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REAL-GAS EFFECTS IN CRITICAL FLOW THROUGH NOZZLES AND THERMODYNAMIC PROPERTIES OF NITROGEN AND HELIUM AT PRESSURES TO 300×10^5 NEWTONS PER SQUARE METER (APPROX. 300 ATM)

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SUMMARY

A critical-flow factor for gaseous nitrogen and helium flowing through critical-flow nozzles has been calculated. This factor provides a convenient means for determining the mass-flow rate of these gases through critical-flow nozzles. In addition, the results include the nozzle throat velocity, the compressibility factor, the entropy, the enthalpy, the specific heat, the specific-heat ratio, the speed of sound, and the critical pressure, density, and temperature ratios. These results are tabulated as functions of the plenum pressure and temperature. The pressure range is to 300×10^5 newtons per square meter (approx. 300 atm). For nitrogen, the temperature range is from 100 to 400 K. For helium, the range is from 15 to 400 K.

The FORTRAN IV subroutines used to calculate these results are also included. These routines permit three different sets of independent variables. In addition to the plenum pressure and temperature, the other independent variable is either the nozzle exit pressure, the nozzle exit Mach number, or the nozzle exit temperature.

INTRODUCTION

In recent years, a number of methods have been developed for calculating the mass-flow rate of nonideal gases through nozzles. These methods assume the flow to be one-dimensional and isentropic. In reference 1, the authors present tables of the compressible flow functions for the one-dimensional flow of air. Reference 2, using the state equations of reference 3, presents tables for air, nitrogen, oxygen, normal hydrogen, parahydrogen, and steam that permit the calculation of the isentropic mass-flow rate of these gases through critical-flow nozzles. A critical-flow nozzle is one that operates with a throat Mach number of 1. Reference 2 refers to a number of other reports that

describe other methods for making this type of calculation.

Recently there has been a need to calculate the mass-flow rate of helium and nitrogen at pressures greater than have been previously reported. This need arises from the use of these as driver gases for the propellant feed in vernier-control space thrusters. These gases are commonly stored at pressures of the order of 250×10^5 newtons per square meter. Nitrogen is one of the gases treated in reference 2, but the pressure range is only to 100×10^5 newtons per square meter. Helium is one of the gases treated in reference 4, but again the pressure range is only to 100×10^5 newtons per square meter.

This report presents a critical-flow factor that permits the isentropic mass-flow rate of nitrogen and helium through critical-flow nozzles to be calculated from plenum conditions. For the case of nitrogen, the temperature range is from condensation to 400 K. For helium, the temperature range is 15 to 400 K. For both gases, the pressure range is from 0 to 300×10^5 newtons per square meter.

As a result of these calculations, two groups of quantities are tabulated. The first group consists of quantities that depend on both the plenum conditions and the conditions in the nozzle throat, where the Mach number is 1. These quantities are

(1) Critical flow factor

(2) Nozzle throat velocity

(3) Ratio of throat to plenum pressure

(4) Ratio of throat to plenum density

(5) Ratio of throat to plenum temperature

The second group consists of thermodynamic point functions that depend only on plenum conditions. These are

(1) Compressibility factor

(2) Enthalpy

(3) Entropy

(4) Specific heat at constant pressure

(5) Specific-heat ratio

(6) Speed of sound

In addition to these tabulations, a description of the calculation procedure is given in appendix B. Appendix C presents a description of the FORTRAN IV subroutines that were used to make these calculations. The listing of these subroutines is presented in appendix D. All symbols are defined in appendix A.

ANALYSIS

Basic Equations

The calculations in this report make use of three basic relations. The first relation

describes the pressure-temperature-density behavior of the gas. This is represented by a compressibility factor Z which is a function of density and temperature and is defined as

$$Z = Z(\rho, T) = \frac{p}{\rho RT} \tag{1}$$

The second relation describes the specific heat of the gas at vanishing density where the compressibility factor equals 1. This specific heat is a function of temperature and is represented by

$$\tilde{C}_v = \tilde{C}_v(T) = \tilde{C}_p(T) - R \tag{2}$$

(In this report, an ideal gas is defined as one whose compressibility factor is 1 and whose specific heat is constant.) The third relation describes the saturated vapor pressure as a function of temperature. This is represented by

$$p_{sat} = p_{sat}(T) \qquad T \leq T_c \tag{3}$$

For temperatures greater than critical, the fluid is always a gas for the pressures involved. (For $T \geq T_c$, the saturation pressure can be considered to be infinite.) Since this report is only concerned with the gaseous phase, equation (3) is merely used to confirm that the fluid is a gas. This condition is represented by

$$p < p_{sat} \tag{4}$$

Working Equations

Nitrogen. - The equations that follow were developed by the National Bureau of Standards (NBS) cryogenic laboratories in Boulder, Colorado and are given in reference 5. The equation for the compressibility factor is equation (5) in reference 5 modified by dividing both sides of the equation by ρRT. The equation is further modified by changing the density units from gram-moles per liter to kilograms per cubic meter. The following equation results from these modifications:

$$Z(\rho, T) = 1 + \left(B_1 + \frac{B_2}{T} + \frac{B_3}{T^2} + \frac{B_4}{T^3} + \frac{B_5}{T^5}\right)\rho + \left(B_6 + \frac{B_7}{T}\right)\rho^2 + B_8\rho^3 + \frac{B_{15}}{T}\rho^5$$

$$+ \rho^2\left[\left(\frac{B_9}{T^3} + \frac{B_{10}}{T^4} + \frac{B_{11}}{T^5}\right) + \rho^2\left(\frac{B_{12}}{T^3} + \frac{B_{13}}{T^4} + \frac{B_{14}}{T^5}\right)\right]e^{A\rho^2} \qquad (5)$$

where

$A = -7.135\times10^{-6}$

$B_1 = 1.2034917\times10^{-3}$

$B_2 = -2.5107891\times10^{-1}$

$B_3 = -4.9681584\times10^{1}$

$B_4 = 3.7073373\times10^{2}$

$B_5 = 1.496473\times10^{6}$

$B_6 = 2.1027719\times10^{-6}$

$B_7 = -2.4516046\times10^{-4}$

$B_8 = 2.3102822\times10^{-9}$

$B_9 = 4.9866482$

$B_{10} = 1.6771286\times10^{3}$

$B_{11} = -1.656225\times10^{5}$

$B_{12} = -6.5374809\times10^{-5}$

$B_{13} = 2.4209108\times10^{-2}$

$B_{14} = -1.126389$

$B_{15} = 1.1829604\times10^{-12}$

The equation for specific heat at vanishing density $\tilde{C}_v$ is equation (4) in reference 5 modified by dividing by R and subtracting 1 from the result. The modified equation is as follows:

$$\frac{\tilde{C}_v}{R} = \alpha_1 + \alpha_2 T + \alpha_3 T^2 + \alpha_4 T^3 + \alpha_5 T^4 \qquad (6)$$

where T is in K and

$\alpha_1 = 2.501146$

$\alpha_2 = -9.720581\times10^{-5}$

$\alpha_3 = -1.036056\times10^{-6}$

$\alpha_4 = -4.437258\times10^{-9}$

$\alpha_5 = 6.825596\times10^{-12}$

The relation between the saturated vapor pressure and temperature is equation (1) in reference 5 modified by changing the units of pressure from atmospheres to newtons per square meter. The following equation results:

$$\log_{10} p_{sat} = j_1 + \frac{j_2}{T} + j_3 T + j_4 T^2 + j_5 T^3 + j_6 T^4 + j_7 T^5 \tag{7}$$

where

$j_1 = 5.5335216$

$j_2 = -3.0507339 \times 10^{2}$

$j_3 = 1.6441101 \times 10^{-1}$

$j_4 = -3.1389205 \times 10^{-3}$

$j_5 = 2.9857103 \times 10^{-5}$

$j_6 = -1.4238458 \times 10^{-7}$

$j_7 = 2.7375282 \times 10^{-10}$

Helium. - The equation for the compressibility factor is that developed by the NBS cryogenic laboratories in Boulder, Colorado and is equation (1) in reference 6. This equation is modified by dividing both sides by ρRT. The equation is further modified by changing the density units from gram-moles per liter to kilograms per cubic meter. The equation that results from these modifications is as follows:

$$Z(\rho, T) = 1 + \left(B_1 + \frac{B_2}{T} + \frac{B_3}{T^2} + \frac{B_4}{T^3} + \frac{B_5}{T^5}\right)\rho + \left(B_6 + \frac{B_7}{T}\right)\rho^2 + \frac{B_8}{T}\rho^3 + \frac{B_{15}}{T}\rho^4 + \frac{B_{16}}{T}\rho^5$$

$$+ \rho^2\left[\left(\frac{B_9}{T^3} + \frac{B_{10}}{T^4} + \frac{B_{11}}{T^5}\right) + \rho^2\left(\frac{B_{12}}{T^3} + \frac{B_{13}}{T^4} + \frac{B_{14}}{T^5}\right)\right] e^{A\rho^2/T} \tag{8}$$

where

$A = -4.057 \times 10^{-4}$

$B_1 = 4.0665013 \times 10^{-3}$

$B_2 = -1.1267764 \times 10^{-1}$

$B_3 = 2.3039266 \times 10^{-2}$

$B_4 = -5.7468818 \times 10^{-2}$

$B_5 = 1.3691368\times10^{-1}$ $B_{11} = 7.6742661\times10^{-2}$

$B_6 = 9.7390626\times10^{-6}$ $B_{12} = -8.7904911\times10^{-7}$

$B_7 = 7.0543876\times10^{-4}$ $B_{13} = 1.9960611\times10^{-6}$

$B_8 = -5.3854984\times10^{-6}$ $B_{14} = -8.1300167\times10^{-6}$

$B_9 = -3.8053762\times10^{-3}$ $B_{15} = 3.6743583\times10^{-8}$

$B_{10} = 2.625179\times10^{-2}$ $B_{16} = -3.4049435\times10^{-11}$

Since helium is monatomic, the specific heat at vanishing density is given by

$$\frac{\tilde{C}_v}{R} = 1.5 \tag{9}$$

And since the temperatures involved for these calculations are always greater than critical, the helium is always in the gaseous phase for the pressures involved.

Calculations of Plenum Thermodynamic Functions

These functions are the compressibility factor, enthalpy, entropy, specific heat at constant pressure, specific-heat ratio, and speed of sound. The basic equations that are used to evaluate these functions follow. The working equations are listed in appendix B.

Compressibility factor. - This function is evaluated by use of equations (5) or (8).

Enthalpy and entropy. - These equations, which are derived from equations (6) and (7) in reference 5, are

$$\frac{H}{R} = \int \frac{\tilde{C}_v}{R}\,dT + T\left\{Z - \int_0^\rho \left[T\left(\frac{\partial Z}{\partial T}\right)_\rho \frac{d\rho}{\rho}\right]_T\right\} + K_H \tag{10}$$

$$\frac{S}{R} = \int \frac{\tilde{C}_v}{R}\,\frac{dT}{T} - \ln\rho - \int_0^\rho \left\{\left[Z - 1 + T\left(\frac{\partial Z}{\partial T}\right)_\rho\right]\frac{d\rho}{\rho}\right\}_T + K_S \tag{11}$$

The temperature integrals in equations (10) and (11) are indefinite integrals whose constants of integration are included in K_H and K_S, respectively. The values of K_H and K_S depend on the choice of the fluid reference state; K_H and K_S are chosen such that when the fluid is at this reference state the values of enthalpy and entropy are zero. The reference state for nitrogen is the triple point (i.e., T = 63.156 K, P = 0.1253×10^5 N/m^2), which is that used in reference 5. The reference state for helium is the liquid at a temperature of 0 K and a pressure of 0 newtons per square meter. This reference state is the same as that used in reference 6.

Specific heat at constant pressure. - This function is given by

$$\frac{C_p}{R} = \frac{T}{R}\left(\frac{\partial S}{\partial T}\right)_p = \frac{T}{R}\left[\left(\frac{\partial S}{\partial T}\right)_\rho + \left(\frac{\partial S}{\partial \rho}\right)_T \left(\frac{\partial \rho}{\partial T}\right)_p\right] \tag{12}$$

Specific-heat ratio. - This function is given by

$$\gamma = \frac{C_p}{C_v} = 1 + \frac{\left(\frac{\partial S}{\partial \rho}\right)_T \left(\frac{\partial \rho}{\partial T}\right)_p}{\left(\frac{\partial S}{\partial T}\right)_\rho} \tag{13}$$

Speed of sound. - This function is given by

$$a = \sqrt{k \frac{p}{\rho}} \tag{14}$$

where k is the isentropic exponent and is defined by

$$k = \frac{\rho}{p}\left(\frac{\partial p}{\partial \rho}\right)_S = \frac{\rho}{p}\left[\left(\frac{\partial p}{\partial \rho}\right)_T + \left(\frac{\partial p}{\partial T}\right)_\rho \left(\frac{\partial T}{\partial \rho}\right)_S\right] \equiv \gamma \frac{\rho}{p}\left(\frac{\partial p}{\partial \rho}\right)_T \tag{15}$$

Calculation of Nozzle Throat Thermodynamic Functions

These quantities are the critical-flow factor, nozzle throat velocity, ratio of throat to plenum pressures, ratio of throat to plenum densities, and ratio of throat to plenum temperatures.

Critical-flow factor. - The critical-flow factor C^* is defined by the following equation:

$$C^* = \frac{G_t \sqrt{RT_o}}{p_o} \tag{16}$$

The mass-flow rate per unit area G_t is determined by the methods of reference 2. The assumptions involved in this calculation are

(1) The flow from the plenum to the nozzle throat is isentropic.

(2) The flow is one-dimensional.

(3) The Mach number in the nozzle throat is 1 (i.e., the nozzle is choked).

If, in addition to these assumptions, the specific heat of the gas is constant and the compressibility factor of the gas is 1 (i.e., the gas is ideal), the ideal-gas, critical-flow factor C_i^* is constant for a given gas and is represented by

$$C_i^* = \left[\gamma_i \left(\frac{2}{\gamma_i + 1}\right)^{(\gamma_i+1)/(\gamma_i-1)}\right]^{1/2} \tag{17}$$

where C_i^* has a value of 0.6848 for nitrogen where $\gamma_i = 1.4$ and 0.7262 for helium where $\gamma_i = 5/3$.

Nozzle throat velocity. - The nozzle throat velocity is also equal to the speed of sound in the nozzle throat since the Mach number is 1. This is evaluated by use of equation (14).

Throat to plenum pressure, density, and temperature ratios. - These ratios are directly calculated through knowledge of the pressure-density-temperature state of the gas at both the plenum and the nozzle throat locations.

Although these functions are calculated by the methods of reference 2, the iteration procedures for calculating the plenum density, the nozzle throat density, and the nozzle throat temperature are different. A description of these procedures is given in appendix B. The procedures in this report permit calculation at pressures close to those that cause condensation. This calculation could not be done by the methods of reference 2.

RESULTS AND DISCUSSION

Calculations were performed for nitrogen and helium. For both gases, the calculations yielded

(1) Critical-flow factor, $C^* = \frac{G_t \sqrt{RT_o}}{p_o}$

(2) Nozzle throat velocity, v_t in m/sec

(3) Critical pressure ratio, p_t/p_o

(4) Critical density ratio, ρ_t/ρ_o

(5) Critical temperature ratio, T_t/T_o

(6) Compressibility factor, $Z_o = p_o/\rho_o RT_o$

(7) Enthalpy, H_o/R in K

(8) Entropy, S_o/R

(9) Specific heat, $C_{p,o}/R$

(10) Specific-heat ratio, $\gamma_o = C_{p,o}/C_{v,o}$

(11) Speed of sound, a_o in m/sec

The values of the specific gas constant R is 296.774 square meters per square second per K for nitrogen and 2077.15 square meters per square second per K for helium.

