 | -12.099 | 102.10 | 44.98 | 70.14 | 1723.1 | 390.42 | 220.9 |
| 135. | 20.043 | 0.011 | -11.749 | 104.74 | 44.48 | 70.03 | 1686.1 | 353.09 | 216.0 |
| 140. | 19.855 | 0.011 | -11.399 | 107.29 | 44.05 | 70.00 | 1649.1 | 321.45 | 211.1 |
| 145. | 19.666 | 0.011 | -11.049 | 109.74 | 43.69 | 70.04 | 1611.9 | 294.32 | 206.1 |
| 150. | 19.475 | 0.010 | -10.698 | 112.12 | 43.39 | 70.16 | 1574.7 | 270.82 | 201.2 |
| 155. | 19.283 | 0.010 | -10.347 | 114.42 | 43.15 | 70.36 | 1537.4 | 250.26 | 196.2 |
| 160. | 19.088 | 0.010 | -9.995 | 116.66 | 42.96 | 70.63 | 1500.0 | 232.12 | 191.2 |
| 165. | 18.891 | 0.010 | -9.641 | 118.84 | 42.82 | 70.97 | 1462.4 | 215.99 | 186.3 |
| 170. | 18.692 | 0.009 | -9.285 | 120.96 | 42.72 | 71.37 | 1424.8 | 201.53 | 181.4 |
| 175. | 18.490 | 0.009 | -8.927 | 123.04 | 42.67 | 71.85 | 1387.0 | 188.49 | 176.5 |
| 180. | 18.285 | 0.009 | -8.566 | 125.07 | 42.66 | 72.39 | 1349.0 | 176.65 | 171.7 |
| 185. | 18.076 | 0.009 | -8.203 | 127.06 | 42.68 | 72.99 | 1310.9 | 165.83 | 166.8 |
| 190. | 17.864 | 0.009 | -7.836 | 129.02 | 42.74 | 73.66 | 1272.6 | 155.91 | 162.0 |
| 195. | 17.647 | 0.009 | -7.466 | 130.94 | 42.83 | 74.40 | 1234.0 | 146.76 | 157.3 |
| 200. | 17.426 | 0.009 | -7.092 | 132.84 | 42.94 | 75.22 | 1195.2 | 138.28 | 152.6 |
| 203.144 | 17.285 | 0.009 | -6.855 | 134.01 | 43.03 | 75.78 | 1170.6 | 133.25 | 149.7 |
| 203.144 | 0.1583 | 0.935 | 7.064 | 202.53 | 34.54 | 45.46 | 253.6 | 6.50 | 11.3 |
| 205. | 0.1565 | 0.937 | 7.149 | 202.95 | 34.85 | 45.68 | 254.8 | 6.55 | 11.5 |
| 210. | 0.1520 | 0.942 | 7.378 | 204.05 | 35.51 | 46.12 | 258.2 | 6.71 | 11.9 |
| 215. | 0.1478 | 0.946 | 7.610 | 205.14 | 36.03 | 46.46 | 261.6 | 6.87 | 12.3 |
| 220. | 0.1438 | 0.950 | 7.843 | 206.21 | 36.50 | 46.75 | 264.9 | 7.02 | 12.7 |
| 225. | 0.1401 | 0.954 | 8.077 | 207.27 | 36.95 | 47.04 | 268.1 | 7.18 | 13.2 |
| 230. | 0.1366 | 0.957 | 8.313 | 208.30 | 37.39 | 47.34 | 271.3 | 7.33 | 13.6 |
| 235. | 0.1333 | 0.960 | 8.551 | 209.33 | 37.83 | 47.66 | 274.4 | 7.49 | 14.1 |
| 240. | 0.1302 | 0.962 | 8.790 | 210.33 | 38.28 | 48.01 | 277.4 | 7.64 | 14.6 |
| 245. | 0.1272 | 0.965 | 9.031 | 211.33 | 38.75 | 48.37 | 280.4 | 7.79 | 15.1 |
| 250. | 0.1244 | 0.967 | 9.274 | 212.31 | 39.23 | 48.76 | 283.3 | 7.95 | 15.6 |
| 255. | 0.1217 | 0.969 | 9.518 | 213.28 | 39.72 | 49.18 | 286.2 | 8.10 | 16.1 |
| 260. | 0.1191 | 0.971 | 9.765 | 214.24 | 40.22 | 49.61 | 289.0 | 8.25 | 16.7 |
| 265. | 0.1167 | 0.973 | 10.015 | 215.18 | 40.74 | 50.06 | 291.7 | 8.40 | 17.2 |
| 270. | 0.1143 | 0.974 | 10.266 | 216.12 | 41.27 | 50.53 | 294.4 | 8.55 | 17.8 |
| 275. | 0.1121 | 0.976 | 10.520 | 217.06 | 41.81 | 51.01 | 297.1 | 8.70 | 18.3 |
| 280. | 0.1099 | 0.977 | 10.776 | 217.98 | 42.36 | 51.51 | 299.7 | 8.85 | 18.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.2500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 285. | 0.1079 | 0.978 | 11.035 | 218.90 | 42.92 | 52.03 | 302.3 | 9.00 | 19.5 |
| 290. | 0.1059 | 0.979 | 11.296 | 219.81 | 43.49 | 52.56 | 304.8 | 9.15 | 20.1 |
| 295. | 0.1040 | 0.980 | 11.561 | 220.71 | 44.07 | 53.10 | 307.3 | 9.30 | 20.7 |
| 300. | 0.1021 | 0.981 | 11.827 | 221.61 | 44.65 | 53.65 | 309.8 | 9.44 | 21.4 |
| 310. | 0.0986 | 0.983 | 12.370 | 223.38 | 45.85 | 54.78 | 314.6 | 9.73 | 22.6 |
| 320. | 0.0954 | 0.985 | 12.923 | 225.14 | 47.07 | 55.95 | 319.3 | 10.02 | 24.0 |
| 330. | 0.0924 | 0.986 | 13.489 | 226.88 | 48.32 | 57.14 | 324.0 | 10.31 | 25.4 |
| 340. | 0.0896 | 0.988 | 14.066 | 228.60 | 49.57 | 58.36 | 328.5 | 10.59 | 26.8 |
| 350. | 0.0869 | 0.989 | 14.656 | 230.31 | 50.85 | 59.59 | 332.9 | 10.87 | 28.2 |
| 360. | 0.0844 | 0.990 | 15.258 | 232.01 | 52.13 | 60.84 | 337.3 | 11.15 | 29.7 |
| 370. | 0.0820 | 0.991 | 15.873 | 233.69 | 53.41 | 62.10 | 341.6 | 11.43 | 31.3 |
| 380. | 0.0798 | 0.991 | 16.500 | 235.37 | 54.70 | 63.36 | 345.8 | 11.70 | 32.8 |
| 390. | 0.0777 | 0.992 | 17.140 | 237.03 | 55.99 | 64.63 | 350.0 | 11.98 | 34.4 |
| 400. | 0.0757 | 0.993 | 17.792 | 238.68 | 57.28 | 65.89 | 354.1 | 12.24 | 36.1 |
| 410. | 0.0738 | 0.993 | 18.458 | 240.32 | 58.56 | 67.16 | 358.2 | 12.51 | 37.7 |
| 420. | 0.0720 | 0.994 | 19.136 | 241.96 | 59.84 | 68.42 | 362.2 | 12.77 | 39.4 |
| 430. | 0.0703 | 0.994 | 19.826 | 243.58 | 61.11 | 69.67 | 366.1 | 13.04 | 41.2 |
| 440. | 0.0687 | 0.995 | 20.529 | 245.20 | 62.37 | 70.92 | 370.0 | 13.30 | 42.9 |
| 450. | 0.0671 | 0.995 | 21.244 | 246.81 | 63.62 | 72.16 | 373.9 | 13.55 | 44.7 |
| 460. | 0.0657 | 0.996 | 21.972 | 248.40 | 64.86 | 73.39 | 377.7 | 13.81 | 46.5 |
| 470. | 0.0642 | 0.996 | 22.712 | 250.00 | 66.09 | 74.61 | 381.5 | 14.06 | 48.3 |
| 480. | 0.0629 | 0.996 | 23.464 | 251.58 | 67.31 | 75.81 | 385.2 | 14.31 | 50.1 |
| 490. | 0.0616 | 0.997 | 24.228 | 253.15 | 68.52 | 77.01 | 388.9 | 14.56 | 52.0 |
| 500. | 0.0603 | 0.997 | 25.004 | 254.72 | 69.71 | 78.20 | 392.6 | 14.81 | 53.9 |
| 520. | 0.0580 | 0.997 | 26.592 | 257.84 | 72.06 | 80.53 | 399.8 | | 57.7 |
| 540. | 0.0558 | 0.998 | 28.225 | 260.92 | 74.35 | 82.81 | 406.9 | | 61.5 |
| 560. | 0.0538 | 0.998 | 29.904 | 263.97 | 76.60 | 85.04 | 413.9 | | 65.4 |
| 580. | 0.0519 | 0.998 | 31.626 | 266.99 | 78.79 | 87.22 | 420.7 | | 69.4 |
| 600. | 0.0502 | 0.999 | 33.392 | 269.98 | 80.93 | 89.35 | 427.5 | | 73.4 |
| 625. | 0.0482 | 0.999 | 35.658 | 273.69 | 83.53 | 91.95 | 435.7 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.3000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.506 | 0.018 | -14.561 | 80.02 | 47.93 | 68.70 | 1971.5 | 1059.81 | 252.2 |
| 100. | 21.329 | 0.017 | -14.214 | 83.58 | 48.15 | 70.10 | 1939.6 | 880.08 | 248.3 |
| 105. | 21.148 | 0.016 | -13.861 | 87.02 | 47.90 | 70.68 | 1905.2 | 743.75 | 244.1 |
| 110. | 20.967 | 0.016 | -13.507 | 90.31 | 47.40 | 70.81 | 1869.6 | 638.42 | 239.7 |
| 115. | 20.784 | 0.015 | -13.154 | 93.46 | 46.79 | 70.70 | 1833.4 | 555.53 | 235.1 |
| 120. | 20.600 | 0.015 | -12.801 | 96.46 | 46.15 | 70.51 | 1796.9 | 489.16 | 230.5 |
| 125. | 20.416 | 0.014 | -12.449 | 99.34 | 45.54 | 70.30 | 1760.2 | 435.15 | 225.7 |
| 130. | 20.230 | 0.014 | -12.097 | 102.09 | 44.98 | 70.13 | 1723.3 | 390.55 | 220.9 |
| 135. | 20.044 | 0.013 | -11.747 | 104.74 | 44.49 | 70.03 | 1686.4 | 353.21 | 216.0 |
| 140. | 19.856 | 0.013 | -11.397 | 107.28 | 44.06 | 69.99 | 1649.4 | 321.56 | 211.1 |
| 145. | 19.667 | 0.013 | -11.047 | 109.74 | 43.69 | 70.04 | 1612.2 | 294.43 | 206.1 |
| 150. | 19.477 | 0.012 | -10.697 | 112.12 | 43.39 | 70.16 | 1575.0 | 270.92 | 201.2 |
| 155. | 19.284 | 0.012 | -10.345 | 114.42 | 43.15 | 70.35 | 1537.7 | 250.35 | 196.2 |
| 160. | 19.090 | 0.012 | -9.993 | 116.66 | 42.96 | 70.62 | 1500.3 | 232.21 | 191.3 |
| 165. | 18.893 | 0.012 | -9.639 | 118.83 | 42.82 | 70.96 | 1462.8 | 216.07 | 186.3 |
| 170. | 18.693 | 0.011 | -9.283 | 120.96 | 42.73 | 71.37 | 1425.1 | 201.61 | 181.4 |
| 175. | 18.491 | 0.011 | -8.925 | 123.03 | 42.68 | 71.84 | 1387.3 | 188.56 | 176.6 |
| 180. | 18.286 | 0.011 | -8.565 | 125.07 | 42.66 | 72.38 | 1349.4 | 176.72 | 171.7 |
| 185. | 18.078 | 0.011 | -8.201 | 127.06 | 42.68 | 72.98 | 1311.3 | 165.91 | 166.9 |
| 190. | 17.865 | 0.011 | -7.835 | 129.01 | 42.74 | 73.65 | 1273.0 | 155.98 | 162.1 |
| 195. | 17.649 | 0.010 | -7.465 | 130.93 | 42.83 | 74.39 | 1234.5 | 146.83 | 157.3 |
| 200. | 17.428 | 0.010 | -7.091 | 132.83 | 42.95 | 75.21 | 1195.7 | 138.35 | 152.6 |
| 205. | 17.202 | 0.010 | -6.712 | 134.70 | 43.09 | 76.11 | 1156.5 | 130.45 | 148.0 |
| 207.404 | 17.092 | 0.010 | -6.529 | 135.59 | 43.17 | 76.57 | 1137.6 | 126.85 | 145.8 |
| 207.404 | 0.1878 | 0.926 | 7.188 | 201.72 | 35.40 | 46.84 | 254.2 | 6.64 | 11.8 |
| 210. | 0.1849 | 0.929 | 7.310 | 202.31 | 35.73 | 47.01 | 256.0 | 6.72 | 12.0 |
| 215. | 0.1795 | 0.935 | 7.546 | 203.42 | 36.26 | 47.25 | 259.5 | 6.88 | 12.4 |
| 220. | 0.1745 | 0.940 | 7.783 | 204.51 | 36.71 | 47.47 | 262.9 | 7.04 | 12.8 |
| 225. | 0.1699 | 0.944 | 8.021 | 205.58 | 37.14 | 47.69 | 266.3 | 7.19 | 13.3 |
| 230. | 0.1655 | 0.948 | 8.260 | 206.63 | 37.57 | 47.93 | 269.6 | 7.35 | 13.7 |
| 235. | 0.1614 | 0.951 | 8.500 | 207.66 | 38.00 | 48.19 | 272.8 | 7.50 | 14.2 |
| 240. | 0.1575 | 0.955 | 8.742 | 208.68 | 38.44 | 48.49 | 275.9 | 7.65 | 14.7 |
| 245. | 0.1538 | 0.957 | 8.985 | 209.68 | 38.89 | 48.82 | 279.0 | 7.81 | 15.2 |
| 250. | 0.1503 | 0.960 | 9.230 | 210.67 | 39.35 | 49.17 | 282.0 | 7.96 | 15.7 |
| 255. | 0.1470 | 0.963 | 9.477 | 211.65 | 39.83 | 49.55 | 284.9 | 8.11 | 16.2 |
| 260. | 0.1438 | 0.965 | 9.725 | 212.61 | 40.33 | 49.95 | 287.8 | 8.26 | 16.7 |
| 265. | 0.1408 | 0.967 | 9.976 | 213.57 | 40.84 | 50.38 | 290.6 | 8.41 | 17.3 |
| 270. | 0.1379 | 0.969 | 10.229 | 214.52 | 41.36 | 50.83 | 293.3 | 8.56 | 17.8 |
| 275. | 0.1352 | 0.971 | 10.485 | 215.45 | 41.89 | 51.29 | 296.0 | 8.71 | 18.4 |
| 280. | 0.1326 | 0.972 | 10.742 | 216.38 | 42.43 | 51.77 | 298.7 | 8.86 | 19.0 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.3000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.1300 | 0.974 | 11.002 | 217.30 | 42.99 | 52.27 | 301.3 | 9.01 | 19.6 |
| 290. | 0.1276 | 0.975 | 11.265 | 218.22 | 43.55 | 52.78 | 303.9 | 9.16 | 20.2 |
| 295. | 0.1253 | 0.976 | 11.530 | 219.12 | 44.13 | 53.31 | 306.4 | 9.31 | 20.8 |
| 300. | 0.1230 | 0.978 | 11.798 | 220.02 | 44.71 | 53.85 | 308.9 | 9.45 | 21.4 |
| 310. | 0.1188 | 0.980 | 12.342 | 221.81 | 45.90 | 54.96 | 313.9 | 9.75 | 22.7 |
| 320. | 0.1148 | 0.982 | 12.897 | 223.57 | 47.12 | 56.11 | 318.7 | 10.03 | 24.0 |
| 330. | 0.1112 | 0.983 | 13.464 | 225.31 | 48.35 | 57.29 | 323.3 | 10.32 | 25.4 |
| 340. | 0.1077 | 0.985 | 14.043 | 227.04 | 49.61 | 58.49 | 327.9 | 10.61 | 26.8 |
| 350. | 0.1045 | 0.986 | 14.634 | 228.75 | 50.87 | 59.71 | 332.4 | 10.89 | 28.3 |
| 360. | 0.1015 | 0.988 | 15.237 | 230.45 | 52.15 | 60.95 | 336.8 | 11.17 | 29.8 |
| 370. | 0.0986 | 0.989 | 15.853 | 232.14 | 53.43 | 62.20 | 341.2 | 11.44 | 31.3 |
| 380. | 0.0959 | 0.990 | 16.481 | 233.82 | 54.72 | 63.45 | 345.4 | 11.71 | 32.9 |
| 390. | 0.0934 | 0.990 | 17.122 | 235.48 | 56.01 | 64.71 | 349.6 | 11.99 | 34.5 |
| 400. | 0.0910 | 0.991 | 17.776 | 237.14 | 57.29 | 65.97 | 353.8 | 12.25 | 36.1 |
| 410. | 0.0887 | 0.992 | 18.442 | 238.78 | 58.57 | 67.23 | 357.8 | 12.52 | 37.8 |
| 420. | 0.0865 | 0.993 | 19.120 | 240.41 | 59.85 | 68.48 | 361.9 | 12.79 | 39.5 |
| 430. | 0.0845 | 0.993 | 19.811 | 242.04 | 61.12 | 69.73 | 365.8 | 13.05 | 41.2 |
| 440. | 0.0825 | 0.994 | 20.515 | 243.66 | 62.38 | 70.98 | 369.8 | 13.31 | 42.9 |
| 450. | 0.0806 | 0.994 | 21.231 | 245.27 | 63.63 | 72.21 | 373.6 | 13.56 | 44.7 |
| 460. | 0.0788 | 0.995 | 21.959 | 246.87 | 64.87 | 73.44 | 377.5 | 13.82 | 46.5 |
| 470. | 0.0771 | 0.995 | 22.700 | 248.46 | 66.10 | 74.65 | 381.3 | 14.07 | 48.3 |
| 480. | 0.0755 | 0.996 | 23.452 | 250.04 | 67.32 | 75.86 | 385.0 | 14.32 | 50.2 |
| 490. | 0.0739 | 0.996 | 24.217 | 251.62 | 68.52 | 77.05 | 388.7 | 14.57 | 52.0 |
| 500. | 0.0724 | 0.996 | 24.993 | 253.19 | 69.72 | 78.24 | 392.4 | 14.81 | 53.9 |
| 520. | 0.0696 | 0.997 | 26.581 | 256.30 | 72.07 | 80.57 | 399.7 | | 57.7 |
| 540. | 0.0670 | 0.997 | 28.215 | 259.39 | 74.36 | 82.84 | 406.8 | | 61.5 |
| 560. | 0.0646 | 0.998 | 29.895 | 262.44 | 76.60 | 85.07 | 413.8 | | 65.5 |
| 580. | 0.0623 | 0.998 | 31.618 | 265.46 | 78.79 | 87.25 | 420.7 | | 69.4 |
| 600. | 0.0602 | 0.999 | 33.384 | 268.46 | 80.93 | 89.38 | 427.4 | | 73.4 |
| 625. | 0.0578 | 0.999 | 35.651 | 272.16 | 83.54 | 91.97 | 435.7 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.3500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.507 | 0.021 | -14.559 | 80.02 | 47.93 | 68.69 | 1971.7 | 1060.26 | 252.3 |
| 100. | 21.329 | 0.020 | -14.212 | 83.58 | 48.15 | 70.10 | 1939.8 | 880.43 | 248.3 |
| 105. | 21.149 | 0.019 | -13.859 | 87.02 | 47.90 | 70.68 | 1905.4 | 744.03 | 244.1 |
| 110. | 20.967 | 0.018 | -13.506 | 90.31 | 47.40 | 70.81 | 1869.8 | 638.65 | 239.7 |
| 115. | 20.785 | 0.018 | -13.152 | 93.45 | 46.79 | 70.70 | 1833.6 | 555.72 | 235.2 |
| 120. | 20.601 | 0.017 | -12.799 | 96.46 | 46.16 | 70.51 | 1797.1 | 489.33 | 230.5 |
| 125. | 20.417 | 0.016 | -12.447 | 99.33 | 45.55 | 70.30 | 1760.4 | 435.30 | 225.7 |
| 130. | 20.231 | 0.016 | -12.096 | 102.09 | 44.99 | 70.13 | 1723.6 | 390.68 | 220.9 |
| 135. | 20.045 | 0.016 | -11.745 | 104.73 | 44.49 | 70.02 | 1686.7 | 353.33 | 216.0 |
| 140. | 19.857 | 0.015 | -11.395 | 107.28 | 44.06 | 69.99 | 1649.6 | 321.67 | 211.1 |
| 145. | 19.668 | 0.015 | -11.045 | 109.73 | 43.69 | 70.03 | 1612.5 | 294.53 | 206.2 |
| 150. | 19.478 | 0.014 | -10.695 | 112.11 | 43.39 | 70.15 | 1575.3 | 271.01 | 201.2 |
| 155. | 19.285 | 0.014 | -10.344 | 114.41 | 43.15 | 70.35 | 1538.0 | 250.44 | 196.3 |
| 160. | 19.091 | 0.014 | -9.991 | 116.65 | 42.96 | 70.62 | 1500.6 | 232.29 | 191.3 |
| 165. | 18.894 | 0.014 | -9.637 | 118.83 | 42.82 | 70.96 | 1463.1 | 216.15 | 186.4 |
| 170. | 18.695 | 0.013 | -9.281 | 120.95 | 42.73 | 71.36 | 1425.5 | 201.69 | 181.5 |
| 175. | 18.493 | 0.013 | -8.924 | 123.03 | 42.68 | 71.83 | 1387.7 | 188.64 | 176.6 |
| 180. | 18.288 | 0.013 | -8.563 | 125.06 | 42.66 | 72.37 | 1349.8 | 176.79 | 171.7 |
| 185. | 18.079 | 0.013 | -8.200 | 127.05 | 42.69 | 72.97 | 1311.7 | 165.98 | 166.9 |
| 190. | 17.867 | 0.012 | -7.833 | 129.01 | 42.74 | 73.64 | 1273.4 | 156.05 | 162.1 |
| 195. | 17.651 | 0.012 | -7.463 | 130.93 | 42.83 | 74.38 | 1234.9 | 146.90 | 157.4 |
| 200. | 17.430 | 0.012 | -7.089 | 132.82 | 42.95 | 75.19 | 1196.1 | 138.42 | 152.7 |
| 205. | 17.204 | 0.012 | -6.711 | 134.69 | 43.10 | 76.09 | 1157.0 | 130.52 | 148.0 |
| 210. | 16.973 | 0.012 | -6.328 | 136.53 | 43.27 | 77.08 | 1117.6 | 123.14 | 143.4 |
| 211.158 | 16.918 | 0.012 | -6.239 | 136.96 | 43.32 | 77.32 | 1108.4 | 121.50 | 142.4 |
| 211.158 | 0.2172 | 0.918 | 7.294 | 201.05 | 36.16 | 48.12 | 254.6 | 6.77 | 12.2 |
| 215. | 0.2122 | 0.923 | 7.479 | 201.92 | 36.54 | 48.19 | 257.4 | 6.89 | 12.5 |
| 220. | 0.2060 | 0.929 | 7.721 | 203.03 | 36.96 | 48.28 | 261.0 | 7.05 | 13.0 |
| 225. | 0.2003 | 0.934 | 7.962 | 204.11 | 37.37 | 48.40 | 264.4 | 7.20 | 13.4 |
| 230. | 0.1950 | 0.939 | 8.205 | 205.18 | 37.77 | 48.56 | 267.8 | 7.36 | 13.8 |
| 235. | 0.1900 | 0.943 | 8.448 | 206.23 | 38.17 | 48.76 | 271.1 | 7.51 | 14.3 |
| 240. | 0.1853 | 0.947 | 8.692 | 207.25 | 38.60 | 49.01 | 274.4 | 7.67 | 14.8 |
| 245. | 0.1809 | 0.950 | 8.938 | 208.27 | 39.03 | 49.29 | 277.5 | 7.82 | 15.3 |
| 250. | 0.1767 | 0.953 | 9.185 | 209.27 | 39.49 | 49.60 | 280.6 | 7.97 | 15.8 |
| 255. | 0.1727 | 0.956 | 9.434 | 210.25 | 39.95 | 49.94 | 283.6 | 8.12 | 16.3 |
| 260. | 0.1689 | 0.959 | 9.685 | 211.23 | 40.44 | 50.32 | 286.5 | 8.28 | 16.8 |
| 265. | 0.1653 | 0.961 | 9.937 | 212.19 | 40.94 | 50.71 | 289.4 | 8.43 | 17.3 |
| 270. | 0.1618 | 0.963 | 10.192 | 213.14 | 41.45 | 51.14 | 292.2 | 8.58 | 17.9 |
| 275. | 0.1585 | 0.965 | 10.449 | 214.08 | 41.98 | 51.58 | 295.0 | 8.73 | 18.5 |
| 280. | 0.1554 | 0.967 | 10.708 | 215.02 | 42.51 | 52.04 | 297.7 | 8.88 | 19.0 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.3500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.1524 | 0.969 | 10.969 | 215.94 | 43.06 | 52.52 | 300.4 | 9.02 | 19.6 |
| 290. | 0.1495 | 0.971 | 11.233 | 216.86 | 43.62 | 53.02 | 303.0 | 9.17 | 20.2 |
| 295. | 0.1467 | 0.972 | 11.499 | 217.77 | 44.19 | 53.53 | 305.6 | 9.32 | 20.8 |
| 300. | 0.1441 | 0.974 | 11.768 | 218.67 | 44.77 | 54.06 | 308.1 | 9.47 | 21.5 |
| 310. | 0.1391 | 0.976 | 12.314 | 220.46 | 45.95 | 55.14 | 313.1 | 9.76 | 22.7 |
| 320. | 0.1344 | 0.979 | 12.871 | 222.23 | 47.16 | 56.27 | 318.0 | 10.05 | 24.1 |
| 330. | 0.1301 | 0.981 | 13.440 | 223.98 | 48.39 | 57.43 | 322.7 | 10.33 | 25.4 |
| 340. | 0.1260 | 0.982 | 14.020 | 225.71 | 49.64 | 58.62 | 327.3 | 10.62 | 26.8 |
| 350. | 0.1222 | 0.984 | 14.612 | 227.43 | 50.90 | 59.83 | 331.9 | 10.90 | 28.3 |
| 360. | 0.1187 | 0.985 | 15.217 | 229.13 | 52.18 | 61.06 | 336.3 | 11.18 | 29.8 |
| 370. | 0.1153 | 0.987 | 15.834 | 230.82 | 53.46 | 62.30 | 340.7 | 11.45 | 31.3 |
| 380. | 0.1121 | 0.988 | 16.463 | 232.50 | 54.74 | 63.54 | 345.0 | 11.73 | 32.9 |
| 390. | 0.1091 | 0.989 | 17.105 | 234.17 | 56.03 | 64.80 | 349.2 | 12.00 | 34.5 |
| 400. | 0.1063 | 0.990 | 17.759 | 235.82 | 57.31 | 66.05 | 353.4 | 12.27 | 36.1 |
| 410. | 0.1036 | 0.991 | 18.426 | 237.47 | 58.59 | 67.30 | 357.5 | 12.53 | 37.8 |
| 420. | 0.1011 | 0.991 | 19.105 | 239.11 | 59.86 | 68.55 | 361.6 | 12.80 | 39.5 |
| 430. | 0.0987 | 0.992 | 19.797 | 240.73 | 61.13 | 69.80 | 365.6 | 13.06 | 41.2 |
| 440. | 0.0964 | 0.993 | 20.501 | 242.35 | 62.39 | 71.04 | 369.5 | 13.32 | 43.0 |
| 450. | 0.0942 | 0.993 | 21.217 | 243.96 | 63.64 | 72.27 | 373.4 | 13.57 | 44.7 |
| 460. | 0.0921 | 0.994 | 21.946 | 245.57 | 64.88 | 73.49 | 377.3 | 13.83 | 46.5 |
| 470. | 0.0901 | 0.994 | 22.687 | 247.16 | 66.11 | 74.70 | 381.1 | 14.08 | 48.3 |
| 480. | 0.0882 | 0.995 | 23.440 | 248.74 | 67.33 | 75.91 | 384.8 | 14.33 | 50.2 |
| 490. | 0.0863 | 0.995 | 24.205 | 250.32 | 68.53 | 77.10 | 388.6 | 14.58 | 52.0 |
| 500. | 0.0846 | 0.996 | 24.982 | 251.89 | 69.73 | 78.28 | 392.3 | 14.82 | 53.9 |
| 520. | 0.0812 | 0.996 | 26.571 | 255.01 | 72.07 | 80.60 | 399.5 | | 57.7 |
| 540. | 0.0782 | 0.997 | 28.206 | 258.09 | 74.37 | 82.88 | 406.7 | | 61.6 |
| 560. | 0.0754 | 0.997 | 29.886 | 261.15 | 76.61 | 85.10 | 413.7 | | 65.5 |
| 580. | 0.0727 | 0.998 | 31.610 | 264.17 | 78.80 | 87.28 | 420.6 | | 69.4 |
| 600. | 0.0703 | 0.998 | 33.377 | 267.17 | 80.94 | 89.40 | 427.4 | | 73.4 |
| 625. | 0.0674 | 0.999 | 35.644 | 270.87 | 83.54 | 91.99 | 435.7 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.4000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.508 | 0.024 | -14.557 | 80.01 | 47.93 | 68.69 | 1971.9 | 1060.70 | 252.3 |
| 100. | 21.330 | 0.023 | -14.210 | 83.58 | 48.15 | 70.10 | 1940.0 | 880.77 | 248.3 |
| 105. | 21.150 | 0.022 | -13.857 | 87.01 | 47.90 | 70.68 | 1905.6 | 744.31 | 244.1 |
| 110. | 20.968 | 0.021 | -13.504 | 90.30 | 47.40 | 70.81 | 1870.1 | 638.88 | 239.7 |
| 115. | 20.785 | 0.020 | -13.150 | 93.45 | 46.79 | 70.70 | 1833.9 | 555.92 | 235.2 |
| 120. | 20.602 | 0.019 | -12.797 | 96.46 | 46.16 | 70.50 | 1797.4 | 489.49 | 230.5 |
| 125. | 20.417 | 0.019 | -12.445 | 99.33 | 45.55 | 70.30 | 1760.7 | 435.45 | 225.8 |
| 130. | 20.232 | 0.018 | -12.094 | 102.08 | 44.99 | 70.13 | 1723.9 | 390.81 | 220.9 |
| 135. | 20.046 | 0.018 | -11.743 | 104.73 | 44.49 | 70.02 | 1686.9 | 353.45 | 216.1 |
| 140. | 19.858 | 0.017 | -11.393 | 107.27 | 44.06 | 69.99 | 1649.9 | 321.78 | 211.2 |
| 145. | 19.669 | 0.017 | -11.043 | 109.73 | 43.70 | 70.03 | 1612.8 | 294.63 | 206.2 |
| 150. | 19.479 | 0.016 | -10.693 | 112.11 | 43.40 | 70.15 | 1575.6 | 271.11 | 201.3 |
| 155. | 19.286 | 0.016 | -10.342 | 114.41 | 43.15 | 70.34 | 1538.3 | 250.53 | 196.3 |
| 160. | 19.092 | 0.016 | -9.989 | 116.65 | 42.96 | 70.61 | 1500.9 | 232.38 | 191.4 |
| 165. | 18.895 | 0.015 | -9.635 | 118.82 | 42.83 | 70.95 | 1463.4 | 216.23 | 186.4 |
| 170. | 18.696 | 0.015 | -9.280 | 120.95 | 42.73 | 71.35 | 1425.8 | 201.76 | 181.5 |
| 175. | 18.494 | 0.015 | -8.922 | 123.02 | 42.68 | 71.82 | 1388.1 | 188.71 | 176.6 |
| 180. | 18.289 | 0.015 | -8.561 | 125.05 | 42.67 | 72.36 | 1350.2 | 176.87 | 171.8 |
| 185. | 18.081 | 0.014 | -8.198 | 127.04 | 42.69 | 72.96 | 1312.1 | 166.05 | 167.0 |
| 190. | 17.869 | 0.014 | -7.832 | 129.00 | 42.75 | 73.63 | 1273.9 | 156.12 | 162.2 |
| 195. | 17.653 | 0.014 | -7.462 | 130.92 | 42.83 | 74.37 | 1235.4 | 146.97 | 157.4 |
| 200. | 17.432 | 0.014 | -7.088 | 132.81 | 42.95 | 75.18 | 1196.6 | 138.48 | 152.7 |
| 205. | 17.207 | 0.014 | -6.710 | 134.68 | 43.10 | 76.08 | 1157.6 | 130.59 | 148.1 |
| 210. | 16.975 | 0.013 | -6.327 | 136.53 | 43.27 | 77.06 | 1118.1 | 123.21 | 143.5 |
| 214.528 | 16.760 | 0.013 | -5.976 | 138.18 | 43.46 | 78.04 | 1082.0 | 116.93 | 139.3 |
| 214.528 | 0.2465 | 0.910 | 7.387 | 200.47 | 36.85 | 49.33 | 254.8 | 6.89 | 12.6 |
| 215. | 0.2458 | 0.910 | 7.410 | 200.58 | 36.89 | 49.31 | 255.2 | 6.91 | 12.7 |
| 220. | 0.2384 | 0.917 | 7.656 | 201.71 | 37.26 | 49.22 | 258.9 | 7.06 | 13.1 |
| 225. | 0.2315 | 0.924 | 7.902 | 202.82 | 37.62 | 49.20 | 262.5 | 7.22 | 13.5 |
| 230. | 0.2251 | 0.929 | 8.148 | 203.90 | 37.99 | 49.26 | 266.0 | 7.37 | 13.9 |
| 235. | 0.2192 | 0.934 | 8.395 | 204.96 | 38.37 | 49.38 | 269.5 | 7.53 | 14.4 |
| 240. | 0.2136 | 0.938 | 8.642 | 206.00 | 38.77 | 49.56 | 272.8 | 7.68 | 14.9 |
| 245. | 0.2083 | 0.942 | 8.891 | 207.02 | 39.19 | 49.78 | 276.0 | 7.83 | 15.3 |
| 250. | 0.2034 | 0.946 | 9.140 | 208.03 | 39.62 | 50.05 | 279.2 | 7.99 | 15.8 |
| 255. | 0.1987 | 0.949 | 9.391 | 209.03 | 40.08 | 50.35 | 282.3 | 8.14 | 16.3 |
| 260. | 0.1942 | 0.953 | 9.644 | 210.01 | 40.55 | 50.69 | 285.3 | 8.29 | 16.9 |
| 265. | 0.1900 | 0.955 | 9.898 | 210.98 | 41.04 | 51.06 | 288.2 | 8.44 | 17.4 |
| 270. | 0.1860 | 0.958 | 10.154 | 211.93 | 41.54 | 51.46 | 291.1 | 8.59 | 18.0 |
| 275. | 0.1822 | 0.960 | 10.413 | 212.88 | 42.06 | 51.88 | 293.9 | 8.74 | 18.5 |
| 280. | 0.1785 | 0.963 | 10.673 | 213.82 | 42.59 | 52.32 | 296.7 | 8.89 | 19.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.4000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 285. | 0.1750 | 0.965 | 10.936 | 214.75 | 43.14 | 52.78 | 299.4 | 9.04 | 19.7 |
| 290. | 0.1716 | 0.967 | 11.201 | 215.67 | 43.69 | 53.26 | 302.1 | 9.19 | 20.3 |
| 295. | 0.1684 | 0.968 | 11.469 | 216.59 | 44.25 | 53.76 | 304.7 | 9.33 | 20.9 |
| 300. | 0.1653 | 0.970 | 11.739 | 217.50 | 44.83 | 54.27 | 307.3 | 9.48 | 21.5 |
| 310. | 0.1595 | 0.973 | 12.287 | 219.29 | 46.00 | 55.33 | 312.3 | 9.77 | 22.8 |
| 320. | 0.1541 | 0.976 | 12.845 | 221.07 | 47.20 | 56.44 | 317.3 | 10.06 | 24.1 |
| 330. | 0.1491 | 0.978 | 13.415 | 222.82 | 48.43 | 57.58 | 322.1 | 10.35 | 25.5 |
| 340. | 0.1444 | 0.980 | 13.997 | 224.56 | 49.67 | 58.76 | 326.7 | 10.63 | 26.9 |
| 350. | 0.1400 | 0.982 | 14.591 | 226.28 | 50.93 | 59.95 | 331.3 | 10.91 | 28.3 |
| 360. | 0.1359 | 0.983 | 15.196 | 227.98 | 52.20 | 61.17 | 335.8 | 11.19 | 29.8 |
| 370. | 0.1320 | 0.985 | 15.814 | 229.68 | 53.48 | 62.40 | 340.2 | 11.46 | 31.4 |
| 380. | 0.1284 | 0.986 | 16.444 | 231.36 | 54.76 | 63.64 | 344.6 | 11.74 | 32.9 |
| 390. | 0.1249 | 0.987 | 17.087 | 233.03 | 56.05 | 64.88 | 348.8 | 12.01 | 34.5 |
| 400. | 0.1217 | 0.988 | 17.742 | 234.68 | 57.33 | 66.13 | 353.0 | 12.28 | 36.2 |
| 410. | 0.1186 | 0.989 | 18.410 | 236.33 | 58.61 | 67.38 | 357.2 | 12.54 | 37.8 |
| 420. | 0.1157 | 0.990 | 19.090 | 237.97 | 59.88 | 68.62 | 361.2 | 12.81 | 39.5 |
| 430. | 0.1129 | 0.991 | 19.782 | 239.60 | 61.14 | 69.86 | 365.3 | 13.07 | 41.2 |
| 440. | 0.1102 | 0.992 | 20.487 | 241.22 | 62.40 | 71.10 | 369.2 | 13.33 | 43.0 |
| 450. | 0.1077 | 0.992 | 21.204 | 242.83 | 63.65 | 72.32 | 373.2 | 13.58 | 44.7 |
| 460. | 0.1053 | 0.993 | 21.933 | 244.43 | 64.89 | 73.54 | 377.0 | 13.84 | 46.5 |
| 470. | 0.1030 | 0.994 | 22.675 | 246.03 | 66.12 | 74.75 | 380.9 | 14.09 | 48.4 |
| 480. | 0.1008 | 0.994 | 23.428 | 247.62 | 67.34 | 75.95 | 384.7 | 14.34 | 50.2 |
| 490. | 0.0987 | 0.995 | 24.194 | 249.19 | 68.54 | 77.14 | 388.4 | 14.59 | 52.0 |
| 500. | 0.0967 | 0.995 | 24.971 | 250.76 | 69.73 | 78.32 | 392.1 | 14.83 | 53.9 |
| 520. | 0.0929 | 0.996 | 26.561 | 253.88 | 72.08 | 80.64 | 399.4 | | 57.7 |
| 540. | 0.0894 | 0.997 | 28.196 | 256.97 | 74.37 | 82.91 | 406.6 | | 61.6 |
| 560. | 0.0862 | 0.997 | 29.877 | 260.02 | 76.61 | 85.13 | 413.6 | | 65.5 |
| 580. | 0.0831 | 0.998 | 31.601 | 263.05 | 78.80 | 87.31 | 420.5 | | 69.4 |
| 600. | 0.0803 | 0.998 | 33.369 | 266.04 | 80.94 | 89.43 | 427.3 | | 73.4 |
| 625. | 0.0771 | 0.999 | 35.637 | 269.75 | 83.54 | 92.02 | 435.6 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.4500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.508 | 0.026 | -14.555 | 80.01 | 47.93 | 68.69 | 1972.1 | 1061.15 | 252.3 |
| 100. | 21.331 | 0.025 | -14.208 | 83.57 | 48.15 | 70.09 | 1940.2 | 881.12 | 248.4 |
| 105. | 21.150 | 0.024 | -13.856 | 87.01 | 47.90 | 70.68 | 1905.9 | 744.59 | 244.2 |
| 110. | 20.969 | 0.023 | -13.502 | 90.30 | 47.40 | 70.80 | 1870.3 | 639.11 | 239.8 |
| 115. | 20.786 | 0.023 | -13.148 | 93.45 | 46.79 | 70.70 | 1834.1 | 556.11 | 235.2 |
| 120. | 20.603 | 0.022 | -12.795 | 96.45 | 46.16 | 70.50 | 1797.6 | 489.66 | 230.5 |
| 125. | 20.418 | 0.021 | -12.443 | 99.32 | 45.55 | 70.30 | 1760.9 | 435.59 | 225.8 |
| 130. | 20.233 | 0.021 | -12.092 | 102.08 | 44.99 | 70.13 | 1724.1 | 390.95 | 221.0 |
| 135. | 20.047 | 0.020 | -11.741 | 104.72 | 44.49 | 70.02 | 1687.2 | 353.57 | 216.1 |
| 140. | 19.859 | 0.019 | -11.392 | 107.27 | 44.06 | 69.98 | 1650.2 | 321.89 | 211.2 |
| 145. | 19.670 | 0.019 | -11.042 | 109.72 | 43.70 | 70.03 | 1613.1 | 294.73 | 206.2 |
| 150. | 19.480 | 0.019 | -10.691 | 112.10 | 43.40 | 70.15 | 1575.9 | 271.20 | 201.3 |
| 155. | 19.287 | 0.018 | -10.340 | 114.40 | 43.16 | 70.34 | 1538.6 | 250.62 | 196.3 |
| 160. | 19.093 | 0.018 | -9.988 | 116.64 | 42.97 | 70.61 | 1501.2 | 232.46 | 191.4 |
| 165. | 18.897 | 0.017 | -9.634 | 118.82 | 42.83 | 70.94 | 1463.8 | 216.31 | 186.5 |
| 170. | 18.698 | 0.017 | -9.278 | 120.94 | 42.73 | 71.35 | 1426.2 | 201.84 | 181.6 |
| 175. | 18.496 | 0.017 | -8.920 | 123.02 | 42.68 | 71.82 | 1388.4 | 188.79 | 176.7 |
| 180. | 18.291 | 0.016 | -8.560 | 125.05 | 42.67 | 72.35 | 1350.6 | 176.94 | 171.8 |
| 185. | 18.083 | 0.016 | -8.197 | 127.04 | 42.69 | 72.95 | 1312.5 | 166.12 | 167.0 |
| 190. | 17.871 | 0.016 | -7.830 | 128.99 | 42.75 | 73.62 | 1274.3 | 156.19 | 162.2 |
| 195. | 17.655 | 0.016 | -7.460 | 130.91 | 42.84 | 74.35 | 1235.8 | 147.04 | 157.5 |
| 200. | 17.434 | 0.016 | -7.087 | 132.81 | 42.95 | 75.17 | 1197.1 | 138.55 | 152.8 |
| 205. | 17.209 | 0.015 | -6.708 | 134.67 | 43.10 | 76.06 | 1158.1 | 130.66 | 148.1 |
| 210. | 16.978 | 0.015 | -6.326 | 136.52 | 43.28 | 77.04 | 1118.7 | 123.28 | 143.5 |
| 215. | 16.740 | 0.015 | -5.938 | 138.34 | 43.48 | 78.13 | 1078.8 | 116.36 | 139.0 |
| 217.598 | 16.614 | 0.015 | -5.734 | 139.28 | 43.59 | 78.74 | 1057.9 | 112.93 | 136.6 |
| 217.598 | 0.2758 | 0.902 | 7.468 | 199.96 | 37.49 | 50.46 | 254.9 | 7.00 | 13.0 |
| 220. | 0.2716 | 0.906 | 7.589 | 200.51 | 37.62 | 50.31 | 256.8 | 7.08 | 13.2 |
| 225. | 0.2635 | 0.913 | 7.840 | 201.64 | 37.92 | 50.11 | 260.6 | 7.23 | 13.6 |
| 230. | 0.2559 | 0.919 | 8.091 | 202.74 | 38.23 | 50.03 | 264.2 | 7.39 | 14.0 |
| 235. | 0.2490 | 0.925 | 8.341 | 203.82 | 38.58 | 50.05 | 267.8 | 7.54 | 14.5 |
| 240. | 0.2424 | 0.930 | 8.591 | 204.87 | 38.95 | 50.15 | 271.2 | 7.69 | 15.0 |
| 245. | 0.2363 | 0.935 | 8.842 | 205.91 | 39.35 | 50.31 | 274.5 | 7.85 | 15.4 |
| 250. | 0.2305 | 0.939 | 9.094 | 206.93 | 39.77 | 50.52 | 277.8 | 8.00 | 15.9 |
| 255. | 0.2251 | 0.943 | 9.348 | 207.93 | 40.21 | 50.78 | 280.9 | 8.15 | 16.4 |
| 260. | 0.2200 | 0.946 | 9.602 | 208.92 | 40.67 | 51.08 | 284.0 | 8.30 | 16.9 |
| 265. | 0.2151 | 0.950 | 9.858 | 209.89 | 41.15 | 51.42 | 287.0 | 8.45 | 17.5 |
| 270. | 0.2104 | 0.953 | 10.116 | 210.86 | 41.64 | 51.79 | 290.0 | 8.60 | 18.0 |
| 275. | 0.2060 | 0.955 | 10.376 | 211.81 | 42.15 | 52.18 | 292.8 | 8.75 | 18.6 |
| 280. | 0.2018 | 0.958 | 10.638 | 212.76 | 42.67 | 52.60 | 295.7 | 8.90 | 19.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.4500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.1978 | 0.960 | 10.902 | 213.69 | 43.21 | 53.04 | 298.4 | 9.05 | 19.7 |
| 290. | 0.1939 | 0.962 | 11.169 | 214.62 | 43.76 | 53.50 | 301.1 | 9.20 | 20.3 |
| 295. | 0.1903 | 0.964 | 11.438 | 215.54 | 44.32 | 53.99 | 303.8 | 9.35 | 20.9 |
| 300. | 0.1867 | 0.966 | 11.709 | 216.45 | 44.89 | 54.48 | 306.4 | 9.49 | 21.6 |
| 310. | 0.1801 | 0.970 | 12.259 | 218.25 | 46.05 | 55.52 | 311.6 | 9.78 | 22.8 |
| 320. | 0.1739 | 0.972 | 12.819 | 220.03 | 47.25 | 56.61 | 316.6 | 10.07 | 24.1 |
| 330. | 0.1682 | 0.975 | 13.391 | 221.79 | 48.47 | 57.73 | 321.4 | 10.36 | 25.5 |
| 340. | 0.1629 | 0.977 | 13.974 | 223.53 | 49.71 | 58.89 | 326.2 | 10.64 | 26.9 |
| 350. | 0.1579 | 0.979 | 14.569 | 225.25 | 50.96 | 60.08 | 330.8 | 10.92 | 28.4 |
| 360. | 0.1532 | 0.981 | 15.176 | 226.96 | 52.23 | 61.28 | 335.3 | 11.20 | 29.9 |
| 370. | 0.1488 | 0.983 | 15.795 | 228.66 | 53.50 | 62.50 | 339.8 | 11.48 | 31.4 |
| 380. | 0.1447 | 0.984 | 16.426 | 230.34 | 54.78 | 63.73 | 344.1 | 11.75 | 33.0 |
| 390. | 0.1408 | 0.986 | 17.069 | 232.01 | 56.06 | 64.97 | 348.4 | 12.02 | 34.6 |
| 400. | 0.1371 | 0.987 | 17.725 | 233.67 | 57.34 | 66.21 | 352.7 | 12.29 | 36.2 |
| 410. | 0.1336 | 0.988 | 18.393 | 235.32 | 58.62 | 67.45 | 356.8 | 12.55 | 37.8 |
| 420. | 0.1303 | 0.989 | 19.074 | 236.96 | 59.89 | 68.69 | 360.9 | 12.82 | 39.5 |
| 430. | 0.1271 | 0.990 | 19.767 | 238.60 | 61.16 | 69.93 | 365.0 | 13.08 | 41.3 |
| 440. | 0.1242 | 0.991 | 20.473 | 240.22 | 62.42 | 71.16 | 369.0 | 13.34 | 43.0 |
| 450. | 0.1213 | 0.991 | 21.190 | 241.83 | 63.66 | 72.38 | 372.9 | 13.59 | 44.8 |
| 460. | 0.1186 | 0.992 | 21.920 | 243.43 | 64.90 | 73.60 | 376.8 | 13.85 | 46.6 |
| 470. | 0.1160 | 0.993 | 22.662 | 245.03 | 66.13 | 74.80 | 380.7 | 14.10 | 48.4 |
| 480. | 0.1135 | 0.993 | 23.416 | 246.62 | 67.35 | 76.00 | 384.5 | 14.35 | 50.2 |
| 490. | 0.1111 | 0.994 | 24.182 | 248.20 | 68.55 | 77.19 | 388.2 | 14.60 | 52.1 |
| 500. | 0.1089 | 0.994 | 24.960 | 249.77 | 69.74 | 78.36 | 392.0 | 14.84 | 53.9 |
| 520. | 0.1046 | 0.995 | 26.551 | 252.89 | 72.09 | 80.68 | 399.3 | | 57.7 |
| 540. | 0.1006 | 0.996 | 28.187 | 255.97 | 74.38 | 82.95 | 406.5 | | 61.6 |
| 560. | 0.0970 | 0.997 | 29.868 | 259.03 | 76.62 | 85.17 | 413.5 | | 65.5 |
| 580. | 0.0936 | 0.997 | 31.593 | 262.06 | 78.81 | 87.34 | 420.4 | | 69.5 |
| 600. | 0.0904 | 0.998 | 33.361 | 265.05 | 80.94 | 89.46 | 427.3 | | 73.5 |
| 625. | 0.0867 | 0.998 | 35.630 | 268.76 | 83.55 | 92.04 | 435.6 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.5000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.509 | 0.029 | -14.553 | 80.00 | 47.93 | 68.68 | 1972.3 | 1061.60 | 252.3 |
| 100. | 21.331 | 0.028 | -14.206 | 83.57 | 48.15 | 70.09 | 1940.5 | 881.47 | 248.4 |
| 105. | 21.151 | 0.027 | -13.854 | 87.00 | 47.91 | 70.68 | 1906.1 | 744.87 | 244.2 |
| 110. | 20.970 | 0.026 | -13.500 | 90.30 | 47.41 | 70.80 | 1870.5 | 639.34 | 239.8 |
| 115. | 20.787 | 0.025 | -13.146 | 93.44 | 46.80 | 70.70 | 1834.3 | 556.31 | 235.2 |
| 120. | 20.603 | 0.024 | -12.793 | 96.45 | 46.16 | 70.50 | 1797.8 | 489.83 | 230.6 |
| 125. | 20.419 | 0.024 | -12.441 | 99.32 | 45.55 | 70.29 | 1761.2 | 435.74 | 225.8 |
| 130. | 20.234 | 0.023 | -12.090 | 102.07 | 44.99 | 70.12 | 1724.4 | 391.08 | 221.0 |
| 135. | 20.048 | 0.022 | -11.740 | 104.72 | 44.50 | 70.01 | 1687.4 | 353.69 | 216.1 |
| 140. | 19.860 | 0.022 | -11.390 | 107.26 | 44.07 | 69.98 | 1650.4 | 322.00 | 211.2 |
| 145. | 19.671 | 0.021 | -11.040 | 109.72 | 43.70 | 70.02 | 1613.4 | 294.83 | 206.3 |
| 150. | 19.481 | 0.021 | -10.689 | 112.10 | 43.40 | 70.14 | 1576.2 | 271.30 | 201.3 |
| 155. | 19.289 | 0.020 | -10.338 | 114.40 | 43.16 | 70.34 | 1538.9 | 250.71 | 196.4 |
| 160. | 19.094 | 0.020 | -9.986 | 116.64 | 42.97 | 70.60 | 1501.6 | 232.55 | 191.4 |
| 165. | 18.898 | 0.019 | -9.632 | 118.81 | 42.83 | 70.94 | 1464.1 | 216.39 | 186.5 |
| 170. | 18.699 | 0.019 | -9.276 | 120.94 | 42.74 | 71.34 | 1426.5 | 201.92 | 181.6 |
| 175. | 18.497 | 0.019 | -8.919 | 123.01 | 42.69 | 71.81 | 1388.8 | 188.86 | 176.7 |
| 180. | 18.292 | 0.018 | -8.558 | 125.04 | 42.67 | 72.34 | 1351.0 | 177.01 | 171.9 |
| 185. | 18.084 | 0.018 | -8.195 | 127.03 | 42.69 | 72.94 | 1312.9 | 166.19 | 167.0 |
| 190. | 17.873 | 0.018 | -7.829 | 128.99 | 42.75 | 73.61 | 1274.7 | 156.26 | 162.3 |
| 195. | 17.657 | 0.017 | -7.459 | 130.91 | 42.84 | 74.34 | 1236.3 | 147.11 | 157.5 |
| 200. | 17.436 | 0.017 | -7.085 | 132.80 | 42.96 | 75.15 | 1197.6 | 138.62 | 152.8 |
| 205. | 17.211 | 0.017 | -6.707 | 134.67 | 43.10 | 76.04 | 1158.6 | 130.73 | 148.2 |
| 210. | 16.980 | 0.017 | -6.325 | 136.51 | 43.28 | 77.02 | 1119.2 | 123.35 | 143.6 |
| 215. | 16.743 | 0.017 | -5.937 | 138.33 | 43.48 | 78.11 | 1079.4 | 116.43 | 139.0 |
| 220. | 16.499 | 0.017 | -5.543 | 140.14 | 43.71 | 79.31 | 1039.1 | 109.91 | 134.5 |
| 220.423 | 16.478 | 0.017 | -5.510 | 140.30 | 43.73 | 79.42 | 1035.6 | 109.37 | 134.1 |
| 220.423 | 0.3050 | 0.895 | 7.541 | 199.50 | 38.08 | 51.55 | 254.9 | 7.10 | 13.4 |
| 225. | 0.2963 | 0.902 | 7.776 | 200.56 | 38.26 | 51.15 | 258.5 | 7.25 | 13.7 |
| 230. | 0.2875 | 0.909 | 8.031 | 201.68 | 38.51 | 50.89 | 262.3 | 7.40 | 14.2 |
| 235. | 0.2794 | 0.916 | 8.285 | 202.77 | 38.81 | 50.78 | 266.0 | 7.55 | 14.6 |
| 240. | 0.2718 | 0.922 | 8.539 | 203.84 | 39.15 | 50.78 | 269.5 | 7.71 | 15.0 |
| 245. | 0.2648 | 0.927 | 8.793 | 204.89 | 39.52 | 50.87 | 273.0 | 7.86 | 15.5 |
| 250. | 0.2582 | 0.932 | 9.048 | 205.92 | 39.92 | 51.02 | 276.3 | 8.01 | 16.0 |
| 255. | 0.2519 | 0.936 | 9.303 | 206.93 | 40.34 | 51.23 | 279.6 | 8.17 | 16.5 |
| 260. | 0.2460 | 0.940 | 9.560 | 207.93 | 40.79 | 51.49 | 282.7 | 8.32 | 17.0 |
| 265. | 0.2405 | 0.944 | 9.818 | 208.91 | 41.26 | 51.79 | 285.8 | 8.47 | 17.5 |
| 270. | 0.2352 | 0.947 | 10.078 | 209.88 | 41.74 | 52.13 | 288.8 | 8.62 | 18.1 |
| 275. | 0.2302 | 0.950 | 10.340 | 210.84 | 42.24 | 52.50 | 291.7 | 8.77 | 18.6 |
| 280. | 0.2254 | 0.953 | 10.603 | 211.79 | 42.76 | 52.89 | 294.6 | 8.92 | 19.2 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.5000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.2208 | 0.956 | 10.869 | 212.73 | 43.29 | 53.31 | 297.4 | 9.06 | 19.8 |
| 290. | 0.2165 | 0.958 | 11.136 | 213.66 | 43.83 | 53.76 | 300.2 | 9.21 | 20.4 |
| 295. | 0.2123 | 0.960 | 11.406 | 214.59 | 44.38 | 54.22 | 302.9 | 9.36 | 21.0 |
| 300. | 0.2083 | 0.962 | 11.678 | 215.50 | 44.95 | 54.70 | 305.6 | 9.50 | 21.6 |
| 310. | 0.2008 | 0.966 | 12.231 | 217.31 | 46.10 | 55.71 | 310.8 | 9.80 | 22.9 |
| 320. | 0.1939 | 0.969 | 12.793 | 219.10 | 47.29 | 56.78 | 315.9 | 10.08 | 24.2 |
| 330. | 0.1874 | 0.972 | 13.366 | 220.86 | 48.51 | 57.89 | 320.8 | 10.37 | 25.6 |
| 340. | 0.1814 | 0.975 | 13.951 | 222.61 | 49.74 | 59.03 | 325.6 | 10.65 | 27.0 |
| 350. | 0.1758 | 0.977 | 14.547 | 224.33 | 50.99 | 60.20 | 330.2 | 10.93 | 28.4 |
| 360. | 0.1706 | 0.979 | 15.155 | 226.05 | 52.26 | 61.40 | 334.8 | 11.21 | 29.9 |
| 370. | 0.1657 | 0.981 | 15.775 | 227.75 | 53.53 | 62.61 | 339.3 | 11.49 | 31.4 |
| 380. | 0.1610 | 0.983 | 16.407 | 229.43 | 54.80 | 63.83 | 343.7 | 11.76 | 33.0 |
| 390. | 0.1567 | 0.984 | 17.051 | 231.11 | 56.08 | 65.06 | 348.1 | 12.03 | 34.6 |
| 400. | 0.1526 | 0.985 | 17.708 | 232.77 | 57.36 | 66.29 | 352.3 | 12.30 | 36.2 |
| 410. | 0.1487 | 0.987 | 18.377 | 234.42 | 58.64 | 67.53 | 356.5 | 12.56 | 37.9 |
| 420. | 0.1450 | 0.988 | 19.059 | 236.06 | 59.91 | 68.76 | 360.6 | 12.83 | 39.6 |
| 430. | 0.1414 | 0.989 | 19.752 | 237.69 | 61.17 | 69.99 | 364.7 | 13.09 | 41.3 |
| 440. | 0.1381 | 0.990 | 20.459 | 239.32 | 62.43 | 71.22 | 368.7 | 13.35 | 43.0 |
| 450. | 0.1349 | 0.991 | 21.177 | 240.93 | 63.67 | 72.44 | 372.7 | 13.60 | 44.8 |
| 460. | 0.1319 | 0.991 | 21.907 | 242.54 | 64.91 | 73.65 | 376.6 | 13.86 | 46.6 |
| 470. | 0.1290 | 0.992 | 22.650 | 244.13 | 66.14 | 74.85 | 380.5 | 14.11 | 48.4 |
| 480. | 0.1262 | 0.993 | 23.404 | 245.72 | 67.35 | 76.05 | 384.3 | 14.36 | 50.2 |
| 490. | 0.1236 | 0.993 | 24.171 | 247.30 | 68.56 | 77.23 | 388.1 | 14.61 | 52.1 |
| 500. | 0.1210 | 0.994 | 24.949 | 248.87 | 69.75 | 78.41 | 391.8 | 14.85 | 54.0 |
| 520. | 0.1163 | 0.995 | 26.540 | 252.00 | 72.09 | 80.72 | 399.2 | | 57.7 |
| 540. | 0.1118 | 0.996 | 28.177 | 255.08 | 74.38 | 82.98 | 406.4 | | 61.6 |
| 560. | 0.1078 | 0.996 | 29.859 | 258.14 | 76.62 | 85.20 | 413.4 | | 65.5 |
| 580. | 0.1040 | 0.997 | 31.585 | 261.17 | 78.81 | 87.36 | 420.4 | | 69.5 |
| 600. | 0.1005 | 0.998 | 33.353 | 264.17 | 80.95 | 89.48 | 427.2 | | 73.5 |
| 625. | 0.0964 | 0.998 | 35.623 | 267.87 | 83.55 | 92.06 | 435.6 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.5500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.510 | 0.032 | -14.551 | 80.00 | 47.93 | 68.68 | 1972.6 | 1062.05 | 252.4 |
| 100. | 21.332 | 0.031 | -14.204 | 83.56 | 48.15 | 70.09 | 1940.7 | 881.82 | 248.4 |
| 105. | 21.152 | 0.030 | -13.852 | 87.00 | 47.91 | 70.67 | 1906.3 | 745.15 | 244.2 |
| 110. | 20.970 | 0.029 | -13.498 | 90.29 | 47.41 | 70.80 | 1870.7 | 639.57 | 239.8 |
| 115. | 20.788 | 0.028 | -13.144 | 93.44 | 46.80 | 70.69 | 1834.6 | 556.50 | 235.3 |
| 120. | 20.604 | 0.027 | -12.791 | 96.44 | 46.16 | 70.50 | 1798.1 | 490.00 | 230.6 |
| 125. | 20.420 | 0.026 | -12.439 | 99.32 | 45.55 | 70.29 | 1761.4 | 435.89 | 225.9 |
| 130. | 20.235 | 0.025 | -12.088 | 102.07 | 45.00 | 70.12 | 1724.6 | 391.21 | 221.0 |
| 135. | 20.048 | 0.024 | -11.738 | 104.71 | 44.50 | 70.01 | 1687.7 | 353.81 | 216.2 |
| 140. | 19.861 | 0.024 | -11.388 | 107.26 | 44.07 | 69.98 | 1650.7 | 322.11 | 211.3 |
| 145. | 19.672 | 0.023 | -11.038 | 109.71 | 43.70 | 70.02 | 1613.6 | 294.93 | 206.3 |
| 150. | 19.482 | 0.023 | -10.688 | 112.09 | 43.40 | 70.14 | 1576.5 | 271.39 | 201.4 |
| 155. | 19.290 | 0.022 | -10.336 | 114.39 | 43.16 | 70.33 | 1539.2 | 250.80 | 196.4 |
| 160. | 19.096 | 0.022 | -9.984 | 116.63 | 42.97 | 70.60 | 1501.9 | 232.63 | 191.5 |
| 165. | 18.899 | 0.021 | -9.630 | 118.81 | 42.83 | 70.93 | 1464.4 | 216.48 | 186.5 |
| 170. | 18.700 | 0.021 | -9.275 | 120.93 | 42.74 | 71.33 | 1426.9 | 202.00 | 181.6 |
| 175. | 18.499 | 0.020 | -8.917 | 123.00 | 42.69 | 71.80 | 1389.2 | 188.94 | 176.8 |
| 180. | 18.294 | 0.020 | -8.557 | 125.03 | 42.67 | 72.33 | 1351.4 | 177.09 | 171.9 |
| 185. | 18.086 | 0.020 | -8.193 | 127.02 | 42.70 | 72.93 | 1313.4 | 166.27 | 167.1 |
| 190. | 17.874 | 0.019 | -7.827 | 128.98 | 42.75 | 73.59 | 1275.2 | 156.33 | 162.3 |
| 195. | 17.659 | 0.019 | -7.457 | 130.90 | 42.84 | 74.33 | 1236.8 | 147.18 | 157.6 |
| 200. | 17.438 | 0.019 | -7.084 | 132.79 | 42.96 | 75.14 | 1198.1 | 138.69 | 152.9 |
| 205. | 17.213 | 0.019 | -6.706 | 134.66 | 43.11 | 76.03 | 1159.1 | 130.79 | 148.2 |
| 210. | 16.982 | 0.019 | -6.323 | 136.50 | 43.28 | 77.01 | 1119.7 | 123.42 | 143.6 |
| 215. | 16.745 | 0.018 | -5.936 | 138.33 | 43.48 | 78.09 | 1080.0 | 116.50 | 139.1 |
| 220. | 16.501 | 0.018 | -5.542 | 140.13 | 43.71 | 79.29 | 1039.7 | 109.98 | 134.5 |
| 223.045 | 16.349 | 0.018 | -5.300 | 141.23 | 43.87 | 80.08 | 1014.9 | 106.18 | 131.8 |
| 223.045 | 0.3343 | 0.887 | 7.606 | 199.09 | 38.62 | 52.60 | 254.8 | 7.20 | 13.7 |
| 225. | 0.3300 | 0.891 | 7.709 | 199.55 | 38.66 | 52.34 | 256.4 | 7.26 | 13.9 |
| 230. | 0.3198 | 0.899 | 7.969 | 200.70 | 38.83 | 51.85 | 260.4 | 7.42 | 14.3 |
| 235. | 0.3105 | 0.907 | 8.228 | 201.81 | 39.07 | 51.58 | 264.2 | 7.57 | 14.7 |
| 240. | 0.3018 | 0.913 | 8.485 | 202.89 | 39.36 | 51.47 | 267.9 | 7.72 | 15.1 |
| 245. | 0.2938 | 0.919 | 8.743 | 203.95 | 39.70 | 51.46 | 271.4 | 7.88 | 15.6 |
| 250. | 0.2862 | 0.924 | 9.000 | 204.99 | 40.08 | 51.55 | 274.9 | 8.03 | 16.1 |
| 255. | 0.2792 | 0.929 | 9.258 | 206.02 | 40.48 | 51.71 | 278.2 | 8.18 | 16.6 |
| 260. | 0.2725 | 0.934 | 9.517 | 207.02 | 40.91 | 51.92 | 281.4 | 8.33 | 17.1 |
| 265. | 0.2662 | 0.938 | 9.778 | 208.01 | 41.37 | 52.18 | 284.6 | 8.48 | 17.6 |
| 270. | 0.2602 | 0.941 | 10.039 | 208.99 | 41.84 | 52.48 | 287.6 | 8.63 | 18.2 |
| 275. | 0.2546 | 0.945 | 10.302 | 209.96 | 42.33 | 52.82 | 290.6 | 8.78 | 18.7 |
| 280. | 0.2492 | 0.948 | 10.567 | 210.91 | 42.84 | 53.19 | 293.6 | 8.93 | 19.3 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.5500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.2441 | 0.951 | 10.834 | 211.86 | 43.36 | 53.59 | 296.5 | 9.08 | 19.8 |
| 290. | 0.2392 | 0.954 | 11.103 | 212.79 | 43.90 | 54.02 | 299.3 | 9.23 | 20.4 |
| 295. | 0.2345 | 0.956 | 11.375 | 213.72 | 44.45 | 54.46 | 302.0 | 9.37 | 21.0 |
| 300. | 0.2301 | 0.958 | 11.648 | 214.64 | 45.01 | 54.93 | 304.7 | 9.52 | 21.7 |
| 310. | 0.2217 | 0.963 | 12.202 | 216.46 | 46.15 | 55.91 | 310.0 | 9.81 | 22.9 |
| 320. | 0.2139 | 0.966 | 12.766 | 218.25 | 47.34 | 56.95 | 315.1 | 10.10 | 24.2 |
| 330. | 0.2068 | 0.969 | 13.341 | 220.02 | 48.55 | 58.04 | 320.1 | 10.38 | 25.6 |
| 340. | 0.2001 | 0.972 | 13.927 | 221.77 | 49.78 | 59.17 | 325.0 | 10.67 | 27.0 |
| 350. | 0.1939 | 0.975 | 14.525 | 223.50 | 51.02 | 60.33 | 329.7 | 10.95 | 28.4 |
| 360. | 0.1881 | 0.977 | 15.134 | 225.21 | 52.28 | 61.51 | 334.3 | 11.22 | 29.9 |
| 370. | 0.1826 | 0.979 | 15.755 | 226.92 | 53.55 | 62.71 | 338.9 | 11.50 | 31.5 |
| 380. | 0.1775 | 0.981 | 16.388 | 228.60 | 54.83 | 63.92 | 343.3 | 11.77 | 33.0 |
| 390. | 0.1726 | 0.983 | 17.034 | 230.28 | 56.10 | 65.14 | 347.7 | 12.04 | 34.6 |
| 400. | 0.1681 | 0.984 | 17.691 | 231.95 | 57.38 | 66.37 | 352.0 | 12.31 | 36.2 |
| 410. | 0.1637 | 0.985 | 18.361 | 233.60 | 58.65 | 67.60 | 356.2 | 12.58 | 37.9 |
| 420. | 0.1596 | 0.987 | 19.043 | 235.24 | 59.92 | 68.83 | 360.3 | 12.84 | 39.6 |
| 430. | 0.1558 | 0.988 | 19.738 | 236.88 | 61.18 | 70.06 | 364.4 | 13.10 | 41.3 |
| 440. | 0.1521 | 0.989 | 20.444 | 238.50 | 62.44 | 71.28 | 368.5 | 13.36 | 43.0 |
| 450. | 0.1485 | 0.990 | 21.163 | 240.12 | 63.69 | 72.50 | 372.4 | 13.61 | 44.8 |
| 460. | 0.1452 | 0.990 | 21.894 | 241.72 | 64.92 | 73.70 | 376.4 | 13.87 | 46.6 |
| 470. | 0.1420 | 0.991 | 22.637 | 243.32 | 66.15 | 74.91 | 380.3 | 14.12 | 48.4 |
| 480. | 0.1389 | 0.992 | 23.392 | 244.91 | 67.36 | 76.10 | 384.1 | 14.37 | 50.2 |
| 490. | 0.1360 | 0.993 | 24.159 | 246.49 | 68.57 | 77.28 | 387.9 | 14.62 | 52.1 |
| 500. | 0.1332 | 0.993 | 24.938 | 248.07 | 69.76 | 78.45 | 391.6 | 14.86 | 54.0 |
| 520. | 0.1279 | 0.994 | 26.530 | 251.19 | 72.10 | 80.76 | 399.0 | | 57.8 |
| 540. | 0.1231 | 0.995 | 28.168 | 254.28 | 74.39 | 83.02 | 406.3 | | 61.6 |
| 560. | 0.1186 | 0.996 | 29.850 | 257.34 | 76.63 | 85.23 | 413.4 | | 65.5 |
| 580. | 0.1144 | 0.997 | 31.577 | 260.37 | 78.82 | 87.39 | 420.3 | | 69.5 |
| 600. | 0.1105 | 0.997 | 33.346 | 263.36 | 80.95 | 89.51 | 427.2 | | 73.5 |
| 625. | 0.1061 | 0.998 | 35.616 | 267.07 | 83.56 | 92.09 | 435.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.6000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.510 | 0.035 | -14.549 | 80.00 | 47.93 | 68.68 | 1972.8 | 1062.50 | 252.4 |
| 100. | 21.333 | 0.034 | -14.202 | 83.56 | 48.16 | 70.09 | 1940.9 | 882.17 | 248.4 |
| 105. | 21.152 | 0.032 | -13.850 | 87.00 | 47.91 | 70.67 | 1906.5 | 745.43 | 244.2 |
| 110. | 20.971 | 0.031 | -13.496 | 90.29 | 47.41 | 70.80 | 1870.9 | 639.80 | 239.8 |
| 115. | 20.788 | 0.030 | -13.142 | 93.43 | 46.80 | 70.69 | 1834.8 | 556.70 | 235.3 |
| 120. | 20.605 | 0.029 | -12.789 | 96.44 | 46.17 | 70.49 | 1798.3 | 490.17 | 230.6 |
| 125. | 20.421 | 0.028 | -12.437 | 99.31 | 45.56 | 70.29 | 1761.6 | 436.04 | 225.9 |
| 130. | 20.236 | 0.027 | -12.086 | 102.06 | 45.00 | 70.12 | 1724.9 | 391.34 | 221.1 |
| 135. | 20.049 | 0.027 | -11.736 | 104.71 | 44.50 | 70.01 | 1688.0 | 353.93 | 216.2 |
| 140. | 19.862 | 0.026 | -11.386 | 107.25 | 44.07 | 69.97 | 1651.0 | 322.22 | 211.3 |
| 145. | 19.673 | 0.025 | -11.036 | 109.71 | 43.71 | 70.01 | 1613.9 | 295.03 | 206.3 |
| 150. | 19.483 | 0.025 | -10.686 | 112.09 | 43.41 | 70.13 | 1576.8 | 271.49 | 201.4 |
| 155. | 19.291 | 0.024 | -10.335 | 114.39 | 43.16 | 70.33 | 1539.5 | 250.89 | 196.5 |
| 160. | 19.097 | 0.024 | -9.982 | 116.62 | 42.97 | 70.59 | 1502.2 | 232.72 | 191.5 |
| 165. | 18.900 | 0.023 | -9.629 | 118.80 | 42.84 | 70.93 | 1464.8 | 216.56 | 186.6 |
| 170. | 18.702 | 0.023 | -9.273 | 120.92 | 42.74 | 71.33 | 1427.2 | 202.08 | 181.7 |
| 175. | 18.500 | 0.022 | -8.915 | 123.00 | 42.69 | 71.79 | 1389.6 | 189.02 | 176.8 |
| 180. | 18.296 | 0.022 | -8.555 | 125.03 | 42.68 | 72.32 | 1351.7 | 177.16 | 171.9 |
| 185. | 18.088 | 0.022 | -8.192 | 127.02 | 42.70 | 72.92 | 1313.8 | 166.34 | 167.1 |
| 190. | 17.876 | 0.021 | -7.826 | 128.97 | 42.76 | 73.58 | 1275.6 | 156.40 | 162.4 |
| 195. | 17.660 | 0.021 | -7.456 | 130.89 | 42.84 | 74.32 | 1237.2 | 147.25 | 157.6 |
| 200. | 17.440 | 0.021 | -7.082 | 132.78 | 42.96 | 75.12 | 1198.6 | 138.76 | 152.9 |
| 205. | 17.215 | 0.020 | -6.705 | 134.65 | 43.11 | 76.01 | 1159.6 | 130.86 | 148.3 |
| 210. | 16.985 | 0.020 | -6.322 | 136.49 | 43.28 | 76.99 | 1120.3 | 123.48 | 143.7 |
| 215. | 16.748 | 0.020 | -5.934 | 138.32 | 43.49 | 78.07 | 1080.6 | 116.56 | 139.1 |
| 220. | 16.504 | 0.020 | -5.541 | 140.13 | 43.72 | 79.26 | 1040.3 | 110.05 | 134.6 |
| 225. | 16.252 | 0.020 | -5.142 | 141.92 | 43.97 | 80.59 | 999.5 | 103.88 | 130.1 |
| 225.497 | 16.227 | 0.020 | -5.102 | 142.10 | 44.00 | 80.74 | 995.4 | 103.29 | 129.7 |
| 225.497 | 0.3636 | 0.880 | 7.666 | 198.72 | 39.14 | 53.62 | 254.7 | 7.29 | 14.0 |
| 230. | 0.3530 | 0.889 | 7.905 | 199.77 | 39.19 | 52.94 | 258.4 | 7.43 | 14.4 |
| 235. | 0.3423 | 0.897 | 8.169 | 200.90 | 39.35 | 52.47 | 262.4 | 7.59 | 14.8 |
| 240. | 0.3324 | 0.904 | 8.431 | 202.01 | 39.59 | 52.21 | 266.2 | 7.74 | 15.2 |
| 245. | 0.3233 | 0.911 | 8.691 | 203.08 | 39.90 | 52.10 | 269.8 | 7.89 | 15.7 |
| 250. | 0.3148 | 0.917 | 8.952 | 204.13 | 40.24 | 52.11 | 273.4 | 8.04 | 16.2 |
| 255. | 0.3068 | 0.922 | 9.213 | 205.17 | 40.63 | 52.20 | 276.8 | 8.20 | 16.7 |
| 260. | 0.2993 | 0.927 | 9.474 | 206.18 | 41.04 | 52.36 | 280.1 | 8.35 | 17.2 |
| 265. | 0.2923 | 0.932 | 9.736 | 207.18 | 41.48 | 52.58 | 283.3 | 8.50 | 17.7 |
| 270. | 0.2856 | 0.936 | 10.000 | 208.17 | 41.95 | 52.85 | 286.5 | 8.65 | 18.2 |
| 275. | 0.2793 | 0.940 | 10.265 | 209.14 | 42.43 | 53.16 | 289.5 | 8.80 | 18.8 |
| 280. | 0.2733 | 0.943 | 10.531 | 210.10 | 42.93 | 53.50 | 292.5 | 8.94 | 19.3 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.6000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.2676 | 0.946 | 10.800 | 211.05 | 43.44 | 53.88 | 295.5 | 9.09 | 19.9 |
| 290. | 0.2622 | 0.949 | 11.070 | 211.99 | 43.97 | 54.28 | 298.3 | 9.24 | 20.5 |
| 295. | 0.2570 | 0.952 | 11.343 | 212.92 | 44.51 | 54.71 | 301.1 | 9.39 | 21.1 |
| 300. | 0.2520 | 0.954 | 11.617 | 213.85 | 45.07 | 55.16 | 303.9 | 9.53 | 21.7 |
| 310. | 0.2427 | 0.959 | 12.174 | 215.67 | 46.21 | 56.11 | 309.2 | 9.82 | 23.0 |
| 320. | 0.2341 | 0.963 | 12.740 | 217.47 | 47.38 | 57.13 | 314.4 | 10.11 | 24.3 |
| 330. | 0.2262 | 0.967 | 13.316 | 219.24 | 48.58 | 58.20 | 319.5 | 10.40 | 25.6 |
| 340. | 0.2189 | 0.970 | 13.904 | 220.99 | 49.81 | 59.31 | 324.4 | 10.68 | 27.0 |
| 350. | 0.2120 | 0.973 | 14.503 | 222.73 | 51.05 | 60.46 | 329.2 | 10.96 | 28.5 |
| 360. | 0.2056 | 0.975 | 15.113 | 224.45 | 52.31 | 61.63 | 333.8 | 11.24 | 30.0 |
| 370. | 0.1996 | 0.977 | 15.735 | 226.15 | 53.58 | 62.82 | 338.4 | 11.51 | 31.5 |
| 380. | 0.1939 | 0.979 | 16.370 | 227.85 | 54.85 | 64.02 | 342.9 | 11.78 | 33.0 |
| 390. | 0.1886 | 0.981 | 17.016 | 229.52 | 56.12 | 65.23 | 347.3 | 12.05 | 34.6 |
| 400. | 0.1836 | 0.983 | 17.674 | 231.19 | 57.40 | 66.45 | 351.6 | 12.32 | 36.3 |
| 410. | 0.1789 | 0.984 | 18.345 | 232.85 | 58.67 | 67.68 | 355.8 | 12.59 | 37.9 |
| 420. | 0.1744 | 0.985 | 19.028 | 234.49 | 59.93 | 68.90 | 360.0 | 12.85 | 39.6 |
| 430. | 0.1701 | 0.987 | 19.723 | 236.13 | 61.20 | 70.12 | 364.1 | 13.11 | 41.3 |
| 440. | 0.1661 | 0.988 | 20.430 | 237.75 | 62.45 | 71.34 | 368.2 | 13.37 | 43.1 |
| 450. | 0.1622 | 0.989 | 21.150 | 239.37 | 63.70 | 72.55 | 372.2 | 13.63 | 44.8 |
| 460. | 0.1585 | 0.990 | 21.881 | 240.98 | 64.93 | 73.76 | 376.2 | 13.88 | 46.6 |
| 470. | 0.1550 | 0.990 | 22.625 | 242.58 | 66.16 | 74.96 | 380.1 | 14.13 | 48.4 |
| 480. | 0.1517 | 0.991 | 23.380 | 244.17 | 67.37 | 76.14 | 383.9 | 14.38 | 50.3 |
| 490. | 0.1485 | 0.992 | 24.148 | 245.75 | 68.57 | 77.32 | 387.7 | 14.63 | 52.1 |
| 500. | 0.1454 | 0.993 | 24.927 | 247.32 | 69.76 | 78.49 | 391.5 | 14.87 | 54.0 |
| 520. | 0.1396 | 0.994 | 26.520 | 250.45 | 72.11 | 80.79 | 398.9 | | 57.8 |
| 540. | 0.1343 | 0.995 | 28.158 | 253.54 | 74.40 | 83.05 | 406.2 | | 61.6 |
| 560. | 0.1294 | 0.996 | 29.842 | 256.60 | 76.63 | 85.26 | 413.3 | | 65.5 |
| 580. | 0.1249 | 0.996 | 31.568 | 259.63 | 78.82 | 87.42 | 420.2 | | 69.5 |
| 600. | 0.1206 | 0.997 | 33.338 | 262.63 | 80.96 | 89.53 | 427.1 | | 73.5 |
| 625. | 0.1157 | 0.998 | 35.609 | 266.34 | 83.56 | 92.11 | 435.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.6500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.511 | 0.038 | -14.547 | 79.99 | 47.93 | 68.67 | 1973.0 | 1062.95 | 252.4 |
| 100. | 21.333 | 0.037 | -14.200 | 83.56 | 48.16 | 70.09 | 1941.1 | 882.52 | 248.5 |
| 105. | 21.153 | 0.035 | -13.848 | 86.99 | 47.91 | 70.67 | 1906.7 | 745.71 | 244.3 |
| 110. | 20.972 | 0.034 | -13.494 | 90.28 | 47.41 | 70.80 | 1871.2 | 640.04 | 239.9 |
| 115. | 20.789 | 0.033 | -13.140 | 93.43 | 46.80 | 70.69 | 1835.0 | 556.89 | 235.3 |
| 120. | 20.606 | 0.032 | -12.787 | 96.43 | 46.17 | 70.49 | 1798.5 | 490.34 | 230.7 |
| 125. | 20.422 | 0.031 | -12.435 | 99.31 | 45.56 | 70.29 | 1761.9 | 436.19 | 225.9 |
| 130. | 20.236 | 0.030 | -12.084 | 102.06 | 45.00 | 70.11 | 1725.1 | 391.47 | 221.1 |
| 135. | 20.050 | 0.029 | -11.734 | 104.70 | 44.50 | 70.01 | 1688.2 | 354.05 | 216.2 |
| 140. | 19.863 | 0.028 | -11.384 | 107.25 | 44.07 | 69.97 | 1651.3 | 322.33 | 211.3 |
| 145. | 19.674 | 0.027 | -11.034 | 109.70 | 43.71 | 70.01 | 1614.2 | 295.14 | 206.4 |
| 150. | 19.484 | 0.027 | -10.684 | 112.08 | 43.41 | 70.13 | 1577.1 | 271.58 | 201.4 |
| 155. | 19.292 | 0.026 | -10.333 | 114.38 | 43.16 | 70.32 | 1539.8 | 250.98 | 196.5 |
| 160. | 19.098 | 0.026 | -9.981 | 116.62 | 42.98 | 70.59 | 1502.5 | 232.80 | 191.5 |
| 165. | 18.902 | 0.025 | -9.627 | 118.80 | 42.84 | 70.92 | 1465.1 | 216.64 | 186.6 |
| 170. | 18.703 | 0.025 | -9.271 | 120.92 | 42.74 | 71.32 | 1427.6 | 202.16 | 181.7 |
| 175. | 18.502 | 0.024 | -8.914 | 122.99 | 42.69 | 71.79 | 1389.9 | 189.09 | 176.8 |
| 180. | 18.297 | 0.024 | -8.553 | 125.02 | 42.68 | 72.32 | 1352.1 | 177.23 | 172.0 |
| 185. | 18.089 | 0.023 | -8.190 | 127.01 | 42.70 | 72.91 | 1314.2 | 166.41 | 167.2 |
| 190. | 17.878 | 0.023 | -7.824 | 128.97 | 42.76 | 73.57 | 1276.0 | 156.48 | 162.4 |
| 195. | 17.662 | 0.023 | -7.454 | 130.89 | 42.85 | 74.30 | 1237.7 | 147.31 | 157.7 |
| 200. | 17.442 | 0.022 | -7.081 | 132.78 | 42.96 | 75.11 | 1199.0 | 138.83 | 153.0 |
| 205. | 17.217 | 0.022 | -6.703 | 134.64 | 43.11 | 75.99 | 1160.1 | 130.93 | 148.3 |
| 210. | 16.987 | 0.022 | -6.321 | 136.48 | 43.29 | 76.97 | 1120.8 | 123.55 | 143.7 |
| 215. | 16.750 | 0.022 | -5.933 | 138.31 | 43.49 | 78.05 | 1081.1 | 116.63 | 139.2 |
| 220. | 16.507 | 0.022 | -5.540 | 140.12 | 43.72 | 79.24 | 1041.0 | 110.11 | 134.7 |
| 225. | 16.255 | 0.021 | -5.141 | 141.91 | 43.97 | 80.57 | 1000.2 | 103.95 | 130.2 |
| 227.802 | 16.111 | 0.021 | -4.914 | 142.91 | 44.13 | 81.38 | 977.0 | 100.64 | 127.7 |
| 227.802 | 0.3930 | 0.873 | 7.720 | 198.37 | 39.63 | 54.62 | 254.4 | 7.38 | 14.3 |
| 230. | 0.3871 | 0.878 | 7.839 | 198.90 | 39.61 | 54.17 | 256.3 | 7.45 | 14.5 |
| 235. | 0.3749 | 0.887 | 8.108 | 200.05 | 39.67 | 53.45 | 260.5 | 7.60 | 14.9 |
| 240. | 0.3637 | 0.896 | 8.374 | 201.17 | 39.85 | 53.02 | 264.4 | 7.76 | 15.4 |
| 245. | 0.3534 | 0.903 | 8.639 | 202.26 | 40.11 | 52.79 | 268.2 | 7.91 | 15.8 |
| 250. | 0.3439 | 0.909 | 8.902 | 203.33 | 40.42 | 52.71 | 271.8 | 8.06 | 16.3 |
| 255. | 0.3349 | 0.915 | 9.166 | 204.37 | 40.78 | 52.73 | 275.4 | 8.21 | 16.8 |
| 260. | 0.3266 | 0.921 | 9.430 | 205.40 | 41.18 | 52.83 | 278.8 | 8.36 | 17.3 |
| 265. | 0.3187 | 0.926 | 9.694 | 206.41 | 41.60 | 53.00 | 282.1 | 8.51 | 17.8 |
| 270. | 0.3113 | 0.930 | 9.960 | 207.40 | 42.05 | 53.23 | 285.3 | 8.66 | 18.3 |
| 275. | 0.3043 | 0.934 | 10.227 | 208.38 | 42.52 | 53.51 | 288.4 | 8.81 | 18.8 |
| 280. | 0.2977 | 0.938 | 10.495 | 209.34 | 43.01 | 53.82 | 291.5 | 8.96 | 19.4 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.6500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.2913 | 0.942 | 10.765 | 210.30 | 43.52 | 54.17 | 294.5 | 9.11 | 20.0 |
| 290. | 0.2853 | 0.945 | 11.037 | 211.25 | 44.04 | 54.55 | 297.4 | 9.25 | 20.6 |
| 295. | 0.2796 | 0.948 | 11.311 | 212.18 | 44.58 | 54.96 | 300.2 | 9.40 | 21.2 |
| 300. | 0.2741 | 0.951 | 11.587 | 213.11 | 45.13 | 55.39 | 303.0 | 9.55 | 21.8 |
| 310. | 0.2639 | 0.956 | 12.145 | 214.94 | 46.26 | 56.32 | 308.5 | 9.84 | 23.0 |
| 320. | 0.2545 | 0.960 | 12.713 | 216.74 | 47.43 | 57.31 | 313.7 | 10.12 | 24.3 |
| 330. | 0.2458 | 0.964 | 13.291 | 218.52 | 48.62 | 58.36 | 318.8 | 10.41 | 25.7 |
| 340. | 0.2377 | 0.967 | 13.881 | 220.28 | 49.84 | 59.46 | 323.8 | 10.69 | 27.1 |
| 350. | 0.2302 | 0.970 | 14.481 | 222.02 | 51.08 | 60.59 | 328.6 | 10.97 | 28.5 |
| 360. | 0.2232 | 0.973 | 15.092 | 223.74 | 52.34 | 61.74 | 333.3 | 11.25 | 30.0 |
| 370. | 0.2167 | 0.975 | 15.716 | 225.45 | 53.60 | 62.92 | 337.9 | 11.52 | 31.5 |
| 380. | 0.2105 | 0.977 | 16.351 | 227.15 | 54.87 | 64.12 | 342.5 | 11.80 | 33.1 |
| 390. | 0.2047 | 0.979 | 16.998 | 228.83 | 56.14 | 65.32 | 346.9 | 12.07 | 34.7 |
| 400. | 0.1992 | 0.981 | 17.657 | 230.50 | 57.41 | 66.54 | 351.2 | 12.33 | 36.3 |
| 410. | 0.1940 | 0.983 | 18.329 | 232.15 | 58.68 | 67.75 | 355.5 | 12.60 | 38.0 |
| 420. | 0.1891 | 0.984 | 19.012 | 233.80 | 59.95 | 68.97 | 359.7 | 12.86 | 39.6 |
| 430. | 0.1845 | 0.985 | 19.708 | 235.44 | 61.21 | 70.19 | 363.9 | 13.12 | 41.3 |
| 440. | 0.1801 | 0.987 | 20.416 | 237.07 | 62.46 | 71.40 | 367.9 | 13.38 | 43.1 |
| 450. | 0.1759 | 0.988 | 21.136 | 238.68 | 63.71 | 72.61 | 372.0 | 13.64 | 44.9 |
| 460. | 0.1719 | 0.989 | 21.868 | 240.29 | 64.94 | 73.81 | 375.9 | 13.89 | 46.6 |
| 470. | 0.1681 | 0.990 | 22.612 | 241.89 | 66.17 | 75.01 | 379.9 | 14.14 | 48.5 |
| 480. | 0.1644 | 0.990 | 23.368 | 243.48 | 67.38 | 76.19 | 383.7 | 14.39 | 50.3 |
| 490. | 0.1610 | 0.991 | 24.136 | 245.07 | 68.58 | 77.37 | 387.5 | 14.64 | 52.1 |
| 500. | 0.1576 | 0.992 | 24.916 | 246.64 | 69.77 | 78.53 | 391.3 | 14.88 | 54.0 |
| 520. | 0.1514 | 0.993 | 26.510 | 249.77 | 72.11 | 80.83 | 398.8 | | 57.8 |
| 540. | 0.1456 | 0.994 | 28.149 | 252.86 | 74.40 | 83.09 | 406.0 | | 61.6 |
| 560. | 0.1403 | 0.995 | 29.833 | 255.92 | 76.64 | 85.29 | 413.2 | | 65.6 |
| 580. | 0.1353 | 0.996 | 31.560 | 258.95 | 78.83 | 87.45 | 420.2 | | 69.5 |
| 600. | 0.1307 | 0.997 | 33.330 | 261.95 | 80.96 | 89.56 | 427.1 | | 73.5 |
| 625. | 0.1254 | 0.998 | 35.602 | 265.66 | 83.56 | 92.14 | 435.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.7000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.511 | 0.041 | -14.545 | 79.99 | 47.93 | 68.67 | 1973.2 | 1063.40 | 252.4 |
| 100. | 21.334 | 0.039 | -14.198 | 83.55 | 48.16 | 70.08 | 1941.3 | 882.87 | 248.5 |
| 105. | 21.154 | 0.038 | -13.846 | 86.99 | 47.91 | 70.67 | 1907.0 | 745.99 | 244.3 |
| 110. | 20.972 | 0.036 | -13.492 | 90.28 | 47.41 | 70.79 | 1871.4 | 640.27 | 239.9 |
| 115. | 20.790 | 0.035 | -13.138 | 93.42 | 46.80 | 70.69 | 1835.2 | 557.09 | 235.3 |
| 120. | 20.606 | 0.034 | -12.785 | 96.43 | 46.17 | 70.49 | 1798.8 | 490.50 | 230.7 |
| 125. | 20.422 | 0.033 | -12.433 | 99.30 | 45.56 | 70.28 | 1762.1 | 436.33 | 225.9 |
| 130. | 20.237 | 0.032 | -12.082 | 102.06 | 45.00 | 70.11 | 1725.4 | 391.61 | 221.1 |
| 135. | 20.051 | 0.031 | -11.732 | 104.70 | 44.51 | 70.00 | 1688.5 | 354.17 | 216.3 |
| 140. | 19.864 | 0.030 | -11.382 | 107.24 | 44.08 | 69.97 | 1651.5 | 322.44 | 211.3 |
| 145. | 19.675 | 0.030 | -11.032 | 109.70 | 43.71 | 70.01 | 1614.5 | 295.24 | 206.4 |
| 150. | 19.485 | 0.029 | -10.682 | 112.08 | 43.41 | 70.12 | 1577.4 | 271.68 | 201.5 |
| 155. | 19.293 | 0.028 | -10.331 | 114.38 | 43.17 | 70.32 | 1540.1 | 251.07 | 196.5 |
| 160. | 19.099 | 0.028 | -9.979 | 116.61 | 42.98 | 70.58 | 1502.8 | 232.89 | 191.6 |
| 165. | 18.903 | 0.027 | -9.625 | 118.79 | 42.84 | 70.91 | 1465.4 | 216.72 | 186.6 |
| 170. | 18.704 | 0.026 | -9.270 | 120.91 | 42.75 | 71.31 | 1427.9 | 202.23 | 181.7 |
| 175. | 18.503 | 0.026 | -8.912 | 122.99 | 42.69 | 71.78 | 1390.3 | 189.17 | 176.9 |
| 180. | 18.299 | 0.026 | -8.552 | 125.02 | 42.68 | 72.31 | 1352.5 | 177.31 | 172.0 |
| 185. | 18.091 | 0.025 | -8.189 | 127.01 | 42.70 | 72.90 | 1314.6 | 166.48 | 167.2 |
| 190. | 17.880 | 0.025 | -7.823 | 128.96 | 42.76 | 73.56 | 1276.5 | 156.55 | 162.4 |
| 195. | 17.664 | 0.024 | -7.453 | 130.88 | 42.85 | 74.29 | 1238.1 | 147.38 | 157.7 |
| 200. | 17.444 | 0.024 | -7.080 | 132.77 | 42.97 | 75.10 | 1199.5 | 138.90 | 153.0 |
| 205. | 17.220 | 0.024 | -6.702 | 134.63 | 43.11 | 75.98 | 1160.6 | 131.00 | 148.4 |
| 210. | 16.989 | 0.024 | -6.320 | 136.48 | 43.29 | 76.95 | 1121.4 | 123.62 | 143.8 |
| 215. | 16.753 | 0.023 | -5.932 | 138.30 | 43.49 | 78.02 | 1081.7 | 116.70 | 139.2 |
| 220. | 16.510 | 0.023 | -5.539 | 140.11 | 43.72 | 79.21 | 1041.6 | 110.18 | 134.7 |
| 225. | 16.258 | 0.023 | -5.140 | 141.90 | 43.98 | 80.54 | 1000.8 | 104.02 | 130.2 |
| 229.980 | 15.999 | 0.023 | -4.735 | 143.68 | 44.26 | 82.02 | 959.5 | 98.20 | 125.8 |
| 229.980 | 0.4224 | 0.867 | 7.769 | 198.05 | 40.09 | 55.59 | 254.1 | 7.47 | 14.7 |
| 230. | 0.4223 | 0.867 | 7.770 | 198.06 | 40.09 | 55.58 | 254.2 | 7.47 | 14.7 |
| 235. | 0.4084 | 0.877 | 8.045 | 199.24 | 40.03 | 54.55 | 258.5 | 7.62 | 15.0 |
| 240. | 0.3958 | 0.886 | 8.316 | 200.38 | 40.13 | 53.91 | 262.6 | 7.77 | 15.5 |
| 245. | 0.3842 | 0.894 | 8.585 | 201.49 | 40.33 | 53.54 | 266.5 | 7.92 | 15.9 |
| 250. | 0.3735 | 0.902 | 8.852 | 202.57 | 40.61 | 53.34 | 270.3 | 8.08 | 16.4 |
| 255. | 0.3635 | 0.908 | 9.119 | 203.62 | 40.94 | 53.28 | 273.9 | 8.23 | 16.8 |
| 260. | 0.3542 | 0.914 | 9.385 | 204.66 | 41.32 | 53.32 | 277.4 | 8.38 | 17.3 |
| 265. | 0.3455 | 0.919 | 9.652 | 205.68 | 41.73 | 53.44 | 280.8 | 8.53 | 17.8 |
| 270. | 0.3373 | 0.924 | 9.920 | 206.68 | 42.16 | 53.63 | 284.1 | 8.68 | 18.4 |
| 275. | 0.3296 | 0.929 | 10.188 | 207.66 | 42.62 | 53.87 | 287.3 | 8.83 | 18.9 |
| 280. | 0.3223 | 0.933 | 10.458 | 208.64 | 43.10 | 54.15 | 290.4 | 8.97 | 19.5 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.7000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.3153 | 0.937 | 10.730 | 209.60 | 43.60 | 54.47 | 293.4 | 9.12 | 20.0 |
| 290. | 0.3087 | 0.940 | 11.003 | 210.55 | 44.12 | 54.83 | 296.4 | 9.27 | 20.6 |
| 295. | 0.3025 | 0.944 | 11.278 | 211.49 | 44.65 | 55.22 | 299.3 | 9.41 | 21.2 |
| 300. | 0.2965 | 0.947 | 11.555 | 212.42 | 45.19 | 55.63 | 302.2 | 9.56 | 21.8 |
| 310. | 0.2853 | 0.952 | 12.116 | 214.26 | 46.31 | 56.53 | 307.7 | 9.85 | 23.1 |
| 320. | 0.2750 | 0.957 | 12.686 | 216.07 | 47.47 | 57.50 | 313.0 | 10.14 | 24.4 |
| 330. | 0.2655 | 0.961 | 13.266 | 217.85 | 48.66 | 58.53 | 318.2 | 10.42 | 25.7 |
| 340. | 0.2567 | 0.965 | 13.857 | 219.62 | 49.88 | 59.60 | 323.2 | 10.70 | 27.1 |
| 350. | 0.2485 | 0.968 | 14.458 | 221.36 | 51.11 | 60.72 | 328.1 | 10.98 | 28.6 |
| 360. | 0.2409 | 0.971 | 15.071 | 223.09 | 52.36 | 61.86 | 332.8 | 11.26 | 30.0 |
| 370. | 0.2338 | 0.973 | 15.696 | 224.80 | 53.62 | 63.03 | 337.5 | 11.54 | 31.6 |
| 380. | 0.2271 | 0.976 | 16.332 | 226.49 | 54.89 | 64.22 | 342.0 | 11.81 | 33.1 |
| 390. | 0.2208 | 0.978 | 16.980 | 228.18 | 56.16 | 65.41 | 346.5 | 12.08 | 34.7 |
| 400. | 0.2149 | 0.980 | 17.640 | 229.85 | 57.43 | 66.62 | 350.9 | 12.34 | 36.3 |
| 410. | 0.2092 | 0.981 | 18.313 | 231.51 | 58.70 | 67.83 | 355.2 | 12.61 | 38.0 |
| 420. | 0.2039 | 0.983 | 18.997 | 233.16 | 59.96 | 69.04 | 359.4 | 12.87 | 39.7 |
| 430. | 0.1989 | 0.984 | 19.693 | 234.80 | 61.22 | 70.25 | 363.6 | 13.13 | 41.4 |
| 440. | 0.1941 | 0.986 | 20.402 | 236.43 | 62.47 | 71.46 | 367.7 | 13.39 | 43.1 |
| 450. | 0.1896 | 0.987 | 21.123 | 238.05 | 63.72 | 72.67 | 371.7 | 13.65 | 44.9 |
| 460. | 0.1853 | 0.988 | 21.855 | 239.66 | 64.95 | 73.87 | 375.7 | 13.90 | 46.7 |
| 470. | 0.1812 | 0.989 | 22.600 | 241.26 | 66.18 | 75.06 | 379.6 | 14.15 | 48.5 |
| 480. | 0.1772 | 0.990 | 23.356 | 242.85 | 67.39 | 76.24 | 383.5 | 14.40 | 50.3 |
| 490. | 0.1734 | 0.991 | 24.125 | 244.43 | 68.59 | 77.41 | 387.4 | 14.65 | 52.2 |
| 500. | 0.1698 | 0.991 | 24.905 | 246.01 | 69.78 | 78.58 | 391.2 | 14.89 | 54.0 |
| 520. | 0.1631 | 0.993 | 26.499 | 249.14 | 72.12 | 80.87 | 398.6 | | 57.8 |
| 540. | 0.1569 | 0.994 | 28.139 | 252.23 | 74.41 | 83.12 | 405.9 | | 61.7 |
| 560. | 0.1511 | 0.995 | 29.824 | 255.29 | 76.65 | 85.32 | 413.1 | | 65.6 |
| 580. | 0.1458 | 0.996 | 31.552 | 258.33 | 78.83 | 87.48 | 420.1 | | 69.5 |
| 600. | 0.1408 | 0.997 | 33.323 | 261.33 | 80.97 | 89.59 | 427.0 | | 73.5 |
| 625. | 0.1350 | 0.997 | 35.595 | 265.04 | 83.57 | 92.16 | 435.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.7500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.512 | 0.044 | -14.543 | 79.99 | 47.93 | 68.67 | 1973.4 | 1063.85 | 252.4 |
| 100. | 21.334 | 0.042 | -14.196 | 83.55 | 48.16 | 70.08 | 1941.5 | 883.22 | 248.5 |
| 105. | 21.154 | 0.041 | -13.844 | 86.98 | 47.91 | 70.67 | 1907.2 | 746.27 | 244.3 |
| 110. | 20.973 | 0.039 | -13.490 | 90.28 | 47.41 | 70.79 | 1871.6 | 640.50 | 239.9 |
| 115. | 20.791 | 0.038 | -13.136 | 93.42 | 46.81 | 70.69 | 1835.5 | 557.29 | 235.4 |
| 120. | 20.607 | 0.036 | -12.783 | 96.43 | 46.17 | 70.49 | 1799.0 | 490.67 | 230.7 |
| 125. | 20.423 | 0.035 | -12.431 | 99.30 | 45.56 | 70.28 | 1762.4 | 436.48 | 226.0 |
| 130. | 20.238 | 0.034 | -12.081 | 102.05 | 45.00 | 70.11 | 1725.6 | 391.74 | 221.2 |
| 135. | 20.052 | 0.033 | -11.730 | 104.69 | 44.51 | 70.00 | 1688.7 | 354.29 | 216.3 |
| 140. | 19.865 | 0.032 | -11.380 | 107.24 | 44.08 | 69.96 | 1651.8 | 322.55 | 211.4 |
| 145. | 19.676 | 0.032 | -11.031 | 109.70 | 43.71 | 70.00 | 1614.8 | 295.34 | 206.4 |
| 150. | 19.486 | 0.031 | -10.680 | 112.07 | 43.41 | 70.12 | 1577.6 | 271.77 | 201.5 |
| 155. | 19.294 | 0.030 | -10.329 | 114.37 | 43.17 | 70.31 | 1540.5 | 251.16 | 196.6 |
| 160. | 19.100 | 0.030 | -9.977 | 116.61 | 42.98 | 70.57 | 1503.2 | 232.97 | 191.6 |
| 165. | 18.904 | 0.029 | -9.623 | 118.79 | 42.84 | 70.91 | 1465.8 | 216.80 | 186.7 |
| 170. | 18.706 | 0.028 | -9.268 | 120.91 | 42.75 | 71.31 | 1428.3 | 202.31 | 181.8 |
| 175. | 18.504 | 0.028 | -8.910 | 122.98 | 42.70 | 71.77 | 1390.7 | 189.24 | 176.9 |
| 180. | 18.300 | 0.027 | -8.550 | 125.01 | 42.68 | 72.30 | 1352.9 | 177.38 | 172.1 |
| 185. | 18.093 | 0.027 | -8.187 | 127.00 | 42.71 | 72.89 | 1315.0 | 166.55 | 167.3 |
| 190. | 17.881 | 0.027 | -7.821 | 128.95 | 42.76 | 73.55 | 1276.9 | 156.62 | 162.5 |
| 195. | 17.666 | 0.026 | -7.451 | 130.87 | 42.85 | 74.28 | 1238.6 | 147.45 | 157.8 |
| 200. | 17.446 | 0.026 | -7.078 | 132.76 | 42.97 | 75.08 | 1200.0 | 138.96 | 153.1 |
| 205. | 17.222 | 0.026 | -6.701 | 134.63 | 43.12 | 75.96 | 1161.1 | 131.07 | 148.4 |
| 210. | 16.992 | 0.025 | -6.318 | 136.47 | 43.29 | 76.93 | 1121.9 | 123.69 | 143.8 |
| 215. | 16.756 | 0.025 | -5.931 | 138.29 | 43.49 | 78.00 | 1082.3 | 116.77 | 139.3 |
| 220. | 16.512 | 0.025 | -5.538 | 140.10 | 43.72 | 79.19 | 1042.2 | 110.25 | 134.8 |
| 225. | 16.262 | 0.025 | -5.139 | 141.89 | 43.98 | 80.51 | 1001.5 | 104.09 | 130.3 |
| 230. | 16.002 | 0.025 | -4.733 | 143.68 | 44.26 | 81.99 | 960.1 | 98.24 | 125.9 |
| 232.046 | 15.892 | 0.024 | -4.564 | 144.41 | 44.39 | 82.65 | 942.9 | 95.93 | 124.1 |
| 232.046 | 0.4520 | 0.860 | 7.814 | 197.75 | 40.53 | 56.55 | 253.8 | 7.55 | 14.9 |
| 235. | 0.4428 | 0.867 | 7.980 | 198.46 | 40.44 | 55.78 | 256.5 | 7.64 | 15.2 |
| 240. | 0.4286 | 0.877 | 8.257 | 199.63 | 40.44 | 54.89 | 260.8 | 7.79 | 15.6 |
| 245. | 0.4156 | 0.886 | 8.530 | 200.75 | 40.58 | 54.34 | 264.8 | 7.94 | 16.0 |
| 250. | 0.4037 | 0.894 | 8.801 | 201.85 | 40.81 | 54.02 | 268.7 | 8.09 | 16.5 |
| 255. | 0.3926 | 0.901 | 9.070 | 202.92 | 41.11 | 53.87 | 272.4 | 8.24 | 16.9 |
| 260. | 0.3824 | 0.907 | 9.340 | 203.96 | 41.46 | 53.84 | 276.0 | 8.39 | 17.4 |
| 265. | 0.3727 | 0.913 | 9.609 | 204.99 | 41.85 | 53.90 | 279.5 | 8.54 | 17.9 |
| 270. | 0.3637 | 0.919 | 9.879 | 206.00 | 42.28 | 54.04 | 282.9 | 8.69 | 18.4 |
| 275. | 0.3552 | 0.923 | 10.150 | 206.99 | 42.72 | 54.24 | 286.1 | 8.84 | 19.0 |
| 280. | 0.3472 | 0.928 | 10.421 | 207.97 | 43.20 | 54.49 | 289.3 | 8.99 | 19.5 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.7500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.3396 | 0.932 | 10.694 | 208.94 | 43.69 | 54.79 | 292.4 | 9.14 | 20.1 |
| 290. | 0.3324 | 0.936 | 10.969 | 209.89 | 44.19 | 55.12 | 295.4 | 9.28 | 20.7 |
| 295. | 0.3255 | 0.939 | 11.246 | 210.84 | 44.72 | 55.48 | 298.4 | 9.43 | 21.3 |
| 300. | 0.3190 | 0.943 | 11.524 | 211.77 | 45.26 | 55.88 | 301.3 | 9.57 | 21.9 |
| 310. | 0.3068 | 0.948 | 12.087 | 213.62 | 46.37 | 56.74 | 306.9 | 9.86 | 23.1 |
| 320. | 0.2956 | 0.954 | 12.659 | 215.44 | 47.52 | 57.68 | 312.3 | 10.15 | 24.4 |
| 330. | 0.2853 | 0.958 | 13.241 | 217.23 | 48.70 | 58.69 | 317.5 | 10.43 | 25.8 |
| 340. | 0.2758 | 0.962 | 13.833 | 218.99 | 49.91 | 59.75 | 322.6 | 10.72 | 27.2 |
| 350. | 0.2669 | 0.966 | 14.436 | 220.74 | 51.14 | 60.85 | 327.5 | 11.00 | 28.6 |
| 360. | 0.2587 | 0.969 | 15.050 | 222.47 | 52.39 | 61.98 | 332.3 | 11.27 | 30.1 |
| 370. | 0.2510 | 0.971 | 15.676 | 224.19 | 53.65 | 63.14 | 337.0 | 11.55 | 31.6 |
| 380. | 0.2437 | 0.974 | 16.313 | 225.89 | 54.91 | 64.31 | 341.6 | 11.82 | 33.1 |
| 390. | 0.2369 | 0.976 | 16.962 | 227.57 | 56.18 | 65.50 | 346.1 | 12.09 | 34.7 |
| 400. | 0.2305 | 0.978 | 17.623 | 229.24 | 57.45 | 66.70 | 350.5 | 12.36 | 36.4 |
| 410. | 0.2245 | 0.980 | 18.296 | 230.91 | 58.71 | 67.91 | 354.8 | 12.62 | 38.0 |
| 420. | 0.2188 | 0.982 | 18.981 | 232.56 | 59.98 | 69.11 | 359.1 | 12.88 | 39.7 |
| 430. | 0.2134 | 0.983 | 19.679 | 234.20 | 61.24 | 70.32 | 363.3 | 13.14 | 41.4 |
| 440. | 0.2082 | 0.985 | 20.388 | 235.83 | 62.49 | 71.53 | 367.4 | 13.40 | 43.1 |
| 450. | 0.2033 | 0.986 | 21.109 | 237.45 | 63.73 | 72.73 | 371.5 | 13.66 | 44.9 |
| 460. | 0.1987 | 0.987 | 21.842 | 239.06 | 64.96 | 73.92 | 375.5 | 13.91 | 46.7 |
| 470. | 0.1942 | 0.988 | 22.587 | 240.66 | 66.19 | 75.11 | 379.4 | 14.16 | 48.5 |
| 480. | 0.1900 | 0.989 | 23.344 | 242.26 | 67.40 | 76.29 | 383.4 | 14.41 | 50.3 |
| 490. | 0.1860 | 0.990 | 24.113 | 243.84 | 68.60 | 77.46 | 387.2 | 14.66 | 52.2 |
| 500. | 0.1821 | 0.991 | 24.894 | 245.42 | 69.79 | 78.62 | 391.0 | 14.90 | 54.0 |
| 520. | 0.1748 | 0.992 | 26.489 | 248.55 | 72.13 | 80.91 | 398.5 | | 57.8 |
| 540. | 0.1681 | 0.994 | 28.130 | 251.64 | 74.41 | 83.16 | 405.8 | | 61.7 |
| 560. | 0.1620 | 0.995 | 29.815 | 254.71 | 76.65 | 85.36 | 413.0 | | 65.6 |
| 580. | 0.1562 | 0.996 | 31.544 | 257.74 | 78.84 | 87.51 | 420.1 | | 69.5 |
| 600. | 0.1509 | 0.996 | 33.315 | 260.74 | 80.97 | 89.61 | 427.0 | | 73.5 |
| 625. | 0.1447 | 0.997 | 35.588 | 264.45 | 83.57 | 92.18 | 435.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.8000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.513 | 0.047 | -14.541 | 79.98 | 47.93 | 68.67 | 1973.7 | 1064.30 | 252.5 |
| 100. | 21.335 | 0.045 | -14.194 | 83.54 | 48.16 | 70.08 | 1941.8 | 883.57 | 248.5 |
| 105. | 21.155 | 0.043 | -13.842 | 86.98 | 47.91 | 70.66 | 1907.4 | 746.55 | 244.3 |
| 110. | 20.974 | 0.042 | -13.488 | 90.27 | 47.42 | 70.79 | 1871.8 | 640.73 | 239.9 |
| 115. | 20.791 | 0.040 | -13.134 | 93.42 | 46.81 | 70.68 | 1835.7 | 557.48 | 235.4 |
| 120. | 20.608 | 0.039 | -12.781 | 96.42 | 46.17 | 70.49 | 1799.2 | 490.84 | 230.7 |
| 125. | 20.424 | 0.038 | -12.430 | 99.29 | 45.57 | 70.28 | 1762.6 | 436.63 | 226.0 |
| 130. | 20.239 | 0.037 | -12.079 | 102.05 | 45.01 | 70.11 | 1725.9 | 391.87 | 221.2 |
| 135. | 20.053 | 0.036 | -11.728 | 104.69 | 44.51 | 70.00 | 1689.0 | 354.41 | 216.3 |
| 140. | 19.866 | 0.035 | -11.379 | 107.23 | 44.08 | 69.96 | 1652.1 | 322.66 | 211.4 |
| 145. | 19.677 | 0.034 | -11.029 | 109.69 | 43.72 | 70.00 | 1615.0 | 295.44 | 206.5 |
| 150. | 19.487 | 0.033 | -10.678 | 112.07 | 43.41 | 70.11 | 1577.9 | 271.87 | 201.5 |
| 155. | 19.295 | 0.032 | -10.327 | 114.37 | 43.17 | 70.31 | 1540.8 | 251.25 | 196.6 |
| 160. | 19.102 | 0.031 | -9.975 | 116.60 | 42.98 | 70.57 | 1503.5 | 233.06 | 191.7 |
| 165. | 18.906 | 0.031 | -9.622 | 118.78 | 42.84 | 70.90 | 1466.1 | 216.88 | 186.7 |
| 170. | 18.707 | 0.030 | -9.266 | 120.90 | 42.75 | 71.30 | 1428.6 | 202.39 | 181.8 |
| 175. | 18.506 | 0.030 | -8.909 | 122.98 | 42.70 | 71.76 | 1391.0 | 189.32 | 177.0 |
| 180. | 18.302 | 0.029 | -8.548 | 125.00 | 42.69 | 72.29 | 1353.3 | 177.45 | 172.1 |
| 185. | 18.094 | 0.029 | -8.186 | 126.99 | 42.71 | 72.88 | 1315.4 | 166.62 | 167.3 |
| 190. | 17.883 | 0.028 | -7.819 | 128.94 | 42.77 | 73.54 | 1277.3 | 156.69 | 162.5 |
| 195. | 17.668 | 0.028 | -7.450 | 130.86 | 42.85 | 74.27 | 1239.0 | 147.52 | 157.8 |
| 200. | 17.448 | 0.028 | -7.077 | 132.75 | 42.97 | 75.07 | 1200.5 | 139.03 | 153.1 |
| 205. | 17.224 | 0.027 | -6.699 | 134.62 | 43.12 | 75.95 | 1161.7 | 131.13 | 148.5 |
| 210. | 16.994 | 0.027 | -6.317 | 136.46 | 43.29 | 76.91 | 1122.5 | 123.76 | 143.9 |
| 215. | 16.758 | 0.027 | -5.930 | 138.28 | 43.49 | 77.98 | 1082.9 | 116.84 | 139.3 |
| 220. | 16.515 | 0.026 | -5.537 | 140.09 | 43.72 | 79.16 | 1042.8 | 110.32 | 134.8 |
| 225. | 16.265 | 0.026 | -5.138 | 141.88 | 43.98 | 80.48 | 1002.2 | 104.16 | 130.4 |
| 230. | 16.005 | 0.026 | -4.732 | 143.67 | 44.26 | 81.96 | 960.8 | 98.31 | 125.9 |
| 234.014 | 15.789 | 0.026 | -4.400 | 145.10 | 44.51 | 83.28 | 927.0 | 93.82 | 122.4 |
| 234.014 | 0.4816 | 0.854 | 7.856 | 197.47 | 40.95 | 57.49 | 253.5 | 7.63 | 15.2 |
| 235. | 0.4782 | 0.856 | 7.913 | 197.71 | 40.90 | 57.18 | 254.4 | 7.66 | 15.3 |
| 240. | 0.4622 | 0.867 | 8.196 | 198.91 | 40.78 | 55.98 | 258.8 | 7.81 | 15.7 |
| 245. | 0.4477 | 0.877 | 8.473 | 200.05 | 40.85 | 55.22 | 263.1 | 7.96 | 16.1 |
| 250. | 0.4345 | 0.886 | 8.748 | 201.16 | 41.03 | 54.76 | 267.1 | 8.11 | 16.6 |
| 255. | 0.4223 | 0.894 | 9.021 | 202.24 | 41.29 | 54.49 | 270.9 | 8.26 | 17.0 |
| 260. | 0.4109 | 0.901 | 9.293 | 203.30 | 41.62 | 54.38 | 274.6 | 8.41 | 17.5 |
| 265. | 0.4004 | 0.907 | 9.565 | 204.34 | 41.99 | 54.38 | 278.2 | 8.56 | 18.0 |
| 270. | 0.3905 | 0.913 | 9.837 | 205.35 | 42.39 | 54.47 | 281.6 | 8.71 | 18.5 |
| 275. | 0.3812 | 0.918 | 10.110 | 206.35 | 42.83 | 54.63 | 285.0 | 8.86 | 19.1 |
| 280. | 0.3724 | 0.923 | 10.384 | 207.34 | 43.29 | 54.84 | 288.2 | 9.00 | 19.6 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.8000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 285. | 0.3641 | 0.927 | 10.659 | 208.31 | 43.77 | 55.11 | 291.4 | 9.15 | 20.2 |
| 290. | 0.3563 | 0.931 | 10.935 | 209.27 | 44.27 | 55.41 | 294.5 | 9.30 | 20.7 |
| 295. | 0.3488 | 0.935 | 11.213 | 210.22 | 44.79 | 55.76 | 297.5 | 9.44 | 21.3 |
| 300. | 0.3417 | 0.939 | 11.493 | 211.16 | 45.32 | 56.13 | 300.4 | 9.59 | 21.9 |
| 310. | 0.3285 | 0.945 | 12.058 | 213.02 | 46.42 | 56.96 | 306.1 | 9.88 | 23.2 |
| 320. | 0.3164 | 0.950 | 12.632 | 214.84 | 47.57 | 57.87 | 311.6 | 10.16 | 24.5 |
| 330. | 0.3052 | 0.955 | 13.216 | 216.64 | 48.74 | 58.86 | 316.9 | 10.45 | 25.8 |
| 340. | 0.2950 | 0.959 | 13.809 | 218.41 | 49.95 | 59.90 | 322.0 | 10.73 | 27.2 |
| 350. | 0.2854 | 0.963 | 14.414 | 220.16 | 51.18 | 60.98 | 327.0 | 11.01 | 28.6 |
| 360. | 0.2765 | 0.966 | 15.029 | 221.89 | 52.42 | 62.10 | 331.8 | 11.29 | 30.1 |
| 370. | 0.2682 | 0.969 | 15.656 | 223.61 | 53.67 | 63.25 | 336.6 | 11.56 | 31.6 |
| 380. | 0.2605 | 0.972 | 16.294 | 225.31 | 54.93 | 64.41 | 341.2 | 11.83 | 33.2 |
| 390. | 0.2532 | 0.975 | 16.944 | 227.00 | 56.20 | 65.60 | 345.7 | 12.10 | 34.8 |
| 400. | 0.2463 | 0.977 | 17.606 | 228.68 | 57.46 | 66.79 | 350.2 | 12.37 | 36.4 |
| 410. | 0.2398 | 0.979 | 18.280 | 230.34 | 58.73 | 67.99 | 354.5 | 12.63 | 38.0 |
| 420. | 0.2337 | 0.980 | 18.966 | 231.99 | 59.99 | 69.19 | 358.8 | 12.90 | 39.7 |
| 430. | 0.2279 | 0.982 | 19.664 | 233.64 | 61.25 | 70.39 | 363.0 | 13.16 | 41.4 |
| 440. | 0.2223 | 0.984 | 20.374 | 235.27 | 62.50 | 71.59 | 367.2 | 13.41 | 43.2 |
| 450. | 0.2171 | 0.985 | 21.095 | 236.89 | 63.74 | 72.78 | 371.2 | 13.67 | 44.9 |
| 460. | 0.2121 | 0.986 | 21.829 | 238.50 | 64.97 | 73.98 | 375.3 | 13.92 | 46.7 |
| 470. | 0.2074 | 0.987 | 22.575 | 240.11 | 66.19 | 75.16 | 379.2 | 14.17 | 48.5 |
| 480. | 0.2028 | 0.988 | 23.332 | 241.70 | 67.41 | 76.34 | 383.2 | 14.42 | 50.3 |
| 490. | 0.1985 | 0.989 | 24.102 | 243.29 | 68.61 | 77.50 | 387.0 | 14.67 | 52.2 |
| 500. | 0.1944 | 0.990 | 24.883 | 244.86 | 69.79 | 78.66 | 390.9 | 14.91 | 54.1 |
| 520. | 0.1866 | 0.992 | 26.479 | 247.99 | 72.13 | 80.95 | 398.4 | | 57.8 |
| 540. | 0.1794 | 0.993 | 28.120 | 251.09 | 74.42 | 83.19 | 405.7 | | 61.7 |
| 560. | 0.1728 | 0.994 | 29.806 | 254.16 | 76.66 | 85.39 | 412.9 | | 65.6 |
| 580. | 0.1667 | 0.995 | 31.535 | 257.19 | 78.84 | 87.54 | 420.0 | | 69.5 |
| 600. | 0.1610 | 0.996 | 33.307 | 260.19 | 80.98 | 89.64 | 426.9 | | 73.5 |
| 625. | 0.1544 | 0.997 | 35.580 | 263.91 | 83.58 | 92.21 | 435.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.8500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.513 | 0.050 | -14.539 | 79.98 | 47.93 | 68.66 | 1973.9 | 1064.75 | 252.5 |
| 100. | 21.336 | 0.048 | -14.192 | 83.54 | 48.16 | 70.08 | 1942.0 | 883.92 | 248.5 |
| 105. | 21.156 | 0.046 | -13.840 | 86.98 | 47.91 | 70.66 | 1907.6 | 746.83 | 244.4 |
| 110. | 20.974 | 0.044 | -13.486 | 90.27 | 47.42 | 70.79 | 1872.1 | 640.96 | 240.0 |
| 115. | 20.792 | 0.043 | -13.133 | 93.41 | 46.81 | 70.68 | 1835.9 | 557.68 | 235.4 |
| 120. | 20.609 | 0.041 | -12.780 | 96.42 | 46.18 | 70.48 | 1799.5 | 491.01 | 230.8 |
| 125. | 20.425 | 0.040 | -12.428 | 99.29 | 45.57 | 70.28 | 1762.9 | 436.78 | 226.0 |
| 130. | 20.240 | 0.039 | -12.077 | 102.04 | 45.01 | 70.10 | 1726.1 | 392.00 | 221.2 |
| 135. | 20.054 | 0.038 | -11.727 | 104.69 | 44.51 | 69.99 | 1689.3 | 354.53 | 216.3 |
| 140. | 19.867 | 0.037 | -11.377 | 107.23 | 44.08 | 69.96 | 1652.3 | 322.77 | 211.4 |
| 145. | 19.678 | 0.036 | -11.027 | 109.69 | 43.72 | 69.99 | 1615.3 | 295.54 | 206.5 |
| 150. | 19.488 | 0.035 | -10.677 | 112.06 | 43.42 | 70.11 | 1578.2 | 271.96 | 201.6 |
| 155. | 19.297 | 0.034 | -10.326 | 114.36 | 43.17 | 70.30 | 1541.1 | 251.34 | 196.6 |
| 160. | 19.103 | 0.033 | -9.974 | 116.60 | 42.99 | 70.56 | 1503.8 | 233.14 | 191.7 |
| 165. | 18.907 | 0.033 | -9.620 | 118.77 | 42.85 | 70.89 | 1466.4 | 216.96 | 186.8 |
| 170. | 18.708 | 0.032 | -9.264 | 120.90 | 42.75 | 71.29 | 1429.0 | 202.47 | 181.9 |
| 175. | 18.507 | 0.032 | -8.907 | 122.97 | 42.70 | 71.76 | 1391.4 | 189.39 | 177.0 |
| 180. | 18.303 | 0.031 | -8.547 | 125.00 | 42.69 | 72.28 | 1353.7 | 177.53 | 172.2 |
| 185. | 18.096 | 0.031 | -8.184 | 126.99 | 42.71 | 72.87 | 1315.8 | 166.70 | 167.4 |
| 190. | 17.885 | 0.030 | -7.818 | 128.94 | 42.77 | 73.53 | 1277.8 | 156.76 | 162.6 |
| 195. | 17.670 | 0.030 | -7.449 | 130.86 | 42.86 | 74.26 | 1239.5 | 147.59 | 157.9 |
| 200. | 17.450 | 0.029 | -7.075 | 132.75 | 42.97 | 75.05 | 1201.0 | 139.10 | 153.2 |
| 205. | 17.226 | 0.029 | -6.698 | 134.61 | 43.12 | 75.93 | 1162.2 | 131.20 | 148.5 |
| 210. | 16.996 | 0.029 | -6.316 | 136.45 | 43.29 | 76.90 | 1123.0 | 123.82 | 143.9 |
| 215. | 16.761 | 0.028 | -5.929 | 138.27 | 43.50 | 77.96 | 1083.5 | 116.90 | 139.4 |
| 220. | 16.518 | 0.028 | -5.536 | 140.08 | 43.73 | 79.14 | 1043.4 | 110.39 | 134.9 |
| 225. | 16.268 | 0.028 | -5.137 | 141.87 | 43.98 | 80.45 | 1002.8 | 104.23 | 130.4 |
| 230. | 16.008 | 0.028 | -4.731 | 143.66 | 44.27 | 81.92 | 961.5 | 98.38 | 126.0 |
| 235. | 15.739 | 0.028 | -4.318 | 145.44 | 44.58 | 83.59 | 919.4 | 92.81 | 121.6 |
| 235.894 | 15.689 | 0.028 | -4.243 | 145.75 | 44.64 | 83.91 | 911.8 | 91.84 | 120.8 |
| 235.894 | 0.5114 | 0.848 | 7.895 | 197.21 | 41.35 | 58.43 | 253.1 | 7.71 | 15.5 |
| 240. | 0.4967 | 0.858 | 8.132 | 198.21 | 41.16 | 57.18 | 256.9 | 7.83 | 15.8 |
| 245. | 0.4806 | 0.868 | 8.415 | 199.37 | 41.14 | 56.17 | 261.3 | 7.98 | 16.2 |
| 250. | 0.4659 | 0.878 | 8.695 | 200.50 | 41.26 | 55.54 | 265.4 | 8.13 | 16.7 |
| 255. | 0.4524 | 0.886 | 8.971 | 201.60 | 41.48 | 55.16 | 269.4 | 8.28 | 17.1 |
| 260. | 0.4400 | 0.894 | 9.246 | 202.67 | 41.78 | 54.96 | 273.2 | 8.43 | 17.6 |
| 265. | 0.4284 | 0.900 | 9.521 | 203.71 | 42.12 | 54.88 | 276.9 | 8.58 | 18.1 |
| 270. | 0.4176 | 0.907 | 9.796 | 204.74 | 42.51 | 54.92 | 280.4 | 8.73 | 18.6 |
| 275. | 0.4075 | 0.912 | 10.070 | 205.75 | 42.93 | 55.03 | 283.8 | 8.87 | 19.1 |
| 280. | 0.3979 | 0.918 | 10.346 | 206.74 | 43.38 | 55.20 | 287.1 | 9.02 | 19.7 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.8500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 285. | 0.3889 | 0.922 | 10.622 | 207.72 | 43.86 | 55.44 | 290.3 | 9.17 | 20.2 |
| 290. | 0.3804 | 0.927 | 10.900 | 208.69 | 44.35 | 55.72 | 293.5 | 9.31 | 20.8 |
| 295. | 0.3723 | 0.931 | 11.180 | 209.64 | 44.86 | 56.03 | 296.5 | 9.46 | 21.4 |
| 300. | 0.3646 | 0.935 | 11.461 | 210.59 | 45.39 | 56.39 | 299.5 | 9.60 | 22.0 |
| 310. | 0.3503 | 0.941 | 12.028 | 212.45 | 46.48 | 57.18 | 305.3 | 9.89 | 23.2 |
| 320. | 0.3373 | 0.947 | 12.605 | 214.28 | 47.61 | 58.07 | 310.8 | 10.18 | 24.5 |
| 330. | 0.3253 | 0.952 | 13.190 | 216.08 | 48.78 | 59.03 | 316.2 | 10.46 | 25.9 |
| 340. | 0.3142 | 0.957 | 13.785 | 217.86 | 49.98 | 60.05 | 321.4 | 10.74 | 27.2 |
| 350. | 0.3040 | 0.961 | 14.391 | 219.61 | 51.21 | 61.12 | 326.4 | 11.02 | 28.7 |
| 360. | 0.2945 | 0.964 | 15.008 | 221.35 | 52.44 | 62.23 | 331.3 | 11.30 | 30.1 |
| 370. | 0.2856 | 0.968 | 15.636 | 223.07 | 53.70 | 63.36 | 336.1 | 11.57 | 31.7 |
| 380. | 0.2772 | 0.970 | 16.275 | 224.77 | 54.95 | 64.52 | 340.8 | 11.84 | 33.2 |
| 390. | 0.2694 | 0.973 | 16.926 | 226.46 | 56.22 | 65.69 | 345.3 | 12.11 | 34.8 |
| 400. | 0.2621 | 0.975 | 17.589 | 228.14 | 57.48 | 66.87 | 349.8 | 12.38 | 36.4 |
| 410. | 0.2551 | 0.977 | 18.264 | 229.81 | 58.75 | 68.06 | 354.2 | 12.64 | 38.1 |
| 420. | 0.2486 | 0.979 | 18.950 | 231.46 | 60.01 | 69.26 | 358.5 | 12.91 | 39.7 |
| 430. | 0.2424 | 0.981 | 19.649 | 233.11 | 61.26 | 70.46 | 362.7 | 13.17 | 41.4 |
| 440. | 0.2365 | 0.982 | 20.359 | 234.74 | 62.51 | 71.65 | 366.9 | 13.42 | 43.2 |
| 450. | 0.2309 | 0.984 | 21.082 | 236.36 | 63.75 | 72.84 | 371.0 | 13.68 | 44.9 |
| 460. | 0.2256 | 0.985 | 21.816 | 237.98 | 64.98 | 74.03 | 375.1 | 13.93 | 46.7 |
| 470. | 0.2205 | 0.986 | 22.562 | 239.58 | 66.20 | 75.21 | 379.0 | 14.18 | 48.5 |
| 480. | 0.2157 | 0.988 | 23.320 | 241.18 | 67.41 | 76.39 | 383.0 | 14.43 | 50.4 |
| 490. | 0.2110 | 0.989 | 24.090 | 242.77 | 68.61 | 77.55 | 386.9 | 14.68 | 52.2 |
| 500. | 0.2066 | 0.990 | 24.871 | 244.34 | 69.80 | 78.71 | 390.7 | 14.92 | 54.1 |
| 520. | 0.1983 | 0.991 | 26.468 | 247.48 | 72.14 | 80.99 | 398.3 | | 57.9 |
| 540. | 0.1907 | 0.993 | 28.111 | 250.57 | 74.43 | 83.23 | 405.6 | | 61.7 |
| 560. | 0.1837 | 0.994 | 29.797 | 253.64 | 76.66 | 85.42 | 412.9 | | 65.6 |
| 580. | 0.1772 | 0.995 | 31.527 | 256.68 | 78.85 | 87.57 | 419.9 | | 69.6 |
| 600. | 0.1711 | 0.996 | 33.300 | 259.68 | 80.98 | 89.67 | 426.9 | | 73.6 |
| 625. | 0.1641 | 0.997 | 35.573 | 263.39 | 83.58 | 92.23 | 435.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.9000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.514 | 0.053 | -14.537 | 79.97 | 47.93 | 68.66 | 1974.1 | 1065.20 | 252.5 |
| 100. | 21.336 | 0.051 | -14.190 | 83.54 | 48.16 | 70.07 | 1942.2 | 884.27 | 248.6 |
| 105. | 21.157 | 0.049 | -13.838 | 86.97 | 47.92 | 70.66 | 1907.8 | 747.12 | 244.4 |
| 110. | 20.975 | 0.047 | -13.484 | 90.26 | 47.42 | 70.78 | 1872.3 | 641.19 | 240.0 |
| 115. | 20.793 | 0.045 | -13.131 | 93.41 | 46.81 | 70.68 | 1836.2 | 557.87 | 235.5 |
| 120. | 20.610 | 0.044 | -12.778 | 96.41 | 46.18 | 70.48 | 1799.7 | 491.18 | 230.8 |
| 125. | 20.426 | 0.042 | -12.426 | 99.28 | 45.57 | 70.27 | 1763.1 | 436.93 | 226.1 |
| 130. | 20.241 | 0.041 | -12.075 | 102.04 | 45.01 | 70.10 | 1726.4 | 392.13 | 221.2 |
| 135. | 20.055 | 0.040 | -11.725 | 104.68 | 44.51 | 69.99 | 1689.5 | 354.65 | 216.4 |
| 140. | 19.868 | 0.039 | -11.375 | 107.23 | 44.08 | 69.95 | 1652.6 | 322.88 | 211.5 |
| 145. | 19.679 | 0.038 | -11.025 | 109.68 | 43.72 | 69.99 | 1615.6 | 295.64 | 206.5 |
| 150. | 19.489 | 0.037 | -10.675 | 112.06 | 43.42 | 70.11 | 1578.5 | 272.06 | 201.6 |
| 155. | 19.298 | 0.036 | -10.324 | 114.36 | 43.18 | 70.30 | 1541.4 | 251.43 | 196.7 |
| 160. | 19.104 | 0.035 | -9.972 | 116.59 | 42.99 | 70.56 | 1504.1 | 233.23 | 191.7 |
| 165. | 18.908 | 0.035 | -9.618 | 118.77 | 42.85 | 70.89 | 1466.8 | 217.04 | 186.8 |
| 170. | 18.710 | 0.034 | -9.263 | 120.89 | 42.76 | 71.29 | 1429.3 | 202.55 | 181.9 |
| 175. | 18.509 | 0.033 | -8.905 | 122.96 | 42.70 | 71.75 | 1391.8 | 189.47 | 177.0 |
| 180. | 18.305 | 0.033 | -8.545 | 124.99 | 42.69 | 72.27 | 1354.1 | 177.60 | 172.2 |
| 185. | 18.097 | 0.032 | -8.182 | 126.98 | 42.71 | 72.86 | 1316.2 | 166.77 | 167.4 |
| 190. | 17.887 | 0.032 | -7.816 | 128.93 | 42.77 | 73.52 | 1278.2 | 156.83 | 162.6 |
| 195. | 17.672 | 0.031 | -7.447 | 130.85 | 42.86 | 74.24 | 1239.9 | 147.66 | 157.9 |
| 200. | 17.452 | 0.031 | -7.074 | 132.74 | 42.98 | 75.04 | 1201.4 | 139.17 | 153.2 |
| 205. | 17.228 | 0.031 | -6.697 | 134.60 | 43.12 | 75.92 | 1162.7 | 131.27 | 148.6 |
| 210. | 16.999 | 0.030 | -6.315 | 136.44 | 43.30 | 76.88 | 1123.6 | 123.89 | 144.0 |
| 215. | 16.763 | 0.030 | -5.928 | 138.27 | 43.50 | 77.94 | 1084.0 | 116.97 | 139.4 |
| 220. | 16.521 | 0.030 | -5.535 | 140.07 | 43.73 | 79.11 | 1044.1 | 110.45 | 134.9 |
| 225. | 16.271 | 0.030 | -5.136 | 141.86 | 43.98 | 80.42 | 1003.5 | 104.30 | 130.5 |
| 230. | 16.012 | 0.029 | -4.731 | 143.65 | 44.27 | 81.89 | 962.3 | 98.45 | 126.0 |
| 235. | 15.742 | 0.029 | -4.317 | 145.42 | 44.58 | 83.55 | 920.2 | 92.88 | 121.6 |
| 237.694 | 15.592 | 0.029 | -4.091 | 146.38 | 44.76 | 84.54 | 897.1 | 89.98 | 119.3 |
| 237.694 | 0.5413 | 0.841 | 7.931 | 196.96 | 41.74 | 59.35 | 252.6 | 7.78 | 15.8 |
| 240. | 0.5322 | 0.847 | 8.067 | 197.53 | 41.59 | 58.52 | 254.9 | 7.85 | 16.0 |
| 245. | 0.5142 | 0.859 | 8.356 | 198.72 | 41.46 | 57.22 | 259.4 | 8.00 | 16.4 |
| 250. | 0.4980 | 0.869 | 8.640 | 199.87 | 41.51 | 56.39 | 263.8 | 8.15 | 16.8 |
| 255. | 0.4832 | 0.879 | 8.920 | 200.98 | 41.68 | 55.87 | 267.9 | 8.30 | 17.2 |
| 260. | 0.4695 | 0.887 | 9.199 | 202.06 | 41.94 | 55.56 | 271.8 | 8.45 | 17.7 |
| 265. | 0.4569 | 0.894 | 9.476 | 203.12 | 42.27 | 55.41 | 275.5 | 8.60 | 18.2 |
| 270. | 0.4451 | 0.901 | 9.753 | 204.15 | 42.64 | 55.38 | 279.1 | 8.74 | 18.7 |
| 275. | 0.4341 | 0.907 | 10.030 | 205.17 | 43.04 | 55.44 | 282.6 | 8.89 | 19.2 |
| 280. | 0.4237 | 0.912 | 10.308 | 206.17 | 43.48 | 55.58 | 286.0 | 9.04 | 19.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.9000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.4140 | 0.917 | 10.586 | 207.15 | 43.94 | 55.78 | 289.3 | 9.18 | 20.3 |
| 290. | 0.4048 | 0.922 | 10.865 | 208.13 | 44.43 | 56.03 | 292.5 | 9.33 | 20.9 |
| 295. | 0.3961 | 0.926 | 11.146 | 209.09 | 44.93 | 56.32 | 295.6 | 9.48 | 21.5 |
| 300. | 0.3878 | 0.930 | 11.429 | 210.04 | 45.45 | 56.65 | 298.6 | 9.62 | 22.1 |
| 310. | 0.3724 | 0.938 | 11.999 | 211.91 | 46.53 | 57.41 | 304.5 | 9.91 | 23.3 |
| 320. | 0.3584 | 0.944 | 12.577 | 213.74 | 47.66 | 58.26 | 310.1 | 10.19 | 24.6 |
| 330. | 0.3455 | 0.949 | 13.164 | 215.55 | 48.83 | 59.20 | 315.5 | 10.48 | 25.9 |
| 340. | 0.3336 | 0.954 | 13.761 | 217.33 | 50.02 | 60.21 | 320.8 | 10.76 | 27.3 |
| 350. | 0.3227 | 0.958 | 14.369 | 219.09 | 51.24 | 61.26 | 325.9 | 11.04 | 28.7 |
| 360. | 0.3125 | 0.962 | 14.987 | 220.83 | 52.47 | 62.35 | 330.8 | 11.31 | 30.2 |
| 370. | 0.3030 | 0.966 | 15.616 | 222.56 | 53.72 | 63.47 | 335.6 | 11.59 | 31.7 |
| 380. | 0.2941 | 0.969 | 16.256 | 224.26 | 54.98 | 64.62 | 340.3 | 11.86 | 33.2 |
| 390. | 0.2857 | 0.971 | 16.908 | 225.96 | 56.24 | 65.78 | 344.9 | 12.13 | 34.8 |
| 400. | 0.2779 | 0.974 | 17.572 | 227.64 | 57.50 | 66.96 | 349.4 | 12.39 | 36.4 |
| 410. | 0.2705 | 0.976 | 18.247 | 229.30 | 58.76 | 68.14 | 353.9 | 12.66 | 38.1 |
| 420. | 0.2635 | 0.978 | 18.935 | 230.96 | 60.02 | 69.33 | 358.2 | 12.92 | 39.8 |
| 430. | 0.2569 | 0.980 | 19.634 | 232.61 | 61.27 | 70.52 | 362.5 | 13.18 | 41.5 |
| 440. | 0.2507 | 0.981 | 20.345 | 234.24 | 62.52 | 71.71 | 366.6 | 13.44 | 43.2 |
| 450. | 0.2447 | 0.983 | 21.068 | 235.87 | 63.76 | 72.90 | 370.8 | 13.69 | 45.0 |
| 460. | 0.2390 | 0.984 | 21.803 | 237.48 | 64.99 | 74.09 | 374.8 | 13.94 | 46.7 |
| 470. | 0.2337 | 0.986 | 22.550 | 239.09 | 66.21 | 75.26 | 378.9 | 14.19 | 48.6 |
| 480. | 0.2285 | 0.987 | 23.308 | 240.68 | 67.42 | 76.43 | 382.8 | 14.44 | 50.4 |
| 490. | 0.2236 | 0.988 | 24.079 | 242.27 | 68.62 | 77.60 | 386.7 | 14.69 | 52.2 |
| 500. | 0.2189 | 0.989 | 24.860 | 243.85 | 69.81 | 78.75 | 390.6 | 14.93 | 54.1 |
| 520. | 0.2101 | 0.991 | 26.458 | 246.98 | 72.15 | 81.03 | 398.1 | | 57.9 |
| 540. | 0.2020 | 0.992 | 28.101 | 250.08 | 74.43 | 83.26 | 405.5 | | 61.7 |
| 560. | 0.1946 | 0.994 | 29.788 | 253.15 | 76.67 | 85.45 | 412.8 | | 65.6 |
| 580. | 0.1876 | 0.995 | 31.519 | 256.19 | 78.85 | 87.59 | 419.9 | | 69.6 |
| 600. | 0.1812 | 0.996 | 33.292 | 259.19 | 80.98 | 89.69 | 426.8 | | 73.6 |
| 625. | 0.1738 | 0.997 | 35.566 | 262.91 | 83.58 | 92.25 | 435.3 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.9500 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 95. | 21.514 | 0.056 | -14.535 | 79.97 | 47.93 | 68.66 | 1974.3 | 1065.65 | 252.5 |
| 100. | 21.337 | 0.054 | -14.188 | 83.53 | 48.16 | 70.07 | 1942.4 | 884.62 | 248.6 |
| 105. | 21.157 | 0.051 | -13.836 | 86.97 | 47.92 | 70.66 | 1908.1 | 747.40 | 244.4 |
| 110. | 20.976 | 0.050 | -13.482 | 90.26 | 47.42 | 70.78 | 1872.5 | 641.42 | 240.0 |
| 115. | 20.794 | 0.048 | -13.129 | 93.40 | 46.81 | 70.68 | 1836.4 | 558.07 | 235.5 |
| 120. | 20.610 | 0.046 | -12.776 | 96.41 | 46.18 | 70.48 | 1799.9 | 491.35 | 230.8 |
| 125. | 20.426 | 0.045 | -12.424 | 99.28 | 45.57 | 70.27 | 1763.3 | 437.07 | 226.1 |
| 130. | 20.242 | 0.043 | -12.073 | 102.03 | 45.01 | 70.10 | 1726.6 | 392.27 | 221.3 |
| 135. | 20.056 | 0.042 | -11.723 | 104.68 | 44.52 | 69.99 | 1689.8 | 354.77 | 216.4 |
| 140. | 19.869 | 0.041 | -11.373 | 107.22 | 44.09 | 69.95 | 1652.9 | 322.99 | 211.5 |
| 145. | 19.680 | 0.040 | -11.023 | 109.68 | 43.72 | 69.99 | 1615.9 | 295.74 | 206.6 |
| 150. | 19.491 | 0.039 | -10.673 | 112.05 | 43.42 | 70.10 | 1578.8 | 272.15 | 201.6 |
| 155. | 19.299 | 0.038 | -10.322 | 114.35 | 43.18 | 70.29 | 1541.7 | 251.52 | 196.7 |
| 160. | 19.105 | 0.037 | -9.970 | 116.59 | 42.99 | 70.55 | 1504.4 | 233.31 | 191.8 |
| 165. | 18.909 | 0.037 | -9.616 | 118.76 | 42.85 | 70.88 | 1467.1 | 217.13 | 186.8 |
| 170. | 18.711 | 0.036 | -9.261 | 120.88 | 42.76 | 71.28 | 1429.7 | 202.62 | 181.9 |
| 175. | 18.510 | 0.035 | -8.904 | 122.96 | 42.71 | 71.74 | 1392.1 | 189.54 | 177.1 |
| 180. | 18.306 | 0.035 | -8.544 | 124.99 | 42.69 | 72.27 | 1354.5 | 177.67 | 172.2 |
| 185. | 18.099 | 0.034 | -8.181 | 126.97 | 42.72 | 72.85 | 1316.6 | 166.84 | 167.4 |
| 190. | 17.888 | 0.034 | -7.815 | 128.93 | 42.77 | 73.51 | 1278.6 | 156.90 | 162.7 |
| 195. | 17.674 | 0.033 | -7.446 | 130.84 | 42.86 | 74.23 | 1240.4 | 147.73 | 157.9 |
| 200. | 17.454 | 0.033 | -7.072 | 132.73 | 42.98 | 75.03 | 1201.9 | 139.24 | 153.3 |
| 205. | 17.230 | 0.032 | -6.695 | 134.60 | 43.13 | 75.90 | 1163.2 | 131.34 | 148.6 |
| 210. | 17.001 | 0.032 | -6.313 | 136.44 | 43.30 | 76.86 | 1124.1 | 123.96 | 144.0 |
| 215. | 16.766 | 0.032 | -5.926 | 138.26 | 43.50 | 77.92 | 1084.6 | 117.04 | 139.5 |
| 220. | 16.524 | 0.031 | -5.534 | 140.06 | 43.73 | 79.09 | 1044.7 | 110.52 | 135.0 |
| 225. | 16.274 | 0.031 | -5.135 | 141.85 | 43.99 | 80.39 | 1004.2 | 104.37 | 130.5 |
| 230. | 16.015 | 0.031 | -4.730 | 143.64 | 44.27 | 81.85 | 963.0 | 98.52 | 126.1 |
| 235. | 15.746 | 0.031 | -4.316 | 145.41 | 44.58 | 83.51 | 921.0 | 92.95 | 121.7 |
| 239.423 | 15.498 | 0.031 | -3.943 | 146.99 | 44.88 | 85.18 | 883.0 | 88.23 | 117.8 |
| 239.423 | 0.5714 | 0.835 | 7.964 | 196.72 | 42.11 | 60.28 | 252.2 | 7.86 | 16.1 |
| 240. | 0.5688 | 0.837 | 7.999 | 196.87 | 42.06 | 60.03 | 252.8 | 7.87 | 16.1 |
| 245. | 0.5488 | 0.850 | 8.294 | 198.08 | 41.80 | 58.37 | 257.6 | 8.02 | 16.5 |
| 250. | 0.5309 | 0.861 | 8.583 | 199.25 | 41.78 | 57.31 | 262.0 | 8.17 | 16.9 |
| 255. | 0.5146 | 0.871 | 8.868 | 200.38 | 41.90 | 56.63 | 266.3 | 8.32 | 17.3 |
| 260. | 0.4996 | 0.880 | 9.150 | 201.48 | 42.12 | 56.20 | 270.3 | 8.47 | 17.8 |
| 265. | 0.4858 | 0.887 | 9.430 | 202.54 | 42.42 | 55.97 | 274.2 | 8.61 | 18.3 |
| 270. | 0.4730 | 0.895 | 9.710 | 203.59 | 42.77 | 55.87 | 277.9 | 8.76 | 18.8 |
| 275. | 0.4611 | 0.901 | 9.989 | 204.61 | 43.16 | 55.88 | 281.4 | 8.91 | 19.3 |
| 280. | 0.4499 | 0.907 | 10.269 | 205.62 | 43.58 | 55.97 | 284.9 | 9.05 | 19.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 0.9500 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 285. | 0.4394 | 0.912 | 10.549 | 206.61 | 44.03 | 56.13 | 288.2 | 9.20 | 20.4 |
| 290. | 0.4294 | 0.918 | 10.830 | 207.59 | 44.51 | 56.35 | 291.5 | 9.35 | 20.9 |
| 295. | 0.4200 | 0.922 | 11.113 | 208.56 | 45.01 | 56.61 | 294.6 | 9.49 | 21.5 |
| 300. | 0.4111 | 0.926 | 11.396 | 209.51 | 45.52 | 56.92 | 297.7 | 9.64 | 22.1 |
| 310. | 0.3946 | 0.934 | 11.969 | 211.39 | 46.59 | 57.64 | 303.7 | 9.92 | 23.3 |
| 320. | 0.3796 | 0.941 | 12.549 | 213.23 | 47.71 | 58.47 | 309.4 | 10.21 | 24.6 |
| 330. | 0.3658 | 0.947 | 13.139 | 215.04 | 48.87 | 59.38 | 314.9 | 10.49 | 26.0 |
| 340. | 0.3531 | 0.952 | 13.737 | 216.83 | 50.06 | 60.36 | 320.2 | 10.77 | 27.3 |
| 350. | 0.3414 | 0.956 | 14.346 | 218.60 | 51.27 | 61.40 | 325.3 | 11.05 | 28.8 |
| 360. | 0.3306 | 0.960 | 14.965 | 220.34 | 52.50 | 62.47 | 330.3 | 11.33 | 30.2 |
| 370. | 0.3205 | 0.964 | 15.596 | 222.07 | 53.74 | 63.58 | 335.2 | 11.60 | 31.7 |
| 380. | 0.3110 | 0.967 | 16.237 | 223.78 | 55.00 | 64.72 | 339.9 | 11.87 | 33.3 |
| 390. | 0.3021 | 0.970 | 16.890 | 225.47 | 56.26 | 65.88 | 344.5 | 12.14 | 34.9 |
| 400. | 0.2938 | 0.972 | 17.555 | 227.16 | 57.52 | 67.04 | 349.1 | 12.40 | 36.5 |
| 410. | 0.2859 | 0.975 | 18.231 | 228.83 | 58.78 | 68.22 | 353.5 | 12.67 | 38.1 |
| 420. | 0.2785 | 0.977 | 18.919 | 230.48 | 60.03 | 69.41 | 357.9 | 12.93 | 39.8 |
| 430. | 0.2715 | 0.979 | 19.619 | 232.13 | 61.29 | 70.59 | 362.2 | 13.19 | 41.5 |
| 440. | 0.2649 | 0.980 | 20.331 | 233.77 | 62.53 | 71.78 | 366.4 | 13.45 | 43.2 |
| 450. | 0.2585 | 0.982 | 21.055 | 235.39 | 63.77 | 72.96 | 370.5 | 13.70 | 45.0 |
| 460. | 0.2525 | 0.984 | 21.790 | 237.01 | 65.00 | 74.14 | 374.6 | 13.95 | 46.8 |
| 470. | 0.2468 | 0.985 | 22.537 | 238.62 | 66.22 | 75.32 | 378.7 | 14.20 | 48.6 |
| 480. | 0.2414 | 0.986 | 23.296 | 240.22 | 67.43 | 76.48 | 382.6 | 14.45 | 50.4 |
| 490. | 0.2362 | 0.987 | 24.067 | 241.80 | 68.63 | 77.64 | 386.5 | 14.70 | 52.2 |
| 500. | 0.2312 | 0.988 | 24.849 | 243.38 | 69.82 | 78.79 | 390.4 | 14.94 | 54.1 |
| 520. | 0.2219 | 0.990 | 26.448 | 246.52 | 72.15 | 81.07 | 398.0 | | 57.9 |
| 540. | 0.2133 | 0.992 | 28.092 | 249.62 | 74.44 | 83.30 | 405.4 | | 61.7 |
| 560. | 0.2054 | 0.993 | 29.779 | 252.69 | 76.67 | 85.48 | 412.7 | | 65.6 |
| 580. | 0.1981 | 0.994 | 31.511 | 255.73 | 78.86 | 87.62 | 419.8 | | 69.6 |
| 600. | 0.1913 | 0.995 | 33.284 | 258.73 | 80.99 | 89.72 | 426.8 | | 73.6 |
| 625. | 0.1834 | 0.997 | 35.559 | 262.45 | 83.59 | 92.28 | 435.3 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 1.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.515 | 0.059 | -14.533 | 79.97 | 47.93 | 68.65 | 1974.5 | 1066.10 | 252.5 |
| 100. | 21.338 | 0.056 | -14.186 | 83.53 | 48.16 | 70.07 | 1942.6 | 884.97 | 248.6 |
| 105. | 21.158 | 0.054 | -13.834 | 86.96 | 47.92 | 70.66 | 1908.3 | 747.68 | 244.4 |
| 110. | 20.977 | 0.052 | -13.480 | 90.26 | 47.42 | 70.78 | 1872.7 | 641.66 | 240.0 |
| 115. | 20.794 | 0.050 | -13.127 | 93.40 | 46.81 | 70.67 | 1836.6 | 558.26 | 235.5 |
| 120. | 20.611 | 0.049 | -12.774 | 96.40 | 46.18 | 70.48 | 1800.2 | 491.52 | 230.9 |
| 125. | 20.427 | 0.047 | -12.422 | 99.28 | 45.57 | 70.27 | 1763.6 | 437.22 | 226.1 |
| 130. | 20.243 | 0.046 | -12.071 | 102.03 | 45.01 | 70.10 | 1726.9 | 392.40 | 221.3 |
| 135. | 20.057 | 0.044 | -11.721 | 104.67 | 44.52 | 69.98 | 1690.0 | 354.89 | 216.4 |
| 140. | 19.870 | 0.043 | -11.371 | 107.22 | 44.09 | 69.94 | 1653.1 | 323.10 | 211.5 |
| 145. | 19.681 | 0.042 | -11.021 | 109.67 | 43.72 | 69.98 | 1616.2 | 295.85 | 206.6 |
| 150. | 19.492 | 0.041 | -10.671 | 112.05 | 43.42 | 70.10 | 1579.1 | 272.25 | 201.7 |
| 155. | 19.300 | 0.040 | -10.320 | 114.35 | 43.18 | 70.29 | 1542.0 | 251.61 | 196.7 |
| 160. | 19.106 | 0.039 | -9.968 | 116.58 | 42.99 | 70.55 | 1504.8 | 233.40 | 191.8 |
| 165. | 18.911 | 0.039 | -9.615 | 118.76 | 42.85 | 70.88 | 1467.4 | 217.21 | 186.9 |
| 170. | 18.713 | 0.038 | -9.259 | 120.88 | 42.76 | 71.27 | 1430.0 | 202.70 | 182.0 |
| 175. | 18.512 | 0.037 | -8.902 | 122.95 | 42.71 | 71.73 | 1392.5 | 189.62 | 177.1 |
| 180. | 18.308 | 0.036 | -8.542 | 124.98 | 42.70 | 72.26 | 1354.8 | 177.75 | 172.3 |
| 185. | 18.101 | 0.036 | -8.179 | 126.97 | 42.72 | 72.84 | 1317.0 | 166.91 | 167.5 |
| 190. | 17.890 | 0.035 | -7.813 | 128.92 | 42.78 | 73.50 | 1279.0 | 156.97 | 162.7 |
| 195. | 17.675 | 0.035 | -7.444 | 130.84 | 42.86 | 74.22 | 1240.8 | 147.80 | 158.0 |
| 200. | 17.456 | 0.034 | -7.071 | 132.73 | 42.98 | 75.01 | 1202.4 | 139.31 | 153.3 |
| 205. | 17.233 | 0.034 | -6.694 | 134.59 | 43.13 | 75.88 | 1163.7 | 131.41 | 148.7 |
| 210. | 17.003 | 0.034 | -6.312 | 136.43 | 43.30 | 76.84 | 1124.6 | 124.03 | 144.1 |
| 215. | 16.768 | 0.033 | -5.925 | 138.25 | 43.50 | 77.90 | 1085.2 | 117.11 | 139.5 |
| 220. | 16.526 | 0.033 | -5.533 | 140.05 | 43.73 | 79.07 | 1045.3 | 110.59 | 135.0 |
| 225. | 16.277 | 0.033 | -5.134 | 141.84 | 43.99 | 80.36 | 1004.8 | 104.43 | 130.6 |
| 230. | 16.018 | 0.033 | -4.729 | 143.63 | 44.27 | 81.82 | 963.7 | 98.59 | 126.2 |
| 235. | 15.750 | 0.032 | -4.316 | 145.40 | 44.58 | 83.47 | 921.7 | 93.03 | 121.8 |
| 240. | 15.469 | 0.032 | -3.894 | 147.18 | 44.93 | 85.36 | 878.8 | 87.70 | 117.4 |
| 241.086 | 15.406 | 0.032 | -3.801 | 147.57 | 45.01 | 85.81 | 869.3 | 86.57 | 116.5 |
| 241.086 | 0.6016 | 0.829 | 7.994 | 196.49 | 42.48 | 61.20 | 251.7 | 7.93 | 16.4 |
| 245. | 0.5843 | 0.840 | 8.231 | 197.47 | 42.19 | 59.64 | 255.6 | 8.04 | 16.6 |
| 250. | 0.5645 | 0.852 | 8.525 | 198.66 | 42.07 | 58.31 | 260.3 | 8.19 | 17.0 |
| 255. | 0.5466 | 0.863 | 8.815 | 199.80 | 42.13 | 57.44 | 264.6 | 8.34 | 17.5 |
| 260. | 0.5303 | 0.872 | 9.100 | 200.91 | 42.31 | 56.89 | 268.8 | 8.49 | 17.9 |
| 265. | 0.5153 | 0.881 | 9.384 | 201.99 | 42.57 | 56.55 | 272.8 | 8.63 | 18.4 |
| 270. | 0.5014 | 0.888 | 9.666 | 203.05 | 42.90 | 56.38 | 276.6 | 8.78 | 18.9 |
| 275. | 0.4885 | 0.895 | 9.948 | 204.08 | 43.27 | 56.33 | 280.2 | 8.93 | 19.4 |
| 280. | 0.4764 | 0.902 | 10.230 | 205.10 | 43.68 | 56.37 | 283.7 | 9.07 | 19.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 1.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol·K) | J/(mol·K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m·K) |
| 285. | 0.4650 | 0.908 | 10.512 | 206.09 | 44.13 | 56.49 | 287.2 | 9.22 | 20.4 |
| 290. | 0.4543 | 0.913 | 10.795 | 207.08 | 44.59 | 56.68 | 290.5 | 9.36 | 21.0 |
| 295. | 0.4442 | 0.918 | 11.079 | 208.05 | 45.08 | 56.91 | 293.7 | 9.51 | 21.6 |
| 300. | 0.4347 | 0.922 | 11.364 | 209.01 | 45.59 | 57.20 | 296.8 | 9.65 | 22.2 |
| 310. | 0.4170 | 0.930 | 11.939 | 210.89 | 46.65 | 57.87 | 302.9 | 9.94 | 23.4 |
| 320. | 0.4009 | 0.937 | 12.522 | 212.74 | 47.76 | 58.67 | 308.7 | 10.22 | 24.7 |
| 330. | 0.3863 | 0.944 | 13.113 | 214.56 | 48.91 | 59.56 | 314.2 | 10.51 | 26.0 |
| 340. | 0.3728 | 0.949 | 13.713 | 216.35 | 50.09 | 60.52 | 319.6 | 10.79 | 27.4 |
| 350. | 0.3603 | 0.954 | 14.323 | 218.12 | 51.30 | 61.54 | 324.8 | 11.06 | 28.8 |
| 360. | 0.3488 | 0.958 | 14.944 | 219.87 | 52.53 | 62.60 | 329.8 | 11.34 | 30.3 |
| 370. | 0.3380 | 0.962 | 15.575 | 221.60 | 53.77 | 63.70 | 334.7 | 11.61 | 31.8 |
| 380. | 0.3280 | 0.965 | 16.218 | 223.32 | 55.02 | 64.82 | 339.5 | 11.88 | 33.3 |
| 390. | 0.3186 | 0.968 | 16.872 | 225.01 | 56.27 | 65.97 | 344.2 | 12.15 | 34.9 |
| 400. | 0.3097 | 0.971 | 17.537 | 226.70 | 57.53 | 67.13 | 348.7 | 12.42 | 36.5 |
| 410. | 0.3014 | 0.973 | 18.215 | 228.37 | 58.79 | 68.30 | 353.2 | 12.68 | 38.1 |
| 420. | 0.2935 | 0.976 | 18.904 | 230.03 | 60.05 | 69.48 | 357.6 | 12.94 | 39.8 |
| 430. | 0.2861 | 0.978 | 19.604 | 231.68 | 61.30 | 70.66 | 361.9 | 13.20 | 41.5 |
| 440. | 0.2791 | 0.979 | 20.317 | 233.32 | 62.55 | 71.84 | 366.1 | 13.46 | 43.3 |
| 450. | 0.2724 | 0.981 | 21.041 | 234.95 | 63.78 | 73.02 | 370.3 | 13.71 | 45.0 |
| 460. | 0.2661 | 0.983 | 21.777 | 236.56 | 65.01 | 74.20 | 374.4 | 13.96 | 46.8 |
| 470. | 0.2600 | 0.984 | 22.525 | 238.17 | 66.23 | 75.37 | 378.5 | 14.22 | 48.6 |
| 480. | 0.2543 | 0.985 | 23.284 | 239.77 | 67.44 | 76.53 | 382.4 | 14.46 | 50.4 |
| 490. | 0.2488 | 0.987 | 24.056 | 241.36 | 68.64 | 77.69 | 386.4 | 14.71 | 52.3 |
| 500. | 0.2435 | 0.988 | 24.838 | 242.94 | 69.82 | 78.84 | 390.3 | 14.95 | 54.1 |
| 520. | 0.2337 | 0.990 | 26.438 | 246.08 | 72.16 | 81.10 | 397.9 | | 57.9 |
| 540. | 0.2247 | 0.991 | 28.082 | 249.18 | 74.44 | 83.33 | 405.3 | | 61.8 |
| 560. | 0.2163 | 0.993 | 29.771 | 252.25 | 76.68 | 85.51 | 412.6 | | 65.7 |
| 580. | 0.2086 | 0.994 | 31.502 | 255.29 | 78.86 | 87.65 | 419.7 | | 69.6 |
| 600. | 0.2014 | 0.995 | 33.276 | 258.30 | 80.99 | 89.75 | 426.7 | | 73.6 |
| 625. | 0.1931 | 0.996 | 35.552 | 262.01 | 83.59 | 92.30 | 435.3 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 1.5000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.521 | 0.088 | -14.514 | 79.93 | 47.92 | 68.63 | 1976.7 | 1070.63 | 252.8 |
| 100. | 21.344 | 0.085 | -14.167 | 83.49 | 48.17 | 70.05 | 1944.8 | 888.49 | 248.8 |
| 105. | 21.165 | 0.081 | -13.815 | 86.92 | 47.93 | 70.63 | 1910.4 | 750.50 | 244.7 |
| 110. | 20.984 | 0.078 | -13.461 | 90.21 | 47.44 | 70.76 | 1874.9 | 643.98 | 240.3 |
| 115. | 20.802 | 0.075 | -13.108 | 93.36 | 46.83 | 70.65 | 1838.9 | 560.22 | 235.8 |
| 120. | 20.619 | 0.073 | -12.755 | 96.36 | 46.20 | 70.45 | 1802.5 | 493.21 | 231.1 |
| 125. | 20.436 | 0.071 | -12.403 | 99.23 | 45.59 | 70.24 | 1766.0 | 438.71 | 226.4 |
| 130. | 20.251 | 0.069 | -12.052 | 101.98 | 45.04 | 70.07 | 1729.4 | 393.72 | 221.6 |
| 135. | 20.066 | 0.067 | -11.702 | 104.63 | 44.54 | 69.95 | 1692.6 | 356.08 | 216.8 |
| 140. | 19.879 | 0.065 | -11.353 | 107.17 | 44.11 | 69.91 | 1655.8 | 324.19 | 211.9 |
| 145. | 19.692 | 0.063 | -11.003 | 109.62 | 43.75 | 69.94 | 1619.0 | 296.86 | 206.9 |
| 150. | 19.502 | 0.062 | -10.653 | 111.99 | 43.45 | 70.05 | 1582.0 | 273.20 | 202.0 |
| 155. | 19.311 | 0.060 | -10.302 | 114.29 | 43.20 | 70.24 | 1545.0 | 252.50 | 197.1 |
| 160. | 19.118 | 0.059 | -9.951 | 116.53 | 43.02 | 70.49 | 1507.9 | 234.25 | 192.2 |
| 165. | 18.923 | 0.058 | -9.597 | 118.70 | 42.88 | 70.82 | 1470.8 | 218.02 | 187.3 |
| 170. | 18.726 | 0.057 | -9.242 | 120.82 | 42.79 | 71.21 | 1433.5 | 203.48 | 182.4 |
| 175. | 18.526 | 0.056 | -8.885 | 122.89 | 42.73 | 71.66 | 1396.2 | 190.37 | 177.5 |
| 180. | 18.323 | 0.055 | -8.526 | 124.92 | 42.72 | 72.17 | 1358.7 | 178.48 | 172.7 |
| 185. | 18.117 | 0.054 | -8.163 | 126.90 | 42.74 | 72.75 | 1321.1 | 167.63 | 167.9 |
| 190. | 17.907 | 0.053 | -7.798 | 128.85 | 42.80 | 73.39 | 1283.3 | 157.67 | 163.2 |
| 195. | 17.694 | 0.052 | -7.429 | 130.77 | 42.89 | 74.10 | 1245.3 | 148.49 | 158.5 |
| 200. | 17.476 | 0.052 | -7.057 | 132.65 | 43.01 | 74.88 | 1207.2 | 139.99 | 153.8 |
| 205. | 17.254 | 0.051 | -6.680 | 134.51 | 43.15 | 75.73 | 1168.7 | 132.08 | 149.2 |
| 210. | 17.027 | 0.050 | -6.299 | 136.35 | 43.33 | 76.67 | 1130.0 | 124.70 | 144.6 |
| 215. | 16.793 | 0.050 | -5.914 | 138.16 | 43.53 | 77.69 | 1090.9 | 117.78 | 140.1 |
| 220. | 16.554 | 0.050 | -5.522 | 139.96 | 43.75 | 78.83 | 1051.4 | 111.27 | 135.6 |
| 225. | 16.306 | 0.049 | -5.125 | 141.75 | 44.01 | 80.09 | 1011.4 | 105.12 | 131.2 |
| 230. | 16.051 | 0.049 | -4.721 | 143.52 | 44.29 | 81.49 | 970.8 | 99.29 | 126.8 |
| 235. | 15.786 | 0.049 | -4.310 | 145.29 | 44.60 | 83.07 | 929.4 | 93.74 | 122.4 |
| 240. | 15.510 | 0.048 | -3.890 | 147.06 | 44.94 | 84.88 | 887.2 | 88.43 | 118.1 |
| 245. | 15.220 | 0.048 | -3.461 | 148.83 | 45.31 | 86.97 | 843.8 | 83.33 | 113.8 |
| 250. | 14.914 | 0.048 | -3.020 | 150.61 | 45.72 | 89.43 | 799.0 | 78.40 | 109.5 |
| 255. | 14.589 | 0.048 | -2.565 | 152.41 | 46.16 | 92.43 | 752.4 | 73.61 | 105.2 |
| 255.089 | 14.583 | 0.049 | -2.557 | 152.44 | 46.17 | 92.49 | 751.6 | 73.52 | 105.1 |
| 255.089 | 0.9144 | 0.774 | 8.199 | 194.61 | 45.63 | 70.71 | 246.0 | 8.61 | 19.0 |
| 260. | 0.8761 | 0.792 | 8.537 | 195.93 | 44.94 | 67.13 | 252.0 | 8.73 | 19.2 |
| 265. | 0.8426 | 0.808 | 8.866 | 197.18 | 44.64 | 64.78 | 257.4 | 8.87 | 19.6 |
| 270. | 0.8131 | 0.822 | 9.186 | 198.38 | 44.57 | 63.21 | 262.5 | 9.00 | 19.9 |
| 275. | 0.7865 | 0.834 | 9.499 | 199.52 | 44.67 | 62.14 | 267.2 | 9.14 | 20.4 |
| 280. | 0.7625 | 0.845 | 9.808 | 200.64 | 44.88 | 61.40 | 271.6 | 9.28 | 20.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 1.5000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol·K) | J/(mol·K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m·K) |
| 285. | 0.7404 | 0.855 | 10.114 | 201.72 | 45.17 | 60.92 | 275.8 | 9.42 | 21.3 |
| 290. | 0.7201 | 0.864 | 10.418 | 202.78 | 45.51 | 60.61 | 279.9 | 9.56 | 21.8 |
| 295. | 0.7013 | 0.872 | 10.720 | 203.81 | 45.90 | 60.45 | 283.7 | 9.70 | 22.3 |
| 300. | 0.6837 | 0.880 | 11.022 | 204.83 | 46.32 | 60.40 | 287.5 | 9.84 | 22.9 |
| 310. | 0.6519 | 0.893 | 11.627 | 206.81 | 47.25 | 60.54 | 294.5 | 10.11 | 24.0 |
| 320. | 0.6236 | 0.904 | 12.234 | 208.74 | 48.27 | 60.94 | 301.2 | 10.39 | 25.2 |
| 330. | 0.5983 | 0.914 | 12.846 | 210.62 | 49.34 | 61.52 | 307.4 | 10.67 | 26.5 |
| 340. | 0.5753 | 0.922 | 13.465 | 212.47 | 50.47 | 62.23 | 313.4 | 10.94 | 27.9 |
| 350. | 0.5544 | 0.930 | 14.091 | 214.28 | 51.62 | 63.05 | 319.2 | 11.21 | 29.2 |
| 360. | 0.5352 | 0.936 | 14.726 | 216.07 | 52.81 | 63.95 | 324.7 | 11.48 | 30.7 |
| 370. | 0.5176 | 0.942 | 15.370 | 217.84 | 54.02 | 64.91 | 330.1 | 11.75 | 32.1 |
| 380. | 0.5012 | 0.947 | 16.024 | 219.58 | 55.24 | 65.91 | 335.2 | 12.02 | 33.7 |
| 390. | 0.4860 | 0.952 | 16.689 | 221.31 | 56.47 | 66.96 | 340.3 | 12.28 | 35.2 |
| 400. | 0.4717 | 0.956 | 17.364 | 223.01 | 57.71 | 68.03 | 345.2 | 12.55 | 36.8 |
| 410. | 0.4584 | 0.960 | 18.049 | 224.71 | 58.95 | 69.13 | 349.9 | 12.81 | 38.4 |
| 420. | 0.4459 | 0.963 | 18.746 | 226.39 | 60.19 | 70.24 | 354.6 | 13.07 | 40.1 |
| 430. | 0.4342 | 0.966 | 19.454 | 228.05 | 61.43 | 71.36 | 359.1 | 13.32 | 41.8 |
| 440. | 0.4231 | 0.969 | 20.174 | 229.71 | 62.67 | 72.49 | 363.6 | 13.58 | 43.5 |
| 450. | 0.4126 | 0.972 | 20.904 | 231.35 | 63.89 | 73.63 | 368.0 | 13.83 | 45.3 |
| 460. | 0.4026 | 0.974 | 21.646 | 232.98 | 65.11 | 74.76 | 372.3 | 14.08 | 47.0 |
| 470. | 0.3932 | 0.976 | 22.399 | 234.60 | 66.33 | 75.90 | 376.5 | 14.33 | 48.8 |
| 480. | 0.3842 | 0.978 | 23.164 | 236.21 | 67.53 | 77.03 | 380.7 | 14.57 | 50.6 |
| 490. | 0.3757 | 0.980 | 23.940 | 237.81 | 68.72 | 78.16 | 384.8 | 14.82 | 52.5 |
| 500. | 0.3676 | 0.982 | 24.727 | 239.40 | 69.90 | 79.28 | 388.8 | 15.06 | 54.3 |
| 520. | 0.3524 | 0.985 | 26.335 | 242.55 | 72.23 | 81.50 | 396.7 | | 58.1 |
| 540. | 0.3384 | 0.987 | 27.987 | 245.67 | 74.50 | 83.69 | 404.4 | | 61.9 |
| 560. | 0.3256 | 0.989 | 29.682 | 248.75 | 76.73 | 85.84 | 411.8 | | 65.8 |
| 580. | 0.3138 | 0.991 | 31.420 | 251.80 | 78.91 | 87.95 | 419.2 | | 69.7 |
| 600. | 0.3028 | 0.993 | 33.200 | 254.82 | 81.04 | 90.01 | 426.3 | | 73.7 |
| 625. | 0.2902 | 0.995 | 35.482 | 258.54 | 83.63 | 92.54 | 435.0 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 2.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.527 | 0.118 | -14.494 | 79.89 | 47.92 | 68.60 | 1978.9 | 1075.18 | 253.0 |
| 100. | 21.350 | 0.113 | -14.147 | 83.45 | 48.17 | 70.02 | 1947.0 | 892.03 | 249.1 |
| 105. | 21.171 | 0.108 | -13.795 | 86.88 | 47.94 | 70.61 | 1912.6 | 753.33 | 244.9 |
| 110. | 20.991 | 0.104 | -13.442 | 90.17 | 47.45 | 70.74 | 1877.2 | 646.31 | 240.5 |
| 115. | 20.809 | 0.101 | -13.088 | 93.32 | 46.85 | 70.63 | 1841.1 | 562.19 | 236.0 |
| 120. | 20.627 | 0.097 | -12.736 | 96.32 | 46.22 | 70.43 | 1804.8 | 494.90 | 231.4 |
| 125. | 20.444 | 0.094 | -12.384 | 99.19 | 45.62 | 70.22 | 1768.4 | 440.20 | 226.7 |
| 130. | 20.260 | 0.091 | -12.033 | 101.94 | 45.06 | 70.04 | 1731.8 | 395.05 | 221.9 |
| 135. | 20.075 | 0.089 | -11.684 | 104.58 | 44.56 | 69.92 | 1695.2 | 357.29 | 217.1 |
| 140. | 19.889 | 0.086 | -11.334 | 107.12 | 44.13 | 69.88 | 1658.5 | 325.29 | 212.2 |
| 145. | 19.702 | 0.084 | -10.985 | 109.57 | 43.77 | 69.91 | 1621.8 | 297.88 | 207.3 |
| 150. | 19.513 | 0.082 | -10.635 | 111.95 | 43.47 | 70.01 | 1584.9 | 274.15 | 202.4 |
| 155. | 19.323 | 0.080 | -10.284 | 114.24 | 43.23 | 70.19 | 1548.1 | 253.40 | 197.4 |
| 160. | 19.130 | 0.079 | -9.933 | 116.48 | 43.04 | 70.44 | 1511.1 | 235.10 | 192.5 |
| 165. | 18.936 | 0.077 | -9.580 | 118.65 | 42.90 | 70.76 | 1474.1 | 218.83 | 187.6 |
| 170. | 18.739 | 0.076 | -9.225 | 120.77 | 42.81 | 71.14 | 1437.0 | 204.27 | 182.8 |
| 175. | 18.540 | 0.074 | -8.868 | 122.83 | 42.76 | 71.58 | 1399.8 | 191.13 | 177.9 |
| 180. | 18.338 | 0.073 | -8.509 | 124.86 | 42.74 | 72.09 | 1362.5 | 179.21 | 173.1 |
| 185. | 18.133 | 0.072 | -8.147 | 126.84 | 42.77 | 72.66 | 1325.1 | 168.34 | 168.3 |
| 190. | 17.925 | 0.071 | -7.783 | 128.79 | 42.82 | 73.29 | 1287.5 | 158.37 | 163.6 |
| 195. | 17.713 | 0.070 | -7.414 | 130.70 | 42.91 | 73.98 | 1249.8 | 149.18 | 158.9 |
| 200. | 17.496 | 0.069 | -7.043 | 132.58 | 43.03 | 74.75 | 1211.9 | 140.67 | 154.3 |
| 205. | 17.275 | 0.068 | -6.667 | 134.44 | 43.18 | 75.58 | 1173.7 | 132.76 | 149.7 |
| 210. | 17.050 | 0.067 | -6.287 | 136.27 | 43.35 | 76.49 | 1135.3 | 125.37 | 145.1 |
| 215. | 16.818 | 0.067 | -5.902 | 138.08 | 43.55 | 77.50 | 1096.6 | 118.45 | 140.6 |
| 220. | 16.580 | 0.066 | -5.512 | 139.88 | 43.78 | 78.60 | 1057.4 | 111.95 | 136.1 |
| 225. | 16.336 | 0.065 | -5.116 | 141.65 | 44.03 | 79.82 | 1017.9 | 105.80 | 131.7 |
| 230. | 16.083 | 0.065 | -4.713 | 143.42 | 44.31 | 81.18 | 977.7 | 99.98 | 127.4 |
| 235. | 15.821 | 0.065 | -4.304 | 145.19 | 44.62 | 82.70 | 936.9 | 94.44 | 123.0 |
| 240. | 15.549 | 0.064 | -3.886 | 146.94 | 44.95 | 84.42 | 895.4 | 89.15 | 118.8 |
| 245. | 15.264 | 0.064 | -3.459 | 148.70 | 45.32 | 86.40 | 852.8 | 84.08 | 114.5 |
| 250. | 14.964 | 0.064 | -3.021 | 150.47 | 45.72 | 88.72 | 808.9 | 79.18 | 110.2 |
| 255. | 14.646 | 0.064 | -2.571 | 152.26 | 46.16 | 91.50 | 763.5 | 74.43 | 106.0 |
| 260. | 14.306 | 0.065 | -2.105 | 154.07 | 46.64 | 94.93 | 716.0 | 69.78 | 101.7 |
| 265. | 13.935 | 0.065 | -1.620 | 155.91 | 47.18 | 99.36 | 665.7 | 65.17 | 97.3 |
| 266.011 | 13.856 | 0.065 | -1.519 | 156.29 | 47.29 | 100.42 | 655.1 | 64.25 | 96.5 |
| 266.011 | 1.253 | 0.722 | 8.273 | 193.10 | 48.28 | 81.83 | 239.3 | 9.25 | 21.6 |
| 270. | 1.201 | 0.742 | 8.589 | 194.29 | 47.40 | 76.57 | 245.2 | 9.33 | 21.6 |
| 275. | 1.147 | 0.763 | 8.961 | 195.65 | 46.81 | 72.33 | 251.8 | 9.45 | 21.8 |
| 280. | 1.101 | 0.780 | 9.315 | 196.93 | 46.57 | 69.55 | 257.7 | 9.56 | 22.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 2.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 285. | 1.060 | 0.796 | 9.658 | 198.14 | 46.55 | 67.64 | 263.1 | 9.69 | 22.4 |
| 290. | 1.024 | 0.810 | 9.992 | 199.30 | 46.67 | 66.30 | 268.1 | 9.81 | 22.8 |
| 295. | 0.9918 | 0.822 | 10.321 | 200.43 | 46.90 | 65.35 | 272.8 | 9.94 | 23.3 |
| 300. | 0.9622 | 0.833 | 10.646 | 201.52 | 47.20 | 64.69 | 277.3 | 10.07 | 23.8 |
| 310. | 0.9100 | 0.853 | 11.289 | 203.63 | 47.94 | 63.94 | 285.6 | 10.33 | 24.8 |
| 320. | 0.8651 | 0.869 | 11.927 | 205.65 | 48.83 | 63.72 | 293.3 | 10.59 | 25.9 |
| 330. | 0.8257 | 0.883 | 12.564 | 207.62 | 49.81 | 63.85 | 300.5 | 10.86 | 27.1 |
| 340. | 0.7908 | 0.895 | 13.205 | 209.53 | 50.86 | 64.22 | 307.2 | 11.12 | 28.4 |
| 350. | 0.7594 | 0.905 | 13.849 | 211.40 | 51.97 | 64.77 | 313.5 | 11.39 | 29.7 |
| 360. | 0.7310 | 0.914 | 14.500 | 213.23 | 53.11 | 65.46 | 319.6 | 11.65 | 31.1 |
| 370. | 0.7050 | 0.922 | 15.159 | 215.03 | 54.28 | 66.24 | 325.4 | 11.91 | 32.6 |
| 380. | 0.6812 | 0.929 | 15.826 | 216.81 | 55.47 | 67.11 | 331.0 | 12.17 | 34.1 |
| 390. | 0.6592 | 0.936 | 16.501 | 218.57 | 56.68 | 68.03 | 336.4 | 12.43 | 35.6 |
| 400. | 0.6389 | 0.941 | 17.186 | 220.30 | 57.89 | 69.00 | 341.6 | 12.69 | 37.2 |
| 410. | 0.6199 | 0.946 | 17.881 | 222.02 | 59.11 | 70.01 | 346.7 | 12.95 | 38.8 |
| 420. | 0.6022 | 0.951 | 18.587 | 223.72 | 60.34 | 71.05 | 351.6 | 13.20 | 40.4 |
| 430. | 0.5857 | 0.955 | 19.302 | 225.40 | 61.56 | 72.11 | 356.5 | 13.46 | 42.1 |
| 440. | 0.5701 | 0.959 | 20.029 | 227.07 | 62.79 | 73.18 | 361.2 | 13.71 | 43.8 |
| 450. | 0.5554 | 0.962 | 20.766 | 228.73 | 64.00 | 74.26 | 365.7 | 13.96 | 45.5 |
| 460. | 0.5416 | 0.966 | 21.514 | 230.37 | 65.22 | 75.35 | 370.2 | 14.20 | 47.3 |
| 470. | 0.5285 | 0.968 | 22.273 | 232.00 | 66.42 | 76.45 | 374.6 | 14.45 | 49.0 |
| 480. | 0.5161 | 0.971 | 23.043 | 233.63 | 67.62 | 77.54 | 379.0 | 14.69 | 50.9 |
| 490. | 0.5043 | 0.973 | 23.824 | 235.24 | 68.80 | 78.64 | 383.2 | 14.93 | 52.7 |
| 500. | 0.4931 | 0.976 | 24.616 | 236.84 | 69.98 | 79.73 | 387.4 | 15.17 | 54.5 |
| 520. | 0.4722 | 0.980 | 26.232 | 240.00 | 72.29 | 81.90 | 395.5 | | 58.3 |
| 540. | 0.4531 | 0.983 | 27.892 | 243.14 | 74.56 | 84.05 | 403.4 | | 62.1 |
| 560. | 0.4357 | 0.986 | 29.594 | 246.23 | 76.78 | 86.16 | 411.1 | | 66.0 |
| 580. | 0.4196 | 0.988 | 31.338 | 249.29 | 78.96 | 88.24 | 418.6 | | 69.9 |
| 600. | 0.4047 | 0.991 | 33.123 | 252.32 | 81.08 | 90.28 | 425.9 | | 73.9 |
| 625. | 0.3876 | 0.993 | 35.412 | 256.05 | 83.67 | 92.78 | 434.8 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 2.5000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.533 | 0.147 | -14.475 | 79.85 | 47.92 | 68.57 | 1981.1 | 1079.77 | 253.2 |
| 100. | 21.357 | 0.141 | -14.128 | 83.41 | 48.18 | 70.00 | 1949.1 | 895.59 | 249.3 |
| 105. | 21.178 | 0.135 | -13.776 | 86.84 | 47.95 | 70.59 | 1914.8 | 756.18 | 245.2 |
| 110. | 20.998 | 0.130 | -13.423 | 90.13 | 47.47 | 70.72 | 1879.4 | 648.66 | 240.8 |
| 115. | 20.817 | 0.126 | -13.069 | 93.27 | 46.87 | 70.61 | 1843.4 | 564.17 | 236.3 |
| 120. | 20.635 | 0.121 | -12.717 | 96.27 | 46.24 | 70.41 | 1807.2 | 496.61 | 231.7 |
| 125. | 20.452 | 0.118 | -12.365 | 99.14 | 45.64 | 70.19 | 1770.8 | 441.69 | 227.0 |
| 130. | 20.268 | 0.114 | -12.015 | 101.89 | 45.08 | 70.01 | 1734.3 | 396.38 | 222.2 |
| 135. | 20.084 | 0.111 | -11.665 | 104.53 | 44.59 | 69.89 | 1697.8 | 358.49 | 217.4 |
| 140. | 19.899 | 0.108 | -11.316 | 107.07 | 44.16 | 69.84 | 1661.2 | 326.40 | 212.5 |
| 145. | 19.712 | 0.105 | -10.966 | 109.53 | 43.79 | 69.87 | 1624.5 | 298.90 | 207.6 |
| 150. | 19.524 | 0.103 | -10.617 | 111.90 | 43.49 | 69.97 | 1587.8 | 275.10 | 202.7 |
| 155. | 19.334 | 0.100 | -10.267 | 114.19 | 43.25 | 70.14 | 1551.1 | 254.30 | 197.8 |
| 160. | 19.142 | 0.098 | -9.915 | 116.42 | 43.06 | 70.39 | 1514.3 | 235.95 | 192.9 |
| 165. | 18.949 | 0.096 | -9.563 | 118.59 | 42.93 | 70.70 | 1477.4 | 219.65 | 188.0 |
| 170. | 18.753 | 0.094 | -9.208 | 120.71 | 42.83 | 71.08 | 1440.4 | 205.05 | 183.1 |
| 175. | 18.554 | 0.093 | -8.852 | 122.78 | 42.78 | 71.51 | 1403.4 | 191.89 | 178.3 |
| 180. | 18.353 | 0.091 | -8.493 | 124.80 | 42.77 | 72.01 | 1366.3 | 179.95 | 173.5 |
| 185. | 18.149 | 0.090 | -8.131 | 126.78 | 42.79 | 72.57 | 1329.1 | 169.06 | 168.8 |
| 190. | 17.942 | 0.088 | -7.767 | 128.72 | 42.85 | 73.19 | 1291.7 | 159.07 | 164.0 |
| 195. | 17.731 | 0.087 | -7.399 | 130.63 | 42.94 | 73.87 | 1254.2 | 149.87 | 159.4 |
| 200. | 17.516 | 0.086 | -7.028 | 132.51 | 43.05 | 74.62 | 1216.5 | 141.35 | 154.7 |
| 205. | 17.296 | 0.085 | -6.653 | 134.36 | 43.20 | 75.43 | 1178.7 | 133.43 | 150.1 |
| 210. | 17.072 | 0.084 | -6.274 | 136.19 | 43.37 | 76.33 | 1140.5 | 126.04 | 145.6 |
| 215. | 16.843 | 0.083 | -5.890 | 138.00 | 43.57 | 77.31 | 1102.1 | 119.12 | 141.1 |
| 220. | 16.607 | 0.082 | -5.501 | 139.79 | 43.80 | 78.38 | 1063.4 | 112.62 | 136.7 |
| 225. | 16.365 | 0.082 | -5.106 | 141.56 | 44.05 | 79.56 | 1024.2 | 106.48 | 132.3 |
| 230. | 16.115 | 0.081 | -4.705 | 143.33 | 44.33 | 80.87 | 984.6 | 100.66 | 128.0 |
| 235. | 15.856 | 0.081 | -4.297 | 145.08 | 44.64 | 82.34 | 944.3 | 95.14 | 123.7 |
| 240. | 15.587 | 0.080 | -3.881 | 146.83 | 44.97 | 83.99 | 903.3 | 89.86 | 119.4 |
| 245. | 15.307 | 0.080 | -3.457 | 148.58 | 45.33 | 85.87 | 861.5 | 84.81 | 115.2 |
| 250. | 15.013 | 0.080 | -3.022 | 150.34 | 45.72 | 88.06 | 818.5 | 79.94 | 111.0 |
| 255. | 14.702 | 0.080 | -2.575 | 152.11 | 46.15 | 90.65 | 774.2 | 75.23 | 106.8 |
| 260. | 14.370 | 0.080 | -2.114 | 153.90 | 46.62 | 93.80 | 728.1 | 70.63 | 102.5 |
| 265. | 14.012 | 0.081 | -1.636 | 155.72 | 47.15 | 97.77 | 679.6 | 66.10 | 98.3 |
| 270. | 13.618 | 0.082 | -1.135 | 157.59 | 47.73 | 103.06 | 627.8 | 61.58 | 93.9 |
| 275. | 13.173 | 0.083 | -0.601 | 159.55 | 48.43 | 110.70 | 571.0 | 56.98 | 89.4 |
| 275.090 | 13.165 | 0.083 | -0.592 | 159.58 | 48.44 | 110.86 | 569.9 | 56.89 | 89.4 |
| 275.090 | 1.628 | 0.672 | 8.251 | 191.73 | 50.74 | 96.46 | 231.9 | 9.93 | 24.4 |
| 280. | 1.529 | 0.702 | 8.697 | 193.34 | 49.30 | 85.69 | 240.6 | 9.98 | 24.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 2.5000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 285. | 1.451 | 0.727 | 9.109 | 194.80 | 48.58 | 79.42 | 248.1 | 10.06 | 24.1 |
| 290. | 1.386 | 0.748 | 9.495 | 196.14 | 48.26 | 75.43 | 254.7 | 10.16 | 24.3 |
| 295. | 1.330 | 0.766 | 9.865 | 197.41 | 48.18 | 72.71 | 260.7 | 10.26 | 24.6 |
| 300. | 1.281 | 0.782 | 10.224 | 198.61 | 48.27 | 70.80 | 266.2 | 10.37 | 24.9 |
| 310. | 1.198 | 0.810 | 10.919 | 200.89 | 48.74 | 68.43 | 276.2 | 10.60 | 25.7 |
| 320. | 1.130 | 0.832 | 11.596 | 203.04 | 49.46 | 67.21 | 285.1 | 10.84 | 26.7 |
| 330. | 1.072 | 0.850 | 12.265 | 205.10 | 50.33 | 66.67 | 293.2 | 11.08 | 27.8 |
| 340. | 1.021 | 0.866 | 12.931 | 207.09 | 51.29 | 66.56 | 300.8 | 11.33 | 29.0 |
| 350. | 0.9766 | 0.880 | 13.597 | 209.02 | 52.33 | 66.75 | 307.8 | 11.58 | 30.3 |
| 360. | 0.9369 | 0.892 | 14.267 | 210.90 | 53.42 | 67.16 | 314.5 | 11.84 | 31.6 |
| 370. | 0.9011 | 0.902 | 14.941 | 212.75 | 54.55 | 67.73 | 320.8 | 12.09 | 33.0 |
| 380. | 0.8686 | 0.911 | 15.622 | 214.57 | 55.71 | 68.41 | 326.8 | 12.35 | 34.5 |
| 390. | 0.8388 | 0.919 | 16.310 | 216.35 | 56.88 | 69.19 | 332.6 | 12.60 | 36.0 |
| 400. | 0.8114 | 0.926 | 17.006 | 218.12 | 58.08 | 70.05 | 338.2 | 12.85 | 37.5 |
| 410. | 0.7861 | 0.933 | 17.711 | 219.86 | 59.28 | 70.95 | 343.6 | 13.10 | 39.1 |
| 420. | 0.7626 | 0.939 | 18.425 | 221.58 | 60.49 | 71.90 | 348.8 | 13.35 | 40.7 |
| 430. | 0.7407 | 0.944 | 19.149 | 223.28 | 61.70 | 72.89 | 353.8 | 13.60 | 42.4 |
| 440. | 0.7203 | 0.949 | 19.883 | 224.97 | 62.91 | 73.90 | 358.8 | 13.85 | 44.1 |
| 450. | 0.7010 | 0.953 | 20.627 | 226.64 | 64.12 | 74.93 | 363.6 | 14.09 | 45.8 |
| 460. | 0.6830 | 0.957 | 21.381 | 228.30 | 65.32 | 75.97 | 368.3 | 14.33 | 47.5 |
| 470. | 0.6659 | 0.961 | 22.146 | 229.94 | 66.51 | 77.02 | 372.9 | 14.58 | 49.3 |
| 480. | 0.6498 | 0.964 | 22.922 | 231.58 | 67.70 | 78.07 | 377.3 | 14.82 | 51.1 |
| 490. | 0.6345 | 0.967 | 23.708 | 233.20 | 68.88 | 79.13 | 381.7 | 15.06 | 52.9 |
| 500. | 0.6200 | 0.970 | 24.504 | 234.81 | 70.05 | 80.20 | 386.1 | 15.29 | 54.7 |
| 520. | 0.5932 | 0.975 | 26.130 | 237.99 | 72.36 | 82.31 | 394.5 | | 58.5 |
| 540. | 0.5687 | 0.979 | 27.797 | 241.14 | 74.62 | 84.41 | 402.6 | | 62.3 |
| 560. | 0.5464 | 0.983 | 29.506 | 244.25 | 76.84 | 86.49 | 410.5 | | 66.1 |
| 580. | 0.5259 | 0.986 | 31.256 | 247.32 | 79.00 | 88.54 | 418.1 | | 70.1 |
| 600. | 0.5069 | 0.989 | 33.047 | 250.35 | 81.12 | 90.55 | 425.6 | | 74.0 |
| 625. | 0.4852 | 0.991 | 35.342 | 254.10 | 83.71 | 93.03 | 434.7 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 3.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.539 | 0.176 | -14.455 | 79.82 | 47.92 | 68.54 | 1983.3 | 1084.38 | 253.4 |
| 100. | 21.363 | 0.169 | -14.108 | 83.37 | 48.19 | 69.98 | 1951.3 | 899.17 | 249.5 |
| 105. | 21.185 | 0.162 | -13.757 | 86.80 | 47.97 | 70.57 | 1917.0 | 759.04 | 245.4 |
| 110. | 21.005 | 0.156 | -13.403 | 90.09 | 47.49 | 70.70 | 1881.6 | 651.01 | 241.1 |
| 115. | 20.824 | 0.151 | -13.050 | 93.23 | 46.89 | 70.59 | 1845.7 | 566.15 | 236.6 |
| 120. | 20.642 | 0.146 | -12.698 | 96.23 | 46.26 | 70.39 | 1809.5 | 498.32 | 232.0 |
| 125. | 20.460 | 0.141 | -12.346 | 99.10 | 45.66 | 70.17 | 1773.2 | 443.19 | 227.3 |
| 130. | 20.277 | 0.137 | -11.996 | 101.85 | 45.10 | 69.99 | 1736.8 | 397.72 | 222.5 |
| 135. | 20.093 | 0.133 | -11.646 | 104.49 | 44.61 | 69.86 | 1700.3 | 359.70 | 217.7 |
| 140. | 19.908 | 0.129 | -11.297 | 107.03 | 44.18 | 69.81 | 1663.8 | 327.50 | 212.8 |
| 145. | 19.722 | 0.126 | -10.948 | 109.48 | 43.82 | 69.83 | 1627.3 | 299.93 | 207.9 |
| 150. | 19.534 | 0.123 | -10.599 | 111.85 | 43.52 | 69.93 | 1590.7 | 276.06 | 203.0 |
| 155. | 19.345 | 0.120 | -10.249 | 114.14 | 43.28 | 70.10 | 1554.1 | 255.20 | 198.1 |
| 160. | 19.154 | 0.118 | -9.897 | 116.37 | 43.09 | 70.34 | 1517.4 | 236.81 | 193.3 |
| 165. | 18.961 | 0.115 | -9.545 | 118.54 | 42.95 | 70.64 | 1480.7 | 220.46 | 188.4 |
| 170. | 18.766 | 0.113 | -9.191 | 120.65 | 42.86 | 71.01 | 1443.9 | 205.83 | 183.5 |
| 175. | 18.568 | 0.111 | -8.835 | 122.72 | 42.81 | 71.44 | 1407.0 | 192.64 | 178.7 |
| 180. | 18.368 | 0.109 | -8.476 | 124.74 | 42.79 | 71.93 | 1370.1 | 180.68 | 173.9 |
| 185. | 18.165 | 0.107 | -8.115 | 126.72 | 42.82 | 72.48 | 1333.0 | 169.77 | 169.2 |
| 190. | 17.959 | 0.106 | -7.752 | 128.66 | 42.87 | 73.09 | 1295.9 | 159.77 | 164.5 |
| 195. | 17.749 | 0.104 | -7.384 | 130.56 | 42.96 | 73.76 | 1258.6 | 150.55 | 159.8 |
| 200. | 17.535 | 0.103 | -7.014 | 132.44 | 43.08 | 74.49 | 1221.2 | 142.03 | 155.2 |
| 205. | 17.317 | 0.102 | -6.639 | 134.29 | 43.22 | 75.29 | 1183.6 | 134.10 | 150.6 |
| 210. | 17.095 | 0.101 | -6.261 | 136.11 | 43.40 | 76.17 | 1145.7 | 126.71 | 146.1 |
| 215. | 16.867 | 0.099 | -5.878 | 137.92 | 43.60 | 77.12 | 1107.6 | 119.79 | 141.7 |
| 220. | 16.633 | 0.099 | -5.489 | 139.70 | 43.82 | 78.17 | 1069.2 | 113.28 | 137.2 |
| 225. | 16.393 | 0.098 | -5.096 | 141.47 | 44.07 | 79.32 | 1030.5 | 107.15 | 132.9 |
| 230. | 16.146 | 0.097 | -4.696 | 143.23 | 44.35 | 80.58 | 991.3 | 101.34 | 128.6 |
| 235. | 15.890 | 0.097 | -4.290 | 144.98 | 44.65 | 82.00 | 951.5 | 95.83 | 124.3 |
| 240. | 15.625 | 0.096 | -3.876 | 146.72 | 44.98 | 83.58 | 911.1 | 90.57 | 120.1 |
| 245. | 15.349 | 0.096 | -3.454 | 148.46 | 45.34 | 85.37 | 870.0 | 85.53 | 115.9 |
| 250. | 15.060 | 0.096 | -3.022 | 150.21 | 45.73 | 87.44 | 827.9 | 80.70 | 111.7 |
| 255. | 14.755 | 0.096 | -2.579 | 151.96 | 46.15 | 89.86 | 784.5 | 76.02 | 107.5 |
| 260. | 14.432 | 0.096 | -2.122 | 153.73 | 46.61 | 92.77 | 739.6 | 71.46 | 103.4 |
| 265. | 14.085 | 0.097 | -1.650 | 155.53 | 47.12 | 96.37 | 692.7 | 67.00 | 99.2 |
| 270. | 13.706 | 0.098 | -1.157 | 157.37 | 47.69 | 101.03 | 643.1 | 62.57 | 95.0 |
| 275. | 13.284 | 0.099 | -0.636 | 159.28 | 48.33 | 107.47 | 589.5 | 58.10 | 90.6 |
| 280. | 12.798 | 0.101 | -0.077 | 161.30 | 49.12 | 117.31 | 529.7 | 53.47 | 86.1 |
| 282.915 | 12.468 | 0.102 | 0.277 | 162.56 | 49.69 | 126.19 | 490.4 | 50.61 | 83.2 |
| 282.915 | 2.055 | 0.621 | 8.140 | 190.35 | 53.17 | 117.99 | 224.1 | 10.69 | 27.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 3.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 285. | 1.980 | 0.639 | 8.378 | 191.19 | 52.14 | 107.55 | 229.0 | 10.66 | 27.3 |
| 290. | 1.846 | 0.674 | 8.876 | 192.92 | 50.69 | 93.22 | 238.6 | 10.66 | 26.7 |
| 295. | 1.743 | 0.702 | 9.320 | 194.44 | 49.98 | 85.33 | 246.7 | 10.71 | 26.5 |
| 300. | 1.659 | 0.725 | 9.734 | 195.83 | 49.67 | 80.39 | 253.8 | 10.77 | 26.5 |
| 310. | 1.526 | 0.763 | 10.506 | 198.37 | 49.70 | 74.70 | 266.0 | 10.94 | 27.0 |
| 320. | 1.424 | 0.792 | 11.237 | 200.69 | 50.17 | 71.74 | 276.5 | 11.14 | 27.7 |
| 330. | 1.340 | 0.816 | 11.945 | 202.87 | 50.89 | 70.14 | 285.8 | 11.35 | 28.7 |
| 340. | 1.269 | 0.836 | 12.642 | 204.95 | 51.75 | 69.34 | 294.2 | 11.58 | 29.8 |
| 350. | 1.208 | 0.854 | 13.334 | 206.95 | 52.71 | 69.04 | 302.0 | 11.81 | 31.0 |
| 360. | 1.154 | 0.868 | 14.024 | 208.90 | 53.75 | 69.09 | 309.3 | 12.05 | 32.2 |
| 370. | 1.107 | 0.881 | 14.716 | 210.79 | 54.83 | 69.38 | 316.2 | 12.29 | 33.6 |
| 380. | 1.064 | 0.893 | 15.412 | 212.65 | 55.95 | 69.85 | 322.7 | 12.54 | 35.0 |
| 390. | 1.025 | 0.903 | 16.114 | 214.47 | 57.10 | 70.46 | 328.9 | 12.78 | 36.4 |
| 400. | 0.9897 | 0.911 | 16.822 | 216.26 | 58.27 | 71.17 | 334.8 | 13.02 | 37.9 |
| 410. | 0.9572 | 0.919 | 17.537 | 218.03 | 59.45 | 71.96 | 340.5 | 13.27 | 39.5 |
| 420. | 0.9273 | 0.926 | 18.261 | 219.77 | 60.64 | 72.81 | 346.0 | 13.51 | 41.1 |
| 430. | 0.8995 | 0.933 | 18.994 | 221.50 | 61.84 | 73.71 | 351.3 | 13.75 | 42.7 |
| 440. | 0.8736 | 0.939 | 19.736 | 223.20 | 63.03 | 74.65 | 356.5 | 14.00 | 44.4 |
| 450. | 0.8494 | 0.944 | 20.487 | 224.89 | 64.23 | 75.61 | 361.5 | 14.24 | 46.1 |
| 460. | 0.8268 | 0.949 | 21.248 | 226.56 | 65.42 | 76.60 | 366.4 | 14.48 | 47.8 |
| 470. | 0.8055 | 0.953 | 22.019 | 228.22 | 66.61 | 77.61 | 371.1 | 14.71 | 49.6 |
| 480. | 0.7854 | 0.957 | 22.800 | 229.87 | 67.79 | 78.62 | 375.8 | 14.95 | 51.3 |
| 490. | 0.7665 | 0.961 | 23.591 | 231.50 | 68.96 | 79.64 | 380.3 | 15.19 | 53.1 |
| 500. | 0.7485 | 0.964 | 24.393 | 233.12 | 70.13 | 80.67 | 384.8 | 15.42 | 55.0 |
| 520. | 0.7153 | 0.970 | 26.027 | 236.32 | 72.42 | 82.73 | 393.5 | | 58.7 |
| 540. | 0.6852 | 0.975 | 27.702 | 239.48 | 74.68 | 84.79 | 401.8 | | 62.5 |
| 560. | 0.6578 | 0.979 | 29.418 | 242.60 | 76.89 | 86.82 | 409.9 | | 66.3 |
| 580. | 0.6327 | 0.983 | 31.175 | 245.69 | 79.05 | 88.84 | 417.7 | | 70.2 |
| 600. | 0.6096 | 0.986 | 32.972 | 248.73 | 81.16 | 90.83 | 425.3 | | 74.2 |
| 625. | 0.5832 | 0.990 | 35.273 | 252.49 | 83.74 | 93.27 | 434.6 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 4.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.551 | 0.235 | -14.416 | 79.74 | 47.91 | 68.49 | 1987.6 | 1093.70 | 253.9 |
| 100. | 21.376 | 0.225 | -14.069 | 83.29 | 48.20 | 69.93 | 1955.6 | 906.38 | 250.0 |
| 105. | 21.198 | 0.216 | -13.718 | 86.72 | 47.99 | 70.53 | 1921.3 | 764.81 | 245.9 |
| 110. | 21.019 | 0.208 | -13.365 | 90.01 | 47.52 | 70.66 | 1886.0 | 655.75 | 241.6 |
| 115. | 20.839 | 0.201 | -13.012 | 93.15 | 46.92 | 70.55 | 1850.1 | 570.15 | 237.1 |
| 120. | 20.658 | 0.194 | -12.659 | 96.15 | 46.30 | 70.34 | 1814.1 | 501.75 | 232.5 |
| 125. | 20.476 | 0.188 | -12.308 | 99.01 | 45.70 | 70.12 | 1777.9 | 446.20 | 227.8 |
| 130. | 20.294 | 0.182 | -11.958 | 101.76 | 45.14 | 69.93 | 1741.7 | 400.40 | 223.1 |
| 135. | 20.111 | 0.177 | -11.609 | 104.40 | 44.65 | 69.80 | 1705.4 | 362.12 | 218.3 |
| 140. | 19.927 | 0.172 | -11.260 | 106.93 | 44.22 | 69.74 | 1669.1 | 329.72 | 213.5 |
| 145. | 19.742 | 0.168 | -10.911 | 109.38 | 43.86 | 69.76 | 1632.8 | 301.98 | 208.6 |
| 150. | 19.555 | 0.164 | -10.562 | 111.75 | 43.56 | 69.85 | 1596.4 | 277.97 | 203.7 |
| 155. | 19.367 | 0.160 | -10.213 | 114.04 | 43.32 | 70.01 | 1560.0 | 257.00 | 198.9 |
| 160. | 19.178 | 0.157 | -9.862 | 116.27 | 43.13 | 70.24 | 1523.6 | 238.51 | 194.0 |
| 165. | 18.986 | 0.154 | -9.510 | 118.43 | 43.00 | 70.53 | 1487.2 | 222.09 | 189.1 |
| 170. | 18.792 | 0.151 | -9.157 | 120.54 | 42.90 | 70.89 | 1450.7 | 207.39 | 184.3 |
| 175. | 18.596 | 0.148 | -8.801 | 122.60 | 42.85 | 71.30 | 1414.1 | 194.15 | 179.5 |
| 180. | 18.398 | 0.145 | -8.443 | 124.62 | 42.84 | 71.78 | 1377.5 | 182.14 | 174.8 |
| 185. | 18.197 | 0.143 | -8.083 | 126.59 | 42.86 | 72.31 | 1340.8 | 171.20 | 170.0 |
| 190. | 17.992 | 0.141 | -7.720 | 128.53 | 42.92 | 72.90 | 1304.1 | 161.16 | 165.4 |
| 195. | 17.785 | 0.139 | -7.354 | 130.43 | 43.01 | 73.54 | 1267.2 | 151.92 | 160.7 |
| 200. | 17.573 | 0.137 | -6.985 | 132.30 | 43.13 | 74.25 | 1230.3 | 143.38 | 156.1 |
| 205. | 17.358 | 0.135 | -6.612 | 134.14 | 43.27 | 75.02 | 1193.2 | 135.44 | 151.6 |
| 210. | 17.138 | 0.134 | -6.234 | 135.96 | 43.44 | 75.86 | 1155.9 | 128.04 | 147.1 |
| 215. | 16.914 | 0.132 | -5.853 | 137.76 | 43.64 | 76.77 | 1118.4 | 121.11 | 142.7 |
| 220. | 16.684 | 0.131 | -5.467 | 139.53 | 43.87 | 77.76 | 1080.7 | 114.61 | 138.3 |
| 225. | 16.449 | 0.130 | -5.075 | 141.29 | 44.12 | 78.85 | 1042.7 | 108.48 | 134.0 |
| 230. | 16.206 | 0.129 | -4.678 | 143.04 | 44.39 | 80.04 | 1004.3 | 102.68 | 129.7 |
| 235. | 15.956 | 0.128 | -4.275 | 144.77 | 44.69 | 81.36 | 965.5 | 97.19 | 125.5 |
| 240. | 15.698 | 0.128 | -3.864 | 146.50 | 45.02 | 82.82 | 926.3 | 91.96 | 121.3 |
| 245. | 15.430 | 0.127 | -3.446 | 148.23 | 45.37 | 84.46 | 886.4 | 86.96 | 117.2 |
| 250. | 15.150 | 0.127 | -3.019 | 149.95 | 45.75 | 86.32 | 845.7 | 82.16 | 113.1 |
| 255. | 14.857 | 0.127 | -2.582 | 151.68 | 46.16 | 88.47 | 804.1 | 77.54 | 109.0 |
| 260. | 14.548 | 0.127 | -2.134 | 153.42 | 46.60 | 90.98 | 761.4 | 73.07 | 105.0 |
| 265. | 14.220 | 0.128 | -1.672 | 155.18 | 47.09 | 94.00 | 717.2 | 68.71 | 100.9 |
| 270. | 13.867 | 0.128 | -1.193 | 156.97 | 47.61 | 97.74 | 671.1 | 64.43 | 96.9 |
| 275. | 13.481 | 0.130 | -0.693 | 158.81 | 48.20 | 102.57 | 622.4 | 60.17 | 92.8 |
| 280. | 13.051 | 0.132 | -0.164 | 160.71 | 48.88 | 109.23 | 569.9 | 55.86 | 88.5 |
| 285. | 12.555 | 0.134 | 0.405 | 162.73 | 49.70 | 119.29 | 512.0 | 51.40 | 84.1 |
| 290. | 11.946 | 0.139 | 1.041 | 164.94 | 50.81 | 137.19 | 444.6 | 46.55 | 79.4 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 4.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 295. | 11.087 | 0.147 | 1.820 | 167.60 | 52.86 | 183.68 | 356.7 | 40.66 | 74.2 |
| 295.981 | 10.852 | 0.150 | 2.009 | 168.24 | 53.60 | 205.14 | 334.1 | 39.21 | 73.2 |
| 295.981 | 3.196 | 0.509 | 7.580 | 187.06 | 58.83 | 233.23 | 207.1 | 12.80 | 38.8 |
| 300. | 2.824 | 0.568 | 8.300 | 189.48 | 55.20 | 145.57 | 221.1 | 12.33 | 34.0 |
| 310. | 2.387 | 0.650 | 9.471 | 193.32 | 52.47 | 100.11 | 242.5 | 12.01 | 31.1 |
| 320. | 2.139 | 0.703 | 10.394 | 196.26 | 51.98 | 86.56 | 257.8 | 11.99 | 30.7 |
| 330. | 1.965 | 0.742 | 11.225 | 198.81 | 52.21 | 80.24 | 270.2 | 12.08 | 31.0 |
| 340. | 1.830 | 0.773 | 12.008 | 201.15 | 52.78 | 76.82 | 280.9 | 12.22 | 31.7 |
| 350. | 1.720 | 0.799 | 12.766 | 203.35 | 53.55 | 74.88 | 290.4 | 12.39 | 32.6 |
| 360. | 1.628 | 0.821 | 13.509 | 205.44 | 54.44 | 73.81 | 299.1 | 12.58 | 33.7 |
| 370. | 1.549 | 0.839 | 14.244 | 207.46 | 55.42 | 73.30 | 307.1 | 12.78 | 34.8 |
| 380. | 1.480 | 0.855 | 14.976 | 209.41 | 56.46 | 73.18 | 314.6 | 12.99 | 36.1 |
| 390. | 1.419 | 0.869 | 15.709 | 211.31 | 57.54 | 73.33 | 321.7 | 13.20 | 37.5 |
| 400. | 1.364 | 0.881 | 16.443 | 213.17 | 58.65 | 73.67 | 328.3 | 13.43 | 38.9 |
| 410. | 1.315 | 0.892 | 17.183 | 215.00 | 59.79 | 74.17 | 334.7 | 13.65 | 40.4 |
| 420. | 1.270 | 0.902 | 17.927 | 216.79 | 60.95 | 74.78 | 340.7 | 13.87 | 41.9 |
| 430. | 1.228 | 0.911 | 18.678 | 218.56 | 62.11 | 75.48 | 346.6 | 14.10 | 43.5 |
| 440. | 1.190 | 0.919 | 19.437 | 220.30 | 63.28 | 76.25 | 352.2 | 14.33 | 45.1 |
| 450. | 1.155 | 0.926 | 20.204 | 222.03 | 64.46 | 77.08 | 357.6 | 14.56 | 46.7 |
| 460. | 1.122 | 0.932 | 20.979 | 223.73 | 65.63 | 77.94 | 362.9 | 14.79 | 48.4 |
| 470. | 1.091 | 0.938 | 21.763 | 225.41 | 66.80 | 78.84 | 368.0 | 15.01 | 50.1 |
| 480. | 1.062 | 0.944 | 22.556 | 227.08 | 67.96 | 79.76 | 373.0 | 15.24 | 51.9 |
| 490. | 1.035 | 0.948 | 23.358 | 228.74 | 69.12 | 80.70 | 377.8 | 15.47 | 53.7 |
| 500. | 1.010 | 0.953 | 24.170 | 230.38 | 70.28 | 81.65 | 382.5 | 15.69 | 55.5 |
| 520. | 0.9629 | 0.961 | 25.822 | 233.62 | 72.56 | 83.59 | 391.7 | | 59.1 |
| 540. | 0.9208 | 0.968 | 27.513 | 236.81 | 74.79 | 85.54 | 400.4 | | 62.9 |
| 560. | 0.8826 | 0.973 | 29.244 | 239.96 | 76.99 | 87.50 | 408.9 | | 66.7 |
| 580. | 0.8479 | 0.978 | 31.013 | 243.06 | 79.14 | 89.45 | 417.0 | | 70.6 |
| 600. | 0.8160 | 0.983 | 32.821 | 246.13 | 81.25 | 91.38 | 424.9 | | 74.5 |
| 625. | 0.7798 | 0.987 | 35.136 | 249.90 | 83.82 | 93.76 | 434.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 5.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.563 | 0.294 | -14.376 | 79.67 | 47.91 | 68.43 | 1991.9 | 1103.13 | 254.3 |
| 100. | 21.388 | 0.281 | -14.030 | 83.22 | 48.22 | 69.89 | 1959.8 | 913.68 | 250.5 |
| 105. | 21.211 | 0.270 | -13.679 | 86.64 | 48.02 | 70.49 | 1925.6 | 770.64 | 246.4 |
| 110. | 21.033 | 0.260 | -13.326 | 89.93 | 47.55 | 70.62 | 1890.3 | 660.54 | 242.1 |
| 115. | 20.853 | 0.251 | -12.973 | 93.07 | 46.96 | 70.51 | 1854.6 | 574.17 | 237.6 |
| 120. | 20.673 | 0.242 | -12.621 | 96.06 | 46.34 | 70.30 | 1818.7 | 505.21 | 233.1 |
| 125. | 20.492 | 0.235 | -12.270 | 98.93 | 45.74 | 70.08 | 1782.7 | 449.23 | 228.4 |
| 130. | 20.311 | 0.228 | -11.920 | 101.67 | 45.19 | 69.88 | 1746.6 | 403.10 | 223.7 |
| 135. | 20.129 | 0.221 | -11.571 | 104.31 | 44.70 | 69.75 | 1710.5 | 364.56 | 218.9 |
| 140. | 19.946 | 0.215 | -11.223 | 106.84 | 44.27 | 69.68 | 1674.4 | 331.95 | 214.1 |
| 145. | 19.762 | 0.210 | -10.874 | 109.29 | 43.91 | 69.69 | 1638.3 | 304.03 | 209.3 |
| 150. | 19.576 | 0.205 | -10.526 | 111.65 | 43.61 | 69.77 | 1602.1 | 279.89 | 204.4 |
| 155. | 19.389 | 0.200 | -10.176 | 113.94 | 43.37 | 69.92 | 1565.9 | 258.80 | 199.5 |
| 160. | 19.201 | 0.196 | -9.826 | 116.16 | 43.18 | 70.14 | 1529.8 | 240.22 | 194.7 |
| 165. | 19.011 | 0.192 | -9.475 | 118.33 | 43.04 | 70.42 | 1493.6 | 223.72 | 189.9 |
| 170. | 18.818 | 0.188 | -9.122 | 120.43 | 42.95 | 70.77 | 1457.4 | 208.96 | 185.1 |
| 175. | 18.624 | 0.185 | -8.767 | 122.49 | 42.90 | 71.17 | 1421.1 | 195.66 | 180.3 |
| 180. | 18.427 | 0.181 | -8.410 | 124.50 | 42.89 | 71.63 | 1384.9 | 183.61 | 175.6 |
| 185. | 18.228 | 0.178 | -8.051 | 126.47 | 42.91 | 72.14 | 1348.5 | 172.62 | 170.9 |
| 190. | 18.025 | 0.176 | -7.689 | 128.40 | 42.97 | 72.71 | 1312.2 | 162.56 | 166.2 |
| 195. | 17.820 | 0.173 | -7.324 | 130.30 | 43.06 | 73.34 | 1275.7 | 153.29 | 161.6 |
| 200. | 17.611 | 0.171 | -6.955 | 132.16 | 43.17 | 74.02 | 1239.2 | 144.72 | 157.0 |
| 205. | 17.398 | 0.169 | -6.583 | 134.00 | 43.32 | 74.76 | 1202.6 | 136.77 | 152.5 |
| 210. | 17.181 | 0.167 | -6.208 | 135.81 | 43.49 | 75.56 | 1165.8 | 129.36 | 148.1 |
| 215. | 16.960 | 0.165 | -5.828 | 137.60 | 43.69 | 76.43 | 1128.9 | 122.43 | 143.7 |
| 220. | 16.734 | 0.163 | -5.443 | 139.37 | 43.91 | 77.38 | 1091.8 | 115.92 | 139.4 |
| 225. | 16.502 | 0.162 | -5.054 | 141.12 | 44.16 | 78.41 | 1054.5 | 109.79 | 135.1 |
| 230. | 16.265 | 0.161 | -4.659 | 142.85 | 44.43 | 79.54 | 1017.0 | 104.01 | 130.8 |
| 235. | 16.020 | 0.160 | -4.258 | 144.58 | 44.73 | 80.77 | 979.1 | 98.53 | 126.7 |
| 240. | 15.768 | 0.159 | -3.851 | 146.29 | 45.05 | 82.13 | 940.8 | 93.32 | 122.6 |
| 245. | 15.507 | 0.158 | -3.437 | 148.00 | 45.40 | 83.64 | 902.0 | 88.35 | 118.5 |
| 250. | 15.236 | 0.158 | -3.014 | 149.71 | 45.77 | 85.33 | 862.7 | 83.59 | 114.5 |
| 255. | 14.953 | 0.158 | -2.583 | 151.41 | 46.17 | 87.25 | 822.6 | 79.02 | 110.5 |
| 260. | 14.656 | 0.158 | -2.141 | 153.13 | 46.60 | 89.46 | 781.7 | 74.61 | 106.5 |
| 265. | 14.344 | 0.158 | -1.688 | 154.86 | 47.07 | 92.05 | 739.7 | 70.33 | 102.6 |
| 270. | 14.011 | 0.159 | -1.220 | 156.61 | 47.57 | 95.16 | 696.3 | 66.16 | 98.7 |
| 275. | 13.653 | 0.160 | -0.735 | 158.39 | 48.12 | 98.99 | 651.2 | 62.05 | 94.7 |
| 280. | 13.262 | 0.162 | -0.228 | 160.21 | 48.73 | 103.93 | 603.7 | 57.96 | 90.7 |
| 285. | 12.826 | 0.165 | 0.307 | 162.11 | 49.43 | 110.65 | 553.0 | 53.83 | 86.6 |
| 290. | 12.325 | 0.168 | 0.884 | 164.11 | 50.26 | 120.55 | 497.6 | 49.56 | 82.4 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 5.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 11.718 | 0.174 | 1.524 | 166.30 | 51.37 | 137.09 | 435.1 | 44.97 | 77.9 |
| 300. | 10.906 | 0.184 | 2.283 | 168.85 | 53.19 | 172.16 | 360.6 | 39.64 | 73.1 |
| 310. | 4.127 | 0.470 | 7.602 | 186.23 | 59.31 | 263.20 | 210.7 | 14.98 | 45.4 |
| 320. | 3.181 | 0.591 | 9.258 | 191.50 | 54.72 | 123.27 | 236.9 | 13.55 | 36.4 |
| 330. | 2.774 | 0.657 | 10.347 | 194.85 | 53.90 | 98.73 | 253.9 | 13.22 | 34.7 |
| 340. | 2.512 | 0.704 | 11.277 | 197.63 | 53.99 | 88.51 | 267.5 | 13.14 | 34.5 |
| 350. | 2.319 | 0.741 | 12.133 | 200.11 | 54.49 | 83.15 | 279.1 | 13.17 | 34.8 |
| 360. | 2.167 | 0.771 | 12.948 | 202.40 | 55.20 | 80.07 | 289.4 | 13.26 | 35.5 |
| 370. | 2.042 | 0.796 | 13.739 | 204.57 | 56.05 | 78.26 | 298.6 | 13.39 | 36.4 |
| 380. | 1.937 | 0.817 | 14.515 | 206.64 | 56.99 | 77.23 | 307.1 | 13.55 | 37.5 |
| 390. | 1.846 | 0.836 | 15.285 | 208.64 | 58.00 | 76.72 | 315.0 | 13.72 | 38.7 |
| 400. | 1.766 | 0.852 | 16.051 | 210.58 | 59.05 | 76.57 | 322.4 | 13.91 | 40.0 |
| 410. | 1.694 | 0.866 | 16.817 | 212.47 | 60.14 | 76.68 | 329.4 | 14.10 | 41.4 |
| 420. | 1.630 | 0.878 | 17.585 | 214.32 | 61.26 | 76.98 | 336.0 | 14.30 | 42.8 |
| 430. | 1.573 | 0.889 | 18.357 | 216.14 | 62.39 | 77.43 | 342.3 | 14.50 | 44.3 |
| 440. | 1.520 | 0.899 | 19.134 | 217.93 | 63.53 | 78.00 | 348.4 | 14.71 | 45.9 |
| 450. | 1.471 | 0.908 | 19.917 | 219.69 | 64.68 | 78.65 | 354.2 | 14.92 | 47.5 |
| 460. | 1.427 | 0.916 | 20.707 | 221.42 | 65.83 | 79.37 | 359.8 | 15.14 | 49.1 |
| 470. | 1.385 | 0.924 | 21.505 | 223.14 | 66.99 | 80.14 | 365.3 | 15.35 | 50.8 |
| 480. | 1.346 | 0.930 | 22.310 | 224.83 | 68.14 | 80.95 | 370.6 | 15.56 | 52.5 |
| 490. | 1.310 | 0.937 | 23.124 | 226.51 | 69.28 | 81.80 | 375.7 | 15.78 | 54.3 |
| 500. | 1.276 | 0.942 | 23.946 | 228.17 | 70.43 | 82.67 | 380.7 | 15.99 | 56.0 |
| 520. | 1.215 | 0.952 | 25.618 | 231.45 | 72.68 | 84.47 | 390.2 | | 59.6 |
| 540. | 1.160 | 0.960 | 27.326 | 234.67 | 74.91 | 86.32 | 399.4 | | 63.3 |
| 560. | 1.110 | 0.968 | 29.071 | 237.85 | 77.09 | 88.19 | 408.2 | | 67.1 |
| 580. | 1.065 | 0.974 | 30.853 | 240.97 | 79.23 | 90.06 | 416.6 | | 70.9 |
| 600. | 1.024 | 0.979 | 32.673 | 244.06 | 81.33 | 91.93 | 424.8 | | 74.8 |
| 625. | 0.9772 | 0.985 | 35.000 | 247.86 | 83.89 | 94.25 | 434.6 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 6.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.575 | 0.352 | -14.337 | 79.59 | 47.91 | 68.38 | 1996.2 | 1112.69 | 254.7 |
| 100. | 21.401 | 0.337 | -13.991 | 83.14 | 48.23 | 69.84 | 1964.1 | 921.07 | 250.9 |
| 105. | 21.224 | 0.324 | -13.640 | 86.57 | 48.04 | 70.45 | 1929.8 | 776.53 | 246.8 |
| 110. | 21.046 | 0.312 | -13.287 | 89.85 | 47.58 | 70.58 | 1894.7 | 665.37 | 242.6 |
| 115. | 20.868 | 0.301 | -12.935 | 92.98 | 47.00 | 70.47 | 1859.1 | 578.23 | 238.1 |
| 120. | 20.688 | 0.291 | -12.583 | 95.98 | 46.38 | 70.26 | 1823.3 | 508.70 | 233.6 |
| 125. | 20.508 | 0.281 | -12.232 | 98.84 | 45.78 | 70.03 | 1787.4 | 452.28 | 229.0 |
| 130. | 20.328 | 0.273 | -11.882 | 101.58 | 45.23 | 69.83 | 1751.5 | 405.82 | 224.3 |
| 135. | 20.146 | 0.265 | -11.534 | 104.22 | 44.74 | 69.69 | 1715.5 | 367.01 | 219.5 |
| 140. | 19.964 | 0.258 | -11.185 | 106.75 | 44.31 | 69.62 | 1679.6 | 334.19 | 214.7 |
| 145. | 19.781 | 0.252 | -10.837 | 109.19 | 43.95 | 69.62 | 1643.7 | 306.10 | 209.9 |
| 150. | 19.597 | 0.245 | -10.489 | 111.55 | 43.65 | 69.69 | 1607.7 | 281.82 | 205.1 |
| 155. | 19.411 | 0.240 | -10.140 | 113.84 | 43.41 | 69.84 | 1571.8 | 260.61 | 200.2 |
| 160. | 19.224 | 0.235 | -9.791 | 116.06 | 43.23 | 70.05 | 1535.9 | 241.94 | 195.4 |
| 165. | 19.035 | 0.230 | -9.440 | 118.22 | 43.09 | 70.32 | 1499.9 | 225.36 | 190.6 |
| 170. | 18.844 | 0.225 | -9.087 | 120.32 | 43.00 | 70.65 | 1464.0 | 210.53 | 185.8 |
| 175. | 18.651 | 0.221 | -8.733 | 122.38 | 42.95 | 71.04 | 1428.1 | 197.17 | 181.1 |
| 180. | 18.456 | 0.217 | -8.377 | 124.39 | 42.94 | 71.49 | 1392.1 | 185.07 | 176.4 |
| 185. | 18.258 | 0.214 | -8.018 | 126.35 | 42.96 | 71.98 | 1356.1 | 174.04 | 171.7 |
| 190. | 18.058 | 0.210 | -7.657 | 128.28 | 43.02 | 72.53 | 1320.1 | 163.95 | 167.1 |
| 195. | 17.854 | 0.207 | -7.293 | 130.17 | 43.10 | 73.14 | 1284.1 | 154.65 | 162.5 |
| 200. | 17.648 | 0.204 | -6.926 | 132.03 | 43.22 | 73.80 | 1248.0 | 146.06 | 158.0 |
| 205. | 17.437 | 0.202 | -6.555 | 133.86 | 43.36 | 74.51 | 1211.8 | 138.09 | 153.5 |
| 210. | 17.224 | 0.200 | -6.180 | 135.66 | 43.54 | 75.28 | 1175.6 | 130.67 | 149.1 |
| 215. | 17.005 | 0.197 | -5.802 | 137.45 | 43.73 | 76.12 | 1139.2 | 123.73 | 144.7 |
| 220. | 16.783 | 0.195 | -5.419 | 139.21 | 43.96 | 77.02 | 1102.7 | 117.22 | 140.4 |
| 225. | 16.555 | 0.194 | -5.031 | 140.95 | 44.20 | 78.00 | 1066.1 | 111.10 | 136.1 |
| 230. | 16.321 | 0.192 | -4.639 | 142.67 | 44.47 | 79.07 | 1029.2 | 105.32 | 132.0 |
| 235. | 16.082 | 0.191 | -4.241 | 144.39 | 44.77 | 80.23 | 992.1 | 99.85 | 127.8 |
| 240. | 15.835 | 0.190 | -3.836 | 146.09 | 45.09 | 81.50 | 954.7 | 94.65 | 123.8 |
| 245. | 15.580 | 0.189 | -3.425 | 147.78 | 45.43 | 82.90 | 917.0 | 89.70 | 119.8 |
| 250. | 15.317 | 0.188 | -3.007 | 149.47 | 45.80 | 84.45 | 878.8 | 84.98 | 115.8 |
| 255. | 15.043 | 0.188 | -2.581 | 151.16 | 46.19 | 86.19 | 840.1 | 80.45 | 111.9 |
| 260. | 14.758 | 0.188 | -2.145 | 152.85 | 46.61 | 88.16 | 800.7 | 76.09 | 108.0 |
| 265. | 14.458 | 0.188 | -1.699 | 154.55 | 47.06 | 90.42 | 760.6 | 71.88 | 104.2 |
| 270. | 14.142 | 0.189 | -1.240 | 156.27 | 47.54 | 93.07 | 719.5 | 67.79 | 100.3 |
| 275. | 13.806 | 0.190 | -0.767 | 158.00 | 48.07 | 96.22 | 677.1 | 63.79 | 96.5 |
| 280. | 13.444 | 0.192 | -0.277 | 159.77 | 48.63 | 100.11 | 633.2 | 59.86 | 92.7 |
| 285. | 13.049 | 0.194 | 0.236 | 161.59 | 49.26 | 105.05 | 587.2 | 55.95 | 88.9 |
| 290. | 12.611 | 0.197 | 0.777 | 163.47 | 49.97 | 111.65 | 538.6 | 52.00 | 84.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 6.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 12.111 | 0.202 | 1.357 | 165.45 | 50.81 | 121.02 | 486.5 | 47.95 | 80.9 |
| 300. | 11.516 | 0.209 | 1.995 | 167.60 | 51.88 | 135.51 | 429.9 | 43.65 | 76.7 |
| 310. | 9.684 | 0.240 | 3.662 | 173.05 | 56.14 | 222.98 | 296.8 | 33.14 | 67.8 |
| 320. | 5.268 | 0.428 | 7.314 | 184.64 | 59.68 | 284.90 | 217.8 | 17.85 | 51.8 |
| 330. | 3.937 | 0.555 | 9.199 | 190.45 | 56.13 | 139.15 | 239.0 | 15.25 | 41.3 |
| 340. | 3.382 | 0.628 | 10.408 | 194.06 | 55.40 | 108.15 | 255.4 | 14.54 | 38.6 |
| 350. | 3.036 | 0.679 | 11.418 | 196.99 | 55.52 | 95.25 | 268.9 | 14.26 | 37.9 |
| 360. | 2.787 | 0.719 | 12.333 | 199.57 | 56.01 | 88.48 | 280.6 | 14.17 | 37.9 |
| 370. | 2.594 | 0.752 | 13.197 | 201.93 | 56.71 | 84.53 | 291.0 | 14.18 | 38.4 |
| 380. | 2.438 | 0.779 | 14.029 | 204.15 | 57.54 | 82.15 | 300.5 | 14.24 | 39.2 |
| 390. | 2.307 | 0.802 | 14.843 | 206.27 | 58.47 | 80.71 | 309.1 | 14.35 | 40.2 |
| 400. | 2.195 | 0.822 | 15.645 | 208.30 | 59.46 | 79.89 | 317.2 | 14.48 | 41.3 |
| 410. | 2.097 | 0.839 | 16.442 | 210.27 | 60.50 | 79.50 | 324.8 | 14.63 | 42.6 |
| 420. | 2.010 | 0.855 | 17.236 | 212.18 | 61.57 | 79.41 | 331.9 | 14.79 | 43.9 |
| 430. | 1.933 | 0.868 | 18.031 | 214.05 | 62.67 | 79.56 | 338.7 | 14.96 | 45.3 |
| 440. | 1.863 | 0.880 | 18.828 | 215.88 | 63.78 | 79.88 | 345.2 | 15.15 | 46.8 |
| 450. | 1.799 | 0.891 | 19.629 | 217.68 | 64.91 | 80.33 | 351.4 | 15.33 | 48.3 |
| 460. | 1.741 | 0.901 | 20.435 | 219.45 | 66.04 | 80.88 | 357.3 | 15.53 | 49.9 |
| 470. | 1.687 | 0.910 | 21.247 | 221.20 | 67.17 | 81.51 | 363.0 | 15.72 | 51.5 |
| 480. | 1.638 | 0.918 | 22.065 | 222.92 | 68.31 | 82.20 | 368.6 | 15.92 | 53.2 |
| 490. | 1.591 | 0.925 | 22.891 | 224.62 | 69.44 | 82.94 | 374.0 | 16.12 | 54.9 |
| 500. | 1.548 | 0.932 | 23.724 | 226.31 | 70.57 | 83.73 | 379.2 | 16.33 | 56.6 |
| 520. | 1.470 | 0.944 | 25.415 | 229.62 | 72.81 | 85.38 | 389.2 | | 60.2 |
| 540. | 1.401 | 0.954 | 27.140 | 232.88 | 75.02 | 87.11 | 398.7 | | 63.8 |
| 560. | 1.339 | 0.962 | 28.900 | 236.08 | 77.19 | 88.88 | 407.8 | | 67.5 |
| 580. | 1.283 | 0.970 | 30.695 | 239.23 | 79.32 | 90.68 | 416.5 | | 71.3 |
| 600. | 1.233 | 0.976 | 32.527 | 242.33 | 81.41 | 92.48 | 424.9 | | 75.2 |
| 625. | 1.175 | 0.982 | 34.867 | 246.15 | 83.96 | 94.74 | 435.0 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 7.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.587 | 0.411 | -14.298 | 79.52 | 47.90 | 68.32 | 2000.4 | 1122.37 | 255.2 |
| 100. | 21.413 | 0.393 | -13.952 | 83.06 | 48.24 | 69.80 | 1968.3 | 928.54 | 251.4 |
| 105. | 21.237 | 0.378 | -13.601 | 86.49 | 48.07 | 70.41 | 1934.1 | 782.48 | 247.3 |
| 110. | 21.060 | 0.363 | -13.249 | 89.77 | 47.61 | 70.55 | 1899.0 | 670.24 | 243.1 |
| 115. | 20.882 | 0.351 | -12.896 | 92.90 | 47.03 | 70.43 | 1863.5 | 582.32 | 238.7 |
| 120. | 20.703 | 0.339 | -12.545 | 95.89 | 46.42 | 70.22 | 1827.8 | 512.21 | 234.1 |
| 125. | 20.524 | 0.328 | -12.194 | 98.76 | 45.82 | 69.98 | 1792.0 | 455.35 | 229.5 |
| 130. | 20.344 | 0.318 | -11.845 | 101.50 | 45.27 | 69.78 | 1756.3 | 408.55 | 224.9 |
| 135. | 20.164 | 0.309 | -11.496 | 104.13 | 44.78 | 69.64 | 1720.5 | 369.47 | 220.1 |
| 140. | 19.983 | 0.301 | -11.148 | 106.66 | 44.36 | 69.56 | 1684.8 | 336.43 | 215.3 |
| 145. | 19.801 | 0.293 | -10.800 | 109.10 | 44.00 | 69.55 | 1649.0 | 308.18 | 210.6 |
| 150. | 19.617 | 0.286 | -10.453 | 111.46 | 43.70 | 69.62 | 1613.3 | 283.75 | 205.7 |
| 155. | 19.433 | 0.280 | -10.104 | 113.74 | 43.46 | 69.75 | 1577.6 | 262.43 | 200.9 |
| 160. | 19.246 | 0.273 | -9.755 | 115.96 | 43.27 | 69.95 | 1541.9 | 243.66 | 196.1 |
| 165. | 19.059 | 0.268 | -9.404 | 118.12 | 43.14 | 70.22 | 1506.2 | 226.99 | 191.3 |
| 170. | 18.869 | 0.262 | -9.053 | 120.22 | 43.04 | 70.54 | 1470.6 | 212.09 | 186.6 |
| 175. | 18.678 | 0.258 | -8.699 | 122.27 | 42.99 | 70.92 | 1434.9 | 198.68 | 181.9 |
| 180. | 18.484 | 0.253 | -8.343 | 124.27 | 42.98 | 71.35 | 1399.3 | 186.53 | 177.2 |
| 185. | 18.288 | 0.249 | -7.985 | 126.23 | 43.01 | 71.83 | 1363.6 | 175.46 | 172.5 |
| 190. | 18.090 | 0.245 | -7.625 | 128.15 | 43.06 | 72.36 | 1328.0 | 165.33 | 167.9 |
| 195. | 17.888 | 0.241 | -7.262 | 130.04 | 43.15 | 72.95 | 1292.3 | 156.01 | 163.4 |
| 200. | 17.684 | 0.238 | -6.895 | 131.90 | 43.27 | 73.58 | 1256.6 | 147.40 | 158.9 |
| 205. | 17.476 | 0.235 | -6.526 | 133.72 | 43.41 | 74.27 | 1220.9 | 139.41 | 154.4 |
| 210. | 17.265 | 0.232 | -6.153 | 135.52 | 43.58 | 75.02 | 1185.1 | 131.97 | 150.0 |
| 215. | 17.049 | 0.230 | -5.776 | 137.29 | 43.78 | 75.82 | 1149.3 | 125.02 | 145.7 |
| 220. | 16.830 | 0.227 | -5.394 | 139.05 | 44.00 | 76.69 | 1113.3 | 118.51 | 141.4 |
| 225. | 16.606 | 0.225 | -5.009 | 140.78 | 44.25 | 77.62 | 1077.3 | 112.38 | 137.2 |
| 230. | 16.376 | 0.224 | -4.618 | 142.50 | 44.52 | 78.63 | 1041.1 | 106.61 | 133.1 |
| 235. | 16.141 | 0.222 | -4.222 | 144.20 | 44.81 | 79.73 | 1004.7 | 101.15 | 129.0 |
| 240. | 15.900 | 0.221 | -3.821 | 145.89 | 45.12 | 80.92 | 968.2 | 95.96 | 124.9 |
| 245. | 15.651 | 0.220 | -3.413 | 147.57 | 45.46 | 82.22 | 931.3 | 91.04 | 121.0 |
| 250. | 15.395 | 0.219 | -2.998 | 149.25 | 45.83 | 83.66 | 894.2 | 86.34 | 117.1 |
| 255. | 15.129 | 0.218 | -2.576 | 150.92 | 46.21 | 85.24 | 856.7 | 81.84 | 113.2 |
| 260. | 14.853 | 0.218 | -2.145 | 152.59 | 46.63 | 87.02 | 818.7 | 77.52 | 109.4 |
| 265. | 14.565 | 0.218 | -1.705 | 154.27 | 47.06 | 89.03 | 780.1 | 73.36 | 105.7 |
| 270. | 14.263 | 0.219 | -1.255 | 155.95 | 47.53 | 91.32 | 740.9 | 69.34 | 101.9 |
| 275. | 13.944 | 0.220 | -0.792 | 157.65 | 48.03 | 94.00 | 700.8 | 65.44 | 98.2 |
| 280. | 13.605 | 0.221 | -0.314 | 159.37 | 48.57 | 97.18 | 659.6 | 61.62 | 94.6 |
| 285. | 13.241 | 0.223 | 0.181 | 161.13 | 49.15 | 101.04 | 617.1 | 57.86 | 90.9 |
| 290. | 12.846 | 0.226 | 0.698 | 162.93 | 49.79 | 105.89 | 573.0 | 54.12 | 87.2 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 7.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 12.408 | 0.230 | 1.243 | 164.79 | 50.51 | 112.19 | 527.0 | 50.37 | 83.4 |
| 300. | 11.914 | 0.236 | 1.824 | 166.74 | 51.34 | 120.74 | 478.6 | 46.55 | 79.6 |
| 310. | 10.646 | 0.255 | 3.164 | 171.13 | 53.63 | 151.66 | 375.5 | 38.33 | 71.6 |
| 320. | 8.552 | 0.308 | 5.050 | 177.11 | 57.57 | 243.11 | 270.7 | 28.34 | 63.7 |
| 330. | 5.793 | 0.440 | 7.634 | 185.07 | 58.30 | 217.92 | 235.5 | 19.51 | 52.3 |
| 340. | 4.542 | 0.545 | 9.359 | 190.22 | 56.88 | 140.79 | 247.8 | 16.82 | 44.8 |
| 350. | 3.912 | 0.615 | 10.606 | 193.84 | 56.57 | 112.72 | 261.5 | 15.84 | 42.0 |
| 360. | 3.508 | 0.667 | 11.661 | 196.81 | 56.82 | 99.58 | 273.9 | 15.39 | 41.1 |
| 370. | 3.216 | 0.708 | 12.617 | 199.43 | 57.37 | 92.35 | 285.1 | 15.18 | 40.9 |
| 380. | 2.990 | 0.741 | 13.517 | 201.83 | 58.09 | 88.02 | 295.2 | 15.10 | 41.3 |
| 390. | 2.807 | 0.769 | 14.383 | 204.08 | 58.93 | 85.32 | 304.5 | 15.10 | 42.0 |
| 400. | 2.654 | 0.793 | 15.227 | 206.22 | 59.86 | 83.64 | 313.1 | 15.16 | 42.9 |
| 410. | 2.523 | 0.814 | 16.058 | 208.27 | 60.85 | 82.62 | 321.1 | 15.24 | 43.9 |
| 420. | 2.409 | 0.832 | 16.881 | 210.25 | 61.88 | 82.07 | 328.7 | 15.36 | 45.1 |
| 430. | 2.309 | 0.848 | 17.700 | 212.18 | 62.94 | 81.85 | 335.8 | 15.49 | 46.4 |
| 440. | 2.219 | 0.862 | 18.519 | 214.06 | 64.03 | 81.88 | 342.6 | 15.64 | 47.8 |
| 450. | 2.138 | 0.875 | 19.339 | 215.91 | 65.13 | 82.10 | 349.1 | 15.80 | 49.3 |
| 460. | 2.064 | 0.887 | 20.161 | 217.71 | 66.24 | 82.46 | 355.4 | 15.96 | 50.8 |
| 470. | 1.997 | 0.897 | 20.988 | 219.49 | 67.36 | 82.93 | 361.4 | 16.14 | 52.3 |
| 480. | 1.935 | 0.906 | 21.820 | 221.24 | 68.48 | 83.49 | 367.1 | 16.32 | 53.9 |
| 490. | 1.878 | 0.915 | 22.658 | 222.97 | 69.60 | 84.12 | 372.7 | 16.50 | 55.6 |
| 500. | 1.825 | 0.923 | 23.503 | 224.68 | 70.71 | 84.81 | 378.1 | 16.69 | 57.3 |
| 520. | 1.729 | 0.936 | 25.214 | 228.03 | 72.94 | 86.30 | 388.5 | | 60.8 |
| 540. | 1.645 | 0.948 | 26.956 | 231.32 | 75.13 | 87.90 | 398.3 | | 64.3 |
| 560. | 1.570 | 0.957 | 28.730 | 234.55 | 77.29 | 89.58 | 407.7 | | 68.0 |
| 580. | 1.503 | 0.966 | 30.539 | 237.72 | 79.41 | 91.30 | 416.6 | | 71.8 |
| 600. | 1.442 | 0.973 | 32.383 | 240.84 | 81.49 | 93.04 | 425.2 | | 75.6 |
| 625. | 1.374 | 0.981 | 34.736 | 244.69 | 84.03 | 95.22 | 435.6 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 8.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.599 | 0.469 | -14.258 | 79.44 | 47.90 | 68.27 | 2004.7 | 1132.19 | 255.6 |
| 100. | 21.426 | 0.449 | -13.913 | 82.99 | 48.26 | 69.75 | 1972.5 | 936.09 | 251.8 |
| 105. | 21.250 | 0.431 | -13.562 | 86.41 | 48.09 | 70.37 | 1938.3 | 788.48 | 247.8 |
| 110. | 21.074 | 0.415 | -13.210 | 89.69 | 47.64 | 70.51 | 1903.3 | 675.15 | 243.6 |
| 115. | 20.896 | 0.400 | -12.858 | 92.82 | 47.07 | 70.39 | 1867.9 | 586.45 | 239.2 |
| 120. | 20.718 | 0.387 | -12.506 | 95.81 | 46.46 | 70.18 | 1832.3 | 515.75 | 234.7 |
| 125. | 20.540 | 0.375 | -12.156 | 98.67 | 45.86 | 69.94 | 1796.7 | 458.45 | 230.1 |
| 130. | 20.361 | 0.364 | -11.807 | 101.41 | 45.31 | 69.73 | 1761.1 | 411.29 | 225.4 |
| 135. | 20.181 | 0.353 | -11.459 | 104.04 | 44.82 | 69.58 | 1725.5 | 371.95 | 220.7 |
| 140. | 20.001 | 0.344 | -11.111 | 106.57 | 44.40 | 69.50 | 1689.9 | 338.69 | 216.0 |
| 145. | 19.820 | 0.335 | -10.763 | 109.01 | 44.04 | 69.49 | 1654.4 | 310.26 | 211.2 |
| 150. | 19.637 | 0.327 | -10.416 | 111.36 | 43.74 | 69.54 | 1618.9 | 285.69 | 206.4 |
| 155. | 19.454 | 0.319 | -10.068 | 113.64 | 43.50 | 69.67 | 1583.4 | 264.25 | 201.6 |
| 160. | 19.269 | 0.312 | -9.719 | 115.86 | 43.32 | 69.86 | 1547.9 | 245.38 | 196.8 |
| 165. | 19.083 | 0.306 | -9.369 | 118.01 | 43.18 | 70.12 | 1512.5 | 228.63 | 192.1 |
| 170. | 18.894 | 0.300 | -9.018 | 120.11 | 43.09 | 70.43 | 1477.1 | 213.66 | 187.3 |
| 175. | 18.704 | 0.294 | -8.665 | 122.16 | 43.04 | 70.79 | 1441.7 | 200.19 | 182.6 |
| 180. | 18.512 | 0.289 | -8.310 | 124.16 | 43.03 | 71.21 | 1406.4 | 187.99 | 178.0 |
| 185. | 18.318 | 0.284 | -7.953 | 126.11 | 43.05 | 71.68 | 1371.0 | 176.88 | 173.3 |
| 190. | 18.121 | 0.279 | -7.593 | 128.03 | 43.11 | 72.20 | 1335.7 | 166.72 | 168.8 |
| 195. | 17.922 | 0.275 | -7.230 | 129.92 | 43.20 | 72.77 | 1300.4 | 157.37 | 164.2 |
| 200. | 17.719 | 0.272 | -6.865 | 131.77 | 43.31 | 73.38 | 1265.1 | 148.73 | 159.7 |
| 205. | 17.514 | 0.268 | -6.497 | 133.59 | 43.46 | 74.05 | 1229.8 | 140.72 | 155.3 |
| 210. | 17.305 | 0.265 | -6.125 | 135.38 | 43.63 | 74.76 | 1194.5 | 133.27 | 151.0 |
| 215. | 17.093 | 0.262 | -5.749 | 137.15 | 43.82 | 75.54 | 1159.1 | 126.31 | 146.7 |
| 220. | 16.876 | 0.259 | -5.369 | 138.89 | 44.05 | 76.37 | 1123.7 | 119.79 | 142.4 |
| 225. | 16.655 | 0.257 | -4.985 | 140.62 | 44.29 | 77.26 | 1088.2 | 113.66 | 138.2 |
| 230. | 16.430 | 0.255 | -4.596 | 142.33 | 44.56 | 78.22 | 1052.7 | 107.89 | 134.1 |
| 235. | 16.199 | 0.253 | -4.203 | 144.02 | 44.85 | 79.26 | 1017.0 | 102.43 | 130.1 |
| 240. | 15.962 | 0.251 | -3.804 | 145.70 | 45.16 | 80.38 | 981.2 | 97.26 | 126.1 |
| 245. | 15.719 | 0.250 | -3.399 | 147.37 | 45.50 | 81.60 | 945.2 | 92.35 | 122.2 |
| 250. | 15.469 | 0.249 | -2.987 | 149.03 | 45.86 | 82.94 | 909.0 | 87.67 | 118.3 |
| 255. | 15.211 | 0.248 | -2.569 | 150.69 | 46.24 | 84.40 | 872.5 | 83.20 | 114.5 |
| 260. | 14.943 | 0.248 | -2.143 | 152.34 | 46.64 | 86.01 | 835.7 | 78.91 | 110.8 |
| 265. | 14.665 | 0.248 | -1.709 | 154.00 | 47.07 | 87.82 | 798.5 | 74.80 | 107.1 |
| 270. | 14.375 | 0.248 | -1.265 | 155.66 | 47.53 | 89.85 | 760.8 | 70.83 | 103.5 |
| 275. | 14.071 | 0.249 | -0.810 | 157.33 | 48.01 | 92.16 | 722.6 | 66.99 | 99.9 |
| 280. | 13.751 | 0.250 | -0.342 | 159.01 | 48.53 | 94.84 | 683.6 | 63.26 | 96.3 |
| 285. | 13.411 | 0.252 | 0.139 | 160.72 | 49.08 | 97.99 | 643.8 | 59.62 | 92.8 |
| 290. | 13.046 | 0.254 | 0.639 | 162.45 | 49.67 | 101.78 | 603.0 | 56.03 | 89.2 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 8.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 12.651 | 0.258 | 1.159 | 164.23 | 50.32 | 106.43 | 561.0 | 52.48 | 85.7 |
| 300. | 12.218 | 0.262 | 1.705 | 166.07 | 51.04 | 112.29 | 517.8 | 48.93 | 82.1 |
| 310. | 11.186 | 0.277 | 2.908 | 170.01 | 52.77 | 129.90 | 428.5 | 41.68 | 74.9 |
| 320. | 9.793 | 0.307 | 4.353 | 174.60 | 55.09 | 162.85 | 341.0 | 33.97 | 67.5 |
| 330. | 7.849 | 0.371 | 6.223 | 180.34 | 57.38 | 206.54 | 272.3 | 25.92 | 60.2 |
| 340. | 6.029 | 0.469 | 8.185 | 186.21 | 57.69 | 174.83 | 253.9 | 20.46 | 52.3 |
| 350. | 4.974 | 0.553 | 9.712 | 190.63 | 57.43 | 134.32 | 260.5 | 18.10 | 47.3 |
| 360. | 4.342 | 0.616 | 10.937 | 194.09 | 57.55 | 113.12 | 271.1 | 17.02 | 44.9 |
| 370. | 3.913 | 0.665 | 12.006 | 197.02 | 57.98 | 101.59 | 281.8 | 16.46 | 43.9 |
| 380. | 3.595 | 0.704 | 12.985 | 199.63 | 58.61 | 94.77 | 292.0 | 16.16 | 43.7 |
| 390. | 3.346 | 0.737 | 13.909 | 202.03 | 59.38 | 90.51 | 301.4 | 16.01 | 44.0 |
| 400. | 3.143 | 0.765 | 14.800 | 204.28 | 60.25 | 87.77 | 310.3 | 15.95 | 44.6 |
| 410. | 2.972 | 0.790 | 15.668 | 206.43 | 61.19 | 86.01 | 318.6 | 15.96 | 45.5 |
| 420. | 2.827 | 0.810 | 16.522 | 208.49 | 62.18 | 84.92 | 326.4 | 16.01 | 46.5 |
| 430. | 2.699 | 0.829 | 17.368 | 210.48 | 63.21 | 84.29 | 333.9 | 16.09 | 47.7 |
| 440. | 2.587 | 0.845 | 18.209 | 212.41 | 64.27 | 83.99 | 340.9 | 16.19 | 48.9 |
| 450. | 2.487 | 0.860 | 19.049 | 214.30 | 65.34 | 83.95 | 347.6 | 16.31 | 50.3 |
| 460. | 2.396 | 0.873 | 19.889 | 216.14 | 66.44 | 84.10 | 354.1 | 16.45 | 51.7 |
| 470. | 2.314 | 0.885 | 20.731 | 217.96 | 67.54 | 84.40 | 360.3 | 16.59 | 53.2 |
| 480. | 2.239 | 0.895 | 21.577 | 219.74 | 68.64 | 84.82 | 366.3 | 16.75 | 54.8 |
| 490. | 2.170 | 0.905 | 22.428 | 221.49 | 69.75 | 85.33 | 372.0 | 16.91 | 56.4 |
| 500. | 2.106 | 0.914 | 23.284 | 223.22 | 70.85 | 85.91 | 377.6 | 17.08 | 58.0 |
| 520. | 1.992 | 0.929 | 25.015 | 226.61 | 73.06 | 87.23 | 388.2 | | 61.4 |
| 540. | 1.891 | 0.942 | 26.774 | 229.93 | 75.23 | 88.71 | 398.3 | | 64.9 |
| 560. | 1.803 | 0.953 | 28.564 | 233.19 | 77.38 | 90.28 | 407.9 | | 68.5 |
| 580. | 1.724 | 0.962 | 30.386 | 236.38 | 79.49 | 91.92 | 417.1 | | 72.2 |
| 600. | 1.652 | 0.970 | 32.241 | 239.53 | 81.57 | 93.59 | 425.9 | | 76.0 |
| 625. | 1.572 | 0.979 | 34.607 | 243.39 | 84.10 | 95.71 | 436.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 9.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.611 | 0.527 | -14.219 | 79.37 | 47.90 | 68.21 | 2008.9 | 1142.13 | 256.0 |
| 100. | 21.438 | 0.505 | -13.874 | 82.91 | 48.27 | 69.71 | 1976.7 | 943.74 | 252.3 |
| 105. | 21.263 | 0.485 | -13.524 | 86.33 | 48.11 | 70.34 | 1942.5 | 794.56 | 248.3 |
| 110. | 21.087 | 0.467 | -13.171 | 89.61 | 47.67 | 70.47 | 1907.6 | 680.12 | 244.1 |
| 115. | 20.910 | 0.450 | -12.819 | 92.74 | 47.10 | 70.36 | 1872.2 | 590.61 | 239.7 |
| 120. | 20.733 | 0.435 | -12.468 | 95.73 | 46.50 | 70.14 | 1836.8 | 519.31 | 235.2 |
| 125. | 20.556 | 0.421 | -12.118 | 98.59 | 45.90 | 69.90 | 1801.3 | 461.56 | 230.7 |
| 130. | 20.377 | 0.409 | -11.769 | 101.32 | 45.36 | 69.69 | 1765.9 | 414.05 | 226.0 |
| 135. | 20.199 | 0.397 | -11.421 | 103.95 | 44.87 | 69.53 | 1730.4 | 374.43 | 221.3 |
| 140. | 20.019 | 0.386 | -11.073 | 106.48 | 44.44 | 69.44 | 1695.0 | 340.96 | 216.6 |
| 145. | 19.839 | 0.376 | -10.726 | 108.91 | 44.08 | 69.42 | 1659.7 | 312.35 | 211.8 |
| 150. | 19.658 | 0.367 | -10.379 | 111.27 | 43.79 | 69.47 | 1624.3 | 287.63 | 207.1 |
| 155. | 19.475 | 0.359 | -10.032 | 113.55 | 43.55 | 69.59 | 1589.1 | 266.08 | 202.3 |
| 160. | 19.291 | 0.351 | -9.683 | 115.76 | 43.36 | 69.78 | 1553.8 | 247.11 | 197.5 |
| 165. | 19.106 | 0.343 | -9.334 | 117.91 | 43.23 | 70.02 | 1518.7 | 230.28 | 192.8 |
| 170. | 18.919 | 0.337 | -8.983 | 120.01 | 43.13 | 70.32 | 1483.5 | 215.24 | 188.1 |
| 175. | 18.730 | 0.330 | -8.630 | 122.05 | 43.09 | 70.68 | 1448.4 | 201.71 | 183.4 |
| 180. | 18.540 | 0.324 | -8.276 | 124.05 | 43.07 | 71.08 | 1413.4 | 189.46 | 178.7 |
| 185. | 18.347 | 0.319 | -7.919 | 126.00 | 43.10 | 71.54 | 1378.3 | 178.30 | 174.1 |
| 190. | 18.152 | 0.314 | -7.560 | 127.91 | 43.15 | 72.04 | 1343.4 | 168.10 | 169.6 |
| 195. | 17.954 | 0.309 | -7.199 | 129.79 | 43.24 | 72.59 | 1308.4 | 158.72 | 165.1 |
| 200. | 17.754 | 0.305 | -6.835 | 131.64 | 43.36 | 73.19 | 1273.5 | 150.06 | 160.6 |
| 205. | 17.551 | 0.301 | -6.467 | 133.45 | 43.50 | 73.83 | 1238.6 | 142.03 | 156.2 |
| 210. | 17.345 | 0.297 | -6.096 | 135.24 | 43.67 | 74.52 | 1203.6 | 134.56 | 151.9 |
| 215. | 17.135 | 0.294 | -5.722 | 137.00 | 43.87 | 75.27 | 1168.7 | 127.59 | 147.6 |
| 220. | 16.921 | 0.291 | -5.343 | 138.74 | 44.09 | 76.07 | 1133.8 | 121.06 | 143.4 |
| 225. | 16.704 | 0.288 | -4.961 | 140.46 | 44.33 | 76.92 | 1098.9 | 114.93 | 139.3 |
| 230. | 16.482 | 0.286 | -4.574 | 142.16 | 44.60 | 77.84 | 1063.9 | 109.15 | 135.2 |
| 235. | 16.255 | 0.283 | -4.182 | 143.84 | 44.89 | 78.83 | 1028.9 | 103.70 | 131.2 |
| 240. | 16.023 | 0.281 | -3.786 | 145.52 | 45.20 | 79.89 | 993.8 | 98.53 | 127.2 |
| 245. | 15.785 | 0.280 | -3.383 | 147.17 | 45.53 | 81.04 | 958.5 | 93.63 | 123.4 |
| 250. | 15.540 | 0.279 | -2.975 | 148.82 | 45.89 | 82.28 | 923.2 | 88.97 | 119.5 |
| 255. | 15.289 | 0.278 | -2.560 | 150.47 | 46.27 | 83.64 | 887.7 | 84.52 | 115.8 |
| 260. | 15.029 | 0.277 | -2.139 | 152.10 | 46.67 | 85.12 | 851.9 | 80.27 | 112.1 |
| 265. | 14.760 | 0.277 | -1.709 | 153.74 | 47.09 | 86.75 | 815.9 | 76.19 | 108.5 |
| 270. | 14.481 | 0.277 | -1.271 | 155.38 | 47.54 | 88.57 | 779.6 | 72.27 | 104.9 |
| 275. | 14.189 | 0.277 | -0.823 | 157.02 | 48.01 | 90.61 | 742.9 | 68.48 | 101.4 |
| 280. | 13.884 | 0.278 | -0.364 | 158.68 | 48.51 | 92.92 | 705.8 | 64.82 | 97.9 |
| 285. | 13.563 | 0.280 | 0.107 | 160.34 | 49.04 | 95.57 | 668.1 | 61.26 | 94.5 |
| 290. | 13.223 | 0.282 | 0.592 | 162.03 | 49.60 | 98.65 | 629.8 | 57.78 | 91.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 9.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 12.859 | 0.285 | 1.094 | 163.75 | 50.20 | 102.30 | 590.9 | 54.37 | 87.7 |
| 300. | 12.468 | 0.289 | 1.616 | 165.50 | 50.85 | 106.67 | 551.2 | 51.01 | 84.4 |
| 310. | 11.573 | 0.302 | 2.738 | 169.18 | 52.33 | 118.55 | 470.6 | 44.32 | 77.6 |
| 320. | 10.466 | 0.323 | 4.008 | 173.21 | 54.11 | 136.78 | 392.3 | 37.58 | 70.9 |
| 330. | 9.064 | 0.362 | 5.501 | 177.80 | 55.98 | 162.27 | 324.7 | 30.81 | 64.4 |
| 340. | 7.469 | 0.426 | 7.201 | 182.88 | 57.27 | 171.68 | 282.3 | 24.89 | 58.2 |
| 350. | 6.153 | 0.503 | 8.822 | 187.58 | 57.77 | 149.72 | 271.0 | 21.12 | 52.7 |
| 360. | 5.272 | 0.570 | 10.195 | 191.45 | 58.06 | 126.36 | 274.6 | 19.13 | 49.2 |
| 370. | 4.678 | 0.625 | 11.378 | 194.69 | 58.48 | 111.28 | 282.6 | 18.06 | 47.3 |
| 380. | 4.249 | 0.670 | 12.440 | 197.52 | 59.07 | 101.96 | 291.6 | 17.44 | 46.5 |
| 390. | 3.921 | 0.708 | 13.428 | 200.09 | 59.79 | 96.03 | 300.6 | 17.08 | 46.3 |
| 400. | 3.659 | 0.740 | 14.368 | 202.47 | 60.61 | 92.15 | 309.3 | 16.88 | 46.6 |
| 410. | 3.443 | 0.767 | 15.275 | 204.71 | 61.51 | 89.59 | 317.6 | 16.78 | 47.2 |
| 420. | 3.261 | 0.790 | 16.162 | 206.85 | 62.46 | 87.89 | 325.4 | 16.74 | 48.0 |
| 430. | 3.104 | 0.811 | 17.035 | 208.90 | 63.46 | 86.81 | 333.0 | 16.75 | 49.0 |
| 440. | 2.966 | 0.829 | 17.900 | 210.89 | 64.49 | 86.17 | 340.1 | 16.80 | 50.1 |
| 450. | 2.844 | 0.846 | 18.760 | 212.82 | 65.55 | 85.85 | 347.0 | 16.88 | 51.4 |
| 460. | 2.736 | 0.860 | 19.618 | 214.71 | 66.62 | 85.78 | 353.6 | 16.98 | 52.7 |
| 470. | 2.637 | 0.873 | 20.476 | 216.55 | 67.71 | 85.90 | 359.9 | 17.09 | 54.1 |
| 480. | 2.548 | 0.885 | 21.336 | 218.36 | 68.80 | 86.16 | 366.0 | 17.22 | 55.6 |
| 490. | 2.466 | 0.896 | 22.200 | 220.14 | 69.89 | 86.54 | 371.9 | 17.35 | 57.2 |
| 500. | 2.391 | 0.906 | 23.067 | 221.90 | 70.99 | 87.02 | 377.5 | 17.50 | 58.8 |
| 520. | 2.256 | 0.923 | 24.819 | 225.33 | 73.17 | 88.17 | 388.4 | | 62.1 |
| 540. | 2.139 | 0.937 | 26.595 | 228.68 | 75.34 | 89.51 | 398.7 | | 65.5 |
| 560. | 2.037 | 0.949 | 28.400 | 231.96 | 77.47 | 90.98 | 408.5 | | 69.1 |
| 580. | 1.945 | 0.959 | 30.235 | 235.18 | 79.58 | 92.53 | 417.8 | | 72.7 |
| 600. | 1.863 | 0.968 | 32.102 | 238.35 | 81.64 | 94.14 | 426.7 | | 76.5 |
| 625. | 1.771 | 0.978 | 34.481 | 242.23 | 84.17 | 96.19 | 437.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 10.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.623 | 0.586 | -14.180 | 79.30 | 47.89 | 68.16 | 2013.1 | 1152.21 | 256.4 |
| 100. | 21.450 | 0.561 | -13.835 | 82.84 | 48.28 | 69.67 | 1980.8 | 951.48 | 252.7 |
| 105. | 21.276 | 0.538 | -13.485 | 86.25 | 48.14 | 70.30 | 1946.7 | 800.69 | 248.7 |
| 110. | 21.101 | 0.518 | -13.133 | 89.53 | 47.71 | 70.44 | 1911.8 | 685.13 | 244.6 |
| 115. | 20.925 | 0.500 | -12.781 | 92.66 | 47.14 | 70.32 | 1876.6 | 594.80 | 240.2 |
| 120. | 20.748 | 0.483 | -12.430 | 95.65 | 46.53 | 70.10 | 1841.3 | 522.90 | 235.8 |
| 125. | 20.571 | 0.468 | -12.080 | 98.50 | 45.94 | 69.86 | 1805.9 | 464.69 | 231.2 |
| 130. | 20.394 | 0.454 | -11.731 | 101.24 | 45.40 | 69.64 | 1770.6 | 416.83 | 226.6 |
| 135. | 20.216 | 0.441 | -11.383 | 103.86 | 44.91 | 69.48 | 1735.3 | 376.93 | 221.9 |
| 140. | 20.037 | 0.429 | -11.036 | 106.39 | 44.49 | 69.38 | 1700.1 | 343.24 | 217.2 |
| 145. | 19.858 | 0.418 | -10.689 | 108.82 | 44.13 | 69.36 | 1664.9 | 314.45 | 212.5 |
| 150. | 19.677 | 0.407 | -10.342 | 111.17 | 43.83 | 69.40 | 1629.8 | 289.59 | 207.7 |
| 155. | 19.496 | 0.398 | -9.995 | 113.45 | 43.59 | 69.52 | 1594.7 | 267.91 | 203.0 |
| 160. | 19.313 | 0.389 | -9.647 | 115.66 | 43.41 | 69.69 | 1559.7 | 248.84 | 198.2 |
| 165. | 19.129 | 0.381 | -9.298 | 117.81 | 43.27 | 69.93 | 1524.8 | 231.92 | 193.5 |
| 170. | 18.944 | 0.373 | -8.948 | 119.90 | 43.18 | 70.22 | 1489.9 | 216.81 | 188.8 |
| 175. | 18.756 | 0.366 | -8.596 | 121.94 | 43.13 | 70.56 | 1455.0 | 203.22 | 184.1 |
| 180. | 18.567 | 0.360 | -8.242 | 123.93 | 43.12 | 70.96 | 1420.3 | 190.92 | 179.5 |
| 185. | 18.376 | 0.354 | -7.886 | 125.88 | 43.14 | 71.40 | 1385.5 | 179.72 | 174.9 |
| 190. | 18.183 | 0.348 | -7.528 | 127.79 | 43.20 | 71.89 | 1350.9 | 169.48 | 170.4 |
| 195. | 17.987 | 0.343 | -7.167 | 129.67 | 43.29 | 72.42 | 1316.3 | 160.07 | 165.9 |
| 200. | 17.788 | 0.338 | -6.804 | 131.51 | 43.41 | 73.00 | 1281.7 | 151.38 | 161.5 |
| 205. | 17.587 | 0.334 | -6.437 | 133.32 | 43.55 | 73.62 | 1247.2 | 143.33 | 157.1 |
| 210. | 17.383 | 0.329 | -6.067 | 135.10 | 43.72 | 74.29 | 1212.7 | 135.85 | 152.8 |
| 215. | 17.176 | 0.326 | -5.694 | 136.86 | 43.92 | 75.01 | 1178.2 | 128.86 | 148.6 |
| 220. | 16.965 | 0.322 | -5.317 | 138.59 | 44.13 | 75.78 | 1143.7 | 122.32 | 144.4 |
| 225. | 16.751 | 0.319 | -4.936 | 140.30 | 44.38 | 76.60 | 1109.3 | 116.18 | 140.3 |
| 230. | 16.532 | 0.316 | -4.551 | 142.00 | 44.64 | 77.48 | 1074.9 | 110.41 | 136.2 |
| 235. | 16.309 | 0.314 | -4.161 | 143.67 | 44.93 | 78.42 | 1040.4 | 104.95 | 132.2 |
| 240. | 16.081 | 0.312 | -3.767 | 145.33 | 45.24 | 79.43 | 1006.0 | 99.79 | 128.3 |
| 245. | 15.848 | 0.310 | -3.367 | 146.98 | 45.57 | 80.51 | 971.5 | 94.90 | 124.5 |
| 250. | 15.609 | 0.308 | -2.961 | 148.62 | 45.93 | 81.68 | 936.9 | 90.25 | 120.7 |
| 255. | 15.363 | 0.307 | -2.550 | 150.25 | 46.30 | 82.94 | 902.2 | 85.82 | 117.0 |
| 260. | 15.110 | 0.306 | -2.132 | 151.87 | 46.69 | 84.31 | 867.4 | 81.59 | 113.4 |
| 265. | 14.850 | 0.306 | -1.707 | 153.49 | 47.11 | 85.81 | 832.5 | 77.54 | 109.8 |
| 270. | 14.580 | 0.306 | -1.273 | 155.11 | 47.55 | 87.46 | 797.4 | 73.66 | 106.3 |
| 275. | 14.299 | 0.306 | -0.832 | 156.74 | 48.01 | 89.27 | 762.0 | 69.92 | 102.9 |
| 280. | 14.007 | 0.307 | -0.380 | 158.36 | 48.50 | 91.30 | 726.4 | 66.31 | 99.5 |
| 285. | 13.702 | 0.308 | 0.082 | 160.00 | 49.01 | 93.58 | 690.5 | 62.82 | 96.2 |
| 290. | 13.381 | 0.310 | 0.556 | 161.65 | 49.55 | 96.18 | 654.2 | 59.42 | 92.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 10.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 295. | 13.042 | 0.313 | 1.044 | 163.32 | 50.12 | 99.15 | 617.6 | 56.12 | 89.6 |
| 300. | 12.682 | 0.316 | 1.548 | 165.01 | 50.73 | 102.60 | 580.6 | 52.88 | 86.4 |
| 310. | 11.880 | 0.327 | 2.616 | 168.51 | 52.07 | 111.37 | 506.3 | 46.56 | 80.0 |
| 320. | 10.936 | 0.344 | 3.787 | 172.23 | 53.59 | 123.47 | 434.1 | 40.37 | 73.8 |
| 330. | 9.808 | 0.372 | 5.098 | 176.26 | 55.21 | 139.15 | 369.9 | 34.34 | 67.8 |
| 340. | 8.515 | 0.415 | 6.562 | 180.63 | 56.59 | 151.90 | 321.0 | 28.79 | 62.2 |
| 350. | 7.248 | 0.474 | 8.080 | 185.03 | 57.58 | 148.87 | 294.3 | 24.46 | 57.3 |
| 360. | 6.227 | 0.536 | 9.499 | 189.03 | 58.24 | 134.09 | 286.6 | 21.65 | 53.4 |
| 370. | 5.483 | 0.593 | 10.763 | 192.49 | 58.80 | 119.38 | 288.9 | 19.97 | 50.9 |
| 380. | 4.938 | 0.641 | 11.901 | 195.53 | 59.42 | 108.70 | 295.0 | 18.96 | 49.4 |
| 390. | 4.524 | 0.682 | 12.949 | 198.25 | 60.13 | 101.44 | 302.5 | 18.33 | 48.8 |
| 400. | 4.198 | 0.716 | 13.937 | 200.75 | 60.92 | 96.53 | 310.4 | 17.94 | 48.7 |
| 410. | 3.931 | 0.746 | 14.885 | 203.09 | 61.79 | 93.18 | 318.2 | 17.70 | 49.0 |
| 420. | 3.709 | 0.772 | 15.804 | 205.31 | 62.72 | 90.90 | 325.9 | 17.56 | 49.7 |
| 430. | 3.519 | 0.795 | 16.705 | 207.43 | 63.70 | 89.37 | 333.3 | 17.49 | 50.5 |
| 440. | 3.354 | 0.815 | 17.594 | 209.47 | 64.71 | 88.37 | 340.4 | 17.48 | 51.5 |
| 450. | 3.210 | 0.833 | 18.474 | 211.45 | 65.75 | 87.77 | 347.2 | 17.50 | 52.6 |
| 460. | 3.081 | 0.849 | 19.350 | 213.38 | 66.80 | 87.47 | 353.8 | 17.55 | 53.8 |
| 470. | 2.965 | 0.863 | 20.224 | 215.26 | 67.87 | 87.40 | 360.2 | 17.63 | 55.2 |
| 480. | 2.861 | 0.876 | 21.099 | 217.10 | 68.95 | 87.51 | 366.4 | 17.72 | 56.6 |
| 490. | 2.765 | 0.888 | 21.975 | 218.90 | 70.03 | 87.76 | 372.3 | 17.83 | 58.0 |
| 500. | 2.678 | 0.898 | 22.854 | 220.68 | 71.12 | 88.12 | 378.1 | 17.95 | 59.6 |
| 520. | 2.523 | 0.917 | 24.626 | 224.15 | 73.29 | 89.10 | 389.1 | | 62.8 |
| 540. | 2.388 | 0.933 | 26.420 | 227.54 | 75.44 | 90.31 | 399.5 | | 66.1 |
| 560. | 2.271 | 0.946 | 28.239 | 230.85 | 77.56 | 91.67 | 409.4 | | 69.6 |
| 580. | 2.167 | 0.957 | 30.087 | 234.09 | 79.66 | 93.14 | 418.8 | | 73.2 |
| 600. | 2.073 | 0.967 | 31.966 | 237.27 | 81.71 | 94.68 | 427.9 | | 76.9 |
| 625. | 1.970 | 0.977 | 34.357 | 241.18 | 84.23 | 96.66 | 438.7 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 11.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.634 | 0.644 | -14.141 | 79.22 | 47.89 | 68.11 | 2017.3 | 1162.42 | 256.9 |
| 100. | 21.463 | 0.616 | -13.796 | 82.76 | 48.30 | 69.63 | 1985.0 | 959.31 | 253.2 |
| 105. | 21.289 | 0.592 | -13.446 | 86.18 | 48.16 | 70.26 | 1950.9 | 806.89 | 249.2 |
| 110. | 21.114 | 0.570 | -13.094 | 89.45 | 47.74 | 70.40 | 1916.1 | 690.18 | 245.1 |
| 115. | 20.939 | 0.549 | -12.742 | 92.58 | 47.17 | 70.29 | 1880.9 | 599.03 | 240.7 |
| 120. | 20.763 | 0.531 | -12.391 | 95.56 | 46.57 | 70.06 | 1845.7 | 526.52 | 236.3 |
| 125. | 20.587 | 0.514 | -12.042 | 98.42 | 45.98 | 69.82 | 1810.5 | 467.84 | 231.8 |
| 130. | 20.410 | 0.499 | -11.693 | 101.15 | 45.44 | 69.60 | 1775.3 | 419.63 | 227.2 |
| 135. | 20.233 | 0.484 | -11.345 | 103.78 | 44.95 | 69.43 | 1740.2 | 379.45 | 222.5 |
| 140. | 20.055 | 0.471 | -10.999 | 106.30 | 44.53 | 69.33 | 1705.1 | 345.53 | 217.8 |
| 145. | 19.877 | 0.459 | -10.652 | 108.73 | 44.17 | 69.30 | 1670.1 | 316.56 | 213.1 |
| 150. | 19.697 | 0.448 | -10.306 | 111.08 | 43.87 | 69.34 | 1635.2 | 291.55 | 208.4 |
| 155. | 19.517 | 0.437 | -9.959 | 113.36 | 43.64 | 69.44 | 1600.4 | 269.75 | 203.7 |
| 160. | 19.335 | 0.428 | -9.611 | 115.56 | 43.45 | 69.61 | 1565.6 | 250.57 | 198.9 |
| 165. | 19.152 | 0.419 | -9.262 | 117.71 | 43.32 | 69.84 | 1530.8 | 233.57 | 194.2 |
| 170. | 18.968 | 0.410 | -8.913 | 119.80 | 43.22 | 70.12 | 1496.2 | 218.39 | 189.5 |
| 175. | 18.782 | 0.403 | -8.561 | 121.83 | 43.18 | 70.45 | 1461.6 | 204.73 | 184.9 |
| 180. | 18.594 | 0.395 | -8.208 | 123.82 | 43.16 | 70.84 | 1427.1 | 192.38 | 180.3 |
| 185. | 18.404 | 0.389 | -7.853 | 125.77 | 43.19 | 71.27 | 1392.7 | 181.14 | 175.7 |
| 190. | 18.213 | 0.382 | -7.495 | 127.68 | 43.25 | 71.74 | 1358.3 | 170.86 | 171.2 |
| 195. | 18.019 | 0.377 | -7.135 | 129.55 | 43.33 | 72.26 | 1324.0 | 161.42 | 166.8 |
| 200. | 17.822 | 0.371 | -6.773 | 131.38 | 43.45 | 72.82 | 1289.8 | 152.70 | 162.4 |
| 205. | 17.623 | 0.366 | -6.407 | 133.19 | 43.59 | 73.43 | 1255.6 | 144.63 | 158.0 |
| 210. | 17.421 | 0.362 | -6.038 | 134.97 | 43.76 | 74.07 | 1221.5 | 137.12 | 153.7 |
| 215. | 17.217 | 0.357 | -5.666 | 136.72 | 43.96 | 74.77 | 1187.5 | 130.12 | 149.5 |
| 220. | 17.009 | 0.354 | -5.290 | 138.45 | 44.18 | 75.51 | 1153.5 | 123.58 | 145.4 |
| 225. | 16.797 | 0.350 | -4.911 | 140.15 | 44.42 | 76.30 | 1119.5 | 117.43 | 141.3 |
| 230. | 16.582 | 0.347 | -4.527 | 141.84 | 44.69 | 77.14 | 1085.6 | 111.65 | 137.2 |
| 235. | 16.362 | 0.344 | -4.139 | 143.51 | 44.97 | 78.04 | 1051.7 | 106.20 | 133.3 |
| 240. | 16.138 | 0.342 | -3.747 | 145.16 | 45.28 | 79.00 | 1017.8 | 101.04 | 129.4 |
| 245. | 15.909 | 0.339 | -3.349 | 146.80 | 45.61 | 80.03 | 984.0 | 96.15 | 125.6 |
| 250. | 15.675 | 0.338 | -2.946 | 148.43 | 45.96 | 81.13 | 950.1 | 91.51 | 121.9 |
| 255. | 15.435 | 0.336 | -2.538 | 150.04 | 46.33 | 82.31 | 916.2 | 87.10 | 118.2 |
| 260. | 15.189 | 0.335 | -2.123 | 151.65 | 46.72 | 83.59 | 882.3 | 82.89 | 114.7 |
| 265. | 14.935 | 0.334 | -1.702 | 153.26 | 47.13 | 84.97 | 848.3 | 78.86 | 111.1 |
| 270. | 14.673 | 0.334 | -1.273 | 154.86 | 47.57 | 86.47 | 814.2 | 75.00 | 107.7 |
| 275. | 14.403 | 0.334 | -0.837 | 156.46 | 48.02 | 88.11 | 780.1 | 71.30 | 104.3 |
| 280. | 14.122 | 0.335 | -0.392 | 158.07 | 48.50 | 89.92 | 745.8 | 67.74 | 101.0 |
| 285. | 13.830 | 0.336 | 0.063 | 159.68 | 48.99 | 91.92 | 711.3 | 64.30 | 97.7 |
| 290. | 13.525 | 0.337 | 0.528 | 161.29 | 49.52 | 94.15 | 676.7 | 60.97 | 94.5 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 11.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 13.206 | 0.340 | 1.005 | 162.92 | 50.07 | 96.66 | 642.0 | 57.74 | 91.4 |
| 300. | 12.870 | 0.343 | 1.495 | 164.57 | 50.64 | 99.49 | 607.1 | 54.60 | 88.3 |
| 310. | 12.135 | 0.352 | 2.523 | 167.94 | 51.89 | 106.36 | 537.5 | 48.54 | 82.2 |
| 320. | 11.298 | 0.366 | 3.628 | 171.45 | 53.28 | 115.19 | 470.0 | 42.71 | 76.3 |
| 330. | 10.336 | 0.388 | 4.833 | 175.16 | 54.74 | 125.99 | 408.8 | 37.14 | 70.7 |
| 340. | 9.252 | 0.421 | 6.148 | 179.08 | 56.10 | 136.35 | 358.6 | 31.97 | 65.5 |
| 350. | 8.127 | 0.465 | 7.536 | 183.11 | 57.24 | 139.76 | 324.3 | 27.58 | 60.9 |
| 360. | 7.106 | 0.517 | 8.911 | 186.98 | 58.16 | 134.01 | 306.6 | 24.31 | 57.1 |
| 370. | 6.276 | 0.570 | 10.201 | 190.51 | 58.92 | 123.71 | 301.2 | 22.10 | 54.3 |
| 380. | 5.636 | 0.618 | 11.387 | 193.68 | 59.64 | 113.82 | 302.8 | 20.67 | 52.5 |
| 390. | 5.141 | 0.660 | 12.485 | 196.53 | 60.38 | 106.13 | 307.7 | 19.74 | 51.4 |
| 400. | 4.749 | 0.696 | 13.517 | 199.14 | 61.18 | 100.56 | 314.0 | 19.13 | 51.0 |
| 410. | 4.431 | 0.728 | 14.502 | 201.58 | 62.04 | 96.60 | 320.9 | 18.73 | 51.0 |
| 420. | 4.167 | 0.756 | 15.453 | 203.87 | 62.96 | 93.81 | 327.9 | 18.47 | 51.4 |
| 430. | 3.943 | 0.780 | 16.381 | 206.05 | 63.91 | 91.86 | 334.9 | 18.31 | 52.0 |
| 440. | 3.749 | 0.802 | 17.292 | 208.15 | 64.91 | 90.53 | 341.8 | 18.21 | 52.9 |
| 450. | 3.580 | 0.821 | 18.193 | 210.17 | 65.93 | 89.66 | 348.5 | 18.17 | 53.9 |
| 460. | 3.431 | 0.838 | 19.087 | 212.13 | 66.97 | 89.14 | 355.0 | 18.17 | 55.0 |
| 470. | 3.297 | 0.854 | 19.977 | 214.05 | 68.03 | 88.89 | 361.3 | 18.21 | 56.2 |
| 480. | 3.176 | 0.868 | 20.865 | 215.92 | 69.10 | 88.85 | 367.4 | 18.26 | 57.5 |
| 490. | 3.067 | 0.880 | 21.754 | 217.75 | 70.17 | 88.97 | 373.4 | 18.34 | 58.9 |
| 500. | 2.967 | 0.892 | 22.645 | 219.55 | 71.24 | 89.22 | 379.1 | 18.43 | 60.4 |
| 520. | 2.790 | 0.912 | 24.437 | 223.07 | 73.40 | 90.02 | 390.2 | | 63.5 |
| 540. | 2.638 | 0.929 | 26.248 | 226.48 | 75.53 | 91.09 | 400.7 | | 66.8 |
| 560. | 2.505 | 0.943 | 28.082 | 229.82 | 77.65 | 92.36 | 410.7 | | 70.2 |
| 580. | 2.388 | 0.955 | 29.943 | 233.08 | 79.73 | 93.74 | 420.2 | | 73.8 |
| 600. | 2.284 | 0.966 | 31.832 | 236.29 | 81.79 | 95.21 | 429.3 | | 77.4 |
| 625. | 2.168 | 0.977 | 34.236 | 240.21 | 84.30 | 97.12 | 440.2 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 12.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.646 | 0.702 | -14.101 | 79.15 | 47.89 | 68.06 | 2021.5 | 1172.78 | 257.3 |
| 100. | 21.475 | 0.672 | -13.757 | 82.69 | 48.31 | 69.59 | 1989.1 | 967.23 | 253.6 |
| 105. | 21.302 | 0.645 | -13.407 | 86.10 | 48.19 | 70.23 | 1955.1 | 813.16 | 249.7 |
| 110. | 21.127 | 0.621 | -13.055 | 89.37 | 47.77 | 70.37 | 1920.3 | 695.29 | 245.6 |
| 115. | 20.953 | 0.599 | -12.704 | 92.50 | 47.21 | 70.25 | 1885.2 | 603.30 | 241.3 |
| 120. | 20.777 | 0.579 | -12.353 | 95.48 | 46.61 | 70.03 | 1850.1 | 530.16 | 236.8 |
| 125. | 20.602 | 0.560 | -12.003 | 98.34 | 46.02 | 69.78 | 1815.0 | 471.02 | 232.3 |
| 130. | 20.426 | 0.544 | -11.655 | 101.07 | 45.48 | 69.55 | 1780.0 | 422.44 | 227.8 |
| 135. | 20.250 | 0.528 | -11.308 | 103.69 | 44.99 | 69.38 | 1745.0 | 381.98 | 223.1 |
| 140. | 20.073 | 0.514 | -10.961 | 106.21 | 44.57 | 69.28 | 1710.2 | 347.83 | 218.4 |
| 145. | 19.895 | 0.500 | -10.615 | 108.64 | 44.21 | 69.24 | 1675.3 | 318.68 | 213.8 |
| 150. | 19.717 | 0.488 | -10.269 | 110.99 | 43.92 | 69.27 | 1640.6 | 293.52 | 209.0 |
| 155. | 19.537 | 0.477 | -9.922 | 113.26 | 43.68 | 69.37 | 1605.9 | 271.59 | 204.3 |
| 160. | 19.357 | 0.466 | -9.575 | 115.47 | 43.49 | 69.53 | 1571.3 | 252.31 | 199.6 |
| 165. | 19.175 | 0.456 | -9.227 | 117.61 | 43.36 | 69.75 | 1536.8 | 235.23 | 194.9 |
| 170. | 18.992 | 0.447 | -8.877 | 119.69 | 43.27 | 70.02 | 1502.4 | 219.97 | 190.3 |
| 175. | 18.807 | 0.439 | -8.526 | 121.73 | 43.22 | 70.35 | 1468.1 | 206.25 | 185.6 |
| 180. | 18.621 | 0.431 | -8.174 | 123.72 | 43.21 | 70.72 | 1433.9 | 193.84 | 181.1 |
| 185. | 18.432 | 0.423 | -7.819 | 125.66 | 43.23 | 71.14 | 1399.7 | 182.56 | 176.5 |
| 190. | 18.242 | 0.416 | -7.462 | 127.56 | 43.29 | 71.60 | 1365.6 | 172.24 | 172.0 |
| 195. | 18.050 | 0.410 | -7.103 | 129.43 | 43.38 | 72.10 | 1331.6 | 162.76 | 167.6 |
| 200. | 17.855 | 0.404 | -6.741 | 131.26 | 43.50 | 72.65 | 1297.7 | 154.02 | 163.2 |
| 205. | 17.658 | 0.399 | -6.377 | 133.06 | 43.64 | 73.24 | 1263.9 | 145.92 | 158.9 |
| 210. | 17.459 | 0.394 | -6.009 | 134.83 | 43.81 | 73.86 | 1230.2 | 138.40 | 154.6 |
| 215. | 17.256 | 0.389 | -5.638 | 136.58 | 44.00 | 74.54 | 1196.6 | 131.38 | 150.4 |
| 220. | 17.051 | 0.385 | -5.263 | 138.30 | 44.22 | 75.25 | 1163.0 | 124.82 | 146.3 |
| 225. | 16.842 | 0.381 | -4.885 | 140.00 | 44.47 | 76.01 | 1129.5 | 118.67 | 142.2 |
| 230. | 16.630 | 0.377 | -4.503 | 141.68 | 44.73 | 76.82 | 1096.0 | 112.88 | 138.3 |
| 235. | 16.414 | 0.374 | -4.117 | 143.34 | 45.02 | 77.68 | 1062.7 | 107.43 | 134.3 |
| 240. | 16.193 | 0.371 | -3.726 | 144.99 | 45.32 | 78.60 | 1029.4 | 102.27 | 130.5 |
| 245. | 15.969 | 0.369 | -3.331 | 146.62 | 45.65 | 79.58 | 996.1 | 97.39 | 126.7 |
| 250. | 15.739 | 0.367 | -2.930 | 148.24 | 46.00 | 80.62 | 962.9 | 92.76 | 123.0 |
| 255. | 15.504 | 0.365 | -2.525 | 149.84 | 46.37 | 81.73 | 929.7 | 88.35 | 119.4 |
| 260. | 15.263 | 0.364 | -2.113 | 151.44 | 46.75 | 82.92 | 896.6 | 84.16 | 115.9 |
| 265. | 15.016 | 0.363 | -1.695 | 153.03 | 47.16 | 84.21 | 863.4 | 80.15 | 112.4 |
| 270. | 14.762 | 0.362 | -1.271 | 154.62 | 47.59 | 85.59 | 830.3 | 76.32 | 109.0 |
| 275. | 14.500 | 0.362 | -0.839 | 156.20 | 48.04 | 87.09 | 797.2 | 72.64 | 105.7 |
| 280. | 14.230 | 0.362 | -0.400 | 157.79 | 48.50 | 88.72 | 764.0 | 69.11 | 102.4 |
| 285. | 13.949 | 0.363 | 0.048 | 159.37 | 48.99 | 90.50 | 730.8 | 65.72 | 99.2 |
| 290. | 13.658 | 0.364 | 0.506 | 160.96 | 49.50 | 92.46 | 697.6 | 62.44 | 96.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 12.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 13.355 | 0.366 | 0.973 | 162.56 | 50.03 | 94.62 | 664.4 | 59.28 | 93.0 |
| 300. | 13.038 | 0.369 | 1.452 | 164.17 | 50.59 | 97.01 | 631.2 | 56.21 | 90.0 |
| 310. | 12.356 | 0.377 | 2.449 | 167.44 | 51.77 | 102.62 | 565.4 | 50.34 | 84.2 |
| 320. | 11.596 | 0.389 | 3.509 | 170.80 | 53.07 | 109.48 | 501.8 | 44.77 | 78.6 |
| 330. | 10.745 | 0.407 | 4.643 | 174.29 | 54.43 | 117.52 | 443.1 | 39.50 | 73.3 |
| 340. | 9.803 | 0.433 | 5.860 | 177.93 | 55.76 | 125.62 | 393.1 | 34.62 | 68.4 |
| 350. | 8.810 | 0.468 | 7.145 | 181.65 | 56.94 | 130.48 | 355.3 | 30.33 | 64.0 |
| 360. | 7.851 | 0.511 | 8.449 | 185.33 | 57.98 | 129.52 | 331.0 | 26.87 | 60.3 |
| 370. | 7.008 | 0.557 | 9.719 | 188.81 | 58.90 | 123.93 | 318.8 | 24.31 | 57.4 |
| 380. | 6.312 | 0.602 | 10.922 | 192.01 | 59.74 | 116.50 | 315.0 | 22.51 | 55.4 |
| 390. | 5.752 | 0.643 | 12.051 | 194.95 | 60.55 | 109.52 | 316.2 | 21.28 | 54.0 |
| 400. | 5.302 | 0.681 | 13.117 | 197.64 | 61.38 | 103.88 | 320.2 | 20.44 | 53.3 |
| 410. | 4.934 | 0.713 | 14.133 | 200.15 | 62.25 | 99.61 | 325.6 | 19.86 | 53.1 |
| 420. | 4.629 | 0.742 | 15.113 | 202.52 | 63.15 | 96.47 | 331.7 | 19.46 | 53.2 |
| 430. | 4.370 | 0.768 | 16.066 | 204.76 | 64.10 | 94.20 | 338.0 | 19.19 | 53.6 |
| 440. | 4.148 | 0.791 | 16.999 | 206.90 | 65.09 | 92.59 | 344.4 | 19.01 | 54.3 |
| 450. | 3.954 | 0.811 | 17.919 | 208.97 | 66.10 | 91.48 | 350.8 | 18.90 | 55.2 |
| 460. | 3.783 | 0.829 | 18.830 | 210.97 | 67.13 | 90.76 | 357.1 | 18.84 | 56.2 |
| 470. | 3.630 | 0.846 | 19.735 | 212.92 | 68.17 | 90.34 | 363.2 | 18.82 | 57.3 |
| 480. | 3.494 | 0.861 | 20.637 | 214.82 | 69.23 | 90.15 | 369.2 | 18.84 | 58.6 |
| 490. | 3.370 | 0.874 | 21.539 | 216.68 | 70.29 | 90.14 | 375.1 | 18.88 | 59.9 |
| 500. | 3.257 | 0.886 | 22.441 | 218.50 | 71.36 | 90.29 | 380.8 | 18.94 | 61.3 |
| 520. | 3.058 | 0.908 | 24.252 | 222.05 | 73.50 | 90.92 | 391.8 | | 64.3 |
| 540. | 2.888 | 0.925 | 26.080 | 225.50 | 75.63 | 91.86 | 402.3 | | 67.5 |
| 560. | 2.740 | 0.941 | 27.928 | 228.86 | 77.73 | 93.02 | 412.3 | | 70.8 |
| 580. | 2.609 | 0.954 | 29.802 | 232.15 | 79.81 | 94.33 | 421.9 | | 74.3 |
| 600. | 2.493 | 0.965 | 31.702 | 235.37 | 81.85 | 95.73 | 431.0 | | 77.9 |
| 625. | 2.365 | 0.976 | 34.118 | 239.32 | 84.36 | 97.58 | 442.0 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 13.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 95. | 21.657 | 0.760 | -14.062 | 79.08 | 47.89 | 68.01 | 2025.6 | 1183.27 | 257.7 |
| 100. | 21.487 | 0.728 | -13.718 | 82.61 | 48.33 | 69.55 | 1993.2 | 975.25 | 254.1 |
| 105. | 21.314 | 0.699 | -13.368 | 86.02 | 48.21 | 70.19 | 1959.2 | 819.50 | 250.2 |
| 110. | 21.141 | 0.672 | -13.016 | 89.29 | 47.80 | 70.33 | 1924.5 | 700.44 | 246.0 |
| 115. | 20.966 | 0.648 | -12.665 | 92.42 | 47.24 | 70.22 | 1889.5 | 607.60 | 241.8 |
| 120. | 20.792 | 0.627 | -12.314 | 95.40 | 46.65 | 69.99 | 1854.5 | 533.84 | 237.4 |
| 125. | 20.617 | 0.607 | -11.965 | 98.25 | 46.06 | 69.74 | 1819.6 | 474.22 | 232.9 |
| 130. | 20.442 | 0.588 | -11.617 | 100.98 | 45.52 | 69.51 | 1784.7 | 425.27 | 228.3 |
| 135. | 20.267 | 0.571 | -11.270 | 103.60 | 45.03 | 69.33 | 1749.9 | 384.52 | 223.7 |
| 140. | 20.090 | 0.556 | -10.924 | 106.12 | 44.61 | 69.22 | 1715.1 | 350.14 | 219.1 |
| 145. | 19.914 | 0.541 | -10.578 | 108.55 | 44.26 | 69.18 | 1680.5 | 320.80 | 214.4 |
| 150. | 19.736 | 0.528 | -10.232 | 110.90 | 43.96 | 69.21 | 1645.9 | 295.49 | 209.7 |
| 155. | 19.558 | 0.516 | -9.885 | 113.17 | 43.72 | 69.30 | 1611.5 | 273.44 | 205.0 |
| 160. | 19.378 | 0.504 | -9.539 | 115.37 | 43.54 | 69.45 | 1577.1 | 254.06 | 200.3 |
| 165. | 19.198 | 0.494 | -9.191 | 117.51 | 43.40 | 69.66 | 1542.8 | 236.88 | 195.7 |
| 170. | 19.016 | 0.484 | -8.842 | 119.59 | 43.31 | 69.93 | 1508.6 | 221.55 | 191.0 |
| 175. | 18.832 | 0.474 | -8.492 | 121.62 | 43.26 | 70.24 | 1474.5 | 207.77 | 186.4 |
| 180. | 18.647 | 0.466 | -8.139 | 123.61 | 43.25 | 70.60 | 1440.5 | 195.31 | 181.8 |
| 185. | 18.460 | 0.458 | -7.785 | 125.55 | 43.28 | 71.01 | 1406.6 | 183.98 | 177.3 |
| 190. | 18.272 | 0.450 | -7.429 | 127.45 | 43.34 | 71.46 | 1372.9 | 173.62 | 172.9 |
| 195. | 18.081 | 0.443 | -7.071 | 129.31 | 43.42 | 71.95 | 1339.2 | 164.11 | 168.4 |
| 200. | 17.888 | 0.437 | -6.710 | 131.14 | 43.54 | 72.48 | 1305.6 | 155.33 | 164.1 |
| 205. | 17.693 | 0.431 | -6.346 | 132.94 | 43.68 | 73.05 | 1272.1 | 147.21 | 159.8 |
| 210. | 17.496 | 0.426 | -5.979 | 134.70 | 43.85 | 73.66 | 1238.8 | 139.67 | 155.5 |
| 215. | 17.295 | 0.420 | -5.609 | 136.44 | 44.05 | 74.31 | 1205.5 | 132.64 | 151.4 |
| 220. | 17.092 | 0.416 | -5.236 | 138.16 | 44.27 | 75.01 | 1172.3 | 126.06 | 147.3 |
| 225. | 16.886 | 0.412 | -4.859 | 139.85 | 44.51 | 75.74 | 1139.2 | 119.90 | 143.2 |
| 230. | 16.677 | 0.408 | -4.478 | 141.53 | 44.77 | 76.52 | 1106.3 | 114.10 | 139.3 |
| 235. | 16.464 | 0.404 | -4.094 | 143.18 | 45.06 | 77.35 | 1073.4 | 108.65 | 135.4 |
| 240. | 16.247 | 0.401 | -3.705 | 144.82 | 45.36 | 78.23 | 1040.6 | 103.49 | 131.6 |
| 245. | 16.026 | 0.398 | -3.311 | 146.44 | 45.69 | 79.16 | 1007.9 | 98.61 | 127.8 |
| 250. | 15.801 | 0.396 | -2.913 | 148.05 | 46.04 | 80.14 | 975.3 | 93.98 | 124.2 |
| 255. | 15.571 | 0.394 | -2.510 | 149.65 | 46.40 | 81.20 | 942.8 | 89.59 | 120.6 |
| 260. | 15.335 | 0.392 | -2.101 | 151.24 | 46.79 | 82.32 | 910.4 | 85.40 | 117.1 |
| 265. | 15.094 | 0.391 | -1.687 | 152.81 | 47.19 | 83.52 | 878.0 | 81.41 | 113.6 |
| 270. | 14.847 | 0.390 | -1.266 | 154.39 | 47.61 | 84.80 | 845.7 | 77.60 | 110.3 |
| 275. | 14.593 | 0.390 | -0.838 | 155.96 | 48.05 | 86.18 | 813.5 | 73.95 | 107.0 |
| 280. | 14.331 | 0.390 | -0.404 | 157.52 | 48.51 | 87.66 | 781.3 | 70.45 | 103.8 |
| 285. | 14.061 | 0.390 | 0.038 | 159.09 | 48.99 | 89.27 | 749.2 | 67.09 | 100.7 |
| 290. | 13.781 | 0.391 | 0.489 | 160.66 | 49.49 | 91.01 | 717.2 | 63.86 | 97.6 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 13.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol·K) | J/(mol·K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m·K) |
| 295. | 13.492 | 0.393 | 0.949 | 162.23 | 50.01 | 92.91 | 685.3 | 60.74 | 94.6 |
| 300. | 13.191 | 0.395 | 1.419 | 163.81 | 50.55 | 94.98 | 653.6 | 57.73 | 91.7 |
| 310. | 12.550 | 0.402 | 2.391 | 166.99 | 51.69 | 99.70 | 590.8 | 52.00 | 86.0 |
| 320. | 11.849 | 0.412 | 3.415 | 170.25 | 52.92 | 105.27 | 530.3 | 46.61 | 80.7 |
| 330. | 11.078 | 0.428 | 4.499 | 173.58 | 54.21 | 111.59 | 474.0 | 41.57 | 75.6 |
| 340. | 10.239 | 0.449 | 5.648 | 177.01 | 55.50 | 118.03 | 424.8 | 36.91 | 70.9 |
| 350. | 9.351 | 0.478 | 6.855 | 180.51 | 56.71 | 122.86 | 385.2 | 32.74 | 66.7 |
| 360. | 8.468 | 0.513 | 8.093 | 183.99 | 57.81 | 124.06 | 356.9 | 29.23 | 63.2 |
| 370. | 7.650 | 0.552 | 9.323 | 187.37 | 58.82 | 121.60 | 339.5 | 26.46 | 60.3 |
| 380. | 6.937 | 0.593 | 10.517 | 190.55 | 59.75 | 116.83 | 330.7 | 24.39 | 58.0 |
| 390. | 6.338 | 0.633 | 11.658 | 193.51 | 60.64 | 111.32 | 328.0 | 22.90 | 56.5 |
| 400. | 5.843 | 0.669 | 12.745 | 196.27 | 61.51 | 106.23 | 329.1 | 21.83 | 55.6 |
| 410. | 5.432 | 0.702 | 13.785 | 198.83 | 62.40 | 102.02 | 332.6 | 21.06 | 55.1 |
| 420. | 5.088 | 0.732 | 14.788 | 201.25 | 63.32 | 98.75 | 337.2 | 20.52 | 55.0 |
| 430. | 4.796 | 0.758 | 15.763 | 203.55 | 64.27 | 96.28 | 342.6 | 20.13 | 55.3 |
| 440. | 4.546 | 0.782 | 16.716 | 205.74 | 65.24 | 94.47 | 348.3 | 19.86 | 55.8 |
| 450. | 4.327 | 0.803 | 17.654 | 207.84 | 66.25 | 93.17 | 354.2 | 19.67 | 56.6 |
| 460. | 4.135 | 0.822 | 18.581 | 209.88 | 67.27 | 92.28 | 360.1 | 19.55 | 57.5 |
| 470. | 3.964 | 0.839 | 19.501 | 211.86 | 68.31 | 91.71 | 366.0 | 19.48 | 58.5 |
| 480. | 3.811 | 0.855 | 20.416 | 213.79 | 69.36 | 91.39 | 371.8 | 19.45 | 59.6 |
| 490. | 3.673 | 0.869 | 21.329 | 215.67 | 70.41 | 91.28 | 377.5 | 19.45 | 60.9 |
| 500. | 3.547 | 0.882 | 22.242 | 217.51 | 71.47 | 91.32 | 383.1 | 19.48 | 62.2 |
| 520. | 3.326 | 0.904 | 24.072 | 221.10 | 73.60 | 91.79 | 394.0 | | 65.1 |
| 540. | 3.137 | 0.923 | 25.916 | 224.58 | 75.72 | 92.61 | 404.3 | | 68.2 |
| 560. | 2.974 | 0.939 | 27.778 | 227.97 | 77.81 | 93.67 | 414.3 | | 71.5 |
| 580. | 2.830 | 0.953 | 29.664 | 231.28 | 79.88 | 94.90 | 423.8 | | 74.9 |
| 600. | 2.702 | 0.964 | 31.575 | 234.52 | 81.92 | 96.24 | 433.0 | | 78.4 |
| 625. | 2.561 | 0.977 | 34.003 | 238.48 | 84.42 | 98.02 | 444.0 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 14.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.669 | 0.818 | -14.023 | 79.01 | 47.88 | 67.96 | 2029.7 | 1193.92 | 258.2 |
| 100. | 21.499 | 0.783 | -13.678 | 82.54 | 48.34 | 69.51 | 1997.3 | 983.37 | 254.5 |
| 105. | 21.327 | 0.752 | -13.329 | 85.95 | 48.24 | 70.16 | 1963.3 | 825.90 | 250.6 |
| 110. | 21.154 | 0.724 | -12.978 | 89.22 | 47.83 | 70.30 | 1928.7 | 705.65 | 246.5 |
| 115. | 20.980 | 0.698 | -12.626 | 92.34 | 47.28 | 70.18 | 1893.8 | 611.94 | 242.3 |
| 120. | 20.806 | 0.674 | -12.276 | 95.32 | 46.68 | 69.95 | 1858.9 | 537.54 | 237.9 |
| 125. | 20.632 | 0.653 | -11.927 | 98.17 | 46.10 | 69.70 | 1824.1 | 477.44 | 233.4 |
| 130. | 20.458 | 0.633 | -11.579 | 100.90 | 45.56 | 69.47 | 1789.3 | 428.12 | 228.9 |
| 135. | 20.283 | 0.615 | -11.232 | 103.52 | 45.08 | 69.29 | 1754.6 | 387.08 | 224.3 |
| 140. | 20.108 | 0.598 | -10.886 | 106.04 | 44.66 | 69.17 | 1720.1 | 352.47 | 219.7 |
| 145. | 19.932 | 0.583 | -10.540 | 108.46 | 44.30 | 69.12 | 1685.6 | 322.94 | 215.0 |
| 150. | 19.755 | 0.568 | -10.195 | 110.81 | 44.00 | 69.14 | 1651.2 | 297.47 | 210.3 |
| 155. | 19.578 | 0.555 | -9.849 | 113.07 | 43.77 | 69.23 | 1616.9 | 275.30 | 205.7 |
| 160. | 19.399 | 0.542 | -9.502 | 115.27 | 43.58 | 69.37 | 1582.8 | 255.81 | 201.0 |
| 165. | 19.220 | 0.531 | -9.155 | 117.41 | 43.45 | 69.58 | 1548.7 | 238.54 | 196.4 |
| 170. | 19.039 | 0.520 | -8.806 | 119.49 | 43.36 | 69.83 | 1514.7 | 223.13 | 191.7 |
| 175. | 18.857 | 0.510 | -8.457 | 121.52 | 43.31 | 70.14 | 1480.9 | 209.29 | 187.1 |
| 180. | 18.673 | 0.501 | -8.105 | 123.50 | 43.30 | 70.49 | 1447.1 | 196.77 | 182.6 |
| 185. | 18.488 | 0.492 | -7.752 | 125.44 | 43.32 | 70.89 | 1413.5 | 185.39 | 178.1 |
| 190. | 18.301 | 0.484 | -7.396 | 127.34 | 43.38 | 71.33 | 1380.0 | 174.99 | 173.7 |
| 195. | 18.112 | 0.477 | -7.038 | 129.19 | 43.47 | 71.81 | 1346.6 | 165.45 | 169.3 |
| 200. | 17.920 | 0.470 | -6.678 | 131.02 | 43.58 | 72.32 | 1313.4 | 156.65 | 164.9 |
| 205. | 17.727 | 0.463 | -6.315 | 132.81 | 43.73 | 72.88 | 1280.2 | 148.50 | 160.6 |
| 210. | 17.532 | 0.457 | -5.949 | 134.57 | 43.90 | 73.47 | 1247.2 | 140.94 | 156.4 |
| 215. | 17.334 | 0.452 | -5.580 | 136.31 | 44.09 | 74.10 | 1214.3 | 133.89 | 152.3 |
| 220. | 17.133 | 0.447 | -5.208 | 138.02 | 44.31 | 74.77 | 1181.5 | 127.30 | 148.2 |
| 225. | 16.929 | 0.442 | -4.832 | 139.71 | 44.55 | 75.48 | 1148.8 | 121.12 | 144.2 |
| 230. | 16.723 | 0.438 | -4.453 | 141.38 | 44.82 | 76.24 | 1116.3 | 115.32 | 140.2 |
| 235. | 16.513 | 0.434 | -4.070 | 143.02 | 45.10 | 77.03 | 1083.9 | 109.86 | 136.4 |
| 240. | 16.299 | 0.430 | -3.683 | 144.66 | 45.40 | 77.87 | 1051.6 | 104.70 | 132.6 |
| 245. | 16.082 | 0.427 | -3.291 | 146.27 | 45.73 | 78.76 | 1019.4 | 99.82 | 128.9 |
| 250. | 15.861 | 0.425 | -2.895 | 147.87 | 46.07 | 79.70 | 987.4 | 95.19 | 125.3 |