The tables for the critical-flow factor permit the calculation of the isentropic mass-flow rates per unit area by means of equation (16). This factor is plotted in figure 1 for

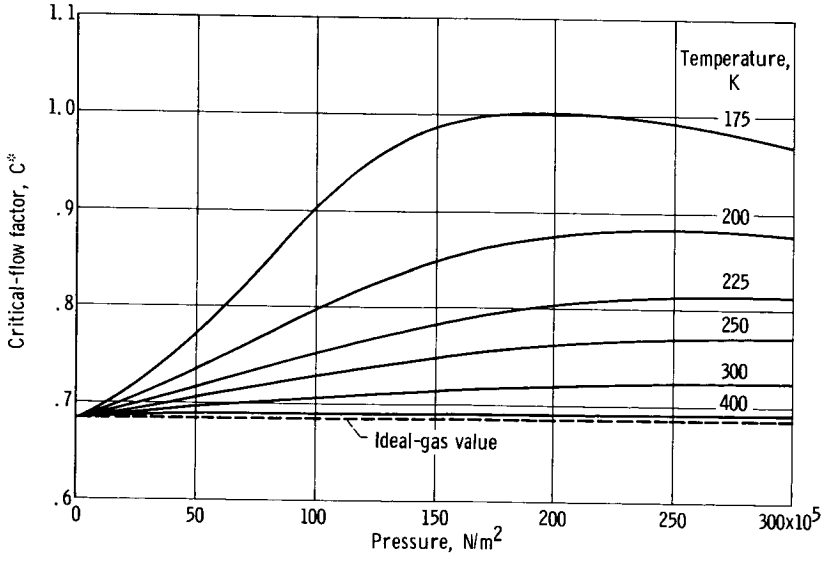

Figure 1. - Critical-flow factor for nitrogen.

the case of nitrogen to indicate the extent of deviation of this factor from the value it would have if nitrogen were an ideal gas with a specific-heat ratio of 1.4. The actual mass-flow rate $\dot{m}$ of a gas through a critical-flow nozzle of geometric throat area A_t is given by

$$\dot{m} = C_D A_t G_t \tag{18}$$

The discharge coefficient C_D mainly represents the effects of the nonisentropic and non-one-dimensional flow in the boundary layer of the nozzle. The discharge coefficient is generally determined by a nozzle calibration and is usually plotted as a function of Reynolds number. Typical values of C_D are between 0.96 and 1. The results for the nozzle used in reference 7 indicate that C_D is independent of Mach number in the range from 0.2 to 1. Since this indicates that compressibility effects on the discharge coefficient are negligible for flows up to critical, the real-gas effects on the discharge coefficient should also be negligible for flows up to critical.

The maximum nozzle throat pressure to maintain critical flow in the nozzle can be easily determined by multiplying the plenum pressure by the tabulated values of the critical pressure ratio. The pressure-temperature-density state of the gas at the nozzle throat can be determined from the plenum conditions by use of the tables of the critical density and temperature ratios. The speed of sound in the nozzle throat is the same as the tabulated value of the nozzle throat velocity.

All the tables in this report contain at least one nonsignificant figure, which aids in tabular interpolation.

The results for the two gases are discussed in the following paragraphs.

Nitrogen

The results for nitrogen are presented in tables I(a) to (k) for pressures up to 300×10^5 newtons per square meter and temperatures that range from 100 to 400 K. The state equation (eq. (5)) used in this report was developed in reference 5 from pressure-volume-temperature data representing pressures up to 300×10^5 newtons per square meter and temperatures up to 350 K. The root-mean-square error in calculating the compressibility factor is quoted as 0.2 percent in reference 5. This error would, of course, be larger if only regions near saturation were considered. The errors in derived functions such as specific heat are estimated to be under 5 percent.

Since the state equation (ref. 5) used for the calculations in this report does not represent data above 350 K, the functions calculated from this equation in the region from 350 to 400 K represent an extrapolation. A comparison of this data with that tabulated

in reference 3 indicates that this extrapolation is good to within 0.3 percent in both the compressibility factor and the specific heat at pressures up to 100×10^5 newtons per square meter. Because of the form of the state equation and the fact that the extrapolation is toward higher temperatures, the extrapolation should be valid to 300×10^5 newtons per square meter.

Helium

The results for helium are given in tables II(a) to (k) for pressures up to 300×10^5 newtons per square meter and temperatures that range from 15 to 400 K. The state equation in this report was developed in reference 6 from data representing pressures up to 100×10^5 newtons per square meter and temperatures that ranged from 2.5 to 570 K. In the temperature range from 10 to 300 K, reference 6 estimates that the calculated values of enthalpy and entropy are accurate to within 3 percent, and the specific heat is accurate to within 5 percent.

Since the state equation (ref. 6) used for the calculations in this report represents data whose pressures extend only to 100×10^5 newtons per square meter, the functions calculated from this equation at pressures greater than 100×10^5 newtons per square meter represent an extrapolation. For temperatures greater than 20 K, reference 8 states that this extrapolation is good to 1300×10^5 newtons per square meter.

A comparison of the compressibility factor calculated from the experimental data in reference 8 with the compressibility factor calculated from equation (8) indicates that this extrapolation is valid for temperatures greater than 15 K and pressures up to 300×10^5 newtons per square meter.

Subroutines

In addition to the tables presented in this report, the FORTRAN IV subroutines used to compute these tables are described in appendix C and are presented in appendix D. While the tables in this report are for critical flow, the subroutines used to compute these tables are more versatile. In fact, they can be used to compute either subsonic or supersonic isentropic flow functions for three different sets of independent variables. All three sets of these variables include the plenum pressure and the plenum temperature. The third independent variable is one of the following:

(1) Nozzle exit Mach number

(2) Nozzle exit pressure

(3) Nozzle exit temperature

It should be noted that for critical flow, the downstream nozzle reference station is always the nozzle throat. For supersonic flow this would not be true. Thus, in the descriptions of the calculation procedures in appendixes B and C, the downstream nozzle reference station is referred to as the nozzle exit.

CONCLUDING REMARKS

The tables of the critical-flow factor in this report provide a means for calculating the one-dimensional isentropic mass-flow rate of nitrogen and helium through critical-flow nozzles. For nitrogen, this critical-flow factor ranges from its ideal-gas value of 0.648 to a value of 1.196 at 155 K and 140×10^5 newtons per square meter. For helium the range is from 0.483 at 15 K and 300×10^5 newtons per square meter to a value of 0.814 at 15 K and 30×10^5 newtons per square meter. The ideal-gas, critical-flow factor for helium is 0.726. This indicates that significant errors would occur if the ideal-gas values of the critical-flow factor were used in mass-flow calculations.

The subroutines in this report have been used to reduce calibration data for critical-flow nozzles. The design of these subroutines permits easy modification for other gases.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio, August 22, 1968,
128-31-06-77-22.

APPENDIX A

SYMBOLS

A_t	nozzle throat area, m^2
a	speed of sound, m/sec
C^*	critical-flow factor
C_D	discharge coefficient
C_p	specific heat at constant pressure, J/(kg)(K)
$\tilde{C}_p$	specific heat at constant pressure for a gas at vanishing density, J/(kg)(K)
C_v	specific heat at constant volume, J/(kg)(K)
$\tilde{C}_v$	specific heat at constant volume for a gas at vanishing density, J/(kg)(K)
G	mass-flow rate per unit area, $kg/(m^2)(sec)$
H	enthalpy, J/kg
K_H	constant in enthalpy equation, K
K_S	constant in entropy equation
k	isentropic exponent
M	Mach number
$\dot{m}$	mass-flow rate, kg/sec
p	pressure, N/m^2
p_{sat}	minimum pressure at which condensation occurs for given temperature, N/m^2
R	gas constant, $m^2/(sec^2)(K)$
S	entropy, J/(kg)(K)
T	temperature, K
T_c	critical temperature, K
T_{sat}	maximum temperature at which condensation occurs for fixed pressure, K
v	velocity, m/sec
Z	compressibility factor
$Z_I, \ldots, Z_{VI}$	functions of compressibility factor as defined in appendix B
γ	specific-heat ratio
ρ	density, kg/m^3

Subscripts:

e	nozzle exit conditions
i	ideal gas
o	plenum conditions
t	nozzle throat conditions when Mach number is 1
$1, \ldots, n-1, n$	estimate in an iteration process

APPENDIX B

CALCULATIONS

The following functions of the compressibility factor are used in the calculations:

$$Z_I = Z(\rho, T) = \frac{p}{\rho RT} \tag{B1}$$

$$Z_{II} = Z + T\left(\frac{\partial Z}{\partial T}\right)_\rho = \frac{1}{R\rho}\left(\frac{\partial p}{\partial T}\right)_\rho \tag{B2}$$

$$Z_{III} = Z + \rho\left(\frac{\partial Z}{\partial \rho}\right)_T = \frac{1}{RT}\left(\frac{\partial p}{\partial \rho}\right)_T \tag{B3}$$

$$Z_{IV} = \int_0^\rho (Z_{II} - 1)\frac{d\rho}{\rho} \tag{B4}$$

$$Z_V = \int_0^\rho T\left(\frac{\partial Z}{\partial T}\right)_\rho \frac{d\rho}{\rho} \tag{B5}$$

$$Z_{VI} = T\left(\frac{\partial Z_{IV}}{\partial T}\right)_\rho = -\frac{C_v - \tilde{C}_v}{R} \tag{B6}$$

In terms of these functions, equations (10) to (13) and (15) become

$$\frac{H}{R} = \int \frac{\tilde{C}_v}{R}\, dT + T(Z_I - Z_V) + K_H \tag{B7}$$

where K_H is 508.31 K for nitrogen and 6.98973 K for helium.

$$\frac{S}{R} = \int \frac{\tilde{C}_v}{R}\frac{dT}{T} - \ln \rho - Z_{IV} + K_S \tag{B8}$$

where K_S is 0.77124 for nitrogen and 4.75063 for helium.

$$\frac{C_p}{R} = \frac{\tilde{C}_v}{R} - Z_{VI} + \frac{Z_{II}^2}{Z_{III}} \tag{B9}$$

$$\gamma = \frac{C_p}{C_v} = \frac{1}{Z_{III}} \left(Z_{III} + \frac{Z_{II}^2}{\frac{\tilde{C}_v}{R} - Z_{VI}} \right) \tag{B10}$$

$$k = \frac{\rho}{p} \left(\frac{\partial p}{\partial \rho} \right)_S = \gamma \frac{Z_{III}}{Z_I} \tag{B11}$$

The calculation of the isentropic flow functions from the plenum to the nozzle exit involves the following equations:

$$\rho_o = \frac{p_o}{Z_I(\rho_o, T_o) R T_o} \tag{B12}$$

$$\frac{a_e^2}{R} = k(\rho_e, T_e) \frac{p_e}{\rho_e} \tag{B13}$$

$$\frac{S_o - S_e}{R} \equiv 0 = \int_{T_e}^{T_o} \frac{\tilde{C}_v}{R} \frac{dT}{T} - \ln \frac{\rho_o}{\rho_e} - Z_{IV}(\rho_o, T_o) + Z_{IV}(\rho_e, T_e) \tag{B14}$$

$$\frac{v_e^2}{R} = 2\left(\frac{H_o - H_e}{R} \right)$$

$$= 2\left\{ \int_{T_e}^{T_o} \frac{\tilde{C}_v}{R} dT + T_o \left[Z_I(\rho_o, T_o) - Z_V(\rho_o, T_o) \right] - T_e \left[Z_I(\rho_e, T_e) - Z_V(\rho_e, T_e) \right] \right\} \tag{B15}$$

The independent variables for the plenum conditions are the pressure and temperature. The calculation of the plenum thermodynamic functions involves density. It is, therefore, necessary to solve equation (B12) for density. Since this equation involves density implicitly, an iterative procedure is necessary for solution. A description of this procedure follows:

First estimate of plenum density:

$$\rho_{o,1} = \frac{p_o}{RT_o} \tag{B16}$$

Succeeding estimates:

$$\rho_{o,n} = \rho_{o,n-1} + \left(\frac{\partial \rho}{\partial p}\right)_T (p_o - p_{o,n-1}) \tag{B17}$$

where

$$\left(\frac{\partial \rho}{\partial p}\right)_T = \frac{1}{RT_o Z_{III}(\rho_{o,n-1}, T_o)} \tag{B18}$$

When the last two density estimates agree to within one part per million, the computation is considered complete. For certain cases of helium at high pressures and low temperatures, this procedure failed to converge. For these cases, the iteration procedure is restarted with the following initial estimate:

$$\rho_{o,1} = \frac{p_o}{3RT_o} \tag{B19}$$

This restart permitted convergence for all tabulated cases.

If the nozzle exit independent variable is the temperature, the nozzle exit density can be determined by solving equation (B14) for ρ_e. Since ρ_e is involved implicitly in equation (B14), an iterative procedure for solution is used. This procedure is as follows:

First estimate of nozzle exit density:

$$\ln \rho_{e,1} = \ln \rho_o - \int_{T_e}^{T_o} \frac{\tilde{C}_v}{R} \frac{dT}{T} \tag{B20}$$

Succeeding estimates:

$$\ln \rho_{e,n} = \ln \rho_{e,n-1} + \left[\frac{\partial(\ln \rho_e)}{\partial(S_o - S_e)}\right]_T \Delta(S_o - S_e) \tag{B21}$$

where

$$\left[\frac{\partial(\ln \rho_e)}{\partial(S_o - S_e)}\right]_T = \frac{1}{Z_{II}(\rho_{e,n-1}, T_e)} \tag{B22}$$

and

$$\Delta(S_o - S_e) = -\int_{T_e}^{T_o} \frac{\tilde{C}_v}{R}\frac{dT}{T} + \ln\left(\frac{\rho_o}{\rho_{e,n-1}}\right) + Z_{IV}(\rho_o, T_o) - Z_{IV}(\rho_{e,n-1}, T_e) \tag{B23}$$

When the last two density estimates agree to within one part per million, the computation is considered complete.

For physically valid solutions for either ρ_o or ρ_e, Z_I, Z_{II}, and Z_{III} must be positive. That is, the density has to be positive, the pressure has to increase with temperature at constant density, and the pressure has to increase with density at constant temperature. These conditions were verified for all tabulated cases.

Once the thermodynamic state of the gas is known at both the plenum and the nozzle exit, isentropic flow quantities can be calculated. For example, the nozzle exit Mach number can be calculated from equations (B13) and (B15), and the nozzle exit mass-flow rate per unit area from the nozzle exit density and equation (B15).

If the nozzle exit independent variable is either pressure or Mach number rather than temperature, a nozzle exit temperature has to be estimated such that the calculated pressure or Mach number agrees with the prescribed pressure or Mach number. This temperature estimate is then used in equations (B20) to (B23) to calculate the nozzle exit density. (This procedure always assures that the nozzle exit entropy is equal to the plenum entropy.) The procedures for these two cases are discussed separately.

If the nozzle exit pressure is the independent variable, the first estimate of the nozzle exit temperature is less than the plenum temperature and either greater than the saturation temperature for the case of nitrogen or greater than the critical temperature for the case of helium. These conditions take precedence over the following equation for the first temperature estimate. This estimate represents the nozzle exit temperature that would exist if the gas were ideal.

$$T_{e,1} = T_o \left(\frac{p_e}{p_o} \right)^{(\gamma_i - 1)/\gamma_i} \tag{B24}$$

The second temperature estimate is given by

$$T_{e,2} = T_{e,1} + \left[\left(\frac{\partial T}{\partial p} \right)_S \right]_i (p_e - p_{e,1}) \tag{B25}$$

where

$$\left[\left(\frac{\partial T}{\partial p} \right)_S \right]_i = \left(\frac{\gamma_i - 1}{\gamma_i} \right) \left(\frac{T_{e,1}}{p_{e,1}} \right) \tag{B26}$$

The other estimates are given by

$$T_{e,n} = T_{e,n-1} + \left(\frac{T_{e,n-1} - T_{e,n-2}}{p_{e,n-1} - p_{e,n-2}} \right) (p_e - p_{e,n-1}) \tag{B27}$$

For all estimates, a check is made to determine that the temperature is either greater than saturation for the case of nitrogen or greater than critical for the case of helium. When the calculated nozzle exit pressure $p_{e,n}$ agrees with the prescribed nozzle exit pressure p_e to within one part per million, the nozzle exit temperature is considered to be known.

If the nozzle exit Mach number is the independent variable, the first estimate of the nozzle exit temperature is made on the basis of the gas being ideal. This estimate is

$$T_{e,1} = \frac{T_o}{1 + \frac{\gamma_i - 1}{2} M_e^2} \tag{B28}$$

The second estimate is given by

$$T_{e,2} = T_{e,1} + \left[\left(\frac{\partial T}{\partial M} \right)_S \right]_i (M_e - M_{e,1}) \tag{B29}$$

where

$$\left[\left(\frac{\partial T}{\partial M}\right)_S\right]_i = \left(-\frac{T_{e,1}^2}{T_o}\right)(\gamma_i - 1)M_e \tag{B30}$$

The succeeding estimates are given by

$$T_{e,n} = T_{e,n-1} + \left(\frac{T_{e,n-1} - T_{e,n-2}}{M_{e,n-1} - M_{e,n-2}}\right)(M_e - M_{e,n-1}) \tag{B31}$$

For all estimates, a check is made to determine that the temperature is either above saturation for the case of nitrogen or above critical for the case of helium. When the calculated nozzle exit Mach number agrees with the prescribed nozzle exit Mach number to within one part in ten thousand, the nozzle exit temperature is considered to be known.