| 255. | 15.635 | 0.422 | -2.494 | 149.46 | 46.44 | 80.70 | 955.5 | 90.80 | 121.7 |
| 260. | 15.405 | 0.420 | -2.088 | 151.04 | 46.82 | 81.76 | 923.7 | 86.63 | 118.2 |
| 265. | 15.169 | 0.419 | -1.676 | 152.60 | 47.22 | 82.89 | 892.0 | 82.65 | 114.8 |
| 270. | 14.928 | 0.418 | -1.259 | 154.16 | 47.64 | 84.08 | 860.5 | 78.85 | 111.5 |
| 275. | 14.681 | 0.417 | -0.835 | 155.72 | 48.08 | 85.36 | 829.0 | 75.22 | 108.3 |
| 280. | 14.427 | 0.417 | -0.405 | 157.27 | 48.53 | 86.73 | 797.8 | 71.75 | 105.1 |
| 285. | 14.165 | 0.417 | 0.032 | 158.82 | 49.00 | 88.19 | 766.6 | 68.42 | 102.0 |
| 290. | 13.896 | 0.418 | 0.477 | 160.36 | 49.50 | 89.76 | 735.7 | 65.21 | 99.0 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 14.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 13.619 | 0.419 | 0.930 | 161.91 | 50.00 | 91.45 | 704.9 | 62.14 | 96.1 |
| 300. | 13.331 | 0.421 | 1.392 | 163.46 | 50.53 | 93.27 | 674.3 | 59.17 | 93.2 |
| 310. | 12.725 | 0.427 | 2.344 | 166.59 | 51.64 | 97.35 | 614.2 | 53.55 | 87.7 |
| 320. | 12.069 | 0.436 | 3.341 | 169.75 | 52.82 | 102.02 | 556.3 | 48.31 | 82.5 |
| 330. | 11.360 | 0.449 | 4.386 | 172.97 | 54.06 | 107.19 | 502.1 | 43.43 | 77.7 |
| 340. | 10.597 | 0.467 | 5.485 | 176.25 | 55.31 | 112.46 | 453.8 | 38.93 | 73.2 |
| 350. | 9.793 | 0.491 | 6.633 | 179.57 | 56.52 | 116.86 | 413.5 | 34.88 | 69.2 |
| 360. | 8.980 | 0.521 | 7.814 | 182.90 | 57.65 | 118.97 | 382.8 | 31.38 | 65.7 |
| 370. | 8.204 | 0.555 | 9.003 | 186.16 | 58.72 | 118.33 | 361.6 | 28.50 | 62.8 |
| 380. | 7.499 | 0.591 | 10.174 | 189.28 | 59.72 | 115.59 | 348.8 | 26.25 | 60.5 |
| 390. | 6.884 | 0.627 | 11.311 | 192.24 | 60.67 | 111.68 | 342.3 | 24.54 | 58.9 |
| 400. | 6.359 | 0.662 | 12.407 | 195.01 | 61.59 | 107.52 | 340.4 | 23.26 | 57.8 |
| 410. | 5.915 | 0.694 | 13.462 | 197.62 | 62.51 | 103.72 | 341.6 | 22.32 | 57.1 |
| 420. | 5.539 | 0.724 | 14.483 | 200.08 | 63.45 | 100.55 | 344.6 | 21.63 | 56.9 |
| 430. | 5.217 | 0.751 | 15.476 | 202.41 | 64.40 | 98.04 | 348.7 | 21.13 | 57.0 |
| 440. | 4.940 | 0.775 | 16.446 | 204.64 | 65.38 | 96.12 | 353.5 | 20.76 | 57.4 |
| 450. | 4.698 | 0.796 | 17.400 | 206.79 | 66.38 | 94.69 | 358.7 | 20.49 | 58.0 |
| 460. | 4.485 | 0.816 | 18.341 | 208.86 | 67.40 | 93.67 | 364.1 | 20.30 | 58.7 |
| 470. | 4.296 | 0.834 | 19.274 | 210.86 | 68.43 | 92.98 | 369.6 | 20.17 | 59.7 |
| 480. | 4.127 | 0.850 | 20.202 | 212.82 | 69.47 | 92.56 | 375.1 | 20.09 | 60.7 |
| 490. | 3.974 | 0.865 | 21.126 | 214.72 | 70.52 | 92.34 | 380.6 | 20.05 | 61.9 |
| 500. | 3.836 | 0.878 | 22.049 | 216.59 | 71.58 | 92.31 | 386.0 | 20.04 | 63.2 |
| 520. | 3.592 | 0.901 | 23.898 | 220.21 | 73.69 | 92.63 | 396.6 | | 65.9 |
| 540. | 3.385 | 0.921 | 25.757 | 223.72 | 75.80 | 93.33 | 406.8 | | 69.0 |
| 560. | 3.206 | 0.938 | 27.633 | 227.13 | 77.89 | 94.30 | 416.7 | | 72.2 |
| 580. | 3.049 | 0.952 | 29.530 | 230.46 | 79.95 | 95.46 | 426.1 | | 75.5 |
| 600. | 2.910 | 0.964 | 31.452 | 233.72 | 81.98 | 96.74 | 435.3 | | 78.9 |
| 625. | 2.757 | 0.977 | 33.892 | 237.70 | 84.48 | 98.45 | 446.2 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 15.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.680 | 0.876 | -13.983 | 78.94 | 47.88 | 67.91 | 2033.8 | 1204.71 | 258.6 |
| 100. | 21.511 | 0.839 | -13.639 | 82.46 | 48.35 | 69.47 | 2001.4 | 991.59 | 255.0 |
| 105. | 21.339 | 0.805 | -13.290 | 85.87 | 48.26 | 70.12 | 1967.4 | 832.38 | 251.1 |
| 110. | 21.167 | 0.775 | -12.939 | 89.14 | 47.86 | 70.27 | 1932.8 | 710.91 | 247.0 |
| 115. | 20.994 | 0.747 | -12.588 | 92.26 | 47.31 | 70.15 | 1898.1 | 616.32 | 242.8 |
| 120. | 20.821 | 0.722 | -12.238 | 95.24 | 46.72 | 69.92 | 1863.3 | 541.27 | 238.4 |
| 125. | 20.647 | 0.699 | -11.889 | 98.09 | 46.14 | 69.66 | 1828.6 | 480.68 | 234.0 |
| 130. | 20.474 | 0.678 | -11.541 | 100.82 | 45.60 | 69.43 | 1793.9 | 430.99 | 229.5 |
| 135. | 20.300 | 0.658 | -11.194 | 103.43 | 45.12 | 69.24 | 1759.4 | 389.65 | 224.9 |
| 140. | 20.125 | 0.640 | -10.848 | 105.95 | 44.70 | 69.12 | 1725.0 | 354.81 | 220.3 |
| 145. | 19.950 | 0.624 | -10.503 | 108.37 | 44.34 | 69.07 | 1690.7 | 325.09 | 215.6 |
| 150. | 19.775 | 0.608 | -10.158 | 110.72 | 44.05 | 69.08 | 1656.5 | 299.47 | 211.0 |
| 155. | 19.598 | 0.594 | -9.812 | 112.98 | 43.81 | 69.16 | 1622.4 | 277.16 | 206.3 |
| 160. | 19.420 | 0.581 | -9.466 | 115.18 | 43.62 | 69.30 | 1588.4 | 257.56 | 201.7 |
| 165. | 19.242 | 0.568 | -9.119 | 117.31 | 43.49 | 69.50 | 1554.5 | 240.21 | 197.1 |
| 170. | 19.062 | 0.557 | -8.771 | 119.39 | 43.40 | 69.75 | 1520.8 | 224.72 | 192.5 |
| 175. | 18.881 | 0.546 | -8.421 | 121.42 | 43.35 | 70.04 | 1487.2 | 210.81 | 187.9 |
| 180. | 18.699 | 0.536 | -8.070 | 123.40 | 43.34 | 70.39 | 1453.7 | 198.24 | 183.4 |
| 185. | 18.515 | 0.527 | -7.718 | 125.33 | 43.37 | 70.77 | 1420.3 | 186.81 | 178.9 |
| 190. | 18.329 | 0.518 | -7.363 | 127.22 | 43.42 | 71.20 | 1387.1 | 176.37 | 174.5 |
| 195. | 18.142 | 0.510 | -7.005 | 129.08 | 43.51 | 71.66 | 1354.0 | 166.79 | 170.1 |
| 200. | 17.952 | 0.502 | -6.646 | 130.90 | 43.63 | 72.17 | 1321.0 | 157.96 | 165.8 |
| 205. | 17.761 | 0.495 | -6.284 | 132.69 | 43.77 | 72.71 | 1288.2 | 149.79 | 161.5 |
| 210. | 17.567 | 0.489 | -5.919 | 134.45 | 43.94 | 73.29 | 1255.5 | 142.20 | 157.3 |
| 215. | 17.371 | 0.483 | -5.551 | 136.18 | 44.14 | 73.90 | 1222.9 | 135.13 | 153.2 |
| 220. | 17.173 | 0.478 | -5.180 | 137.88 | 44.35 | 74.55 | 1190.5 | 128.53 | 149.1 |
| 225. | 16.972 | 0.472 | -4.805 | 139.57 | 44.60 | 75.24 | 1158.2 | 122.34 | 145.1 |
| 230. | 16.768 | 0.468 | -4.427 | 141.23 | 44.86 | 75.96 | 1126.1 | 116.53 | 141.2 |
| 235. | 16.561 | 0.464 | -4.046 | 142.87 | 45.14 | 76.73 | 1094.1 | 111.06 | 137.4 |
| 240. | 16.350 | 0.460 | -3.660 | 144.49 | 45.45 | 77.54 | 1062.3 | 105.89 | 133.6 |
| 245. | 16.137 | 0.456 | -3.270 | 146.10 | 45.77 | 78.39 | 1030.6 | 101.01 | 129.9 |
| 250. | 15.919 | 0.453 | -2.876 | 147.70 | 46.11 | 79.29 | 999.1 | 96.39 | 126.3 |
| 255. | 15.697 | 0.451 | -2.477 | 149.27 | 46.47 | 80.24 | 967.7 | 92.01 | 122.8 |
| 260. | 15.472 | 0.448 | -2.073 | 150.84 | 46.85 | 81.25 | 936.5 | 87.84 | 119.4 |
| 265. | 15.241 | 0.447 | -1.665 | 152.40 | 47.25 | 82.31 | 905.5 | 83.87 | 116.0 |
| 270. | 15.006 | 0.445 | -1.250 | 153.95 | 47.67 | 83.43 | 874.7 | 80.08 | 112.7 |
| 275. | 14.765 | 0.444 | -0.830 | 155.49 | 48.10 | 84.62 | 844.0 | 76.47 | 109.5 |
| 280. | 14.518 | 0.444 | -0.404 | 157.03 | 48.55 | 85.89 | 813.5 | 73.01 | 106.4 |
| 285. | 14.265 | 0.444 | 0.029 | 158.56 | 49.02 | 87.24 | 783.2 | 69.70 | 103.4 |
| 290. | 14.005 | 0.444 | 0.469 | 160.09 | 49.50 | 88.67 | 753.2 | 66.53 | 100.4 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 15.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 295. | 13.737 | 0.445 | 0.916 | 161.62 | 50.00 | 90.19 | 723.4 | 63.48 | 97.5 |
| 300. | 13.461 | 0.447 | 1.371 | 163.15 | 50.52 | 91.82 | 693.9 | 60.55 | 94.7 |
| 310. | 12.884 | 0.452 | 2.307 | 166.21 | 51.61 | 95.40 | 636.0 | 55.02 | 89.4 |
| 320. | 12.266 | 0.460 | 3.280 | 169.31 | 52.75 | 99.41 | 580.2 | 49.89 | 84.3 |
| 330. | 11.605 | 0.471 | 4.296 | 172.43 | 53.95 | 103.77 | 528.0 | 45.14 | 79.6 |
| 340. | 10.901 | 0.487 | 5.356 | 175.59 | 55.17 | 108.20 | 480.8 | 40.76 | 75.3 |
| 350. | 10.163 | 0.507 | 6.458 | 178.79 | 56.37 | 112.11 | 440.3 | 36.81 | 71.4 |
| 360. | 9.412 | 0.532 | 7.593 | 181.99 | 57.52 | 114.56 | 407.9 | 33.34 | 68.0 |
| 370. | 8.680 | 0.562 | 8.743 | 185.14 | 58.62 | 114.98 | 384.1 | 30.41 | 65.1 |
| 380. | 7.996 | 0.594 | 9.887 | 188.19 | 59.66 | 113.60 | 368.1 | 28.03 | 62.8 |
| 390. | 7.382 | 0.627 | 11.011 | 191.11 | 60.67 | 111.03 | 358.5 | 26.16 | 61.1 |
| 400. | 6.842 | 0.659 | 12.105 | 193.88 | 61.64 | 107.88 | 353.7 | 24.72 | 59.9 |
| 410. | 6.376 | 0.690 | 13.168 | 196.50 | 62.59 | 104.69 | 352.4 | 23.62 | 59.1 |
| 420. | 5.974 | 0.719 | 14.200 | 198.99 | 63.54 | 101.82 | 353.5 | 22.79 | 58.7 |
| 430. | 5.628 | 0.746 | 15.206 | 201.36 | 64.51 | 99.41 | 356.2 | 22.16 | 58.7 |
| 440. | 5.327 | 0.770 | 16.190 | 203.62 | 65.50 | 97.49 | 360.0 | 21.69 | 58.9 |
| 450. | 5.064 | 0.792 | 17.158 | 205.79 | 66.50 | 96.01 | 364.3 | 21.34 | 59.4 |
| 460. | 4.832 | 0.812 | 18.112 | 207.89 | 67.51 | 94.92 | 369.1 | 21.08 | 60.1 |
| 470. | 4.625 | 0.830 | 19.057 | 209.92 | 68.54 | 94.14 | 374.1 | 20.89 | 60.9 |
| 480. | 4.440 | 0.846 | 19.996 | 211.90 | 69.58 | 93.63 | 379.2 | 20.76 | 61.9 |
| 490. | 4.273 | 0.862 | 20.930 | 213.83 | 70.63 | 93.34 | 384.3 | 20.67 | 63.0 |
| 500. | 4.122 | 0.875 | 21.863 | 215.71 | 71.68 | 93.23 | 389.5 | 20.62 | 64.2 |
| 520. | 3.857 | 0.900 | 23.729 | 219.37 | 73.78 | 93.42 | 399.7 | | 66.8 |
| 540. | 3.632 | 0.920 | 25.603 | 222.91 | 75.88 | 94.02 | 409.7 | | 69.7 |
| 560. | 3.437 | 0.937 | 27.492 | 226.34 | 77.96 | 94.91 | 419.4 | | 72.8 |
| 580. | 3.267 | 0.952 | 29.400 | 229.69 | 80.02 | 95.99 | 428.8 | | 76.1 |
| 600. | 3.116 | 0.965 | 31.332 | 232.96 | 82.05 | 97.21 | 437.8 | | 79.5 |
| 625. | 2.950 | 0.978 | 33.783 | 236.97 | 84.53 | 98.87 | 448.7 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 16.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.692 | 0.934 | -13.944 | 78.86 | 47.88 | 67.86 | 2037.9 | 1215.66 | 259.0 |
| 100. | 21.523 | 0.894 | -13.600 | 82.39 | 48.37 | 69.43 | 2005.5 | 999.92 | 255.4 |
| 105. | 21.352 | 0.858 | -13.251 | 85.80 | 48.28 | 70.09 | 1971.5 | 838.93 | 251.6 |
| 110. | 21.180 | 0.826 | -12.900 | 89.06 | 47.89 | 70.24 | 1937.0 | 716.21 | 247.5 |
| 115. | 21.008 | 0.797 | -12.549 | 92.18 | 47.35 | 70.12 | 1902.3 | 620.74 | 243.3 |
| 120. | 20.835 | 0.770 | -12.199 | 95.16 | 46.76 | 69.88 | 1867.6 | 545.03 | 239.0 |
| 125. | 20.662 | 0.745 | -11.850 | 98.01 | 46.18 | 69.62 | 1833.0 | 483.95 | 234.5 |
| 130. | 20.489 | 0.722 | -11.503 | 100.73 | 45.64 | 69.39 | 1798.5 | 433.88 | 230.0 |
| 135. | 20.316 | 0.702 | -11.156 | 103.35 | 45.16 | 69.20 | 1764.1 | 392.24 | 225.5 |
| 140. | 20.143 | 0.682 | -10.811 | 105.86 | 44.74 | 69.07 | 1729.9 | 357.15 | 220.9 |
| 145. | 19.968 | 0.665 | -10.466 | 108.29 | 44.38 | 69.01 | 1695.7 | 327.24 | 216.3 |
| 150. | 19.793 | 0.648 | -10.121 | 110.63 | 44.09 | 69.02 | 1661.7 | 301.46 | 211.6 |
| 155. | 19.618 | 0.633 | -9.775 | 112.89 | 43.85 | 69.09 | 1627.8 | 279.03 | 207.0 |
| 160. | 19.441 | 0.619 | -9.430 | 115.09 | 43.67 | 69.23 | 1594.0 | 259.32 | 202.4 |
| 165. | 19.264 | 0.605 | -9.083 | 117.22 | 43.53 | 69.42 | 1560.3 | 241.88 | 197.8 |
| 170. | 19.085 | 0.593 | -8.735 | 119.29 | 43.44 | 69.66 | 1526.8 | 226.31 | 193.2 |
| 175. | 18.905 | 0.582 | -8.386 | 121.32 | 43.39 | 69.95 | 1493.4 | 212.34 | 188.6 |
| 180. | 18.724 | 0.571 | -8.036 | 123.29 | 43.38 | 70.28 | 1460.2 | 199.71 | 184.1 |
| 185. | 18.541 | 0.561 | -7.683 | 125.22 | 43.41 | 70.66 | 1427.0 | 188.23 | 179.7 |
| 190. | 18.357 | 0.552 | -7.329 | 127.11 | 43.47 | 71.07 | 1394.1 | 177.75 | 175.2 |
| 195. | 18.171 | 0.543 | -6.973 | 128.96 | 43.55 | 71.53 | 1361.2 | 168.13 | 170.9 |
| 200. | 17.984 | 0.535 | -6.614 | 130.78 | 43.67 | 72.02 | 1328.5 | 159.27 | 166.6 |
| 205. | 17.794 | 0.528 | -6.252 | 132.57 | 43.82 | 72.55 | 1296.0 | 151.07 | 162.3 |
| 210. | 17.602 | 0.521 | -5.888 | 134.32 | 43.99 | 73.11 | 1263.6 | 143.46 | 158.2 |
| 215. | 17.408 | 0.514 | -5.521 | 136.05 | 44.18 | 73.70 | 1231.4 | 136.37 | 154.1 |
| 220. | 17.212 | 0.508 | -5.151 | 137.75 | 44.40 | 74.34 | 1199.3 | 129.75 | 150.0 |
| 225. | 17.013 | 0.503 | -4.778 | 139.43 | 44.64 | 75.00 | 1167.4 | 123.55 | 146.1 |
| 230. | 16.812 | 0.498 | -4.401 | 141.08 | 44.90 | 75.71 | 1135.7 | 117.73 | 142.2 |
| 235. | 16.607 | 0.493 | -4.021 | 142.72 | 45.18 | 76.45 | 1104.1 | 112.25 | 138.4 |
| 240. | 16.400 | 0.489 | -3.637 | 144.34 | 45.49 | 77.23 | 1072.7 | 107.08 | 134.6 |
| 245. | 16.189 | 0.485 | -3.248 | 145.94 | 45.81 | 78.05 | 1041.5 | 102.20 | 131.0 |
| 250. | 15.975 | 0.482 | -2.856 | 147.52 | 46.15 | 78.91 | 1010.5 | 97.58 | 127.4 |
| 255. | 15.758 | 0.479 | -2.459 | 149.10 | 46.51 | 79.82 | 979.7 | 93.19 | 123.9 |
| 260. | 15.536 | 0.476 | -2.058 | 150.65 | 46.89 | 80.77 | 949.0 | 89.03 | 120.5 |
| 265. | 15.310 | 0.474 | -1.651 | 152.20 | 47.29 | 81.78 | 918.6 | 85.06 | 117.2 |
| 270. | 15.080 | 0.473 | -1.240 | 153.74 | 47.70 | 82.84 | 888.4 | 81.29 | 113.9 |
| 275. | 14.845 | 0.471 | -0.823 | 155.27 | 48.13 | 83.95 | 858.4 | 77.69 | 110.8 |
| 280. | 14.605 | 0.471 | -0.400 | 156.79 | 48.58 | 85.13 | 828.6 | 74.25 | 107.7 |
| 285. | 14.359 | 0.470 | 0.029 | 158.31 | 49.04 | 86.38 | 799.1 | 70.96 | 104.7 |
| 290. | 14.107 | 0.470 | 0.464 | 159.83 | 49.52 | 87.70 | 769.8 | 67.81 | 101.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 16.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 13.848 | 0.471 | 0.906 | 161.34 | 50.01 | 89.09 | 740.9 | 64.78 | 98.9 |
| 300. | 13.583 | 0.472 | 1.355 | 162.85 | 50.52 | 90.57 | 712.3 | 61.88 | 96.2 |
| 310. | 13.030 | 0.476 | 2.276 | 165.87 | 51.58 | 93.76 | 656.3 | 56.42 | 90.9 |
| 320. | 12.443 | 0.483 | 3.231 | 168.90 | 52.70 | 97.28 | 602.5 | 51.38 | 86.0 |
| 330. | 11.821 | 0.493 | 4.222 | 171.95 | 53.87 | 101.04 | 551.9 | 46.72 | 81.4 |
| 340. | 11.165 | 0.507 | 5.252 | 175.02 | 55.07 | 104.85 | 505.8 | 42.45 | 77.2 |
| 350. | 10.480 | 0.525 | 6.318 | 178.11 | 56.26 | 108.32 | 465.5 | 38.57 | 73.4 |
| 360. | 9.782 | 0.546 | 7.415 | 181.20 | 57.41 | 110.82 | 432.2 | 35.14 | 70.1 |
| 370. | 9.092 | 0.572 | 8.530 | 184.26 | 58.53 | 111.84 | 406.4 | 32.18 | 67.3 |
| 380. | 8.436 | 0.600 | 9.647 | 187.24 | 59.60 | 111.37 | 388.0 | 29.73 | 65.0 |
| 390. | 7.831 | 0.630 | 10.754 | 190.11 | 60.64 | 109.80 | 375.7 | 27.74 | 63.2 |
| 400. | 7.289 | 0.660 | 11.841 | 192.86 | 61.65 | 107.56 | 368.3 | 26.16 | 61.9 |
| 410. | 6.810 | 0.689 | 12.904 | 195.49 | 62.64 | 105.04 | 364.7 | 24.92 | 61.0 |
| 420. | 6.390 | 0.717 | 13.942 | 197.99 | 63.62 | 102.59 | 363.9 | 23.96 | 60.5 |
| 430. | 6.024 | 0.743 | 14.956 | 200.38 | 64.60 | 100.40 | 365.1 | 23.22 | 60.3 |
| 440. | 5.703 | 0.767 | 15.951 | 202.66 | 65.59 | 98.57 | 367.6 | 22.65 | 60.4 |
| 450. | 5.421 | 0.789 | 16.929 | 204.86 | 66.60 | 97.11 | 371.0 | 22.22 | 60.8 |
| 460. | 5.171 | 0.809 | 17.894 | 206.98 | 67.61 | 95.99 | 375.0 | 21.88 | 61.4 |
| 470. | 4.949 | 0.827 | 18.850 | 209.04 | 68.64 | 95.17 | 379.4 | 21.63 | 62.1 |
| 480. | 4.749 | 0.844 | 19.799 | 211.04 | 69.68 | 94.60 | 384.0 | 21.45 | 63.0 |
| 490. | 4.569 | 0.860 | 20.743 | 212.98 | 70.72 | 94.25 | 388.8 | 21.32 | 64.0 |
| 500. | 4.405 | 0.874 | 21.684 | 214.88 | 71.77 | 94.08 | 393.6 | 21.23 | 65.2 |
| 520. | 4.119 | 0.898 | 23.566 | 218.57 | 73.87 | 94.17 | 403.4 | | 67.7 |
| 540. | 3.876 | 0.919 | 25.454 | 222.14 | 75.96 | 94.68 | 413.0 | | 70.5 |
| 560. | 3.666 | 0.937 | 27.355 | 225.59 | 78.03 | 95.49 | 422.5 | | 73.5 |
| 580. | 3.483 | 0.953 | 29.274 | 228.96 | 80.08 | 96.50 | 431.7 | | 76.7 |
| 600. | 3.321 | 0.966 | 31.216 | 232.25 | 82.11 | 97.67 | 440.6 | | 80.1 |
| 625. | 3.143 | 0.980 | 33.678 | 236.27 | 84.59 | 99.27 | 451.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 17.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.703 | 0.992 | -13.905 | 78.79 | 47.88 | 67.81 | 2042.0 | 1226.77 | 259.4 |
| 100. | 21.534 | 0.949 | -13.561 | 82.32 | 48.38 | 69.39 | 2009.5 | 1008.35 | 255.9 |
| 105. | 21.364 | 0.911 | -13.212 | 85.72 | 48.31 | 70.05 | 1975.6 | 845.55 | 252.0 |
| 110. | 21.193 | 0.877 | -12.861 | 88.98 | 47.92 | 70.20 | 1941.1 | 721.58 | 248.0 |
| 115. | 21.021 | 0.846 | -12.511 | 92.10 | 47.38 | 70.09 | 1906.5 | 625.20 | 243.8 |
| 120. | 20.849 | 0.817 | -12.161 | 95.08 | 46.80 | 69.85 | 1871.9 | 548.83 | 239.5 |
| 125. | 20.677 | 0.791 | -11.812 | 97.93 | 46.22 | 69.59 | 1837.4 | 487.24 | 235.1 |
| 130. | 20.505 | 0.767 | -11.465 | 100.65 | 45.68 | 69.35 | 1803.1 | 436.78 | 230.6 |
| 135. | 20.332 | 0.745 | -11.119 | 103.27 | 45.20 | 69.15 | 1768.8 | 394.84 | 226.1 |
| 140. | 20.160 | 0.724 | -10.773 | 105.78 | 44.78 | 69.02 | 1734.7 | 359.52 | 221.5 |
| 145. | 19.986 | 0.706 | -10.428 | 108.20 | 44.42 | 68.96 | 1700.7 | 329.41 | 216.9 |
| 150. | 19.812 | 0.688 | -10.083 | 110.54 | 44.13 | 68.96 | 1666.9 | 303.47 | 212.3 |
| 155. | 19.638 | 0.672 | -9.739 | 112.80 | 43.89 | 69.03 | 1633.2 | 280.90 | 207.7 |
| 160. | 19.462 | 0.657 | -9.393 | 114.99 | 43.71 | 69.16 | 1599.6 | 261.09 | 203.0 |
| 165. | 19.286 | 0.643 | -9.047 | 117.12 | 43.57 | 69.34 | 1566.1 | 243.55 | 198.5 |
| 170. | 19.108 | 0.629 | -8.700 | 119.20 | 43.48 | 69.57 | 1532.8 | 227.91 | 193.9 |
| 175. | 18.929 | 0.617 | -8.351 | 121.22 | 43.44 | 69.86 | 1499.6 | 213.86 | 189.3 |
| 180. | 18.749 | 0.606 | -8.001 | 123.19 | 43.43 | 70.18 | 1466.6 | 201.18 | 184.9 |
| 185. | 18.568 | 0.595 | -7.649 | 125.12 | 43.45 | 70.55 | 1433.7 | 189.65 | 180.4 |
| 190. | 18.385 | 0.585 | -7.295 | 127.00 | 43.51 | 70.95 | 1401.0 | 179.13 | 176.0 |
| 195. | 18.201 | 0.576 | -6.940 | 128.85 | 43.60 | 71.40 | 1368.4 | 169.47 | 171.7 |
| 200. | 18.014 | 0.567 | -6.581 | 130.67 | 43.71 | 71.88 | 1336.0 | 160.58 | 167.4 |
| 205. | 17.826 | 0.559 | -6.221 | 132.45 | 43.86 | 72.39 | 1303.7 | 152.35 | 163.2 |
| 210. | 17.636 | 0.552 | -5.857 | 134.20 | 44.03 | 72.94 | 1271.7 | 144.72 | 159.0 |
| 215. | 17.444 | 0.545 | -5.491 | 135.92 | 44.22 | 73.52 | 1239.7 | 137.61 | 154.9 |
| 220. | 17.250 | 0.539 | -5.122 | 137.62 | 44.44 | 74.13 | 1208.0 | 130.97 | 150.9 |
| 225. | 17.054 | 0.533 | -4.750 | 139.29 | 44.68 | 74.78 | 1176.5 | 124.75 | 147.0 |
| 230. | 16.855 | 0.527 | -4.374 | 140.94 | 44.94 | 75.46 | 1145.1 | 118.92 | 143.1 |
| 235. | 16.653 | 0.522 | -3.995 | 142.57 | 45.22 | 76.18 | 1113.9 | 113.43 | 139.3 |
| 240. | 16.448 | 0.518 | -3.613 | 144.18 | 45.53 | 76.93 | 1083.0 | 108.26 | 135.6 |
| 245. | 16.241 | 0.514 | -3.226 | 145.78 | 45.85 | 77.72 | 1052.2 | 103.37 | 132.0 |
| 250. | 16.030 | 0.510 | -2.835 | 147.36 | 46.19 | 78.55 | 1021.6 | 98.75 | 128.4 |
| 255. | 15.816 | 0.507 | -2.440 | 148.92 | 46.55 | 79.42 | 991.3 | 94.36 | 125.0 |
| 260. | 15.599 | 0.504 | -2.041 | 150.47 | 46.93 | 80.33 | 961.2 | 90.20 | 121.6 |
| 265. | 15.377 | 0.502 | -1.637 | 152.01 | 47.32 | 81.28 | 931.3 | 86.25 | 118.3 |
| 270. | 15.152 | 0.500 | -1.228 | 153.54 | 47.73 | 82.29 | 901.6 | 82.48 | 115.1 |
| 275. | 14.922 | 0.498 | -0.814 | 155.06 | 48.16 | 83.34 | 872.3 | 78.89 | 112.0 |
| 280. | 14.688 | 0.497 | -0.395 | 156.57 | 48.60 | 84.45 | 843.1 | 75.46 | 108.9 |
| 285. | 14.448 | 0.497 | 0.031 | 158.08 | 49.06 | 85.61 | 814.3 | 72.18 | 105.9 |
| 290. | 14.203 | 0.496 | 0.462 | 159.57 | 49.53 | 86.83 | 785.8 | 69.05 | 103.1 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 17.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 13.953 | 0.497 | 0.899 | 161.07 | 50.02 | 88.12 | 757.6 | 66.05 | 100.3 |
| 300. | 13.697 | 0.498 | 1.343 | 162.56 | 50.53 | 89.46 | 729.8 | 63.17 | 97.6 |
| 310. | 13.165 | 0.501 | 2.252 | 165.54 | 51.57 | 92.35 | 675.4 | 57.77 | 92.4 |
| 320. | 12.605 | 0.507 | 3.191 | 168.52 | 52.67 | 95.49 | 623.3 | 52.79 | 87.6 |
| 330. | 12.016 | 0.516 | 4.162 | 171.51 | 53.82 | 98.80 | 574.2 | 48.21 | 83.1 |
| 340. | 11.399 | 0.528 | 5.167 | 174.51 | 54.99 | 102.14 | 529.2 | 44.01 | 79.0 |
| 350. | 10.758 | 0.543 | 6.204 | 177.52 | 56.17 | 105.23 | 489.2 | 40.20 | 75.3 |
| 360. | 10.103 | 0.562 | 7.269 | 180.52 | 57.32 | 107.67 | 455.4 | 36.81 | 72.0 |
| 370. | 9.453 | 0.585 | 8.354 | 183.49 | 58.45 | 109.02 | 428.3 | 33.85 | 69.3 |
| 380. | 8.825 | 0.610 | 9.446 | 186.40 | 59.55 | 109.16 | 407.9 | 31.33 | 66.9 |
| 390. | 8.236 | 0.637 | 10.534 | 189.23 | 60.61 | 108.32 | 393.4 | 29.26 | 65.1 |
| 400. | 7.698 | 0.664 | 11.610 | 191.95 | 61.65 | 106.80 | 383.8 | 27.57 | 63.7 |
| 410. | 7.214 | 0.691 | 12.668 | 194.57 | 62.66 | 104.91 | 378.1 | 26.22 | 62.8 |
| 420. | 6.783 | 0.718 | 13.708 | 197.07 | 63.67 | 102.91 | 375.5 | 25.14 | 62.2 |
| 430. | 6.402 | 0.743 | 14.727 | 199.47 | 64.67 | 101.02 | 375.1 | 24.30 | 61.9 |
| 440. | 6.066 | 0.766 | 15.729 | 201.77 | 65.67 | 99.36 | 376.3 | 23.64 | 61.9 |
| 450. | 5.768 | 0.788 | 16.715 | 203.99 | 66.68 | 97.97 | 378.6 | 23.12 | 62.2 |
| 460. | 5.502 | 0.808 | 17.689 | 206.13 | 67.70 | 96.88 | 381.8 | 22.71 | 62.7 |
| 470. | 5.265 | 0.826 | 18.654 | 208.20 | 68.73 | 96.05 | 385.5 | 22.40 | 63.3 |
| 480. | 5.052 | 0.843 | 19.611 | 210.22 | 69.77 | 95.45 | 389.5 | 22.16 | 64.2 |
| 490. | 4.860 | 0.859 | 20.563 | 212.18 | 70.81 | 95.07 | 393.9 | 21.98 | 65.1 |
| 500. | 4.684 | 0.873 | 21.513 | 214.10 | 71.85 | 94.85 | 398.3 | 21.85 | 66.2 |
| 520. | 4.378 | 0.898 | 23.409 | 217.82 | 73.95 | 94.86 | 407.5 | | 68.6 |
| 540. | 4.118 | 0.920 | 25.310 | 221.41 | 76.03 | 95.29 | 416.8 | | 71.3 |
| 560. | 3.893 | 0.938 | 27.223 | 224.89 | 78.10 | 96.03 | 425.9 | | 74.2 |
| 580. | 3.697 | 0.954 | 29.153 | 228.27 | 80.15 | 96.99 | 434.9 | | 77.4 |
| 600. | 3.524 | 0.967 | 31.104 | 231.58 | 82.16 | 98.11 | 443.7 | | 80.6 |
| 625. | 3.333 | 0.981 | 33.576 | 235.61 | 84.64 | 99.66 | 454.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 18.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.714 | 10.049 | -13.865 | 78.72 | 47.88 | 67.76 | 2046.1 | 1238.04 | 259.8 |
| 100. | 21.546 | 10.005 | -13.522 | 82.24 | 48.40 | 69.35 | 2013.5 | 1016.88 | 256.3 |
| 105. | 21.376 | 0.965 | -13.173 | 85.65 | 48.33 | 70.02 | 1979.6 | 852.24 | 252.5 |
| 110. | 21.206 | 0.928 | -12.823 | 88.91 | 47.95 | 70.17 | 1945.2 | 726.99 | 248.5 |
| 115. | 21.035 | 0.895 | -12.472 | 92.03 | 47.42 | 70.06 | 1910.7 | 629.70 | 244.3 |
| 120. | 20.863 | 0.865 | -12.122 | 95.00 | 46.83 | 69.82 | 1876.2 | 552.65 | 240.0 |
| 125. | 20.692 | 0.837 | -11.774 | 97.85 | 46.26 | 69.55 | 1841.9 | 490.55 | 235.6 |
| 130. | 20.521 | 0.812 | -11.427 | 100.57 | 45.72 | 69.31 | 1807.6 | 439.71 | 231.2 |
| 135. | 20.349 | 0.788 | -11.081 | 103.18 | 45.24 | 69.11 | 1773.5 | 397.46 | 226.6 |
| 140. | 20.177 | 0.766 | -10.735 | 105.69 | 44.82 | 68.98 | 1739.6 | 361.89 | 222.1 |
| 145. | 20.004 | 0.746 | -10.391 | 108.11 | 44.47 | 68.91 | 1705.7 | 331.59 | 217.5 |
| 150. | 19.831 | 0.728 | -10.046 | 110.45 | 44.17 | 68.91 | 1672.0 | 305.49 | 212.9 |
| 155. | 19.657 | 0.711 | -9.702 | 112.71 | 43.93 | 68.97 | 1638.5 | 282.79 | 208.3 |
| 160. | 19.482 | 0.694 | -9.357 | 114.90 | 43.75 | 69.09 | 1605.1 | 262.86 | 203.7 |
| 165. | 19.307 | 0.680 | -9.011 | 117.03 | 43.62 | 69.26 | 1571.8 | 245.23 | 199.1 |
| 170. | 19.131 | 0.666 | -8.664 | 119.10 | 43.53 | 69.49 | 1538.7 | 229.51 | 194.6 |
| 175. | 18.953 | 0.653 | -8.316 | 121.12 | 43.48 | 69.76 | 1505.7 | 215.39 | 190.1 |
| 180. | 18.774 | 0.641 | -7.966 | 123.09 | 43.47 | 70.08 | 1472.9 | 202.65 | 185.6 |
| 185. | 18.594 | 0.629 | -7.615 | 125.01 | 43.49 | 70.44 | 1440.3 | 191.07 | 181.2 |
| 190. | 18.412 | 0.619 | -7.262 | 126.90 | 43.55 | 70.84 | 1407.8 | 180.50 | 176.8 |
| 195. | 18.229 | 0.609 | -6.906 | 128.74 | 43.64 | 71.27 | 1375.5 | 170.81 | 172.5 |
| 200. | 18.045 | 0.600 | -6.549 | 130.55 | 43.76 | 71.74 | 1343.3 | 161.88 | 168.2 |
| 205. | 17.858 | 0.591 | -6.189 | 132.33 | 43.90 | 72.24 | 1311.4 | 153.63 | 164.0 |
| 210. | 17.670 | 0.583 | -5.826 | 134.08 | 44.07 | 72.77 | 1279.6 | 145.97 | 159.9 |
| 215. | 17.480 | 0.576 | -5.461 | 135.79 | 44.27 | 73.34 | 1248.0 | 138.84 | 155.8 |
| 220. | 17.288 | 0.569 | -5.093 | 137.49 | 44.48 | 73.94 | 1216.6 | 132.18 | 151.8 |
| 225. | 17.093 | 0.563 | -4.722 | 139.16 | 44.72 | 74.56 | 1185.4 | 125.95 | 147.9 |
| 230. | 16.897 | 0.557 | -4.347 | 140.80 | 44.98 | 75.23 | 1154.4 | 120.11 | 144.1 |
| 235. | 16.698 | 0.552 | -3.969 | 142.43 | 45.27 | 75.92 | 1123.6 | 114.61 | 140.3 |
| 240. | 16.496 | 0.547 | -3.588 | 144.03 | 45.57 | 76.65 | 1093.0 | 109.43 | 136.6 |
| 245. | 16.291 | 0.542 | -3.203 | 145.62 | 45.89 | 77.41 | 1062.6 | 104.54 | 133.0 |
| 250. | 16.084 | 0.538 | -2.814 | 147.19 | 46.23 | 78.21 | 1032.5 | 99.91 | 129.5 |
| 255. | 15.873 | 0.535 | -2.421 | 148.75 | 46.59 | 79.04 | 1002.6 | 95.52 | 126.0 |
| 260. | 15.660 | 0.532 | -2.023 | 150.29 | 46.96 | 79.92 | 973.0 | 91.36 | 122.7 |
| 265. | 15.442 | 0.529 | -1.622 | 151.82 | 47.36 | 80.83 | 943.6 | 87.41 | 119.4 |
| 270. | 15.221 | 0.527 | -1.215 | 153.34 | 47.76 | 81.78 | 914.5 | 83.65 | 116.2 |
| 275. | 14.996 | 0.525 | -0.804 | 154.85 | 48.19 | 82.78 | 885.7 | 80.06 | 113.1 |
| 280. | 14.767 | 0.524 | -0.387 | 156.35 | 48.63 | 83.82 | 857.1 | 76.64 | 110.1 |
| 285. | 14.534 | 0.523 | 0.035 | 157.85 | 49.09 | 84.91 | 828.9 | 73.38 | 107.2 |
| 290. | 14.296 | 0.522 | 0.462 | 159.33 | 49.56 | 86.06 | 801.0 | 70.26 | 104.3 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 18.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | μPa•s | mW/(m•K) |
| 295. | 14.053 | 0.522 | 0.895 | 160.82 | 50.04 | 87.25 | 773.5 | 67.28 | 101.6 |
| 300. | 13.804 | 0.523 | 1.335 | 162.29 | 50.54 | 88.49 | 746.4 | 64.42 | 98.9 |
| 310. | 13.291 | 0.525 | 2.233 | 165.24 | 51.57 | 91.13 | 693.6 | 59.06 | 93.8 |
| 320. | 12.754 | 0.530 | 3.158 | 168.17 | 52.65 | 93.96 | 642.9 | 54.14 | 89.1 |
| 330. | 12.193 | 0.538 | 4.112 | 171.11 | 53.78 | 96.92 | 595.2 | 49.62 | 84.7 |
| 340. | 11.608 | 0.549 | 5.096 | 174.05 | 54.93 | 99.89 | 551.1 | 45.48 | 80.7 |
| 350. | 11.003 | 0.562 | 6.110 | 176.98 | 56.10 | 102.69 | 511.7 | 41.73 | 77.1 |
| 360. | 10.387 | 0.579 | 7.149 | 179.91 | 57.25 | 105.00 | 477.6 | 38.36 | 73.9 |
| 370. | 9.771 | 0.599 | 8.207 | 182.81 | 58.38 | 106.52 | 449.6 | 35.41 | 71.1 |
| 380. | 9.171 | 0.621 | 9.276 | 185.66 | 59.49 | 107.07 | 427.6 | 32.86 | 68.8 |
| 390. | 8.601 | 0.645 | 10.346 | 188.44 | 60.58 | 106.76 | 411.3 | 30.71 | 67.0 |
| 400. | 8.072 | 0.671 | 11.409 | 191.13 | 61.64 | 105.80 | 399.9 | 28.94 | 65.5 |
| 410. | 7.589 | 0.696 | 12.460 | 193.73 | 62.68 | 104.45 | 392.3 | 27.49 | 64.5 |
| 420. | 7.152 | 0.721 | 13.497 | 196.23 | 63.70 | 102.89 | 387.9 | 26.32 | 63.8 |
| 430. | 6.762 | 0.745 | 14.518 | 198.63 | 64.72 | 101.33 | 386.0 | 25.38 | 63.5 |
| 440. | 6.413 | 0.767 | 15.524 | 200.94 | 65.73 | 99.87 | 385.9 | 24.63 | 63.4 |
| 450. | 6.102 | 0.788 | 16.516 | 203.17 | 66.75 | 98.62 | 387.1 | 24.03 | 63.6 |
| 460. | 5.824 | 0.808 | 17.497 | 205.33 | 67.78 | 97.58 | 389.3 | 23.56 | 64.0 |
| 470. | 5.574 | 0.826 | 18.469 | 207.42 | 68.81 | 96.78 | 392.3 | 23.18 | 64.6 |
| 480. | 5.348 | 0.843 | 19.433 | 209.45 | 69.85 | 96.19 | 395.7 | 22.89 | 65.3 |
| 490. | 5.144 | 0.859 | 20.393 | 211.43 | 70.89 | 95.78 | 399.5 | 22.66 | 66.2 |
| 500. | 4.958 | 0.873 | 21.350 | 213.36 | 71.93 | 95.55 | 403.6 | 22.49 | 67.2 |
| 520. | 4.633 | 0.899 | 23.259 | 217.11 | 74.02 | 95.49 | 412.1 | | 69.5 |
| 540. | 4.356 | 0.920 | 25.172 | 220.71 | 76.10 | 95.86 | 420.9 | | 72.1 |
| 560. | 4.117 | 0.939 | 27.096 | 224.21 | 78.17 | 96.55 | 429.7 | | 75.0 |
| 580. | 3.909 | 0.955 | 29.035 | 227.62 | 80.21 | 97.46 | 438.5 | | 78.0 |
| 600. | 3.724 | 0.969 | 30.995 | 230.94 | 82.22 | 98.53 | 447.1 | | 81.2 |
| 625. | 3.522 | 0.983 | 33.477 | 234.99 | 84.69 | 100.03 | 457.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 19.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.725 | 1.107 | -13.826 | 78.65 | 47.87 | 67.71 | 2050.1 | 1249.47 | 260.3 |
| 100. | 21.558 | 1.060 | -13.483 | 82.17 | 48.41 | 69.31 | 2017.6 | 1025.53 | 256.8 |
| 105. | 21.389 | 1.018 | -13.134 | 85.57 | 48.36 | 69.99 | 1983.7 | 859.02 | 253.0 |
| 110. | 21.219 | 0.979 | -12.784 | 88.83 | 47.98 | 70.14 | 1949.3 | 732.46 | 249.0 |
| 115. | 21.048 | 0.944 | -12.433 | 91.95 | 47.45 | 70.02 | 1914.9 | 634.23 | 244.8 |
| 120. | 20.878 | 0.912 | -12.084 | 94.92 | 46.87 | 69.79 | 1880.5 | 556.50 | 240.5 |
| 125. | 20.707 | 0.883 | -11.736 | 97.77 | 46.29 | 69.52 | 1846.3 | 493.89 | 236.2 |
| 130. | 20.536 | 0.856 | -11.389 | 100.49 | 45.76 | 69.27 | 1812.1 | 442.65 | 231.7 |
| 135. | 20.365 | 0.831 | -11.043 | 103.10 | 45.28 | 69.07 | 1778.2 | 400.09 | 227.2 |
| 140. | 20.193 | 0.808 | -10.698 | 105.61 | 44.86 | 68.93 | 1744.4 | 364.28 | 222.7 |
| 145. | 20.022 | 0.787 | -10.353 | 108.03 | 44.51 | 68.86 | 1710.7 | 333.78 | 218.1 |
| 150. | 19.849 | 0.768 | -10.009 | 110.36 | 44.21 | 68.85 | 1677.1 | 307.51 | 213.5 |
| 155. | 19.676 | 0.749 | -9.665 | 112.62 | 43.98 | 68.91 | 1643.8 | 284.68 | 209.0 |
| 160. | 19.503 | 0.732 | -9.320 | 114.81 | 43.79 | 69.02 | 1610.5 | 264.64 | 204.4 |
| 165. | 19.328 | 0.717 | -8.974 | 116.93 | 43.66 | 69.19 | 1577.5 | 246.91 | 199.8 |
| 170. | 19.153 | 0.702 | -8.628 | 119.00 | 43.57 | 69.41 | 1544.6 | 231.11 | 195.3 |
| 175. | 18.976 | 0.688 | -8.280 | 121.02 | 43.52 | 69.68 | 1511.8 | 216.93 | 190.8 |
| 180. | 18.799 | 0.675 | -7.931 | 122.99 | 43.51 | 69.99 | 1479.2 | 204.12 | 186.3 |
| 185. | 18.620 | 0.663 | -7.580 | 124.91 | 43.54 | 70.34 | 1446.8 | 192.49 | 181.9 |
| 190. | 18.440 | 0.652 | -7.228 | 126.79 | 43.59 | 70.72 | 1414.5 | 181.88 | 177.6 |
| 195. | 18.258 | 0.642 | -6.873 | 128.63 | 43.68 | 71.15 | 1382.5 | 172.15 | 173.3 |
| 200. | 18.075 | 0.632 | -6.516 | 130.44 | 43.80 | 71.60 | 1350.6 | 163.19 | 169.0 |
| 205. | 17.890 | 0.623 | -6.157 | 132.21 | 43.94 | 72.09 | 1318.9 | 154.90 | 164.8 |
| 210. | 17.703 | 0.615 | -5.795 | 133.96 | 44.11 | 72.61 | 1287.4 | 147.22 | 160.7 |
| 215. | 17.515 | 0.607 | -5.431 | 135.67 | 44.31 | 73.17 | 1256.1 | 140.07 | 156.7 |
| 220. | 17.325 | 0.600 | -5.063 | 137.36 | 44.52 | 73.75 | 1225.0 | 133.40 | 152.7 |
| 225. | 17.133 | 0.593 | -4.693 | 139.02 | 44.76 | 74.36 | 1194.1 | 127.15 | 148.8 |
| 230. | 16.938 | 0.587 | -4.320 | 140.66 | 45.03 | 75.00 | 1163.4 | 121.29 | 145.0 |
| 235. | 16.741 | 0.581 | -3.943 | 142.28 | 45.31 | 75.68 | 1133.0 | 115.78 | 141.2 |
| 240. | 16.542 | 0.576 | -3.563 | 143.89 | 45.61 | 76.38 | 1102.8 | 110.59 | 137.6 |
| 245. | 16.340 | 0.571 | -3.179 | 145.47 | 45.93 | 77.12 | 1072.8 | 105.69 | 134.0 |
| 250. | 16.136 | 0.566 | -2.792 | 147.03 | 46.27 | 77.89 | 1043.1 | 101.06 | 130.5 |
| 255. | 15.929 | 0.563 | -2.400 | 148.58 | 46.63 | 78.69 | 1013.6 | 96.67 | 127.1 |
| 260. | 15.718 | 0.559 | -2.005 | 150.12 | 47.00 | 79.53 | 984.5 | 92.51 | 123.7 |
| 265. | 15.505 | 0.556 | -1.605 | 151.64 | 47.39 | 80.40 | 955.5 | 88.56 | 120.5 |
| 270. | 15.288 | 0.554 | -1.201 | 153.15 | 47.80 | 81.31 | 926.9 | 84.80 | 117.3 |
| 275. | 15.068 | 0.551 | -0.792 | 154.66 | 48.22 | 82.26 | 898.6 | 81.22 | 114.3 |
| 280. | 14.844 | 0.550 | -0.378 | 156.15 | 48.66 | 83.25 | 870.6 | 77.81 | 111.3 |
| 285. | 14.616 | 0.549 | 0.041 | 157.63 | 49.11 | 84.28 | 843.0 | 74.56 | 108.4 |
| 290. | 14.384 | 0.548 | 0.465 | 159.10 | 49.58 | 85.35 | 815.7 | 71.45 | 105.6 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 19.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 14.147 | 0.548 | 0.894 | 160.57 | 50.06 | 86.46 | 788.8 | 68.48 | 102.8 |
| 300. | 13.906 | 0.548 | 1.330 | 162.03 | 50.55 | 87.62 | 762.3 | 65.63 | 100.2 |
| 310. | 13.410 | 0.550 | 2.218 | 164.95 | 51.58 | 90.06 | 710.8 | 60.31 | 95.2 |
| 320. | 12.893 | 0.554 | 3.131 | 167.85 | 52.64 | 92.64 | 661.5 | 55.43 | 90.5 |
| 330. | 12.355 | 0.560 | 4.071 | 170.74 | 53.75 | 95.32 | 614.9 | 50.96 | 86.2 |
| 340. | 11.798 | 0.570 | 5.038 | 173.62 | 54.89 | 98.01 | 571.8 | 46.87 | 82.3 |
| 350. | 11.224 | 0.582 | 6.031 | 176.50 | 56.04 | 100.55 | 532.9 | 43.16 | 78.7 |
| 360. | 10.640 | 0.597 | 7.048 | 179.37 | 57.19 | 102.74 | 498.8 | 39.83 | 75.6 |
| 370. | 10.055 | 0.614 | 8.083 | 182.21 | 58.33 | 104.33 | 470.1 | 36.87 | 72.9 |
| 380. | 9.481 | 0.634 | 9.131 | 185.00 | 59.45 | 105.15 | 447.0 | 34.30 | 70.6 |
| 390. | 8.931 | 0.656 | 10.184 | 187.73 | 60.55 | 105.22 | 429.2 | 32.11 | 68.7 |
| 400. | 8.413 | 0.679 | 11.234 | 190.39 | 61.62 | 104.70 | 416.1 | 30.27 | 67.2 |
| 410. | 7.935 | 0.702 | 12.277 | 192.97 | 62.68 | 103.78 | 407.0 | 28.74 | 66.2 |
| 420. | 7.497 | 0.726 | 13.309 | 195.45 | 63.72 | 102.62 | 401.0 | 27.48 | 65.4 |
| 430. | 7.101 | 0.748 | 14.329 | 197.85 | 64.76 | 101.37 | 397.6 | 26.46 | 65.0 |
| 440. | 6.744 | 0.770 | 15.336 | 200.17 | 65.78 | 100.15 | 396.2 | 25.62 | 64.9 |
| 450. | 6.423 | 0.791 | 16.332 | 202.41 | 66.81 | 99.05 | 396.3 | 24.95 | 65.0 |
| 460. | 6.134 | 0.810 | 17.318 | 204.58 | 67.84 | 98.12 | 397.6 | 24.41 | 65.3 |
| 470. | 5.873 | 0.828 | 18.295 | 206.68 | 68.88 | 97.37 | 399.8 | 23.98 | 65.8 |
| 480. | 5.637 | 0.845 | 19.266 | 208.72 | 69.92 | 96.80 | 402.6 | 23.63 | 66.5 |
| 490. | 5.422 | 0.860 | 20.232 | 210.71 | 70.96 | 96.40 | 405.8 | 23.36 | 67.3 |
| 500. | 5.227 | 0.874 | 21.194 | 212.66 | 72.00 | 96.16 | 409.4 | 23.14 | 68.2 |
| 520. | 4.883 | 0.900 | 23.116 | 216.43 | 74.09 | 96.06 | 417.2 | | 70.4 |
| 540. | 4.590 | 0.922 | 25.040 | 220.06 | 76.17 | 96.39 | 425.4 | | 72.9 |
| 560. | 4.338 | 0.941 | 26.974 | 223.57 | 78.23 | 97.03 | 433.9 | | 75.7 |
| 580. | 4.117 | 0.957 | 28.922 | 226.99 | 80.26 | 97.89 | 442.3 | | 78.7 |
| 600. | 3.923 | 0.971 | 30.890 | 230.33 | 82.27 | 98.93 | 450.7 | | 81.8 |
| 625. | 3.709 | 0.986 | 33.382 | 234.39 | 84.74 | 100.39 | 460.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 20.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 95. | 21.737 | 1.165 | -13.787 | 78.58 | 47.87 | 67.66 | 2054.1 | 1261.07 | 260.7 |
| 100. | 21.570 | 1.115 | -13.444 | 82.10 | 48.42 | 69.27 | 2021.6 | 1034.29 | 257.2 |
| 105. | 21.401 | 1.070 | -13.095 | 85.50 | 48.38 | 69.96 | 1987.7 | 865.87 | 253.4 |
| 110. | 21.231 | 1.030 | -12.745 | 88.76 | 48.01 | 70.11 | 1953.4 | 737.99 | 249.5 |
| 115. | 21.062 | 0.993 | -12.395 | 91.87 | 47.48 | 69.99 | 1919.0 | 638.82 | 245.3 |
| 120. | 20.891 | 0.959 | -12.045 | 94.85 | 46.91 | 69.75 | 1884.8 | 560.39 | 241.1 |
| 125. | 20.721 | 0.929 | -11.697 | 97.69 | 46.33 | 69.48 | 1850.6 | 497.26 | 236.7 |
| 130. | 20.551 | 0.900 | -11.350 | 100.41 | 45.80 | 69.23 | 1816.6 | 445.61 | 232.3 |
| 135. | 20.381 | 0.874 | -11.005 | 103.02 | 45.32 | 69.03 | 1782.8 | 402.74 | 227.8 |
| 140. | 20.210 | 0.850 | -10.660 | 105.52 | 44.90 | 68.89 | 1749.1 | 366.68 | 223.3 |
| 145. | 20.039 | 0.828 | -10.316 | 107.94 | 44.55 | 68.81 | 1715.6 | 335.97 | 218.7 |
| 150. | 19.868 | 0.807 | -9.972 | 110.27 | 44.25 | 68.80 | 1682.2 | 309.55 | 214.2 |
| 155. | 19.696 | 0.788 | -9.628 | 112.53 | 44.02 | 68.85 | 1649.0 | 286.57 | 209.6 |
| 160. | 19.523 | 0.770 | -9.283 | 114.72 | 43.83 | 68.95 | 1616.0 | 266.42 | 205.1 |
| 165. | 19.349 | 0.753 | -8.938 | 116.84 | 43.70 | 69.12 | 1583.1 | 248.60 | 200.5 |
| 170. | 19.175 | 0.738 | -8.592 | 118.91 | 43.61 | 69.33 | 1550.4 | 232.71 | 196.0 |
| 175. | 19.000 | 0.723 | -8.245 | 120.92 | 43.56 | 69.59 | 1517.8 | 218.46 | 191.5 |
| 180. | 18.823 | 0.710 | -7.896 | 122.89 | 43.55 | 69.89 | 1485.4 | 205.60 | 187.1 |
| 185. | 18.645 | 0.697 | -7.546 | 124.80 | 43.58 | 70.24 | 1453.2 | 193.92 | 182.7 |
| 190. | 18.466 | 0.686 | -7.194 | 126.68 | 43.64 | 70.62 | 1421.2 | 183.26 | 178.3 |
| 195. | 18.286 | 0.675 | -6.839 | 128.52 | 43.72 | 71.03 | 1389.4 | 173.49 | 174.1 |
| 200. | 18.104 | 0.664 | -6.483 | 130.33 | 43.84 | 71.48 | 1357.8 | 164.49 | 169.8 |
| 205. | 17.921 | 0.655 | -6.125 | 132.10 | 43.99 | 71.95 | 1326.3 | 156.18 | 165.7 |
| 210. | 17.736 | 0.646 | -5.764 | 133.84 | 44.16 | 72.46 | 1295.1 | 148.47 | 161.6 |
| 215. | 17.550 | 0.638 | -5.400 | 135.55 | 44.35 | 73.00 | 1264.1 | 141.30 | 157.5 |
| 220. | 17.361 | 0.630 | -5.034 | 137.23 | 44.57 | 73.57 | 1233.3 | 134.60 | 153.6 |
| 225. | 17.171 | 0.623 | -4.664 | 138.89 | 44.81 | 74.16 | 1202.7 | 128.34 | 149.7 |
| 230. | 16.979 | 0.616 | -4.292 | 140.53 | 45.07 | 74.79 | 1172.4 | 122.47 | 145.9 |
| 235. | 16.784 | 0.610 | -3.916 | 142.14 | 45.35 | 75.44 | 1142.3 | 116.95 | 142.2 |
| 240. | 16.587 | 0.604 | -3.537 | 143.74 | 45.65 | 76.13 | 1112.4 | 111.75 | 138.5 |
| 245. | 16.388 | 0.599 | -3.155 | 145.32 | 45.97 | 76.84 | 1082.8 | 106.84 | 135.0 |
| 250. | 16.187 | 0.594 | -2.769 | 146.88 | 46.31 | 77.59 | 1053.5 | 102.20 | 131.5 |
| 255. | 15.983 | 0.590 | -2.379 | 148.42 | 46.66 | 78.36 | 1024.4 | 97.81 | 128.1 |
| 260. | 15.776 | 0.586 | -1.985 | 149.95 | 47.04 | 79.17 | 995.7 | 93.65 | 124.8 |
| 265. | 15.566 | 0.583 | -1.587 | 151.47 | 47.43 | 80.01 | 967.2 | 89.70 | 121.6 |
| 270. | 15.353 | 0.580 | -1.185 | 152.97 | 47.83 | 80.88 | 939.0 | 85.94 | 118.4 |
| 275. | 15.137 | 0.578 | -0.779 | 154.46 | 48.25 | 81.78 | 911.2 | 82.36 | 115.4 |
| 280. | 14.917 | 0.576 | -0.367 | 155.94 | 48.69 | 82.72 | 883.7 | 78.96 | 112.4 |
| 285. | 14.695 | 0.574 | 0.049 | 157.42 | 49.14 | 83.70 | 856.6 | 75.71 | 109.5 |
| 290. | 14.468 | 0.573 | 0.470 | 158.88 | 49.60 | 84.71 | 829.9 | 72.61 | 106.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 20.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 14.237 | 0.573 | 0.896 | 160.34 | 50.08 | 85.75 | 803.5 | 69.65 | 104.1 |
| 300. | 14.003 | 0.573 | 1.327 | 161.79 | 50.57 | 86.84 | 777.6 | 66.82 | 101.4 |
| 310. | 13.521 | 0.574 | 2.207 | 164.67 | 51.59 | 89.10 | 727.2 | 61.52 | 96.5 |
| 320. | 13.022 | 0.577 | 3.110 | 167.54 | 52.64 | 91.49 | 679.1 | 56.68 | 91.9 |
| 330. | 12.506 | 0.583 | 4.037 | 170.39 | 53.74 | 93.95 | 633.6 | 52.24 | 87.7 |
| 340. | 11.972 | 0.591 | 4.989 | 173.23 | 54.86 | 96.40 | 591.4 | 48.20 | 83.8 |
| 350. | 11.425 | 0.602 | 5.965 | 176.06 | 56.00 | 98.73 | 553.0 | 44.52 | 80.3 |
| 360. | 10.869 | 0.615 | 6.962 | 178.87 | 57.15 | 100.80 | 519.1 | 41.21 | 77.2 |
| 370. | 10.311 | 0.631 | 7.979 | 181.66 | 58.29 | 102.40 | 490.0 | 38.27 | 74.5 |
| 380. | 9.761 | 0.648 | 9.008 | 184.40 | 59.41 | 103.39 | 466.0 | 35.68 | 72.2 |
| 390. | 9.230 | 0.668 | 10.045 | 187.09 | 60.52 | 103.75 | 447.0 | 33.45 | 70.4 |
| 400. | 8.726 | 0.689 | 11.082 | 189.72 | 61.61 | 103.57 | 432.5 | 31.55 | 68.9 |
| 410. | 8.254 | 0.711 | 12.115 | 192.27 | 62.68 | 103.00 | 421.9 | 29.95 | 67.7 |
| 420. | 7.819 | 0.732 | 13.141 | 194.74 | 63.74 | 102.18 | 414.5 | 28.62 | 67.0 |
| 430. | 7.421 | 0.754 | 14.158 | 197.14 | 64.79 | 101.22 | 409.8 | 27.52 | 66.5 |
| 440. | 7.058 | 0.775 | 15.165 | 199.45 | 65.83 | 100.24 | 407.1 | 26.62 | 66.3 |
| 450. | 6.730 | 0.794 | 16.163 | 201.69 | 66.86 | 99.31 | 406.2 | 25.88 | 66.3 |
| 460. | 6.432 | 0.813 | 17.152 | 203.87 | 67.90 | 98.50 | 406.5 | 25.27 | 66.5 |
| 470. | 6.162 | 0.831 | 18.133 | 205.98 | 68.94 | 97.82 | 407.9 | 24.78 | 67.0 |
| 480. | 5.916 | 0.847 | 19.109 | 208.03 | 69.98 | 97.30 | 409.9 | 24.38 | 67.6 |
| 490. | 5.693 | 0.862 | 20.080 | 210.03 | 71.02 | 96.92 | 412.6 | 24.06 | 68.3 |
| 500. | 5.488 | 0.877 | 21.048 | 211.99 | 72.07 | 96.68 | 415.7 | 23.80 | 69.2 |
| 520. | 5.128 | 0.902 | 22.980 | 215.78 | 74.15 | 96.58 | 422.7 | | 71.3 |
| 540. | 4.821 | 0.924 | 24.913 | 219.43 | 76.23 | 96.87 | 430.3 | | 73.7 |
| 560. | 4.555 | 0.943 | 26.856 | 222.96 | 78.29 | 97.47 | 438.3 | | 76.4 |
| 580. | 4.323 | 0.959 | 28.814 | 226.40 | 80.32 | 98.30 | 446.4 | | 79.4 |
| 600. | 4.118 | 0.973 | 30.790 | 229.74 | 82.32 | 99.30 | 454.5 | | 82.4 |
| 625. | 3.893 | 0.989 | 33.290 | 233.83 | 84.79 | 100.73 | 464.5 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 25.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 95. | 21.792 | 1.452 | -13.590 | 78.23 | 47.87 | 67.43 | 2074.0 | 1321.76 | 262.8 |
| 100. | 21.627 | 1.390 | -13.248 | 81.74 | 48.49 | 69.09 | 2041.3 | 1079.85 | 259.4 |
| 105. | 21.461 | 1.334 | -12.900 | 85.13 | 48.50 | 69.80 | 2007.6 | 901.35 | 255.7 |
| 110. | 21.294 | 1.284 | -12.551 | 88.38 | 48.16 | 69.97 | 1973.5 | 766.50 | 251.9 |
| 115. | 21.127 | 1.238 | -12.201 | 91.49 | 47.65 | 69.85 | 1939.6 | 662.37 | 247.8 |
| 120. | 20.960 | 1.195 | -11.853 | 94.46 | 47.09 | 69.61 | 1905.8 | 580.32 | 243.7 |
| 125. | 20.793 | 1.157 | -11.505 | 97.30 | 46.52 | 69.32 | 1872.2 | 514.47 | 239.4 |
| 130. | 20.626 | 1.121 | -11.159 | 100.01 | 45.99 | 69.06 | 1838.8 | 460.74 | 235.1 |
| 135. | 20.459 | 1.089 | -10.815 | 102.61 | 45.51 | 68.84 | 1805.6 | 416.24 | 230.7 |
| 140. | 20.292 | 1.058 | -10.471 | 105.11 | 45.10 | 68.67 | 1772.6 | 378.88 | 226.2 |
| 145. | 20.125 | 1.030 | -10.128 | 107.52 | 44.75 | 68.57 | 1739.8 | 347.13 | 221.8 |
| 150. | 19.957 | 1.004 | -9.785 | 109.84 | 44.45 | 68.54 | 1707.2 | 319.85 | 217.3 |
| 155. | 19.789 | 0.980 | -9.442 | 112.09 | 44.22 | 68.57 | 1674.8 | 296.18 | 212.8 |
| 160. | 19.621 | 0.958 | -9.099 | 114.27 | 44.03 | 68.65 | 1642.6 | 275.43 | 208.3 |
| 165. | 19.452 | 0.937 | -8.756 | 116.38 | 43.90 | 68.78 | 1610.5 | 257.11 | 203.9 |
| 170. | 19.282 | 0.917 | -8.411 | 118.44 | 43.81 | 68.97 | 1578.7 | 240.80 | 199.5 |
| 175. | 19.112 | 0.899 | -8.066 | 120.44 | 43.76 | 69.20 | 1547.1 | 226.19 | 195.1 |
| 180. | 18.941 | 0.882 | -7.719 | 122.40 | 43.76 | 69.47 | 1515.8 | 213.01 | 190.7 |
| 185. | 18.769 | 0.866 | -7.371 | 124.30 | 43.78 | 69.77 | 1484.6 | 201.06 | 186.4 |
| 190. | 18.596 | 0.851 | -7.021 | 126.17 | 43.84 | 70.11 | 1453.6 | 190.17 | 182.1 |
| 195. | 18.422 | 0.837 | -6.670 | 127.99 | 43.93 | 70.49 | 1422.9 | 180.19 | 177.9 |
| 200. | 18.247 | 0.824 | -6.317 | 129.78 | 44.05 | 70.89 | 1392.4 | 171.01 | 173.8 |
| 205. | 18.071 | 0.812 | -5.961 | 131.54 | 44.19 | 71.32 | 1362.2 | 162.54 | 169.7 |
| 210. | 17.893 | 0.800 | -5.603 | 133.26 | 44.36 | 71.78 | 1332.2 | 154.69 | 165.7 |
| 215. | 17.715 | 0.789 | -5.243 | 134.96 | 44.55 | 72.26 | 1302.5 | 147.40 | 161.7 |
| 220. | 17.535 | 0.779 | -4.881 | 136.63 | 44.77 | 72.77 | 1273.0 | 140.59 | 157.9 |
| 225. | 17.353 | 0.770 | -4.516 | 138.27 | 45.01 | 73.30 | 1243.8 | 134.24 | 154.1 |
| 230. | 17.171 | 0.761 | -4.148 | 139.88 | 45.27 | 73.85 | 1214.9 | 128.28 | 150.4 |
| 235. | 16.986 | 0.753 | -3.777 | 141.48 | 45.55 | 74.43 | 1186.3 | 122.69 | 146.7 |
| 240. | 16.801 | 0.746 | -3.403 | 143.05 | 45.85 | 75.03 | 1158.0 | 117.43 | 143.2 |
| 245. | 16.613 | 0.739 | -3.027 | 144.60 | 46.17 | 75.65 | 1130.0 | 112.48 | 139.7 |
| 250. | 16.424 | 0.732 | -2.647 | 146.14 | 46.50 | 76.29 | 1102.3 | 107.80 | 136.3 |
| 255. | 16.233 | 0.726 | -2.264 | 147.66 | 46.86 | 76.96 | 1074.9 | 103.37 | 133.0 |
| 260. | 16.041 | 0.721 | -1.877 | 149.16 | 47.23 | 77.64 | 1048.0 | 99.18 | 129.8 |
| 265. | 15.846 | 0.716 | -1.487 | 150.64 | 47.61 | 78.35 | 1021.3 | 95.21 | 126.7 |
| 270. | 15.650 | 0.712 | -1.094 | 152.11 | 48.01 | 79.08 | 995.1 | 91.44 | 123.6 |
| 275. | 15.451 | 0.708 | -0.696 | 153.57 | 48.43 | 79.83 | 969.2 | 87.86 | 120.7 |
| 280. | 15.251 | 0.704 | -0.295 | 155.02 | 48.85 | 80.60 | 943.7 | 84.46 | 117.8 |
| 285. | 15.048 | 0.701 | 0.110 | 156.45 | 49.30 | 81.38 | 918.7 | 81.22 | 115.1 |
| 290. | 14.843 | 0.699 | 0.519 | 157.87 | 49.75 | 82.19 | 894.1 | 78.14 | 112.4 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 25.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 295. | 14.637 | 0.696 | 0.932 | 159.29 | 50.22 | 83.01 | 869.9 | 75.20 | 109.8 |
| 300. | 14.427 | 0.695 | 1.349 | 160.69 | 50.70 | 83.85 | 846.2 | 72.39 | 107.3 |
| 310. | 14.003 | 0.693 | 2.196 | 163.47 | 51.68 | 85.57 | 800.3 | 67.17 | 102.6 |
| 320. | 13.569 | 0.692 | 3.060 | 166.21 | 52.71 | 87.34 | 756.6 | 62.41 | 98.2 |
| 330. | 13.127 | 0.694 | 3.943 | 168.92 | 53.76 | 89.13 | 715.2 | 58.07 | 94.2 |
| 340. | 12.677 | 0.698 | 4.843 | 171.61 | 54.85 | 90.90 | 676.5 | 54.12 | 90.6 |
| 350. | 12.222 | 0.703 | 5.760 | 174.27 | 55.95 | 92.61 | 640.7 | 50.54 | 87.3 |
| 360. | 11.762 | 0.710 | 6.695 | 176.90 | 57.07 | 94.21 | 608.1 | 47.29 | 84.3 |
| 370. | 11.302 | 0.719 | 7.644 | 179.50 | 58.19 | 95.65 | 578.7 | 44.36 | 81.8 |
| 380. | 10.845 | 0.730 | 8.607 | 182.07 | 59.32 | 96.87 | 552.9 | 41.73 | 79.5 |
| 390. | 10.394 | 0.742 | 9.581 | 184.60 | 60.44 | 97.83 | 530.6 | 39.40 | 77.6 |
| 400. | 9.956 | 0.755 | 10.563 | 187.09 | 61.56 | 98.50 | 511.8 | 37.33 | 76.1 |
| 410. | 9.533 | 0.769 | 11.550 | 189.53 | 62.67 | 98.92 | 496.4 | 35.52 | 74.8 |
| 420. | 9.129 | 0.784 | 12.540 | 191.91 | 63.77 | 99.11 | 483.9 | 33.95 | 73.8 |
| 430. | 8.747 | 0.799 | 13.532 | 194.24 | 64.87 | 99.14 | 474.1 | 32.58 | 73.2 |
| 440. | 8.387 | 0.815 | 14.523 | 196.52 | 65.95 | 99.05 | 466.6 | 31.41 | 72.7 |
| 450. | 8.050 | 0.830 | 15.512 | 198.75 | 67.03 | 98.89 | 461.0 | 30.40 | 72.5 |
| 460. | 7.736 | 0.845 | 16.500 | 200.92 | 68.10 | 98.71 | 457.0 | 29.54 | 72.5 |
| 470. | 7.443 | 0.859 | 17.487 | 203.04 | 69.16 | 98.52 | 454.5 | 28.80 | 72.7 |
| 480. | 7.172 | 0.873 | 18.471 | 205.11 | 70.22 | 98.37 | 453.1 | 28.17 | 73.0 |
| 490. | 6.920 | 0.887 | 19.454 | 207.14 | 71.28 | 98.26 | 452.6 | 27.64 | 73.5 |
| 500. | 6.686 | 0.899 | 20.436 | 209.12 | 72.33 | 98.20 | 452.9 | 27.19 | 74.2 |
| 520. | 6.266 | 0.923 | 22.401 | 212.98 | 74.42 | 98.28 | 455.4 | | 75.8 |
| 540. | 5.901 | 0.944 | 24.369 | 216.69 | 76.49 | 98.62 | 459.5 | | 77.8 |
| 560. | 5.582 | 0.962 | 26.347 | 220.29 | 78.54 | 99.18 | 464.8 | | 80.2 |
| 580. | 5.301 | 0.978 | 28.338 | 223.78 | 80.56 | 99.94 | 470.7 | | 82.8 |
| 600. | 5.051 | 0.992 | 30.345 | 227.18 | 82.55 | 100.85 | 477.1 | | 85.5 |
| 625. | 4.776 | 1.007 | 32.883 | 231.33 | 85.00 | 102.15 | 485.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 30.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 100. | 21.683 | 1.664 | -13.052 | 81.39 | 48.56 | 68.92 | 2060.7 | 1128.63 | 261.6 |
| 105. | 21.520 | 1.597 | -12.705 | 84.77 | 48.61 | 69.66 | 2027.0 | 939.02 | 258.0 |
| 110. | 21.355 | 1.536 | -12.356 | 88.02 | 48.30 | 69.84 | 1993.3 | 796.59 | 254.2 |
| 115. | 21.191 | 1.481 | -12.007 | 91.12 | 47.82 | 69.72 | 1959.7 | 687.09 | 250.3 |
| 120. | 21.027 | 1.430 | -11.659 | 94.09 | 47.26 | 69.47 | 1926.3 | 601.13 | 246.2 |
| 125. | 20.863 | 1.384 | -11.313 | 96.92 | 46.70 | 69.18 | 1893.2 | 532.37 | 242.1 |
| 130. | 20.699 | 1.341 | -10.968 | 99.62 | 46.18 | 68.90 | 1860.4 | 476.41 | 237.8 |
| 135. | 20.535 | 1.302 | -10.624 | 102.22 | 45.71 | 68.66 | 1827.8 | 430.18 | 233.5 |
| 140. | 20.371 | 1.265 | -10.281 | 104.71 | 45.29 | 68.48 | 1795.4 | 391.44 | 229.1 |
| 145. | 20.208 | 1.231 | -9.939 | 107.11 | 44.94 | 68.37 | 1763.3 | 358.59 | 224.8 |
| 150. | 20.044 | 1.200 | -9.597 | 109.43 | 44.65 | 68.31 | 1731.4 | 330.41 | 220.4 |
| 155. | 19.880 | 1.171 | -9.256 | 111.67 | 44.41 | 68.32 | 1699.7 | 305.98 | 216.0 |
| 160. | 19.715 | 1.144 | -8.914 | 113.84 | 44.23 | 68.38 | 1668.3 | 284.62 | 211.6 |
| 165. | 19.550 | 1.119 | -8.572 | 115.95 | 44.10 | 68.49 | 1637.0 | 265.77 | 207.2 |
| 170. | 19.385 | 1.095 | -8.229 | 117.99 | 44.01 | 68.65 | 1606.1 | 249.01 | 202.8 |
| 175. | 19.219 | 1.073 | -7.885 | 119.98 | 43.96 | 68.85 | 1575.3 | 234.02 | 198.5 |
| 180. | 19.053 | 1.052 | -7.540 | 121.93 | 43.95 | 69.09 | 1544.8 | 220.50 | 194.2 |
| 185. | 18.886 | 1.033 | -7.194 | 123.82 | 43.98 | 69.37 | 1514.6 | 208.26 | 190.0 |
| 190. | 18.718 | 1.015 | -6.847 | 125.68 | 44.03 | 69.68 | 1484.6 | 197.12 | 185.8 |
| 195. | 18.550 | 0.997 | -6.497 | 127.49 | 44.12 | 70.02 | 1454.8 | 186.92 | 181.7 |
| 200. | 18.381 | 0.981 | -6.146 | 129.27 | 44.24 | 70.38 | 1425.3 | 177.54 | 177.6 |
| 205. | 18.211 | 0.966 | -5.793 | 131.01 | 44.38 | 70.78 | 1396.1 | 168.90 | 173.6 |
| 210. | 18.040 | 0.952 | -5.439 | 132.72 | 44.55 | 71.19 | 1367.2 | 160.89 | 169.6 |
| 215. | 17.868 | 0.939 | -5.082 | 134.40 | 44.75 | 71.64 | 1338.6 | 153.46 | 165.8 |
| 220. | 17.696 | 0.927 | -4.722 | 136.06 | 44.96 | 72.10 | 1310.2 | 146.54 | 162.0 |
| 225. | 17.522 | 0.915 | -4.360 | 137.68 | 45.20 | 72.58 | 1282.2 | 140.07 | 158.3 |
| 230. | 17.347 | 0.904 | -3.996 | 139.28 | 45.46 | 73.08 | 1254.5 | 134.02 | 154.6 |
| 235. | 17.171 | 0.894 | -3.630 | 140.86 | 45.74 | 73.60 | 1227.0 | 128.34 | 151.1 |
| 240. | 16.995 | 0.885 | -3.260 | 142.41 | 46.04 | 74.14 | 1200.0 | 123.01 | 147.6 |
| 245. | 16.817 | 0.876 | -2.888 | 143.95 | 46.36 | 74.70 | 1173.3 | 117.98 | 144.2 |
| 250. | 16.638 | 0.867 | -2.513 | 145.46 | 46.69 | 75.28 | 1146.9 | 113.24 | 140.9 |
| 255. | 16.458 | 0.860 | -2.135 | 146.96 | 47.04 | 75.87 | 1120.9 | 108.76 | 137.6 |
| 260. | 16.276 | 0.853 | -1.755 | 148.44 | 47.41 | 76.48 | 1095.3 | 104.53 | 134.5 |
| 265. | 16.094 | 0.846 | -1.371 | 149.90 | 47.79 | 77.10 | 1070.1 | 100.52 | 131.5 |
| 270. | 15.910 | 0.840 | -0.983 | 151.35 | 48.19 | 77.74 | 1045.2 | 96.72 | 128.5 |
| 275. | 15.725 | 0.834 | -0.593 | 152.78 | 48.60 | 78.39 | 1020.8 | 93.11 | 125.6 |
| 280. | 15.539 | 0.829 | -0.200 | 154.20 | 49.03 | 79.05 | 996.8 | 89.68 | 122.8 |
| 285. | 15.351 | 0.825 | 0.197 | 155.61 | 49.46 | 79.73 | 973.3 | 86.42 | 120.1 |
| 290. | 15.162 | 0.821 | 0.598 | 157.00 | 49.91 | 80.42 | 950.2 | 83.32 | 117.5 |
| 295. | 14.972 | 0.817 | 1.002 | 158.38 | 50.38 | 81.12 | 927.5 | 80.37 | 115.0 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 30.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 300. | 14.781 | 0.814 | 1.409 | 159.75 | 50.85 | 81.83 | 905.4 | 77.56 | 112.6 |
| 310. | 14.395 | 0.809 | 2.234 | 162.45 | 51.82 | 83.27 | 862.5 | 72.33 | 108.0 |
| 320. | 14.004 | 0.805 | 3.074 | 165.12 | 52.83 | 84.73 | 821.7 | 67.57 | 103.8 |
| 330. | 13.609 | 0.803 | 3.929 | 167.75 | 53.87 | 86.20 | 783.1 | 63.25 | 99.9 |
| 340. | 13.211 | 0.803 | 4.798 | 170.35 | 54.93 | 87.65 | 746.9 | 59.31 | 96.4 |
| 350. | 12.810 | 0.805 | 5.682 | 172.91 | 56.02 | 89.07 | 713.1 | 55.73 | 93.2 |
| 360. | 12.408 | 0.808 | 6.580 | 175.44 | 57.12 | 90.44 | 681.8 | 52.48 | 90.4 |
| 370. | 12.007 | 0.812 | 7.490 | 177.93 | 58.23 | 91.72 | 653.2 | 49.53 | 87.8 |
| 380. | 11.608 | 0.818 | 8.414 | 180.39 | 59.34 | 92.89 | 627.3 | 46.87 | 85.6 |
| 390. | 11.214 | 0.825 | 9.348 | 182.82 | 60.47 | 93.94 | 604.2 | 44.47 | 83.7 |
| 400. | 10.827 | 0.833 | 10.292 | 185.21 | 61.59 | 94.85 | 583.8 | 42.31 | 82.1 |
| 410. | 10.450 | 0.842 | 11.244 | 187.56 | 62.71 | 95.60 | 566.0 | 40.39 | 80.8 |
| 420. | 10.083 | 0.852 | 12.204 | 189.87 | 63.82 | 96.22 | 550.8 | 38.67 | 79.7 |
| 430. | 9.730 | 0.862 | 13.168 | 192.14 | 64.93 | 96.71 | 537.9 | 37.15 | 78.9 |
| 440. | 9.392 | 0.873 | 14.137 | 194.37 | 66.04 | 97.09 | 527.2 | 35.81 | 78.4 |
| 450. | 9.069 | 0.884 | 15.110 | 196.56 | 67.13 | 97.40 | 518.5 | 34.62 | 78.0 |
| 460. | 8.762 | 0.895 | 16.085 | 198.70 | 68.22 | 97.64 | 511.4 | 33.58 | 77.8 |
| 470. | 8.471 | 0.906 | 17.063 | 200.80 | 69.31 | 97.86 | 505.8 | 32.67 | 77.8 |
| 480. | 8.196 | 0.917 | 18.042 | 202.86 | 70.38 | 98.05 | 501.5 | 31.87 | 78.0 |
| 490. | 7.936 | 0.928 | 19.024 | 204.89 | 71.45 | 98.23 | 498.4 | 31.17 | 78.4 |
| 500. | 7.692 | 0.938 | 20.007 | 206.87 | 72.51 | 98.43 | 496.2 | 30.56 | 78.8 |
| 520. | 7.245 | 0.958 | 21.980 | 210.74 | 74.61 | 98.88 | 494.1 | | 80.1 |
| 540. | 6.849 | 0.976 | 23.963 | 214.49 | 76.69 | 99.44 | 494.5 | | 81.8 |
| 560. | 6.496 | 0.992 | 25.958 | 218.11 | 78.74 | 100.13 | 496.6 | | 83.9 |
| 580. | 6.182 | 1.006 | 27.969 | 221.64 | 80.76 | 100.94 | 500.0 | | 86.2 |
| 600. | 5.900 | 1.019 | 29.996 | 225.08 | 82.74 | 101.86 | 504.3 | | 88.7 |
| 625. | 5.586 | 1.033 | 32.559 | 229.26 | 85.18 | 103.15 | 510.4 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 35.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 100. | 21.738 | 1.936 | -12.856 | 81.05 | 48.63 | 68.76 | 2079.7 | 1180.99 | 263.7 |
| 105. | 21.577 | 1.858 | -12.510 | 84.42 | 48.73 | 69.52 | 2046.2 | 979.13 | 260.3 |
| 110. | 21.415 | 1.787 | -12.162 | 87.66 | 48.44 | 69.72 | 2012.7 | 828.40 | 256.6 |
| 115. | 21.253 | 1.722 | -11.813 | 90.76 | 47.98 | 69.60 | 1979.4 | 713.08 | 252.7 |
| 120. | 21.092 | 1.663 | -11.466 | 93.72 | 47.43 | 69.35 | 1946.5 | 622.91 | 248.8 |
| 125. | 20.931 | 1.609 | -11.120 | 96.54 | 46.88 | 69.05 | 1913.8 | 551.01 | 244.7 |
| 130. | 20.770 | 1.559 | -10.776 | 99.25 | 46.36 | 68.76 | 1881.5 | 492.68 | 240.5 |
| 135. | 20.609 | 1.513 | -10.432 | 101.84 | 45.89 | 68.51 | 1849.5 | 444.59 | 236.3 |
| 140. | 20.448 | 1.470 | -10.090 | 104.32 | 45.48 | 68.31 | 1817.7 | 404.40 | 232.0 |
| 145. | 20.288 | 1.431 | -9.749 | 106.72 | 45.13 | 68.18 | 1786.2 | 370.38 | 227.7 |
| 150. | 20.127 | 1.394 | -9.409 | 109.03 | 44.83 | 68.11 | 1754.9 | 341.24 | 223.4 |
| 155. | 19.967 | 1.360 | -9.068 | 111.26 | 44.60 | 68.09 | 1723.9 | 316.02 | 219.1 |
| 160. | 19.806 | 1.328 | -8.728 | 113.42 | 44.42 | 68.13 | 1693.2 | 294.00 | 214.7 |
| 165. | 19.645 | 1.299 | -8.387 | 115.52 | 44.28 | 68.22 | 1662.7 | 274.59 | 210.4 |
| 170. | 19.484 | 1.271 | -8.045 | 117.56 | 44.19 | 68.36 | 1632.4 | 257.36 | 206.1 |
| 175. | 19.322 | 1.245 | -7.703 | 119.54 | 44.15 | 68.54 | 1602.5 | 241.95 | 201.9 |
| 180. | 19.160 | 1.221 | -7.360 | 121.48 | 44.14 | 68.76 | 1572.8 | 228.09 | 197.7 |
| 185. | 18.998 | 1.198 | -7.015 | 123.36 | 44.16 | 69.01 | 1543.3 | 215.54 | 193.5 |
| 190. | 18.835 | 1.176 | -6.670 | 125.21 | 44.22 | 69.30 | 1514.2 | 204.13 | 189.4 |
| 195. | 18.671 | 1.156 | -6.322 | 127.01 | 44.31 | 69.61 | 1485.3 | 193.69 | 185.3 |
| 200. | 18.508 | 1.137 | -5.973 | 128.78 | 44.43 | 69.95 | 1456.7 | 184.10 | 181.3 |
| 205. | 18.343 | 1.119 | -5.623 | 130.51 | 44.57 | 70.31 | 1428.4 | 175.27 | 177.4 |
| 210. | 18.178 | 1.103 | -5.270 | 132.21 | 44.74 | 70.70 | 1400.4 | 167.10 | 173.5 |
| 215. | 18.012 | 1.087 | -4.916 | 133.88 | 44.93 | 71.10 | 1372.7 | 159.52 | 169.7 |
| 220. | 17.846 | 1.072 | -4.559 | 135.52 | 45.15 | 71.53 | 1345.3 | 152.46 | 165.9 |
| 225. | 17.679 | 1.058 | -4.200 | 137.13 | 45.39 | 71.98 | 1318.3 | 145.87 | 162.3 |
| 230. | 17.511 | 1.045 | -3.839 | 138.72 | 45.65 | 72.44 | 1291.6 | 139.71 | 158.7 |
| 235. | 17.343 | 1.033 | -3.476 | 140.28 | 45.92 | 72.92 | 1265.2 | 133.93 | 155.2 |
| 240. | 17.173 | 1.021 | -3.110 | 141.82 | 46.22 | 73.42 | 1239.2 | 128.51 | 151.8 |
| 245. | 17.004 | 1.010 | -2.742 | 143.34 | 46.54 | 73.93 | 1213.5 | 123.40 | 148.5 |
| 250. | 16.833 | 1.000 | -2.371 | 144.84 | 46.87 | 74.45 | 1188.2 | 118.59 | 145.2 |
| 255. | 16.662 | 0.991 | -1.997 | 146.32 | 47.22 | 74.99 | 1163.3 | 114.04 | 142.0 |
| 260. | 16.489 | 0.982 | -1.621 | 147.78 | 47.59 | 75.55 | 1138.8 | 109.75 | 139.0 |
| 265. | 16.317 | 0.974 | -1.242 | 149.22 | 47.97 | 76.11 | 1114.7 | 105.68 | 136.0 |
| 270. | 16.143 | 0.966 | -0.860 | 150.65 | 48.37 | 76.69 | 1091.0 | 101.83 | 133.1 |
| 275. | 15.969 | 0.959 | -0.475 | 152.06 | 48.78 | 77.28 | 1067.7 | 98.18 | 130.3 |
| 280. | 15.793 | 0.952 | -0.087 | 153.46 | 49.20 | 77.88 | 1044.9 | 94.71 | 127.5 |
| 285. | 15.618 | 0.946 | 0.304 | 154.85 | 49.63 | 78.48 | 1022.4 | 91.41 | 124.9 |
| 290. | 15.441 | 0.940 | 0.698 | 156.22 | 50.08 | 79.10 | 1000.5 | 88.28 | 122.3 |
| 295. | 15.264 | 0.935 | 1.095 | 157.57 | 50.54 | 79.72 | 979.0 | 85.30 | 119.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 35.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 300. | 15.086 | 0.930 | 1.495 | 158.92 | 51.01 | 80.35 | 958.0 | 82.46 | 117.5 |
| 310. | 14.728 | 0.922 | 2.305 | 161.57 | 51.97 | 81.63 | 917.3 | 77.18 | 113.0 |
| 320. | 14.368 | 0.916 | 3.128 | 164.19 | 52.97 | 82.92 | 878.7 | 72.39 | 108.9 |
| 330. | 14.007 | 0.911 | 3.963 | 166.76 | 54.00 | 84.21 | 842.1 | 68.03 | 105.1 |
| 340. | 13.644 | 0.907 | 4.812 | 169.29 | 55.05 | 85.49 | 807.7 | 64.06 | 101.7 |
| 350. | 13.280 | 0.906 | 5.673 | 171.79 | 56.13 | 86.75 | 775.4 | 60.44 | 98.5 |
| 360. | 12.918 | 0.905 | 6.547 | 174.25 | 57.22 | 87.98 | 745.3 | 57.15 | 95.7 |
| 370. | 12.556 | 0.906 | 7.433 | 176.68 | 58.32 | 89.16 | 717.5 | 54.16 | 93.2 |
| 380. | 12.198 | 0.908 | 8.330 | 179.07 | 59.43 | 90.28 | 692.0 | 51.45 | 91.0 |
| 390. | 11.843 | 0.911 | 9.238 | 181.43 | 60.55 | 91.32 | 668.8 | 48.99 | 89.1 |
| 400. | 11.493 | 0.916 | 10.156 | 183.75 | 61.67 | 92.29 | 647.8 | 46.76 | 87.5 |
| 410. | 11.151 | 0.921 | 11.083 | 186.04 | 62.79 | 93.17 | 629.1 | 44.75 | 86.1 |
| 420. | 10.816 | 0.927 | 12.019 | 188.30 | 63.91 | 93.96 | 612.5 | 42.93 | 85.0 |
| 430. | 10.490 | 0.933 | 12.962 | 190.51 | 65.02 | 94.66 | 597.9 | 41.30 | 84.1 |
| 440. | 10.175 | 0.940 | 13.912 | 192.70 | 66.13 | 95.29 | 585.3 | 39.84 | 83.4 |
| 450. | 9.871 | 0.948 | 14.868 | 194.85 | 67.24 | 95.85 | 574.4 | 38.53 | 82.9 |
| 460. | 9.579 | 0.955 | 15.829 | 196.96 | 68.34 | 96.36 | 565.2 | 37.36 | 82.7 |
| 470. | 9.298 | 0.963 | 16.795 | 199.04 | 69.43 | 96.82 | 557.4 | 36.32 | 82.6 |
| 480. | 9.030 | 0.971 | 17.765 | 201.08 | 70.51 | 97.25 | 550.9 | 35.38 | 82.6 |
| 490. | 8.774 | 0.979 | 18.740 | 203.09 | 71.59 | 97.66 | 545.7 | 34.56 | 82.8 |
| 500. | 8.530 | 0.987 | 19.718 | 205.07 | 72.66 | 98.06 | 541.4 | 33.82 | 83.2 |
| 520. | 8.078 | 1.002 | 21.687 | 208.93 | 74.77 | 98.85 | 535.5 | | 84.2 |
| 540. | 7.668 | 1.017 | 23.672 | 212.67 | 76.85 | 99.66 | 532.5 | | 85.7 |
| 560. | 7.299 | 1.030 | 25.674 | 216.31 | 78.90 | 100.53 | 531.7 | | 87.5 |
| 580. | 6.965 | 1.042 | 27.694 | 219.86 | 80.92 | 101.46 | 532.5 | | 89.6 |
| 600. | 6.662 | 1.053 | 29.733 | 223.31 | 82.91 | 102.46 | 534.5 | | 91.8 |
| 625. | 6.321 | 1.065 | 32.311 | 227.52 | 85.34 | 103.80 | 538.3 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 40.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 100. | 21.792 | 2.208 | -12.660 | 80.71 | 48.70 | 68.61 | 2098.4 | 1237.38 | 265.8 |
| 105. | 21.633 | 2.118 | -12.315 | 84.08 | 48.84 | 69.40 | 2065.0 | 1021.96 | 262.5 |
| 110. | 21.474 | 2.037 | -11.967 | 87.31 | 48.58 | 69.60 | 2031.7 | 862.12 | 258.9 |
| 115. | 21.314 | 1.963 | -11.619 | 90.41 | 48.13 | 69.49 | 1998.8 | 740.46 | 255.1 |
| 120. | 21.155 | 1.895 | -11.272 | 93.36 | 47.60 | 69.24 | 1966.2 | 645.73 | 251.3 |
| 125. | 20.997 | 1.833 | -10.927 | 96.18 | 47.06 | 68.93 | 1934.0 | 570.47 | 247.3 |
| 130. | 20.838 | 1.776 | -10.583 | 98.88 | 46.54 | 68.63 | 1902.2 | 509.58 | 243.2 |
| 135. | 20.680 | 1.723 | -10.241 | 101.46 | 46.07 | 68.37 | 1870.7 | 459.53 | 239.0 |
| 140. | 20.523 | 1.674 | -9.899 | 103.94 | 45.66 | 68.16 | 1839.4 | 417.79 | 234.8 |
| 145. | 20.365 | 1.629 | -9.559 | 106.33 | 45.31 | 68.01 | 1808.5 | 382.51 | 230.6 |
| 150. | 20.208 | 1.587 | -9.219 | 108.64 | 45.02 | 67.92 | 1777.8 | 352.36 | 226.3 |
| 155. | 20.051 | 1.548 | -8.880 | 110.86 | 44.78 | 67.89 | 1747.4 | 326.31 | 222.1 |
| 160. | 19.893 | 1.511 | -8.540 | 113.02 | 44.60 | 67.91 | 1717.3 | 303.59 | 217.8 |
| 165. | 19.736 | 1.477 | -8.200 | 115.11 | 44.46 | 67.99 | 1687.5 | 283.59 | 213.6 |
| 170. | 19.578 | 1.445 | -7.860 | 117.14 | 44.37 | 68.11 | 1658.0 | 265.86 | 209.4 |
| 175. | 19.421 | 1.416 | -7.519 | 119.12 | 44.33 | 68.27 | 1628.7 | 250.02 | 205.2 |
| 180. | 19.263 | 1.388 | -7.178 | 121.04 | 44.32 | 68.47 | 1599.7 | 235.79 | 201.0 |
| 185. | 19.104 | 1.361 | -6.835 | 122.92 | 44.34 | 68.70 | 1571.1 | 222.91 | 196.9 |
| 190. | 18.946 | 1.336 | -6.490 | 124.76 | 44.40 | 68.96 | 1542.7 | 211.21 | 192.9 |
| 195. | 18.787 | 1.313 | -6.145 | 126.55 | 44.49 | 69.25 | 1514.6 | 200.52 | 188.9 |
| 200. | 18.628 | 1.291 | -5.798 | 128.31 | 44.60 | 69.57 | 1486.8 | 190.71 | 184.9 |
| 205. | 18.468 | 1.271 | -5.449 | 130.03 | 44.75 | 69.90 | 1459.3 | 181.68 | 181.0 |
| 210. | 18.308 | 1.251 | -5.099 | 131.72 | 44.92 | 70.26 | 1432.1 | 173.32 | 177.2 |
| 215. | 18.148 | 1.233 | -4.747 | 133.38 | 45.11 | 70.65 | 1405.2 | 165.58 | 173.5 |
| 220. | 17.987 | 1.216 | -4.392 | 135.01 | 45.33 | 71.04 | 1378.7 | 158.37 | 169.8 |
| 225. | 17.826 | 1.199 | -4.036 | 136.61 | 45.56 | 71.46 | 1352.5 | 151.65 | 166.2 |
| 230. | 17.664 | 1.184 | -3.678 | 138.18 | 45.82 | 71.90 | 1326.6 | 145.37 | 162.7 |
| 235. | 17.502 | 1.170 | -3.317 | 139.74 | 46.10 | 72.34 | 1301.1 | 139.49 | 159.2 |
| 240. | 17.339 | 1.156 | -2.954 | 141.26 | 46.40 | 72.81 | 1276.0 | 133.96 | 155.8 |
| 245. | 17.176 | 1.143 | -2.589 | 142.77 | 46.71 | 73.28 | 1251.2 | 128.76 | 152.6 |
| 250. | 17.013 | 1.131 | -2.221 | 144.25 | 47.05 | 73.77 | 1226.9 | 123.86 | 149.4 |
| 255. | 16.849 | 1.120 | -1.851 | 145.72 | 47.40 | 74.28 | 1202.9 | 119.24 | 146.3 |
| 260. | 16.685 | 1.109 | -1.479 | 147.17 | 47.76 | 74.79 | 1179.3 | 114.88 | 143.2 |
| 265. | 16.520 | 1.099 | -1.103 | 148.60 | 48.14 | 75.31 | 1156.1 | 110.74 | 140.3 |
| 270. | 16.355 | 1.089 | -0.725 | 150.01 | 48.54 | 75.85 | 1133.3 | 106.83 | 137.4 |
| 275. | 16.189 | 1.081 | -0.345 | 151.41 | 48.94 | 76.39 | 1110.9 | 103.12 | 134.7 |
| 280. | 16.023 | 1.072 | 0.038 | 152.79 | 49.36 | 76.94 | 1089.0 | 99.60 | 132.0 |
| 285. | 15.856 | 1.065 | 0.425 | 154.15 | 49.80 | 77.50 | 1067.5 | 96.26 | 129.4 |
| 290. | 15.690 | 1.057 | 0.814 | 155.51 | 50.24 | 78.07 | 1046.5 | 93.08 | 126.9 |
| 295. | 15.523 | 1.051 | 1.205 | 156.85 | 50.70 | 78.64 | 1025.9 | 90.06 | 124.5 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 40.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 300. | 15.355 | 1.044 | 1.600 | 158.17 | 51.17 | 79.22 | 1005.7 | 87.18 | 122.1 |
| 310. | 15.020 | 1.033 | 2.398 | 160.79 | 52.13 | 80.39 | 966.8 | 81.83 | 117.7 |
| 320. | 14.683 | 1.024 | 3.208 | 163.36 | 53.12 | 81.57 | 929.9 | 76.97 | 113.6 |
| 330. | 14.347 | 1.016 | 4.030 | 165.89 | 54.14 | 82.76 | 894.8 | 72.54 | 109.9 |
| 340. | 14.010 | 1.010 | 4.863 | 168.38 | 55.19 | 83.94 | 861.7 | 68.52 | 106.5 |
| 350. | 13.675 | 1.005 | 5.708 | 170.83 | 56.26 | 85.10 | 830.6 | 64.85 | 103.4 |
| 360. | 13.340 | 1.002 | 6.565 | 173.24 | 57.34 | 86.25 | 801.5 | 61.50 | 100.6 |
| 370. | 13.008 | 1.000 | 7.433 | 175.62 | 58.44 | 87.36 | 774.5 | 58.45 | 98.1 |
| 380. | 12.678 | 0.999 | 8.312 | 177.96 | 59.55 | 88.44 | 749.4 | 55.68 | 95.9 |
| 390. | 12.353 | 0.999 | 9.202 | 180.27 | 60.66 | 89.47 | 726.4 | 53.15 | 94.0 |
| 400. | 12.031 | 1.000 | 10.101 | 182.55 | 61.78 | 90.45 | 705.3 | 50.85 | 92.3 |
| 410. | 11.715 | 1.002 | 11.010 | 184.80 | 62.90 | 91.37 | 686.1 | 48.76 | 90.9 |
| 420. | 11.406 | 1.004 | 11.928 | 187.01 | 64.01 | 92.24 | 668.8 | 46.86 | 89.7 |
| 430. | 11.104 | 1.008 | 12.855 | 189.19 | 65.13 | 93.05 | 653.3 | 45.14 | 88.8 |
| 440. | 10.809 | 1.012 | 13.789 | 191.34 | 66.24 | 93.80 | 639.5 | 43.58 | 88.0 |
| 450. | 10.523 | 1.016 | 14.731 | 193.45 | 67.35 | 94.51 | 627.3 | 42.17 | 87.5 |
| 460. | 10.246 | 1.021 | 15.679 | 195.54 | 68.45 | 95.17 | 616.6 | 40.90 | 87.1 |
| 470. | 9.979 | 1.026 | 16.634 | 197.59 | 69.55 | 95.79 | 607.3 | 39.75 | 86.9 |
| 480. | 9.721 | 1.031 | 17.595 | 199.61 | 70.63 | 96.37 | 599.2 | 38.72 | 86.9 |
| 490. | 9.473 | 1.036 | 18.561 | 201.61 | 71.71 | 96.94 | 592.4 | 37.78 | 87.0 |
| 500. | 9.234 | 1.042 | 19.533 | 203.57 | 72.79 | 97.48 | 586.5 | 36.95 | 87.2 |
| 520. | 8.787 | 1.053 | 21.494 | 207.41 | 74.91 | 98.53 | 577.6 | | 88.0 |
| 540. | 8.376 | 1.064 | 23.475 | 211.15 | 77.00 | 99.56 | 571.7 | | 89.3 |
| 560. | 8.000 | 1.074 | 25.476 | 214.79 | 79.05 | 100.60 | 568.2 | | 90.9 |
| 580. | 7.656 | 1.083 | 27.499 | 218.34 | 81.06 | 101.67 | 566.6 | | 92.8 |
| 600. | 7.341 | 1.092 | 29.543 | 221.81 | 83.05 | 102.76 | 566.5 | | 94.9 |
| 625. | 6.984 | 1.102 | 32.130 | 226.03 | 85.48 | 104.18 | 568.0 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 45.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 100. | 21.845 | 2.478 | -12.464 | 80.38 | 48.77 | 68.46 | 2116.8 | 1298.34 | 267.9 |
| 105. | 21.688 | 2.377 | -12.119 | 83.74 | 48.95 | 69.28 | 2083.5 | 1067.81 | 264.7 |
| 110. | 21.531 | 2.285 | -11.772 | 86.97 | 48.72 | 69.50 | 2050.4 | 897.94 | 261.2 |
| 115. | 21.374 | 2.202 | -11.425 | 90.06 | 48.29 | 69.39 | 2017.8 | 769.36 | 257.5 |
| 120. | 21.217 | 2.126 | -11.079 | 93.01 | 47.76 | 69.13 | 1985.6 | 669.70 | 253.7 |
| 125. | 21.061 | 2.056 | -10.734 | 95.82 | 47.23 | 68.82 | 1953.8 | 590.81 | 249.8 |
| 130. | 20.905 | 1.991 | -10.390 | 98.52 | 46.71 | 68.51 | 1922.4 | 527.19 | 245.8 |
| 135. | 20.750 | 1.932 | -10.049 | 101.10 | 46.25 | 68.24 | 1891.4 | 475.03 | 241.7 |
| 140. | 20.595 | 1.877 | -9.708 | 103.57 | 45.84 | 68.02 | 1860.7 | 431.63 | 237.6 |
| 145. | 20.440 | 1.826 | -9.368 | 105.96 | 45.49 | 67.85 | 1830.3 | 395.03 | 233.4 |
| 150. | 20.286 | 1.779 | -9.029 | 108.26 | 45.19 | 67.75 | 1800.2 | 363.80 | 229.3 |
| 155. | 20.132 | 1.734 | -8.691 | 110.48 | 44.96 | 67.71 | 1770.4 | 336.87 | 225.1 |
| 160. | 19.978 | 1.693 | -8.352 | 112.63 | 44.77 | 67.72 | 1740.9 | 313.41 | 220.9 |
| 165. | 19.824 | 1.655 | -8.013 | 114.71 | 44.64 | 67.78 | 1711.7 | 292.79 | 216.7 |
| 170. | 19.669 | 1.619 | -7.674 | 116.74 | 44.55 | 67.88 | 1682.8 | 274.53 | 212.6 |
| 175. | 19.515 | 1.585 | -7.335 | 118.71 | 44.50 | 68.02 | 1654.1 | 258.24 | 208.4 |
| 180. | 19.361 | 1.553 | -6.994 | 120.63 | 44.49 | 68.20 | 1625.8 | 243.61 | 204.3 |
| 185. | 19.207 | 1.523 | -6.652 | 122.50 | 44.51 | 68.42 | 1597.8 | 230.39 | 200.3 |
| 190. | 19.052 | 1.495 | -6.310 | 124.32 | 44.57 | 68.66 | 1570.1 | 218.38 | 196.3 |
| 195. | 18.897 | 1.469 | -5.966 | 126.11 | 44.66 | 68.93 | 1542.7 | 207.42 | 192.3 |
| 200. | 18.742 | 1.444 | -5.620 | 127.86 | 44.77 | 69.23 | 1515.6 | 197.38 | 188.4 |
| 205. | 18.587 | 1.420 | -5.273 | 129.57 | 44.92 | 69.55 | 1488.9 | 188.13 | 184.6 |
| 210. | 18.432 | 1.398 | -4.925 | 131.25 | 45.09 | 69.89 | 1462.4 | 179.59 | 180.8 |
| 215. | 18.276 | 1.377 | -4.575 | 132.90 | 45.28 | 70.25 | 1436.3 | 171.67 | 177.2 |
| 220. | 18.120 | 1.358 | -4.222 | 134.52 | 45.49 | 70.62 | 1410.5 | 164.31 | 173.5 |
| 225. | 17.964 | 1.339 | -3.868 | 136.11 | 45.73 | 71.02 | 1385.1 | 157.44 | 170.0 |
| 230. | 17.808 | 1.321 | -3.512 | 137.68 | 45.99 | 71.43 | 1360.0 | 151.03 | 166.5 |
| 235. | 17.651 | 1.305 | -3.154 | 139.22 | 46.27 | 71.85 | 1335.2 | 145.03 | 163.1 |
| 240. | 17.495 | 1.289 | -2.794 | 140.74 | 46.56 | 72.29 | 1310.9 | 139.39 | 159.8 |
| 245. | 17.337 | 1.274 | -2.431 | 142.23 | 46.88 | 72.74 | 1286.9 | 134.09 | 156.5 |
| 250. | 17.180 | 1.260 | -2.066 | 143.71 | 47.21 | 73.20 | 1263.3 | 129.10 | 153.4 |
| 255. | 17.023 | 1.247 | -1.699 | 145.16 | 47.56 | 73.68 | 1240.1 | 124.39 | 150.3 |
| 260. | 16.865 | 1.234 | -1.329 | 146.60 | 47.92 | 74.16 | 1217.2 | 119.94 | 147.3 |
| 265. | 16.707 | 1.222 | -0.957 | 148.01 | 48.30 | 74.65 | 1194.8 | 115.74 | 144.4 |
| 270. | 16.549 | 1.211 | -0.583 | 149.41 | 48.70 | 75.16 | 1172.8 | 111.76 | 141.6 |
| 275. | 16.390 | 1.201 | -0.206 | 150.80 | 49.10 | 75.67 | 1151.2 | 107.98 | 138.9 |
| 280. | 16.232 | 1.191 | 0.174 | 152.16 | 49.52 | 76.19 | 1130.1 | 104.40 | 136.2 |
| 285. | 16.073 | 1.181 | 0.556 | 153.52 | 49.96 | 76.72 | 1109.3 | 101.00 | 133.7 |
| 290. | 15.915 | 1.173 | 0.941 | 154.86 | 50.40 | 77.25 | 1089.0 | 97.76 | 131.2 |
| 295. | 15.756 | 1.164 | 1.329 | 156.18 | 50.86 | 77.79 | 1069.2 | 94.69 | 128.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 45.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 300. | 15.597 | 1.157 | 1.719 | 157.49 | 51.32 | 78.33 | 1049.8 | 91.76 | 126.5 |
| 310. | 15.280 | 1.143 | 2.508 | 160.08 | 52.28 | 79.43 | 1012.3 | 86.32 | 122.1 |
| 320. | 14.962 | 1.130 | 3.307 | 162.62 | 53.27 | 80.54 | 976.6 | 81.38 | 118.1 |
| 330. | 14.645 | 1.120 | 4.118 | 165.11 | 54.29 | 81.65 | 942.8 | 76.88 | 114.4 |
| 340. | 14.330 | 1.111 | 4.940 | 167.57 | 55.33 | 82.76 | 910.8 | 72.78 | 111.0 |
| 350. | 14.015 | 1.103 | 5.774 | 169.98 | 56.40 | 83.87 | 880.6 | 69.04 | 108.0 |
| 360. | 13.703 | 1.097 | 6.618 | 172.36 | 57.48 | 84.96 | 852.4 | 65.63 | 105.2 |
| 370. | 13.393 | 1.092 | 7.473 | 174.70 | 58.57 | 86.03 | 825.9 | 62.51 | 102.7 |
| 380. | 13.085 | 1.088 | 8.338 | 177.01 | 59.67 | 87.07 | 801.3 | 59.66 | 100.5 |
| 390. | 12.782 | 1.086 | 9.214 | 179.29 | 60.78 | 88.09 | 778.5 | 57.06 | 98.5 |
| 400. | 12.483 | 1.084 | 10.100 | 181.53 | 61.90 | 89.07 | 757.5 | 54.69 | 96.8 |
| 410. | 12.188 | 1.083 | 10.995 | 183.74 | 63.01 | 90.01 | 738.2 | 52.53 | 95.4 |
| 420. | 11.899 | 1.083 | 11.900 | 185.92 | 64.13 | 90.92 | 720.5 | 50.55 | 94.1 |
| 430. | 11.615 | 1.084 | 12.813 | 188.07 | 65.24 | 91.78 | 704.5 | 48.75 | 93.1 |
| 440. | 11.338 | 1.085 | 13.735 | 190.19 | 66.36 | 92.61 | 689.9 | 47.11 | 92.3 |
| 450. | 11.069 | 1.087 | 14.665 | 192.28 | 67.46 | 93.39 | 676.9 | 45.61 | 91.7 |
| 460. | 10.806 | 1.089 | 15.603 | 194.34 | 68.57 | 94.14 | 665.2 | 44.25 | 91.2 |
| 470. | 10.551 | 1.091 | 16.548 | 196.37 | 69.66 | 94.86 | 654.8 | 43.02 | 91.0 |
| 480. | 10.304 | 1.094 | 17.500 | 198.38 | 70.75 | 95.55 | 645.6 | 41.89 | 90.8 |
| 490. | 10.065 | 1.097 | 18.459 | 200.35 | 71.83 | 96.22 | 637.6 | 40.87 | 90.9 |
| 500. | 9.834 | 1.101 | 19.424 | 202.30 | 72.91 | 96.86 | 630.5 | 39.94 | 91.0 |
| 520. | 9.396 | 1.108 | 21.374 | 206.13 | 75.03 | 98.10 | 619.1 | | 91.7 |
| 540. | 8.990 | 1.115 | 23.348 | 209.85 | 77.12 | 99.31 | 610.8 | | 92.8 |
| 560. | 8.615 | 1.122 | 25.346 | 213.49 | 79.17 | 100.49 | 605.1 | | 94.2 |
| 580. | 8.268 | 1.129 | 27.368 | 217.03 | 81.19 | 101.68 | 601.4 | | 95.9 |
| 600. | 7.947 | 1.135 | 29.414 | 220.50 | 83.17 | 102.87 | 599.4 | | 97.9 |
| 625. | 7.580 | 1.142 | 32.004 | 224.73 | 85.60 | 104.38 | 598.8 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 50.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 100. | 21.896 | 2.746 | -12.268 | 80.05 | 48.84 | 68.32 | 2134.9 | 1364.46 | 270.0 |
| 105. | 21.742 | 2.634 | -11.924 | 83.41 | 49.06 | 69.17 | 2101.7 | 1117.04 | 266.9 |
| 110. | 21.587 | 2.533 | -11.577 | 86.64 | 48.86 | 69.40 | 2068.8 | 936.09 | 263.5 |
| 115. | 21.432 | 2.440 | -11.230 | 89.72 | 48.44 | 69.30 | 2036.5 | 799.94 | 259.9 |
| 120. | 21.277 | 2.355 | -10.885 | 92.66 | 47.92 | 69.04 | 2004.7 | 694.92 | 256.2 |
| 125. | 21.124 | 2.277 | -10.540 | 95.48 | 47.39 | 68.72 | 1973.3 | 612.11 | 252.3 |
| 130. | 20.970 | 2.206 | -10.197 | 98.17 | 46.88 | 68.40 | 1942.3 | 545.55 | 248.4 |
| 135. | 20.818 | 2.140 | -9.856 | 100.74 | 46.42 | 68.12 | 1911.7 | 491.14 | 244.4 |
| 140. | 20.665 | 2.079 | -9.516 | 103.21 | 46.01 | 67.89 | 1881.4 | 445.97 | 240.3 |
| 145. | 20.513 | 2.022 | -9.177 | 105.59 | 45.66 | 67.72 | 1851.5 | 407.96 | 236.3 |
| 150. | 20.362 | 1.969 | -8.839 | 107.89 | 45.36 | 67.60 | 1822.0 | 375.59 | 232.1 |
| 155. | 20.210 | 1.920 | -8.501 | 110.10 | 45.13 | 67.54 | 1792.7 | 347.72 | 228.0 |
| 160. | 20.059 | 1.874 | -8.163 | 112.25 | 44.94 | 67.54 | 1763.8 | 323.48 | 223.9 |
| 165. | 19.908 | 1.831 | -7.825 | 114.33 | 44.81 | 67.58 | 1735.1 | 302.20 | 219.8 |
| 170. | 19.757 | 1.790 | -7.487 | 116.34 | 44.72 | 67.67 | 1706.8 | 283.38 | 215.7 |
| 175. | 19.606 | 1.753 | -7.149 | 118.31 | 44.67 | 67.80 | 1678.8 | 266.61 | 211.6 |
| 180. | 19.456 | 1.717 | -6.809 | 120.22 | 44.66 | 67.97 | 1651.1 | 251.56 | 207.6 |
| 185. | 19.305 | 1.684 | -6.469 | 122.08 | 44.68 | 68.17 | 1623.7 | 237.98 | 203.6 |
| 190. | 19.154 | 1.652 | -6.128 | 123.91 | 44.74 | 68.39 | 1596.6 | 225.66 | 199.6 |
| 195. | 19.003 | 1.623 | -5.785 | 125.69 | 44.82 | 68.65 | 1569.9 | 214.41 | 195.7 |
| 200. | 18.852 | 1.595 | -5.441 | 127.43 | 44.94 | 68.93 | 1543.4 | 204.12 | 191.9 |
| 205. | 18.701 | 1.569 | -5.096 | 129.13 | 45.08 | 69.23 | 1517.3 | 194.64 | 188.1 |
| 210. | 18.550 | 1.544 | -4.749 | 130.80 | 45.25 | 69.55 | 1491.5 | 185.90 | 184.4 |
| 215. | 18.398 | 1.520 | -4.400 | 132.45 | 45.44 | 69.90 | 1466.1 | 177.79 | 180.7 |
| 220. | 18.247 | 1.498 | -4.050 | 134.06 | 45.66 | 70.26 | 1441.0 | 170.27 | 177.2 |
| 225. | 18.095 | 1.477 | -3.697 | 135.64 | 45.89 | 70.63 | 1416.2 | 163.25 | 173.7 |
| 230. | 17.944 | 1.457 | -3.343 | 137.20 | 46.15 | 71.02 | 1391.8 | 156.70 | 170.2 |
| 235. | 17.792 | 1.438 | -2.987 | 138.73 | 46.43 | 71.43 | 1367.8 | 150.57 | 166.9 |
| 240. | 17.640 | 1.420 | -2.629 | 140.24 | 46.72 | 71.84 | 1344.1 | 144.81 | 163.6 |
| 245. | 17.488 | 1.404 | -2.269 | 141.72 | 47.04 | 72.27 | 1320.8 | 139.40 | 160.4 |
| 250. | 17.337 | 1.387 | -1.906 | 143.19 | 47.37 | 72.71 | 1297.8 | 134.31 | 157.3 |
| 255. | 17.185 | 1.372 | -1.542 | 144.63 | 47.72 | 73.17 | 1275.3 | 129.51 | 154.2 |
| 260. | 17.033 | 1.358 | -1.175 | 146.06 | 48.08 | 73.63 | 1253.1 | 124.97 | 151.3 |
| 265. | 16.881 | 1.344 | -0.805 | 147.46 | 48.46 | 74.10 | 1231.4 | 120.69 | 148.4 |
| 270. | 16.728 | 1.331 | -0.434 | 148.85 | 48.85 | 74.58 | 1210.1 | 116.63 | 145.6 |
| 275. | 16.576 | 1.319 | -0.060 | 150.23 | 49.26 | 75.07 | 1189.1 | 112.78 | 142.9 |
| 280. | 16.424 | 1.308 | 0.317 | 151.58 | 49.68 | 75.56 | 1168.6 | 109.13 | 140.3 |
| 285. | 16.273 | 1.297 | 0.696 | 152.92 | 50.11 | 76.06 | 1148.5 | 105.66 | 137.8 |
| 290. | 16.121 | 1.286 | 1.078 | 154.25 | 50.55 | 76.57 | 1128.8 | 102.37 | 135.3 |
| 295. | 15.969 | 1.277 | 1.462 | 155.56 | 51.01 | 77.09 | 1109.6 | 99.24 | 133.0 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 50.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 300. | 15.817 | 1.267 | 1.849 | 156.86 | 51.47 | 77.60 | 1090.8 | 96.26 | 130.7 |
| 310. | 15.515 | 1.250 | 2.630 | 159.43 | 52.42 | 78.65 | 1054.4 | 90.71 | 126.4 |
| 320. | 15.213 | 1.235 | 3.422 | 161.94 | 53.41 | 79.71 | 1019.9 | 85.67 | 122.4 |
| 330. | 14.912 | 1.222 | 4.224 | 164.41 | 54.43 | 80.77 | 987.0 | 81.09 | 118.7 |
| 340. | 14.613 | 1.210 | 5.037 | 166.84 | 55.47 | 81.84 | 955.9 | 76.90 | 115.3 |
| 350. | 14.316 | 1.200 | 5.861 | 169.22 | 56.53 | 82.90 | 926.6 | 73.08 | 112.3 |
| 360. | 14.021 | 1.191 | 6.695 | 171.57 | 57.61 | 83.96 | 899.0 | 69.59 | 109.5 |
| 370. | 13.729 | 1.184 | 7.540 | 173.89 | 58.70 | 85.00 | 873.1 | 66.40 | 107.0 |
| 380. | 13.439 | 1.178 | 8.395 | 176.17 | 59.80 | 86.02 | 848.9 | 63.48 | 104.8 |
| 390. | 13.153 | 1.172 | 9.260 | 178.42 | 60.91 | 87.02 | 826.4 | 60.80 | 102.8 |
| 400. | 12.872 | 1.168 | 10.135 | 180.63 | 62.02 | 88.00 | 805.5 | 58.36 | 101.1 |
| 410. | 12.594 | 1.165 | 11.020 | 182.82 | 63.13 | 88.96 | 786.1 | 56.12 | 99.6 |
| 420. | 12.321 | 1.162 | 11.914 | 184.97 | 64.25 | 89.88 | 768.3 | 54.06 | 98.3 |
| 430. | 12.054 | 1.160 | 12.818 | 187.10 | 65.36 | 90.78 | 751.9 | 52.19 | 97.2 |
| 440. | 11.792 | 1.159 | 13.730 | 189.19 | 66.47 | 91.64 | 737.0 | 50.47 | 96.4 |
| 450. | 11.536 | 1.158 | 14.651 | 191.26 | 67.58 | 92.48 | 723.4 | 48.89 | 95.7 |
| 460. | 11.286 | 1.158 | 15.579 | 193.30 | 68.68 | 93.29 | 711.0 | 47.46 | 95.2 |
| 470. | 11.042 | 1.159 | 16.516 | 195.32 | 69.78 | 94.07 | 699.9 | 46.14 | 94.8 |
| 480. | 10.805 | 1.159 | 17.461 | 197.31 | 70.87 | 94.83 | 689.9 | 44.94 | 94.6 |
| 490. | 10.575 | 1.160 | 18.413 | 199.27 | 71.95 | 95.56 | 680.9 | 43.84 | 94.6 |
| 500. | 10.352 | 1.162 | 19.372 | 201.21 | 73.02 | 96.28 | 672.9 | 42.83 | 94.6 |
| 520. | 9.927 | 1.165 | 21.311 | 205.01 | 75.15 | 97.66 | 659.6 | | 95.2 |
| 540. | 9.529 | 1.169 | 23.278 | 208.72 | 77.24 | 98.99 | 649.4 | | 96.1 |
| 560. | 9.157 | 1.173 | 25.271 | 212.35 | 79.29 | 100.30 | 641.8 | | 97.4 |
| 580. | 8.811 | 1.177 | 27.290 | 215.89 | 81.31 | 101.58 | 636.3 | | 99.0 |
| 600. | 8.489 | 1.181 | 29.334 | 219.35 | 83.29 | 102.86 | 632.6 | | 100.8 |
| 625. | 8.118 | 1.185 | 31.926 | 223.59 | 85.71 | 104.46 | 630.0 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 55.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 100. | 21.947 | 3.014 | -12.072 | 79.74 | 48.90 | 68.19 | 2152.7 | 1436.49 | 272.1 |
| 105. | 21.794 | 2.891 | -11.728 | 83.09 | 49.17 | 69.06 | 2119.6 | 1170.08 | 269.0 |
| 110. | 21.641 | 2.779 | -11.382 | 86.31 | 48.99 | 69.31 | 2086.9 | 976.84 | 265.7 |
| 115. | 21.488 | 2.677 | -11.036 | 89.39 | 48.58 | 69.22 | 2054.9 | 832.37 | 262.2 |
| 120. | 21.336 | 2.584 | -10.690 | 92.33 | 48.08 | 68.95 | 2023.4 | 721.50 | 258.6 |
| 125. | 21.185 | 2.498 | -10.346 | 95.14 | 47.56 | 68.63 | 1992.3 | 634.45 | 254.8 |
| 130. | 21.034 | 2.419 | -10.004 | 97.82 | 47.05 | 68.31 | 1961.7 | 564.73 | 251.0 |
| 135. | 20.883 | 2.346 | -9.663 | 100.39 | 46.59 | 68.02 | 1931.6 | 507.90 | 247.0 |
| 140. | 20.734 | 2.279 | -9.324 | 102.86 | 46.18 | 67.77 | 1901.8 | 460.84 | 243.0 |
| 145. | 20.584 | 2.216 | -8.985 | 105.24 | 45.82 | 67.59 | 1872.4 | 421.34 | 239.0 |
| 150. | 20.435 | 2.158 | -8.648 | 107.53 | 45.53 | 67.46 | 1843.3 | 387.76 | 235.0 |
| 155. | 20.287 | 2.104 | -8.311 | 109.74 | 45.29 | 67.39 | 1814.5 | 358.89 | 230.9 |
| 160. | 20.138 | 2.053 | -7.974 | 111.88 | 45.11 | 67.38 | 1786.1 | 333.82 | 226.9 |
| 165. | 19.990 | 2.006 | -7.637 | 113.95 | 44.97 | 67.41 | 1758.0 | 311.85 | 222.8 |
| 170. | 19.842 | 1.961 | -7.300 | 115.96 | 44.88 | 67.48 | 1730.2 | 292.44 | 218.8 |
| 175. | 19.694 | 1.919 | -6.962 | 117.92 | 44.83 | 67.60 | 1702.8 | 275.16 | 214.8 |
| 180. | 19.547 | 1.880 | -6.624 | 119.83 | 44.82 | 67.75 | 1675.7 | 259.67 | 210.8 |
| 185. | 19.399 | 1.843 | -6.284 | 121.69 | 44.84 | 67.94 | 1648.8 | 245.71 | 206.8 |
| 190. | 19.252 | 1.808 | -5.944 | 123.50 | 44.89 | 68.16 | 1622.3 | 233.05 | 202.9 |
| 195. | 19.104 | 1.776 | -5.603 | 125.27 | 44.98 | 68.40 | 1596.2 | 221.51 | 199.1 |
| 200. | 18.957 | 1.745 | -5.260 | 127.01 | 45.10 | 68.66 | 1570.3 | 210.94 | 195.3 |
| 205. | 18.809 | 1.716 | -4.916 | 128.71 | 45.24 | 68.95 | 1544.8 | 201.23 | 191.5 |
| 210. | 18.662 | 1.688 | -4.571 | 130.37 | 45.40 | 69.26 | 1519.6 | 192.27 | 187.8 |
| 215. | 18.515 | 1.662 | -4.223 | 132.01 | 45.60 | 69.59 | 1494.8 | 183.97 | 184.2 |
| 220. | 18.367 | 1.637 | -3.875 | 133.61 | 45.81 | 69.93 | 1470.3 | 176.27 | 180.7 |
| 225. | 18.220 | 1.614 | -3.524 | 135.19 | 46.05 | 70.29 | 1446.1 | 169.09 | 177.2 |
| 230. | 18.072 | 1.591 | -3.172 | 136.74 | 46.30 | 70.67 | 1422.3 | 162.39 | 173.8 |
| 235. | 17.925 | 1.570 | -2.817 | 138.26 | 46.58 | 71.05 | 1398.9 | 156.12 | 170.5 |
| 240. | 17.778 | 1.550 | -2.461 | 139.76 | 46.88 | 71.46 | 1375.8 | 150.24 | 167.3 |
| 245. | 17.631 | 1.531 | -2.103 | 141.24 | 47.19 | 71.87 | 1353.1 | 144.72 | 164.1 |
| 250. | 17.484 | 1.513 | -1.742 | 142.69 | 47.52 | 72.29 | 1330.8 | 139.52 | 161.0 |
| 255. | 17.337 | 1.496 | -1.380 | 144.13 | 47.87 | 72.73 | 1308.8 | 134.62 | 158.0 |
| 260. | 17.190 | 1.480 | -1.015 | 145.55 | 48.23 | 73.17 | 1287.3 | 129.99 | 155.1 |
| 265. | 17.043 | 1.465 | -0.648 | 146.94 | 48.61 | 73.63 | 1266.1 | 125.61 | 152.3 |
| 270. | 16.896 | 1.450 | -0.279 | 148.32 | 49.00 | 74.09 | 1245.3 | 121.47 | 149.5 |
| 275. | 16.750 | 1.436 | 0.093 | 149.69 | 49.41 | 74.56 | 1225.0 | 117.54 | 146.8 |
| 280. | 16.603 | 1.423 | 0.467 | 151.04 | 49.82 | 75.04 | 1205.0 | 113.82 | 144.2 |
| 285. | 16.457 | 1.410 | 0.843 | 152.37 | 50.25 | 75.52 | 1185.5 | 110.28 | 141.7 |
| 290. | 16.311 | 1.398 | 1.222 | 153.69 | 50.70 | 76.01 | 1166.3 | 106.92 | 139.3 |
| 295. | 16.165 | 1.387 | 1.603 | 154.99 | 51.15 | 76.50 | 1147.6 | 103.73 | 136.9 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 55.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 300. | 16.020 | 1.376 | 1.987 | 156.28 | 51.61 | 77.00 | 1129.3 | 100.69 | 134.7 |
| 310. | 15.730 | 1.357 | 2.762 | 158.82 | 52.56 | 78.01 | 1094.0 | 95.03 | 130.4 |
| 320. | 15.441 | 1.339 | 3.547 | 161.31 | 53.55 | 79.04 | 1060.3 | 89.88 | 126.4 |
| 330. | 15.154 | 1.323 | 4.343 | 163.76 | 54.56 | 80.07 | 1028.3 | 85.20 | 122.8 |
| 340. | 14.869 | 1.309 | 5.149 | 166.17 | 55.60 | 81.10 | 998.0 | 80.92 | 119.4 |
| 350. | 14.586 | 1.296 | 5.965 | 168.53 | 56.66 | 82.13 | 969.3 | 77.01 | 116.4 |
| 360. | 14.305 | 1.284 | 6.791 | 170.86 | 57.74 | 83.16 | 942.3 | 73.44 | 113.6 |
| 370. | 14.027 | 1.275 | 7.628 | 173.15 | 58.83 | 84.18 | 916.9 | 70.17 | 111.1 |
| 380. | 13.753 | 1.266 | 8.475 | 175.41 | 59.92 | 85.19 | 893.1 | 67.17 | 108.8 |
| 390. | 13.481 | 1.258 | 9.332 | 177.64 | 61.03 | 86.18 | 870.8 | 64.41 | 106.8 |
| 400. | 13.214 | 1.252 | 10.198 | 179.83 | 62.14 | 87.16 | 850.1 | 61.89 | 105.1 |
| 410. | 12.951 | 1.246 | 11.075 | 182.00 | 63.25 | 88.12 | 830.7 | 59.57 | 103.5 |
| 420. | 12.691 | 1.241 | 11.961 | 184.13 | 64.37 | 89.05 | 812.8 | 57.45 | 102.2 |
| 430. | 12.437 | 1.237 | 12.856 | 186.24 | 65.48 | 89.97 | 796.3 | 55.49 | 101.1 |
| 440. | 12.188 | 1.234 | 13.760 | 188.32 | 66.59 | 90.86 | 781.0 | 53.70 | 100.2 |
| 450. | 11.943 | 1.231 | 14.673 | 190.37 | 67.69 | 91.72 | 767.0 | 52.05 | 99.4 |
| 460. | 11.705 | 1.229 | 15.594 | 192.39 | 68.80 | 92.57 | 754.2 | 50.54 | 98.9 |
| 470. | 11.471 | 1.227 | 16.524 | 194.39 | 69.89 | 93.39 | 742.5 | 49.15 | 98.5 |
| 480. | 11.244 | 1.226 | 17.462 | 196.37 | 70.98 | 94.20 | 731.9 | 47.87 | 98.2 |
| 490. | 11.023 | 1.225 | 18.408 | 198.32 | 72.06 | 94.98 | 722.3 | 46.70 | 98.1 |
| 500. | 10.807 | 1.224 | 19.362 | 200.24 | 73.14 | 95.75 | 713.6 | 45.62 | 98.1 |
| 520. | 10.394 | 1.224 | 21.292 | 204.03 | 75.26 | 97.23 | 698.8 | | 98.5 |
| 540. | 10.005 | 1.224 | 23.251 | 207.72 | 77.35 | 98.67 | 687.0 | | 99.3 |
| 560. | 9.640 | 1.225 | 25.238 | 211.34 | 79.40 | 100.06 | 677.8 | | 100.5 |
| 580. | 9.297 | 1.227 | 27.253 | 214.87 | 81.41 | 101.43 | 670.7 | | 101.9 |
| 600. | 8.976 | 1.228 | 29.295 | 218.34 | 83.39 | 102.79 | 665.6 | | 103.6 |
| 625. | 8.604 | 1.230 | 31.886 | 222.57 | 85.81 | 104.46 | 661.3 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 60.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 100. | 21.996 | 3.281 | -11.876 | 79.42 | 48.97 | 68.06 | 2170.3 | 1515.28 | 274.1 |
| 105. | 21.846 | 3.146 | -11.533 | 82.77 | 49.27 | 68.97 | 2137.2 | 1227.42 | 271.2 |
| 110. | 21.695 | 3.024 | -11.187 | 85.98 | 49.12 | 69.23 | 2104.8 | 1020.48 | 267.9 |
| 115. | 21.544 | 2.913 | -10.841 | 89.06 | 48.73 | 69.14 | 2073.0 | 866.85 | 264.5 |
| 120. | 21.394 | 2.811 | -10.496 | 92.00 | 48.24 | 68.88 | 2041.7 | 749.59 | 261.0 |
| 125. | 21.244 | 2.717 | -10.152 | 94.80 | 47.71 | 68.55 | 2011.1 | 657.93 | 257.3 |
| 130. | 21.096 | 2.631 | -9.810 | 97.48 | 47.21 | 68.22 | 1980.9 | 584.80 | 253.5 |
| 135. | 20.948 | 2.552 | -9.470 | 100.05 | 46.75 | 67.92 | 1951.1 | 525.37 | 249.6 |
| 140. | 20.800 | 2.478 | -9.131 | 102.52 | 46.34 | 67.67 | 1921.7 | 476.29 | 245.7 |
| 145. | 20.653 | 2.410 | -8.793 | 104.89 | 45.99 | 67.47 | 1892.7 | 435.19 | 241.8 |
| 150. | 20.507 | 2.346 | -8.456 | 107.17 | 45.69 | 67.34 | 1864.1 | 400.32 | 237.8 |
| 155. | 20.361 | 2.287 | -8.120 | 109.38 | 45.46 | 67.26 | 1835.8 | 370.39 | 233.8 |
| 160. | 20.215 | 2.231 | -7.784 | 111.52 | 45.27 | 67.23 | 1807.9 | 344.45 | 229.8 |
| 165. | 20.070 | 2.179 | -7.447 | 113.58 | 45.13 | 67.25 | 1780.3 | 321.75 | 225.8 |
| 170. | 19.924 | 2.130 | -7.111 | 115.59 | 45.04 | 67.32 | 1753.1 | 301.71 | 221.8 |
| 175. | 19.780 | 2.085 | -6.774 | 117.55 | 44.99 | 67.42 | 1726.1 | 283.90 | 217.8 |
| 180. | 19.635 | 2.042 | -6.437 | 119.45 | 44.97 | 67.56 | 1699.5 | 267.95 | 213.9 |
| 185. | 19.490 | 2.001 | -6.099 | 121.30 | 44.99 | 67.74 | 1673.2 | 253.58 | 210.0 |
| 190. | 19.346 | 1.963 | -5.759 | 123.11 | 45.05 | 67.94 | 1647.3 | 240.56 | 206.1 |
| 195. | 19.202 | 1.927 | -5.419 | 124.88 | 45.13 | 68.17 | 1621.7 | 228.71 | 202.3 |
| 200. | 19.057 | 1.893 | -5.078 | 126.61 | 45.25 | 68.42 | 1596.4 | 217.87 | 198.6 |
| 205. | 18.913 | 1.861 | -4.735 | 128.30 | 45.39 | 68.70 | 1571.4 | 207.90 | 194.9 |
| 210. | 18.769 | 1.831 | -4.391 | 129.96 | 45.55 | 69.00 | 1546.8 | 198.72 | 191.2 |
| 215. | 18.626 | 1.802 | -4.045 | 131.59 | 45.74 | 69.31 | 1522.5 | 190.22 | 187.7 |
| 220. | 18.482 | 1.775 | -3.698 | 133.18 | 45.96 | 69.64 | 1498.5 | 182.33 | 184.2 |
| 225. | 18.338 | 1.749 | -3.348 | 134.75 | 46.19 | 69.99 | 1474.9 | 174.98 | 180.7 |
| 230. | 18.195 | 1.724 | -2.998 | 136.29 | 46.45 | 70.35 | 1451.7 | 168.12 | 177.4 |
| 235. | 18.052 | 1.701 | -2.645 | 137.81 | 46.73 | 70.73 | 1428.8 | 161.71 | 174.1 |
| 240. | 17.908 | 1.679 | -2.290 | 139.30 | 47.02 | 71.12 | 1406.2 | 155.70 | 170.9 |
| 245. | 17.765 | 1.658 | -1.934 | 140.77 | 47.33 | 71.52 | 1384.1 | 150.05 | 167.7 |
| 250. | 17.623 | 1.638 | -1.575 | 142.22 | 47.66 | 71.93 | 1362.3 | 144.73 | 164.7 |
| 255. | 17.480 | 1.619 | -1.214 | 143.65 | 48.01 | 72.35 | 1340.9 | 139.72 | 161.7 |
| 260. | 17.337 | 1.601 | -0.852 | 145.06 | 48.37 | 72.78 | 1319.8 | 134.99 | 158.8 |
| 265. | 17.195 | 1.584 | -0.487 | 146.45 | 48.75 | 73.22 | 1299.2 | 130.52 | 156.0 |
| 270. | 17.053 | 1.567 | -0.119 | 147.82 | 49.14 | 73.67 | 1278.9 | 126.29 | 153.3 |
| 275. | 16.911 | 1.552 | 0.250 | 149.18 | 49.55 | 74.12 | 1259.1 | 122.28 | 150.6 |
| 280. | 16.770 | 1.537 | 0.622 | 150.52 | 49.96 | 74.59 | 1239.6 | 118.48 | 148.0 |
| 285. | 16.629 | 1.523 | 0.996 | 151.84 | 50.39 | 75.06 | 1220.5 | 114.87 | 145.5 |
| 290. | 16.488 | 1.509 | 1.372 | 153.15 | 50.83 | 75.53 | 1201.9 | 111.44 | 143.1 |
| 295. | 16.347 | 1.496 | 1.751 | 154.45 | 51.29 | 76.01 | 1183.6 | 108.17 | 140.8 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 60.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 300. | 16.207 | 1.484 | 2.133 | 155.73 | 51.75 | 76.50 | 1165.7 | 105.07 | 138.6 |
| 310. | 15.928 | 1.461 | 2.902 | 158.25 | 52.70 | 77.48 | 1131.3 | 99.29 | 134.3 |
| 320. | 15.651 | 1.441 | 3.682 | 160.73 | 53.68 | 78.48 | 1098.4 | 94.03 | 130.3 |
| 330. | 15.375 | 1.422 | 4.472 | 163.16 | 54.70 | 79.48 | 1067.1 | 89.24 | 126.7 |
| 340. | 15.102 | 1.405 | 5.272 | 165.55 | 55.73 | 80.49 | 1037.5 | 84.87 | 123.4 |
| 350. | 14.831 | 1.390 | 6.082 | 167.90 | 56.79 | 81.50 | 1009.4 | 80.86 | 120.3 |
| 360. | 14.562 | 1.377 | 6.902 | 170.21 | 57.86 | 82.51 | 982.9 | 77.20 | 117.5 |
| 370. | 14.297 | 1.364 | 7.732 | 172.48 | 58.95 | 83.52 | 957.9 | 73.84 | 115.0 |
| 380. | 14.034 | 1.353 | 8.572 | 174.72 | 60.05 | 84.51 | 934.4 | 70.76 | 112.7 |
| 390. | 13.775 | 1.343 | 9.422 | 176.93 | 61.15 | 85.50 | 912.4 | 67.93 | 110.7 |
| 400. | 13.520 | 1.334 | 10.282 | 179.11 | 62.26 | 86.47 | 891.8 | 65.33 | 108.9 |
| 410. | 13.268 | 1.327 | 11.152 | 181.25 | 63.37 | 87.43 | 872.5 | 62.93 | 107.3 |
| 420. | 13.021 | 1.320 | 12.031 | 183.37 | 64.48 | 88.38 | 854.6 | 60.73 | 106.0 |
| 430. | 12.778 | 1.313 | 12.919 | 185.46 | 65.59 | 89.30 | 838.0 | 58.70 | 104.8 |
| 440. | 12.539 | 1.308 | 13.817 | 187.53 | 66.70 | 90.21 | 822.5 | 56.84 | 103.9 |
| 450. | 12.305 | 1.303 | 14.723 | 189.56 | 67.81 | 91.10 | 808.3 | 55.12 | 103.1 |
| 460. | 12.076 | 1.299 | 15.639 | 191.57 | 68.91 | 91.97 | 795.1 | 53.53 | 102.4 |
| 470. | 11.852 | 1.295 | 16.563 | 193.56 | 70.00 | 92.82 | 783.0 | 52.07 | 102.0 |
| 480. | 11.633 | 1.292 | 17.495 | 195.52 | 71.09 | 93.66 | 771.9 | 50.73 | 101.7 |
| 490. | 11.419 | 1.290 | 18.436 | 197.46 | 72.17 | 94.48 | 761.8 | 49.49 | 101.5 |
| 500. | 11.211 | 1.287 | 19.385 | 199.38 | 73.24 | 95.28 | 752.5 | 48.34 | 101.4 |
| 520. | 10.810 | 1.284 | 21.306 | 203.15 | 75.36 | 96.84 | 736.5 | | 101.7 |
| 540. | 10.431 | 1.281 | 23.258 | 206.83 | 77.45 | 98.35 | 723.4 | | 102.4 |
| 560. | 10.073 | 1.279 | 25.240 | 210.44 | 79.50 | 99.82 | 712.9 | | 103.4 |
| 580. | 9.735 | 1.278 | 27.251 | 213.96 | 81.51 | 101.26 | 704.6 | | 104.8 |
| 600. | 9.417 | 1.277 | 29.290 | 217.42 | 83.49 | 102.67 | 698.1 | | 106.4 |
| 625. | 9.046 | 1.276 | 31.879 | 221.65 | 85.90 | 104.41 | 692.3 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 65.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 105. | 21.896 | 3.400 | -11.337 | 82.45 | 49.37 | 68.87 | 2154.6 | 1289.63 | 273.3 |
| 110. | 21.747 | 3.268 | -10.992 | 85.67 | 49.25 | 69.15 | 2122.3 | 1067.36 | 270.1 |
| 115. | 21.598 | 3.147 | -10.646 | 88.74 | 48.87 | 69.07 | 2090.7 | 903.58 | 266.8 |
| 120. | 21.450 | 3.037 | -10.301 | 91.67 | 48.39 | 68.80 | 2059.8 | 779.32 | 263.3 |
| 125. | 21.303 | 2.936 | -9.958 | 94.48 | 47.87 | 68.47 | 2029.5 | 682.66 | 259.7 |
| 130. | 21.156 | 2.842 | -9.617 | 97.15 | 47.37 | 68.14 | 1999.6 | 605.83 | 256.0 |
| 135. | 21.010 | 2.756 | -9.277 | 99.72 | 46.91 | 67.83 | 1970.2 | 543.60 | 252.2 |
| 140. | 20.865 | 2.676 | -8.938 | 102.18 | 46.50 | 67.57 | 1941.3 | 492.37 | 248.4 |
| 145. | 20.720 | 2.602 | -8.601 | 104.55 | 46.15 | 67.37 | 1912.7 | 449.55 | 244.5 |
| 150. | 20.576 | 2.533 | -8.264 | 106.83 | 45.85 | 67.22 | 1884.5 | 413.31 | 240.5 |
| 155. | 20.433 | 2.468 | -7.929 | 109.03 | 45.61 | 67.13 | 1856.7 | 382.27 | 236.6 |
| 160. | 20.289 | 2.408 | -7.593 | 111.16 | 45.42 | 67.09 | 1829.2 | 355.40 | 232.6 |
| 165. | 20.147 | 2.352 | -7.258 | 113.23 | 45.29 | 67.11 | 1802.1 | 331.92 | 228.7 |
| 170. | 20.004 | 2.299 | -6.922 | 115.23 | 45.19 | 67.16 | 1775.3 | 311.22 | 224.8 |
| 175. | 19.862 | 2.249 | -6.586 | 117.18 | 45.14 | 67.26 | 1748.9 | 292.84 | 220.9 |
| 180. | 19.720 | 2.202 | -6.249 | 119.08 | 45.12 | 67.39 | 1722.8 | 276.41 | 217.0 |
| 185. | 19.578 | 2.158 | -5.912 | 120.93 | 45.14 | 67.55 | 1697.0 | 261.61 | 213.1 |
| 190. | 19.437 | 2.117 | -5.574 | 122.73 | 45.20 | 67.74 | 1671.5 | 248.22 | 209.3 |
| 195. | 19.295 | 2.078 | -5.234 | 124.49 | 45.28 | 67.96 | 1646.4 | 236.04 | 205.5 |
| 200. | 19.154 | 2.041 | -4.894 | 126.22 | 45.39 | 68.21 | 1621.6 | 224.90 | 201.8 |
| 205. | 19.013 | 2.006 | -4.552 | 127.90 | 45.53 | 68.47 | 1597.2 | 214.67 | 198.2 |
| 210. | 18.873 | 1.973 | -4.209 | 129.56 | 45.70 | 68.76 | 1573.1 | 205.25 | 194.6 |
| 215. | 18.732 | 1.941 | -3.865 | 131.18 | 45.89 | 69.06 | 1549.3 | 196.53 | 191.0 |
| 220. | 18.592 | 1.911 | -3.519 | 132.77 | 46.10 | 69.38 | 1525.8 | 188.45 | 187.6 |
| 225. | 18.452 | 1.883 | -3.171 | 134.33 | 46.33 | 69.72 | 1502.7 | 180.92 | 184.2 |
| 230. | 18.312 | 1.856 | -2.821 | 135.87 | 46.59 | 70.07 | 1480.0 | 173.90 | 180.8 |
| 235. | 18.172 | 1.831 | -2.470 | 137.38 | 46.87 | 70.44 | 1457.6 | 167.34 | 177.6 |
| 240. | 18.033 | 1.806 | -2.117 | 138.87 | 47.16 | 70.82 | 1435.5 | 161.18 | 174.4 |
| 245. | 17.893 | 1.783 | -1.762 | 140.33 | 47.47 | 71.20 | 1413.9 | 155.40 | 171.3 |
| 250. | 17.754 | 1.761 | -1.405 | 141.77 | 47.80 | 71.61 | 1392.6 | 149.97 | 168.3 |
| 255. | 17.616 | 1.740 | -1.046 | 143.20 | 48.15 | 72.02 | 1371.6 | 144.84 | 165.3 |
| 260. | 17.477 | 1.720 | -0.685 | 144.60 | 48.51 | 72.44 | 1351.1 | 140.01 | 162.4 |
| 265. | 17.339 | 1.701 | -0.322 | 145.98 | 48.88 | 72.86 | 1330.9 | 135.44 | 159.6 |
| 270. | 17.201 | 1.683 | 0.044 | 147.35 | 49.28 | 73.30 | 1311.1 | 131.11 | 156.9 |
| 275. | 17.064 | 1.666 | 0.412 | 148.70 | 49.68 | 73.75 | 1291.7 | 127.02 | 154.3 |
| 280. | 16.927 | 1.649 | 0.781 | 150.03 | 50.10 | 74.20 | 1272.6 | 123.13 | 151.7 |
| 285. | 16.790 | 1.634 | 1.154 | 151.35 | 50.53 | 74.66 | 1254.0 | 119.44 | 149.3 |
| 290. | 16.654 | 1.619 | 1.528 | 152.65 | 50.97 | 75.12 | 1235.7 | 115.93 | 146.9 |
| 295. | 16.518 | 1.604 | 1.905 | 153.94 | 51.42 | 75.59 | 1217.9 | 112.59 | 144.5 |
| 300. | 16.382 | 1.591 | 2.284 | 155.21 | 51.88 | 76.07 | 1200.4 | 109.42 | 142.3 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 65.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 310. | 16.112 | 1.565 | 3.049 | 157.72 | 52.83 | 77.03 | 1166.7 | 103.51 | 138.1 |
| 320. | 15.845 | 1.542 | 3.825 | 160.18 | 53.81 | 78.00 | 1134.5 | 98.13 | 134.1 |
| 330. | 15.579 | 1.521 | 4.609 | 162.60 | 54.82 | 78.99 | 1103.9 | 93.23 | 130.5 |
| 340. | 15.316 | 1.501 | 5.404 | 164.97 | 55.86 | 79.98 | 1074.8 | 88.75 | 127.1 |
| 350. | 15.055 | 1.484 | 6.209 | 167.30 | 56.91 | 80.98 | 1047.3 | 84.65 | 124.1 |
| 360. | 14.797 | 1.468 | 7.024 | 169.60 | 57.98 | 81.98 | 1021.2 | 80.90 | 121.3 |
| 370. | 14.542 | 1.453 | 7.849 | 171.86 | 59.07 | 82.97 | 996.6 | 77.45 | 118.7 |
| 380. | 14.290 | 1.440 | 8.683 | 174.08 | 60.16 | 83.96 | 973.4 | 74.28 | 116.5 |
| 390. | 14.042 | 1.428 | 9.528 | 176.28 | 61.26 | 84.94 | 951.6 | 71.37 | 114.4 |
| 400. | 13.797 | 1.417 | 10.382 | 178.44 | 62.37 | 85.91 | 931.1 | 68.68 | 112.6 |
| 410. | 13.555 | 1.407 | 11.246 | 180.57 | 63.48 | 86.87 | 912.0 | 66.21 | 111.0 |
| 420. | 13.318 | 1.398 | 12.119 | 182.68 | 64.59 | 87.82 | 894.1 | 63.94 | 109.6 |
| 430. | 13.084 | 1.389 | 13.002 | 184.76 | 65.70 | 88.75 | 877.3 | 61.84 | 108.4 |
| 440. | 12.855 | 1.382 | 13.894 | 186.81 | 66.81 | 89.67 | 861.8 | 59.90 | 107.4 |
| 450. | 12.630 | 1.375 | 14.796 | 188.83 | 67.91 | 90.58 | 847.3 | 58.11 | 106.5 |
| 460. | 12.409 | 1.370 | 15.706 | 190.83 | 69.01 | 91.46 | 833.9 | 56.45 | 105.9 |
| 470. | 12.194 | 1.364 | 16.625 | 192.81 | 70.10 | 92.34 | 821.5 | 54.93 | 105.4 |
| 480. | 11.982 | 1.359 | 17.553 | 194.76 | 71.19 | 93.20 | 810.1 | 53.51 | 105.0 |
| 490. | 11.776 | 1.355 | 18.489 | 196.69 | 72.27 | 94.04 | 799.6 | 52.21 | 104.8 |
| 500. | 11.574 | 1.351 | 19.433 | 198.60 | 73.34 | 94.87 | 789.9 | 51.00 | 104.7 |
| 520. | 11.185 | 1.344 | 21.347 | 202.35 | 75.46 | 96.49 | 772.9 | | 104.8 |
| 540. | 10.815 | 1.339 | 23.293 | 206.02 | 77.54 | 98.06 | 758.8 | | 105.4 |
| 560. | 10.464 | 1.334 | 25.269 | 209.62 | 79.59 | 99.58 | 747.1 | | 106.3 |
| 580. | 10.132 | 1.330 | 27.276 | 213.14 | 81.60 | 101.08 | 737.7 | | 107.6 |
| 600. | 9.818 | 1.327 | 29.312 | 216.59 | 83.58 | 102.54 | 730.1 | | 109.0 |
| 625. | 9.449 | 1.324 | 31.898 | 220.81 | 85.99 | 104.34 | 722.9 | | |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 70.0000 MPa

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | $mol \cdot dm^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 105. | 21.945 | 3.654 | -11.141 | 82.15 | 49.48 | 68.78 | 2171.7 | 1357.39 | 275.4 |
| 110. | 21.798 | 3.511 | -10.796 | 85.35 | 49.37 | 69.08 | 2139.6 | 1117.87 | 272.3 |
| 115. | 21.651 | 3.381 | -10.451 | 88.42 | 49.01 | 69.00 | 2108.2 | 942.83 | 269.1 |
| 120. | 21.505 | 3.262 | -10.107 | 91.35 | 48.54 | 68.74 | 2077.6 | 810.87 | 265.7 |
| 125. | 21.360 | 3.153 | -9.764 | 94.15 | 48.03 | 68.41 | 2047.6 | 708.74 | 262.1 |
| 130. | 21.215 | 3.053 | -9.423 | 96.83 | 47.53 | 68.07 | 2018.0 | 627.91 | 258.5 |
| 135. | 21.072 | 2.960 | -9.083 | 99.39 | 47.07 | 67.75 | 1989.0 | 562.67 | 254.7 |
| 140. | 20.928 | 2.873 | -8.745 | 101.85 | 46.66 | 67.48 | 1960.4 | 509.11 | 251.0 |
| 145. | 20.786 | 2.793 | -8.408 | 104.22 | 46.30 | 67.27 | 1932.3 | 464.47 | 247.1 |
| 150. | 20.644 | 2.719 | -8.072 | 106.49 | 46.01 | 67.12 | 1904.5 | 426.77 | 243.3 |
| 155. | 20.503 | 2.649 | -7.737 | 108.69 | 45.77 | 67.02 | 1877.1 | 394.53 | 239.4 |
| 160. | 20.362 | 2.584 | -7.402 | 110.82 | 45.58 | 66.97 | 1850.1 | 366.68 | 235.5 |
| 165. | 20.221 | 2.523 | -7.067 | 112.88 | 45.44 | 66.97 | 1823.4 | 342.37 | 231.6 |
| 170. | 20.081 | 2.466 | -6.732 | 114.88 | 45.34 | 67.02 | 1797.1 | 320.98 | 227.7 |
| 175. | 19.942 | 2.412 | -6.397 | 116.83 | 45.28 | 67.11 | 1771.1 | 302.01 | 223.8 |
| 180. | 19.802 | 2.362 | -6.061 | 118.72 | 45.27 | 67.23 | 1745.4 | 285.06 | 220.0 |
| 185. | 19.663 | 2.314 | -5.725 | 120.56 | 45.29 | 67.38 | 1720.1 | 269.82 | 216.2 |
| 190. | 19.524 | 2.270 | -5.387 | 122.36 | 45.34 | 67.57 | 1695.1 | 256.03 | 212.4 |
| 195. | 19.386 | 2.227 | -5.049 | 124.12 | 45.42 | 67.78 | 1670.5 | 243.50 | 208.7 |
| 200. | 19.247 | 2.187 | -4.709 | 125.84 | 45.53 | 68.01 | 1646.2 | 232.05 | 205.0 |
| 205. | 19.109 | 2.149 | -4.369 | 127.52 | 45.67 | 68.27 | 1622.2 | 221.55 | 201.4 |
| 210. | 18.972 | 2.113 | -4.027 | 129.17 | 45.84 | 68.55 | 1598.5 | 211.88 | 197.8 |
| 215. | 18.834 | 2.079 | -3.683 | 130.78 | 46.03 | 68.84 | 1575.2 | 202.93 | 194.3 |
| 220. | 18.697 | 2.047 | -3.338 | 132.37 | 46.24 | 69.15 | 1552.3 | 194.64 | 190.9 |
| 225. | 18.560 | 2.016 | -2.992 | 133.93 | 46.47 | 69.48 | 1529.6 | 186.93 | 187.5 |
| 230. | 18.423 | 1.987 | -2.643 | 135.46 | 46.73 | 69.82 | 1507.3 | 179.73 | 184.2 |
| 235. | 18.287 | 1.959 | -2.293 | 136.96 | 47.00 | 70.18 | 1485.4 | 173.01 | 181.0 |
| 240. | 18.151 | 1.933 | -1.942 | 138.45 | 47.29 | 70.55 | 1463.8 | 166.71 | 177.8 |
| 245. | 18.015 | 1.907 | -1.588 | 139.90 | 47.60 | 70.93 | 1442.6 | 160.79 | 174.8 |
| 250. | 17.880 | 1.883 | -1.232 | 141.34 | 47.93 | 71.32 | 1421.7 | 155.23 | 171.8 |
| 255. | 17.745 | 1.861 | -0.875 | 142.76 | 48.28 | 71.72 | 1401.2 | 149.99 | 168.8 |
| 260. | 17.610 | 1.839 | -0.515 | 144.15 | 48.64 | 72.13 | 1381.1 | 145.04 | 166.0 |
| 265. | 17.475 | 1.818 | -0.153 | 145.53 | 49.01 | 72.55 | 1361.3 | 140.37 | 163.2 |
| 270. | 17.341 | 1.798 | 0.211 | 146.89 | 49.40 | 72.98 | 1341.9 | 135.94 | 160.5 |
| 275. | 17.208 | 1.779 | 0.577 | 148.24 | 49.81 | 73.42 | 1322.9 | 131.75 | 157.9 |
| 280. | 17.075 | 1.761 | 0.945 | 149.56 | 50.22 | 73.86 | 1304.3 | 127.78 | 155.3 |
| 285. | 16.942 | 1.744 | 1.315 | 150.87 | 50.65 | 74.31 | 1286.0 | 124.00 | 152.9 |
| 290. | 16.809 | 1.727 | 1.688 | 152.17 | 51.09 | 74.77 | 1268.1 | 120.41 | 150.5 |
| 295. | 16.678 | 1.711 | 2.063 | 153.45 | 51.54 | 75.23 | 1250.6 | 117.00 | 148.2 |
| 300. | 16.546 | 1.696 | 2.440 | 154.72 | 52.00 | 75.70 | 1233.5 | 113.75 | 146.0 |