APPENDIX C

DESCRIPTION OF FORTRAN IV SUBROUTINES

The subroutine used to calculate the thermodynamic properties of nitrogen is referenced by the following statement:

CALL CNIT (KKK, PA, TA, AM, PB, TB, FLOW, KODE)

For a valid computation, the following conditions must be satisfied:

$$55\ K < T < 501\ K \tag{C1}$$

$$p < p_{sat} \tag{C2}$$

$$p < 351 \times 10^5\ N/m^2 \tag{C3}$$

The subroutine used to calculate the thermodynamic properties of helium is referenced by the following statement:

CALL CHEL (KKK, PA, TA, AM, PB, TB, FLOW, KODE)

For a valid computation, the following conditions have to be satisfied:

$$5.4\ K < T < 501\ K \tag{C4}$$

$$p < 305 \times 10^5\ N/m^2 \tag{C5}$$

For both subroutines, certain variables are returned through labeled common. These are referenced by the following statement:

COMMON/OUTPUT/OUX(15), Z(6, 2), KOD1(5)

The following symbol definitions apply to both subroutines:

KKK Controls entry to and exit from the subroutine. If KKK=0, just the plenum properties are calculated. If KKK=2, both the plenum and the nozzle exit properties are calculated. If KKK=1, just the nozzle exit properties are calculated. For a given set of plenum conditions, at least one reference has to be made for KKK=0 or 2 before a reference can be made for KKK=1.

PA — Plenum pressure, p_o, N/m^2

TA — Plenum temperature, T_o, K

AM — Nozzle exit Mach number, M_e

PB — Nozzle exit pressure, p_e, N/m^2

FLOW — Nozzle exit mass-flow rate per unit area, G_e, $kg/(m^2)(sec)$

KODE — Indicates the independent variables to the subroutine. If KODE=1, the independent variables are PA, TA, and PB. If KODE=2, the independent variables are PA, TA, and AM. If KODE=3, the independent variables are PA, TA, and TB.

OUX(1) — Actual mass-flow rate G_e divided by ideal mass-flow rate $G_{e,i}$. The ideal mass-flow rate is defined as follows:

$$G_{e,i} = \left\{ \frac{2\gamma_i}{\gamma_i - 1} \frac{p_o^2}{RT_o} \left(\frac{p_e}{p_o}\right)^{2/\gamma_i} \left[1 - \left(\frac{p_e}{p_o}\right)^{(\gamma_i - 1)/\gamma_i} \right] \right\}^{1/2} \qquad \text{(C6)}$$

for $M_e \neq 1$

$$G_{e,i} = \left[\gamma_i \left(\frac{2}{\gamma_i + 1} \right)^{(\gamma_i + 1)(\gamma_i - 1)} \right]^{1/2} \frac{p_o}{\sqrt{RT_o}} \qquad \text{for } M_e = M_t = 1 \qquad \text{(C7)}$$

where $\gamma_i = 7/5$ for nitrogen and $\gamma_i = 5/3$ for helium.

OUX(2) — Nozzle exit specific heat, $C_{p,e}/R$

OUX(3) — Nozzle exit specific-heat ratio, γ_e

OUX(4) — Nozzle exit isentropic exponent, k_e

OUX(5) — Plenum enthalpy, H_o/R, K

OUX(6) — Plenum specific heat, $C_{p,o}/R$

OUX(7) — Plenum specific-heat ratio, γ_o

OUX(8) Plenum isentropic exponent, k_o

OUX(9) Plenum pressure as calculated from plenum density and temperature, N/m^2

OUX(10) For KODE=1, this is the nozzle exit pressure in newtons per square meter as calculated from nozzle exit density and temperature. For KODE=2, this is the nozzle exit Mach number as calculated from nozzle exit thermodynamic gas state. For KODE=3, this is set equal to zero.

OUX(11) Indicates the degree of convergence achieved in calculating the plenum density and is defined by

$$\mathrm{OUX}(11) = 1 - \frac{\rho_{o,n}}{\rho_{o,n-1}} \tag{C8}$$

OUX(12) Indicates the degree of convergence achieved in calculation of nozzle exit density and is defined by

$$\mathrm{OUX}(12) = \ln\left(\frac{\rho_{e,n-1}}{\rho_{e,n}}\right) \approx \frac{\rho_{e,n-1}}{\rho_{e,n}} - 1 \tag{C9}$$

OUX(13) Ratio of plenum pressure to saturation pressure, or

$$\mathrm{OUX}(13) = \frac{p_o}{p_{sat}} \tag{C10}$$

OUX(14) Ratio of nozzle exit pressure to saturation pressure, or

$$\mathrm{OUX}(14) = \frac{p_e}{p_{sat}} \tag{C11}$$

OUX(15) Plenum entropy, S_o/R

The following symbols refer to functions of the compressibility factor. These functions are defined in appendix B.

Z(1, 1) $Z(1, 1) = Z_I(\rho_o, T_o)$

Z(2, 1) $Z(2, 1) = Z_{II}(\rho_o, T_o)$

Z(3, 1) $Z(3, 1) = Z_{III}(\rho_o, T_o)$

Z(4, 1) $Z(4, 1) = Z_{IV}(\rho_o, T_o)$

Z(5, 1) $Z(5, 1) = Z_V(\rho_o, T_o)$

Z(6, 1) $Z(6, 1) = Z_{VI}(\rho_o, T_o)$

Z(1, 2) $Z(1, 2) = Z_I(\rho_e, T_e)$

Z(2, 2) $Z(2, 2) = Z_{II}(\rho_e, T_e)$

Z(3, 2) $Z(3, 2) = Z_{III}(\rho, T_e)$

Z(4, 2) $Z(4, 2) = Z_{IV}(\rho_e, T_e)$

Z(5, 2) $Z(5, 2) = Z_V(\rho_e, T_e)$

Z(6, 2) $Z(6, 2) = Z_{VI}(\rho_e, T_e)$

The following symbols represent integers that are used to indicate if the calculation is valid. If all these integers equal zero, a valid calculation has been performed. If these are not zero, the conditions are as follows:

KOD1(1) Equals 1 if the plenum conditions are out of range in either temperature or pressure. A value of 1 terminates the calculation.

KOD1(2) Equals 1 if the nozzle exit conditions are out of range in either temperature or pressure. A value of 1 terminates the calculation. For the case of nitrogen, the computation is permitted to continue if p_e/p_{sat} is between 1 and 3. If this is the case, KOD1(2) is set equal to 2.

KOD1(3) If KODE=1, this quantity equals 1 if the calculated nozzle exit pressure fails to converge to the prescribed nozzle exit pressure. If KODE=2, this quantity equals 1 if the calculated nozzle exit Mach number fails to converge to the prescribed nozzle exit Mach number.

KOD1(4) Equals 1 if the iteration procedure for the calculation of the plenum density fails to converge.

KOD1(5) Equals 1 if the iteration procedure for the calculation of the nozzle exit density fails to converge.

APPENDIX D

FORTRAN IV SUBROUTINES

```
$IBFTC CNITS   LIST,DECK
       SUBROUTINE CNIT (KKK,PA,TA,AM,PB,TB,FLOW,KODE)
       EQUIVALENCE (R,RR)
       COMMON /OUTPUT/ OUX(15),Z(6,2),KOD1(5)
       COMMON /CONV/ MM,M,NN
       DATA A1,A2,A3,A4,A5/2.501146,-9.720581E-5,1.036056E-6,-4.437258E-9
      1,6.825596E-12/
       DATA R,GAMA,GAMB,GAMC,GAME/296.774,.285714286,.2,1.42857143,7.0/
       CP(S)=A1+(A2+(A3+(A4+A5*S)*S)*S)*S
       CS(S)=A1*ALOG(S)+(A2+(A3/2.0+(A4/3.0+A5*S/4.0)*S)*S)*S
       CH(S)=(A1+(A2/2.0+(A3/3.0+(A4/4.0+A5*S/5.0)*S)*S)*S)*S
       IF (KKK.EQ.1) GO TO 10
       DO 1 N=1,5
1      KOD1(N)=0
       DO 2 N=1,12
2      OUX(N)=0.0
       OUX(15)=0.0
       DO 3 NX=1,2
       DO 3 N=1,6
3      Z(N,NX)=0.0
       CALL LOGIC (PA,TA,OUX(13),KOD1(1))
       IF (KOD1(1).EQ.2) KOD1(1)=1
       IF (KOD1(1).EQ.1) RETURN
C
C  THE ITERATION PROCESS FOR CALCULATING THE PLENUM DENSITY FOLLOWS.
C
       A=PA/(R*TA)
       RHOA=A
       CALL ZETA (1,RHOA,TA,Z,1)
       DO 7 MM=1,50
       OUX(11)=(RHOA-PA/(Z(1,1)*R*TA))/RHOA
       IF (ABS(OUX(11)).LT.1.0E-6) GO TO 8
       AAA=(Z(1,1)-A/RHOA)/Z(3,1)
4      IF (1.0-AAA) 5,5,6
5      AAA=AAA/2.0
       GO TO 4
6      RHOA=RHOA*(1.0-AAA)
7      CALL ZETA (1,RHOA,TA,Z,1)
       KOD1(4)=1
8      CALL ZETA (3,RHOA,TA,Z,1)
       IF ((Z(1,1).GT.0.).AND.(Z(2,1).GT.0.).AND.(Z(3,1).GT.0.)) GO TO 9
       KOD1(1)=1
       RETURN
C
C  THE PLENUM THERMODYNAMIC FUNCTIONS ARE CALCULATED BY THE FOLLOWING
C  STATEMENTS
C
9      CV=CP(TA)-Z(6,1)
       GA=Z(3,1)+Z(2,1)**2/CV
       OUX(7)=GA/Z(3,1)
       OUX(8)=GA/Z(1,1)
       OUX(6)=CV*OUX(7)
       OUX(5)=CH(TA)+TA*(Z(1,1)-Z(5,1))+508.31
       OUX(15)=CS(TA)-ALOG(RHOA)-Z(4,1)+0.77124
       OUX(9)=Z(1,1)*TA*R*RHOA
C
       IF (KKK.EQ.0) RETURN
10     GO TO (11,15,16),KODE
11     AM=0.0
```

```
C
C  THE INITIAL ESTIMATE OF THE NOZZLE EXIT TEMPERATURE WHEN THE NOZZLE
C  EXIT PRESSURE IS GIVEN IS MADE BY THE FOLLOWING STATEMENTS.
C
      TB=TA*(PB/PA)**GAMA
      IF (TB.GE.126.36) GO TO 14
      IF (PB-3.3984E6) 12,12,13
12    X=ALOG10(PB)-5.0057166
      TB1=77.4635+(19.5407+(5.33082+(1.41895+.309106*X)*X)*X)*X
      IF ((TB.LT.TB1).AND.(TA.GT.1.001*TB1)) TB=TB1
      GO TO 14
13    IF (TA.GT.126.48) TB=126.36
14    TB1=TB
      IF (PA.GT.PB) GO TO 17
      KOD1(2)=1
      RETURN
15    PB=PA*(1.0+GAMB*AM**2)**(-3.5)
C
C  THE INITIAL ESTIMATE OF THE NOZZLE EXIT TEMPERATURE WHEN THE NOZZLE
C  EXIT MACH NUMBER IS GIVEN IS MADE BY THE FOLLOWING STATEMENTS.
C
      TB=TA/(1.0+GAMB*AM**2)
      TB1=TB
C
      GO TO 17
16    PB=PA*(TB/TA)**(3.5)
      IF (TA.GT.TB) GO TO 17
      KOD1(2)=1
      RETURN
17    KOD1(3)=0
      NN=1
      DO 18 N=1,4
18    OUX(N)=0.0
      OUX(10)=0.0
      OUX(12)=0.0
      DO 19 N=1,6
19    Z(N,2)=0.0
      FLOW=0.0
20    KOD1(5)=0
      CALL LOGIC (PB,TB,OUX(14),KOD1(2))
      IF (KOD1(2).EQ.1) RETURN
C
C  THE ITERATION PROCESS FOR CALCULATING THE NOZZLE EXIT DENSITY
C  FOLLOWS.
C
      AL=ALOG(RHOA)+Z(4,1)+CS(TB)-CS(TA)
      ALA=AL-Z(4,1)
      CALL ZETA (2,EXP(ALA),TB,Z,2)
      DO 21 M=1,50
      OUX(12)=ALA-AL+Z(4,2)
      IF (ABS(OUX(12)).LT.1.0E-6) GO TO 22
      ALA=ALA-OUX(12)/Z(2,2)
21    CALL ZETA (2,EXP(ALA),TB,Z,2)
      KOD1(5)=1
22    RHOB=EXP(ALA)
      IF (RHOA-RHOB) 23,23,24
23    KOD1(2)=1
      RETURN
24    CALL ZETA (3,RHOB,TB,Z,2)
C
```

```
C  THE THERMODYNAMIC FUNCTIONS AT THE NOZZLE EXIT CONDITIONS ARE
C  CALCULATED BY THE FOLLOWING STATEMENTS.
C
      VV=2.0*(CH(TA)-CH(TB)+TA*(Z(1,1)-Z(5,1))-TB*(Z(1,2)-Z(5,2)))
      CV=CP(TB)-Z(6,2)
      GA=Z(3,2)+Z(2,2)**2/CV
      OUX(3)=GA/Z(3,2)
      OUX(4)=GA/Z(1,2)
      OUX(2)=CV*OUX(3)
C
      GO TO (25,29,33),KODE
25    AM=ASQRT(VV/(Z(1,2)*OUX(4)*TB))
      IF (NN.NE.1) B1=OUX(10)
      OUX(10)=RHOB*Z(1,2)*R*TB
      PERR=PB/OUX(10)-1.0
      IF (ABS(PERR).LT.1.0E-6) GO TO 34
      IF (NN.GT.20) GO TO 28
      NN=NN+1
C
C  THE SUCCEEDING ESTIMATES OF THE NOZZLE EXIT TEMPERATURE ARE MADE
C  BY THE FOLLOWING STATEMENTS FOR THE CASE OF A GIVEN NOZZLE EXIT
C  PRESSURE.
C
      IF (NN-2) 27,26,27
26    TB=TB*(1.0+GAMA*PERR)
      IF (TB.GE.TA) TB=.999*TA
      TB2=TB
      GO TO 20
27    TB=TB+(TB2-TB1)*(PB-OUX(10))/(OUX(10)-B1)
      TB1=TB2
      TB2=TB
C
      GO TO 20
28    KOD1(3)=1
      GO TO 34
29    PB=Z(1,2)*TB*R*RHOB
      IF (NN.NE.1) B1=OUX(10)
      OUX(10)=ASQRT(VV/(Z(1,2)*TB*OUX(4)))
      IF (ABS(1.0-OUX(10)/AM).LT.1.0E-4) GO TO 34
      IF (NN.GT.20) GO TO 32
      NN=NN+1
C
C  THE SUCCEEDING ESTIMATES OF THE NOZZLE EXIT TEMPERATURE ARE MADE
C  BY THE FOLLOWING STATEMENTS FOR THE CASE OF A GIVEN NOZZLE EXIT
C  MACH NUMBER.
C
      IF (NN-2) 31,30,31
30    TB=TB*(1.0-0.400*TB*AM*(AM-OUX(10))/TA)
      IF (TB.GE.TA) TB=.999*TA
      TB2=TB
      GO TO 20
31    TB=TB+(TB2-TB1)*(AM-OUX(10))/(OUX(10)-B1)
      TB1=TB2
      TB2=TB
C
      GO TO 20
32    KOD1(3)=1
      GO TO 34
33    AM=ASQRT(VV/(Z(1,2)*OUX(4)*TB))
      PB=Z(1,2)*R*RHOB*TB
```

```
      OUX(10)=0.0
34    CALL LOGIC (PB,TB,OUX(14),KOD1(2))
      IF ((VV.GT.0.).AND.(Z(2,2).GT.0.).AND.(Z(3,2).GT.0.)) GO TO 35
      KOD1(2)=1
      RETURN
C
C  THE ISENTROPIC FLOW PROPERTIES ARE CALCULATED BY THE FOLLOWING
C  STATEMENTS.
C
35    FLOW=PB*SQRT(VV/RB)/(Z(1,2)*TB)
      TBF=(PB/PA)**GAMA
      IF ((AM.EQ.1.0).AND.(KODE.EQ.2)) GO TO 36
      FLOWI=PA*SQRT(GAME*(PB/PA)**GAMC*(1.0-TBF)/(RB*TA))
      GO TO 37
36    FLOWI=PA*SQRT(1.57985E-3/TA)
37    OUX(1)=FLOW/FLOWI
C
      RETURN
      END


$IBFTC NZET    LIST,DECK
C
C  THE FUNCTIONS OF THE COMPRESSIBILITY FACTOR ARE CALCULATED IN THE
C  FOLLOWING SUBROUTINE.
C
      SUBROUTINE ZETA (K,P,T,Z,J)
      DIMENSION Z(6,2)
      DATA A,B1,B2,B3,B4,B5,B6,B7,B8,B9,B10,B11,B12,B13,B14,B15/-7.135E-
     16,1.2034917E-3,-2.510789E-1,-4.9681584E1,3.7073373E2,1.496473E6,
     22.1027719E-6,-2.4516046E-4,2.3102822E-9,4.9866482,1.6771286E3,
     3-1.656225E5,-6.5374809E-5,2.4209108E-2,-1.126389,1.1829604E-12/
      CO(X,Y,Z)=X*S3+Y*S4+Z*S5
      S1=1.0/T
      S2=S1*S1
      S3=S1*S2
      S4=S1*S3
      S5=S1*S4
      P2=P*P
      EXPO=EXP(A*P2)
      AA=1.0/(2.0*A)
      BB=1.0/A
      C1=CO(B9,B10,B11)
      C2=CO(B12,B13,B14)
      IF (K.EQ.2) GO TO 1
      BA1=B1+B2*S1+B3*S2+B4*S3+B5*S5
      BA2=B6+B7*S1
      ZA=1.0+(BA1+(BA2+(B8+B15*S1*P2)*P)*P)*P
      ZB=EXPO*P2*(C1+C2*P2)
      Z(1,J)=ZA+ZB
      ZA=1.0+(2.0*BA1+(3.0*BA2+(4.0*B8+6.0*B15*S1*P2)*P)*P)*P
      ZB=P2*EXPO*(3.0*C1+(2.0*A*C1+5.0*C2+2.0*C2*P2*A)*P2)
      Z(3,J)=ZA+ZB
      IF (K.EQ.1) RETURN
1     BT=B1-B3*S2-2.0*B4*S3-4.0*B5*S5
      C1P=-CO(3.0*B9,4.0*B10,5.0*B11)
      C2P=-CO(3.0*B12,4.0*B13,5.0*B14)
      CC1=C1+C1P
      CC2=C2+C2P
      ZA=1.0+(BT+(B6+B8*P)*P)*P
```

```
      ZB=P2*EXP0*(CC1+CC2*P2)
      Z(2,J)=ZA+ZB
      ZA=(BT+(B6/2.0+B8*P/3.0)*P)*P
      ZB=AA*(EXP0*(CC1+(P2-BB)*CC2)+BB*CC2-CC1)
      Z(4,J)=ZA+ZB
      IF (K.EQ.2) RETURN
      C1PP=C0(9.0*B9,16.0*B10,25.0*B11)
      C2PP=C0(9.0*B12,16.0*B13,25.0*B14)
      ZA=-((B2*S1+2.0*B3*S2+3.0*B4*S3+5.0*B5*S5)+(B7*S1/2.0+B15*S1*P**3/
     15.0)*P)*P
      ZB=AA*(EXP0*(C1P+(P2-BB)*C2P)+BB*C2P-C1P)
      Z(5,J)=ZA+ZB
      CC1P=C1P+C1PP
      CC2P=C2P+C2PP
      ZA=(2.0*B3*S2+6.0*B4*S3+20.0*B5*S5)*P
      ZB=AA*(EXP0*(CC1P+(P2-BB)*CC2P)+CC2P*BB-CC1P)
      Z(6,J)=ZA+ZB
      RETURN
      END


$IBFTC NLOG    LIST,DECK
C
C   THE FOLLOWING SUBROUTINE IS USED TO DETERMINE WHETHER OR NOT THE
C   FLUID IS A GAS, AND WHETHER OR NOT THE PRESSURE AND TEMPERATURE LIES
C   WITHIN THE RANGE OF THE STATE EQUATION.
C
      SUBROUTINE LOGIC (P,T,R,J)
      LOGICAL TNH,PNH
      TNH=T.GT.501.0
      PNH=P.GT.351.0E5
      J=0
      R=0.0
      IF((T.GT.126.26).AND..NOT.TNH.AND..NOT.PNH) RETURN
      J=1
      IF((T.LT.55.0).OR.TNH.OR.PNH) RETURN
      XLIM=10.0**(-305.07339/T+5.5335216+(.16441101+(-3.1389205E-3+(2.98
     157103E-5+(-1.4238458E-7+2.7375282E-10*T)*T)*T)*T)*T)*T)
      R=P/XLIM
      IF (R.GT.3.0) RETURN
      J=0
      IF (R.LE.1.0) RETURN
      J=2
      RETURN
      END
```

```
$IBFTC CHELS   LIST,DECK
      SUBROUTINE CHEL (KKK,PA,TA,AM,PB,TB,FLOW,KODE)
      EQUIVALENCE (R,RB)
      COMMON /OUTPUT/ OUX(15),Z(6,2),KOD1(5)
      COMMON /CONV/ MM,M,NN
      DATA R,GAMA,GAMB,GAMC,GAME/2077.15,.4,.333333333,1.2,5.0/
      IF (KKK.EQ.1) GO TO 11
      DO 1 N=1,5
1     KOD1(N)=0
      DO 2 N=1,12
2     OUX(N)=0.0
      OUX(15)=0.0
      DO 3 NX=1,2
      DO 3 N=1,6
3     Z(N,NX)=0.0
      CALL LOGIC (PA,TA,OUX(13),KOD1(1))
      IF (KOD1(1).EQ.1) RETURN
C
C  THE ITERATION PROCESS FOR CALCULATING THE PLENUM DENSITY FOLLOWS.
C
      A=PA/(R*TA)
      RHOA=A
      DO 9 NX=1,2
      KOD1(4)=0
      CALL ZETA (1,RHOA,TA,Z,1)
      DO 7 MM=1,50
      OUX(11)=(RHOA-PA/(Z(1,1)*R*TA))/RHOA
      IF (ABS(OUX(11)).LT.1.0E-6) GO TO 8
      AAA=(Z(1,1)-A/RHOA)/Z(3,1)
4     IF (1.0-AAA) 5,5,6
5     AAA=AAA/2.0
      GO TO 4
6     RHOA=RHOA*(1.0-AAA)
7     CALL ZETA (1,RHOA,TA,Z,1)
      KOD1(4)=1
8     CALL ZETA (3,RHOA,TA,Z,1)
      IF ((Z(1,1).GT.0.).AND.(Z(2,1).GT.0.).AND.(Z(3,1).GT.0.)) GO TO 10
9     RHOA=A/3.0
      KOD1(1)=1
      RETURN
C
C  THE PLENUM THERMODYNAMIC FUNCTIONS ARE CALCULATED BY THE FOLLOWING
C  STATEMENTS
C
10    CV=1.5-Z(6,1)
      GA=Z(3,1)+Z(2,1)**2/CV
      OUX(7)=GA/Z(3,1)
      OUX(8)=GA/Z(1,1)
      OUX(6)=CV*OUX(7)
      OUX(5)=TA*(1.5+Z(1,1)-Z(5,1))+6.98973
      OUX(15)=1.5*ALOG(TA)-ALOG(RHOA)-Z(4,1)+4.75063
      OUX(9)=Z(1,1)*TA*R*RHOA
C
      IF (KKK.EQ.0) RETURN
11    GO TO (12,13,14),KODE
12    AM=0.0
C
```

```
C  THE INITIAL ESTIMATE OF THE NOZZLE EXIT TEMPERATURE WHEN THE NOZZLE
C  EXIT PRESSURE IS GIVEN IS MADE BY THE FOLLOWING STATEMENTS.
C
      TR=TA*(PR/PA)**GAMA
      IF ((TR.LT.5.401).AND.(TA.GT.5.406)) TR=5.401
      TR1=TR
      IF (PA.GT.PR) GO TO 15
      KOD1(2)=1
      RETURN
13    PR=PA*(1.0+GAMR*AM**2)**(-2.5)
C
C  THE INITIAL ESTIMATE OF THE NOZZLE EXIT TEMPERATURE WHEN THE NOZZLE
C  EXIT MACH NUMBER IS GIVEN IS MADE BY THE FOLLOWING STATEMENTS.
C
      TR=TA/(1.0+GAMR*AM**2)
      TR1=TR
C
      GO TO 15
14    PR=PA*(TR/TA)**(2.5)
      IF (TA.GT.TR) GO TO 15
      KOD1(2)=1
      RETURN
15    KOD1(3)=0
      NM=1
      DO 16 M=1,4
16    RHX(M)=0.0
      RHX(10)=0.0
      RHX(12)=0.0
      DO 17 M=1,6
17    Z(M,2)=0.0
      ELIM=0.0
      CALL LOGIC (PR,TR,RHX(14),KOD1(2))
      IF (KOD1(2).EQ.1) RETURN
18    KOD1(5)=0
C
C  THE ITERATION PROCESS FOR CALCULATING THE NOZZLE EXIT DENSITY
C  FOLLOWS.
C
      AL=ALOG(RHOA)+Z(4,1)+1.5*ALOG(TR/TA)
      ALA=AL-Z(4,1)
      CALL ZETA (2,EXP(ALA),TR,Z,2)
      DO 19 M=1,50
      RHX(12)=ALA-AL+Z(4,2)
      IF (ABS(RHX(12)).LT.1.0E-6) GO TO 20
      ALA=ALA-RHX(12)/Z(2,2)
19    CALL ZETA (2,EXP(ALA),TR,Z,2)
      KOD1(5)=1
20    RHOR=EXP(ALA)
      IF (RHOA-RHOR) 21,21,22
21    KOD1(2)=1
      RETURN
22    CALL ZETA (3,RHOR,TR,Z,2)
C
C  THE THERMODYNAMIC FUNCTIONS AT THE NOZZLE EXIT CONDITIONS ARE
C  CALCULATED BY THE FOLLOWING STATEMENTS.
C
      VV=2.0*(TA*(1.5+Z(1,1)-Z(5,1))-TR*(1.5+Z(1,2)-Z(5,2)))
      CV=1.5-Z(6,2)
      GA=Z(3,2)+Z(2,2)**2/CV
      RHX(3)=GA/Z(3,2)
```

```
      DUX(4)=GA/Z(1,2)
      DUX(2)=CV*DUX(3)
C
      GO TO (23,27,31),KODE
23    AM=ASQRT(VV/(Z(1,2)*DUX(4)*TR))
      IF (NN.NE.1) R1=DUX(10)
      DUX(10)=RHOR*Z(1,2)*R*TR
      PERR=PR/DUX(10)-1.0
      IF (ABS(PERR).LT.1.0E-6) GO TO 32
      IF (NN.GT.20) GO TO 26
      NN=NN+1
C
C  THE SUCCEEDING ESTIMATES OF THE NOZZLE EXIT TEMPERATURE ARE MADE
C  BY THE FOLLOWING STATEMENTS FOR THE CASE OF A GIVEN NOZZLE EXIT
C  PRESSURE.
C
      IF (NN-2) 25,24,25
24    TR=TR*(1.0+GAMA*PERR)
      IF (TR.GE.TA) TR=.999*TA
      TR2=TR
      GO TO 18
25    TR=TR+(TR2-TR1)*(PR-DUX(10))/(DUX(10)-R1)
      TR1=TR2
      TR2=TR
C
      GO TO 18
26    KOD1(3)=1
      GO TO 32
27    PR=Z(1,2)*TR*R*RHOR
      IF (NN.NE.1) R1=DUX(10)
      DUX(10)=ASQRT(VV/(Z(1,2)*TR*DUX(4)))
      IF (ABS(1.0-DUX(10)/AM).LT.1.0E-4) GO TO 32
      IF (NN.GT.20) GO TO 30
      NN=NN+1
C
C  THE SUCCEEDING ESTIMATES OF THE NOZZLE EXIT TEMPERATURE ARE MADE
C  BY THE FOLLOWING STATEMENTS FOR THE CASE OF A GIVEN NOZZLE EXIT
C  MACH NUMBER.
C
      IF (NN-2) 29,28,29
28    TR=TR*(1.0-0.667*TR*AM*(AM-DUX(10))/TA)
      IF (TR.GE.TA) TR=.999*TA
      TR2=TR
      GO TO 18
29    TR=TR+(TR2-TR1)*(AM-DUX(10))/(DUX(10)-R1)
      TR1=TR2
      TR2=TR
C
      GO TO 18
30    KOD1(3)=1
      GO TO 32
31    AM=ASQRT(VV/(Z(1,2)*DUX(4)*TR))
      PR=Z(1,2)*R*RHOR*TR
      DUX(10)=0.0
32    CALL LOGIC (PR,TR,DUX(14),KOD1(2))
      IF ((VV.GT.0.).AND.(Z(2,2).GT.0.).AND.(Z(3,2).GT.0.)) GO TO 33
      KOD1(2)=1
      RETURN
C
C  THE ISENTROPIC FLOW PROPERTIES ARE CALCULATED BY THE FOLLOWING
```

```
C   STATEMENTS.
C
33      FLOW=PB*SQRT(VV/RB)/(Z(1,2)*TB)
        TBF=(PB/PA)**GAMA
        IF ((AM.EQ.1.0).AND.(KODE.EQ.2)) GO TO 34
        FLOWI=PA*SQRT(GAME*(PB/PA)**GAMC*(1.0-TBF)/(RB*TA))
        GO TO 35
34      FLOWI=PA*SQRT(2.53879E-4/TA)
35      QUX(1)=FLOW/FLOWI
C
        RETURN
        END


$IBFTC HZET     LIST,DECK
C
C   THE FUNCTIONS OF THE COMPRESSIBILITY FACTOR ARE CALCULATED IN THE
C   FOLLOWING SUBROUTINE.
C
        SUBROUTINE ZETA (K,P,T,Z,J)
        DIMENSION Z(6,2)
        DATA A,B1,B2,B3,B4,B5,B6,B7,B8,B9,B10,B11,B12,B13,B14,B15,B16/
       1-4.057E-4,4.0665013E-3,-1.1267764E-1,2.3039266E-2,-5.7468818E-2,
       21.3691368E-1,9.7390626E-6,7.0543876E-4,-5.3854984E-6,-3.8053762E-3
       3,2.625179E-2,7.674266E-2,-8.7904911E-7,1.9960611E-6,-8.1300167E-6,
       43.6743583E-8,-3.4049435E-11/
        C0(X,Y,Z)=X*S3+Y*S4+Z*S5
        S1=1.0/T
        S2=S1*S1
        S3=S2*S1
        S4=S3*S1
        S5=S4*S1
        AA=A*S1
        P2=P*P
        EXPO=EXP(AA*P2)
        C1=C0(B9,B10,B11)
        C2=C0(B12,B13,B14)
        IF (K.EQ.2) GO TO 1
        BA1=B1+B2*S1+B3*S2+B4*S3+B5*S5
        BA2=B6+B7*S1
        ZA=1.0+(BA1+(BA2+(B8*S1+(B15*S1+B16*S1*P)*P)*P)*P)*P
        ZB=(C1+C2*P2)*P2*EXPO
        Z(1,J)=ZA+ZB
        ZA=1.0+(2.0*BA1+(3.0*BA2+(4.0*B8*S1+(5.0*B15*S1+6.0*B16*S1*P)*P)*P
       1)*P)*P
        ZB=(3.0*C1+(2.0*AA*C1+5.0*C2+2.0*AA*C2*P2)*P2)*P2*EXPO
        Z(3,J)=ZA+ZB
        IF (K.EQ.1) RETURN
1       BT=B1-B3*S2-2.0*B4*S3-4.0*B5*S5
        C1P=-C0(3.0*B9,4.0*B10,5.0*B11)
        C2P=-C0(3.0*B12,4.0*B13,5.0*B14)
        C11=(2.0*C1+C1P)/AA
        C22=(3.0*C2+C2P)/AA
        ZA=1.0+(BT+B6*P)*P
        ZB=P2*EXPO*(C1+C1P+(-AA*C1+C2+C2P-AA*C2*P2)*P2)
        Z(2,J)=ZA+ZB
        ZA=(BT+B6*P/2.0)*P
        ZB=0.5*(EXPO*(C11-C22/AA+(-C1+C22-C2*P2)*P2)-C11+C22/AA)
        Z(4,J)=ZA+ZB
        IF (K.EQ.2) RETURN
```

```
      C11=(C1+C1P)/AA
      C22=(2.0*C2+C2P)/AA
      ZA=(-(B2*S1+2.0*B3*S2+3.0*B4*S3+5.0*B5*S5)+(-B7*S1/2.0+(-B8*S1/3.0
     1+(-B15*S1/4.0-B16*S1*P/5.0)*P)*P)*P)*P
      ZB=0.5*(EXPO*(C11-C22/AA+(-C1+C22-C2*P2)*P2)-C11+C22/AA)
      Z(5,J)=ZA+ZB
      C1PP=CO(9.0*B9,16.0*B10,25.0*B11)
      C2PP=CO(9.0*B12,16.0*B13,25.0*B14)
      C11=(2.0*C1+3.0*C1P+C1PP)/AA
      C22=(6.0*C2+5.0*C2P+C2PP)/AA
      ZA=(2.0*B3*S2+6.0*B4*S3+20.*B5*S5)*P
      ZB=0.5*(EXPO*(C11-C22/AA+(-2.0*(C1+C1P)+C22+(AA*C1-3.0*C2-2.0*C2P+
     1AA*C2*P2)*P2)*P2)-C11+C22/AA)
      Z(6,J)=ZA+ZB
      RETURN
      END


$IBFTC HLOG    LIST,DECK
C
C   THE FOLLOWING SUBROUTINE IS USED TO DETERMINE WHETHER OR NOT THE
C   FLUID IS A GAS, AND WHETHER OR NOT THE PRESSURE AND TEMPERATURE LIES
C   WITHIN THE RANGE OF THE STATE EQUATION.
C
      SUBROUTINE LOGIC (P,T,R,J)
      J=0
      R=0.0
      IF ((P.LT.305.0E5).AND.(T.GT.5.4).AND.(T.LT.501.0)) RETURN
      J=1
      RETURN
      END
```