Table B3. Properties in the single-phase region along isobars (continued)

ETHANE ISOBAR AT P = 70.0000 MPa (continued)

| T | $\rho$ | Z | H | S | $C_v$ | $C_p$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|---|---|
| K | mol•dm$^{-3}$ | | kJ/mol | J/(mol•K) | J/(mol•K) | | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 310. | 16.285 | 1.668 | 3.202 | 157.22 | 52.95 | 76.64 | 1200.5 | 107.71 | 141.7 |
| 320. | 16.026 | 1.642 | 3.973 | 159.67 | 53.93 | 77.60 | 1168.9 | 102.21 | 137.8 |
| 330. | 15.769 | 1.618 | 4.754 | 162.07 | 54.94 | 78.57 | 1138.8 | 97.19 | 134.2 |
| 340. | 15.515 | 1.596 | 5.545 | 164.43 | 55.97 | 79.55 | 1110.3 | 92.60 | 130.8 |
| 350. | 15.263 | 1.576 | 6.345 | 166.75 | 57.03 | 80.54 | 1083.2 | 88.40 | 127.7 |
| 360. | 15.014 | 1.558 | 7.155 | 169.03 | 58.10 | 81.52 | 1057.5 | 84.55 | 124.9 |
| 370. | 14.768 | 1.541 | 7.975 | 171.28 | 59.18 | 82.51 | 1033.2 | 81.00 | 122.4 |
| 380. | 14.525 | 1.525 | 8.806 | 173.49 | 60.27 | 83.49 | 1010.3 | 77.75 | 120.1 |
| 390. | 14.286 | 1.511 | 9.645 | 175.67 | 61.37 | 84.47 | 988.7 | 74.75 | 118.0 |
| 400. | 14.050 | 1.498 | 10.495 | 177.82 | 62.48 | 85.44 | 968.4 | 71.99 | 116.1 |
| 410. | 13.817 | 1.486 | 11.354 | 179.95 | 63.59 | 86.40 | 949.4 | 69.44 | 114.5 |
| 420. | 13.588 | 1.475 | 12.223 | 182.04 | 64.70 | 87.35 | 931.5 | 67.08 | 113.1 |
| 430. | 13.363 | 1.465 | 13.101 | 184.11 | 65.80 | 88.29 | 914.7 | 64.91 | 111.8 |
| 440. | 13.142 | 1.456 | 13.989 | 186.15 | 66.91 | 89.22 | 899.1 | 62.90 | 110.8 |
| 450. | 12.925 | 1.448 | 14.885 | 188.16 | 68.01 | 90.13 | 884.5 | 61.04 | 109.9 |
| 460. | 12.712 | 1.440 | 15.791 | 190.15 | 69.11 | 91.04 | 870.9 | 59.32 | 109.2 |
| 470. | 12.503 | 1.433 | 16.706 | 192.12 | 70.20 | 91.92 | 858.3 | 57.72 | 108.6 |
| 480. | 12.299 | 1.426 | 17.630 | 194.06 | 71.29 | 92.80 | 846.6 | 56.25 | 108.2 |
| 490. | 12.098 | 1.420 | 18.562 | 195.99 | 72.37 | 93.66 | 835.7 | 54.88 | 107.9 |
| 500. | 11.903 | 1.415 | 19.503 | 197.89 | 73.44 | 94.51 | 825.7 | 53.61 | 107.8 |
| 520. | 11.524 | 1.405 | 21.410 | 201.63 | 75.55 | 96.17 | 807.9 | | 107.8 |
| 540. | 11.163 | 1.397 | 23.349 | 205.29 | 77.64 | 97.79 | 792.9 | | 108.3 |
| 560. | 10.820 | 1.389 | 25.321 | 208.87 | 79.68 | 99.36 | 780.4 | | 109.1 |
| 580. | 10.494 | 1.383 | 27.323 | 212.39 | 81.69 | 100.90 | 770.0 | | 110.3 |
| 600. | 10.184 | 1.378 | 29.356 | 215.83 | 83.66 | 102.40 | 761.4 | | 111.6 |
| 625. | 9.819 | 1.372 | 31.940 | 220.05 | 86.07 | 104.25 | 753.0 | | |