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TABLE I. - THERMODYNAMIC PROPERTIES OF NITROGEN

(a) Critical-flow factor, C*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	0.6848	0.6985	------	------	------	------	------	------	------	------	------
101	0.6848	0.6981	------	------	------	------	------	------	------	------	------
102	0.6848	0.6977	0.7125	------	------	------	------	------	------	------	------
103	0.6848	0.6973	0.7117	------	------	------	------	------	------	------	------
104	0.6848	0.6970	0.7109	------	------	------	------	------	------	------	------
105	0.6848	0.6966	0.7101	------	------	------	------	------	------	------	------
106	0.6848	0.6963	0.7093	------	------	------	------	------	------	------	------
107	0.6848	0.6960	0.7086	------	------	------	------	------	------	------	------
108	0.6848	0.6957	0.7079	0.7218	------	------	------	------	------	------	------
109	0.6848	0.6954	0.7072	0.7206	------	------	------	------	------	------	------
110	0.6848	0.6951	0.7066	0.7195	------	------	------	------	------	------	------
111	0.6848	0.6948	0.7060	0.7185	------	------	------	------	------	------	------
112	0.6848	0.6946	0.7054	0.7175	0.7312	------	------	------	------	------	------
113	0.6848	0.6943	0.7048	0.7165	0.7297	------	------	------	------	------	------
114	0.6848	0.6941	0.7043	0.7156	0.7283	------	------	------	------	------	------
115	0.6848	0.6938	0.7038	0.7148	0.7270	0.7409	------	------	------	------	------
116	0.6848	0.6936	0.7033	0.7139	0.7257	0.7391	------	------	------	------	------
117	0.6848	0.6934	0.7028	0.7131	0.7245	0.7373	------	------	------	------	------
118	0.6848	0.6932	0.7023	0.7123	0.7234	0.7357	------	------	------	------	------
119	0.6848	0.6930	0.7019	0.7116	0.7223	0.7341	0.7475	------	------	------	------
120	0.6848	0.6928	0.7014	0.7109	0.7212	0.7326	0.7454	------	------	------	------
121	0.6848	0.6926	0.7010	0.7102	0.7202	0.7312	0.7435	0.7573	------	------	------
122	0.6848	0.6924	0.7006	0.7095	0.7192	0.7299	0.7417	0.7549	------	------	------
123	0.6848	0.6922	0.7002	0.7089	0.7183	0.7286	0.7399	0.7526	------	------	------
124	0.6848	0.6921	0.6999	0.7083	0.7174	0.7273	0.7383	0.7504	0.7640	------	------
125	0.6848	0.6919	0.6995	0.7077	0.7165	0.7261	0.7367	0.7483	0.7613	------	------
126	0.6848	0.6917	0.6991	0.7071	0.7157	0.7250	0.7352	0.7463	0.7588	0.7727	------
127	0.6848	0.6916	0.6988	0.7065	0.7149	0.7239	0.7337	0.7445	0.7564	0.7696	------
128	0.6848	0.6914	0.6985	0.7060	0.7141	0.7228	0.7323	0.7427	0.7541	0.7667	0.7809
129	0.6848	0.6913	0.6981	0.7055	0.7134	0.7218	0.7310	0.7410	0.7519	0.7640	0.7775
130	0.6848	0.6911	0.6978	0.7050	0.7126	0.7209	0.7297	0.7394	0.7499	0.7614	0.7742
132	0.6848	0.6908	0.6972	0.7040	0.7113	0.7190	0.7273	0.7363	0.7460	0.7566	0.7683
134	0.6848	0.6906	0.6967	0.7032	0.7100	0.7173	0.7251	0.7335	0.7426	0.7523	0.7630
136	0.6848	0.6903	0.6962	0.7023	0.7088	0.7158	0.7231	0.7310	0.7394	0.7484	0.7582
138	0.6848	0.6901	0.6957	0.7015	0.7077	0.7143	0.7212	0.7286	0.7365	0.7449	0.7539
140	0.6848	0.6899	0.6952	0.7008	0.7067	0.7129	0.7195	0.7264	0.7338	0.7416	0.7500
142	0.6848	0.6897	0.6948	0.7001	0.7057	0.7116	0.7178	0.7244	0.7313	0.7386	0.7465
144	0.6848	0.6895	0.6944	0.6995	0.7048	0.7104	0.7163	0.7225	0.7290	0.7359	0.7432
146	0.6848	0.6893	0.6940	0.6989	0.7040	0.7093	0.7149	0.7207	0.7269	0.7333	0.7402
148	0.6848	0.6891	0.6936	0.6983	0.7031	0.7082	0.7135	0.7191	0.7249	0.7310	0.7374
150	0.6848	0.6889	0.6932	0.6977	0.7024	0.7072	0.7123	0.7176	0.7230	0.7288	0.7348

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
125	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
126	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
127	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
128	0.7809	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
129	0.7775	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
130	0.7742	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
132	0.7683	0.8035	-------	-------	-------	-------	-------	-------	-------	-------	-------
134	0.7630	0.7946	-------	-------	-------	-------	-------	-------	-------	-------	-------
136	0.7582	0.7868	0.8237	-------	-------	-------	-------	-------	-------	-------	-------
138	0.7539	0.7800	0.8126	-------	-------	-------	-------	-------	-------	-------	-------
140	0.7500	0.7739	0.8031	0.8402	-------	-------	-------	-------	-------	-------	-------
142	0.7465	0.7684	0.7948	0.8275	0.8690	-------	-------	-------	-------	-------	-------
144	0.7432	0.7635	0.7875	0.8166	0.8524	0.8977	-------	-------	-------	-------	-------
146	0.7402	0.7590	0.7810	0.8071	0.8386	0.8771	0.9244	-------	-------	-------	-------
148	0.7374	0.7550	0.7752	0.7988	0.8268	0.8602	0.9002	0.9475	-------	-------	-------
150	0.7348	0.7513	0.7700	0.7915	0.8166	0.8459	0.8804	0.9205	0.9658	1.0144	-------

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.6848	0.7072	0.7348	0.7700	0.8166	0.8804	0.9658	-------	-------	-------	-------
155	0.6848	0.7050	0.7292	0.7588	0.7961	0.8436	0.9033	0.9723	1.0405	1.0973	1.1387
160	0.6848	0.7030	0.7244	0.7498	0.7805	0.8179	0.8626	0.9136	0.9665	1.0151	1.0550
165	0.6848	0.7013	0.7203	0.7424	0.7683	0.7987	0.8338	0.8732	0.9145	0.9545	0.9900
170	0.6848	0.6998	0.7168	0.7362	0.7584	0.7837	0.8123	0.8437	0.8767	0.9095	0.9399
175	0.6848	0.6985	0.7138	0.7309	0.7502	0.7717	0.7955	0.8212	0.8482	0.8752	0.9010
180	0.6848	0.6973	0.7111	0.7264	0.7433	0.7618	0.7820	0.8035	0.8260	0.8486	0.8705
185	0.6848	0.6963	0.7088	0.7225	0.7374	0.7535	0.7709	0.7892	0.8082	0.8274	0.8461
190	0.6848	0.6953	0.7067	0.7191	0.7323	0.7465	0.7616	0.7775	0.7938	0.8102	0.8263
195	0.6848	0.6945	0.7049	0.7160	0.7279	0.7405	0.7538	0.7676	0.7817	0.7959	0.8099
200	0.6848	0.6937	0.7033	0.7134	0.7241	0.7353	0.7471	0.7592	0.7716	0.7840	0.7962
205	0.6848	0.6930	0.7018	0.7110	0.7207	0.7308	0.7413	0.7520	0.7629	0.7738	0.7846
210	0.6848	0.6924	0.7005	0.7089	0.7177	0.7268	0.7362	0.7458	0.7555	0.7651	0.7747
215	0.6848	0.6919	0.6993	0.7070	0.7150	0.7232	0.7317	0.7403	0.7490	0.7576	0.7661
220	0.6848	0.6913	0.6982	0.7053	0.7126	0.7201	0.7277	0.7355	0.7433	0.7510	0.7586
225	0.6848	0.6909	0.6972	0.7037	0.7104	0.7173	0.7242	0.7312	0.7383	0.7452	0.7521
230	0.6848	0.6905	0.6963	0.7023	0.7085	0.7147	0.7211	0.7274	0.7338	0.7401	0.7463
235	0.6848	0.6901	0.6955	0.7010	0.7067	0.7124	0.7182	0.7240	0.7298	0.7355	0.7411
240	0.6848	0.6897	0.6947	0.6999	0.7051	0.7104	0.7157	0.7210	0.7263	0.7314	0.7365
245	0.6848	0.6894	0.6940	0.6988	0.7036	0.7085	0.7134	0.7182	0.7230	0.7278	0.7324
250	0.6848	0.6891	0.6934	0.6978	0.7023	0.7068	0.7113	0.7157	0.7201	0.7245	0.7287
255	0.6848	0.6888	0.6928	0.6969	0.7011	0.7052	0.7093	0.7134	0.7175	0.7215	0.7253
260	0.6848	0.6885	0.6923	0.6961	0.6999	0.7038	0.7076	0.7114	0.7151	0.7187	0.7223
265	0.6848	0.6883	0.6918	0.6953	0.6989	0.7025	0.7060	0.7095	0.7129	0.7163	0.7195
270	0.6848	0.6880	0.6913	0.6946	0.6979	0.7012	0.7045	0.7077	0.7109	0.7140	0.7170
275	0.6848	0.6878	0.6909	0.6940	0.6971	0.7001	0.7031	0.7061	0.7090	0.7119	0.7147
280	0.6848	0.6876	0.6905	0.6934	0.6962	0.6991	0.7019	0.7047	0.7074	0.7100	0.7125
285	0.6848	0.6874	0.6901	0.6928	0.6955	0.6981	0.7007	0.7033	0.7058	0.7082	0.7106
290	0.6848	0.6873	0.6898	0.6923	0.6948	0.6972	0.6997	0.7020	0.7043	0.7066	0.7088
295	0.6847	0.6871	0.6895	0.6918	0.6941	0.6964	0.6987	0.7009	0.7030	0.7051	0.7071

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(a) Concluded. Critical-flow factor, C*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
300	0.6847	0.6870	0.6892	0.6914	0.6935	0.6956	0.6977	0.6998	0.7018	0.7037	0.7056
310	0.6847	0.6867	0.6886	0.6905	0.6924	0.6943	0.6961	0.6978	0.6995	0.7012	0.7028
320	0.6847	0.6864	0.6881	0.6898	0.6914	0.6930	0.6946	0.6961	0.6976	0.6990	0.7004
330	0.6847	0.6862	0.6877	0.6892	0.6906	0.6920	0.6933	0.6947	0.6959	0.6971	0.6983
340	0.6847	0.6860	0.6873	0.6886	0.6898	0.6910	0.6922	0.6933	0.6944	0.6955	0.6965
350	0.6847	0.6858	0.6870	0.6881	0.6892	0.6902	0.6912	0.6922	0.6931	0.6940	0.6949
360	0.6846	0.6857	0.6867	0.6876	0.6886	0.6895	0.6903	0.6912	0.6920	0.6927	0.6934
370	0.6846	0.6855	0.6864	0.6872	0.6880	0.6888	0.6895	0.6902	0.6909	0.6916	0.6922
380	0.6846	0.6853	0.6861	0.6868	0.6875	0.6882	0.6888	0.6894	0.6900	0.6905	0.6910
390	0.6845	0.6852	0.6858	0.6865	0.6871	0.6876	0.6882	0.6887	0.6891	0.6896	0.6900
400	0.6845	0.6851	0.6856	0.6861	0.6866	0.6871	0.6876	0.6880	0.6884	0.6887	0.6891

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
155	1.1387	1.1664	1.1833	1.1923	1.1956	1.1948	1.1910	1.1851	1.1776	1.1690	1.1596
160	1.0550	1.0852	1.1064	1.1204	1.1287	1.1327	1.1334	1.1315	1.1278	1.1227	1.1165
165	0.9900	1.0191	1.0417	1.0582	1.0697	1.0770	1.0810	1.0823	1.0817	1.0794	1.0758
170	0.9399	0.9664	0.9883	1.0055	1.0185	1.0279	1.0341	1.0378	1.0394	1.0394	1.0380
175	0.9010	0.9244	0.9447	0.9615	0.9749	0.9852	0.9928	0.9981	1.0013	1.0030	1.0032
180	0.8705	0.8909	0.9091	0.9248	0.9379	0.9485	0.9567	0.9629	0.9673	0.9701	0.9716
185	0.8461	0.8638	0.8800	0.8943	0.9067	0.9170	0.9254	0.9321	0.9371	0.9407	0.9431
190	0.8263	0.8417	0.8560	0.8689	0.8803	0.8901	0.8984	0.9051	0.9105	0.9146	0.9176
195	0.8099	0.8233	0.8360	0.8476	0.8580	0.8672	0.8750	0.8817	0.8871	0.8914	0.8948
200	0.7962	0.8080	0.8192	0.8296	0.8390	0.8475	0.8549	0.8612	0.8666	0.8710	0.8745
205	0.7846	0.7950	0.8050	0.8143	0.8228	0.8305	0.8374	0.8434	0.8485	0.8529	0.8564
210	0.7747	0.7839	0.7928	0.8011	0.8088	0.8159	0.8222	0.8278	0.8327	0.8369	0.8404
215	0.7661	0.7743	0.7823	0.7897	0.7967	0.8031	0.8090	0.8142	0.8188	0.8227	0.8261
220	0.7586	0.7660	0.7731	0.7799	0.7862	0.7920	0.7973	0.8022	0.8064	0.8102	0.8135
225	0.7521	0.7587	0.7651	0.7712	0.7769	0.7822	0.7871	0.7916	0.7955	0.7991	0.8021
230	0.7463	0.7523	0.7581	0.7636	0.7687	0.7736	0.7781	0.7821	0.7858	0.7891	0.7920
235	0.7411	0.7466	0.7518	0.7568	0.7615	0.7659	0.7700	0.7738	0.7772	0.7802	0.7829
240	0.7365	0.7415	0.7462	0.7508	0.7551	0.7591	0.7628	0.7663	0.7694	0.7723	0.7748
245	0.7324	0.7369	0.7412	0.7454	0.7493	0.7530	0.7564	0.7596	0.7625	0.7651	0.7675
250	0.7287	0.7328	0.7368	0.7405	0.7441	0.7475	0.7506	0.7535	0.7562	0.7586	0.7608
255	0.7253	0.7291	0.7327	0.7362	0.7394	0.7425	0.7454	0.7481	0.7505	0.7528	0.7548
260	0.7223	0.7257	0.7290	0.7322	0.7352	0.7380	0.7407	0.7432	0.7454	0.7475	0.7493
265	0.7195	0.7227	0.7257	0.7286	0.7314	0.7340	0.7364	0.7387	0.7407	0.7427	0.7444
270	0.7170	0.7199	0.7227	0.7254	0.7279	0.7303	0.7325	0.7346	0.7365	0.7382	0.7398
275	0.7147	0.7173	0.7199	0.7224	0.7247	0.7269	0.7289	0.7308	0.7326	0.7342	0.7357
280	0.7125	0.7150	0.7174	0.7196	0.7218	0.7238	0.7257	0.7274	0.7290	0.7305	0.7319
285	0.7106	0.7129	0.7150	0.7171	0.7191	0.7209	0.7227	0.7243	0.7258	0.7271	0.7284
290	0.7088	0.7109	0.7129	0.7148	0.7166	0.7183	0.7199	0.7214	0.7228	0.7240	0.7252
295	0.7071	0.7090	0.7109	0.7127	0.7143	0.7159	0.7174	0.7187	0.7200	0.7211	0.7222

300	0.7056	0.7074	0.7091	0.7107	0.7122	0.7137	0.7150	0.7163	0.7174	0.7185	0.7194
310	0.7028	0.7043	0.7058	0.7072	0.7085	0.7097	0.7108	0.7119	0.7129	0.7137	0.7145
320	0.7004	0.7017	0.7029	0.7041	0.7052	0.7063	0.7072	0.7081	0.7089	0.7096	0.7103
330	0.6983	0.6994	0.7005	0.7015	0.7024	0.7033	0.7041	0.7048	0.7055	0.7061	0.7066
340	0.6965	0.6974	0.6983	0.6992	0.6999	0.7007	0.7013	0.7019	0.7025	0.7030	0.7034
350	0.6949	0.6957	0.6964	0.6971	0.6978	0.6984	0.6989	0.6994	0.6999	0.7003	0.7006
360	0.6934	0.6941	0.6947	0.6953	0.6959	0.6964	0.6968	0.6972	0.6976	0.6979	0.6981
370	0.6922	0.6927	0.6932	0.6937	0.6942	0.6946	0.6949	0.6952	0.6955	0.6957	0.6959
380	0.6910	0.6915	0.6919	0.6923	0.6927	0.6930	0.6932	0.6935	0.6937	0.6938	0.6940
390	0.6900	0.6904	0.6907	0.6910	0.6913	0.6915	0.6917	0.6919	0.6921	0.6921	0.6922
400	0.6891	0.6894	0.6896	0.6899	0.6901	0.6903	0.6904	0.6905	0.6906	0.6906	0.6906

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
155	1.1596	1.1497	1.1395	1.1291	1.1185	1.1080	1.0975	1.0870	1.0767	1.0666	1.0566
160	1.1165	1.1095	1.1019	1.0939	1.0856	1.0771	1.0685	1.0598	1.0511	1.0425	1.0339
165	1.0758	1.0713	1.0660	1.0601	1.0538	1.0471	1.0402	1.0331	1.0259	1.0186	1.0113
170	1.0380	1.0355	1.0321	1.0280	1.0234	1.0183	1.0129	1.0072	1.0013	0.9953	0.9891
175	1.0032	1.0024	1.0006	0.9980	0.9948	0.9911	0.9869	0.9825	0.9777	0.9728	0.9677
180	0.9716	0.9720	0.9715	0.9701	0.9681	0.9655	0.9625	0.9591	0.9553	0.9513	0.9471
185	0.9431	0.9444	0.9448	0.9445	0.9434	0.9418	0.9396	0.9371	0.9342	0.9310	0.9276
190	0.9176	0.9196	0.9207	0.9210	0.9207	0.9198	0.9184	0.9166	0.9145	0.9120	0.9093
195	0.8948	0.8972	0.8988	0.8997	0.9000	0.8997	0.8989	0.8977	0.8961	0.8943	0.8921
200	0.8745	0.8772	0.8791	0.8804	0.8811	0.8813	0.8810	0.8803	0.8792	0.8778	0.8761
205	0.8564	0.8592	0.8614	0.8630	0.8640	0.8645	0.8645	0.8642	0.8635	0.8625	0.8612
210	0.8404	0.8433	0.8455	0.8472	0.8485	0.8492	0.8496	0.8495	0.8491	0.8485	0.8475
215	0.8261	0.8290	0.8313	0.8331	0.8344	0.8354	0.8359	0.8361	0.8359	0.8355	0.8348
220	0.8135	0.8162	0.8185	0.8203	0.8217	0.8228	0.8235	0.8238	0.8239	0.8236	0.8232
225	0.8021	0.8048	0.8070	0.8088	0.8103	0.8114	0.8121	0.8126	0.8128	0.8127	0.8124
230	0.7920	0.7945	0.7967	0.7984	0.7999	0.8010	0.8018	0.8024	0.8027	0.8027	0.8026
235	0.7829	0.7853	0.7874	0.7891	0.7905	0.7916	0.7925	0.7931	0.7934	0.7935	0.7935
240	0.7748	0.7770	0.7789	0.7806	0.7820	0.7831	0.7839	0.7845	0.7849	0.7851	0.7851
245	0.7675	0.7695	0.7713	0.7729	0.7742	0.7753	0.7761	0.7767	0.7772	0.7774	0.7775
250	0.7608	0.7628	0.7645	0.7659	0.7672	0.7682	0.7690	0.7696	0.7701	0.7703	0.7704
255	0.7548	0.7566	0.7582	0.7596	0.7607	0.7617	0.7625	0.7631	0.7635	0.7638	0.7639
260	0.7493	0.7510	0.7525	0.7538	0.7549	0.7558	0.7565	0.7571	0.7575	0.7578	0.7579
265	0.7444	0.7459	0.7473	0.7485	0.7495	0.7504	0.7511	0.7516	0.7520	0.7523	0.7524
270	0.7398	0.7413	0.7425	0.7436	0.7446	0.7454	0.7460	0.7466	0.7469	0.7472	0.7473
275	0.7357	0.7370	0.7382	0.7392	0.7401	0.7408	0.7414	0.7419	0.7422	0.7425	0.7426
280	0.7319	0.7331	0.7342	0.7351	0.7359	0.7366	0.7372	0.7376	0.7379	0.7381	0.7382
285	0.7284	0.7295	0.7305	0.7313	0.7321	0.7327	0.7332	0.7336	0.7339	0.7341	0.7342
290	0.7252	0.7262	0.7271	0.7279	0.7286	0.7291	0.7296	0.7300	0.7302	0.7304	0.7305
295	0.7222	0.7231	0.7240	0.7247	0.7253	0.7258	0.7262	0.7266	0.7268	0.7269	0.7270
300	0.7194	0.7203	0.7211	0.7217	0.7223	0.7227	0.7231	0.7234	0.7236	0.7237	0.7238
310	0.7145	0.7152	0.7159	0.7164	0.7169	0.7172	0.7175	0.7178	0.7179	0.7180	0.7180
320	0.7103	0.7109	0.7114	0.7118	0.7122	0.7125	0.7127	0.7129	0.7129	0.7130	0.7129
330	0.7066	0.7071	0.7075	0.7078	0.7081	0.7083	0.7085	0.7086	0.7086	0.7086	0.7085
340	0.7034	0.7038	0.7041	0.7044	0.7046	0.7047	0.7048	0.7048	0.7048	0.7048	0.7046
350	0.7006	0.7009	0.7011	0.7013	0.7014	0.7015	0.7016	0.7016	0.7015	0.7014	0.7012
360	0.6981	0.6983	0.6985	0.6986	0.6987	0.6987	0.6987	0.6986	0.6985	0.6984	0.6982
370	0.6959	0.6961	0.6962	0.6962	0.6962	0.6962	0.6962	0.6961	0.6959	0.6958	0.6955
380	0.6940	0.6940	0.6941	0.6941	0.6941	0.6940	0.6939	0.6938	0.6936	0.6934	0.6932
390	0.6922	0.6922	0.6922	0.6922	0.6921	0.6920	0.6919	0.6917	0.6915	0.6913	0.6910
400	0.6906	0.6906	0.6906	0.6905	0.6904	0.6902	0.6901	0.6899	0.6896	0.6894	0.6891

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(b) Nozzle throat velocity, V_t, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	186.1	182.2	-----	-----	-----	-----	-----	-----	-----	-----	-----
101	187.0	183.2	-----	-----	-----	-----	-----	-----	-----	-----	-----
102	187.9	184.2	180.2	-----	-----	-----	-----	-----	-----	-----	-----
103	188.9	185.3	181.3	-----	-----	-----	-----	-----	-----	-----	-----
104	189.8	186.3	182.4	-----	-----	-----	-----	-----	-----	-----	-----
105	190.7	187.2	183.5	-----	-----	-----	-----	-----	-----	-----	-----
106	191.6	188.2	184.6	-----	-----	-----	-----	-----	-----	-----	-----
107	192.5	189.2	185.7	-----	-----	-----	-----	-----	-----	-----	-----
108	193.4	190.2	186.8	183.0	-----	-----	-----	-----	-----	-----	-----
109	194.3	191.2	187.8	184.2	-----	-----	-----	-----	-----	-----	-----
110	195.2	192.1	188.9	185.3	-----	-----	-----	-----	-----	-----	-----
111	196.1	193.1	189.9	186.5	-----	-----	-----	-----	-----	-----	-----
112	196.9	194.0	190.9	187.6	184.0	-----	-----	-----	-----	-----	-----
113	197.8	195.0	191.9	188.7	185.2	-----	-----	-----	-----	-----	-----
114	198.7	195.9	193.0	189.8	186.4	-----	-----	-----	-----	-----	-----
115	199.6	196.8	194.0	190.9	187.6	184.1	-----	-----	-----	-----	-----
116	200.4	197.8	194.9	192.0	188.8	185.4	-----	-----	-----	-----	-----
117	201.3	198.7	195.9	193.0	189.9	186.6	-----	-----	-----	-----	-----
118	202.1	199.6	196.9	194.1	191.1	187.9	-----	-----	-----	-----	-----
119	203.0	200.5	197.9	195.1	192.2	189.1	185.7	-----	-----	-----	-----
120	203.8	201.4	198.9	196.2	193.3	190.3	187.1	-----	-----	-----	-----
121	204.7	202.3	199.8	197.2	194.4	191.5	188.4	185.0	-----	-----	-----
122	205.5	203.2	200.8	198.2	195.5	192.7	189.6	186.4	-----	-----	-----
123	206.4	204.1	201.7	199.2	196.6	193.8	190.9	187.8	-----	-----	-----
124	207.2	205.0	202.6	200.2	197.7	195.0	192.1	189.1	185.8	-----	-----
125	208.0	205.9	203.6	201.2	198.7	196.1	193.3	190.4	187.3	-----	-----
126	208.9	206.7	204.5	202.2	199.8	197.2	194.5	191.7	188.7	185.5	-----
127	209.7	207.6	205.4	203.2	200.8	198.3	195.7	193.0	190.1	187.0	-----
128	210.5	208.5	206.3	204.1	201.8	199.4	196.9	194.2	191.4	188.4	185.3
129	211.3	209.3	207.2	205.1	202.8	200.5	198.0	195.5	192.7	189.9	186.8
130	212.2	210.2	208.2	206.0	203.8	201.6	199.2	196.7	194.0	191.3	188.3
132	213.8	211.9	209.9	207.9	205.8	203.7	201.4	199.0	196.6	194.0	191.3
134	215.4	213.6	211.7	209.8	207.8	205.7	203.6	201.4	199.0	196.6	194.1
136	217.0	215.3	213.5	211.6	209.7	207.7	205.7	203.6	201.4	199.2	196.8
138	218.6	216.9	215.2	213.4	211.6	209.7	207.8	205.8	203.7	201.6	199.4
140	220.2	218.6	216.9	215.2	213.5	211.7	209.8	208.0	206.0	204.0	201.9
142	221.7	220.2	218.6	217.0	215.3	213.6	211.9	210.1	208.2	206.3	204.4
144	223.3	221.8	220.3	218.7	217.1	215.5	213.8	212.1	210.4	208.6	206.7
146	224.8	223.4	221.9	220.5	218.9	217.4	215.8	214.1	212.5	210.8	209.0
148	226.4	225.0	223.6	222.2	220.7	219.2	217.7	216.1	214.6	212.9	211.3
150	227.9	226.6	225.2	223.8	222.4	221.0	219.6	218.1	216.6	215.0	213.5

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
128	185.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
129	186.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
130	188.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
132	191.3	183.7	-----	-----	-----	-----	-----	-----	-----	-----	-----
134	194.1	187.2	-----	-----	-----	-----	-----	-----	-----	-----	-----
136	196.8	190.4	183.2	-----	-----	-----	-----	-----	-----	-----	-----
138	199.4	193.5	186.9	-----	-----	-----	-----	-----	-----	-----	-----
140	201.9	196.4	190.3	183.7	-----	-----	-----	-----	-----	-----	-----
142	204.4	199.2	193.6	187.5	181.0	-----	-----	-----	-----	-----	-----
144	206.7	201.9	196.7	191.1	185.2	179.1	-----	-----	-----	-----	-----
146	209.0	204.5	199.7	194.5	189.1	183.6	178.2	-----	-----	-----	-----
148	211.3	207.0	202.5	197.7	192.8	187.8	182.8	178.3	-----	-----	-----
150	213.5	209.4	205.2	200.8	196.2	191.6	187.1	182.9	179.4	177.0	-----

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	227.9	221.0	213.5	205.2	196.2	187.1	179.4	-----	-----	-----	-----
155	231.7	225.4	218.8	211.6	204.0	196.5	189.9	185.7	184.8	186.9	191.0
160	235.4	229.7	223.8	217.5	211.1	204.7	199.1	195.0	193.2	193.8	196.4
165	239.0	233.9	228.6	223.1	217.5	212.1	207.2	203.5	201.4	201.1	202.6
170	242.6	238.0	233.2	228.3	223.5	218.8	214.6	211.3	209.1	208.4	209.2
175	246.2	241.9	237.6	233.3	229.0	225.0	221.4	218.4	216.4	215.5	215.8
180	249.7	245.8	241.9	238.1	234.3	230.8	227.6	225.0	223.2	222.3	222.3
185	253.1	249.6	246.1	242.7	239.3	236.2	233.5	231.2	229.6	228.7	228.6
190	256.5	253.3	250.2	247.1	244.1	241.4	239.0	237.0	235.6	234.7	234.6
195	259.8	257.0	254.1	251.4	248.7	246.3	244.2	242.5	241.2	240.5	240.4
200	263.2	260.5	258.0	255.5	253.2	251.1	249.2	247.7	246.6	246.0	245.9
205	266.4	264.0	261.7	259.5	257.5	255.6	254.0	252.7	251.8	251.3	251.2
210	269.7	267.5	265.4	263.4	261.6	260.0	258.6	257.5	256.7	256.3	256.2
215	272.8	270.9	269.0	267.2	265.6	264.2	263.0	262.1	261.4	261.1	261.1
220	276.0	274.2	272.5	271.0	269.6	268.3	267.3	266.5	266.0	265.7	265.8
225	279.1	277.5	276.0	274.6	273.4	272.3	271.4	270.8	270.4	270.2	270.4
230	282.2	280.8	279.4	278.2	277.1	276.2	275.4	274.9	274.6	274.6	274.8
235	285.3	284.0	282.8	281.7	280.7	280.0	279.4	278.9	278.7	278.8	279.0
240	288.3	287.1	286.1	285.1	284.3	283.7	283.2	282.9	282.7	282.8	283.1
245	291.3	290.2	289.3	288.5	287.8	287.3	286.9	286.7	286.6	286.8	287.2
250	294.2	293.3	292.5	291.8	291.2	290.8	290.5	290.4	290.4	290.7	291.1
255	297.1	296.4	295.7	295.1	294.6	294.3	294.1	294.0	294.1	294.4	294.9
260	300.0	299.4	298.8	298.3	297.9	297.6	297.5	297.6	297.8	298.1	298.6
265	302.9	302.3	301.8	301.4	301.1	301.0	300.9	301.1	301.3	301.7	302.2
270	305.8	305.3	304.9	304.5	304.3	304.3	304.3	304.5	304.8	305.2	305.8
275	308.6	308.2	307.8	307.6	307.5	307.5	307.6	307.8	308.2	308.7	309.3
280	311.4	311.0	310.8	310.6	310.6	310.6	310.8	311.1	311.5	312.0	312.7
285	314.1	313.9	313.7	313.6	313.6	313.8	314.0	314.3	314.8	315.4	316.0
290	316.9	316.7	316.6	316.6	316.7	316.8	317.1	317.5	318.0	318.6	319.3
295	319.6	319.5	319.4	319.5	319.6	319.9	320.2	320.6	321.2	321.8	322.6
300	322.3	322.2	322.3	322.4	322.6	322.8	323.2	323.7	324.3	325.0	325.7
310	327.6	327.7	327.8	328.0	328.3	328.7	329.2	329.7	330.4	331.1	331.9
320	332.9	333.0	333.3	333.6	334.0	334.4	335.0	335.6	336.3	337.1	338.0
330	338.0	338.3	338.6	339.0	339.5	340.0	340.6	341.3	342.1	342.9	343.8
340	343.1	343.5	343.9	344.3	344.8	345.4	346.1	346.9	347.7	348.6	349.5