Table B4. Properties in the single-phase region along isotherms

ETHANE ISOTHERM AT T = 95.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.458E-05 | 0.362E-05 | 0.3807E-07 | 0.790 | 27.08 | 185.3 | 3.17 | 3.2 |
| 21.503 | 0.362E-05 | 2.870 | 81.417 | 47.93 | 1970.1 | 1057.13 | 252.1 |
| 21.55 | 3.883 | 2.891 | 83.060 | 47.91 | 1987.1 | 1092.60 | 253.8 |
| 21.60 | 8.079 | 2.913 | 84.823 | 47.90 | 2005.0 | 1132.97 | 255.6 |
| 21.65 | 12.365 | 2.935 | 86.611 | 47.89 | 2023.0 | 1176.59 | 257.5 |
| 21.70 | 16.741 | 2.956 | 88.425 | 47.88 | 2041.0 | 1223.88 | 259.3 |
| 21.75 | 21.208 | 2.978 | 90.266 | 47.87 | 2059.0 | 1275.32 | 261.2 |
| 21.80 | 25.768 | 3.000 | 92.133 | 47.86 | 2077.1 | 1331.50 | 263.1 |

ETHANE ISOTHERM AT T = 100.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.133E-04 | 0.111E-04 | 0.1108E-06 | 0.832 | 27.30 | 189.9 | 3.32 | 3.5 |
| 21.325 | 0.111E-04 | 2.784 | 77.575 | 48.15 | 1938.3 | 877.99 | 248.2 |
| 21.35 | 1.964 | 2.794 | 78.406 | 48.17 | 1946.8 | 891.78 | 249.1 |
| 21.40 | 5.926 | 2.815 | 80.071 | 48.23 | 1963.8 | 920.52 | 250.9 |
| 21.45 | 9.972 | 2.836 | 81.760 | 48.28 | 1980.7 | 951.26 | 252.7 |
| 21.50 | 14.103 | 2.857 | 83.472 | 48.34 | 1997.8 | 984.21 | 254.6 |
| 21.55 | 18.320 | 2.878 | 85.210 | 48.40 | 2014.8 | 1019.63 | 256.5 |
| 21.60 | 22.624 | 2.899 | 86.972 | 48.46 | 2032.0 | 1057.82 | 258.3 |
| 21.65 | 27.017 | 2.921 | 88.761 | 48.52 | 2049.2 | 1099.13 | 260.3 |
| 21.70 | 31.501 | 2.942 | 90.576 | 48.58 | 2066.4 | 1143.94 | 262.2 |
| 21.75 | 36.075 | 2.963 | 92.418 | 48.65 | 2083.7 | 1192.76 | 264.2 |
| 21.80 | 40.743 | 2.984 | 94.287 | 48.71 | 2101.2 | 1246.14 | 266.2 |
| 21.85 | 45.504 | 3.005 | 96.185 | 48.78 | 2118.6 | 1304.76 | 268.2 |
| 21.90 | 50.362 | 3.027 | 98.111 | 48.84 | 2136.2 | 1369.47 | 270.2 |
| 21.95 | 55.316 | 3.048 | 100.065 | 48.91 | 2153.8 | 1441.26 | 272.2 |
| 22.00 | 60.369 | 3.070 | 102.049 | 48.97 | 2171.6 | | 274.3 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 105.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.347E-04 | 0.303E-04 | 0.2876E-06 | 0.873 | 27.48 | 194.4 | 3.46 | 3.7 |
| 21.144 | 0.303E-04 | 2.678 | 73.838 | 47.89 | 1903.9 | 742.08 | 243.9 |
| 21.15 | 0.417 | 2.680 | 74.015 | 47.90 | 1905.7 | 744.41 | 244.1 |
| 21.20 | 4.157 | 2.700 | 75.593 | 48.00 | 1921.9 | 765.73 | 246.0 |
| 21.25 | 7.977 | 2.720 | 77.192 | 48.09 | 1938.2 | 788.34 | 247.8 |
| 21.30 | 11.877 | 2.740 | 78.814 | 48.18 | 1954.6 | 812.38 | 249.6 |
| 21.35 | 15.858 | 2.760 | 80.460 | 48.28 | 1970.9 | 838.00 | 251.5 |
| 21.40 | 19.923 | 2.780 | 82.128 | 48.38 | 1987.4 | 865.34 | 253.4 |
| 21.45 | 24.072 | 2.801 | 83.822 | 48.48 | 2003.9 | 894.60 | 255.3 |
| 21.50 | 28.306 | 2.821 | 85.539 | 48.57 | 2020.5 | 925.99 | 257.2 |
| 21.55 | 32.626 | 2.841 | 87.283 | 48.67 | 2037.1 | 959.77 | 259.2 |
| 21.60 | 37.034 | 2.862 | 89.051 | 48.77 | 2053.9 | 996.21 | 261.2 |
| 21.65 | 41.532 | 2.883 | 90.846 | 48.87 | 2070.7 | 1035.67 | 263.2 |
| 21.70 | 46.119 | 2.903 | 92.668 | 48.97 | 2087.6 | 1078.52 | 265.2 |
| 21.75 | 50.799 | 2.924 | 94.516 | 49.08 | 2104.5 | 1125.25 | 267.2 |
| 21.80 | 55.571 | 2.945 | 96.392 | 49.18 | 2121.6 | 1176.41 | 269.3 |
| 21.85 | 60.438 | 2.966 | 98.295 | 49.28 | 2138.7 | | 271.4 |
| 21.90 | 65.401 | 2.986 | 100.227 | 49.38 | 2155.9 | | 273.5 |

ETHANE ISOTHERM AT T = 110.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.816E-04 | 0.747E-04 | 0.6763E-06 | 0.915 | 27.59 | 198.8 | 3.60 | 4.0 |
| 20.962 | 0.747E-04 | 2.564 | 70.231 | 47.39 | 1868.3 | 637.04 | 239.5 |
| 21.00 | 2.662 | 2.578 | 71.359 | 47.47 | 1880.1 | 649.42 | 240.9 |
| 21.05 | 6.268 | 2.598 | 72.878 | 47.59 | 1895.8 | 666.67 | 242.7 |
| 21.10 | 9.951 | 2.617 | 74.417 | 47.70 | 1911.6 | 684.88 | 244.5 |
| 21.15 | 13.710 | 2.636 | 75.979 | 47.82 | 1927.5 | 704.14 | 246.4 |
| 21.20 | 17.549 | 2.655 | 77.562 | 47.94 | 1943.4 | 724.54 | 248.3 |
| 21.25 | 21.467 | 2.675 | 79.168 | 48.05 | 1959.3 | 746.20 | 250.2 |
| 21.30 | 25.466 | 2.694 | 80.798 | 48.17 | 1975.4 | 769.24 | 252.1 |
| 21.35 | 29.547 | 2.714 | 82.450 | 48.29 | 1991.5 | 793.79 | 254.0 |
| 21.40 | 33.711 | 2.734 | 84.127 | 48.41 | 2007.7 | 820.03 | 256.0 |
| 21.45 | 37.960 | 2.754 | 85.829 | 48.53 | 2024.0 | 848.12 | 258.0 |
| 21.50 | 42.295 | 2.773 | 87.555 | 48.65 | 2040.3 | 878.28 | 260.0 |
| 21.55 | 46.716 | 2.793 | 89.306 | 48.77 | 2056.8 | 910.76 | 262.0 |
| 21.60 | 51.226 | 2.814 | 91.083 | 48.89 | 2073.3 | 945.83 | 264.0 |
| 21.65 | 55.825 | 2.834 | 92.886 | 49.01 | 2089.9 | 983.83 | 266.1 |
| 21.70 | 60.515 | 2.854 | 94.715 | 49.13 | 2106.6 | | 268.2 |
| 21.75 | 65.297 | 2.874 | 96.571 | 49.25 | 2123.3 | | 270.3 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 115.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.177E-03 | 0.169E-03 | 0.1460E-05 | 0.957 | 27.62 | 203.1 | 3.75 | 4.3 |
| 20.779 | 0.169E-03 | 2.450 | 66.761 | 46.78 | 1832.0 | 554.36 | 235.0 |
| 20.80 | 1.383 | 2.457 | 67.350 | 46.83 | 1838.3 | 559.76 | 235.7 |
| 20.85 | 4.787 | 2.476 | 68.794 | 46.95 | 1853.7 | 573.31 | 237.5 |
| 20.90 | 8.263 | 2.494 | 70.257 | 47.08 | 1869.0 | 587.54 | 239.3 |
| 20.95 | 11.813 | 2.512 | 71.741 | 47.20 | 1884.4 | 602.50 | 241.2 |
| 21.00 | 15.437 | 2.531 | 73.246 | 47.33 | 1899.9 | 618.25 | 243.0 |
| 21.05 | 19.138 | 2.550 | 74.771 | 47.46 | 1915.5 | 634.86 | 244.9 |
| 21.10 | 22.915 | 2.568 | 76.319 | 47.58 | 1931.1 | 652.41 | 246.8 |
| 21.15 | 26.770 | 2.587 | 77.889 | 47.71 | 1946.7 | 670.98 | 248.7 |
| 21.20 | 30.704 | 2.606 | 79.481 | 47.84 | 1962.5 | 690.67 | 250.6 |
| 21.25 | 34.718 | 2.625 | 81.096 | 47.97 | 1978.3 | 711.58 | 252.6 |
| 21.30 | 38.814 | 2.644 | 82.734 | 48.10 | 1994.2 | 733.83 | 254.6 |
| 21.35 | 42.992 | 2.664 | 84.396 | 48.22 | 2010.2 | 757.56 | 256.6 |
| 21.40 | 47.254 | 2.683 | 86.082 | 48.35 | 2026.3 | 782.93 | 258.6 |
| 21.45 | 51.601 | 2.702 | 87.792 | 48.48 | 2042.4 | 810.12 | 260.6 |
| 21.50 | 56.034 | 2.722 | 89.527 | 48.61 | 2058.6 | 839.33 | 262.7 |
| 21.55 | 60.554 | 2.741 | 91.287 | 48.75 | 2074.9 | | 264.8 |
| 21.60 | 65.163 | 2.761 | 93.072 | 48.88 | 2091.3 | | 266.9 |
| 21.65 | 69.861 | 2.781 | 94.883 | 49.01 | 2107.8 | | 269.0 |

ETHANE ISOTHERM AT T = 120.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.355E-03 | 0.355E-03 | 0.2925E-05 | 0.999 | 27.57 | 207.4 | 3.90 | 4.7 |
| 20.595 | 0.355E-03 | 2.338 | 63.427 | 46.14 | 1795.5 | 488.15 | 230.3 |
| 20.60 | 0.286 | 2.340 | 63.550 | 46.15 | 1796.8 | 489.11 | 230.5 |
| 20.65 | 3.498 | 2.357 | 64.923 | 46.28 | 1811.8 | 500.02 | 232.2 |
| 20.70 | 6.779 | 2.375 | 66.316 | 46.41 | 1826.8 | 511.43 | 234.0 |
| 20.75 | 10.130 | 2.393 | 67.727 | 46.54 | 1841.8 | 523.37 | 235.8 |
| 20.80 | 13.552 | 2.410 | 69.159 | 46.67 | 1857.0 | 535.88 | 237.7 |
| 20.85 | 17.046 | 2.428 | 70.610 | 46.80 | 1872.1 | 549.00 | 239.5 |
| 20.90 | 20.613 | 2.446 | 72.081 | 46.93 | 1887.4 | 562.79 | 241.4 |
| 20.95 | 24.255 | 2.464 | 73.573 | 47.06 | 1902.7 | 577.29 | 243.3 |
| 21.00 | 27.971 | 2.483 | 75.087 | 47.19 | 1918.0 | 592.58 | 245.2 |
| 21.05 | 31.764 | 2.501 | 76.621 | 47.32 | 1933.5 | 608.70 | 247.1 |
| 21.10 | 35.634 | 2.519 | 78.178 | 47.45 | 1949.0 | 625.74 | 249.1 |
| 21.15 | 39.582 | 2.538 | 79.757 | 47.59 | 1964.6 | 643.78 | 251.0 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 120.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 21.20 | 43.610 | 2.556 | 81.359 | 47.72 | 1980.3 | 662.91 | 253.0 |
| 21.25 | 47.718 | 2.575 | 82.983 | 47.85 | 1996.0 | 683.25 | 255.0 |
| 21.30 | 51.908 | 2.594 | 84.630 | 47.98 | 2011.8 | 704.89 | 257.1 |
| 21.35 | 56.182 | 2.612 | 86.301 | 48.12 | 2027.7 | 728.00 | 259.1 |
| 21.40 | 60.539 | 2.631 | 87.996 | 48.25 | 2043.7 | | 261.2 |
| 21.45 | 64.982 | 2.650 | 89.715 | 48.39 | 2059.7 | | 263.3 |
| 21.50 | 69.511 | 2.669 | 91.458 | 48.52 | 2075.9 | | 265.4 |

ETHANE ISOTHERM AT T = 130.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.120E-02 | 0.129E-02 | 0.9749E-05 | 1.082 | 27.30 | 215.7 | 4.19 | 5.3 |
| 20.225 | 0.129E-02 | 2.128 | 57.151 | 44.97 | 1721.8 | 389.76 | 220.7 |
| 20.25 | 1.431 | 2.136 | 57.773 | 45.03 | 1729.0 | 393.54 | 221.6 |
| 20.30 | 4.352 | 2.152 | 59.037 | 45.16 | 1743.4 | 401.35 | 223.3 |
| 20.35 | 7.335 | 2.169 | 60.317 | 45.29 | 1757.9 | 409.47 | 225.0 |
| 20.40 | 10.384 | 2.185 | 61.615 | 45.41 | 1772.4 | 417.90 | 226.8 |
| 20.45 | 13.497 | 2.202 | 62.930 | 45.54 | 1787.0 | 426.69 | 228.6 |
| 20.50 | 16.677 | 2.218 | 64.263 | 45.67 | 1801.6 | 435.84 | 230.4 |
| 20.55 | 19.924 | 2.235 | 65.615 | 45.80 | 1816.3 | 445.39 | 232.2 |
| 20.60 | 23.239 | 2.252 | 66.985 | 45.92 | 1831.0 | 455.35 | 234.1 |
| 20.65 | 26.623 | 2.269 | 68.375 | 46.05 | 1845.8 | 465.76 | 236.0 |
| 20.70 | 30.076 | 2.286 | 69.784 | 46.18 | 1860.7 | 476.65 | 237.8 |
| 20.75 | 33.601 | 2.303 | 71.212 | 46.31 | 1875.6 | 488.06 | 239.8 |
| 20.80 | 37.198 | 2.320 | 72.661 | 46.44 | 1890.7 | 500.03 | 241.7 |
| 20.85 | 40.868 | 2.337 | 74.130 | 46.57 | 1905.7 | 512.59 | 243.6 |
| 20.90 | 44.611 | 2.355 | 75.619 | 46.70 | 1920.9 | 525.80 | 245.6 |
| 20.95 | 48.430 | 2.372 | 77.130 | 46.83 | 1936.1 | 539.70 | 247.6 |
| 21.00 | 52.325 | 2.389 | 78.661 | 46.96 | 1951.4 | 554.36 | 249.6 |
| 21.05 | 56.296 | 2.407 | 80.214 | 47.09 | 1966.7 | 569.84 | 251.6 |
| 21.10 | 60.346 | 2.425 | 81.789 | 47.22 | 1982.2 | | 253.7 |
| 21.15 | 64.476 | 2.443 | 83.386 | 47.35 | 1997.7 | | 255.7 |
| 21.20 | 68.685 | 2.460 | 85.004 | 47.49 | 2013.2 | | 257.8 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 140.00 K

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.330E-02 | 0.383E-02 | 0.2667E-04 | 1.162 | 27.05 | 223.5 | 4.50 | 6.0 |
| 19.850 | 0.383E-02 | 1.938 | 51.358 | 44.04 | 1647.8 | 320.91 | 210.9 |
| 19.90 | 2.576 | 1.953 | 52.495 | 44.16 | 1661.6 | 326.56 | 212.5 |
| 19.95 | 5.229 | 1.968 | 53.658 | 44.28 | 1675.6 | 332.46 | 214.2 |
| 20.00 | 7.942 | 1.983 | 54.837 | 44.40 | 1689.6 | 338.56 | 215.9 |
| 20.05 | 10.713 | 1.999 | 56.031 | 44.52 | 1703.7 | 344.87 | 217.7 |
| 20.10 | 13.545 | 2.014 | 57.242 | 44.64 | 1717.8 | 351.41 | 219.4 |
| 20.15 | 16.438 | 2.030 | 58.468 | 44.76 | 1732.0 | 358.19 | 221.1 |
| 20.20 | 19.392 | 2.045 | 59.712 | 44.88 | 1746.2 | 365.22 | 222.9 |
| 20.25 | 22.409 | 2.061 | 60.972 | 45.00 | 1760.5 | 372.51 | 224.7 |
| 20.30 | 25.490 | 2.077 | 62.250 | 45.12 | 1774.8 | 380.09 | 226.5 |
| 20.35 | 28.634 | 2.093 | 63.546 | 45.24 | 1789.2 | 387.98 | 228.4 |
| 20.40 | 31.845 | 2.108 | 64.859 | 45.36 | 1803.7 | 396.18 | 230.2 |
| 20.45 | 35.121 | 2.124 | 66.190 | 45.48 | 1818.2 | 404.72 | 232.1 |
| 20.50 | 38.464 | 2.140 | 67.540 | 45.60 | 1832.8 | 413.63 | 234.0 |
| 20.55 | 41.875 | 2.157 | 68.909 | 45.73 | 1847.4 | 422.92 | 235.9 |
| 20.60 | 45.355 | 2.173 | 70.296 | 45.85 | 1862.2 | 432.63 | 237.8 |
| 20.65 | 48.905 | 2.189 | 71.703 | 45.97 | 1876.9 | 442.78 | 239.7 |
| 20.70 | 52.526 | 2.206 | 73.129 | 46.09 | 1891.8 | 453.41 | 241.7 |
| 20.75 | 56.218 | 2.222 | 74.575 | 46.22 | 1906.7 | 464.55 | 243.7 |
| 20.80 | 59.984 | 2.239 | 76.041 | 46.34 | 1921.7 | 476.24 | 245.7 |
| 20.85 | 63.823 | 2.255 | 77.527 | 46.46 | 1936.7 | | 247.7 |
| 20.90 | 67.737 | 2.272 | 79.034 | 46.59 | 1951.8 | | 249.8 |

ETHANE ISOTHERM AT T = 150.00 K
Second virial coefficient is -719.2 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.779E-02 | 0.967E-02 | 0.6281E-04 | 1.239 | 27.13 | 230.6 | 4.80 | 6.7 |
| 19.470 | 0.967E-02 | 1.765 | 46.002 | 43.38 | 1573.3 | 270.37 | 201.0 |
| 19.50 | 1.389 | 1.774 | 46.626 | 43.44 | 1581.4 | 272.98 | 201.9 |
| 19.55 | 3.747 | 1.788 | 47.683 | 43.55 | 1595.0 | 277.48 | 203.6 |
| 19.60 | 6.158 | 1.802 | 48.755 | 43.66 | 1608.6 | 282.12 | 205.2 |
| 19.65 | 8.622 | 1.817 | 49.840 | 43.77 | 1622.3 | 286.90 | 206.8 |
| 19.70 | 11.142 | 1.831 | 50.940 | 43.88 | 1636.0 | 291.83 | 208.5 |
| 19.75 | 13.717 | 1.846 | 52.055 | 43.99 | 1649.7 | 296.91 | 210.2 |
| 19.80 | 16.348 | 1.860 | 53.184 | 44.10 | 1663.5 | 302.16 | 211.9 |
| 19.85 | 19.035 | 1.875 | 54.329 | 44.21 | 1677.3 | 307.58 | 213.6 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 150.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 19.90 | 21.781 | 1.890 | 55.490 | 44.32 | 1691.2 | 313.19 | 215.3 |
| 19.95 | 24.585 | 1.904 | 56.666 | 44.44 | 1705.1 | 318.99 | 217.0 |
| 20.00 | 27.448 | 1.919 | 57.858 | 44.55 | 1719.1 | 324.99 | 218.8 |
| 20.05 | 30.371 | 1.934 | 59.067 | 44.66 | 1733.1 | 331.20 | 220.6 |
| 20.10 | 33.355 | 1.949 | 60.292 | 44.77 | 1747.2 | 337.64 | 222.4 |
| 20.15 | 36.400 | 1.964 | 61.534 | 44.89 | 1761.4 | 344.32 | 224.2 |
| 20.20 | 39.508 | 1.979 | 62.793 | 45.00 | 1775.6 | 351.25 | 226.1 |
| 20.25 | 42.680 | 1.995 | 64.069 | 45.11 | 1789.9 | 358.45 | 227.9 |
| 20.30 | 45.915 | 2.010 | 65.363 | 45.22 | 1804.2 | 365.94 | 229.8 |
| 20.35 | 49.216 | 2.025 | 66.675 | 45.34 | 1818.6 | 373.72 | 231.7 |
| 20.40 | 52.583 | 2.041 | 68.005 | 45.45 | 1833.0 | 381.83 | 233.6 |
| 20.45 | 56.017 | 2.056 | 69.353 | 45.57 | 1847.5 | 390.28 | 235.6 |
| 20.50 | 59.519 | 2.072 | 70.719 | 45.68 | 1862.1 | 399.09 | 237.5 |
| 20.55 | 63.089 | 2.088 | 72.104 | 45.79 | 1876.8 | | 239.5 |
| 20.60 | 66.730 | 2.104 | 73.508 | 45.91 | 1891.5 | | 241.5 |

ETHANE ISOTHERM AT T = 160.00 K
Second virial coefficient is -647.7 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.163E-01 | 0.215E-01 | 0.1319E-03 | 1.308 | 27.72 | 236.9 | 5.11 | 7.4 |
| 19.083 | 0.215E-01 | 1.609 | 41.042 | 42.95 | 1498.5 | 231.74 | 191.1 |
| 19.10 | 0.732 | 1.613 | 41.370 | 42.98 | 1503.0 | 232.94 | 191.6 |
| 19.15 | 2.824 | 1.627 | 42.332 | 43.08 | 1516.3 | 236.51 | 193.1 |
| 19.20 | 4.965 | 1.640 | 43.306 | 43.18 | 1529.6 | 240.16 | 194.7 |
| 19.25 | 7.155 | 1.654 | 44.293 | 43.28 | 1542.8 | 243.92 | 196.2 |
| 19.30 | 9.395 | 1.667 | 45.293 | 43.38 | 1556.2 | 247.79 | 197.8 |
| 19.35 | 11.684 | 1.681 | 46.307 | 43.48 | 1569.5 | 251.76 | 199.4 |
| 19.40 | 14.025 | 1.695 | 47.333 | 43.58 | 1582.9 | 255.85 | 201.0 |
| 19.45 | 16.418 | 1.708 | 48.374 | 43.68 | 1596.3 | 260.06 | 202.7 |
| 19.50 | 18.863 | 1.722 | 49.429 | 43.79 | 1609.8 | 264.39 | 204.3 |
| 19.55 | 21.361 | 1.736 | 50.497 | 43.89 | 1623.3 | 268.86 | 206.0 |
| 19.60 | 23.913 | 1.750 | 51.581 | 43.99 | 1636.9 | 273.46 | 207.6 |
| 19.65 | 26.519 | 1.764 | 52.679 | 44.09 | 1650.5 | 278.20 | 209.3 |
| 19.70 | 29.181 | 1.778 | 53.792 | 44.20 | 1664.1 | 283.10 | 211.1 |
| 19.75 | 31.899 | 1.792 | 54.920 | 44.30 | 1677.8 | 288.16 | 212.8 |
| 19.80 | 34.673 | 1.806 | 56.063 | 44.40 | 1691.6 | 293.38 | 214.5 |
| 19.85 | 37.505 | 1.820 | 57.223 | 44.51 | 1705.4 | 298.77 | 216.3 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 160.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 19.90 | 40.396 | 1.835 | 58.398 | 44.61 | 1719.2 | 304.36 | 218.1 |
| 19.95 | 43.346 | 1.849 | 59.589 | 44.72 | 1733.2 | 310.13 | 219.9 |
| 20.00 | 46.355 | 1.863 | 60.797 | 44.82 | 1747.1 | 316.11 | 221.7 |
| 20.05 | 49.425 | 1.878 | 62.021 | 44.92 | 1761.2 | 322.31 | 223.6 |
| 20.10 | 52.557 | 1.893 | 63.262 | 45.03 | 1775.3 | 328.73 | 225.4 |
| 20.15 | 55.752 | 1.907 | 64.519 | 45.13 | 1789.4 | 335.40 | 227.3 |
| 20.20 | 59.010 | 1.922 | 65.794 | 45.24 | 1803.6 | 342.32 | 229.2 |
| 20.25 | 62.332 | 1.937 | 67.087 | 45.34 | 1817.9 | | 231.1 |
| 20.30 | 65.719 | 1.952 | 68.397 | 45.45 | 1832.2 | | 233.1 |
| 20.35 | 69.172 | 1.967 | 69.724 | 45.55 | 1846.6 | | 235.0 |

ETHANE ISOTHERM AT T = 170.00 K
Second virial coefficient is -580.1 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.308E-01 | 0.429E-01 | 0.2530E-03 | 1.368 | 28.79 | 242.3 | 5.42 | 8.2 |
| 18.686 | 0.429E-01 | 1.465 | 36.440 | 42.71 | 1423.3 | 201.21 | 181.2 |
| 18.70 | 0.539 | 1.469 | 36.676 | 42.74 | 1426.8 | 201.98 | 181.6 |
| 18.75 | 2.395 | 1.481 | 37.550 | 42.83 | 1439.7 | 204.88 | 183.1 |
| 18.80 | 4.294 | 1.494 | 38.436 | 42.92 | 1452.6 | 207.85 | 184.5 |
| 18.85 | 6.238 | 1.507 | 39.333 | 43.01 | 1465.6 | 210.90 | 186.0 |
| 18.90 | 8.228 | 1.519 | 40.242 | 43.10 | 1478.5 | 214.02 | 187.5 |
| 18.95 | 10.263 | 1.532 | 41.164 | 43.19 | 1491.5 | 217.23 | 189.0 |
| 19.00 | 12.344 | 1.545 | 42.097 | 43.28 | 1504.6 | 220.51 | 190.5 |
| 19.05 | 14.473 | 1.558 | 43.043 | 43.38 | 1517.6 | 223.88 | 192.1 |
| 19.10 | 16.649 | 1.571 | 44.002 | 43.47 | 1530.7 | 227.35 | 193.6 |
| 19.15 | 18.873 | 1.584 | 44.973 | 43.56 | 1543.8 | 230.90 | 195.2 |
| 19.20 | 21.146 | 1.597 | 45.958 | 43.66 | 1557.0 | 234.56 | 196.8 |
| 19.25 | 23.469 | 1.610 | 46.956 | 43.75 | 1570.2 | 238.31 | 198.4 |
| 19.30 | 25.842 | 1.623 | 47.967 | 43.85 | 1583.4 | 242.18 | 200.0 |
| 19.35 | 28.266 | 1.636 | 48.993 | 43.94 | 1596.7 | 246.15 | 201.7 |
| 19.40 | 30.742 | 1.650 | 50.032 | 44.03 | 1610.0 | 250.24 | 203.3 |
| 19.45 | 33.269 | 1.663 | 51.086 | 44.13 | 1623.4 | 254.46 | 205.0 |
| 19.50 | 35.850 | 1.676 | 52.153 | 44.22 | 1636.8 | 258.80 | 206.7 |
| 19.55 | 38.485 | 1.690 | 53.236 | 44.32 | 1650.3 | 263.27 | 208.4 |
| 19.60 | 41.174 | 1.704 | 54.333 | 44.42 | 1663.9 | 267.88 | 210.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 170.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 19.65 | 43.919 | 1.717 | 55.446 | 44.51 | 1677.5 | 272.64 | 211.9 |
| 19.70 | 46.719 | 1.731 | 56.573 | 44.61 | 1691.1 | 277.55 | 213.7 |
| 19.75 | 49.576 | 1.745 | 57.716 | 44.70 | 1704.8 | 282.63 | 215.4 |
| 19.80 | 52.491 | 1.759 | 58.875 | 44.80 | 1718.6 | 287.87 | 217.2 |
| 19.85 | 55.464 | 1.773 | 60.050 | 44.89 | 1732.4 | 293.29 | 219.1 |
| 19.90 | 58.496 | 1.787 | 61.240 | 44.99 | 1746.3 | 298.90 | 220.9 |
| 19.95 | 61.588 | 1.801 | 62.447 | 45.09 | 1760.2 | | 222.7 |
| 20.00 | 64.741 | 1.815 | 63.670 | 45.18 | 1774.2 | | 224.6 |
| 20.05 | 67.956 | 1.829 | 64.910 | 45.28 | 1788.2 | | 226.5 |

ETHANE ISOTHERM AT T = 180.00 K
Second virial coefficient is -519.6 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.541E-01 | 0.787E-01 | 0.4519E-03 | 1.416 | 30.26 | 246.8 | 5.74 | 9.1 |
| 18.279 | 0.787E-01 | 1.333 | 32.167 | 42.65 | 1347.7 | 176.39 | 171.5 |
| 18.30 | 0.745 | 1.338 | 32.492 | 42.68 | 1352.9 | 177.37 | 172.1 |
| 18.35 | 2.389 | 1.350 | 33.286 | 42.76 | 1365.5 | 179.78 | 173.4 |
| 18.40 | 4.074 | 1.362 | 34.091 | 42.84 | 1378.1 | 182.25 | 174.8 |
| 18.45 | 5.799 | 1.374 | 34.907 | 42.93 | 1390.7 | 184.78 | 176.2 |
| 18.50 | 7.565 | 1.386 | 35.733 | 43.01 | 1403.3 | 187.36 | 177.6 |
| 18.55 | 9.372 | 1.398 | 36.570 | 43.09 | 1415.9 | 190.00 | 179.0 |
| 18.60 | 11.222 | 1.410 | 37.419 | 43.17 | 1428.6 | 192.70 | 180.5 |
| 18.65 | 13.114 | 1.422 | 38.279 | 43.26 | 1441.3 | 195.47 | 181.9 |
| 18.70 | 15.050 | 1.434 | 39.150 | 43.34 | 1454.0 | 198.31 | 183.4 |
| 18.75 | 17.030 | 1.446 | 40.033 | 43.43 | 1466.8 | 201.22 | 184.9 |
| 18.80 | 19.054 | 1.458 | 40.928 | 43.51 | 1479.5 | 204.20 | 186.4 |
| 18.85 | 21.123 | 1.471 | 41.835 | 43.60 | 1492.4 | 207.26 | 187.9 |
| 18.90 | 23.237 | 1.483 | 42.755 | 43.68 | 1505.2 | 210.39 | 189.4 |
| 18.95 | 25.398 | 1.496 | 43.687 | 43.77 | 1518.1 | 213.61 | 191.0 |
| 19.00 | 27.606 | 1.508 | 44.631 | 43.86 | 1531.0 | 216.91 | 192.5 |
| 19.05 | 29.862 | 1.521 | 45.589 | 43.94 | 1544.0 | 220.30 | 194.1 |
| 19.10 | 32.165 | 1.533 | 46.560 | 44.03 | 1557.1 | 223.78 | 195.7 |
| 19.15 | 34.518 | 1.546 | 47.544 | 44.12 | 1570.1 | 227.35 | 197.3 |
| 19.20 | 36.920 | 1.559 | 48.541 | 44.21 | 1583.2 | 231.03 | 199.0 |
| 19.25 | 39.372 | 1.571 | 49.552 | 44.29 | 1596.4 | 234.81 | 200.6 |
| 19.30 | 41.875 | 1.584 | 50.578 | 44.38 | 1609.6 | 238.70 | 202.3 |
| 19.35 | 44.430 | 1.597 | 51.617 | 44.47 | 1622.9 | 242.71 | 204.0 |
| 19.40 | 47.037 | 1.610 | 52.670 | 44.56 | 1636.2 | 246.83 | 205.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 180.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 19.45 | 49.697 | 1.623 | 53.738 | 44.65 | 1649.6 | 251.08 | 207.4 |
| 19.50 | 52.411 | 1.637 | 54.820 | 44.73 | 1663.0 | 255.45 | 209.1 |
| 19.55 | 55.180 | 1.650 | 55.918 | 44.82 | 1676.5 | 259.97 | 210.9 |
| 19.60 | 58.003 | 1.663 | 57.030 | 44.91 | 1690.1 | 264.62 | 212.7 |
| 19.65 | 60.883 | 1.677 | 58.158 | 45.00 | 1703.7 | | 214.4 |
| 19.70 | 63.819 | 1.690 | 59.300 | 45.09 | 1717.3 | | 216.3 |
| 19.75 | 66.813 | 1.704 | 60.459 | 45.18 | 1731.0 | | 218.1 |
| 19.80 | 69.865 | 1.717 | 61.633 | 45.26 | 1744.8 | | 219.9 |

ETHANE ISOTHERM AT T = 190.00 K
Second virial coefficient is -466.7 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.889E-01 | 0.135 | 0.7611E-03 | 1.450 | 32.01 | 250.4 | 6.06 | 10.0 |
| 17.860 | 0.135 | 1.210 | 28.196 | 42.73 | 1271.6 | 155.75 | 161.9 |
| 17.90 | 1.285 | 1.219 | 28.772 | 42.79 | 1281.5 | 157.37 | 163.0 |
| 17.95 | 2.741 | 1.231 | 29.493 | 42.86 | 1293.7 | 159.41 | 164.3 |
| 18.00 | 4.234 | 1.242 | 30.224 | 42.93 | 1306.0 | 161.49 | 165.6 |
| 18.05 | 5.764 | 1.253 | 30.965 | 43.00 | 1318.3 | 163.62 | 166.9 |
| 18.10 | 7.331 | 1.264 | 31.715 | 43.08 | 1330.6 | 165.79 | 168.2 |
| 18.15 | 8.936 | 1.276 | 32.476 | 43.15 | 1342.9 | 168.01 | 169.5 |
| 18.20 | 10.579 | 1.287 | 33.247 | 43.23 | 1355.2 | 170.28 | 170.9 |
| 18.25 | 12.261 | 1.298 | 34.028 | 43.30 | 1367.5 | 172.60 | 172.3 |
| 18.30 | 13.982 | 1.310 | 34.820 | 43.38 | 1379.9 | 174.97 | 173.6 |
| 18.35 | 15.743 | 1.321 | 35.622 | 43.46 | 1392.3 | 177.39 | 175.0 |
| 18.40 | 17.544 | 1.333 | 36.435 | 43.53 | 1404.7 | 179.88 | 176.5 |
| 18.45 | 19.386 | 1.344 | 37.260 | 43.61 | 1417.1 | 182.41 | 177.9 |
| 18.50 | 21.270 | 1.356 | 38.095 | 43.69 | 1429.6 | 185.01 | 179.3 |
| 18.55 | 23.196 | 1.368 | 38.942 | 43.77 | 1442.1 | 187.67 | 180.8 |
| 18.60 | 25.165 | 1.379 | 39.801 | 43.85 | 1454.7 | 190.40 | 182.2 |
| 18.65 | 27.176 | 1.391 | 40.671 | 43.92 | 1467.3 | 193.19 | 183.7 |
| 18.70 | 29.232 | 1.403 | 41.553 | 44.00 | 1479.9 | 196.05 | 185.2 |
| 18.75 | 31.332 | 1.415 | 42.448 | 44.08 | 1492.6 | 198.98 | 186.7 |
| 18.80 | 33.477 | 1.427 | 43.355 | 44.16 | 1505.3 | 201.98 | 188.3 |
| 18.85 | 35.668 | 1.439 | 44.274 | 44.24 | 1518.0 | 205.07 | 189.8 |
| 18.90 | 37.905 | 1.451 | 45.206 | 44.32 | 1530.9 | 208.23 | 191.4 |
| 18.95 | 40.188 | 1.463 | 46.151 | 44.41 | 1543.7 | 211.48 | 193.0 |
| 19.00 | 42.520 | 1.475 | 47.109 | 44.49 | 1556.6 | 214.81 | 194.6 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 190.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 19.05 | 44.899 | 1.488 | 48.080 | 44.57 | 1569.6 | 218.24 | 196.2 |
| 19.10 | 47.328 | 1.500 | 49.064 | 44.65 | 1582.6 | 221.75 | 197.9 |
| 19.15 | 49.806 | 1.512 | 50.062 | 44.73 | 1595.6 | 225.37 | 199.5 |
| 19.20 | 52.334 | 1.525 | 51.074 | 44.81 | 1608.7 | 229.09 | 201.2 |
| 19.25 | 54.914 | 1.538 | 52.099 | 44.89 | 1621.9 | 232.92 | 202.9 |
| 19.30 | 57.545 | 1.550 | 53.139 | 44.97 | 1635.1 | 236.86 | 204.6 |
| 19.35 | 60.228 | 1.563 | 54.193 | 45.05 | 1648.4 | | 206.3 |
| 19.40 | 62.964 | 1.576 | 55.261 | 45.14 | 1661.7 | | 208.0 |
| 19.45 | 65.754 | 1.589 | 56.344 | 45.22 | 1675.1 | | 209.8 |
| 19.50 | 68.599 | 1.602 | 57.442 | 45.30 | 1688.6 | | 211.6 |

ETHANE ISOTHERM AT T = 200.00 K
Second virial coefficient is -420.8 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.159 | 0.8651E-03 | 1.523 | 33.99 | 255.5 | 6.38 | 10.8 |
| 0.139 | 0.217 | 0.1222E-02 | 1.467 | 33.92 | 253.0 | 6.39 | 11.0 |
| 17.425 | 0.217 | 1.096 | 24.505 | 42.94 | 1194.8 | 138.23 | 152.6 |
| 17.45 | 0.839 | 1.101 | 24.827 | 42.97 | 1200.9 | 139.09 | 153.2 |
| 17.50 | 2.097 | 1.112 | 25.473 | 43.03 | 1212.8 | 140.80 | 154.4 |
| 17.55 | 3.386 | 1.122 | 26.127 | 43.10 | 1224.7 | 142.55 | 155.6 |
| 17.60 | 4.709 | 1.133 | 26.790 | 43.16 | 1236.6 | 144.33 | 156.8 |
| 17.65 | 6.066 | 1.143 | 27.462 | 43.22 | 1248.6 | 146.15 | 158.0 |
| 17.70 | 7.456 | 1.154 | 28.143 | 43.29 | 1260.5 | 148.01 | 159.3 |
| 17.75 | 8.880 | 1.165 | 28.833 | 43.35 | 1272.5 | 149.90 | 160.5 |
| 17.80 | 10.339 | 1.175 | 29.533 | 43.42 | 1284.4 | 151.83 | 161.8 |
| 17.85 | 11.834 | 1.186 | 30.242 | 43.49 | 1296.4 | 153.80 | 163.1 |
| 17.90 | 13.364 | 1.197 | 30.961 | 43.56 | 1308.4 | 155.81 | 164.4 |
| 17.95 | 14.930 | 1.207 | 31.689 | 43.63 | 1320.5 | 157.87 | 165.7 |
| 18.00 | 16.533 | 1.218 | 32.428 | 43.69 | 1332.5 | 159.96 | 167.0 |
| 18.05 | 18.173 | 1.229 | 33.177 | 43.76 | 1344.6 | 162.11 | 168.4 |
| 18.10 | 19.850 | 1.240 | 33.936 | 43.84 | 1356.7 | 164.30 | 169.7 |
| 18.15 | 21.566 | 1.251 | 34.705 | 43.91 | 1368.8 | 166.54 | 171.1 |
| 18.20 | 23.321 | 1.262 | 35.485 | 43.98 | 1381.0 | 168.82 | 172.5 |
| 18.25 | 25.115 | 1.273 | 36.276 | 44.05 | 1393.2 | 171.16 | 173.9 |
| 18.30 | 26.949 | 1.284 | 37.078 | 44.12 | 1405.5 | 173.56 | 175.3 |
| 18.35 | 28.823 | 1.295 | 37.891 | 44.19 | 1417.7 | 176.01 | 176.7 |
| 18.40 | 30.738 | 1.307 | 38.715 | 44.27 | 1430.1 | 178.51 | 178.2 |
| 18.45 | 32.695 | 1.318 | 39.550 | 44.34 | 1442.4 | 181.08 | 179.6 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 200.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 18.50 | 34.693 | 1.329 | 40.398 | 44.41 | 1454.8 | 183.70 | 181.1 |
| 18.55 | 36.735 | 1.341 | 41.256 | 44.49 | 1467.3 | 186.39 | 182.6 |
| 18.60 | 38.819 | 1.352 | 42.127 | 44.56 | 1479.8 | 189.14 | 184.1 |
| 18.65 | 40.948 | 1.364 | 43.010 | 44.64 | 1492.3 | 191.97 | 185.6 |
| 18.70 | 43.120 | 1.375 | 43.905 | 44.71 | 1504.9 | 194.86 | 187.1 |
| 18.75 | 45.338 | 1.387 | 44.813 | 44.79 | 1517.5 | 197.83 | 188.7 |
| 18.80 | 47.602 | 1.399 | 45.733 | 44.86 | 1530.2 | 200.87 | 190.2 |
| 18.85 | 49.912 | 1.411 | 46.666 | 44.94 | 1543.0 | 204.00 | 191.8 |
| 18.90 | 52.269 | 1.422 | 47.612 | 45.01 | 1555.8 | 207.20 | 193.4 |
| 18.95 | 54.673 | 1.434 | 48.570 | 45.09 | 1568.6 | 210.49 | 195.0 |
| 19.00 | 57.126 | 1.446 | 49.542 | 45.16 | 1581.5 | 213.87 | 196.7 |
| 19.05 | 59.628 | 1.459 | 50.528 | 45.24 | 1594.5 | 217.35 | 198.3 |
| 19.10 | 62.179 | 1.471 | 51.527 | 45.31 | 1607.5 | | 200.0 |
| 19.15 | 64.781 | 1.483 | 52.540 | 45.39 | 1620.5 | | 201.7 |
| 19.20 | 67.433 | 1.495 | 53.566 | 45.46 | 1633.7 | | 203.4 |

ETHANE ISOTHERM AT T = 210.00 K
Second virial coefficient is -381.0 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.168 | 0.8642E-03 | 1.613 | 35.25 | 261.6 | 6.69 | 11.7 |
| 0.15 | 0.247 | 0.1324E-02 | 1.546 | 35.49 | 258.3 | 6.71 | 11.9 |
| 0.20 | 0.323 | 0.1808E-02 | 1.477 | 35.85 | 255.0 | 6.73 | 12.1 |
| 0.208 | 0.334 | 0.1886E-02 | 1.466 | 35.93 | 254.5 | 6.73 | 12.1 |
| 16.972 | 0.334 | 0.9887 | 21.074 | 43.27 | 1117.4 | 123.12 | 143.4 |
| 17.00 | 0.926 | 0.9941 | 21.392 | 43.30 | 1123.8 | 123.93 | 144.0 |
| 17.05 | 2.010 | 1.004 | 21.969 | 43.35 | 1135.4 | 125.39 | 145.1 |
| 17.10 | 3.123 | 1.014 | 22.554 | 43.40 | 1147.0 | 126.88 | 146.2 |
| 17.15 | 4.265 | 1.024 | 23.146 | 43.46 | 1158.6 | 128.39 | 147.4 |
| 17.20 | 5.438 | 1.033 | 23.747 | 43.51 | 1170.1 | 129.93 | 148.5 |
| 17.25 | 6.640 | 1.043 | 24.356 | 43.57 | 1181.7 | 131.50 | 149.7 |
| 17.30 | 7.873 | 1.053 | 24.973 | 43.62 | 1193.3 | 133.11 | 150.8 |
| 17.35 | 9.138 | 1.063 | 25.599 | 43.68 | 1204.9 | 134.74 | 152.0 |
| 17.40 | 10.433 | 1.073 | 26.233 | 43.74 | 1216.5 | 136.40 | 153.2 |
| 17.45 | 11.761 | 1.083 | 26.876 | 43.80 | 1228.1 | 138.10 | 154.4 |
| 17.50 | 13.121 | 1.093 | 27.528 | 43.86 | 1239.8 | 139.82 | 155.6 |
| 17.55 | 14.514 | 1.104 | 28.189 | 43.92 | 1251.4 | 141.59 | 156.9 |
| 17.60 | 15.940 | 1.114 | 28.860 | 43.98 | 1263.1 | 143.38 | 158.1 |
| 17.65 | 17.400 | 1.124 | 29.539 | 44.05 | 1274.8 | 145.22 | 159.4 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 210.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 17.70 | 18.894 | 1.134 | 30.228 | 44.11 | 1286.6 | 147.09 | 160.6 |
| 17.75 | 20.423 | 1.144 | 30.927 | 44.17 | 1298.3 | 149.00 | 161.9 |
| 17.80 | 21.987 | 1.155 | 31.635 | 44.24 | 1310.1 | 150.95 | 163.2 |
| 17.85 | 23.587 | 1.165 | 32.353 | 44.30 | 1322.0 | 152.94 | 164.5 |
| 17.90 | 25.223 | 1.176 | 33.081 | 44.37 | 1333.8 | 154.97 | 165.9 |
| 17.95 | 26.895 | 1.186 | 33.820 | 44.43 | 1345.7 | 157.04 | 167.2 |
| 18.00 | 28.605 | 1.197 | 34.568 | 44.50 | 1357.6 | 159.16 | 168.6 |
| 18.05 | 30.352 | 1.207 | 35.328 | 44.57 | 1369.6 | 161.33 | 169.9 |
| 18.10 | 32.138 | 1.218 | 36.097 | 44.63 | 1381.6 | 163.55 | 171.3 |
| 18.15 | 33.962 | 1.229 | 36.878 | 44.70 | 1393.6 | 165.81 | 172.7 |
| 18.20 | 35.826 | 1.239 | 37.669 | 44.77 | 1405.7 | 168.13 | 174.1 |
| 18.25 | 37.729 | 1.250 | 38.472 | 44.84 | 1417.9 | 170.49 | 175.5 |
| 18.30 | 39.673 | 1.261 | 39.285 | 44.91 | 1430.0 | 172.92 | 177.0 |
| 18.35 | 41.658 | 1.272 | 40.110 | 44.97 | 1442.3 | 175.40 | 178.4 |
| 18.40 | 43.684 | 1.283 | 40.947 | 45.04 | 1454.5 | 177.93 | 179.9 |
| 18.45 | 45.753 | 1.294 | 41.795 | 45.11 | 1466.9 | 180.53 | 181.4 |
| 18.50 | 47.864 | 1.305 | 42.656 | 45.18 | 1479.2 | 183.19 | 182.9 |
| 18.55 | 50.019 | 1.317 | 43.528 | 45.25 | 1491.7 | 185.92 | 184.4 |
| 18.60 | 52.217 | 1.328 | 44.412 | 45.32 | 1504.1 | 188.71 | 185.9 |
| 18.65 | 54.460 | 1.339 | 45.309 | 45.39 | 1516.7 | 191.58 | 187.5 |
| 18.70 | 56.748 | 1.351 | 46.218 | 45.46 | 1529.2 | 194.52 | 189.0 |
| 18.75 | 59.082 | 1.362 | 47.139 | 45.53 | 1541.9 | 197.53 | 190.6 |
| 18.80 | 61.462 | 1.374 | 48.074 | 45.60 | 1554.5 | | 192.2 |
| 18.85 | 63.890 | 1.385 | 49.021 | 45.67 | 1567.3 | | 193.8 |
| 18.90 | 66.365 | 1.397 | 49.981 | 45.74 | 1580.1 | | 195.5 |
| 18.95 | 68.888 | 1.409 | 50.955 | 45.81 | 1592.9 | | 197.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 220.00 K
Second virial coefficient is -346.5 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.177 | 0.8618E-03 | 1.703 | 36.24 | 267.6 | 7.01 | 12.6 |
| 0.15 | 0.260 | 0.1317E-02 | 1.639 | 36.54 | 264.5 | 7.03 | 12.8 |
| 0.20 | 0.341 | 0.1792E-02 | 1.575 | 36.91 | 261.3 | 7.05 | 12.9 |
| 0.25 | 0.418 | 0.2289E-02 | 1.511 | 37.38 | 258.2 | 7.07 | 13.1 |
| 0.30 | 0.492 | 0.2813E-02 | 1.445 | 37.98 | 255.0 | 7.09 | 13.3 |
| 0.301 | 0.492 | 0.2819E-02 | 1.445 | 37.99 | 254.9 | 7.09 | 13.3 |
| 16.498 | 0.492 | 0.8877 | 17.889 | 43.71 | 1039.0 | 109.90 | 134.5 |
| 16.50 | 0.526 | 0.8880 | 17.908 | 43.71 | 1039.4 | 109.94 | 134.5 |
| 16.55 | 1.434 | 0.8972 | 18.414 | 43.75 | 1050.6 | 111.18 | 135.5 |
| 16.60 | 2.368 | 0.9063 | 18.928 | 43.79 | 1061.8 | 112.44 | 136.6 |
| 16.65 | 3.327 | 0.9155 | 19.449 | 43.84 | 1073.0 | 113.72 | 137.6 |
| 16.70 | 4.313 | 0.9246 | 19.978 | 43.88 | 1084.2 | 115.02 | 138.6 |
| 16.75 | 5.325 | 0.9339 | 20.513 | 43.93 | 1095.4 | 116.34 | 139.7 |
| 16.80 | 6.364 | 0.9431 | 21.057 | 43.97 | 1106.6 | 117.69 | 140.8 |
| 16.85 | 7.431 | 0.9524 | 21.608 | 44.02 | 1117.8 | 119.06 | 141.8 |
| 16.90 | 8.525 | 0.9617 | 22.166 | 44.07 | 1129.0 | 120.46 | 142.9 |
| 16.95 | 9.647 | 0.9710 | 22.733 | 44.12 | 1140.3 | 121.88 | 144.0 |
| 17.00 | 10.798 | 0.9804 | 23.308 | 44.17 | 1151.5 | 123.32 | 145.2 |
| 17.05 | 11.978 | 0.9898 | 23.890 | 44.22 | 1162.8 | 124.80 | 146.3 |
| 17.10 | 13.188 | 0.9992 | 24.481 | 44.28 | 1174.0 | 126.30 | 147.4 |
| 17.15 | 14.427 | 1.009 | 25.080 | 44.33 | 1185.3 | 127.82 | 148.6 |
| 17.20 | 15.696 | 1.018 | 25.688 | 44.38 | 1196.6 | 129.38 | 149.7 |
| 17.25 | 16.996 | 1.028 | 26.304 | 44.44 | 1208.0 | 130.96 | 150.9 |
| 17.30 | 18.326 | 1.037 | 26.929 | 44.50 | 1219.3 | 132.58 | 152.1 |
| 17.35 | 19.689 | 1.047 | 27.562 | 44.55 | 1230.7 | 134.23 | 153.3 |
| 17.40 | 21.083 | 1.057 | 28.205 | 44.61 | 1242.1 | 135.91 | 154.5 |
| 17.45 | 22.509 | 1.066 | 28.857 | 44.67 | 1253.6 | 137.62 | 155.8 |
| 17.50 | 23.969 | 1.076 | 29.518 | 44.73 | 1265.0 | 139.36 | 157.0 |
| 17.55 | 25.461 | 1.086 | 30.188 | 44.79 | 1276.5 | 141.14 | 158.3 |
| 17.60 | 26.987 | 1.096 | 30.867 | 44.85 | 1288.1 | 142.96 | 159.5 |
| 17.65 | 28.548 | 1.106 | 31.557 | 44.91 | 1299.6 | 144.82 | 160.8 |
| 17.70 | 30.143 | 1.116 | 32.256 | 44.97 | 1311.2 | 146.71 | 162.1 |
| 17.75 | 31.774 | 1.126 | 32.965 | 45.03 | 1322.9 | 148.64 | 163.4 |
| 17.80 | 33.440 | 1.136 | 33.684 | 45.09 | 1334.6 | 150.61 | 164.7 |
| 17.85 | 35.142 | 1.146 | 34.413 | 45.15 | 1346.3 | 152.63 | 166.1 |
| 17.90 | 36.881 | 1.156 | 35.152 | 45.22 | 1358.1 | 154.68 | 167.4 |
| 17.95 | 38.658 | 1.167 | 35.902 | 45.28 | 1369.9 | 156.78 | 168.8 |
| 18.00 | 40.472 | 1.177 | 36.662 | 45.34 | 1381.7 | 158.93 | 170.1 |
| 18.05 | 42.324 | 1.187 | 37.433 | 45.41 | 1393.7 | 161.13 | 171.5 |
| 18.10 | 44.215 | 1.198 | 38.215 | 45.47 | 1405.6 | 163.37 | 172.9 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 220.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 18.15 | 46.146 | 1.208 | 39.008 | 45.53 | 1417.6 | 165.67 | 174.4 |
| 18.20 | 48.116 | 1.219 | 39.812 | 45.60 | 1429.6 | 168.02 | 175.8 |
| 18.25 | 50.127 | 1.230 | 40.628 | 45.66 | 1441.7 | 170.42 | 177.3 |
| 18.30 | 52.179 | 1.240 | 41.454 | 45.72 | 1453.9 | 172.88 | 178.7 |
| 18.35 | 54.273 | 1.251 | 42.293 | 45.79 | 1466.1 | 175.39 | 180.2 |
| 18.40 | 56.409 | 1.262 | 43.143 | 45.85 | 1478.3 | 177.97 | 181.7 |
| 18.45 | 58.587 | 1.273 | 44.005 | 45.92 | 1490.7 | 180.61 | 183.2 |
| 18.50 | 60.809 | 1.284 | 44.879 | 45.98 | 1503.0 | | 184.7 |
| 18.55 | 63.075 | 1.295 | 45.766 | 46.05 | 1515.4 | | 186.3 |
| 18.60 | 65.386 | 1.306 | 46.664 | 46.11 | 1527.9 | | 187.8 |
| 18.65 | 67.742 | 1.318 | 47.575 | 46.18 | 1540.4 | | 189.4 |

ETHANE ISOTHERM AT T = 240.00 K
Second virial coefficient is -290.1 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.194 | 0.8569E-03 | 1.880 | 38.12 | 279.1 | 7.63 | 14.5 |
| 0.20 | 0.376 | 0.1767E-02 | 1.766 | 38.68 | 273.6 | 7.67 | 14.8 |
| 0.30 | 0.547 | 0.2735E-02 | 1.652 | 39.35 | 268.0 | 7.72 | 15.1 |
| 0.40 | 0.707 | 0.3772E-02 | 1.539 | 40.17 | 262.4 | 7.78 | 15.5 |
| 0.50 | 0.855 | 0.4888E-02 | 1.425 | 41.20 | 256.7 | 7.83 | 15.9 |
| 0.582 | 0.967 | 0.5870E-02 | 1.331 | 42.24 | 252.0 | 7.88 | 16.2 |
| 15.466 | 0.967 | 0.7015 | 12.202 | 44.93 | 878.2 | 87.65 | 117.4 |
| 15.50 | 1.381 | 0.7068 | 12.458 | 44.94 | 885.2 | 88.26 | 117.9 |
| 15.60 | 2.666 | 0.7224 | 13.237 | 44.97 | 906.0 | 90.10 | 119.6 |
| 15.70 | 4.029 | 0.7381 | 14.040 | 45.02 | 926.7 | 92.00 | 121.4 |
| 15.80 | 5.475 | 0.7539 | 14.867 | 45.07 | 947.4 | 93.95 | 123.1 |
| 15.90 | 7.004 | 0.7699 | 15.720 | 45.12 | 968.2 | 95.97 | 125.0 |
| 16.00 | 8.619 | 0.7859 | 16.598 | 45.19 | 989.0 | 98.05 | 126.8 |
| 16.10 | 10.324 | 0.8021 | 17.503 | 45.25 | 1009.9 | 100.20 | 128.7 |
| 16.20 | 12.121 | 0.8184 | 18.434 | 45.33 | 1030.7 | 102.42 | 130.6 |
| 16.30 | 14.012 | 0.8349 | 19.394 | 45.40 | 1051.7 | 104.71 | 132.6 |
| 16.40 | 16.001 | 0.8514 | 20.381 | 45.49 | 1072.7 | 107.08 | 134.6 |
| 16.50 | 18.089 | 0.8682 | 21.398 | 45.57 | 1093.9 | 109.53 | 136.7 |
| 16.60 | 20.281 | 0.8851 | 22.445 | 45.66 | 1115.1 | 112.07 | 138.8 |
| 16.70 | 22.579 | 0.9022 | 23.523 | 45.75 | 1136.4 | 114.70 | 141.0 |
| 16.80 | 24.987 | 0.9195 | 24.633 | 45.85 | 1157.8 | 117.42 | 143.2 |
| 16.90 | 27.507 | 0.9369 | 25.775 | 45.95 | 1179.4 | 120.24 | 145.4 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 240.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 17.00 | 30.143 | 0.9545 | 26.950 | 46.04 | 1201.1 | 123.16 | 147.7 |
| 17.10 | 32.898 | 0.9724 | 28.159 | 46.15 | 1223.0 | 126.20 | 150.0 |
| 17.20 | 35.776 | 0.9904 | 29.404 | 46.25 | 1245.0 | 129.35 | 152.4 |
| 17.30 | 38.780 | 1.009 | 30.685 | 46.36 | 1267.2 | 132.63 | 154.9 |
| 17.40 | 41.914 | 1.027 | 32.003 | 46.46 | 1289.6 | 136.04 | 157.4 |
| 17.50 | 45.182 | 1.046 | 33.360 | 46.57 | 1312.1 | 139.59 | 159.9 |
| 17.60 | 48.588 | 1.065 | 34.755 | 46.68 | 1334.9 | 143.28 | 162.5 |
| 17.70 | 52.134 | 1.084 | 36.191 | 46.79 | 1357.8 | 147.13 | 165.2 |
| 17.80 | 55.827 | 1.104 | 37.668 | 46.90 | 1380.9 | 151.14 | 167.9 |
| 17.90 | 59.669 | 1.123 | 39.187 | 47.01 | 1404.3 | 155.34 | 170.6 |
| 18.00 | 63.666 | 1.143 | 40.750 | 47.12 | 1427.8 | | 173.5 |
| 18.10 | 67.821 | 1.164 | 42.357 | 47.24 | 1451.6 | | 176.4 |

ETHANE ISOTHERM AT T = 260.00 K
Second virial coefficient is -246.2 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.211 | 0.8531E-03 | 2.056 | 40.14 | 289.9 | 8.24 | 16.6 |
| 0.20 | 0.411 | 0.1750E-02 | 1.952 | 40.58 | 285.0 | 8.29 | 16.9 |
| 0.30 | 0.601 | 0.2692E-02 | 1.848 | 41.05 | 280.1 | 8.35 | 17.2 |
| 0.40 | 0.781 | 0.3682E-02 | 1.747 | 41.56 | 275.2 | 8.40 | 17.5 |
| 0.50 | 0.951 | 0.4722E-02 | 1.646 | 42.12 | 270.3 | 8.47 | 17.8 |
| 0.60 | 1.110 | 0.5816E-02 | 1.547 | 42.75 | 265.4 | 8.53 | 18.1 |
| 0.70 | 1.260 | 0.6967E-02 | 1.448 | 43.46 | 260.5 | 8.60 | 18.5 |
| 0.80 | 1.400 | 0.8181E-02 | 1.351 | 44.26 | 255.7 | 8.68 | 18.9 |
| 0.90 | 1.530 | 0.9462E-02 | 1.255 | 45.17 | 250.8 | 8.75 | 19.3 |
| 1.00 | 1.651 | 0.1082E-01 | 1.160 | 46.18 | 245.9 | 8.83 | 19.8 |
| 1.054 | 1.713 | 0.1159E-01 | 1.108 | 46.79 | 243.3 | 8.88 | 20.1 |
| 14.267 | 1.713 | 0.5317 | 7.370 | 46.65 | 708.9 | 69.27 | 101.2 |
| 14.30 | 1.957 | 0.5358 | 7.544 | 46.64 | 715.0 | 69.70 | 101.6 |
| 14.40 | 2.738 | 0.5487 | 8.087 | 46.62 | 733.6 | 71.03 | 103.0 |
| 14.50 | 3.575 | 0.5617 | 8.651 | 46.61 | 752.4 | 72.40 | 104.3 |
| 14.60 | 4.469 | 0.5747 | 9.233 | 46.60 | 771.1 | 73.80 | 105.7 |
| 14.70 | 5.422 | 0.5879 | 9.836 | 46.61 | 789.9 | 75.24 | 107.2 |
| 14.80 | 6.437 | 0.6013 | 10.460 | 46.62 | 808.7 | 76.72 | 108.6 |
| 14.90 | 7.515 | 0.6147 | 11.104 | 46.63 | 827.5 | 78.24 | 110.1 |
| 15.00 | 8.658 | 0.6283 | 11.769 | 46.66 | 846.5 | 79.81 | 111.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 260.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 15.10 | 9.869 | 0.6420 | 12.457 | 46.69 | 865.4 | 81.42 | 113.2 |
| 15.20 | 11.150 | 0.6558 | 13.166 | 46.73 | 884.5 | 83.08 | 114.8 |
| 15.30 | 12.503 | 0.6697 | 13.899 | 46.77 | 903.6 | 84.79 | 116.5 |
| 15.40 | 13.931 | 0.6838 | 14.654 | 46.82 | 922.8 | 86.54 | 118.2 |
| 15.50 | 15.435 | 0.6980 | 15.434 | 46.87 | 942.0 | 88.36 | 119.9 |
| 15.60 | 17.019 | 0.7124 | 16.238 | 46.93 | 961.4 | 90.22 | 121.6 |
| 15.70 | 18.684 | 0.7269 | 17.067 | 46.99 | 980.8 | 92.15 | 123.4 |
| 15.80 | 20.433 | 0.7416 | 17.921 | 47.05 | 1000.4 | 94.14 | 125.2 |
| 15.90 | 22.269 | 0.7565 | 18.802 | 47.12 | 1020.1 | 96.19 | 127.1 |
| 16.00 | 24.194 | 0.7715 | 19.710 | 47.19 | 1039.9 | 98.31 | 129.0 |
| 16.10 | 26.212 | 0.7866 | 20.645 | 47.27 | 1059.8 | 100.49 | 131.0 |
| 16.20 | 28.324 | 0.8020 | 21.609 | 47.35 | 1079.9 | 102.75 | 133.0 |
| 16.30 | 30.534 | 0.8175 | 22.601 | 47.43 | 1100.1 | 105.09 | 135.0 |
| 16.40 | 32.845 | 0.8333 | 23.624 | 47.51 | 1120.5 | 107.51 | 137.1 |
| 16.50 | 35.260 | 0.8492 | 24.677 | 47.60 | 1141.0 | 110.02 | 139.2 |
| 16.60 | 37.782 | 0.8653 | 25.762 | 47.69 | 1161.6 | 112.61 | 141.4 |
| 16.70 | 40.414 | 0.8816 | 26.879 | 47.77 | 1182.5 | 115.30 | 143.6 |
| 16.80 | 43.159 | 0.8982 | 28.029 | 47.86 | 1203.5 | 118.08 | 145.8 |
| 16.90 | 46.020 | 0.9150 | 29.213 | 47.96 | 1224.7 | 120.97 | 148.1 |
| 17.00 | 49.002 | 0.9320 | 30.432 | 48.05 | 1246.1 | 123.97 | 150.5 |
| 17.10 | 52.108 | 0.9492 | 31.686 | 48.14 | 1267.7 | 127.09 | 152.9 |
| 17.20 | 55.341 | 0.9667 | 32.978 | 48.24 | 1289.5 | 130.33 | 155.4 |
| 17.30 | 58.705 | 0.9844 | 34.307 | 48.34 | 1311.5 | 133.70 | 157.9 |
| 17.40 | 62.203 | 1.002 | 35.674 | 48.43 | 1333.8 | | 160.4 |
| 17.50 | 65.841 | 1.021 | 37.081 | 48.53 | 1356.2 | | 163.0 |
| 17.60 | 69.621 | 1.039 | 38.529 | 48.63 | 1378.8 | | 165.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 273.15 K
Second virial coefficient is -222.5 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.222 | 0.8511E-03 | 2.171 | 41.56 | 296.7 | 8.64 | 18.1 |
| 0.20 | 0.434 | 0.1742E-02 | 2.072 | 41.93 | 292.1 | 8.69 | 18.3 |
| 0.30 | 0.637 | 0.2673E-02 | 1.974 | 42.32 | 287.6 | 8.75 | 18.6 |
| 0.40 | 0.829 | 0.3645E-02 | 1.879 | 42.73 | 283.1 | 8.81 | 18.9 |
| 0.50 | 1.012 | 0.4659E-02 | 1.784 | 43.16 | 278.6 | 8.88 | 19.2 |
| 0.60 | 1.186 | 0.5716E-02 | 1.691 | 43.62 | 274.1 | 8.94 | 19.5 |
| 0.70 | 1.351 | 0.6818E-02 | 1.600 | 44.11 | 269.7 | 9.02 | 19.9 |
| 0.80 | 1.506 | 0.7965E-02 | 1.510 | 44.64 | 265.3 | 9.09 | 20.2 |
| 0.90 | 1.653 | 0.9161E-02 | 1.421 | 45.22 | 260.9 | 9.17 | 20.6 |
| 1.00 | 1.790 | 0.1041E-01 | 1.334 | 45.83 | 256.6 | 9.26 | 21.0 |
| 1.10 | 1.919 | 0.1170E-01 | 1.248 | 46.50 | 252.3 | 9.34 | 21.4 |
| 1.20 | 2.040 | 0.1306E-01 | 1.164 | 47.23 | 248.0 | 9.44 | 21.9 |
| 1.30 | 2.152 | 0.1447E-01 | 1.081 | 48.02 | 243.7 | 9.53 | 22.4 |
| 1.40 | 2.256 | 0.1594E-01 | 1.000 | 48.87 | 239.5 | 9.63 | 22.9 |
| 1.50 | 2.352 | 0.1748E-01 | 0.920 | 49.80 | 235.3 | 9.73 | 23.5 |
| 1.539 | 2.387 | 0.1810E-01 | 0.889 | 50.18 | 233.6 | 9.77 | 23.7 |
| 13.321 | 2.387 | 0.4253 | 4.641 | 48.17 | 588.7 | 58.45 | 90.9 |
| 13.40 | 2.766 | 0.4339 | 4.946 | 48.11 | 602.0 | 59.27 | 91.7 |
| 13.50 | 3.280 | 0.4448 | 5.348 | 48.05 | 618.9 | 60.34 | 92.8 |
| 13.60 | 3.836 | 0.4559 | 5.766 | 47.99 | 635.9 | 61.43 | 94.0 |
| 13.70 | 4.434 | 0.4671 | 6.200 | 47.94 | 653.0 | 62.55 | 95.1 |
| 13.80 | 5.076 | 0.4784 | 6.651 | 47.91 | 670.1 | 63.70 | 96.3 |
| 13.90 | 5.765 | 0.4898 | 7.119 | 47.88 | 687.3 | 64.87 | 97.5 |
| 14.00 | 6.501 | 0.5014 | 7.605 | 47.85 | 704.6 | 66.08 | 98.8 |
| 14.10 | 7.286 | 0.5131 | 8.109 | 47.84 | 721.9 | 67.31 | 100.1 |
| 14.20 | 8.123 | 0.5249 | 8.632 | 47.83 | 739.3 | 68.58 | 101.4 |
| 14.30 | 9.013 | 0.5369 | 9.173 | 47.83 | 756.8 | 69.89 | 102.7 |
| 14.40 | 9.958 | 0.5490 | 9.733 | 47.84 | 774.4 | 71.23 | 104.1 |
| 14.50 | 10.960 | 0.5612 | 10.312 | 47.85 | 792.0 | 72.60 | 105.5 |
| 14.60 | 12.021 | 0.5736 | 10.911 | 47.87 | 809.8 | 74.01 | 106.9 |
| 14.70 | 13.143 | 0.5860 | 11.531 | 47.89 | 827.6 | 75.46 | 108.4 |
| 14.80 | 14.328 | 0.5987 | 12.172 | 47.92 | 845.5 | 76.96 | 109.9 |
| 14.90 | 15.578 | 0.6114 | 12.833 | 47.96 | 863.6 | 78.49 | 111.4 |
| 15.00 | 16.896 | 0.6243 | 13.516 | 48.00 | 881.7 | 80.07 | 113.0 |
| 15.10 | 18.282 | 0.6374 | 14.222 | 48.04 | 899.9 | 81.70 | 114.6 |
| 15.20 | 19.741 | 0.6506 | 14.950 | 48.09 | 918.3 | 83.37 | 116.2 |
| 15.30 | 21.273 | 0.6639 | 15.702 | 48.14 | 936.8 | 85.10 | 117.9 |
| 15.40 | 22.882 | 0.6774 | 16.477 | 48.20 | 955.3 | 86.87 | 119.6 |
| 15.50 | 24.569 | 0.6911 | 17.277 | 48.26 | 974.1 | 88.71 | 121.3 |
| 15.60 | 26.338 | 0.7050 | 18.101 | 48.32 | 992.9 | 90.59 | 123.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 273.15 K (continued)
Second virial coefficient is -222.5 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 15.70 | 28.190 | 0.7190 | 18.952 | 48.38 | 1011.9 | 92.54 | 124.9 |
| 15.80 | 30.129 | 0.7331 | 19.828 | 48.45 | 1031.0 | 94.56 | 126.8 |
| 15.90 | 32.157 | 0.7475 | 20.732 | 48.52 | 1050.3 | 96.63 | 128.7 |
| 16.00 | 34.276 | 0.7621 | 21.663 | 48.60 | 1069.8 | 98.78 | 130.6 |
| 16.10 | 36.490 | 0.7768 | 22.623 | 48.67 | 1089.4 | 101.00 | 132.6 |
| 16.20 | 38.802 | 0.7917 | 23.611 | 48.75 | 1109.2 | 103.29 | 134.6 |
| 16.30 | 41.214 | 0.8069 | 24.630 | 48.83 | 1129.1 | 105.66 | 136.7 |
| 16.40 | 43.729 | 0.8222 | 25.679 | 48.91 | 1149.2 | 108.12 | 138.8 |
| 16.50 | 46.351 | 0.8378 | 26.760 | 48.99 | 1169.6 | 110.66 | 141.0 |
| 16.60 | 49.082 | 0.8535 | 27.873 | 49.08 | 1190.1 | 113.30 | 143.2 |
| 16.70 | 51.926 | 0.8695 | 29.019 | 49.16 | 1210.8 | 116.03 | 145.4 |
| 16.80 | 54.887 | 0.8858 | 30.199 | 49.25 | 1231.7 | 118.86 | 147.7 |
| 16.90 | 57.967 | 0.9022 | 31.413 | 49.34 | 1252.8 | 121.80 | 150.1 |
| 17.00 | 61.171 | 0.9190 | 32.664 | 49.43 | 1274.1 | | 152.5 |
| 17.10 | 64.501 | 0.9359 | 33.951 | 49.52 | 1295.6 | | 154.9 |
| 17.20 | 67.962 | 0.9531 | 35.275 | 49.60 | 1317.4 | | 157.4 |

ETHANE ISOTHERM AT T = 280.00 K
Second virial coefficient is -211.4 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.228 | 0.8502E-03 | 2.230 | 42.32 | 300.1 | 8.85 | 18.9 |
| 0.20 | 0.446 | 0.1738E-02 | 2.134 | 42.67 | 295.7 | 8.90 | 19.1 |
| 0.30 | 0.655 | 0.2664E-02 | 2.039 | 43.02 | 291.4 | 8.96 | 19.4 |
| 0.40 | 0.854 | 0.3629E-02 | 1.946 | 43.39 | 287.0 | 9.02 | 19.7 |
| 0.50 | 1.044 | 0.4633E-02 | 1.855 | 43.78 | 282.7 | 9.09 | 20.0 |
| 0.60 | 1.225 | 0.5676E-02 | 1.765 | 44.18 | 278.5 | 9.16 | 20.3 |
| 0.70 | 1.397 | 0.6760E-02 | 1.676 | 44.60 | 274.2 | 9.23 | 20.6 |
| 0.80 | 1.560 | 0.7886E-02 | 1.589 | 45.05 | 270.0 | 9.31 | 20.9 |
| 0.90 | 1.715 | 0.9053E-02 | 1.504 | 45.53 | 265.9 | 9.39 | 21.3 |
| 1.00 | 1.861 | 0.1026E-01 | 1.420 | 46.03 | 261.8 | 9.47 | 21.7 |
| 1.10 | 1.999 | 0.1152E-01 | 1.337 | 46.57 | 257.7 | 9.56 | 22.1 |
| 1.20 | 2.129 | 0.1282E-01 | 1.257 | 47.14 | 253.7 | 9.66 | 22.5 |
| 1.30 | 2.250 | 0.1417E-01 | 1.178 | 47.74 | 249.7 | 9.75 | 23.0 |
| 1.40 | 2.364 | 0.1557E-01 | 1.100 | 48.39 | 245.7 | 9.85 | 23.5 |
| 1.50 | 2.470 | 0.1701E-01 | 1.024 | 49.09 | 241.8 | 9.95 | 24.0 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 280.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 1.60 | 2.569 | 0.1852E-01 | 0.949 | 49.83 | 237.9 | 10.06 | 24.5 |
| 1.70 | 2.660 | 0.2007E-01 | 0.876 | 50.63 | 234.0 | 10.17 | 25.2 |
| 1.80 | 2.744 | 0.2169E-01 | 0.804 | 51.48 | 230.2 | 10.29 | 25.8 |
| 1.882 | 2.808 | 0.2305E-01 | 0.747 | 52.22 | 227.2 | 10.38 | 26.4 |
| 12.742 | 2.808 | 0.3699 | 3.361 | 49.18 | 520.9 | 52.96 | 85.5 |
| 12.80 | 3.008 | 0.3756 | 3.540 | 49.12 | 530.1 | 53.49 | 86.1 |
| 12.90 | 3.378 | 0.3855 | 3.860 | 49.01 | 545.9 | 54.42 | 87.0 |
| 13.00 | 3.781 | 0.3954 | 4.194 | 48.92 | 561.8 | 55.37 | 88.0 |
| 13.10 | 4.217 | 0.4055 | 4.543 | 48.84 | 577.7 | 56.34 | 89.0 |
| 13.20 | 4.690 | 0.4157 | 4.906 | 48.77 | 593.8 | 57.33 | 90.1 |
| 13.30 | 5.199 | 0.4261 | 5.285 | 48.71 | 609.9 | 58.35 | 91.1 |
| 13.40 | 5.747 | 0.4365 | 5.679 | 48.65 | 626.1 | 59.39 | 92.2 |
| 13.50 | 6.335 | 0.4471 | 6.089 | 48.61 | 642.3 | 60.46 | 93.4 |
| 13.60 | 6.965 | 0.4578 | 6.516 | 48.57 | 658.7 | 61.56 | 94.5 |
| 13.70 | 7.639 | 0.4686 | 6.959 | 48.54 | 675.2 | 62.68 | 95.7 |
| 13.80 | 8.358 | 0.4796 | 7.419 | 48.52 | 691.8 | 63.83 | 96.9 |
| 13.90 | 9.123 | 0.4907 | 7.896 | 48.51 | 708.4 | 65.01 | 98.1 |
| 14.00 | 9.938 | 0.5020 | 8.391 | 48.50 | 725.2 | 66.22 | 99.4 |
| 14.10 | 10.802 | 0.5133 | 8.904 | 48.50 | 742.0 | 67.46 | 100.7 |
| 14.20 | 11.719 | 0.5248 | 9.435 | 48.50 | 759.0 | 68.73 | 102.0 |
| 14.30 | 12.690 | 0.5365 | 9.985 | 48.51 | 776.0 | 70.04 | 103.4 |
| 14.40 | 13.717 | 0.5483 | 10.554 | 48.53 | 793.2 | 71.38 | 104.8 |
| 14.50 | 14.801 | 0.5602 | 11.143 | 48.55 | 810.4 | 72.76 | 106.2 |
| 14.60 | 15.946 | 0.5722 | 11.752 | 48.57 | 827.8 | 74.18 | 107.6 |
| 14.70 | 17.152 | 0.5844 | 12.381 | 48.61 | 845.3 | 75.64 | 109.1 |
| 14.80 | 18.423 | 0.5967 | 13.031 | 48.64 | 862.9 | 77.14 | 110.6 |
| 14.90 | 19.759 | 0.6092 | 13.703 | 48.68 | 880.6 | 78.68 | 112.1 |
| 15.00 | 21.164 | 0.6219 | 14.396 | 48.73 | 898.4 | 80.27 | 113.7 |
| 15.10 | 22.639 | 0.6347 | 15.112 | 48.78 | 916.4 | 81.91 | 115.3 |
| 15.20 | 24.187 | 0.6476 | 15.851 | 48.83 | 934.5 | 83.59 | 117.0 |
| 15.30 | 25.810 | 0.6607 | 16.613 | 48.88 | 952.7 | 85.32 | 118.7 |
| 15.40 | 27.511 | 0.6740 | 17.400 | 48.94 | 971.1 | 87.11 | 120.4 |
| 15.50 | 29.291 | 0.6874 | 18.211 | 49.00 | 989.6 | 88.95 | 122.2 |
| 15.60 | 31.154 | 0.7010 | 19.047 | 49.07 | 1008.3 | 90.86 | 123.9 |
| 15.70 | 33.101 | 0.7148 | 19.910 | 49.13 | 1027.1 | 92.82 | 125.8 |
| 15.80 | 35.136 | 0.7288 | 20.799 | 49.20 | 1046.1 | 94.84 | 127.7 |
| 15.90 | 37.262 | 0.7430 | 21.715 | 49.27 | 1065.3 | 96.94 | 129.6 |
| 16.00 | 39.480 | 0.7573 | 22.659 | 49.35 | 1084.6 | 99.10 | 131.5 |
| 16.10 | 41.795 | 0.7719 | 23.632 | 49.42 | 1104.1 | 101.33 | 133.5 |
| 16.20 | 44.208 | 0.7866 | 24.635 | 49.50 | 1123.7 | 103.64 | 135.6 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 280.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 16.30 | 46.723 | 0.8016 | 25.668 | 49.58 | 1143.6 | 106.04 | 137.6 |
| 16.40 | 49.342 | 0.8168 | 26.732 | 49.66 | 1163.7 | 108.51 | 139.8 |
| 16.50 | 52.070 | 0.8322 | 27.828 | 49.74 | 1183.9 | 111.08 | 141.9 |
| 16.60 | 54.909 | 0.8478 | 28.956 | 49.82 | 1204.4 | 113.73 | 144.2 |
| 16.70 | 57.862 | 0.8637 | 30.118 | 49.90 | 1225.0 | 116.49 | 146.4 |
| 16.80 | 60.934 | 0.8798 | 31.314 | 49.99 | 1245.9 | | 148.7 |
| 16.90 | 64.126 | 0.8961 | 32.546 | 50.07 | 1267.0 | | 151.1 |
| 17.00 | 67.444 | 0.9127 | 33.813 | 50.16 | 1288.3 | | 153.5 |

ETHANE ISOTHERM AT T = 298.15 K
Second virial coefficient is -185.5 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.243 | 0.8483E-03 | 2.388 | 44.43 | 309.0 | 9.39 | 21.1 |
| 0.20 | 0.478 | 0.1730E-02 | 2.298 | 44.71 | 305.0 | 9.44 | 21.4 |
| 0.30 | 0.703 | 0.2646E-02 | 2.210 | 44.99 | 301.1 | 9.51 | 21.6 |
| 0.40 | 0.920 | 0.3596E-02 | 2.123 | 45.28 | 297.2 | 9.57 | 21.9 |
| 0.50 | 1.128 | 0.4579E-02 | 2.038 | 45.58 | 293.3 | 9.64 | 22.1 |
| 0.60 | 1.327 | 0.5596E-02 | 1.955 | 45.88 | 289.5 | 9.71 | 22.4 |
| 0.70 | 1.519 | 0.6647E-02 | 1.873 | 46.19 | 285.7 | 9.79 | 22.7 |
| 0.80 | 1.702 | 0.7732E-02 | 1.793 | 46.51 | 282.0 | 9.87 | 23.0 |
| 0.90 | 1.877 | 0.8850E-02 | 1.714 | 46.84 | 278.3 | 9.96 | 23.3 |
| 1.00 | 2.045 | 0.1000E-01 | 1.637 | 47.17 | 274.7 | 10.04 | 23.7 |
| 1.10 | 2.205 | 0.1119E-01 | 1.562 | 47.51 | 271.2 | 10.13 | 24.0 |
| 1.20 | 2.357 | 0.1241E-01 | 1.488 | 47.87 | 267.6 | 10.23 | 24.4 |
| 1.30 | 2.502 | 0.1366E-01 | 1.416 | 48.23 | 264.2 | 10.33 | 24.8 |
| 1.40 | 2.640 | 0.1495E-01 | 1.346 | 48.60 | 260.8 | 10.43 | 25.2 |
| 1.50 | 2.772 | 0.1627E-01 | 1.277 | 48.99 | 257.4 | 10.54 | 25.6 |
| 1.60 | 2.896 | 0.1762E-01 | 1.210 | 49.39 | 254.1 | 10.64 | 26.1 |
| 1.70 | 3.014 | 0.1901E-01 | 1.145 | 49.80 | 250.9 | 10.76 | 26.5 |
| 1.80 | 3.125 | 0.2043E-01 | 1.081 | 50.23 | 247.7 | 10.87 | 27.0 |
| 1.90 | 3.230 | 0.2188E-01 | 1.019 | 50.67 | 244.6 | 10.99 | 27.5 |
| 2.00 | 3.329 | 0.2337E-01 | 0.959 | 51.13 | 241.6 | 11.12 | 28.1 |
| 2.10 | 3.422 | 0.2489E-01 | 0.900 | 51.60 | 238.6 | 11.24 | 28.7 |
| 2.20 | 3.509 | 0.2645E-01 | 0.843 | 52.09 | 235.7 | 11.37 | 29.3 |
| 2.30 | 3.590 | 0.2803E-01 | 0.787 | 52.60 | 232.8 | 11.51 | 29.9 |
| 2.40 | 3.666 | 0.2965E-01 | 0.734 | 53.12 | 230.0 | 11.65 | 30.6 |
| 2.50 | 3.737 | 0.3131E-01 | 0.682 | 53.67 | 227.3 | 11.79 | 31.4 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 298.15 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 2.60 | 3.803 | 0.3299E-01 | 0.631 | 54.23 | 224.6 | 11.93 | 32.2 |
| 2.70 | 3.863 | 0.3471E-01 | 0.583 | 54.81 | 222.0 | 12.08 | 33.0 |
| 2.80 | 3.919 | 0.3646E-01 | 0.536 | 55.42 | 219.5 | 12.23 | 33.9 |
| 2.90 | 3.971 | 0.3824E-01 | 0.491 | 56.04 | 217.0 | 12.39 | 34.8 |
| 3.00 | 4.018 | 0.4006E-01 | 0.447 | 56.69 | 214.6 | 12.55 | 35.9 |
| 3.10 | 4.060 | 0.4190E-01 | 0.405 | 57.36 | 212.2 | 12.71 | 37.0 |
| 3.20 | 4.099 | 0.4377E-01 | 0.365 | 58.05 | 210.0 | 12.87 | 38.2 |
| 3.30 | 4.133 | 0.4567E-01 | 0.326 | 58.77 | 207.8 | 13.04 | 39.5 |
| 3.40 | 4.164 | 0.4759E-01 | 0.290 | 59.50 | 205.6 | 13.22 | 41.0 |
| 3.496 | 4.190 | 0.4946E-01 | 0.256 | 60.23 | 203.6 | 13.39 | 42.5 |
| 10.468 | 4.190 | 0.2084 | 0.626 | 54.94 | 303.9 | 36.98 | 71.9 |
| 10.50 | 4.211 | 0.2104 | 0.655 | 54.79 | 307.4 | 37.17 | 72.0 |
| 10.60 | 4.281 | 0.2167 | 0.750 | 54.36 | 318.1 | 37.75 | 72.1 |
| 10.70 | 4.361 | 0.2231 | 0.852 | 53.97 | 328.9 | 38.34 | 72.4 |
| 10.80 | 4.452 | 0.2296 | 0.962 | 53.62 | 339.9 | 38.94 | 72.7 |
| 10.90 | 4.554 | 0.2361 | 1.079 | 53.29 | 351.0 | 39.56 | 73.1 |
| 11.00 | 4.668 | 0.2428 | 1.205 | 52.99 | 362.3 | 40.18 | 73.6 |
| 11.10 | 4.795 | 0.2496 | 1.338 | 52.72 | 373.7 | 40.82 | 74.1 |
| 11.20 | 4.936 | 0.2565 | 1.481 | 52.47 | 385.2 | 41.47 | 74.6 |
| 11.30 | 5.091 | 0.2635 | 1.632 | 52.24 | 396.9 | 42.13 | 75.2 |
| 11.40 | 5.263 | 0.2706 | 1.794 | 52.04 | 408.7 | 42.80 | 75.8 |
| 11.50 | 5.450 | 0.2779 | 1.965 | 51.85 | 420.7 | 43.49 | 76.5 |
| 11.60 | 5.656 | 0.2852 | 2.146 | 51.68 | 432.8 | 44.20 | 77.2 |
| 11.70 | 5.880 | 0.2927 | 2.338 | 51.52 | 445.2 | 44.91 | 77.9 |
| 11.80 | 6.124 | 0.3003 | 2.540 | 51.38 | 457.7 | 45.65 | 78.6 |
| 11.90 | 6.388 | 0.3080 | 2.754 | 51.25 | 470.3 | 46.40 | 79.4 |
| 12.00 | 6.675 | 0.3158 | 2.980 | 51.13 | 483.2 | 47.16 | 80.2 |
| 12.10 | 6.985 | 0.3238 | 3.217 | 51.02 | 496.2 | 47.94 | 81.0 |
| 12.20 | 7.319 | 0.3319 | 3.467 | 50.92 | 509.3 | 48.74 | 81.8 |
| 12.30 | 7.679 | 0.3401 | 3.729 | 50.83 | 522.7 | 49.55 | 82.7 |
| 12.40 | 8.065 | 0.3485 | 4.004 | 50.75 | 536.2 | 50.38 | 83.6 |
| 12.50 | 8.480 | 0.3570 | 4.292 | 50.68 | 549.8 | 51.23 | 84.5 |
| 12.60 | 8.924 | 0.3657 | 4.593 | 50.61 | 563.7 | 52.10 | 85.5 |
| 12.70 | 9.399 | 0.3744 | 4.908 | 50.55 | 577.7 | 52.99 | 86.4 |
| 12.80 | 9.906 | 0.3833 | 5.237 | 50.50 | 591.8 | 53.91 | 87.4 |
| 12.90 | 10.447 | 0.3924 | 5.580 | 50.46 | 606.1 | 54.84 | 88.4 |
| 13.00 | 11.022 | 0.4016 | 5.937 | 50.42 | 620.5 | 55.79 | 89.4 |
| 13.10 | 11.635 | 0.4109 | 6.310 | 50.39 | 635.1 | 56.77 | 90.5 |
| 13.20 | 12.285 | 0.4203 | 6.697 | 50.37 | 649.9 | 57.77 | 91.6 |
| 13.30 | 12.975 | 0.4299 | 7.100 | 50.35 | 664.7 | 58.79 | 92.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 298.15 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 13.40 | 13.705 | 0.4397 | 7.518 | 50.34 | 679.8 | 59.84 | 93.8 |
| 13.50 | 14.479 | 0.4495 | 7.953 | 50.33 | 694.9 | 60.92 | 95.0 |
| 13.60 | 15.296 | 0.4595 | 8.403 | 50.33 | 710.2 | 62.02 | 96.2 |
| 13.70 | 16.160 | 0.4697 | 8.871 | 50.33 | 725.6 | 63.15 | 97.4 |
| 13.80 | 17.071 | 0.4800 | 9.356 | 50.34 | 741.2 | 64.31 | 98.6 |
| 13.90 | 18.032 | 0.4904 | 9.858 | 50.35 | 756.9 | 65.50 | 99.9 |
| 14.00 | 19.043 | 0.5009 | 10.377 | 50.37 | 772.7 | 66.72 | 101.2 |
| 14.10 | 20.108 | 0.5116 | 10.916 | 50.39 | 788.7 | 67.98 | 102.5 |
| 14.20 | 21.227 | 0.5225 | 11.472 | 50.42 | 804.9 | 69.26 | 103.9 |
| 14.30 | 22.403 | 0.5335 | 12.048 | 50.45 | 821.1 | 70.59 | 105.3 |
| 14.40 | 23.637 | 0.5446 | 12.643 | 50.48 | 837.5 | 71.95 | 106.7 |
| 14.50 | 24.932 | 0.5559 | 13.258 | 50.52 | 854.1 | 73.34 | 108.1 |
| 14.60 | 26.290 | 0.5674 | 13.894 | 50.56 | 870.8 | 74.78 | 109.6 |
| 14.70 | 27.712 | 0.5790 | 14.551 | 50.60 | 887.6 | 76.26 | 111.1 |
| 14.80 | 29.200 | 0.5907 | 15.229 | 50.65 | 904.6 | 77.78 | 112.7 |
| 14.90 | 30.758 | 0.6026 | 15.929 | 50.70 | 921.8 | 79.34 | 114.3 |
| 15.00 | 32.387 | 0.6147 | 16.651 | 50.75 | 939.1 | 80.96 | 115.9 |
| 15.10 | 34.089 | 0.6270 | 17.397 | 50.80 | 956.6 | 82.62 | 117.5 |
| 15.20 | 35.867 | 0.6394 | 18.166 | 50.86 | 974.2 | 84.33 | 119.2 |
| 15.30 | 37.723 | 0.6520 | 18.959 | 50.92 | 992.0 | 86.09 | 120.9 |
| 15.40 | 39.660 | 0.6648 | 19.777 | 50.98 | 1010.0 | 87.91 | 122.7 |
| 15.50 | 41.679 | 0.6778 | 20.621 | 51.04 | 1028.2 | 89.78 | 124.5 |
| 15.60 | 43.785 | 0.6909 | 21.491 | 51.11 | 1046.5 | 91.72 | 126.3 |
| 15.70 | 45.979 | 0.7043 | 22.388 | 51.18 | 1065.1 | 93.72 | 128.2 |
| 15.80 | 48.263 | 0.7178 | 23.312 | 51.24 | 1083.8 | 95.78 | 130.1 |
| 15.90 | 50.642 | 0.7316 | 24.264 | 51.31 | 1102.7 | 97.92 | 132.0 |
| 16.00 | 53.117 | 0.7456 | 25.246 | 51.39 | 1121.8 | 100.12 | 134.0 |
| 16.10 | 55.692 | 0.7597 | 26.257 | 51.46 | 1141.2 | 102.41 | 136.1 |
| 16.20 | 58.369 | 0.7741 | 27.298 | 51.53 | 1160.7 | 104.77 | 138.1 |
| 16.30 | 61.153 | 0.7887 | 28.371 | 51.61 | 1180.4 | | 140.3 |
| 16.40 | 64.045 | 0.8036 | 29.476 | 51.68 | 1200.4 | | 142.4 |
| 16.50 | 67.049 | 0.8187 | 30.613 | 51.76 | 1220.5 | | 144.6 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 300.00 K
Second virial coefficient is -183.1 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.245 | 0.8481E-03 | 2.404 | 44.65 | 309.9 | 9.44 | 21.3 |
| 0.20 | 0.481 | 0.1730E-02 | 2.315 | 44.92 | 305.9 | 9.50 | 21.6 |
| 0.30 | 0.708 | 0.2645E-02 | 2.227 | 45.20 | 302.0 | 9.56 | 21.8 |
| 0.40 | 0.926 | 0.3593E-02 | 2.141 | 45.49 | 298.2 | 9.63 | 22.1 |
| 0.50 | 1.136 | 0.4575E-02 | 2.057 | 45.78 | 294.3 | 9.70 | 22.4 |
| 0.60 | 1.338 | 0.5589E-02 | 1.974 | 46.07 | 290.6 | 9.77 | 22.6 |
| 0.70 | 1.531 | 0.6638E-02 | 1.893 | 46.37 | 286.8 | 9.85 | 22.9 |
| 0.80 | 1.716 | 0.7719E-02 | 1.813 | 46.68 | 283.2 | 9.93 | 23.2 |
| 0.90 | 1.894 | 0.8834E-02 | 1.735 | 47.00 | 279.6 | 10.01 | 23.5 |
| 1.00 | 2.063 | 0.9981E-02 | 1.659 | 47.32 | 276.0 | 10.10 | 23.9 |
| 1.10 | 2.225 | 0.1116E-01 | 1.584 | 47.65 | 272.5 | 10.19 | 24.2 |
| 1.20 | 2.380 | 0.1238E-01 | 1.511 | 47.99 | 269.0 | 10.29 | 24.6 |
| 1.30 | 2.528 | 0.1362E-01 | 1.440 | 48.34 | 265.6 | 10.39 | 25.0 |
| 1.40 | 2.668 | 0.1490E-01 | 1.370 | 48.70 | 262.2 | 10.49 | 25.4 |
| 1.50 | 2.802 | 0.1621E-01 | 1.302 | 49.07 | 258.9 | 10.59 | 25.8 |
| 1.60 | 2.928 | 0.1756E-01 | 1.235 | 49.45 | 255.7 | 10.70 | 26.2 |
| 1.70 | 3.049 | 0.1893E-01 | 1.171 | 49.84 | 252.5 | 10.82 | 26.7 |
| 1.80 | 3.163 | 0.2034E-01 | 1.107 | 50.24 | 249.4 | 10.93 | 27.2 |
| 1.90 | 3.270 | 0.2178E-01 | 1.046 | 50.66 | 246.3 | 11.05 | 27.7 |
| 2.00 | 3.372 | 0.2326E-01 | 0.986 | 51.08 | 243.3 | 11.18 | 28.2 |
| 2.10 | 3.468 | 0.2476E-01 | 0.928 | 51.53 | 240.4 | 11.30 | 28.8 |
| 2.20 | 3.558 | 0.2630E-01 | 0.872 | 51.99 | 237.5 | 11.43 | 29.4 |
| 2.30 | 3.642 | 0.2787E-01 | 0.817 | 52.46 | 234.7 | 11.57 | 30.0 |
| 2.40 | 3.721 | 0.2947E-01 | 0.764 | 52.95 | 232.0 | 11.71 | 30.7 |
| 2.50 | 3.795 | 0.3110E-01 | 0.712 | 53.45 | 229.3 | 11.85 | 31.4 |
| 2.60 | 3.864 | 0.3276E-01 | 0.663 | 53.97 | 226.7 | 11.99 | 32.1 |
| 2.70 | 3.927 | 0.3446E-01 | 0.615 | 54.51 | 224.2 | 12.14 | 32.9 |
| 2.80 | 3.987 | 0.3618E-01 | 0.568 | 55.06 | 221.7 | 12.29 | 33.8 |
| 2.90 | 4.041 | 0.3793E-01 | 0.524 | 55.63 | 219.3 | 12.45 | 34.7 |
| 3.00 | 4.091 | 0.3971E-01 | 0.480 | 56.23 | 216.9 | 12.61 | 35.6 |
| 3.10 | 4.137 | 0.4151E-01 | 0.439 | 56.83 | 214.7 | 12.77 | 36.6 |
| 3.20 | 4.179 | 0.4334E-01 | 0.399 | 57.46 | 212.5 | 12.94 | 37.7 |
| 3.30 | 4.217 | 0.4520E-01 | 0.361 | 58.11 | 210.3 | 13.11 | 38.9 |
| 3.40 | 4.252 | 0.4708E-01 | 0.325 | 58.77 | 208.2 | 13.28 | 40.2 |
| 3.50 | 4.282 | 0.4899E-01 | 0.291 | 59.45 | 206.2 | 13.46 | 41.6 |
| 3.60 | 4.310 | 0.5091E-01 | 0.258 | 60.15 | 204.3 | 13.64 | 43.2 |
| 3.70 | 4.334 | 0.5286E-01 | 0.226 | 60.87 | 202.4 | 13.82 | 44.9 |
| 3.80 | 4.355 | 0.5482E-01 | 0.197 | 61.61 | 200.6 | 14.01 | 46.8 |
| 3.808 | 4.357 | 0.5497E-01 | 0.194 | 61.67 | 200.5 | 14.02 | 46.9 |
| 10.084 | 4.357 | 0.1892 | 0.433 | 56.47 | 276.8 | 34.92 | 71.4 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 300.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | J/(mol•K) | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | mW/(m•K) |
| 10.10 | 4.364 | 0.1901 | 0.444 | 56.39 | 278.3 | 35.00 | 71.3 |
| 10.20 | 4.412 | 0.1957 | 0.516 | 55.87 | 287.9 | 35.54 | 71.2 |
| 10.30 | 4.467 | 0.2014 | 0.594 | 55.39 | 297.7 | 36.09 | 71.2 |
| 10.40 | 4.531 | 0.2073 | 0.678 | 54.95 | 307.7 | 36.65 | 71.3 |
| 10.50 | 4.603 | 0.2133 | 0.769 | 54.54 | 317.8 | 37.22 | 71.5 |
| 10.60 | 4.684 | 0.2194 | 0.866 | 54.16 | 328.1 | 37.80 | 71.8 |
| 10.70 | 4.776 | 0.2256 | 0.970 | 53.82 | 338.6 | 38.39 | 72.2 |
| 10.80 | 4.879 | 0.2319 | 1.081 | 53.50 | 349.2 | 38.99 | 72.6 |
| 10.90 | 4.993 | 0.2383 | 1.201 | 53.21 | 359.9 | 39.60 | 73.0 |
| 11.00 | 5.119 | 0.2448 | 1.328 | 52.94 | 370.9 | 40.23 | 73.5 |
| 11.10 | 5.259 | 0.2515 | 1.464 | 52.70 | 381.9 | 40.86 | 74.1 |
| 11.20 | 5.412 | 0.2583 | 1.608 | 52.47 | 393.2 | 41.51 | 74.6 |
| 11.30 | 5.581 | 0.2652 | 1.762 | 52.27 | 404.6 | 42.18 | 75.2 |
| 11.40 | 5.765 | 0.2722 | 1.925 | 52.08 | 416.2 | 42.85 | 75.9 |
| 11.50 | 5.966 | 0.2793 | 2.098 | 51.91 | 427.9 | 43.54 | 76.6 |
| 11.60 | 6.185 | 0.2865 | 2.282 | 51.75 | 439.9 | 44.24 | 77.3 |
| 11.70 | 6.423 | 0.2939 | 2.476 | 51.61 | 452.0 | 44.96 | 78.0 |
| 11.80 | 6.680 | 0.3014 | 2.681 | 51.47 | 464.3 | 45.69 | 78.7 |
| 11.90 | 6.959 | 0.3090 | 2.897 | 51.35 | 476.8 | 46.44 | 79.5 |
| 12.00 | 7.260 | 0.3168 | 3.125 | 51.24 | 489.5 | 47.21 | 80.3 |
| 12.10 | 7.585 | 0.3247 | 3.365 | 51.14 | 502.4 | 47.99 | 81.1 |
| 12.20 | 7.934 | 0.3327 | 3.617 | 51.05 | 515.4 | 48.78 | 82.0 |
| 12.30 | 8.309 | 0.3409 | 3.882 | 50.97 | 528.6 | 49.60 | 82.8 |
| 12.40 | 8.711 | 0.3492 | 4.159 | 50.89 | 542.0 | 50.43 | 83.7 |
| 12.50 | 9.141 | 0.3577 | 4.450 | 50.83 | 555.6 | 51.28 | 84.7 |
| 12.60 | 9.601 | 0.3662 | 4.754 | 50.77 | 569.3 | 52.15 | 85.6 |
| 12.70 | 10.092 | 0.3749 | 5.071 | 50.72 | 583.2 | 53.04 | 86.6 |
| 12.80 | 10.616 | 0.3838 | 5.402 | 50.67 | 597.2 | 53.96 | 87.6 |
| 12.90 | 11.173 | 0.3928 | 5.748 | 50.63 | 611.4 | 54.89 | 88.6 |
| 13.00 | 11.766 | 0.4019 | 6.108 | 50.60 | 625.8 | 55.84 | 89.6 |
| 13.10 | 12.395 | 0.4112 | 6.483 | 50.57 | 640.3 | 56.82 | 90.7 |
| 13.20 | 13.063 | 0.4206 | 6.873 | 50.55 | 654.9 | 57.82 | 91.8 |
| 13.30 | 13.770 | 0.4301 | 7.278 | 50.54 | 669.7 | 58.85 | 92.9 |
| 13.40 | 14.519 | 0.4398 | 7.699 | 50.53 | 684.6 | 59.90 | 94.0 |
| 13.50 | 15.310 | 0.4496 | 8.136 | 50.52 | 699.7 | 60.97 | 95.2 |
| 13.60 | 16.147 | 0.4595 | 8.589 | 50.52 | 714.9 | 62.08 | 96.4 |
| 13.70 | 17.029 | 0.4696 | 9.059 | 50.53 | 730.3 | 63.21 | 97.6 |
| 13.80 | 17.959 | 0.4798 | 9.547 | 50.54 | 745.8 | 64.37 | 98.8 |
| 13.90 | 18.939 | 0.4902 | 10.051 | 50.55 | 761.4 | 65.56 | 100.1 |
| 14.00 | 19.970 | 0.5007 | 10.574 | 50.57 | 777.2 | 66.78 | 101.4 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 300.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 14.10 | 21.054 | 0.5113 | 11.114 | 50.59 | 793.1 | 68.04 | 102.7 |
| 14.20 | 22.193 | 0.5221 | 11.674 | 50.62 | 809.1 | 69.33 | 104.1 |
| 14.30 | 23.389 | 0.5331 | 12.252 | 50.65 | 825.3 | 70.65 | 105.5 |
| 14.40 | 24.644 | 0.5442 | 12.850 | 50.69 | 841.7 | 72.01 | 106.9 |
| 14.50 | 25.960 | 0.5554 | 13.468 | 50.72 | 858.2 | 73.41 | 108.4 |
| 14.60 | 27.339 | 0.5668 | 14.107 | 50.76 | 874.8 | 74.85 | 109.8 |
| 14.70 | 28.782 | 0.5784 | 14.766 | 50.81 | 891.6 | 76.33 | 111.4 |
| 14.80 | 30.293 | 0.5901 | 15.447 | 50.86 | 908.6 | 77.85 | 112.9 |
| 14.90 | 31.872 | 0.6019 | 16.150 | 50.91 | 925.7 | 79.42 | 114.5 |
| 15.00 | 33.524 | 0.6140 | 16.876 | 50.96 | 943.0 | 81.04 | 116.1 |
| 15.10 | 35.248 | 0.6262 | 17.625 | 51.01 | 960.4 | 82.70 | 117.8 |
| 15.20 | 37.049 | 0.6386 | 18.397 | 51.07 | 978.1 | 84.41 | 119.4 |
| 15.30 | 38.929 | 0.6511 | 19.194 | 51.13 | 995.8 | 86.18 | 121.2 |
| 15.40 | 40.889 | 0.6639 | 20.015 | 51.19 | 1013.8 | 88.00 | 122.9 |
| 15.50 | 42.932 | 0.6768 | 20.862 | 51.26 | 1032.0 | 89.88 | 124.7 |
| 15.60 | 45.062 | 0.6899 | 21.736 | 51.32 | 1050.3 | 91.82 | 126.5 |
| 15.70 | 47.281 | 0.7033 | 22.636 | 51.39 | 1068.8 | 93.82 | 128.4 |
| 15.80 | 49.590 | 0.7168 | 23.564 | 51.46 | 1087.5 | 95.89 | 130.3 |
| 15.90 | 51.994 | 0.7305 | 24.520 | 51.53 | 1106.4 | 98.03 | 132.3 |
| 16.00 | 54.495 | 0.7444 | 25.506 | 51.60 | 1125.5 | 100.24 | 134.3 |
| 16.10 | 57.096 | 0.7586 | 26.521 | 51.67 | 1144.8 | 102.53 | 136.3 |
| 16.20 | 59.801 | 0.7729 | 27.566 | 51.74 | 1164.3 | 104.89 | 138.4 |
| 16.30 | 62.611 | 0.7875 | 28.643 | 51.82 | 1184.1 | | 140.5 |
| 16.40 | 65.530 | 0.8023 | 29.752 | 51.89 | 1204.0 | | 142.7 |
| 16.50 | 68.562 | 0.8174 | 30.894 | 51.97 | 1224.2 | | 144.9 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 305.33
Second virial coefficient is -176.5 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.249 | 0.8477E-03 | 2.450 | 45.29 | 312.4 | 9.60 | 22.0 |
| 0.20 | 0.490 | 0.1728E-02 | 2.362 | 45.55 | 308.5 | 9.66 | 22.3 |
| 0.30 | 0.722 | 0.2640E-02 | 2.277 | 45.81 | 304.8 | 9.72 | 22.5 |
| 0.40 | 0.945 | 0.3585E-02 | 2.192 | 46.08 | 301.0 | 9.79 | 22.8 |
| 0.50 | 1.160 | 0.4562E-02 | 2.110 | 46.35 | 297.3 | 9.86 | 23.0 |
| 0.60 | 1.367 | 0.5571E-02 | 2.029 | 46.62 | 293.7 | 9.93 | 23.3 |
| 0.70 | 1.566 | 0.6612E-02 | 1.949 | 46.90 | 290.1 | 10.01 | 23.6 |
| 0.80 | 1.757 | 0.7685E-02 | 1.871 | 47.19 | 286.5 | 10.09 | 23.9 |
| 0.90 | 1.941 | 0.8790E-02 | 1.795 | 47.48 | 283.0 | 10.18 | 24.2 |
| 1.00 | 2.116 | 0.9926E-02 | 1.720 | 47.77 | 279.6 | 10.27 | 24.5 |
| 1.10 | 2.285 | 0.1109E-01 | 1.647 | 48.07 | 276.2 | 10.36 | 24.8 |
| 1.20 | 2.446 | 0.1229E-01 | 1.576 | 48.38 | 272.8 | 10.45 | 25.2 |
| 1.30 | 2.600 | 0.1352E-01 | 1.506 | 48.69 | 269.6 | 10.55 | 25.6 |
| 1.40 | 2.747 | 0.1478E-01 | 1.438 | 49.01 | 266.3 | 10.66 | 26.0 |
| 1.50 | 2.888 | 0.1607E-01 | 1.372 | 49.33 | 263.2 | 10.76 | 26.4 |
| 1.60 | 3.022 | 0.1739E-01 | 1.307 | 49.67 | 260.1 | 10.87 | 26.8 |
| 1.70 | 3.149 | 0.1875E-01 | 1.244 | 50.01 | 257.0 | 10.99 | 27.2 |
| 1.80 | 3.270 | 0.2013E-01 | 1.183 | 50.35 | 254.0 | 11.10 | 27.7 |
| 1.90 | 3.386 | 0.2154E-01 | 1.123 | 50.71 | 251.1 | 11.22 | 28.2 |
| 2.00 | 3.495 | 0.2298E-01 | 1.065 | 51.07 | 248.3 | 11.35 | 28.7 |
| 2.10 | 3.599 | 0.2444E-01 | 1.008 | 51.45 | 245.5 | 11.47 | 29.2 |
| 2.20 | 3.697 | 0.2594E-01 | 0.953 | 51.83 | 242.8 | 11.61 | 29.7 |
| 2.30 | 3.789 | 0.2746E-01 | 0.900 | 52.22 | 240.1 | 11.74 | 30.3 |
| 2.40 | 3.877 | 0.2902E-01 | 0.849 | 52.62 | 237.5 | 11.88 | 30.9 |
| 2.50 | 3.959 | 0.3059E-01 | 0.799 | 53.03 | 235.0 | 12.02 | 31.5 |
| 2.60 | 4.037 | 0.3220E-01 | 0.750 | 53.45 | 232.6 | 12.17 | 32.2 |
| 2.70 | 4.109 | 0.3383E-01 | 0.704 | 53.88 | 230.2 | 12.31 | 32.9 |
| 2.80 | 4.177 | 0.3548E-01 | 0.659 | 54.32 | 227.9 | 12.47 | 33.6 |
| 2.90 | 4.241 | 0.3716E-01 | 0.615 | 54.77 | 225.6 | 12.62 | 34.4 |
| 3.00 | 4.301 | 0.3887E-01 | 0.574 | 55.23 | 223.5 | 12.78 | 35.2 |
| 3.10 | 4.356 | 0.4059E-01 | 0.534 | 55.71 | 221.4 | 12.94 | 36.0 |
| 3.20 | 4.407 | 0.4234E-01 | 0.495 | 56.19 | 219.3 | 13.11 | 36.9 |
| 3.30 | 4.455 | 0.4411E-01 | 0.458 | 56.68 | 217.4 | 13.28 | 37.9 |
| 3.40 | 4.499 | 0.4589E-01 | 0.423 | 57.18 | 215.5 | 13.45 | 38.9 |
| 3.50 | 4.540 | 0.4770E-01 | 0.390 | 57.70 | 213.6 | 13.63 | 39.9 |
| 3.60 | 4.577 | 0.4952E-01 | 0.358 | 58.22 | 211.9 | 13.81 | 41.0 |
| 3.70 | 4.611 | 0.5135E-01 | 0.327 | 58.75 | 210.2 | 14.00 | 42.2 |
| 3.80 | 4.643 | 0.5320E-01 | 0.298 | 59.29 | 208.5 | 14.18 | 43.4 |
| 3.90 | 4.671 | 0.5506E-01 | 0.271 | 59.83 | 207.0 | 14.38 | 44.7 |
| 4.00 | 4.697 | 0.5693E-01 | 0.245 | 60.39 | 205.5 | 14.57 | 46.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 305.33 (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 4.10 | 4.720 | 0.5880E-01 | 0.221 | 60.95 | 204.0 | 14.77 | 47.6 |
| 4.20 | 4.741 | 0.6068E-01 | 0.198 | 61.51 | 202.6 | 14.97 | 49.2 |
| 4.30 | 4.760 | 0.6257E-01 | 0.177 | 62.08 | 201.3 | 15.18 | 50.9 |
| 4.40 | 4.777 | 0.6445E-01 | 0.157 | 62.65 | 200.0 | 15.39 | 52.7 |
| 4.50 | 4.791 | 0.6633E-01 | 0.139 | 63.22 | 198.8 | 15.60 | 54.7 |
| 4.60 | 4.804 | 0.6820E-01 | 0.122 | 63.79 | 197.6 | 15.82 | 56.8 |
| 4.70 | 4.816 | 0.7007E-01 | 0.106 | 64.35 | 196.5 | 16.04 | 59.1 |
| 4.80 | 4.826 | 0.7192E-01 | 0.092 | 64.91 | 195.4 | 16.26 | 61.6 |
| 4.90 | 4.834 | 0.7376E-01 | 0.079 | 65.47 | 194.3 | 16.49 | 64.4 |
| 5.00 | 4.841 | 0.7557E-01 | 0.067 | 66.01 | 193.3 | 16.73 | 67.4 |
| 5.10 | 4.848 | 0.7737E-01 | 0.056 | 66.54 | 192.3 | 16.96 | 70.8 |
| 5.20 | 4.853 | 0.7914E-01 | 0.047 | 67.06 | 191.4 | 17.20 | 74.7 |
| 5.30 | 4.857 | 0.8089E-01 | 0.039 | 67.56 | 190.5 | 17.45 | 79.0 |
| 5.40 | 4.860 | 0.8260E-01 | 0.031 | 68.05 | 189.6 | 17.70 | 83.9 |
| 5.50 | 4.863 | 0.8429E-01 | 0.025 | 68.51 | 188.8 | 17.95 | 89.6 |
| 5.60 | 4.866 | 0.8594E-01 | 0.020 | 68.94 | 188.0 | 18.21 | 96.3 |
| 5.70 | 4.867 | 0.8755E-01 | 0.015 | 69.35 | 187.2 | 18.47 | 104.1 |
| 5.80 | 4.869 | 0.8912E-01 | 0.012 | 69.73 | 186.5 | 18.73 | 113.6 |
| 5.90 | 4.870 | 0.9066E-01 | 0.009 | 70.07 | 185.8 | 19.00 | 125.2 |
| 6.00 | 4.870 | 0.9216E-01 | 0.006 | 70.38 | 185.1 | 19.27 | 139.7 |
| 6.10 | 4.871 | 0.9363E-01 | 0.004 | 70.65 | 184.4 | 19.55 | 158.3 |
| 6.20 | 4.871 | 0.9505E-01 | 0.003 | 70.88 | 183.8 | 19.83 | 182.6 |
| 6.30 | 4.872 | 0.9645E-01 | 0.002 | 71.07 | 183.2 | 20.12 | 215.8 |
| 6.40 | 4.872 | 0.9782E-01 | 0.001 | 71.21 | 182.6 | 20.41 | 263.0 |
| 6.50 | 4.872 | 0.9916E-01 | 0.001 | 71.30 | 182.1 | 20.71 | 335.0 |
| 6.60 | 4.872 | 0.1005 | 0.000 | 71.35 | 181.6 | 21.01 | 457.6 |
| 6.70 | 4.872 | 0.1018 | 0.000 | 71.35 | 181.3 | 21.31 | 716.2 |
| 6.80 | 4.872 | 0.1031 | 0.000 | 71.30 | 180.9 | 21.62 | 1677.7 |
| 6.870 | 4.872 | 0.1040 | 0.000 | | | | |
| 6.90 | 4.872 | 0.1044 | 0.000 | 71.20 | 180.7 | 21.93 | 3794.3 |
| 7.00 | 4.872 | 0.1057 | 0.000 | 71.04 | 180.5 | 22.25 | 912.1 |
| 7.10 | 4.872 | 0.1070 | 0.000 | 70.84 | 180.5 | 22.58 | 520.4 |
| 7.20 | 4.872 | 0.1084 | 0.000 | 70.59 | 180.6 | 22.91 | 360.3 |
| 7.30 | 4.872 | 0.1098 | 0.001 | 70.30 | 180.9 | 23.24 | 272.5 |
| 7.40 | 4.872 | 0.1113 | 0.002 | 69.96 | 181.3 | 23.58 | 217.5 |
| 7.50 | 4.872 | 0.1128 | 0.003 | 69.57 | 181.9 | 23.93 | 180.4 |
| 7.60 | 4.873 | 0.1144 | 0.004 | 69.14 | 182.7 | 24.28 | 154.3 |
| 7.70 | 4.873 | 0.1161 | 0.006 | 68.68 | 183.8 | 24.63 | 135.3 |
| 7.80 | 4.874 | 0.1178 | 0.009 | 68.18 | 185.2 | 24.99 | 121.2 |
| 7.90 | 4.875 | 0.1197 | 0.013 | 67.65 | 186.8 | 25.36 | 110.5 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 305.33 (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 8.00 | 4.876 | 0.1217 | 0.017 | 67.09 | 188.7 | 25.73 | 102.2 |
| 8.10 | 4.878 | 0.1239 | 0.024 | 66.51 | 191.0 | 26.11 | 95.7 |
| 8.20 | 4.881 | 0.1261 | 0.031 | 65.90 | 193.6 | 26.50 | 90.6 |
| 8.30 | 4.885 | 0.1285 | 0.041 | 65.28 | 196.6 | 26.89 | 86.5 |
| 8.40 | 4.889 | 0.1311 | 0.052 | 64.65 | 199.9 | 27.28 | 83.2 |
| 8.50 | 4.895 | 0.1338 | 0.065 | 64.02 | 203.6 | 27.69 | 80.4 |
| 8.60 | 4.902 | 0.1366 | 0.081 | 63.37 | 207.7 | 28.10 | 78.2 |
| 8.70 | 4.911 | 0.1397 | 0.099 | 62.73 | 212.2 | 28.52 | 76.3 |
| 8.80 | 4.922 | 0.1428 | 0.121 | 62.10 | 217.0 | 28.94 | 74.7 |
| 8.90 | 4.936 | 0.1462 | 0.145 | 61.47 | 222.2 | 29.37 | 73.5 |
| 9.00 | 4.951 | 0.1497 | 0.172 | 60.85 | 227.8 | 29.81 | 72.4 |
| 9.10 | 4.970 | 0.1534 | 0.203 | 60.25 | 233.7 | 30.25 | 71.5 |
| 9.20 | 4.992 | 0.1572 | 0.237 | 59.66 | 239.9 | 30.71 | 70.8 |
| 9.30 | 5.018 | 0.1611 | 0.274 | 59.09 | 246.4 | 31.17 | 70.2 |
| 9.40 | 5.047 | 0.1653 | 0.316 | 58.54 | 253.2 | 31.63 | 69.8 |
| 9.50 | 5.081 | 0.1695 | 0.362 | 58.01 | 260.3 | 32.11 | 69.5 |
| 9.60 | 5.120 | 0.1740 | 0.411 | 57.51 | 267.7 | 32.59 | 69.3 |
| 9.70 | 5.163 | 0.1785 | 0.465 | 57.03 | 275.3 | 33.09 | 69.2 |
| 9.80 | 5.213 | 0.1832 | 0.524 | 56.58 | 283.1 | 33.59 | 69.2 |
| 9.90 | 5.268 | 0.1880 | 0.587 | 56.15 | 291.1 | 34.10 | 69.2 |
| 10.00 | 5.330 | 0.1930 | 0.655 | 55.75 | 299.4 | 34.62 | 69.4 |
| 10.10 | 5.399 | 0.1981 | 0.729 | 55.37 | 307.9 | 35.15 | 69.6 |
| 10.20 | 5.476 | 0.2033 | 0.807 | 55.01 | 316.5 | 35.68 | 69.9 |
| 10.30 | 5.561 | 0.2086 | 0.892 | 54.68 | 325.4 | 36.23 | 70.2 |
| 10.40 | 5.655 | 0.2141 | 0.982 | 54.37 | 334.4 | 36.79 | 70.5 |
| 10.50 | 5.758 | 0.2197 | 1.079 | 54.08 | 343.6 | 37.36 | 71.0 |
| 10.60 | 5.871 | 0.2254 | 1.183 | 53.81 | 353.1 | 37.94 | 71.4 |
| 10.70 | 5.995 | 0.2313 | 1.293 | 53.57 | 362.7 | 38.53 | 71.9 |
| 10.80 | 6.130 | 0.2372 | 1.411 | 53.34 | 372.5 | 39.13 | 72.4 |
| 10.90 | 6.277 | 0.2433 | 1.537 | 53.12 | 382.6 | 39.74 | 72.9 |
| 11.00 | 6.437 | 0.2496 | 1.671 | 52.92 | 392.8 | 40.37 | 73.5 |
| 11.10 | 6.611 | 0.2559 | 1.813 | 52.74 | 403.3 | 41.00 | 74.1 |
| 11.20 | 6.800 | 0.2624 | 1.964 | 52.57 | 413.9 | 41.65 | 74.8 |
| 11.30 | 7.005 | 0.2690 | 2.125 | 52.42 | 424.8 | 42.31 | 75.4 |
| 11.40 | 7.225 | 0.2758 | 2.295 | 52.27 | 435.9 | 42.99 | 76.1 |
| 11.50 | 7.464 | 0.2827 | 2.475 | 52.14 | 447.2 | 43.68 | 76.8 |
| 11.60 | 7.721 | 0.2897 | 2.666 | 52.02 | 458.7 | 44.38 | 77.5 |
| 11.70 | 7.997 | 0.2969 | 2.867 | 51.90 | 470.4 | 45.10 | 78.3 |
| 11.80 | 8.295 | 0.3042 | 3.079 | 51.80 | 482.3 | 45.83 | 79.1 |
| 11.90 | 8.614 | 0.3116 | 3.303 | 51.70 | 494.5 | 46.58 | 79.9 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 305.33 (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 12.00 | 8.955 | 0.3192 | 3.538 | 51.61 | 506.8 | 47.35 | 80.7 |
| 12.10 | 9.321 | 0.3269 | 3.785 | 51.53 | 519.3 | 48.13 | 81.5 |
| 12.20 | 9.713 | 0.3348 | 4.044 | 51.46 | 532.0 | 48.93 | 82.4 |
| 12.30 | 10.131 | 0.3428 | 4.316 | 51.40 | 544.9 | 49.74 | 83.3 |
| 12.40 | 10.577 | 0.3509 | 4.601 | 51.34 | 558.0 | 50.58 | 84.2 |
| 12.50 | 11.051 | 0.3592 | 4.899 | 51.29 | 571.3 | 51.43 | 85.1 |
| 12.60 | 11.557 | 0.3676 | 5.210 | 51.24 | 584.8 | 52.30 | 86.1 |
| 12.70 | 12.094 | 0.3762 | 5.535 | 51.20 | 598.4 | 53.19 | 87.0 |
| 12.80 | 12.664 | 0.3848 | 5.873 | 51.17 | 612.1 | 54.10 | 88.0 |
| 12.90 | 13.269 | 0.3937 | 6.226 | 51.14 | 626.1 | 55.04 | 89.1 |
| 13.00 | 13.910 | 0.4026 | 6.594 | 51.12 | 640.2 | 56.00 | 90.1 |
| 13.10 | 14.588 | 0.4117 | 6.976 | 51.10 | 654.4 | 56.97 | 91.2 |
| 13.20 | 15.306 | 0.4210 | 7.373 | 51.09 | 668.8 | 57.98 | 92.3 |
| 13.30 | 16.063 | 0.4304 | 7.785 | 51.08 | 683.4 | 59.01 | 93.4 |
| 13.40 | 16.863 | 0.4399 | 8.214 | 51.08 | 698.1 | 60.06 | 94.6 |
| 13.50 | 17.707 | 0.4495 | 8.658 | 51.08 | 713.0 | 61.14 | 95.7 |
| 13.60 | 18.595 | 0.4593 | 9.119 | 51.09 | 728.0 | 62.24 | 96.9 |
| 13.70 | 19.531 | 0.4692 | 9.596 | 51.10 | 743.1 | 63.38 | 98.2 |
| 13.80 | 20.515 | 0.4793 | 10.091 | 51.11 | 758.4 | 64.54 | 99.4 |
| 13.90 | 21.550 | 0.4895 | 10.603 | 51.13 | 773.9 | 65.74 | 100.7 |
| 14.00 | 22.636 | 0.4999 | 11.133 | 51.16 | 789.5 | 66.97 | 102.0 |
| 14.10 | 23.777 | 0.5104 | 11.682 | 51.19 | 805.2 | 68.23 | 103.3 |
| 14.20 | 24.973 | 0.5210 | 12.249 | 51.22 | 821.1 | 69.52 | 104.7 |
| 14.30 | 26.227 | 0.5318 | 12.836 | 51.25 | 837.2 | 70.85 | 106.1 |
| 14.40 | 27.541 | 0.5428 | 13.442 | 51.29 | 853.4 | 72.22 | 107.5 |
| 14.50 | 28.916 | 0.5539 | 14.068 | 51.33 | 869.8 | 73.62 | 109.0 |
| 14.60 | 30.355 | 0.5652 | 14.715 | 51.37 | 886.3 | 75.07 | 110.5 |
| 14.70 | 31.860 | 0.5766 | 15.383 | 51.42 | 903.0 | 76.55 | 112.0 |
| 14.80 | 33.433 | 0.5882 | 16.072 | 51.47 | 919.8 | 78.08 | 113.6 |
| 14.90 | 35.075 | 0.5999 | 16.784 | 51.52 | 936.8 | 79.66 | 115.2 |
| 15.00 | 36.790 | 0.6118 | 17.519 | 51.57 | 954.0 | 81.28 | 116.8 |
| 15.10 | 38.580 | 0.6239 | 18.277 | 51.63 | 971.4 | 82.95 | 118.4 |
| 15.20 | 40.447 | 0.6362 | 19.059 | 51.69 | 988.9 | 84.67 | 120.1 |
| 15.30 | 42.392 | 0.6486 | 19.865 | 51.75 | 1006.6 | 86.45 | 121.9 |
| 15.40 | 44.420 | 0.6613 | 20.697 | 51.81 | 1024.5 | 88.28 | 123.6 |
| 15.50 | 46.533 | 0.6741 | 21.554 | 51.87 | 1042.6 | 90.17 | 125.4 |
| 15.60 | 48.732 | 0.6871 | 22.438 | 51.94 | 1060.9 | 92.12 | 127.3 |
| 15.70 | 51.021 | 0.7003 | 23.349 | 52.00 | 1079.4 | 94.13 | 129.2 |
| 15.80 | 53.403 | 0.7138 | 24.287 | 52.07 | 1098.0 | 96.21 | 131.1 |
| 15.90 | 55.880 | 0.7274 | 25.255 | 52.14 | 1116.9 | 98.36 | 133.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 305.33 (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 16.00 | 58.455 | 0.7412 | 26.251 | 52.21 | 1136.0 | 100.59 | 135.1 |
| 16.10 | 61.131 | 0.7553 | 27.278 | 52.28 | 1155.2 | | 137.1 |
| 16.20 | 63.911 | 0.7696 | 28.336 | 52.35 | 1174.7 | | 139.2 |
| 16.30 | 66.799 | 0.7841 | 29.425 | 52.42 | 1194.4 | | 141.3 |
| 16.40 | 69.797 | 0.7988 | 30.546 | 52.50 | 1214.4 | | 143.5 |

ETHANE ISOTHERM AT T = 320.00 K
Second virial coefficient is -159.8 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.262 | 0.8466E-03 | 2.576 | 47.08 | 319.2 | 10.03 | 24.0 |
| 0.20 | 0.515 | 0.1723E-02 | 2.494 | 47.31 | 315.6 | 10.09 | 24.2 |
| 0.40 | 0.998 | 0.3567E-02 | 2.333 | 47.76 | 308.7 | 10.22 | 24.7 |
| 0.60 | 1.449 | 0.5528E-02 | 2.178 | 48.21 | 301.9 | 10.37 | 25.2 |
| 0.80 | 1.869 | 0.7607E-02 | 2.029 | 48.68 | 295.4 | 10.54 | 25.7 |
| 1.00 | 2.261 | 0.9801E-02 | 1.887 | 49.15 | 289.1 | 10.71 | 26.3 |
| 1.20 | 2.625 | 0.1211E-01 | 1.752 | 49.63 | 283.0 | 10.91 | 27.0 |
| 1.40 | 2.962 | 0.1452E-01 | 1.622 | 50.12 | 277.1 | 11.11 | 27.7 |
| 1.60 | 3.274 | 0.1705E-01 | 1.499 | 50.61 | 271.5 | 11.33 | 28.4 |
| 1.80 | 3.562 | 0.1968E-01 | 1.383 | 51.11 | 266.2 | 11.56 | 29.2 |
| 2.00 | 3.828 | 0.2240E-01 | 1.273 | 51.62 | 261.1 | 11.81 | 30.1 |
| 2.20 | 4.072 | 0.2523E-01 | 1.169 | 52.13 | 256.3 | 12.07 | 31.0 |
| 2.40 | 4.296 | 0.2814E-01 | 1.071 | 52.65 | 251.8 | 12.35 | 32.0 |
| 2.60 | 4.501 | 0.3114E-01 | 0.980 | 53.18 | 247.6 | 12.64 | 33.0 |
| 2.80 | 4.688 | 0.3422E-01 | 0.894 | 53.70 | 243.6 | 12.94 | 34.1 |
| 3.00 | 4.859 | 0.3738E-01 | 0.815 | 54.24 | 239.9 | 13.26 | 35.3 |
| 3.20 | 5.014 | 0.4060E-01 | 0.742 | 54.77 | 236.6 | 13.59 | 36.5 |
| 3.40 | 5.156 | 0.4389E-01 | 0.675 | 55.30 | 233.5 | 13.93 | 37.8 |
| 3.60 | 5.285 | 0.4724E-01 | 0.613 | 55.83 | 230.7 | 14.29 | 39.2 |
| 3.80 | 5.402 | 0.5063E-01 | 0.558 | 56.36 | 228.2 | 14.66 | 40.6 |
| 4.00 | 5.508 | 0.5406E-01 | 0.507 | 56.88 | 225.9 | 15.05 | 42.1 |
| 4.20 | 5.605 | 0.5753E-01 | 0.462 | 57.38 | 223.9 | 15.45 | 43.6 |
| 4.40 | 5.693 | 0.6103E-01 | 0.421 | 57.87 | 222.2 | 15.87 | 45.1 |
| 4.60 | 5.774 | 0.6455E-01 | 0.386 | 58.34 | 220.8 | 16.30 | 46.7 |
| 4.80 | 5.848 | 0.6808E-01 | 0.355 | 58.78 | 219.6 | 16.74 | 48.3 |
| 5.00 | 5.916 | 0.7163E-01 | 0.328 | 59.19 | 218.7 | 17.20 | 49.8 |
| 5.20 | 5.979 | 0.7519E-01 | 0.306 | 59.57 | 218.0 | 17.68 | 51.3 |
| 5.40 | 6.039 | 0.7875E-01 | 0.287 | 59.90 | 217.6 | 18.17 | 52.8 |
| 5.60 | 6.094 | 0.8233E-01 | 0.272 | 60.18 | 217.4 | 18.68 | 54.2 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 320.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 5.80 | 6.148 | 0.8593E-01 | 0.260 | 60.40 | 217.5 | 19.20 | 55.5 |
| 6.00 | 6.199 | 0.8956E-01 | 0.252 | 60.56 | 218.0 | 19.74 | 56.7 |
| 6.20 | 6.249 | 0.9323E-01 | 0.247 | 60.67 | 218.8 | 20.30 | 57.8 |
| 6.40 | 6.298 | 0.9697E-01 | 0.245 | 60.70 | 220.0 | 20.88 | 58.7 |
| 6.60 | 6.347 | 0.1008 | 0.247 | 60.67 | 221.6 | 21.47 | 59.6 |
| 6.80 | 6.397 | 0.1047 | 0.252 | 60.57 | 223.7 | 22.08 | 60.3 |
| 7.00 | 6.448 | 0.1088 | 0.260 | 60.40 | 226.3 | 22.71 | 61.0 |
| 7.20 | 6.501 | 0.1131 | 0.273 | 60.17 | 229.5 | 23.36 | 61.5 |
| 7.40 | 6.557 | 0.1175 | 0.290 | 59.89 | 233.4 | 24.03 | 61.9 |
| 7.60 | 6.617 | 0.1222 | 0.313 | 59.56 | 238.0 | 24.72 | 62.3 |
| 7.80 | 6.683 | 0.1272 | 0.342 | 59.18 | 243.3 | 25.44 | 62.6 |
| 8.00 | 6.755 | 0.1325 | 0.378 | 58.78 | 249.5 | 26.17 | 62.9 |
| 8.20 | 6.835 | 0.1381 | 0.422 | 58.35 | 256.4 | 26.94 | 63.2 |
| 8.40 | 6.924 | 0.1440 | 0.475 | 57.91 | 264.2 | 27.72 | 63.4 |
| 8.60 | 7.025 | 0.1503 | 0.538 | 57.47 | 272.8 | 28.53 | 63.8 |
| 8.80 | 7.140 | 0.1569 | 0.612 | 57.03 | 282.3 | 29.37 | 64.2 |
| 9.00 | 7.271 | 0.1639 | 0.698 | 56.60 | 292.5 | 30.23 | 64.7 |
| 9.20 | 7.420 | 0.1713 | 0.797 | 56.18 | 303.6 | 31.13 | 65.3 |
| 9.40 | 7.591 | 0.1790 | 0.911 | 55.79 | 315.4 | 32.05 | 65.9 |
| 9.60 | 7.785 | 0.1872 | 1.041 | 55.42 | 328.1 | 33.01 | 66.7 |
| 9.80 | 8.008 | 0.1958 | 1.188 | 55.08 | 341.5 | 34.00 | 67.5 |
| 10.00 | 8.262 | 0.2048 | 1.355 | 54.76 | 355.7 | 35.03 | 68.4 |
| 10.20 | 8.551 | 0.2142 | 1.543 | 54.47 | 370.8 | 36.10 | 69.4 |
| 10.40 | 8.881 | 0.2242 | 1.755 | 54.20 | 386.8 | 37.20 | 70.5 |
| 10.60 | 9.255 | 0.2347 | 1.993 | 53.95 | 403.7 | 38.35 | 71.7 |
| 10.80 | 9.680 | 0.2457 | 2.261 | 53.73 | 421.5 | 39.54 | 72.9 |
| 11.00 | 10.162 | 0.2572 | 2.560 | 53.53 | 440.3 | 40.77 | 74.3 |
| 11.20 | 10.706 | 0.2693 | 2.895 | 53.36 | 460.0 | 42.06 | 75.6 |
| 11.40 | 11.322 | 0.2820 | 3.266 | 53.20 | 480.7 | 43.40 | 77.1 |
| 11.60 | 12.016 | 0.2952 | 3.679 | 53.06 | 502.2 | 44.80 | 78.6 |
| 11.80 | 12.796 | 0.3090 | 4.134 | 52.95 | 524.7 | 46.25 | 80.2 |
| 12.00 | 13.672 | 0.3234 | 4.634 | 52.85 | 548.0 | 47.77 | 81.9 |
| 12.20 | 14.653 | 0.3383 | 5.181 | 52.77 | 572.1 | 49.35 | 83.7 |
| 12.40 | 15.748 | 0.3537 | 5.778 | 52.71 | 597.0 | 51.01 | 85.6 |
| 12.60 | 16.968 | 0.3697 | 6.428 | 52.67 | 622.7 | 52.74 | 87.5 |
| 12.80 | 18.323 | 0.3863 | 7.131 | 52.65 | 649.0 | 54.56 | 89.5 |
| 13.00 | 19.824 | 0.4034 | 7.891 | 52.64 | 676.1 | 56.46 | 91.7 |
| 13.20 | 21.483 | 0.4210 | 8.711 | 52.65 | 703.8 | 58.46 | 93.9 |
| 13.40 | 23.312 | 0.4392 | 9.592 | 52.68 | 732.1 | 60.55 | 96.2 |
| 13.60 | 25.324 | 0.4579 | 10.539 | 52.71 | 761.1 | 62.76 | 98.6 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 320.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 13.80 | 27.532 | 0.4772 | 11.553 | 52.76 | 790.8 | 65.08 | 101.1 |
| 14.00 | 29.950 | 0.4971 | 12.638 | 52.83 | 821.1 | 67.53 | 103.8 |
| 14.20 | 32.592 | 0.5176 | 13.797 | 52.90 | 852.1 | 70.11 | 106.5 |
| 14.40 | 35.474 | 0.5387 | 15.035 | 52.99 | 883.8 | 72.83 | 109.4 |
| 14.60 | 38.612 | 0.5604 | 16.355 | 53.08 | 916.2 | 75.71 | 112.4 |
| 14.80 | 42.022 | 0.5829 | 17.762 | 53.18 | 949.2 | 78.77 | 115.5 |
| 15.00 | 45.723 | 0.6060 | 19.259 | 53.29 | 983.0 | 82.01 | 118.7 |
| 15.20 | 49.732 | 0.6298 | 20.852 | 53.40 | 1017.6 | 85.45 | 122.1 |
| 15.40 | 54.070 | 0.6544 | 22.545 | 53.53 | 1053.0 | 89.11 | 125.7 |
| 15.60 | 58.757 | 0.6797 | 24.344 | 53.65 | 1089.1 | 93.00 | 129.4 |
| 15.80 | 63.815 | 0.7059 | 26.255 | 53.78 | 1126.1 | | 133.2 |
| 16.00 | 69.267 | 0.7330 | 28.282 | 53.91 | 1164.0 | | 137.3 |

ETHANE ISOTHERM AT T = 340.00 K
Second virial coefficient is -140.1 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.279 | 0.8453E-03 | 2.748 | 49.59 | 328.2 | 10.60 | 26.8 |
| 0.20 | 0.550 | 0.1718E-02 | 2.671 | 49.78 | 325.0 | 10.67 | 27.0 |
| 0.40 | 1.069 | 0.3547E-02 | 2.522 | 50.14 | 318.7 | 10.81 | 27.4 |
| 0.60 | 1.559 | 0.5483E-02 | 2.378 | 50.51 | 312.7 | 10.96 | 27.9 |
| 0.80 | 2.021 | 0.7527E-02 | 2.241 | 50.88 | 306.9 | 11.13 | 28.4 |
| 1.00 | 2.456 | 0.9674E-02 | 2.110 | 51.25 | 301.3 | 11.31 | 29.0 |
| 1.20 | 2.865 | 0.1192E-01 | 1.984 | 51.62 | 296.0 | 11.51 | 29.6 |
| 1.40 | 3.250 | 0.1427E-01 | 1.865 | 52.00 | 290.9 | 11.72 | 30.2 |
| 1.60 | 3.612 | 0.1672E-01 | 1.753 | 52.36 | 286.1 | 11.94 | 30.9 |
| 1.80 | 3.951 | 0.1926E-01 | 1.646 | 52.73 | 281.5 | 12.18 | 31.6 |
| 2.00 | 4.270 | 0.2189E-01 | 1.545 | 53.09 | 277.3 | 12.43 | 32.3 |
| 2.20 | 4.569 | 0.2460E-01 | 1.450 | 53.45 | 273.2 | 12.70 | 33.1 |
| 2.40 | 4.850 | 0.2740E-01 | 1.360 | 53.80 | 269.5 | 12.98 | 34.0 |
| 2.60 | 5.114 | 0.3028E-01 | 1.277 | 54.15 | 266.0 | 13.27 | 34.9 |
| 2.80 | 5.362 | 0.3323E-01 | 1.199 | 54.48 | 262.9 | 13.57 | 35.8 |
| 3.00 | 5.594 | 0.3626E-01 | 1.127 | 54.81 | 260.0 | 13.89 | 36.7 |
| 3.20 | 5.813 | 0.3935E-01 | 1.060 | 55.13 | 257.4 | 14.22 | 37.7 |
| 3.40 | 6.019 | 0.4251E-01 | 0.999 | 55.43 | 255.2 | 14.57 | 38.7 |
| 3.60 | 6.213 | 0.4572E-01 | 0.943 | 55.72 | 253.2 | 14.93 | 39.8 |
| 3.80 | 6.396 | 0.4900E-01 | 0.892 | 56.00 | 251.5 | 15.30 | 40.8 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 340.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 4.00 | 6.570 | 0.5233E-01 | 0.846 | 56.26 | 250.1 | 15.69 | 41.9 |
| 4.20 | 6.735 | 0.5572E-01 | 0.805 | 56.50 | 249.0 | 16.09 | 43.0 |
| 4.40 | 6.892 | 0.5916E-01 | 0.769 | 56.73 | 248.2 | 16.51 | 44.1 |
| 4.60 | 7.043 | 0.6265E-01 | 0.737 | 56.93 | 247.7 | 16.94 | 45.1 |
| 4.80 | 7.188 | 0.6620E-01 | 0.710 | 57.11 | 247.6 | 17.39 | 46.2 |
| 5.00 | 7.327 | 0.6981E-01 | 0.688 | 57.27 | 247.7 | 17.85 | 47.3 |
| 5.20 | 7.463 | 0.7348E-01 | 0.669 | 57.41 | 248.2 | 18.32 | 48.3 |
| 5.40 | 7.595 | 0.7722E-01 | 0.655 | 57.51 | 249.0 | 18.81 | 49.3 |
| 5.60 | 7.725 | 0.8104E-01 | 0.645 | 57.60 | 250.1 | 19.32 | 50.3 |
| 5.80 | 7.854 | 0.8494E-01 | 0.640 | 57.66 | 251.7 | 19.84 | 51.3 |
| 6.00 | 7.982 | 0.8893E-01 | 0.640 | 57.69 | 253.6 | 20.38 | 52.2 |
| 6.20 | 8.110 | 0.9304E-01 | 0.644 | 57.70 | 256.0 | 20.94 | 53.1 |
| 6.40 | 8.239 | 0.9726E-01 | 0.653 | 57.68 | 258.8 | 21.51 | 54.0 |
| 6.60 | 8.371 | 0.1016 | 0.667 | 57.64 | 262.1 | 22.10 | 54.8 |
| 6.80 | 8.507 | 0.1061 | 0.687 | 57.59 | 265.9 | 22.71 | 55.6 |
| 7.00 | 8.647 | 0.1108 | 0.713 | 57.51 | 270.2 | 23.34 | 56.4 |
| 7.20 | 8.792 | 0.1157 | 0.745 | 57.42 | 275.0 | 23.99 | 57.1 |
| 7.40 | 8.945 | 0.1207 | 0.784 | 57.31 | 280.3 | 24.66 | 57.9 |
| 7.60 | 9.107 | 0.1260 | 0.831 | 57.20 | 286.3 | 25.35 | 58.6 |
| 7.80 | 9.278 | 0.1315 | 0.885 | 57.07 | 292.8 | 26.06 | 59.4 |
| 8.00 | 9.461 | 0.1372 | 0.948 | 56.94 | 299.9 | 26.79 | 60.2 |
| 8.20 | 9.658 | 0.1432 | 1.020 | 56.81 | 307.6 | 27.55 | 60.9 |
| 8.40 | 9.870 | 0.1494 | 1.102 | 56.67 | 315.9 | 28.33 | 61.7 |
| 8.60 | 10.099 | 0.1560 | 1.195 | 56.54 | 324.8 | 29.14 | 62.6 |
| 8.80 | 10.349 | 0.1628 | 1.301 | 56.40 | 334.4 | 29.97 | 63.4 |
| 9.00 | 10.621 | 0.1699 | 1.420 | 56.27 | 344.7 | 30.84 | 64.3 |
| 9.20 | 10.918 | 0.1773 | 1.553 | 56.14 | 355.6 | 31.73 | 65.3 |
| 9.40 | 11.243 | 0.1851 | 1.704 | 56.01 | 367.3 | 32.66 | 66.3 |
| 9.60 | 11.600 | 0.1932 | 1.872 | 55.88 | 379.7 | 33.61 | 67.3 |
| 9.80 | 11.993 | 0.2017 | 2.060 | 55.76 | 392.9 | 34.60 | 68.4 |
| 10.00 | 12.426 | 0.2106 | 2.269 | 55.64 | 406.9 | 35.63 | 69.5 |
| 10.20 | 12.902 | 0.2199 | 2.503 | 55.53 | 421.8 | 36.70 | 70.7 |
| 10.40 | 13.429 | 0.2297 | 2.763 | 55.42 | 437.5 | 37.80 | 71.9 |
| 10.60 | 14.009 | 0.2400 | 3.051 | 55.31 | 454.1 | 38.95 | 73.2 |
| 10.80 | 14.651 | 0.2507 | 3.370 | 55.22 | 471.6 | 40.14 | 74.6 |
| 11.00 | 15.360 | 0.2619 | 3.723 | 55.13 | 490.0 | 41.38 | 76.0 |
| 11.20 | 16.143 | 0.2736 | 4.111 | 55.05 | 509.2 | 42.68 | 77.5 |
| 11.40 | 17.007 | 0.2859 | 4.537 | 54.99 | 529.3 | 44.02 | 79.0 |
| 11.60 | 17.960 | 0.2986 | 5.003 | 54.93 | 550.3 | 45.42 | 80.6 |
| 11.80 | 19.011 | 0.3119 | 5.512 | 54.89 | 572.0 | 46.89 | 82.3 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 340.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol·dm$^{-3}$ | MPa | MPa·K$^{-1}$ | MPa·dm$^3$·mol$^{-1}$ | J/(mol·K) | m·s$^{-1}$ | $\mu$Pa·s | mW/(m·K) |
| 12.00 | 20.167 | 0.3257 | 6.065 | 54.86 | 594.6 | 48.41 | 84.0 |
| 12.20 | 21.440 | 0.3400 | 6.666 | 54.84 | 617.9 | 50.01 | 85.9 |
| 12.40 | 22.837 | 0.3548 | 7.316 | 54.83 | 642.0 | 51.68 | 87.8 |
| 12.60 | 24.370 | 0.3701 | 8.019 | 54.84 | 666.8 | 53.43 | 89.8 |
| 12.80 | 26.048 | 0.3860 | 8.776 | 54.86 | 692.3 | 55.26 | 91.8 |
| 13.00 | 27.884 | 0.4024 | 9.590 | 54.89 | 718.5 | 57.18 | 94.0 |
| 13.20 | 29.888 | 0.4193 | 10.464 | 54.93 | 745.4 | 59.20 | 96.3 |
| 13.40 | 32.074 | 0.4367 | 11.401 | 54.98 | 773.0 | 61.32 | 98.6 |
| 13.60 | 34.453 | 0.4548 | 12.403 | 55.04 | 801.4 | 63.55 | 101.1 |
| 13.80 | 37.040 | 0.4734 | 13.476 | 55.11 | 830.4 | 65.90 | 103.7 |
| 14.00 | 39.848 | 0.4926 | 14.620 | 55.19 | 860.1 | 68.38 | 106.4 |
| 14.20 | 42.893 | 0.5124 | 15.842 | 55.27 | 890.6 | 71.00 | 109.2 |
| 14.40 | 46.190 | 0.5329 | 17.144 | 55.36 | 921.8 | 73.77 | 112.1 |
| 14.60 | 49.756 | 0.5540 | 18.530 | 55.46 | 953.8 | 76.70 | 115.1 |
| 14.80 | 53.608 | 0.5758 | 20.006 | 55.57 | 986.6 | 79.81 | 118.3 |
| 15.00 | 57.765 | 0.5983 | 21.575 | 55.68 | 1020.1 | 83.11 | 121.6 |
| 15.20 | 62.245 | 0.6216 | 23.243 | 55.79 | 1054.5 | | 125.1 |
| 15.40 | 67.069 | 0.6457 | 25.015 | 55.90 | 1089.7 | | 128.7 |

ETHANE ISOTHERM AT T = 360.00 K
Second virial coefficient is -123.4 cm$^3$·mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol·dm$^{-3}$ | MPa | MPa·K$^{-1}$ | MPa·dm$^3$·mol$^{-1}$ | J/(mol·K) | m·s$^{-1}$ | $\mu$Pa·s | mW/(m·K) |
| 0.10 | 0.296 | 0.8444E-03 | 2.920 | 52.15 | 336.9 | 11.16 | 29.8 |
| 0.20 | 0.584 | 0.1715E-02 | 2.848 | 52.30 | 334.0 | 11.23 | 30.0 |
| 0.40 | 1.140 | 0.3531E-02 | 2.709 | 52.61 | 328.4 | 11.38 | 30.4 |
| 0.60 | 1.668 | 0.5449E-02 | 2.576 | 52.91 | 323.0 | 11.54 | 30.8 |
| 0.80 | 2.171 | 0.7465E-02 | 2.449 | 53.21 | 317.9 | 11.71 | 31.3 |
| 1.00 | 2.648 | 0.9578E-02 | 2.328 | 53.51 | 312.9 | 11.90 | 31.8 |
| 1.20 | 3.102 | 0.1179E-01 | 2.212 | 53.81 | 308.3 | 12.10 | 32.4 |
| 1.40 | 3.533 | 0.1409E-01 | 2.103 | 54.11 | 303.8 | 12.31 | 32.9 |
| 1.60 | 3.943 | 0.1648E-01 | 1.999 | 54.40 | 299.7 | 12.54 | 33.6 |
| 1.80 | 4.333 | 0.1896E-01 | 1.901 | 54.69 | 295.8 | 12.78 | 34.2 |
| 2.00 | 4.704 | 0.2152E-01 | 1.808 | 54.97 | 292.2 | 13.04 | 34.9 |
| 2.20 | 5.057 | 0.2417E-01 | 1.722 | 55.25 | 288.8 | 13.31 | 35.6 |
| 2.40 | 5.393 | 0.2690E-01 | 1.640 | 55.51 | 285.7 | 13.59 | 36.4 |
| 2.60 | 5.714 | 0.2971E-01 | 1.565 | 55.77 | 283.0 | 13.88 | 37.2 |
| 2.80 | 6.019 | 0.3259E-01 | 1.494 | 56.02 | 280.5 | 14.19 | 38.0 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 360.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 3.00 | 6.312 | 0.3555E-01 | 1.429 | 56.26 | 278.2 | 14.51 | 38.8 |
| 3.20 | 6.591 | 0.3858E-01 | 1.370 | 56.49 | 276.3 | 14.85 | 39.7 |
| 3.40 | 6.860 | 0.4168E-01 | 1.315 | 56.71 | 274.7 | 15.20 | 40.6 |
| 3.60 | 7.118 | 0.4485E-01 | 1.265 | 56.91 | 273.4 | 15.56 | 41.5 |
| 3.80 | 7.366 | 0.4809E-01 | 1.221 | 57.11 | 272.3 | 15.93 | 42.4 |
| 4.00 | 7.606 | 0.5139E-01 | 1.181 | 57.28 | 271.6 | 16.32 | 43.3 |
| 4.20 | 7.839 | 0.5477E-01 | 1.146 | 57.45 | 271.2 | 16.72 | 44.2 |
| 4.40 | 8.065 | 0.5822E-01 | 1.117 | 57.60 | 271.1 | 17.14 | 45.2 |
| 4.60 | 8.286 | 0.6173E-01 | 1.091 | 57.73 | 271.4 | 17.57 | 46.1 |
| 4.80 | 8.502 | 0.6533E-01 | 1.071 | 57.85 | 271.9 | 18.02 | 47.0 |
| 5.00 | 8.715 | 0.6900E-01 | 1.055 | 57.95 | 272.8 | 18.48 | 47.9 |
| 5.20 | 8.925 | 0.7276E-01 | 1.045 | 58.03 | 274.1 | 18.95 | 48.9 |
| 5.40 | 9.133 | 0.7660E-01 | 1.039 | 58.10 | 275.7 | 19.45 | 49.8 |
| 5.60 | 9.341 | 0.8055E-01 | 1.039 | 58.16 | 277.7 | 19.95 | 50.7 |
| 5.80 | 9.549 | 0.8460E-01 | 1.044 | 58.20 | 280.1 | 20.47 | 51.6 |
| 6.00 | 9.759 | 0.8876E-01 | 1.054 | 58.22 | 282.9 | 21.01 | 52.4 |
| 6.20 | 9.971 | 0.9304E-01 | 1.070 | 58.24 | 286.2 | 21.57 | 53.3 |
| 6.40 | 10.187 | 0.9745E-01 | 1.093 | 58.24 | 289.8 | 22.14 | 54.2 |
| 6.60 | 10.408 | 0.1020 | 1.122 | 58.23 | 294.0 | 22.73 | 55.0 |
| 6.80 | 10.636 | 0.1067 | 1.158 | 58.20 | 298.6 | 23.34 | 55.9 |
| 7.00 | 10.872 | 0.1116 | 1.201 | 58.18 | 303.7 | 23.97 | 56.7 |
| 7.20 | 11.117 | 0.1166 | 1.251 | 58.14 | 309.3 | 24.61 | 57.5 |
| 7.40 | 11.373 | 0.1219 | 1.310 | 58.10 | 315.4 | 25.28 | 58.4 |
| 7.60 | 11.642 | 0.1273 | 1.378 | 58.05 | 322.0 | 25.97 | 59.2 |
| 7.80 | 11.925 | 0.1329 | 1.454 | 58.00 | 329.1 | 26.68 | 60.1 |
| 8.00 | 12.224 | 0.1388 | 1.540 | 57.94 | 336.8 | 27.42 | 61.0 |
| 8.20 | 12.542 | 0.1449 | 1.637 | 57.89 | 345.0 | 28.17 | 61.9 |
| 8.40 | 12.880 | 0.1513 | 1.746 | 57.83 | 353.8 | 28.95 | 62.8 |
| 8.60 | 13.241 | 0.1579 | 1.866 | 57.77 | 363.2 | 29.76 | 63.8 |
| 8.80 | 13.627 | 0.1648 | 2.001 | 57.71 | 373.2 | 30.60 | 64.8 |
| 9.00 | 14.042 | 0.1720 | 2.150 | 57.65 | 383.8 | 31.46 | 65.8 |
| 9.20 | 14.488 | 0.1795 | 2.316 | 57.59 | 395.2 | 32.36 | 66.8 |
| 9.40 | 14.970 | 0.1873 | 2.501 | 57.53 | 407.2 | 33.28 | 67.9 |
| 9.60 | 15.490 | 0.1955 | 2.705 | 57.47 | 419.9 | 34.24 | 69.0 |
| 9.80 | 16.053 | 0.2040 | 2.931 | 57.41 | 433.4 | 35.23 | 70.2 |
| 10.00 | 16.664 | 0.2129 | 3.181 | 57.35 | 447.7 | 36.26 | 71.4 |
| 10.20 | 17.327 | 0.2223 | 3.457 | 57.30 | 462.8 | 37.33 | 72.7 |
| 10.40 | 18.049 | 0.2320 | 3.761 | 57.25 | 478.7 | 38.44 | 74.0 |
| 10.60 | 18.834 | 0.2422 | 4.094 | 57.20 | 495.4 | 39.59 | 75.3 |
| 10.80 | 19.688 | 0.2527 | 4.460 | 57.16 | 512.9 | 40.79 | 76.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 360.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 11.00 | 20.620 | 0.2638 | 4.860 | 57.13 | 531.2 | 42.04 | 78.2 |
| 11.20 | 21.635 | 0.2753 | 5.296 | 57.10 | 550.2 | 43.33 | 79.7 |
| 11.40 | 22.741 | 0.2872 | 5.770 | 57.08 | 570.1 | 44.69 | 81.3 |
| 11.60 | 23.945 | 0.2996 | 6.285 | 57.07 | 590.8 | 46.10 | 82.9 |
| 11.80 | 25.258 | 0.3125 | 6.843 | 57.07 | 612.2 | 47.57 | 84.7 |
| 12.00 | 26.686 | 0.3259 | 7.447 | 57.07 | 634.3 | 49.11 | 86.5 |
| 12.20 | 28.239 | 0.3398 | 8.097 | 57.09 | 657.2 | 50.72 | 88.3 |
| 12.40 | 29.928 | 0.3541 | 8.798 | 57.11 | 680.8 | 52.41 | 90.3 |
| 12.60 | 31.762 | 0.3689 | 9.552 | 57.15 | 705.2 | 54.17 | 92.3 |
| 12.80 | 33.753 | 0.3843 | 10.361 | 57.19 | 730.2 | 56.02 | 94.4 |
| 13.00 | 35.910 | 0.4002 | 11.228 | 57.24 | 756.0 | 57.97 | 96.6 |
| 13.20 | 38.248 | 0.4166 | 12.156 | 57.30 | 782.5 | 60.01 | 98.9 |
| 13.40 | 40.777 | 0.4335 | 13.148 | 57.36 | 809.7 | 62.16 | 101.3 |
| 13.60 | 43.512 | 0.4510 | 14.208 | 57.44 | 837.7 | 64.42 | 103.9 |
| 13.80 | 46.465 | 0.4691 | 15.340 | 57.51 | 866.4 | 66.80 | 106.5 |
| 14.00 | 49.652 | 0.4878 | 16.546 | 57.60 | 895.9 | 69.32 | 109.2 |
| 14.20 | 53.089 | 0.5072 | 17.830 | 57.69 | 926.1 | 71.98 | 112.0 |
| 14.40 | 56.790 | 0.5272 | 19.198 | 57.78 | 957.1 | 74.79 | 115.0 |
| 14.60 | 60.774 | 0.5478 | 20.653 | 57.88 | 989.0 | | 118.1 |
| 14.80 | 65.058 | 0.5692 | 22.200 | 57.98 | 1021.6 | | 121.3 |
| 15.00 | 69.660 | 0.5913 | 23.844 | 58.09 | 1055.1 | | 124.7 |

ETHANE ISOTHERM AT T = 380.00 K
Second virial coefficient is -108.9 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.313 | 0.8436E-03 | 3.091 | 54.73 | 345.3 | 11.72 | 32.9 |
| 0.20 | 0.618 | 0.1712E-02 | 3.025 | 54.85 | 342.7 | 11.79 | 33.1 |
| 0.40 | 1.210 | 0.3519E-02 | 2.895 | 55.11 | 337.7 | 11.94 | 33.5 |
| 0.60 | 1.777 | 0.5422E-02 | 2.772 | 55.37 | 332.9 | 12.10 | 33.9 |
| 0.80 | 2.319 | 0.7417E-02 | 2.654 | 55.62 | 328.3 | 12.28 | 34.3 |
| 1.00 | 2.839 | 0.9504E-02 | 2.542 | 55.87 | 324.0 | 12.47 | 34.8 |
| 1.20 | 3.337 | 0.1168E-01 | 2.436 | 56.12 | 319.9 | 12.68 | 35.3 |
| 1.40 | 3.814 | 0.1395E-01 | 2.335 | 56.36 | 316.1 | 12.90 | 35.9 |
| 1.60 | 4.271 | 0.1630E-01 | 2.240 | 56.60 | 312.5 | 13.13 | 36.5 |
| 1.80 | 4.710 | 0.1873E-01 | 2.151 | 56.83 | 309.2 | 13.37 | 37.1 |
| 2.00 | 5.132 | 0.2125E-01 | 2.067 | 57.06 | 306.2 | 13.63 | 37.7 |
| 2.20 | 5.537 | 0.2385E-01 | 1.988 | 57.29 | 303.4 | 13.90 | 38.4 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 380.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 2.40 | 5.927 | 0.2653E-01 | 1.915 | 57.50 | 300.9 | 14.19 | 39.1 |
| 2.60 | 6.303 | 0.2929E-01 | 1.847 | 57.71 | 298.7 | 14.48 | 39.8 |
| 2.80 | 6.666 | 0.3213E-01 | 1.784 | 57.91 | 296.8 | 14.79 | 40.6 |
| 3.00 | 7.017 | 0.3504E-01 | 1.727 | 58.10 | 295.1 | 15.12 | 41.3 |
| 3.20 | 7.357 | 0.3803E-01 | 1.674 | 58.28 | 293.8 | 15.46 | 42.1 |
| 3.40 | 7.687 | 0.4109E-01 | 1.627 | 58.45 | 292.7 | 15.81 | 42.9 |
| 3.60 | 8.008 | 0.4423E-01 | 1.584 | 58.62 | 292.0 | 16.17 | 43.7 |
| 3.80 | 8.321 | 0.4745E-01 | 1.547 | 58.77 | 291.5 | 16.55 | 44.6 |
| 4.00 | 8.627 | 0.5074E-01 | 1.515 | 58.91 | 291.4 | 16.94 | 45.4 |
| 4.20 | 8.928 | 0.5411E-01 | 1.487 | 59.04 | 291.5 | 17.34 | 46.3 |
| 4.40 | 9.223 | 0.5756E-01 | 1.465 | 59.16 | 292.0 | 17.76 | 47.1 |
| 4.60 | 9.514 | 0.6109E-01 | 1.448 | 59.26 | 292.9 | 18.19 | 48.0 |
| 4.80 | 9.802 | 0.6471E-01 | 1.436 | 59.36 | 294.0 | 18.64 | 48.8 |
| 5.00 | 10.089 | 0.6843E-01 | 1.429 | 59.44 | 295.5 | 19.10 | 49.7 |
| 5.20 | 10.374 | 0.7223E-01 | 1.428 | 59.52 | 297.4 | 19.58 | 50.6 |
| 5.40 | 10.660 | 0.7614E-01 | 1.432 | 59.58 | 299.7 | 20.07 | 51.4 |
| 5.60 | 10.948 | 0.8015E-01 | 1.442 | 59.63 | 302.3 | 20.58 | 52.3 |
| 5.80 | 11.238 | 0.8428E-01 | 1.458 | 59.67 | 305.3 | 21.10 | 53.2 |
| 6.00 | 11.531 | 0.8853E-01 | 1.481 | 59.71 | 308.7 | 21.64 | 54.0 |
| 6.20 | 11.830 | 0.9290E-01 | 1.510 | 59.73 | 312.6 | 22.19 | 54.9 |
| 6.40 | 12.136 | 0.9741E-01 | 1.546 | 59.75 | 316.9 | 22.77 | 55.7 |
| 6.60 | 12.450 | 0.1021 | 1.590 | 59.75 | 321.7 | 23.36 | 56.6 |
| 6.80 | 12.773 | 0.1069 | 1.642 | 59.76 | 326.9 | 23.97 | 57.5 |
| 7.00 | 13.107 | 0.1118 | 1.702 | 59.75 | 332.5 | 24.59 | 58.3 |
| 7.20 | 13.454 | 0.1170 | 1.770 | 59.74 | 338.7 | 25.24 | 59.2 |
| 7.40 | 13.816 | 0.1223 | 1.848 | 59.73 | 345.3 | 25.91 | 60.1 |
| 7.60 | 14.194 | 0.1278 | 1.936 | 59.71 | 352.5 | 26.60 | 61.0 |
| 7.80 | 14.590 | 0.1335 | 2.034 | 59.69 | 360.1 | 27.31 | 61.9 |
| 8.00 | 15.008 | 0.1395 | 2.143 | 59.66 | 368.3 | 28.04 | 62.8 |
| 8.20 | 15.448 | 0.1457 | 2.263 | 59.64 | 377.0 | 28.80 | 63.8 |
| 8.40 | 15.914 | 0.1521 | 2.397 | 59.61 | 386.3 | 29.58 | 64.8 |
| 8.60 | 16.408 | 0.1587 | 2.545 | 59.58 | 396.1 | 30.39 | 65.8 |
| 8.80 | 16.933 | 0.1657 | 2.708 | 59.55 | 406.6 | 31.23 | 66.8 |
| 9.00 | 17.492 | 0.1729 | 2.887 | 59.52 | 417.6 | 32.09 | 67.9 |
| 9.20 | 18.089 | 0.1805 | 3.085 | 59.49 | 429.4 | 32.99 | 69.0 |
| 9.40 | 18.728 | 0.1883 | 3.302 | 59.46 | 441.8 | 33.92 | 70.1 |
| 9.60 | 19.412 | 0.1965 | 3.542 | 59.43 | 454.9 | 34.88 | 71.3 |
| 9.80 | 20.146 | 0.2051 | 3.804 | 59.40 | 468.7 | 35.87 | 72.5 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 380.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 10.00 | 20.935 | 0.2140 | 4.092 | 59.38 | 483.2 | 36.91 | 73.7 |
| 10.20 | 21.784 | 0.2233 | 4.406 | 59.36 | 498.5 | 37.98 | 75.0 |
| 10.40 | 22.699 | 0.2329 | 4.750 | 59.34 | 514.6 | 39.10 | 76.4 |
| 10.60 | 23.686 | 0.2430 | 5.125 | 59.33 | 531.4 | 40.25 | 77.7 |
| 10.80 | 24.752 | 0.2534 | 5.533 | 59.32 | 548.9 | 41.46 | 79.2 |
| 11.00 | 25.902 | 0.2643 | 5.976 | 59.32 | 567.2 | 42.71 | 80.7 |
| 11.20 | 27.145 | 0.2755 | 6.456 | 59.32 | 586.2 | 44.02 | 82.2 |
| 11.40 | 28.487 | 0.2872 | 6.975 | 59.33 | 606.0 | 45.38 | 83.9 |
| 11.60 | 29.937 | 0.2994 | 7.536 | 59.34 | 626.5 | 46.81 | 85.6 |
| 11.80 | 31.504 | 0.3120 | 8.140 | 59.37 | 647.7 | 48.29 | 87.3 |
| 12.00 | 33.196 | 0.3250 | 8.790 | 59.40 | 669.6 | 49.84 | 89.1 |
| 12.20 | 35.023 | 0.3385 | 9.489 | 59.43 | 692.3 | 51.47 | 91.0 |
| 12.40 | 36.995 | 0.3525 | 10.238 | 59.48 | 715.7 | 53.17 | 93.0 |
| 12.60 | 39.122 | 0.3670 | 11.041 | 59.53 | 739.8 | 54.95 | 95.1 |
| 12.80 | 41.416 | 0.3819 | 11.901 | 59.58 | 764.6 | 56.83 | 97.2 |
| 13.00 | 43.887 | 0.3974 | 12.821 | 59.64 | 790.2 | 58.79 | 99.5 |
| 13.20 | 46.548 | 0.4134 | 13.803 | 59.71 | 816.5 | 60.86 | 101.8 |
| 13.40 | 49.412 | 0.4300 | 14.851 | 59.78 | 843.5 | 63.04 | 104.3 |
| 13.60 | 52.493 | 0.4471 | 15.969 | 59.86 | 871.4 | 65.33 | 106.8 |
| 13.80 | 55.805 | 0.4649 | 17.160 | 59.94 | 899.9 | 67.75 | 109.5 |
| 14.00 | 59.362 | 0.4832 | 18.428 | 60.03 | 929.3 | 70.31 | 112.2 |
| 14.20 | 63.182 | 0.5022 | 19.778 | 60.12 | 959.5 | | 115.1 |
| 14.40 | 67.279 | 0.5218 | 21.213 | 60.21 | 990.5 | | 118.1 |

ETHANE ISOTHERM AT T = 400.00 K
Second virial coefficient is -96.3 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.329 | 0.8430E-03 | 3.262 | 57.30 | 353.5 | 12.26 | 36.1 |
| 0.20 | 0.653 | 0.1709E-02 | 3.200 | 57.41 | 351.2 | 12.33 | 36.3 |
| 0.40 | 1.281 | 0.3510E-02 | 3.080 | 57.63 | 346.7 | 12.49 | 36.7 |
| 0.60 | 1.885 | 0.5400E-02 | 2.966 | 57.85 | 342.4 | 12.66 | 37.1 |
| 0.80 | 2.467 | 0.7379E-02 | 2.857 | 58.06 | 338.4 | 12.84 | 37.5 |
| 1.00 | 3.028 | 0.9446E-02 | 2.754 | 58.28 | 334.6 | 13.03 | 38.0 |
| 1.20 | 3.569 | 0.1160E-01 | 2.657 | 58.49 | 331.0 | 13.24 | 38.5 |
| 1.40 | 4.091 | 0.1383E-01 | 2.564 | 58.69 | 327.7 | 13.47 | 39.0 |
| 1.60 | 4.596 | 0.1616E-01 | 2.478 | 58.89 | 324.7 | 13.70 | 39.5 |
| 1.80 | 5.083 | 0.1856E-01 | 2.397 | 59.09 | 321.9 | 13.95 | 40.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 400.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 2.00 | 5.555 | 0.2104E-01 | 2.321 | 59.28 | 319.4 | 14.21 | 40.7 |
| 2.20 | 6.012 | 0.2361E-01 | 2.250 | 59.46 | 317.2 | 14.48 | 41.4 |
| 2.40 | 6.455 | 0.2625E-01 | 2.185 | 59.64 | 315.2 | 14.77 | 42.0 |
| 2.60 | 6.886 | 0.2897E-01 | 2.125 | 59.82 | 313.5 | 15.07 | 42.7 |
| 2.80 | 7.305 | 0.3177E-01 | 2.070 | 59.98 | 312.1 | 15.39 | 43.4 |
| 3.00 | 7.714 | 0.3465E-01 | 2.020 | 60.14 | 310.9 | 15.71 | 44.1 |
| 3.20 | 8.114 | 0.3761E-01 | 1.975 | 60.29 | 310.1 | 16.05 | 44.8 |
| 3.40 | 8.505 | 0.4064E-01 | 1.935 | 60.43 | 309.5 | 16.40 | 45.6 |
| 3.60 | 8.888 | 0.4376E-01 | 1.901 | 60.57 | 309.3 | 16.77 | 46.4 |
| 3.80 | 9.265 | 0.4695E-01 | 1.872 | 60.70 | 309.4 | 17.15 | 47.1 |
| 4.00 | 9.637 | 0.5023E-01 | 1.847 | 60.82 | 309.7 | 17.54 | 47.9 |
| 4.20 | 10.004 | 0.5359E-01 | 1.828 | 60.93 | 310.4 | 17.95 | 48.7 |
| 4.40 | 10.369 | 0.5704E-01 | 1.815 | 61.03 | 311.4 | 18.37 | 49.6 |
| 4.60 | 10.731 | 0.6058E-01 | 1.806 | 61.12 | 312.8 | 18.80 | 50.4 |
| 4.80 | 11.092 | 0.6421E-01 | 1.803 | 61.20 | 314.4 | 19.25 | 51.2 |
| 5.00 | 11.452 | 0.6794E-01 | 1.806 | 61.28 | 316.5 | 19.71 | 52.0 |
| 5.20 | 11.814 | 0.7178E-01 | 1.815 | 61.35 | 318.9 | 20.19 | 52.9 |
| 5.40 | 12.179 | 0.7572E-01 | 1.830 | 61.41 | 321.6 | 20.68 | 53.7 |
| 5.60 | 12.547 | 0.7977E-01 | 1.851 | 61.46 | 324.8 | 21.19 | 54.5 |
| 5.80 | 12.920 | 0.8394E-01 | 1.880 | 61.50 | 328.3 | 21.71 | 55.4 |
| 6.00 | 13.299 | 0.8823E-01 | 1.915 | 61.54 | 332.3 | 22.25 | 56.2 |
| 6.20 | 13.686 | 0.9266E-01 | 1.957 | 61.57 | 336.7 | 22.81 | 57.1 |
| 6.40 | 14.083 | 0.9723E-01 | 2.008 | 61.60 | 341.5 | 23.38 | 57.9 |
| 6.60 | 14.490 | 0.1019 | 2.066 | 61.62 | 346.7 | 23.97 | 58.8 |
| 6.80 | 14.910 | 0.1068 | 2.134 | 61.63 | 352.4 | 24.58 | 59.7 |
| 7.00 | 15.344 | 0.1118 | 2.210 | 61.64 | 358.6 | 25.21 | 60.6 |
| 7.20 | 15.794 | 0.1170 | 2.296 | 61.65 | 365.2 | 25.86 | 61.5 |
| 7.40 | 16.263 | 0.1224 | 2.393 | 61.65 | 372.3 | 26.53 | 62.4 |
| 7.60 | 16.752 | 0.1280 | 2.500 | 61.65 | 379.9 | 27.22 | 63.3 |
| 7.80 | 17.264 | 0.1338 | 2.619 | 61.65 | 388.0 | 27.93 | 64.2 |
| 8.00 | 17.801 | 0.1397 | 2.750 | 61.64 | 396.6 | 28.67 | 65.2 |
| 8.20 | 18.365 | 0.1460 | 2.895 | 61.63 | 405.8 | 29.43 | 66.2 |
| 8.40 | 18.960 | 0.1524 | 3.054 | 61.62 | 415.5 | 30.21 | 67.2 |
| 8.60 | 19.587 | 0.1591 | 3.228 | 61.61 | 425.7 | 31.02 | 68.2 |
| 8.80 | 20.252 | 0.1661 | 3.418 | 61.60 | 436.6 | 31.86 | 69.3 |
| 9.00 | 20.956 | 0.1734 | 3.627 | 61.59 | 448.1 | 32.73 | 70.4 |
| 9.20 | 21.704 | 0.1809 | 3.855 | 61.58 | 460.1 | 33.63 | 71.5 |
| 9.40 | 22.500 | 0.1888 | 4.105 | 61.57 | 472.9 | 34.56 | 72.6 |
| 9.60 | 23.347 | 0.1969 | 4.377 | 61.57 | 486.3 | 35.53 | 73.8 |
| 9.80 | 24.252 | 0.2054 | 4.673 | 61.56 | 500.4 | 36.53 | 75.1 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 400.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 10.00 | 25.218 | 0.2143 | 4.997 | 61.56 | 515.2 | 37.56 | 76.3 |
| 10.20 | 26.252 | 0.2235 | 5.348 | 61.56 | 530.6 | 38.64 | 77.7 |
| 10.40 | 27.360 | 0.2330 | 5.729 | 61.56 | 546.8 | 39.76 | 79.0 |
| 10.60 | 28.546 | 0.2429 | 6.143 | 61.57 | 563.7 | 40.93 | 80.4 |
| 10.80 | 29.819 | 0.2532 | 6.590 | 61.59 | 581.3 | 42.14 | 81.9 |
| 11.00 | 31.185 | 0.2639 | 7.073 | 61.60 | 599.6 | 43.41 | 83.4 |
| 11.20 | 32.651 | 0.2750 | 7.595 | 61.63 | 618.6 | 44.72 | 85.0 |
| 11.40 | 34.225 | 0.2865 | 8.156 | 61.65 | 638.4 | 46.10 | 86.7 |
| 11.60 | 35.916 | 0.2984 | 8.760 | 61.69 | 658.8 | 47.53 | 88.4 |
| 11.80 | 37.732 | 0.3107 | 9.408 | 61.73 | 679.9 | 49.03 | 90.2 |
| 12.00 | 39.682 | 0.3235 | 10.103 | 61.77 | 701.8 | 50.60 | 92.0 |
| 12.20 | 41.777 | 0.3368 | 10.848 | 61.82 | 724.4 | 52.24 | 94.0 |
| 12.40 | 44.025 | 0.3504 | 11.645 | 61.87 | 747.7 | 53.96 | 96.0 |
| 12.60 | 46.438 | 0.3646 | 12.498 | 61.93 | 771.7 | 55.76 | 98.1 |
| 12.80 | 49.028 | 0.3793 | 13.408 | 62.00 | 796.4 | 57.66 | 100.3 |
| 13.00 | 51.806 | 0.3945 | 14.380 | 62.06 | 821.9 | 59.65 | 102.5 |
| 13.20 | 54.784 | 0.4102 | 15.416 | 62.13 | 848.2 | 61.74 | 104.9 |
| 13.40 | 57.977 | 0.4265 | 16.521 | 62.21 | 875.2 | 63.95 | 107.4 |
| 13.60 | 61.397 | 0.4433 | 17.697 | 62.29 | 903.0 | | 109.9 |
| 13.80 | 65.061 | 0.4608 | 18.948 | 62.37 | 931.6 | | 112.6 |
| 14.00 | 68.982 | 0.4788 | 20.279 | 62.46 | 961.0 | | 115.4 |