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(b) Concluded. Nozzle throat velocity, V_t, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
350	348.1	348.5	349.0	349.5	350.1	350.8	351.5	352.3	353.2	354.1	355.1
360	353.1	353.5	354.1	354.7	355.3	356.0	356.8	357.6	358.5	359.5	360.5
370	357.9	358.5	359.1	359.7	360.4	361.2	362.0	362.8	363.8	364.8	365.8
380	362.7	363.3	364.0	364.7	365.4	366.2	367.1	368.0	368.9	369.9	371.0
390	367.5	368.1	368.8	369.5	370.3	371.2	372.1	373.0	374.0	375.0	376.1
400	372.2*	372.9	373.6	374.4	375.2	376.0	377.0	377.9	378.9	380.0	381.1

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
155	191.0	196.2	202.0	208.2	214.5	220.8	227.1	233.2	239.3	245.2	250.9
160	196.4	200.3	205.1	210.4	216.1	221.9	227.7	233.5	239.3	245.0	250.6
165	202.6	205.4	209.3	213.8	218.7	223.9	229.3	234.7	240.1	245.6	250.9
170	209.2	211.2	214.2	217.9	222.2	226.8	231.7	236.6	241.7	246.8	251.9
175	215.8	217.2	219.5	222.6	226.3	230.3	234.7	239.3	243.9	248.7	253.5
180	222.3	223.3	225.1	227.7	230.8	234.3	238.2	242.4	246.7	251.1	255.7
185	228.6	229.3	230.7	232.9	235.5	238.7	242.1	245.9	249.9	254.0	258.2
190	234.6	235.1	236.3	238.1	240.4	243.2	246.3	249.7	253.3	257.2	261.1
195	240.4	240.8	241.8	243.4	245.4	247.8	250.7	253.7	257.1	260.6	264.3
200	245.9	246.3	247.1	248.5	250.3	252.5	255.1	257.9	261.0	264.2	267.6
205	251.2	251.5	252.3	253.6	255.2	257.2	259.5	262.1	265.0	268.0	271.2
210	256.2	256.6	257.4	258.5	260.0	261.9	264.0	266.4	269.0	271.9	274.8
215	261.1	261.5	262.2	263.3	264.7	266.4	268.4	270.7	273.1	275.8	278.6
220	265.8	266.2	266.9	268.0	269.3	270.9	272.8	274.9	277.2	279.7	282.3
225	270.4	270.8	271.5	272.5	273.8	275.3	277.1	279.1	281.3	283.6	286.1
230	274.8	275.2	275.9	276.9	278.2	279.6	281.3	283.2	285.3	287.5	289.9
235	279.0	279.5	280.2	281.2	282.4	283.8	285.5	287.3	289.3	291.4	293.7
240	283.1	283.7	284.4	285.4	286.6	287.9	289.5	291.3	293.2	295.2	297.4
245	287.2	287.7	288.5	289.5	290.6	292.0	293.5	295.2	297.0	299.0	301.1
250	291.1	291.7	292.5	293.4	294.6	295.9	297.4	299.0	300.8	302.8	304.8
255	294.9	295.5	296.3	297.3	298.5	299.8	301.2	302.8	304.6	306.4	308.4
260	298.6	299.3	300.1	301.1	302.2	303.5	305.0	306.5	308.2	310.1	312.0
265	302.2	302.9	303.8	304.8	305.9	307.2	308.6	310.2	311.9	313.6	315.5
270	305.8	306.5	307.4	308.4	309.6	310.8	312.2	313.8	315.4	317.1	319.0
275	309.3	310.0	310.9	312.0	313.1	314.4	315.8	317.3	318.9	320.6	322.4
280	312.7	313.5	314.4	315.4	316.6	317.8	319.2	320.7	322.3	324.0	325.8
285	316.0	316.9	317.8	318.8	320.0	321.3	322.6	324.1	325.7	327.3	329.1
290	319.3	320.2	321.1	322.2	323.3	324.6	326.0	327.4	329.0	330.6	332.4
295	322.6	323.4	324.4	325.5	326.6	327.9	329.3	330.7	332.3	333.9	335.6
300	325.7	326.6	327.6	328.7	329.9	331.1	332.5	333.9	335.5	337.1	338.8
310	331.9	332.9	333.9	335.0	336.2	337.4	338.8	340.2	341.7	343.3	345.0
320	338.0	338.9	340.0	341.1	342.3	343.6	344.9	346.3	347.8	349.4	351.0
330	343.8	344.8	345.9	347.0	348.2	349.5	350.9	352.3	353.8	355.3	356.9
340	349.5	350.5	351.6	352.8	354.0	355.3	356.7	358.1	359.5	361.1	362.6

350	355.1	356.1	357.2	358.4	359.6	360.9	362.3	363.7	365.2	366.7	368.2
360	360.5	361.6	362.7	363.9	365.1	366.4	367.8	369.2	370.7	372.1	373.7
370	365.8	366.9	368.0	369.3	370.5	371.8	373.2	374.6	376.0	377.5	379.0
380	371.0	372.1	373.3	374.5	375.8	377.1	378.4	379.8	381.3	382.8	384.3
390	376.1	377.2	378.4	379.6	380.9	382.2	383.6	385.0	386.4	387.9	389.4
400	381.1	382.2	383.4	384.7	386.0	387.3	388.6	390.0	391.5	392.9	394.4

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
155	250.9	256.5	262.0	267.3	272.5	277.6	282.6	287.4	292.1	296.8	301.3
160	250.6	256.1	261.4	266.7	271.8	276.9	281.8	286.6	291.3	295.9	300.5
165	250.9	256.2	261.4	266.6	271.6	276.6	281.4	286.2	290.9	295.5	300.0
170	251.9	257.0	262.0	267.0	271.9	276.8	281.5	286.2	290.8	295.3	299.8
175	253.5	258.4	263.2	268.0	272.7	277.4	282.0	286.6	291.1	295.6	299.9
180	255.7	260.2	264.8	269.4	273.9	278.5	283.0	287.4	291.8	296.1	300.4
185	258.2	262.5	266.8	271.2	275.5	279.9	284.2	288.5	292.8	297.0	301.2
190	261.1	265.1	269.2	273.3	277.5	281.7	285.9	290.0	294.1	298.3	302.3
195	264.3	268.0	271.9	275.8	279.8	283.8	287.8	291.8	295.8	299.7	303.7
200	267.6	271.2	274.8	278.5	282.3	286.1	289.9	293.8	297.6	301.5	305.3
205	271.2	274.5	277.9	281.5	285.0	288.7	292.3	296.0	299.7	303.4	307.1
210	274.8	278.0	281.2	284.5	288.0	291.4	294.9	298.5	302.0	305.6	309.2
215	278.6	281.5	284.6	287.8	291.0	294.3	297.7	301.1	304.5	307.9	311.4
220	282.3	285.1	288.0	291.1	294.2	297.3	300.5	303.8	307.1	310.4	313.8
225	286.1	288.8	291.6	294.4	297.4	300.4	303.5	306.6	309.8	313.0	316.2
230	289.9	292.5	295.1	297.8	300.7	303.6	306.5	309.5	312.6	315.7	318.8
235	293.7	296.1	298.6	301.3	304.0	306.8	309.6	312.5	315.5	318.5	321.5
240	297.4	299.8	302.2	304.7	307.3	310.0	312.8	315.6	318.4	321.3	324.2
245	301.1	303.4	305.7	308.2	310.7	313.3	315.9	318.6	321.4	324.2	327.0
250	304.8	307.0	309.2	311.6	314.0	316.5	319.1	321.7	324.4	327.1	329.9
255	308.4	310.5	312.7	315.0	317.4	319.8	322.3	324.8	327.4	330.1	332.7
260	312.0	314.0	316.2	318.4	320.7	323.0	325.5	327.9	330.5	333.0	335.6
265	315.5	317.5	319.6	321.7	324.0	326.3	328.6	331.0	333.5	336.0	338.5
270	319.0	320.9	323.0	325.1	327.2	329.5	331.8	334.1	336.5	338.9	341.4
275	322.4	324.3	326.3	328.3	330.5	332.6	334.9	337.2	339.5	341.9	344.3
280	325.8	327.6	329.6	331.6	333.7	335.8	338.0	340.2	342.5	344.9	347.2
285	329.1	330.9	332.8	334.8	336.8	338.9	341.1	343.3	345.5	347.8	350.1
290	332.4	334.2	336.0	338.0	340.0	342.0	344.1	346.3	348.5	350.7	353.0
295	335.6	337.4	339.2	341.1	343.1	345.1	347.2	349.3	351.4	353.6	355.8
300	338.8	340.5	342.3	344.2	346.1	348.1	350.1	352.2	354.3	356.5	358.7
310	345.0	346.7	348.4	350.3	352.2	354.1	356.0	358.1	360.1	362.2	364.3
320	351.0	352.7	354.4	356.2	358.0	359.9	361.8	363.8	365.8	367.8	369.8
330	356.9	358.5	360.2	362.0	363.8	365.6	367.5	369.4	371.3	373.3	375.3
340	362.6	364.3	365.9	367.6	369.4	371.2	373.0	374.9	376.8	378.7	380.7
350	368.2	369.8	371.5	373.2	374.9	376.7	378.5	380.3	382.1	384.0	385.9
360	373.7	375.3	376.9	378.6	380.3	382.0	383.8	385.6	387.4	389.2	391.1
370	379.0	380.6	382.2	383.9	385.5	387.2	389.0	390.7	392.5	394.4	396.2
380	384.3	385.8	387.4	389.0	390.7	392.4	394.1	395.8	397.6	399.4	401.2
390	389.4	390.9	392.5	394.1	395.8	397.4	399.1	400.8	402.6	404.3	406.1
400	394.4	396.0	397.5	399.1	400.7	402.4	404.0	405.7	407.5	409.2	410.9

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(c) Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	0.5282	0.5288	------	------	------	------	------	------	------	------	------
101	0.5282	0.5288	------	------	------	------	------	------	------	------	------
102	0.5282	0.5288	0.5293	------	------	------	------	------	------	------	------
103	0.5282	0.5287	0.5292	------	------	------	------	------	------	------	------
104	0.5282	0.5287	0.5292	------	------	------	------	------	------	------	------
105	0.5282	0.5287	0.5291	------	------	------	------	------	------	------	------
106	0.5282	0.5287	0.5291	------	------	------	------	------	------	------	------
107	0.5282	0.5287	0.5291	------	------	------	------	------	------	------	------
108	0.5282	0.5287	0.5290	0.5294	------	------	------	------	------	------	------
109	0.5282	0.5287	0.5290	0.5293	------	------	------	------	------	------	------
110	0.5282	0.5286	0.5289	0.5293	------	------	------	------	------	------	------
111	0.5282	0.5286	0.5289	0.5292	------	------	------	------	------	------	------
112	0.5282	0.5286	0.5289	0.5292	0.5294	------	------	------	------	------	------
113	0.5282	0.5286	0.5288	0.5291	0.5294	------	------	------	------	------	------
114	0.5282	0.5286	0.5288	0.5291	0.5293	------	------	------	------	------	------
115	0.5282	0.5286	0.5288	0.5290	0.5293	0.5294	------	------	------	------	------
116	0.5282	0.5285	0.5288	0.5290	0.5292	0.5293	------	------	------	------	------
117	0.5282	0.5285	0.5287	0.5289	0.5291	0.5293	------	------	------	------	------
118	0.5282	0.5285	0.5287	0.5289	0.5291	0.5292	------	------	------	------	------
119	0.5282	0.5285	0.5287	0.5289	0.5290	0.5291	0.5292	------	------	------	------
120	0.5282	0.5285	0.5286	0.5288	0.5290	0.5291	0.5291	------	------	------	------
121	0.5282	0.5285	0.5286	0.5288	0.5289	0.5290	0.5291	0.5290	------	------	------
122	0.5282	0.5284	0.5286	0.5287	0.5289	0.5290	0.5290	0.5290	------	------	------
123	0.5282	0.5284	0.5286	0.5287	0.5288	0.5289	0.5289	0.5289	------	------	------
124	0.5282	0.5284	0.5285	0.5287	0.5288	0.5288	0.5289	0.5288	0.5287	------	------
125	0.5282	0.5284	0.5285	0.5286	0.5287	0.5288	0.5288	0.5287	0.5286	------	------
126	0.5282	0.5284	0.5285	0.5286	0.5287	0.5287	0.5287	0.5287	0.5285	0.5283	------
127	0.5282	0.5284	0.5285	0.5286	0.5286	0.5287	0.5287	0.5286	0.5285	0.5282	------
128	0.5282	0.5284	0.5285	0.5285	0.5286	0.5286	0.5286	0.5285	0.5284	0.5282	0.5278
129	0.5282	0.5284	0.5284	0.5285	0.5286	0.5286	0.5286	0.5285	0.5283	0.5281	0.5278
130	0.5282	0.5284	0.5284	0.5285	0.5285	0.5285	0.5285	0.5284	0.5283	0.5280	0.5277
132	0.5282	0.5283	0.5284	0.5284	0.5284	0.5284	0.5284	0.5283	0.5281	0.5279	0.5276
134	0.5282	0.5283	0.5284	0.5284	0.5284	0.5284	0.5283	0.5282	0.5280	0.5278	0.5275
136	0.5282	0.5283	0.5284	0.5283	0.5283	0.5283	0.5282	0.5281	0.5279	0.5277	0.5274
138	0.5282	0.5283	0.5283	0.5283	0.5283	0.5282	0.5281	0.5280	0.5278	0.5276	0.5273
140	0.5282	0.5283	0.5283	0.5282	0.5282	0.5281	0.5280	0.5279	0.5277	0.5275	0.5272
142	0.5282	0.5282	0.5283	0.5282	0.5281	0.5281	0.5280	0.5278	0.5276	0.5274	0.5271
144	0.5282	0.5282	0.5282	0.5282	0.5281	0.5280	0.5279	0.5277	0.5275	0.5273	0.5270
146	0.5282	0.5282	0.5282	0.5281	0.5280	0.5279	0.5278	0.5277	0.5275	0.5272	0.5269
148	0.5282	0.5282	0.5282	0.5281	0.5280	0.5279	0.5278	0.5276	0.5274	0.5271	0.5269
150	0.5282	0.5282	0.5282	0.5281	0.5280	0.5278	0.5277	0.5275	0.5273	0.5271	0.5268