ETHANE ISOTHERM AT T = 420.00 K
Second virial coefficient is -85.2 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.346 | 0.8425E-03 | 3.433 | 59.86 | 361.6 | 12.80 | 39.5 |
| 0.50 | 1.674 | 0.4431E-02 | 3.211 | 60.24 | 353.6 | 13.11 | 40.2 |
| 1.00 | 3.217 | 0.9398E-02 | 2.964 | 60.71 | 344.8 | 13.59 | 41.3 |
| 1.50 | 4.644 | 0.1488E-01 | 2.751 | 61.15 | 337.6 | 14.14 | 42.5 |
| 2.00 | 5.974 | 0.2087E-01 | 2.572 | 61.56 | 332.0 | 14.78 | 43.9 |
| 2.50 | 7.221 | 0.2736E-01 | 2.425 | 61.95 | 328.1 | 15.49 | 45.4 |
| 3.00 | 8.404 | 0.3434E-01 | 2.310 | 62.29 | 325.9 | 16.29 | 47.1 |
| 3.50 | 9.537 | 0.4182E-01 | 2.228 | 62.61 | 325.5 | 17.17 | 48.9 |
| 4.00 | 10.637 | 0.4982E-01 | 2.179 | 62.88 | 327.0 | 18.13 | 50.8 |
| 4.50 | 11.721 | 0.5837E-01 | 2.164 | 63.10 | 330.4 | 19.18 | 52.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 420.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 5.00 | 12.807 | 0.6752E-01 | 2.185 | 63.29 | 336.0 | 20.31 | 54.7 |
| 5.50 | 13.913 | 0.7734E-01 | 2.246 | 63.44 | 343.9 | 21.54 | 56.7 |
| 6.00 | 15.061 | 0.8791E-01 | 2.352 | 63.55 | 354.1 | 22.86 | 58.8 |
| 6.50 | 16.274 | 0.9932E-01 | 2.509 | 63.63 | 367.0 | 24.29 | 60.9 |
| 7.00 | 17.579 | 0.1117 | 2.723 | 63.69 | 382.6 | 25.83 | 63.2 |
| 7.50 | 19.008 | 0.1251 | 3.004 | 63.72 | 401.1 | 27.49 | 65.4 |
| 8.00 | 20.596 | 0.1397 | 3.362 | 63.74 | 422.7 | 29.29 | 67.8 |
| 8.50 | 22.385 | 0.1558 | 3.810 | 63.76 | 447.6 | 31.24 | 70.4 |
| 9.00 | 24.424 | 0.1734 | 4.367 | 63.77 | 475.9 | 33.37 | 73.1 |
| 9.50 | 26.773 | 0.1928 | 5.053 | 63.79 | 508.1 | 35.69 | 76.0 |
| 10.00 | 29.503 | 0.2141 | 5.894 | 63.82 | 544.4 | 38.23 | 79.2 |
| 10.50 | 32.697 | 0.2375 | 6.918 | 63.86 | 584.7 | 41.02 | 82.6 |
| 11.00 | 36.456 | 0.2631 | 8.153 | 63.94 | 629.4 | 44.11 | 86.4 |
| 11.50 | 40.891 | 0.2911 | 9.633 | 64.03 | 678.3 | 47.53 | 90.5 |
| 12.00 | 46.135 | 0.3217 | 11.392 | 64.16 | 731.7 | 51.36 | 95.1 |
| 12.50 | 52.337 | 0.3551 | 13.470 | 64.30 | 789.5 | 55.66 | 100.1 |
| 13.00 | 59.666 | 0.3916 | 15.913 | 64.47 | 851.9 | 60.51 | 105.7 |
| 13.50 | 68.319 | 0.4313 | 18.772 | 64.66 | 919.1 | | 111.9 |

ETHANE ISOTHERM AT T = 450.00 K
Second virial coefficient is -70.9 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.372 | 0.8419E-03 | 3.689 | 63.65 | 373.3 | 13.58 | 44.7 |
| 0.50 | 1.807 | 0.4417E-02 | 3.492 | 63.96 | 366.6 | 13.91 | 45.4 |
| 1.00 | 3.498 | 0.9342E-02 | 3.276 | 64.34 | 359.5 | 14.39 | 46.4 |
| 1.50 | 5.089 | 0.1476E-01 | 3.093 | 64.70 | 353.9 | 14.96 | 47.6 |
| 2.00 | 6.597 | 0.2067E-01 | 2.943 | 65.04 | 349.9 | 15.60 | 48.9 |
| 2.50 | 8.038 | 0.2707E-01 | 2.826 | 65.35 | 347.6 | 16.33 | 50.3 |
| 3.00 | 9.428 | 0.3396E-01 | 2.741 | 65.64 | 347.0 | 17.14 | 51.9 |
| 3.50 | 10.785 | 0.4137E-01 | 2.690 | 65.89 | 348.1 | 18.02 | 53.6 |
| 4.00 | 12.124 | 0.4931E-01 | 2.673 | 66.12 | 351.2 | 18.99 | 55.4 |
| 4.50 | 13.464 | 0.5783E-01 | 2.694 | 66.31 | 356.2 | 20.05 | 57.2 |
| 5.00 | 14.824 | 0.6697E-01 | 2.754 | 66.48 | 363.3 | 21.19 | 59.1 |
| 5.50 | 16.225 | 0.7681E-01 | 2.858 | 66.62 | 372.6 | 22.42 | 61.1 |
| 6.00 | 17.690 | 0.8741E-01 | 3.012 | 66.73 | 384.4 | 23.75 | 63.2 |
| 6.50 | 19.246 | 0.9886E-01 | 3.222 | 66.83 | 398.7 | 25.18 | 65.3 |
| 7.00 | 20.923 | 0.1113 | 3.497 | 66.90 | 415.7 | 26.73 | 67.5 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 450.00 K (continued)

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 7.50 | 22.756 | 0.1248 | 3.847 | 66.97 | 435.6 | 28.40 | 69.8 |
| 8.00 | 24.784 | 0.1394 | 4.282 | 67.02 | 458.5 | 30.21 | 72.2 |
| 8.50 | 27.055 | 0.1555 | 4.818 | 67.07 | 484.6 | 32.18 | 74.8 |
| 9.00 | 29.622 | 0.1730 | 5.472 | 67.13 | 514.1 | 34.32 | 77.6 |
| 9.50 | 32.549 | 0.1922 | 6.265 | 67.19 | 547.3 | 36.65 | 80.6 |
| 10.00 | 35.914 | 0.2133 | 7.224 | 67.26 | 584.3 | 39.21 | 83.8 |
| 10.50 | 39.805 | 0.2363 | 8.374 | 67.34 | 625.3 | 42.04 | 87.3 |
| 11.00 | 44.325 | 0.2614 | 9.745 | 67.45 | 670.4 | 45.16 | 91.1 |
| 11.50 | 49.593 | 0.2889 | 11.372 | 67.57 | 719.7 | 48.63 | 95.4 |
| 12.00 | 55.745 | 0.3189 | 13.290 | 67.71 | 773.3 | 52.52 | 100.0 |
| 12.50 | 62.938 | 0.3516 | 15.541 | 67.87 | 831.5 | | 105.1 |

ETHANE ISOTHERM AT T = 500.00 K
Second virial coefficient is -51.7 cm$^3$•mol$^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| mol•dm$^{-3}$ | MPa | MPa•K$^{-1}$ | MPa•dm$^3$•mol$^{-1}$ | J/(mol•K) | m•s$^{-1}$ | $\mu$Pa•s | mW/(m•K) |
| 0.10 | 0.414 | 0.8412E-03 | 4.115 | 69.74 | 392.1 | 14.84 | 53.9 |
| 0.50 | 2.027 | 0.4399E-02 | 3.958 | 69.98 | 387.3 | 15.18 | 54.5 |
| 1.00 | 3.963 | 0.9273E-02 | 3.790 | 70.27 | 382.6 | 15.68 | 55.5 |
| 1.50 | 5.823 | 0.1462E-01 | 3.655 | 70.55 | 379.4 | 16.27 | 56.5 |
| 2.00 | 7.624 | 0.2043E-01 | 3.553 | 70.80 | 377.7 | 16.93 | 57.7 |
| 2.50 | 9.382 | 0.2673E-01 | 3.485 | 71.04 | 377.7 | 17.67 | 59.1 |
| 3.00 | 11.114 | 0.3352E-01 | 3.450 | 71.26 | 379.3 | 18.49 | 60.5 |
| 3.50 | 12.839 | 0.4082E-01 | 3.452 | 71.46 | 382.7 | 19.39 | 62.1 |
| 4.00 | 14.573 | 0.4868E-01 | 3.492 | 71.64 | 387.9 | 20.37 | 63.7 |
| 4.50 | 16.337 | 0.5713E-01 | 3.573 | 71.80 | 395.1 | 21.44 | 65.5 |
| 5.00 | 18.153 | 0.6622E-01 | 3.700 | 71.94 | 404.4 | 22.59 | 67.3 |
| 5.50 | 20.045 | 0.7602E-01 | 3.877 | 72.07 | 416.0 | 23.83 | 69.3 |
| 6.00 | 22.040 | 0.8660E-01 | 4.113 | 72.19 | 429.8 | 25.17 | 71.3 |
| 6.50 | 24.169 | 0.9803E-01 | 4.414 | 72.29 | 446.2 | 26.62 | 73.4 |
| 7.00 | 26.466 | 0.1104 | 4.789 | 72.39 | 465.2 | 28.18 | 75.6 |
| 7.50 | 28.972 | 0.1239 | 5.250 | 72.48 | 487.0 | 29.87 | 77.9 |
| 8.00 | 31.733 | 0.1385 | 5.811 | 72.56 | 511.8 | 31.71 | 80.4 |
| 8.50 | 34.802 | 0.1544 | 6.486 | 72.65 | 539.6 | 33.69 | 83.0 |
| 9.00 | 38.241 | 0.1717 | 7.294 | 72.74 | 570.8 | 35.86 | 85.8 |
| 9.50 | 42.122 | 0.1906 | 8.257 | 72.84 | 605.4 | 38.23 | 88.8 |
| 10.00 | 46.528 | 0.2112 | 9.399 | 72.94 | 643.6 | 40.84 | 92.1 |
| 10.50 | 51.556 | 0.2337 | 10.750 | 73.06 | 685.8 | 43.71 | 95.7 |
| 11.00 | 57.318 | 0.2583 | 12.339 | 73.19 | 731.8 | 46.89 | 99.7 |
| 11.50 | 63.941 | 0.2851 | 14.203 | 73.32 | 782.1 | | 104.0 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 550.00 K
Second virial coefficient is -36.7 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.456 | 0.8406E-03 | 4.540 | 75.51 | 410.0 | | 63.5 |
| 0.50 | 2.247 | 0.4386E-02 | 4.420 | 75.71 | 406.9 | | 64.1 |
| 1.00 | 4.426 | 0.9225E-02 | 4.299 | 75.94 | 404.3 | | 65.0 |
| 1.50 | 6.551 | 0.1452E-01 | 4.210 | 76.17 | 403.1 | | 65.9 |
| 2.00 | 8.641 | 0.2026E-01 | 4.155 | 76.38 | 403.4 | | 67.1 |
| 2.50 | 10.712 | 0.2648E-01 | 4.134 | 76.57 | 405.3 | | 68.3 |
| 3.00 | 12.782 | 0.3319E-01 | 4.151 | 76.75 | 408.9 | | 69.7 |
| 3.50 | 14.869 | 0.4042E-01 | 4.205 | 76.92 | 414.2 | | 71.2 |
| 4.00 | 16.994 | 0.4819E-01 | 4.302 | 77.07 | 421.3 | | 72.7 |
| 4.50 | 19.179 | 0.5657E-01 | 4.446 | 77.21 | 430.4 | | 74.4 |
| 5.00 | 21.448 | 0.6560E-01 | 4.640 | 77.34 | 441.6 | | 76.2 |
| 5.50 | 23.829 | 0.7533E-01 | 4.892 | 77.46 | 454.9 | | 78.1 |
| 6.00 | 26.351 | 0.8584E-01 | 5.209 | 77.58 | 470.6 | | 80.0 |
| 6.50 | 29.050 | 0.9720E-01 | 5.599 | 77.68 | 488.7 | | 82.1 |
| 7.00 | 31.964 | 0.1095 | 6.074 | 77.79 | 509.5 | | 84.3 |
| 7.50 | 35.140 | 0.1228 | 6.645 | 77.89 | 532.9 | | 86.6 |
| 8.00 | 38.628 | 0.1373 | 7.327 | 77.99 | 559.2 | | 89.1 |
| 8.50 | 42.488 | 0.1530 | 8.135 | 78.09 | 588.6 | | 91.8 |
| 9.00 | 46.788 | 0.1701 | 9.090 | 78.19 | 621.2 | | 94.6 |
| 9.50 | 51.606 | 0.1888 | 10.214 | 78.30 | 657.2 | | 97.7 |
| 10.00 | 57.034 | 0.2090 | 11.533 | 78.42 | 696.8 | | 101.1 |
| 10.50 | 63.177 | 0.2311 | 13.077 | 78.54 | 740.1 | | 104.7 |

Table B4. Properties in the single-phase region along isotherms (continued)

ETHANE ISOTHERM AT T = 600.00 K
Second virial coefficient is -24.6 $cm^3 \cdot mol^{-1}$

| $\rho$ | P | $\partial P/\partial T\|_\rho$ | $\partial P/\partial \rho\|_T$ | $C_v$ | W | $\eta$ | $\lambda$ |
|---|---|---|---|---|---|---|---|
| $mol \cdot dm^{-3}$ | MPa | $MPa \cdot K^{-1}$ | $MPa \cdot dm^3 \cdot mol^{-1}$ | $J/(mol \cdot K)$ | $m \cdot s^{-1}$ | $\mu Pa \cdot s$ | $mW/(m \cdot K)$ |
| 0.10 | 0.498 | 0.8402E-03 | 4.965 | 80.95 | 427.2 | | 73.5 |
| 0.50 | 2.466 | 0.4376E-02 | 4.881 | 81.12 | 425.6 | | 74.0 |
| 1.00 | 4.886 | 0.9188E-02 | 4.804 | 81.32 | 424.8 | | 74.8 |
| 1.50 | 7.275 | 0.1444E-01 | 4.759 | 81.51 | 425.4 | | 75.7 |
| 2.00 | 9.651 | 0.2013E-01 | 4.750 | 81.69 | 427.5 | | 76.8 |
| 2.50 | 12.031 | 0.2629E-01 | 4.777 | 81.86 | 431.1 | | 77.9 |
| 3.00 | 14.435 | 0.3294E-01 | 4.843 | 82.01 | 436.3 | | 79.2 |
| 3.50 | 16.882 | 0.4010E-01 | 4.952 | 82.16 | 443.3 | | 80.6 |
| 4.00 | 19.394 | 0.4781E-01 | 5.106 | 82.29 | 452.1 | | 82.1 |
| 4.50 | 21.996 | 0.5611E-01 | 5.311 | 82.42 | 462.9 | | 83.6 |
| 5.00 | 24.715 | 0.6507E-01 | 5.573 | 82.54 | 475.7 | | 85.4 |
| 5.50 | 27.580 | 0.7473E-01 | 5.899 | 82.66 | 490.7 | | 87.2 |
| 6.00 | 30.626 | 0.8515E-01 | 6.297 | 82.77 | 507.9 | | 89.1 |
| 6.50 | 33.890 | 0.9643E-01 | 6.776 | 82.87 | 527.6 | | 91.1 |
| 7.00 | 37.417 | 0.1086 | 7.349 | 82.98 | 549.8 | | 93.3 |
| 7.50 | 41.257 | 0.1218 | 8.027 | 83.08 | 574.7 | | 95.7 |
| 8.00 | 45.465 | 0.1362 | 8.826 | 83.18 | 602.5 | | 98.2 |
| 8.50 | 50.106 | 0.1517 | 9.765 | 83.29 | 633.3 | | 100.8 |
| 9.00 | 55.256 | 0.1686 | 10.862 | 83.39 | 667.2 | | 103.7 |
| 9.50 | 60.999 | 0.1870 | 12.143 | 83.50 | 704.6 | | 106.9 |
| 10.00 | 67.434 | 0.2070 | 13.635 | 83.62 | 745.4 | | 110.3 |

## Appendix C: Listing of a FORTRAN 77 program to calculate the thermophysical properties of ethane

In this Appendix, we give the complete listing for a FORTRAN 77 (FORTRAN V) program to calculate the thermophysical properties of ethane. Several aspects of this code must be mentioned. The program was written for a mainframe computer with very high precision; implementations for many personal computers will need to convert constants, functions, etc. to double precision. The program reflects the correlations as written in the body of this text; no systematic attempt was made to optimize the code. The comments interspersed throughout the code are meant to assist a programmer; however these are not complete. The program should be used in conjunction with this manuscript and [1], to assist in judging the uncertainties of the resulting properties and the applicable ranges of the correlations.

```
      PROGRAM C2PROPS
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
C
        WRITE(*,5)
 5      FORMAT(
     C ' ********THIS PROGRAM ALLOWS INTERACTIVE CALCULATION*********'/
     C ' *********OF MANY ETHANE THERMOPHYSICAL PROPERTIES**********'/
     C ' ************************************************************'/
     C ' *IT IS BASED ON THE CORRELATIONS OF FRIEND, INGHAM, AND ELY*'/
     C ' *******AS SUBMITTED TO J. PHYS. CHEM. REF. DATA 1989********'/
     C ' ********************UNDER THE TITLE:************************'/
     C ' ***********THERMOPHYSICAL PROPERTIES OF ETHANE*************'/
     C ' ************************************************************'/
     C ' ********* AND APPEARING IN THIS NBS TECHNICAL NOTE********'/)
        WRITE(*,6)
 6      FORMAT(
     C ' **THIS IMPLEMENTATION WAS WRITTEN FOR A MAIN FRAME COMPUTER*'/
     C ' ***************WITH 60 BIT WORD SIZE************************'/
     C ' ************************************************************'/
     C ' ******THE UNITS FOR INPUT AND OUTPUT ARE:******************'/
     C ' ***PRESSURE-MEGAPASCALS, DENSITY-MOLES PER CUBIC DECIMETER,*'/
     C ' ***********TEMPERAURE-KELVINS, ENERGY-JOULES,**************'/
     C ' *************VISCOSITY-MICROPASCAL SECONDS,****************'/
     C' *****AND THERMAL CONDUCTIVITY-MILLIWATTS PER METER KELVIN****'/
     C' *****ALL NOMINALLY EXTENSIVE QUANTITIES ARE EXPRESSED *******'/
     C' ***************ON A PER MOLE BASIS************************'//)
        PAUSE '*****PRESS ANY KEY TO CONTINUE*****'
        WRITE(*,7)
 7      FORMAT(
     C ' *****PLEASE CONSULT THE PAPER AND TEXT OF THIS TECH NOTE*****'/
     C ' ********FOR FURTHER DETAILS CONCERNING THE CORRELATIONS******'/
     C ' ************************************************************'////)
 10     WRITE(*,15)
 15     FORMAT('   PLEASE ENTER CODE FOR THE FOLLOWING CATEGORIES'/
     C '   OF THERMOPHYSICAL PROPERTIES:'/
     C '    1  ALONG THE SATURATION BOUNDARY'/
     C '    2  IN THE SINGLE PHASE GIVEN TEMPERATURE AND DENSITY'/
     C '    3  IN THE SINGLE PHASE GIVEN TEMPERATURE AND PRESSURE'/
     C '    4  OTHER STATE FUNCTIONS IN THE SINGLE PHASE'/
     C '    5  TRANSPORT PROPERTIES IN THE SINGLE PHASE'/
     C '    6  DILUTE AND IDEAL GAS PROPERTIES'/
     C '    7  TERMINATE THIS PROGRAM'/'    ')
        READ(*,*) ICAT
        IF(ICAT.EQ.1)THEN
          WRITE(*,20)
 20       FORMAT('     ENTER FUNCTION NUMBER AND STATE POINT'/
     C   '     1  SATURATION BOUNDARY (PRESSURE AND DENSITIES)'/
     C   '        FROM ANCILLARY EQUATIONS--GIVE T'/
     C   '     2  SATURATION BOUNDARY (PRESSURE AND DENSITIES)'/
     C   '        FROM MAXWELL CONSTRUCTION--GIVE T'/
     C   '     3  SATURATION TEMPERATURE FROM PRESSURE--GIVE P'/
     C   '     4  LIQUID HEAT CAPACITY ALONG SATURATION--GIVE T'/
     C   '     5  LIQUID SOUND SPEED   ALONG SATURATION--GIVE T'//'   ')
          READ(*,*)IFUNC,PROP1
          IF(IFUNC.EQ.1)THEN
            ANS=PSATF(PROP1)/10.
            ANS1=DSATL(PROP1)
            ANS2=DSATV(PROP1)
          END IF
          IF(IFUNC.EQ.2)CALL SATF(PROP1,ANS,ANS1,ANS2)
          IF(IFUNC.EQ.2)ANS=ANS/10.
          IF(IFUNC.EQ.3)ANS=TSAT(PROP1*10.)
          IF(IFUNC.EQ.4)ANS=CSAT(PROP1)
          IF(IFUNC.EQ.5)THEN
            CALL SATF(PROP1,PPP,PROP2,PPPP)
```

```
          ANS=WSF(PROP2,PROP1)
        END IF
        IF(IFUNC.LE.2)WRITE(*,80)PROP1,ANS,ANS1,ANS2
        IF(IFUNC.GT.2)WRITE(*,81)PROP1,ANS
      END IF
      IF(ICAT.EQ.2)THEN
        WRITE(*,25)
25      FORMAT('     ENTER FUNCTION NUMBER AND STATE POINT'/
     C  '      1  PRESSURE--GIVE T AND RHO'/
     C  '      2  ISOCHORIC HEAT CAPACITY--GIVE T AND RHO'/
     C  '      3  ISOBARIC HEAT CAPACITY--GIVE T AND RHO'/
     C  '      4  SOUND SPEED--GIVE T AND RHO'/
     C  '      5  ISOTHERMAL DP/DRHO--GIVE T AND RHO'/
     C  '      6  ISOCHORIC DP/DT--GIVE T AND RHO')
        READ(*,*)IFUNC,PROP1,PROP2
        IF(IFUNC.EQ.1)CALL PRESS(ANS,PROP2,PROP1,1)
        IF(IFUNC.EQ.1)ANS=ANS/10.
        IF(IFUNC.EQ.2)ANS= CVF(PROP2,PROP1)
        IF(IFUNC.EQ.3)ANS=CPEE(PROP2,PROP1)
        IF(IFUNC.EQ.4)ANS=WSF(PROP2,PROP1)
        IF(IFUNC.EQ.5)CALL DPDD(ANS,PROP2,PROP1,1)
        IF(IFUNC.EQ.5)ANS=ANS/10.
        IF(IFUNC.EQ.6)CALL DPDT(ANS,PROP2,PROP1,1)
        IF(IFUNC.EQ.6)ANS=ANS/10.
        WRITE(*,82)PROP1,PROP2,ANS
      END IF
      IF(ICAT.EQ.3)THEN
        WRITE(*,30)
30      FORMAT('     ENTER FUNCTION NUMBER AND STATE POINT'/
     C  '      1  DENSITY--GIVE T AND P'/
     C  '      2  ISOCHORIC HEAT CAPACITY--GIVE T AND P'/
     C  '      3  ISOBARIC HEAT CAPACITY--GIVE T AND P'/
     C  '      4  SOUND SPEED--GIVE T AND P'/
     C  '      5  ISOTHERMAL DP/DRHO--GIVE T AND P'/
     C  '      6  ISOCHORIC DP/DT--GIVE T AND P')
        READ(*,*)IFUNC,PROP1,PROP2
        RHO = RHOF(PROP2*10.,PROP1)
        IF(IFUNC.EQ.1)ANS=RHO
        IF(IFUNC.EQ.2)ANS= CVF(RHO,PROP1)
        IF(IFUNC.EQ.3)ANS=CPEE(RHO,PROP1)
        IF(IFUNC.EQ.4)ANS=WSF(RHO,PROP1)
        IF(IFUNC.EQ.5)CALL DPDD(ANS,RHO,PROP1,1)
        IF(IFUNC.EQ.6)CALL DPDT(ANS,RHO,PROP1,1)
        IF(IFUNC.GE.5)ANS=ANS/10.
        WRITE(*,82)PROP1,PROP2,ANS
      END IF
      IF(ICAT.EQ.4)THEN
        WRITE(*,35)
35      FORMAT('     ENTER FUNCTION NUMBER AND STATE POINT'/
     C  '      1  ENTROPY--GIVE T AND RHO'/
     C  '      2  HELMHOLTZ ENERGY--GIVE T AND RHO'/
     C  '      3  INTERNAL ENERGY--GIVE T AND RHO'/
     C  '      4  GIBBS ENERGY--GIVE T AND RHO'/
     C  '      5  ENTHALPY--GIVE T AND RHO')
        READ(*,*)IFUNC,PROP1,PROP2
        IF(IFUNC.EQ.1)ANS=ENTROPY(PROP2,PROP1)
        IF(IFUNC.EQ.2)ANS=HELM(PROP2,PROP1)
        IF(IFUNC.EQ.3)ANS=UNTERN(PROP2,PROP1)
        IF(IFUNC.GE.4)CALL PRESS(PPP,PROP2,PROP1,1)
        IF(IFUNC.EQ.4)ANS=GIBBS(PROP2,PROP1,PPP)
        IF(IFUNC.EQ.5)ANS=ENTHALP(PROP2,PROP1,PPP)
        WRITE(*,82)PROP1,PROP2,ANS
      END IF
      IF(ICAT.EQ.5)THEN
        WRITE(*,40)
40      FORMAT('     ENTER FUNCTION NUMBER AND STATE POINT'/
```

```
C   '     1  VISCOSITY--GIVE T AND RHO'/
C   '     2  THERMAL CONDUCTIVITY--GIVE T AND RHO'/
C   '     3  VISCOSITY--GIVE T AND P'/
C   '     4  THERMAL CONDUCTIVITY--GIVE T AND P')
      READ(*,*)IFUNC,PROP1,PROP2
      IF(IFUNC.EQ.1)ANS=VSCTY(PROP2,PROP1)
      IF(IFUNC.EQ.2)ANS=XLAMF(PROP2,PROP1)
      IF(IFUNC.GE.3) PROO=RHOF(PROP2*10.,PROP1)
      IF(IFUNC.EQ.3)ANS=VSCTY(PROO,PROP1)
      IF(IFUNC.EQ.4)ANS=XLAMF(PROO,PROP1)
      WRITE(*,82)PROP1,PROP2,ANS
    END IF
    IF(ICAT.EQ.6)THEN
      WRITE(*,45)
 45   FORMAT('     ENTER FUNCTION NUMBER AND STATE POINT'/
C   '     1  SECOND VIRIAL COEFFICIENT--GIVE T AND 0'/
C   '     2  IDEAL GAS ISCHORIC HEAT CAPACITY--GIVE T AND 0'/
C   '     3  IDEAL GAS ISOBARIC HEAT CAPACITY--GIVE T AND 0'/
C   '     4  IDEAL GAS ENTHALPY--GIVE T AND 0'/
C   '     5  IDEAL GAS INTERNAL ENERGY--GIVE T AND 0'/
C   '     6  IDEAL GAS ENTROPY--GIVE T AND RHO'/
C   '     7  IDEAL GAS HELMHOLTZ ENGERGY--GIVE T AND RHO'/
C   '     8  IDEAL GAS ENTROPY--GIVE T AND P'/
C   '     9  IDEAL GAS HELMHOLTZ ENERGY--GIVE T AND P'/
C   '    10  DILUTE GAS VISCOSTIY--GIVE T AND 0'/
C   '    11  DILUTE GAS THERMAL CONDUCTIVITY--GIVE T AND 0')
      READ(*,*)IFUNC,PROP1,PROP2
      IF (PROP2.EQ.0.)PROP2=0.000001
      IF(IFUNC.EQ.1)ANS=BVIR(PROP1)
      IF((IFUNC.EQ.8).OR.(IFUNC.EQ.9))PROP2=10.*PROP2/(R*PROP1)
      IF((IFUNC.GT.1).AND.(IFUNC.LT.10))CALL IDEAL1(
C     PROP1,PROP2,EID,HID,HEL,SID,CVID,CPID,3)
      IF(IFUNC.EQ.2)ANS=CVID
      IF(IFUNC.EQ.3)ANS=CPID
      IF(IFUNC.GE.4)ANS=HID
      IF(IFUNC.EQ.5)ANS=EID
      IF(IFUNC.EQ.6)ANS=SID
      IF(IFUNC.EQ.7)ANS=HEL
      IF(IFUNC.EQ.8)ANS=SID
      IF(IFUNC.EQ.9)ANS=HEL
      IF(IFUNC.EQ.10)ANS=ETA0(PROP1)
      IF(IFUNC.EQ.11)ANS=TCOND0(PROP1)
      IF(IFUNC.LE.5)WRITE(*,81)PROP1,ANS
      IF((IFUNC.GT.5).AND.(IFUNC.LT.10))WRITE(*,82)PROP1,PROP2,ANS
      IF(IFUNC.GE.10)WRITE(*,81)PROP1,ANS
    END IF
    IF(ICAT.EQ.7)STOP 'FINISH C2PROPS'
    GO TO 10
 80 FORMAT(1X,4G20.9)
 81 FORMAT(1X,2G20.9)
 82 FORMAT(1X,3G20.9)
    END
C
    FUNCTION CSAT(T)
C
C*********THIS FUNCTION CALCULATES THE HEAT CAPACITY OF THE LIQUID
C*********ALONG THE SATURATION BOUNDARY
C
    COMMON /DERIV/ DPSDT, DDSDT
    RHO=DSATL(T)
    CALL DPDT(DPD,RHO,T,1)
    CSAT=CVF(RHO,T)-100.*T/RHO**2*DPD*DDSDT
    RETURN
    END
C
```

```
      FUNCTION BVIR(T)
C
C*********THIS FUNCION CALCULATES THE SECOND VIRIAL COEFFICIENT
C*********USING THE SCHMIDT-WAGNER EQUATION OF STATE
C
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
C
      TA = TC / T
      T15 = TA ** 1.5
      T25 = TA ** 2.5
      T5 = TA ** 5
      T6 = TA ** 6
      B = G(1) + G(2)*T15 + G(3)*T25 + G(14)*T5+ G(15)*T6
      BVIR = B / DC
      RETURN
      END
C
       SUBROUTINE SATF(TS,PS,DSL,DSV)
C      PURPOSE --- THIS ROUTINE CALCULATES THE SATURATION
C                  PRESSURE AND COEXISTING DENSITIES FROM
C                  AN EQUATION OF STATE.
C
C      VERSION 2.0  5/20/82
C
C      CODED BY -- J. F. ELY
C                  THERMOPHYSICAL PROPERTIES DIVISION
C                  NATIONAL BUREAU OF STANDARDS
C                  BOULDER, COLORADO  80303
C
C * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  **
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
      LOGICAL ENTER
      DATA TOL, FTOL, ENTER / 1.0E-4, 1.0E-6, .FALSE. /
C
      IF(TS.LT.TC) GO TO 005
      PS = PC
      DSL = DC
      DSV = DC
      RETURN
C
  005 IF (ENTER) GO TO 010
      ENTER = .TRUE.
      BV = ALOG(PTRP/PC) / (1.0/TTRP - 1.0/TC)
      AV = ALOG(PC) - BV / TC
C                         INITIAL GUESS AT THE VAPOR PRESSURE
  010 PS = EXP(AV+BV/TS)
C
C                         INITAL GUESS AT THE VAPOR DENSITY
      DV = PS / (R*TS)
C                         INITIAL GUESS AT LIQUID DENSITY
C
      TR = TS /TC
      EPS = (1.0-TR)**(2.0/7.0)
      DL = DC / ZC**EPS
      IF (DL.GT.DTRP) DL = DTRP
C
C                         IMPROVE VAPOR GUESS NEAR CRITICAL
C
      IF (TR.LT.0.85) GO TO 015
      DV = DL - 3.75 * DC * (1.0-TR)**0.333
C                         NEWTON-RAPHSON ITERATION FOR DENSITIES
  015 DO 100 J = 1, 25
  020 CALL PVTF(PL,DL,TS,DPDL,D2PDD2,GL)
  030 IF (DPDL.GT.0.0.AND.PL.GT.0.0) GO TO 040
```

```
      DL = 1.02 * DL
      GO TO 020
  040 CALL PVTF(PV,DV,TS,DPDV,D2PDD2,GV)
      IF (DPDV.GT.0.0) GO TO 060
      DV = 0.98 * DV
      GO TO 040
  060 F1 = GL -GV
      F2 = PL - PV
      F2L = DPDL
      F2V = - DPDV
      F1L = F2L / DL
      F1V = F2V / DV
      DENOM = F1L * F2V - F2L * F1V
      IF (ABS(DENOM).LE.1.0E-10) GO TO 120
      DDL = -(F1*F2V-F2*F1V) / DENOM
      DDV = -(F1+DDL*F1L) / F1V
      DL = DL + DDL
      IF(DL.LT.DC) DL = DC
      DVS = DV
      DV = DV + DDV
      IF(DV.GT.DC) DV = DC
      IF(DV.LE.0.0) DV=DVS/2.0
      IF (ABS(DDL/DL).LT.TOL .AND. ABS(DDV/DV).LE.TOL) GO TO 110
      FNORM = F1*F1 + F2*F2
      IF(TR.LT.0.99 .AND. FNORM.LE.FTOL) GO TO 110
  100 CONTINUE
  110 PS = PV
      DSL = DL
      DSV = DV
      RETURN
  120 WRITE(6,340) DENOM
      GO TO 110
  300 FORMAT(I3,8G10.4)
  310 FORMAT(I3,2F12.8,G13.6)
  330 FORMAT(F8.2,G13.6,2F10.6,2G13.6)
  340 FORMAT('DENOM IS TOO SMALL IN SATF',G13.6)
      END
C
      FUNCTION RHOF(P1,P2)
C
C * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  **  *
C
C     PURPOSE -- THIS ROUTINE CALCULATES THE DENSITY OF A FLUID AT
C                T AND P GIVEN AN INITIAL GUESS IN FOP.  ON EXIT,
C                IT RETURNS THE FUGACITY COEFFICIENT IN FOP.  IT
C                REQUIRES A ROUTINE 'PVTF' WHICH CALCULATES P,
C                DPDD, AND GR = G(T,P)-G*(T,1)
C
C       CODED BY--J. F. ELY
C                THERMOPHYSICAL PROPERTIES DIVISION
C                NATIONAL ENGINEERING LABORATORY
C                NATIONAL BUREAU OF STANDARDS
C                BOULDER, COLORADO 80302
C
C       VERSION 2.0 -- 5/23/82
C
C * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  * * * *  **  *
C
C       REVISED 3/12/85 TO CHANGE BOUNDS AND AVOID CRITICAL REGION IN N-R.
C
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32), PTRP, DTRP, TTRP
     *              , CMW
      DATA TOLERD, TOLERP / 1.0E-8, 1.0E-8/
C
C                          ESTABLISH BOUNDS AND START NEWTON-RAPHSON
      P = P1
```

```
      T = P2
      D = P / (R*T)
      IF (T.GT.TC) GO TO 019
      CALL SATF(T,PS,DSL,DSV)
      D = DSV
      IF (P.GE.PS) D = DSL
      IF ((P.GE.1.5*PS).AND.((TC-T).LE.7.)) D = 2.0 * DSL
      GO TO 020
  019 IF (P.GT.2.*PC) D = 1.5 * MAX(D,DC)
C
C                          ESTABLISH BOUNDS AND START NEWTON RAPHSON
  020 DLO=0.0
      DHI = 1.50 * DTRP
      DMAX = 1.2 * DHI
      DO 100 LAP=1,20
      CALL PVTF(PX,D,T,DPDD,D2PDD2,GR)
C
C                          IF DPDD IS ZERO OR NEGATIVE, TRY BISECTION
C
      IF(DPDD.LE.1.0E-3) GO TO 120
      DP=P-PX
      DD=DP/DPDD
C                          SAVE DENSITY FOR POSSIBLE BISECTION
      IF (DP) 040,300,060
  040 DHI=D
      GO TO 080
  060 DLO=D
  080 DN=D+DD
C                          KEEP D WITHIN BOUNDS OR GO TO BISECTION
      IF (DN.LT.0.0 .OR. DN.GT.DMAX) GO TO 120
      D=DN
      IF(LAP.EQ.1) GO TO 100
      IF(ABS(DP/P).LE.TOLERP) GO TO 300
      IF(ABS(DD/D).LE.TOLERD) GO TO 300
  100 CONTINUE
C                          NEWTON-RAPHSON FAILURE.  TRY BISECTION
  120 IF(T.GT.TC) GO TO 160
C
C                          SUB-CRITICAL.  MAKE SURE THAT WE HAVE THE
C                          PROPER BOUNDS ON THE DENSITY.
      IF(P.LT.PS) GO TO 140
      DLO = DSL
      IF(DHI.LE.DSL) DHI=DMAX
      GO TO 160
C
  140 IF(DLO.GE.DSV) DLO=0.0
      DHI = DSV
C
C                          START THE BISECTION
  160 D=0.50*(DLO+DHI)
      CALL PVTF(PX,D,T,DPDD,D2PDD2,GR)
      DP=PX-P
      IF(DP) 200,300,220
  200 DLO=D
      GO TO 240
  220 DHI=D
  240 IF(ABS(DP/P) .LE. TOLERP) GO TO 300
      IF(ABS(DLO/DHI-1.0).GT.TOLERD) GO TO 160
C
C                          BISECTION FAILED.  GIVE UP
  260 WRITE(6,400) T, P,D,DPDD,DLO,DHI,LAP,PX
C                          CONVERGENCE ! ! !
  300 RHOF=D
      RETURN
  400 FORMAT('RHOF FAILED AT T =',F9.3,' P =',G14.7,4G12.6,I4,G12.6)
      END
```

```
C
      SUBROUTINE PVTF(P0,D0,T0,DPDD,D2PD2,G0)
C
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
C     PURPOSE --- THIS ROUTINE CALCULATES THE  PRESSURE, ITS FIRST
C                 TWO DENSITY DERIVATIVES AND THE GIBBS ENERGY
C                 RELATIVE TO THE IDEAL GAS AT 1 BAR
C                 THIS ROUTINE IS FOR THE WAGNER EQUATION OF STATE
C
C      VERSION 1.0 - 2/18/85
C
C      CODED BY -- J. F. ELY
C                  CHEMICAL ENGINEERING SCIENCE DIVISION
C                  NATIONAL BUREAU OF STANDARDS
C                  BOULDER, COLORADO  80303
C
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
      DIMENSION S(4), P(10,3), Q(3), DQDD(3), D2QDD2(3), D3QDD3(3)
C
      COMMON /REFDAT/ RG, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
C
      DATA P / 30*0. /, TLAST / -1.0 /
C
C
      T = TC / T0
      D = D0 / DC
      IF(T.EQ.TLAST) GO TO 040
      TLAST=T
      RT = RG * T0
      TS = SQRT(T)
      TTS = T * TS
      T2 = T * T
      T3 = T * T2
      T4 = T * T3
      T5 = T * T4
      T6 = T * T5
      T7 = T * T6
      T8 = T2 * T6
      T11 = T8 * T3
      T17 = T6 * T11
      T18 = T * T17
C
      P(1,1) = G(1) + (G(2) + G(3)*T) * TTS
      P(2,1) = G(4)/TS + G(5)*TTS + G(6)*T2
      P(3,1) = G(7) + (G(8) + G(9)*TTS) * T
      P(6,1) = G(10)
      P(7,1) = G(11)*T2 + G(12)*T5
      P(8,1) = G(13)*T2
C
      P(1,2) = G(14)*T5 + G(15)*T6
      P(2,2) = (G(16) + G(17)*T2) * T2 * TTS
      P(3,2) = G(18)*T3 + G(19)*T7
      P(5,2) = G(20) * T6
      P(6,2) = G(21) * T8 * TS
      P(7,2) = G(22) * T4
      P(8,2) = G(23) * T6 * TS
      P(10,2)= G(24) * T5 * TS
C
      P(2,3) = G(25) * T11 * T11
      P(3,3) = G(26) * T11 + G(27) * T18
      P(4,3) = (G(28) + G(29)*T11*T) * T11
      P(5,3) = (G(30) + T * (G(31) + G(32)*T5)) * T17
C
```

```
  040 DO 070 J = 1, 3
      DO 050 K = 1, 4
  050 S(K) = 0.
      DO 060 I = 1, 10
      S(1) = S(1) * D + P(11-I,J)
      S(2) = S(2) * D + S(1)
      IF (I.EQ.10) GO TO 060
      S(3) = S(3) * D + S(2)
      IF (I.EQ.9) GO TO 060
      S(4) = S(4) * D + S(3)
  060 CONTINUE
      Q(J) = S(1) * D
      DQDD(J) = S(2)
      D2QDD2(J) = S(3) * 2.0
  070 D3QDD3(J) = S(4) * 6.0
C
      D2 = D * D
      D3 = D * D2
      F2 = EXP(-D2)
      F3 = EXP(-D*D3)
      TWOD = 2.0 * D
      FORD = 4.0 * D3
      DRT = D0 * RT
C
      PHI = Q(1) + Q(2) * F2 + Q(3) * F3
C
      TRM2 = DQDD(2) - TWOD * Q(2)
      TRM3 = DQDD(3) - FORD * Q(3)
      DPHDD = DQDD(1) + TRM2 * F2 + TRM3 * F3
      P0 = DRT * (1.0 + D * DPHDD)
C
      TRM2P = D2QDD2(2) - 2.0 * Q(2) - TWOD * DQDD(2)
      TRM3P = D2QDD2(3) - 12.0 * D2 * Q(3) - FORD * DQDD(3)
      TRM22 = TRM2P - TWOD * TRM2
      TRM33 = TRM3P - FORD * TRM3
      D2PHD2 = D2QDD2(1) + TRM22 * F2 + TRM33 * F3
      DPDD = RT * (1.0 + TWOD * DPHDD + D2 * D2PHD2)
C
      TRM22P = D3QDD3(2) - 4.0 * DQDD(2) - TWOD * D2QDD2(2)
     *                   - 2.0 * TRM2    - TWOD * TRM2P
      TRM33P = D3QDD3(3) - 24.0 * D * (Q(3) + D * DQDD(3))
     *       - FORD * (D2QDD2(3) + TRM3P) - 12.0 * D2 * TRM3
      D3PHD3 = D3QDD3(1) + (TRM22P - TWOD * TRM22) * F2
     *                   + (TRM33P - FORD * TRM33) * F3
      D2PD2 = RT * (2.0*DPHDD + 4.0*D*D2PHD2 + D2*D3PHD3) / DC
C
      Z0 = P0 / DRT
      G0 = RT * (PHI + Z0 - 1.0 + ALOG(DRT))
      RETURN
      END
C
      FUNCTION CVF(D,T)
C
C************THIS FUNCTION CALCULATES THE ISOCHORIC HEAT CAPACITY
C
      CALL CVR(CVD,D,T,1)
      CALL IDEAL(T,CVI,SI)
      CVF = CVI + 100.0 * CVD
      RETURN
      END
```

```
      FUNCTION WSF(D,T)
C
C                        THIS ROUTINE CALCULATES THE SOUND VELOCITY
C                        GIVEN THE DENSITY AND TEMPERATURE
C
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
C
      COMMON /DPDCAL/ CP, CV, DPD, DPT
C
      CV = CVF(D,T)
      CALL DPDT(DPT,D,T,1)
      CALL DPDD(DPD,D,T,1)
      DPT = DPT / D
      CP = CV + 100.0 * T * DPT * DPT / DPD
      WSS =  CP * DPD / (CMW * CV)
       IF(WSS.LT.0.)WSS=0.0
      WSF = SQRT(1.0E5 * WSS)
      RETURN
      END
C
      SUBROUTINE PROPSS(PP,DD,TT,IDD)
C************THIS SUBROUTINE CALCULATES MANY OF THE THERMODYNAMIC
C************PROPERTIES FROM THE SCHMIDT-WAGNER EQUATION OF STATE
      DIMENSION X(33),B(33)
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
      EQUIVALENCE (B,X)
    1 CONTINUE
      D = DD/DC
      DEN = DD
      T = TC/TT
      TEMP = TT
      RT = R * TEMP
      DRT = DEN * RT
      DDRT = D * DRT
      RTD = RT / DC
      RD = DEN * R
      RTT = RD / TC
      D2 = D * D
      D3 = D2 * D
      D4 = D3 * D
      D5 = D4 * D
      D6 = D5 * D
      D7 = D6 * D
      D8 = D7 * D
      D9 = D8 * D
      D10 = D9 * D
      D11 = D10 * D
      D12 = D11 * D
      D13 = D12 * D
      D14 = D13 * D
      D15 = D14 * D
      D16 = D15 * D
      TS = SQRT (T)
      TMS = 1.0 / TS
      T15 = T * TS
      T2 = T * T
      T25 = T2 * TS
      T3 = T2 * T
      T35 = T3 * TS
      T4 = T3 * T
      T45 = T4 * TS
      T5 = T4 * T
      T55 = T5 * TS
      T6 = T5 * T
```

```
      T65 = T6 * TS
      T7 = T6 * T
      T75 = T7 * TS
      T8 = T7 * T
      T85 = T8 * TS
      T9 = T8 * T
      T95 = T9 * TS
      T11 = T8 * T3
      T12 = T11 * T
      T17 = T12*T5
      T18 = T17 * T
      T19 = T18 * T
      T22 = T18 * T4
      T23 = T22 * T
      T24 = T23 * T
      F1 = EXP ( -D2)
      F2 = EXP ( -D4)
      GO TO (100,200,300,400,500,600,700,800),K
      ENTRY PRESS(PP,DD,TT,IDD)
C********ENTRY TO CALCULATE PRESSURE
      K = 1
      GO TO 1
  100 CONTINUE
      B( 1) = DDRT *  1.0
      B( 2) = DDRT *  T15
      B( 3) = DDRT *  T25
      B( 4) = DDRT *  2.*D*TMS
      B( 5) = DDRT *  2.*D*T15
      B( 6) = DDRT *  2.*D*T2
      B( 7) = DDRT *  3.*D2
      B( 8) = DDRT *  3.*D2*T
      B( 9) = DDRT *  3.*D2*T25
      B(10) = DDRT *  6.*D5
      B(11) = DDRT *  7.*D6*T2
      B(12) = DDRT *  7.*D6*T5
      B(13) = DDRT *  8.*D7*T2
      B(14) = DDRT *  (1.-2.*D2)*T5*F1
      B(15) = DDRT *  (1.-2.*D2)*T6*F1
      B(16) = DDRT *  (2.*D-2.*D3)*T35*F1
      B(17) = DDRT *  (2.*D-2.*D3)*T55*F1
      B(18) = DDRT *  (3.*D2-2.*D4)*T3*F1
      B(19) = DDRT *  (3.*D2-2.*D4)*T7*F1
      B(20) = DDRT *  (5.*D4-2.*D6)*T6*F1
      B(21) = DDRT *  (6.*D5-2.*D7)*T85*F1
      B(22) = DDRT *  (7.*D6-2.*D8)*T4*F1
      B(23) = DDRT *  (8.*D7-2.*D9)*T65*F1
      B(24) = DDRT *  (10.*D9-2.*D11)*T55*F1
      B(25) = DDRT *  (2.*D-4.*D5)*T22*F2
      B(26) = DDRT *  (3.*D2-4.*D6)*T11*F2
      B(27) = DDRT *  (3.*D2-4.*D6)*T18*F2
      B(28) = DDRT *  (4.*D3-4.*D7)*T11*F2
      B(29) = DDRT *  (4.*D3-4.*D7)*T23*F2
      B(30) = DDRT *  (5.*D4-4.*D8)*T17*F2
      B(31) = DDRT *  (5.*D4-4.*D8)*T18*F2
      B(32) = DDRT *  (5.*D4-4.*D8)*T23*F2
      IF(IDD.GT.0)GO TO 102
      B(33) = PP-DRT
      RETURN
  102 P = 0
      M = 32
      DO 101 I = 1,M
      P = P+B(I) * G(I)
  101 CONTINUE
      P =  P + DRT
      PP = P
      RETURN
```

```
C
      ENTRY DPDD(PP,DD,TT,IDD)
C**********ENTRY TO CALCULATE ISOTHERMAL DENSITY DERIVATIVE OF PRESSURE
C
      K = 2
      GO TO 1
  200 CONTINUE
      B( 1) = RT *   2.00 * D
      B( 2) = RT *   2.00 * D * T15
      B( 3) = RT *   2.00 * D * T25
      B( 4) = RT *   6.00 * D2 *TMS
      B( 5) = RT *   6.00 * D2 * T15
      B( 6) = RT *   6.00 * D2 * T2
      B( 7) = RT *  12.00 * D3
      B( 8) = RT *  12.00 * D3 * T
      B( 9) = RT *  12.00 * D3 * T25
      B(10) = RT *  42.00 * D6
      B(11) = RT *  56.00 * D7 * T2
      B(12) = RT *  56.00 * D7 * T5
      B(13) = RT *  72.00 * D8 * T2
      B(14) = RT * F1 *  (2.00 * D  - 10.*D3 + 4.*D5) * T5
      B(15) = RT * F1 *  (2.00 * D  - 10.*D3 + 4.*D5) * T6
      B(16) = RT * F1 *  (6.00 * D2 - 14.*D4 + 4.*D6) * T35
      B(17) = RT * F1 *  (6.00 * D2 - 14.*D4 + 4.*D6) * T55
      B(18) = RT * F1 *  (12.0 * D3 - 18.*D5 + 4.*D7) * T3
      B(19) = RT * F1 *  (12.0 * D3 - 18.*D5 + 4.*D7) * T7
      B(20) = RT * F1 *  (30.00 *D5 - 26.*D7 + 4.*D9) * T6
      B(21) = RT * F1 *  (42.00 *D6 - 30.*D8 + 4.*D10) * T85
      B(22) = RT * F1 *  (56.00 *D7 - 34.*D9 + 4.*D11) * T4
      B(23) = RT * F1 *  (72.00 *D8 - 38.*D10 + 4.*D12) * T65
      B(24) = RT * F1 * (110.00 *D10 -46.*D12 + 4.*D14) * T55
      B(25) = RT * F2 *  (6.00 * D2 - 36.0 * D6 + 16.0 * D10) * T22
      B(26) = RT * F2 *  (12.0 * D3 - 44.0 * D7 + 16.0 * D11) * T11
      B(27) = RT * F2 *  (12.0 * D3 - 44.0 * D7 + 16.0 * D11) * T18
      B(28) = RT * F2 *  (20.0 * D4 - 52.0 * D8 + 16.0 * D12) * T11
      B(29) = RT * F2 *  (20.0 * D4 - 52.0 * D8 + 16.0 * D12) * T23
      B(30) = RT * F2 *  (30.0 * D5 - 60.0 * D9 + 16.0 * D13) * T17
      B(31) = RT * F2 *  (30.0 * D5 - 60.0 * D9 + 16.0 * D13) * T18
      B(32) = RT * F2 * (30.0 * D5 - 60.0 * D9 + 16.0 * D13) * T23
      M = 32
      IF(IDD.GT.0)GO TO 202
      B(33) = PP-RT
      RETURN
  202 P = 0
      DO 201 I = 1,M
      P = P+B(I) * G(I)
  201 CONTINUE
      P = P+RT
      PP = P
      RETURN
C
      ENTRY DPDT(PP,DD,TT,IDD)
C********ENTRY TO CALCULATE ISOCHORIC TEMPERATURE DERIVATIVE OF PRESSURE
C
      K = 3
      GO TO 1
  300 CONTINUE
      B( 1) = RD *  D
      B( 2) = -RD *  .5*D*T15
      B( 3) = -RD *  1.5*D*T25
      B( 4) = RD *  3.*D2*TMS
      B( 5) = -RD *  D2*T15
      B( 6) = -RD *  2.*D2*T2
      B( 7) = RD *  3.*D3
      B( 8) = 0.0
      B( 9) = -RD *  4.5*D3*T25
```

```
      B(10) = RD *  6.*D6
      B(11) = -RD *  7.*D7*T2
      B(12) = -RD *  28.*D7*T5
      B(13) = -RD *  8.*D8*T2
      B(14) = -RD * (4.0*D-8.*D3)*T5*F1
      B(15) = -RD * (5.0*D-10.*D3)*T6* F1
      B(16) = -RD *  5.0*(D2-D4)*T35*F1
      B(17) = -RD *  9.0*(D2-D4)*T55*F1
      B(18) = -RD * (6.*D3-4.*D5)*T3*F1
      B(19) = -RD * (18.*D3-12.*D5)*T7*F1
      B(20) = -RD * (25.*D5-10.*D7)*T6*F1
      B(21) = -RD * (45.0*D6-15.*D8)*T85*F1
      B(22) = -RD * (21.*D7-6.*D9)*T4*F1
      B(23) = -RD * (44.*D8-11.*D10)*T65*F1
      B(24) = -RD * (45.*D10-9.*D12)*T55*F1
      B(25) = -RD * (42.*D2-84.*D6)*T22*F2
      B(26) = -RD * (30.*D3-40.*D7)*T11*F2
      B(27) = -RD * (51.*D3-68.*D7)*T18*F2
      B(28) = -RD *  40.*(D4-D8)*T11*F2
      B(29) = -RD *  88.*(D4-D8)*T23*F2
      B(30) = -RD * (80.*D5-64.*D9)*T17*F2
      B(31) = -RD * (85.*D5-68.*D9)*T18*F2
      B(32) = -RD * (110.*D5-88.*D9)*T23*F2
      IF(IDD.GT.0)GO TO 302
      B(33) = PP-RD
      RETURN
  302 P = 0
      DO 301 I = 1,32
      P = P+G(I) * B(I)
  301 CONTINUE
      PP = P+RD
      RETURN
C
      ENTRY SR(PP,DD,TT,IDD)
C**********ENTRY TO CALCULATE RESIDUAL ENTROPY
C
      K = 4
      GO TO 1
  400 CONTINUE
      X( 1) = -R * D
      X( 2) = R * 0.50 * D * T15
      X( 3) = R * 1.50 * D * T25
      X( 4) = -R * 1.50 * D2 * TMS
      X( 5) = R * 0.50 * D2 * T15
      X( 6) = R  * D2 * T2
      X( 7) = -R * D3
      X( 8) = 0.0
      X( 9) = R * 1.5 * D3 * T25
      X(10) = -R * D6
      X(11) = R * D7 * T2
      X(12) = R * 4.00 * D7 * T5
      X(13) = R * D8 * T2
      X(14) = R * 4.00 * D * T5 * F1
      X(15) = R * 5.00 * D * T6 * F1
      X(16) = R * 2.5 * D2 *T35 * F1
      X(17) = R * 4.5 * D2 * T55 * F1
      X(18) = R * 2.00 * D3 * T3 * F1
      X(19) = R * 6.00 * D3 * T7 * F1
      X(20) = R * 5.00 * D5 * T6 * F1
      X(21) = R * 7.5 * D6 *T85 * F1
      X(22) = R * 3.0 * D7 * T4 * F1
      X(23) = R * 5.5 * D8 * T65 * F1
      X(24) = R * 4.5 * D10 * T55 * F1
      X(25) = R * 21.0 * D2 * T22 * F2
      X(26) = R * 10.0 * D3 * T11 * F2
      X(27) = R * 17.0 * D3 * T18 * F2
```

```
      X(28) = R * 10.0 * D4 * T11 * F2
      X(29) = R * 22.0 * D4 * T23 * F2
      X(30) = R * 16.0 * D5 * T17 * F2
      X(31) = R * 17.0 * D5 * T18 * F2
      X(32) = R * 22.0 * D5 * T23 * F2
      IF(IDD.GT.0)GO TO 402
      RETURN
  402 P = 0
      DO 401 I = 1,32
      P = P+G(I) * X(I)
  401 CONTINUE
      PP = P
      RETURN
C
      ENTRY AR(PP,DD,TT,IDD)
C************ENTRY TO CALCULATE RESUDUAL HELMHOLTZ FREE ENERGY
C
      K = 5
      GO TO 1
  500 CONTINUE
      B( 1) = RT * D
      B( 2) = RT * D * T15
      B( 3) = RT * D * T25
      B( 4) = RT * D2 *TMS
      B( 5) = RT * D2 * T15
      B( 6) = RT * D2 * T2
      B( 7) = RT * D3
      B( 8) = RT * D3 * T
      B( 9) = RT * D3 * T25
      B(10) = RT * D6
      B(11) = RT * D7 * T2
      B(12) = RT * D7 * T5
      B(13) = RT * D8 * T2
      B(14) = RT * D * T5 * F1
      B(15) = RT * D * T6 *F1
      B(16) = RT * D2 * T35 * F1
      B(17) = RT * D2 *T55 * F1
      B(18) = RT * D3 * T3 * F1
      B(19) = RT * D3 * T7 * F1
      B(20) = RT * D5 * T6 * F1
      B(21) = RT * D6 * T85 * F1
      B(22) = RT * D7 * T4 * F1
      B(23) = RT * D8 * T65 * F1
      B(24) = RT * D10 * T55 * F1
      B(25) = RT * D2 * T22 * F2
      B(26) = RT * D3 * T11 * F2
      B(27) = RT * D3 * T18 * F2
      B(28) = RT * D4 * T11  * F2
      B(29) = RT * D4 * T23 * F2
      B(30) = RT * D5 *T17 * F2
      B(31) = RT * D5 * T18 * F2
      B(32) = RT * D5 * T23 * F2
      IF(IDD.GT.0)GO TO 502
      RETURN
  502 P = 0
      DO 501 I = 1,32
      P = P+G(I) * B(I)
  501 CONTINUE
      PP = P
      RETURN
```

```
      ENTRY CVR(PP,DD,TT,IDD)
C**********ENTRY TO CALCULATE RESIDUAL ISOCHORIC HEAT CAPACITY
C
      K = 6
      GO TO 1
  600 CONTINUE
      X( 1) = 0.0
      X( 2) = -R * 0.75 * D * T15
      X( 3) = -R * 3.75 * D * T25
      X( 4) = -R * 0.75 * D2 * TMS
      X( 5) = -R * 0.75 * D2 * T15
      X( 6) = -R * 2.00 * D2 * T2
      X( 7) = 0.0
      X( 8) =  0.0
      X( 9) = -R * 3.75 * D3 * T25
      X(10) =  0.0
      X(11) = -R * 2.00 * D7 * T2
      X(12) = -R * 20.00 * D7 * T5
      X(13) = -R * 2.00 * D8 * T2
      X(14) = -R * 20.00 * D * T5 * F1
      X(15) = -R * 30.00 * D * T6 * F1
      X(16) = -R * 8.75 * D2 *T35 * F1
      X(17) = -R * 24.75 * D2 * T55 * F1
      X(18) = -R * 6.00 * D3 * T3 * F1
      X(19) = -R * 42.00 * D3 * T7 * F1
      X(20) = -R * 30.00 * D5 * T6 * F1
      X(21) = -R * 63.75 * D6 *T85 * F1
      X(22) = -R * 12.0 * D7 * T4 * F1
      X(23) = -R * 35.75 * D8 * T65 * F1
      X(24) = -R * 24.75 * D10 * T55 * F1
      X(25) = -R * 462.0 * D2 * T22 * F2
      X(26) = -R * 110.0 * D3 * T11 * F2
      X(27) = -R * 306.0 * D3 * T18 * F2
      X(28) = -R * 110.0 * D4 * T11 * F2
      X(29) = -R * 506.0 * D4 * T23 * F2
      X(30) = -R * 272.0 * D5 * T17 * F2
      X(31) = -R * 306.0 * D5 * T18 * F2
      X(32) = -R * 506.0 * D5 * T23 * F2
      IF(IDD.GT.0)GO TO 602
      RETURN
  602 P = 0
      DO 601 I = 1,32
      P = P+G(I) * X(I)
  601 CONTINUE
      PP = P
      RETURN
C
      ENTRY DP2D2(PP,DD,TT,IDD)
C**********ENTRY TO CALCULATE SECOND ISOTHERMAL DENSITY DERIVATIVE
C**********OF PRESSURE
C
      K = 7
      GO TO 1
  700 CONTINUE
      B( 1) = RTD * 2.0
      B( 2) =RTD * 2.0 * T15
      B( 3) =RTD * 2.0 * T25
      B( 4) =RTD * 12.0 * D * TMS
      B( 5) =RTD * 12.0 * D * T15
      B( 6) =RTD * 12.0 * D * T2
      B( 7) =RTD * 36.0 * D2
      B( 8) =RTD * 36.0 * D2 * T
      B( 9) =RTD * 36.0 * D2 * T25
      B(10) =RTD * 252. * D5
      B(11) =RTD * 392. * D6 * T2
      B(12) =RTD * 392. * D6 * T5
```

```
      B(13) =RTD * 576. * D7 * T2
      B(14) =RTD *(  2.0 -  34.0 * D2 +  40.0 * D4 - 8.0 * D6)*T5*F1
      B(15) =RTD *(  2.0 -  34.0 * D2 +  40.0 * D4 - 8.0 * D6)*T6*F1
      B(16) =RTD *(12.0*D - 68.0 * D3 + 52.0 * D5 - 8.0 * D7)*T35*F1
      B(17) =RTD *(12.0*D - 68.0 * D3 + 52.0 * D5 - 8.0 * D7)*T55*F1
      B(18) =RTD*(36.0*D2 -114.0 * D4 +  64.0 * D6 - 8.0 * D8)*T3*F1
      B(19) =RTD*(36.0*D2 -114.0 * D4 +  64.0 * D6 - 8.0 * D8)*T7*F1
      B(20) =RTD*(150.0*D4 -242.0*D6 +  88.0 * D8 - 8.0 * D10)*T6*F1
      B(21) =RTD*(252.0*D5 -324.0*D7 +100.0 * D9 - 8.0 * D11)*T85*F1
      B(22) =RTD*(392.0*D6-418.0 *D8 + 112.0 * D10- 8.0 * D12)*T4*F1
      B(23) =RTD*(576.0*D7-524.0*D9 + 124.0 * D11- 8.0 * D13)*T65*F1
      B(24) =RTD*(1100.0*D9-772.0*D11 +148.0 *D13- 8.0 * D15)*T55*F1
      B(25) =RTD*(12.0*D- 240.0 * D5 +304.0 * D9- 64.0 * D13)*T22*F2
      B(26) =RTD*(36.0*D2 -356.0*D6 +352.0 * D10- 64.0 * D14)*T11*F2
      B(27) =RTD*(36.0*D2 -356.0*D6 +352.0 * D10- 64.0 * D14)*T18*F2
      B(28) =RTD*(80.0*D3 -496.0*D7 +400.0 * D11- 64.0 * D15)*T11*F2
      B(29) =RTD*(80.0*D3 -496.0*D7 +400.0 * D11- 64.0 * D15)*T23*F2
      B(30) =RTD*(150.0*D4 -660.0*D8 +448.0 * D12-64.0 * D16)*T17*F2
      B(31) =RTD*(150.0*D4 -660.0*D8 +448.0* D12- 64.0 * D16)*T18*F2
      B(32) =RTD*(150.0*D4-660.0*D8 +448.0 * D12- 64.0 * D16)*T23*F2
      M = 32
      IF(IDD.GT.0)GO TO 702
      B(33) = PP
      RETURN
  702 PP = 0
      DO 701 I = 1,M
      PP = PP + B(I)*G(I)
  701 CONTINUE
      PP = PP
      RETURN
C
      ENTRY DP2DT2(PP,DD,TT,IDD)
C*********ENTRY TO CALCULATE SECOND ISOCHORIC TEMPERATURE DERIVATIVE
C*********OF PRESSURE
C
      K = 8
      GO TO 1
  800 CONTINUE
      B( 1) = 0.0
      B( 2) = RTT *  D * 0.75 * T25
      B( 3) = RTT *  D * 3.75 * T35
      B( 4) = RTT *  1.5 * D2 * TS
      B( 5) = RTT *  1.5 * D2 * T25
      B( 6) = RTT *  4.0*D2*T3
      B( 7) = 0.0
      B( 8) = 0.0
      B( 9) = RTT *  11.25*D3*T35
      B(10) = 0.0
      B(11) = RTT * 14.*D7 *T3
      B(12) = RTT *  140.*D7* T6
      B(13) = RTT * 16.*D8 *T3
      B(14) = RTT * (20.*D-40.*D3)*T6 * F1
      B(15) = RTT * (30.*D-60.0*D3) *T7*F1
      B(16) = RTT *  (D2-D4)*17.5*T45*F1
      B(17) = RTT *  (D2-D4)*49.50*T65*F1
      B(18) = RTT *  (18.0*D3-12.0*D5)* T4*F1
      B(19) = RTT *  (126.0*D3-84.0*D5)* T8*F1
      B(20) = RTT *  (150.0*D5-60.*D7) * T7*F1
      B(21) = RTT *  (382.5*D6-127.5*D8) * T95*F1
      B(22) = RTT *  (84.0*D7-24.0*D9) * T5*F1
      B(23) = RTT *  (286.0*D8-71.5*D10) * T75*F1
      B(24) = RTT *  (247.5*D10-49.5*D12) * T65*F1
      B(25) = RTT *  (924.0*D2-1848.0*D6) * T23*F2
      B(26) = RTT *  (330.0*D3-440.0*D7) * T12*F2
      B(27) = RTT *  (918.0*D3-1224.0*D7) * T19*F2
      B(28) = RTT *  (D4-D8)*440.0*T12*F2
```

```
      B(29) = RTT *  (D4-D8)* 2024.0*T24*F2
      B(30) = RTT *  (1360.0*D5-1088.0*D9) * T18*F2
      B(31) = RTT *  (1530.0*D5-1224.0*D9) * T19*F2
      B(32) = RTT *  (2530.0*D5-2024.0*D9) * T24*F2
      IF (IDD.GT.0) GO TO 801
      B(33) = PP
      RETURN
  801 PP = 0.0
      DO 802 I = 1,32
      PP = PP + G(I) * B(I)
  802 CONTINUE
      PP=PP
      RETURN
      END
C
       FUNCTION ENTROPY(DENS,TEMP)
C********FUNCTION TO CALCULATE ENTROPY FROM DENSITY AND TEMPERATURE
C
       CALL SR(EN,DENS,TEMP,1)
       CALL IDEAL1(TEMP,DENS,EID,HID,HEL,SID,CVID,CPID,1)
       ENTROPY=100.*EN+SID
       RETURN
       END
C
         SUBROUTINE IDEAL1(T,D,EID,HID,HEL,SID,CVID,CPID,IATM)
CC***********HAS EXPLICIT DENSITY DEPENDENCE; GOOD FOR ALL PROPERTIES
CC*******AT ANY PRESSURE (OR DENSITY RELATED TO P VIA IDEAL GAS EOS)*****
CC******THIS IS FOR ETHANE AT ANY DENSITY AND TEMPERATURE
CC
      COMMON /REFDAT/ R1,PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *               ,CMW
       DIMENSION QS(7)
       DATA QS/-.285949905507E+02,
     A .381594759913E+01,
     B .860212992578E+01,
     C -.330757346034E+01,
     D -.559566778576E+00,
     E .507222665072E+01,
     F -.550748741700E+01/
       DATA Q0/-23.446765/
CC
       CALL IDEAL2(T,EID,HID,HEL,SID,CVID,CPID)
       IF(IATM.NE.0)THEN
       R = R1*100.
       TAU=TC/T
       DEL=D/DC
       ADD=R*(Q0-QS(1) + LOG(DEL/TAU))
       HEL=HEL+T*ADD
       SID=SID-ADD
       END IF
       RETURN
       END
CC
        SUBROUTINE IDEAL2(T,EID,HID,HEL,SID,CVID,CPID)
CC**************NEW IDEAL SUBROUTINE FOR 1986 VALUE OF GAS CONSTANT**********
CC******FORM OF HELMHOLTZ FREE ENERGY FOLLOWS GOODWIN WITH WAGNER VARIABLES**
CC**********GOOD ONLY AT 1 ATM; PROBLEM FOR HEL AND SID--SEE IDEAL1********
CC
      COMMON /REFDAT/ R1,PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *               , CMW
       DIMENSION QS(7)
C********COEFFICIENTS FOR ETHANE (C2)***************
       DATA QS/-.285949905507E+02,
     A .381594759913E+01,
     B .860212992578E+01,
     C -.330757346034E+01,
```

```
     D -.559566778576E+00,
     E .507222665072E+01,
     F -.550748741700E+01/
       DATA P1,P2/-.33333333,-.66666667/
       R = R1*100.
       TAU=TC/T
       TAU3=TAU**P1
       TAU23=TAU**P2
       EXTAU=EXP(QS(7)*TAU )
       PHID=QS(1)+(QS(2)+1.)*LOG(TAU)+QS(3)*TAU3+QS(4)*TAU23
     1 +QS(5)/TAU+QS(6)*LOG(1.-EXTAU)
       PHIDD1=QS(2)-QS(3)/3.*TAU3-2.*QS(4)/3.*TAU23-QS(5)/TAU
     1 -QS(6)*QS(7)*TAU/(1./EXTAU-1.)
       PHIDD2=-QS(2)+4.*QS(3)/9.*TAU3+10.*QS(4)/9.*TAU23
     1 +2.*QS(5)/TAU-QS(6)*QS(7)**2*TAU**2*EXTAU/(EXTAU-1.)**2
        HEL=R*T*PHID
        CPID=R*(1.-PHIDD2)
        EID=R*T*PHIDD1
       HID=R*T+EID
       CVID=-R*PHIDD2
       SID=-R*(PHID-PHIDD1)
       RETURN
        END
C
       FUNCTION HELM(DENS,TEMP)
C*********THIS FUNCTION IS FOR HELMHOLTZ FREE ENERGY
C
       CALL AR(HE,DENS,TEMP,1)
       HE=100.*HE
       CALL IDEAL1(TEMP,DENS,EID,HID,HEL,SID,CVID,CPID,1)
       HELM=HE+HEL
       RETURN
       END
C
       FUNCTION GIBBS(DENS,TEMP,PRES)
C**********THIS FUNCTION IS FOR GIBBS ENERGY
C
       HEL=HELM(DENS,TEMP)
       GIBBS=HEL+PRES*1.E05/(DENS*1000.)
       RETURN
       END
C
       FUNCTION UNTERN(DENS,TEMP)
C*********THIS FUNCTION IS FOR INTERNAL ENERGY
C
       HEL=HELM(DENS,TEMP)
       SS=ENTROPY(DENS,TEMP)
       UNTERN=HEL+SS*TEMP
       RETURN
       END
C
       FUNCTION ENTHALP(DENS,TEMP,PRES)
C*********THIS FUNCTION IS FOR ENTHALPY
C
       HEL=HELM(DENS,TEMP)
       UNT=UNTERN(DENS,TEMP)
       GIB=GIBBS(DENS,TEMP,PRES)
       ENTHALP=GIB+UNT-HEL
       RETURN
       END
```

```
       FUNCTION CPEE(RHO,TEE)
C*********THIS FUNCTION IS FOR ISOBARIC HEAT CAPACITY
C
      D = RHO
      CVCAL = CVF(D,TEE)
      CALL DPDT(P1,D,TEE,1)
      CALL DPDD(P2,D,TEE,1)
      CPCAL = CVCAL + 100.0 * TEE * P1 * P1 / (D * D * P2)
      CPEE=CPCAL
      RETURN
      END
C
      FUNCTION OM22S(TS)
C**********THIS FUNCTION IS FOR THE 11-6-8 GAMMMA EQUALS 3
C**********OMEGA 22 COLLISION INTEGRAL
C
      DIMENSION C0(9)
C
      DATA C0/-3.0328138281E+00, 1.6918880086E+01,-3.7189364917E+01,
     *         4.1288861858E+01,-2.4615921140E+01, 8.9488430959E+00,
     *        -1.8739245042E+00, 2.0966101390E-01,-9.6570437074E-03/
      TI = 1.0 / TS
      T1=TS**(1.0/3.0)
      ETA =0.0
      DO 020 J=1,9
      ETA =ETA +C0(J)*TI
  020 TI=TI*T1
      OM22S = 1.0 / ETA
      RETURN
      END
C
      FUNCTION VSCTY(D,T)
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C     PURPOSE - - THIS ROUTINE CALCULATES THE VISCOSITY OF ETHANE
C
C     VERSION 4.0  5/17/85 - - CODED BY J. F. ELY
C           WITH SUBSEQUENT REVISIONS
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32), PTRP, DTRP, TTRP
     *               , CMW
C
      DIMENSION GV(11), F(11)
C
C     COEF FROM C2ETAWT TRANSFERRED 11/88 --CHANGED 12/88
C   UNITS ARE IN MICRO PA SEC MUST BE *10.
C
C*******THESE ARE TRUNCATED COEFFICIENTS AS IN PAPER***********
       DATA GV,ETAS
     1/0.47177003,-0.23950311,0.39808301,-0.27343335,0.35192260,
     2-0.21101308,-0.004785797,0.073781299,-0.030425255,
     3  -0.30435286 , 0.001215675,15.977/
C
  020 DELTA = D / DC
      TAU = TC / T
      F(1) = DELTA
      F(2) = TAU*DELTA
C
C
      F(3) = DELTA**2
      F(4) =  TAU*DELTA**2
      F(5) = DELTA**2 * TAU * SQRT(TAU)
C
      F(6) = DELTA**3
      F(7) = DELTA**3 * TAU**2
C
```

```
      F(8) = DELTA**4
      F(9) = DELTA**4 * TAU
C
      F(10)= DELTA
      F(11)= DELTA  * TAU
C
         ETA = 0.
         DO 040 J = 1, 9
  040    ETA = ETA + F(J)*GV(J)
         DENOM = 1.0 + F(10)*GV(10) + F(11)*GV(11)
      ETAG = ETA0(T)
  060    ETA = ETAG + ETAS * ETA / DENOM
      VSCTY = ETA
      RETURN
      END
      FUNCTION ETA0(T)
C******THIS FUNCTION EVALUATES THE ZERO DENSITY VISCOSITY
C******OF ETHANE  (C2)
C
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32), PTRP, DTRP, TTRP
     *              , CMW
      DATA  EOK/245.0/
      TS = T / EOK
       ETA0 = 12.0085*SQRT(TS)/OM22S(TS)
      RETURN
      END
C
      FUNCTION TCOND0(T)
C**********THIS FUNCTION EVALUATES THE ZERO DENSITY
C**********THERMAL CONDUCTIVITY OF ETHANE
C**********COEFFICIENTS FOR ETHANE FROM 12/88
C
      COMMON /REFDAT/ RT, PC, DC, TC, ZC, A9(32), PTRP, DTRP, TTRP
     *              , CMW
      DATA CON,EOK/0.276505,245.0/
C       NEW COEFFICIENTS FROM FIT OF 12/20/88
       DATA G1,G2/1.710414723,-0.6936482165/
      CALL IDEAL2(T,X1,X2,X3,X4,CV,X5)
      CVDIM=-CV/(100.*RT)
      TS=T/EOK
      TCC=-(G1+G2/(TS))*(CVDIM+1.5)
      ETA0=ETA0(T)
      TCOND0=CON*ETA0*(3.75+TCC)
      RETURN
      END
C
      FUNCTION XLAMF(D,T)
C
C*******THIS FUNCTION IS FOR THE THERMAL CONDUCTIVITY OF ETHANE
C********COEFFICIENTS ADDED 1/89 FROM HEP'S RUN OF 1/10/89
C
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32), PTRP, DTRP, TTRP
     *              , CMW
C
C
       DIMENSION G(7),F(7)
C*****NEW COEFFICIENTS FROM 1/24/89 FIT
C
      DATA G,ES /.960843217927E+00, .275002352857E+01,
     1  -.266092886126E-01, -.781467287125E-01, .218813393267E+00,
     2  .238495630673E+01, -.751139710430E+00 ,4.41786/
C
C
  020 DELTA = D / DC
      TAU = TC / T
      TC0 = TCOND0(T)
```

```
      TCCRIT = CRLAM(D,T)
C
      F(1) =DELTA
      F(2) = DELTA**2
      F(3)= DELTA**3
      F(4) = DELTA**4
      F(5)= DELTA**5
      F(6) = DELTA*TAU**1.5
      F(7)= DELTA**3*TAU
C
         TCX = 0.
         DO 040 J = 1, 7
  040    TCX = TCX + F(J)*G(J)
  060    TCX = TC0  + ES  * TCX  + TCCRIT
      XLAMF=TCX
      RETURN
      END
C
       FUNCTION CRLAM(D,T)
C    DGF CODING OF OLCHOWY-SENGERS SIMPLE THEORY--5/88
C    CONSTANTS FOR ETHANE FLUID
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *               , CMW
C    THIS FUNCTION DOES CALL THE DAMPING FCT, DAMP  AND
C     THE XICALC FUNCTION TO EVALUATE XI.
         DATA CON1,QDI/1.55E-09,0.545E-09/
       DEL=D/DC
       TAU=TC/T
       THI=2.*TC
      QD=1./QDI
      VISBK=VSCTY(D,T)
      CV = CVF(D,T)
      CALL DPDT(P1,D,T,1)
      CALL DPDD(P2,D,T,1)
      CALL DPDD(P3,D,THI,1)
      CP = CV + 100.0 * T * P1 * P1 / (D * D * P2)
       XI=XICALC(T,D,P2,P3)
       QDPSI=QD*XI
       CRLAM=CON1*DEL*CP/(TAU*VISBK*XI)
       CRLAM=CRLAM*DAMP(DEL,QDPSI,CP,CV)
       RETURN
       END
C
       FUNCTION DAMP(DEL,QDPSI,CP,CV)
       DATA PI/3.141592654/
       FAC1=EXP(-QDPSI/(1.+QDPSI**3/(3.*DEL**2)))
       FAC2=(CP-CV)/CP*(ATAN(QDPSI)+CV*QDPSI/(CP-CV))
       DAMP=2./PI*(FAC1-1.+FAC2)
       RETURN
       END
C
       FUNCTION XICALC(T,D,DPDD,HITDPDD)
C   THIS FUNCTION CALCULATES CORRELATION LENGTH
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *               , CMW
      DATA CON2,POWNG/4.28243E-10,0.50745E0/
       DEL=D/DC
       TAU=TC/T
       THI=2.*TC
      DIMINV=R*T/DPDD
      DIMHINV=R*THI/HITDPDD
      DELDER=DIMINV-DIMHINV
      IF(DELDER.LT.1.E-8)DELDER=1.E-8
      XICALC=CON2*(DEL*TAU*DELDER)**POWNG
      RETURN
      END
```

```
C
C
      FUNCTION TSAT(PRESS)
C********THIS FUNCTION CALCULATES THE SATURATION TEMPERATURE
C********GIVEN A PRESSURE BELOW ITS CRITICAL VALUE
C
      COMMON /DERIV/DF,DJUNK
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
        IF(PRESS.GT.PC)THEN
        PAUSE 'PRESSURE GREATER THAN CRITICAL IN TSAT'
        RETURN
        END IF
        IF(PRESS.LT.PTRP)THEN
        PAUSE 'PRESSURE LESS THAN TRIPLE POINT IN TSAT'
        RETURN
        END IF
        XL=TTRP
        XH=TC
        TSAT=.5*(XL+XH)
        DXOLD=ABS(XH-XL)
        DX=DXOLD
        F=PSATF(TSAT)-PRESS
        DO 11 J=1,100
          IF(((TSAT-XH)*DF-F)*((TSAT-XL)*DF-F).GE.0.
     C     .OR. ABS(2.*F).GT.ABS(DXOLD*DF))THEN
          DXOLD=DX
          DX=0.5*(XH-XL)
          TSAT=XL+DX
          IF(XL.EQ.TSAT)RETURN
          ELSE
           DXOLD=DX
           DX=F/DF
           TEMP=TSAT
           TSAT=TSAT-DX
           IF(TEMP.EQ.TSAT)RETURN
             ENDIF
        IF(ABS(DX).LT..00005)RETURN
        F=PSATF(TSAT)-PRESS
        IF(F.LT.0.)THEN
        XL=TSAT
        ELSE
        XH=TSAT
        ENDIF
11      CONTINUE
        PAUSE 'IN TSAT: EXCEEDES MAXIMUM ITERATIONS'
        RETURN
        END
```

```
       BLOCK DATA C2INIT
C*******THIS BLOCK DATA SUBROUTINE SUPPLIES THE FUNDAMENTAL CONSTANTS
C*******AND PARAMETERS NECESSARY FOR THE ETHANE FLUID IN
C*******ACCORDANCE WITH THE CORRELATIONS OF
C*******FRIEND, ELY, AND INGHAM, 'THERMOPHYSICAL PROPERTIES OF ETHANE'
      COMMON /REFDAT/ R, PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
C
      COMMON/SATBDY/TCC,PCC,DCC,ZCC,RC,EPP,BETA
C
      DATA TC, PC, DC, PTRP, DTRP, TTRP, CMW
     C/305.330, 48.7180, 06.870, 1.130E-05, 21.667, 90.352, 30.070/
      DATA TCC, PCC, DCC
     C/305.330, 48.7180, 06.870/
C********TRIPLE PT PRESSURE CHANGE TO 1.13 RATHER THAN 1.1308--11/88
C COEFFICIENTS FROM FIT OF 9/26/88
      DATA G/.462154305597E+00, -.192369363873E+01, .398786040031E+00,
     1 .160545323723E-01, .128952422187E+00, .354583204912E-01,
     2 .349278445395E-01, -.113061833802E-01, -.398090327788E-01,
     3 .830319368340E-03, .459215751833E-03, .175302879173E-06,
     4 -.709195161256E-04, -.234361622492E+00, .845746976449E-01,
     5 .148610520102E+00, -.100168578674E+00, -.592648243875E-01,
     6 -.412635142172E-01, .218551618688E-01, -.745527209579E-04,
     7 -.988590855721E-02, .102084164987E-02, -.521896558472E-03,
     8 .985921620300E-04, .468651408558E-01, -.195580116459E-01,
     9 -.465571616512E-01, .328779053755E-02, .135720901854E+00,
     A -.108464714554E+00, -.675028369034E-02/

C
       DATA R,EPP,BETA,ZC/0.08314510, 1.9, 0.355,0.27934000/
       DATA RC,ZCC/0.08314510,0.27934000/
C
      END
      FUNCTION PSATF(T)
C
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
C        PURPOSE --- THIS ROUTINE CALCULATES THE SATURATION PRESSURE AND
C                    ITS DERIVATIVE WITH RESPECT TO T, GIVEN T.
C
C
C           CODED BY--J. F. ELY
C                     CHEMICAL ENGINEERING SCIENCE DIVISION 773.20
C                     NATIONAL BUREAU OF STANDARDS
C                     BOULDER, COLORADO   80303
C
C
C           VERSION 1.0 -- 6/3/83
C
C
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C      REVISED 2/27/85 TO REJECT CALLS IF T .GT. TC
C*****************************************************************************
C
C         NEW COEFFICIENTS FROM HEP'S FIT OF ETHANE DATA FROM JIM ELY
C                                  9/10/86
C       CHANGED 2/06/86 TO RETURN TO EPP=1.7
C
C      CHANGED 6/03/86 TO EPP=1.9 AND USES TSTAR AS VARIABLE
C      AND IS FORCED TO PC AT T = TC
C*****************************************************************************
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32), PTRP, DTRP, TTRP
     *              , CMW
      DIMENSION G(5)
      COMMON /DERIV/ DPSDT, DDSDT
      EPP = 1.9
```

```
C     THE FOLLOWING FOR PC = 48.718 AND TC = 305.33 3-4-88
        G( 1)= -.795531542571E+01
        G( 2)=  .147806828674E+02
        G( 3)=  .153282697603E+01
        G( 4)= -.134317917619E+02
        G( 5)=  .470489080510E+01
      X = 1. - T / TC
       IF(X) 1,2,2
 1     PRINT 4
 4     FORMAT(10X, 'T ABOVE TCRT IN PSATF(T). ' / )
       STOP
 2    PCAL = G(1)*X/(1.-X)+G(2)*X**EPP+G(3)*X+G(4)*X*X+G(5)*X*X*X
      PSATF= PC*EXP(PCAL)
      DPSDT=-PSATF/TC*(G(1)/(1.-X)**2+EPP*G(2)*X**(EPP-1.0)+G(3)
     * + 2.*G(4)*X+3.*G(5)*X**2)
      RETURN
      END
      FUNCTION DSATL(T)
C
C            THIS ROUTINE CALCULATES THE SATURATED LIQUID
C            DENSITY OF ETHANE USING NEW CORRELATION
C
C           REVISED 2/27/85 TO REJECT CALLS IF T .GT. TC
C
C*****************************************************************************
C
C         NEW COEFFICIENTS FROM HEP'S FIT OF WAGNER AND ARMSTRONG DATA
C                                    1/31/86
C        REVISED COEFFICIENTS FROM 3/13/88
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32), PTRP, DTRP, TTRP
     *               , CMW
      COMMON /DERIV/ DPSDT, DDSDT
      DIMENSION G(5)
C
C
      BETA = .355
C     TC = 305.33  AND DC = 6.870
       G( 1)=  .193074035545E+01
       G( 2)= -.653985599985E+00
       G( 3)=  .814136166546E+00
       G( 4)= -.383814110665E+00
       G( 5)= -.339743046787E+00
      X = 1.0 - T / TC
       IF (X) 1,2,3
 1     PRINT 4
 4     FORMAT(10X,'DSATL = 0, T EXCEEDS TCRT. ' / )
       STOP
 2     DSATL = DC
       DDSDT = -1.0E+10
       RETURN
 3    DENOM = 1.0 + G(5) * X**(1.0-BETA)
      X4 = X*X*X*X
      Y = (G(1) * X**BETA + G(2) * X*X + G(3) * X*X*X+G(4)*X4) / DENOM
      DYDX = BETA*G(1)*X**(BETA-1.0) + 2.0*G(2)*X + 3.0*G(3)*X*X
     *  + 4.0*G(4)*X*X*X
      DYDX = (DYDX - Y * G(5) * (1.0-BETA) / X**BETA) / DENOM
      DSATL = DC * (Y + 1.0)
      DDSDT = - DC * DYDX / TC
      RETURN
      END
```

```
      FUNCTION DSATV(T)
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
C       PURPOSE --- THIS ROUTINE CALCULATES THE SATURATED VAPOR DENSITY,
C                   AND ITS DERIVATIVE WITH RESPECT TO T, GIVEN T.  IT
C                   REQUIRES THE USE OF "PSATF" WHICH CALCULATES  THE
C                   SATURATIION PRESSURE AND ITS DERIVATIVE WRT T.
C
C          CODED BY--B. C. COOKE
C                    CHEMICAL ENGINEERING SCIENCE DIVISION 773.20
C                    NATIONAL BUREAU OF STANDARDS
C                    BOULDER, COLORADO 80303
C
C          VERSION 1.0 -- 6/3/83
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
C            REVISED 2/27/85 TO REJECT CALLS IF T .GT. TC
C
C*********************************************************************
C
C         NEW COEFFICIENTS FROM HEP'S FIT OF ETHANE DATA FROM ELY
C                                 9/10/86
C
C       REVISED 6/03/86. USES BETA =0.355 AND SCALING AMPLITUDE
C       IS SAME IN VAPOR AND LIQUID TO LOWEST ORDER
C*********************************************************************
      COMMON /DERIV/ DPSDT, DDSDT
      COMMON /REFDAT/ R, PC, DC, TC, ZC, A(32),  PTRP, DTRP, TTRP
     *              , CMW
      DIMENSION G(4)
C       THE FOLLOWING ARE FROM VAPOR AND LIQUID FIT OF 3-13-88
      BETA = .355
C*******CALCULATE G0 FROM UNROUNDED G(1) AND ZC, (THEN ROUND)
       G0 = -0.7483719
C     THESE COEFS FROM A FIT ON 9-21-88. ID 12 DATA OMITTED
       G( 1)= -.137289517553E+01
       G( 2)= -.119259688503E+01
       G( 3)=  .186150455934E+01
       G( 4)=  .131364937601E+01
C      ZC = PC / (R * TC * DC)
      X = T / TC
      TAU = 1.0 - X
       IF (TAU) 1,2,3
 1     PRINT 4
 4     FORMAT(10X,'T EXCEEDS TC IN DSATV. ' / )
       STOP
 2     DSATV=DC
       DDSDT=1.0E+100
       RETURN
 3    F = G0*TAU**BETA + G(1)*TAU**(2.*BETA)
       F = F + G(2)*(TAU + TAU**4) + G(3)*TAU**2
      Y = 1.0 + G(4)*TAU
      PS = PSATF(T)
      PRX = (ZC-1.0) * PS / (PC*X**8)
      FOY = F / Y
      Z = 1.0 + PRX * (1.0 + FOY)
      RTZ = 1.0 / (R * T * Z)
      DSATV = PS * RTZ
      DFDX=- BETA*G0*TAU**(BETA-1.0)-G(1)*2.*BETA*TAU**(2.*BETA-1.)
       DFDX=DFDX-G(2)*(1.+4.*TAU**3)-2.*G(3)*TAU
      DYDX = -G(4)
      DPDX = (ZC-1.0)*DPSDT*TC/(PC*X**8)- 8.0*PRX/X
      DZDX = DPDX*(1.0+FOY) + PRX*(DFDX/Y - FOY*DYDX/Y)
      DDSDT = DPSDT*RTZ - DSATV/T - DZDX*DSATV/(Z*TC)
      RETURN
      END
```

```
      SUBROUTINE IDEAL(T,CVID,SID)
C********IDEAL GAS PROPERTIES FOR ETHANE AT  0.101325 MPA (1 ATM)
C**************NEW IDEAL SUBROUTINE FOR 1986 VALUE OF GAS CONSTANT**********
C******NEW R FORCES SLIGHT DEVIATIONS IN OTHER PROPERTIES, SINCE NOT**********
C*******ALL EQS ARE DIRECTLY PROPORTIONAL TO R*******************************
C**************DATE OF CHANGE 4/14/87***************************************
C******************EVALUATED AT 1 ATM (PROBLEM FOR ARGUMENT SID ONLY*********
C***********HEP'S COEFFICIENTS FOR ETHANE ARE IN HERE 8/88*****************
C*****************************************************************
      COMMON /REFDAT/ R1,PC, DC, TC, ZC, G(32), PTRP, DTRP, TTRP
     *              , CMW
      DIMENSION QS(7)
      DATA QS/-.285949905507E+02,
     A .381594759913E+01,
     B .860212992578E+01,
     C -.330757346034E+01,
     D -.559566778576E+00,
     E .507222665072E+01,
     F -.550748741700E+01/
CC
      DATA P1,P2/-.33333333,-.66666667/
      R = R1*100.
      TAU=TC/T
      TAU3=TAU**P1
      TAU23=TAU**P2
      EXTAU=EXP(QS(7)*TAU )
      PHID=QS(1)+(QS(2)+1.)*LOG(TAU)+QS(3)*TAU3+QS(4)*TAU23
     1 +QS(5)/TAU+QS(6)*LOG(1.-EXTAU)
      PHIDD1=QS(2)-QS(3)/3.*TAU3-2.*QS(4)/3.*TAU23-QS(5)/TAU
     1 -QS(6)*QS(7)*TAU/(1./EXTAU-1.)
      PHIDD2=-QS(2)+4.*QS(3)/9.*TAU3+10.*QS(4)/9.*TAU23
     1 +2.*QS(5)/TAU-QS(6)*QS(7)**2*TAU**2*EXTAU/(EXTAU-1.)**2
      CVID=-R*PHIDD2
      SID=-R*(PHID-PHIDD1)
      RETURN
      END
```



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