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
128	0.5278	------	------	------	------	------	------	------	------	------	------
129	0.5278	------	------	------	------	------	------	------	------	------	------
130	0.5277	------	------	------	------	------	------	------	------	------	------
132	0.5276	0.5262	------	------	------	------	------	------	------	------	------
134	0.5275	0.5262	------	------	------	------	------	------	------	------	------
136	0.5274	0.5262	0.5239	------	------	------	------	------	------	------	------
138	0.5273	0.5262	0.5241	------	------	------	------	------	------	------	------
140	0.5272	0.5261	0.5243	0.5210	------	------	------	------	------	------	------
142	0.5271	0.5261	0.5244	0.5215	0.5168	------	------	------	------	------	------
144	0.5270	0.5260	0.5244	0.5219	0.5178	0.5112	------	------	------	------	------
146	0.5269	0.5260	0.5245	0.5222	0.5187	0.5131	0.5045	------	------	------	------
148	0.5269	0.5259	0.5245	0.5224	0.5193	0.5146	0.5075	0.4970	------	------	------
150	0.5268	0.5259	0.5245	0.5226	0.5197	0.5156	0.5097	0.5012	0.4894	0.4742	------

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.5282	0.5278	0.5268	0.5245	0.5197	0.5097	0.4894	------	------	------	------
155	0.5282	0.5277	0.5266	0.5245	0.5206	0.5133	0.5001	0.4790	0.4509	0.4203	0.3910
160	0.5282	0.5276	0.5265	0.5245	0.5211	0.5153	0.5058	0.4912	0.4714	0.4479	0.4234
165	0.5282	0.5275	0.5264	0.5244	0.5214	0.5166	0.5092	0.4984	0.4838	0.4659	0.4461
170	0.5282	0.5275	0.5263	0.5244	0.5216	0.5174	0.5114	0.5029	0.4917	0.4778	0.4620
175	0.5282	0.5274	0.5262	0.5244	0.5218	0.5181	0.5130	0.5060	0.4970	0.4859	0.4731
180	0.5282	0.5273	0.5261	0.5243	0.5219	0.5186	0.5141	0.5082	0.5007	0.4916	0.4811
185	0.5282	0.5274	0.5260	0.5243	0.5220	0.5189	0.5149	0.5098	0.5035	0.4958	0.4869
190	0.5282	0.5273	0.5260	0.5243	0.5221	0.5192	0.5156	0.5111	0.5056	0.4990	0.4914
195	0.5282	0.5273	0.5259	0.5243	0.5221	0.5195	0.5161	0.5121	0.5072	0.5014	0.4948
200	0.5282	0.5272	0.5259	0.5242	0.5222	0.5197	0.5166	0.5129	0.5085	0.5033	0.4975
205	0.5282	0.5272	0.5259	0.5242	0.5223	0.5199	0.5170	0.5136	0.5095	0.5049	0.4997
210	0.5282	0.5272	0.5258	0.5242	0.5223	0.5200	0.5173	0.5141	0.5105	0.5062	0.5015
215	0.5282	0.5272	0.5258	0.5242	0.5224	0.5202	0.5176	0.5146	0.5112	0.5073	0.5030
220	0.5282	0.5271	0.5258	0.5242	0.5224	0.5203	0.5178	0.5150	0.5118	0.5082	0.5043
225	0.5282	0.5271	0.5258	0.5243	0.5225	0.5204	0.5181	0.5154	0.5124	0.5090	0.5054
230	0.5282	0.5271	0.5258	0.5243	0.5225	0.5205	0.5183	0.5157	0.5129	0.5098	0.5063
235	0.5282	0.5271	0.5258	0.5243	0.5226	0.5206	0.5185	0.5160	0.5134	0.5104	0.5071
240	0.5282	0.5271	0.5258	0.5243	0.5226	0.5207	0.5187	0.5163	0.5138	0.5110	0.5079
245	0.5282	0.5271	0.5258	0.5243	0.5227	0.5208	0.5188	0.5166	0.5141	0.5115	0.5085
250	0.5282	0.5271	0.5258	0.5243	0.5227	0.5209	0.5190	0.5168	0.5145	0.5119	0.5091
255	0.5282	0.5271	0.5258	0.5244	0.5228	0.5210	0.5191	0.5170	0.5148	0.5123	0.5097
260	0.5282	0.5271	0.5258	0.5244	0.5228	0.5211	0.5193	0.5172	0.5150	0.5127	0.5102
265	0.5282	0.5271	0.5258	0.5244	0.5229	0.5212	0.5194	0.5174	0.5153	0.5130	0.5106
270	0.5282	0.5271	0.5258	0.5245	0.5229	0.5213	0.5195	0.5176	0.5156	0.5134	0.5111
275	0.5282	0.5271	0.5259	0.5245	0.5230	0.5214	0.5196	0.5178	0.5158	0.5137	0.5114
280	0.5282	0.5271	0.5259	0.5245	0.5230	0.5214	0.5197	0.5179	0.5160	0.5140	0.5118
285	0.5282	0.5271	0.5259	0.5246	0.5231	0.5215	0.5199	0.5181	0.5162	0.5143	0.5121
290	0.5282	0.5271	0.5259	0.5246	0.5231	0.5216	0.5200	0.5182	0.5164	0.5145	0.5125
295	0.5282	0.5271	0.5259	0.5246	0.5232	0.5217	0.5201	0.5184	0.5166	0.5148	0.5128
300	0.5282	0.5271	0.5259	0.5246	0.5233	0.5217	0.5202	0.5185	0.5168	0.5150	0.5130
310	0.5283	0.5271	0.5259	0.5247	0.5233	0.5219	0.5204	0.5188	0.5172	0.5154	0.5136
320	0.5282	0.5271	0.5260	0.5247	0.5234	0.5220	0.5206	0.5191	0.5175	0.5158	0.5140
330	0.5283	0.5272	0.5260	0.5248	0.5235	0.5222	0.5208	0.5193	0.5178	0.5161	0.5145
340	0.5283	0.5272	0.5260	0.5248	0.5236	0.5223	0.5209	0.5195	0.5180	0.5165	0.5149

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(c) Concluded. Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
350	0.5283	0.5272	0.5261	0.5249	0.5237	0.5224	0.5211	0.5197	0.5183	0.5168	0.5152
360	0.5283	0.5272	0.5261	0.5250	0.5238	0.5225	0.5212	0.5199	0.5185	0.5171	0.5156
370	0.5283	0.5272	0.5262	0.5250	0.5239	0.5226	0.5214	0.5201	0.5187	0.5173	0.5159
380	0.5283	0.5273	0.5262	0.5251	0.5239	0.5228	0.5215	0.5203	0.5190	0.5176	0.5162
390	0.5283	0.5273	0.5263	0.5252	0.5240	0.5229	0.5217	0.5204	0.5192	0.5179	0.5165
400	0.5284	0.5273	0.5263	0.5252	0.5241	0.5230	0.5218	0.5206	0.5194	0.5181	0.5168

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
155	0.3910	0.3644	0.3404	0.3190	0.2998	0.2826	0.2670	0.2530	0.2403	0.2288	0.2184
160	0.4234	0.3997	0.3776	0.3572	0.3386	0.3215	0.3059	0.2916	0.2785	0.2665	0.2555
165	0.4461	0.4259	0.4062	0.3874	0.3699	0.3536	0.3384	0.3243	0.3112	0.2991	0.2879
170	0.4620	0.4450	0.4279	0.4111	0.3950	0.3797	0.3653	0.3517	0.3390	0.3271	0.3159
175	0.4731	0.4590	0.4443	0.4296	0.4151	0.4010	0.3875	0.3747	0.3625	0.3510	0.3402
180	0.4811	0.4693	0.4568	0.4439	0.4310	0.4182	0.4058	0.3938	0.3824	0.3714	0.3610
185	0.4869	0.4770	0.4663	0.4550	0.4436	0.4322	0.4208	0.4098	0.3991	0.3888	0.3788
190	0.4914	0.4828	0.4736	0.4638	0.4537	0.4434	0.4332	0.4230	0.4131	0.4035	0.3941
195	0.4948	0.4874	0.4793	0.4707	0.4617	0.4526	0.4433	0.4340	0.4249	0.4160	0.4072
200	0.4975	0.4910	0.4839	0.4762	0.4683	0.4600	0.4517	0.4433	0.4348	0.4266	0.4184
205	0.4997	0.4939	0.4875	0.4807	0.4736	0.4662	0.4586	0.4510	0.4433	0.4356	0.4280
210	0.5015	0.4962	0.4906	0.4844	0.4780	0.4713	0.4644	0.4574	0.4504	0.4433	0.4362
215	0.5030	0.4982	0.4931	0.4875	0.4817	0.4756	0.4693	0.4629	0.4564	0.4499	0.4433
220	0.5043	0.4999	0.4952	0.4901	0.4848	0.4792	0.4735	0.4676	0.4616	0.4555	0.4494
225	0.5054	0.5013	0.4970	0.4923	0.4874	0.4823	0.4770	0.4716	0.4660	0.4604	0.4547
230	0.5063	0.5026	0.4985	0.4942	0.4897	0.4850	0.4801	0.4750	0.4699	0.4646	0.4594
235	0.5071	0.5036	0.4999	0.4959	0.4917	0.4873	0.4827	0.4780	0.4732	0.4684	0.4634
240	0.5079	0.5046	0.5011	0.4973	0.4934	0.4893	0.4851	0.4807	0.4762	0.4716	0.4670
245	0.5085	0.5054	0.5021	0.4986	0.4949	0.4911	0.4871	0.4830	0.4788	0.4745	0.4702
250	0.5091	0.5062	0.5031	0.4998	0.4963	0.4927	0.4889	0.4851	0.4811	0.4771	0.4730
255	0.5097	0.5069	0.5039	0.5008	0.4975	0.4941	0.4906	0.4869	0.4832	0.4794	0.4755
260	0.5102	0.5075	0.5047	0.5017	0.4986	0.4954	0.4920	0.4886	0.4850	0.4814	0.4778
265	0.5106	0.5081	0.5054	0.5025	0.4996	0.4965	0.4933	0.4901	0.4867	0.4833	0.4798
270	0.5111	0.5086	0.5060	0.5033	0.5005	0.4976	0.4945	0.4914	0.4882	0.4850	0.4817
275	0.5114	0.5091	0.5066	0.5040	0.5013	0.4985	0.4956	0.4926	0.4896	0.4865	0.4833
280	0.5118	0.5095	0.5071	0.5046	0.5021	0.4994	0.4966	0.4938	0.4909	0.4879	0.4849
285	0.5121	0.5099	0.5076	0.5052	0.5028	0.5002	0.4975	0.4948	0.4920	0.4892	0.4863
290	0.5125	0.5103	0.5081	0.5058	0.5034	0.5009	0.4984	0.4958	0.4931	0.4904	0.4876
295	0.5128	0.5107	0.5085	0.5063	0.5040	0.5016	0.4992	0.4967	0.4941	0.4915	0.4888
300	0.5130	0.5110	0.5090	0.5068	0.5046	0.5023	0.4999	0.4975	0.4950	0.4925	0.4899
310	0.5136	0.5116	0.5097	0.5077	0.5056	0.5034	0.5012	0.4990	0.4967	0.4943	0.4919
320	0.5140	0.5122	0.5104	0.5085	0.5065	0.5045	0.5024	0.5003	0.4981	0.4959	0.4937
330	0.5145	0.5127	0.5110	0.5092	0.5073	0.5054	0.5034	0.5014	0.4994	0.4973	0.4952
340	0.5149	0.5132	0.5115	0.5098	0.5080	0.5062	0.5044	0.5025	0.5005	0.4986	0.4966

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
350	0.5152	0.5136	0.5120	0.5104	0.5087	0.5070	0.5052	0.5034	0.5016	0.4997	0.4978
360	0.5156	0.5141	0.5125	0.5109	0.5093	0.5077	0.5060	0.5043	0.5025	0.5007	0.4989
370	0.5159	0.5144	0.5129	0.5114	0.5099	0.5083	0.5067	0.5050	0.5034	0.5017	0.5000
380	0.5162	0.5148	0.5133	0.5119	0.5104	0.5089	0.5073	0.5058	0.5042	0.5025	0.5009
390	0.5165	0.5151	0.5137	0.5124	0.5109	0.5094	0.5079	0.5064	0.5049	0.5033	0.5018
400	0.5168	0.5155	0.5141	0.5128	0.5114	0.5100	0.5085	0.5071	0.5056	0.5041	0.5026

Plenum temperature, K	Plenum pressure. $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
155	0.2184	0.2089	0.2003	0.1924	0.1852	0.1786	0.1725	0.1669	0.1617	0.1570	0.1526
160	0.2555	0.2453	0.2360	0.2274	0.2194	0.2121	0.2053	0.1990	0.1931	0.1877	0.1826
165	0.2879	0.2774	0.2677	0.2587	0.2503	0.2425	0.2352	0.2284	0.2220	0.2161	0.2105
170	0.3159	0.3055	0.2957	0.2865	0.2779	0.2698	0.2622	0.2551	0.2484	0.2421	0.2362
175	0.3402	0.3299	0.3202	0.3111	0.3024	0.2943	0.2866	0.2793	0.2724	0.2659	0.2597
180	0.3610	0.3511	0.3416	0.3326	0.3241	0.3160	0.3083	0.3010	0.2940	0.2874	0.2812
185	0.3788	0.3693	0.3602	0.3515	0.3432	0.3353	0.3277	0.3205	0.3136	0.3069	0.3006
190	0.3941	0.3851	0.3764	0.3680	0.3600	0.3523	0.3449	0.3378	0.3310	0.3245	0.3183
195	0.4072	0.3987	0.3904	0.3825	0.3748	0.3673	0.3602	0.3533	0.3466	0.3403	0.3341
200	0.4184	0.4104	0.4026	0.3951	0.3877	0.3806	0.3737	0.3670	0.3606	0.3544	0.3484
205	0.4280	0.4205	0.4132	0.4060	0.3991	0.3923	0.3857	0.3793	0.3731	0.3670	0.3612
210	0.4362	0.4292	0.4224	0.4156	0.4090	0.4026	0.3963	0.3901	0.3842	0.3784	0.3727
215	0.4433	0.4368	0.4304	0.4240	0.4178	0.4116	0.4057	0.3998	0.3941	0.3885	0.3831
220	0.4494	0.4434	0.4373	0.4314	0.4255	0.4197	0.4140	0.4084	0.4029	0.3976	0.3924
225	0.4547	0.4491	0.4435	0.4378	0.4322	0.4268	0.4214	0.4160	0.4108	0.4057	0.4007
230	0.4594	0.4541	0.4488	0.4435	0.4382	0.4331	0.4279	0.4229	0.4179	0.4130	0.4082
235	0.4634	0.4585	0.4535	0.4485	0.4436	0.4387	0.4338	0.4290	0.4242	0.4196	0.4150
240	0.4670	0.4623	0.4577	0.4530	0.4483	0.4437	0.4390	0.4345	0.4299	0.4255	0.4211
245	0.4702	0.4658	0.4614	0.4570	0.4525	0.4481	0.4438	0.4394	0.4351	0.4308	0.4266
250	0.4730	0.4688	0.4647	0.4605	0.4563	0.4521	0.4480	0.4439	0.4397	0.4356	0.4316
255	0.4755	0.4716	0.4676	0.4637	0.4597	0.4557	0.4518	0.4478	0.4439	0.4400	0.4361
260	0.4778	0.4741	0.4703	0.4666	0.4628	0.4590	0.4552	0.4515	0.4477	0.4440	0.4403
265	0.4798	0.4763	0.4727	0.4691	0.4655	0.4619	0.4583	0.4547	0.4512	0.4476	0.4441
270	0.4817	0.4783	0.4749	0.4715	0.4681	0.4646	0.4612	0.4577	0.4543	0.4509	0.4475
275	0.4833	0.4801	0.4769	0.4736	0.4704	0.4671	0.4638	0.4605	0.4572	0.4539	0.4507
280	0.4849	0.4818	0.4787	0.4756	0.4725	0.4693	0.4662	0.4630	0.4598	0.4567	0.4536
285	0.4863	0.4834	0.4804	0.4774	0.4744	0.4714	0.4683	0.4653	0.4623	0.4592	0.4562
290	0.4876	0.4848	0.4819	0.4791	0.4762	0.4733	0.4704	0.4674	0.4645	0.4616	0.4587
295	0.4888	0.4861	0.4834	0.4806	0.4778	0.4750	0.4722	0.4694	0.4666	0.4638	0.4610
300	0.4899	0.4873	0.4847	0.4820	0.4793	0.4767	0.4739	0.4712	0.4685	0.4658	0.4631
310	0.4919	0.4895	0.4870	0.4846	0.4821	0.4796	0.4770	0.4745	0.4720	0.4695	0.4669
320	0.4937	0.4914	0.4891	0.4868	0.4845	0.4821	0.4797	0.4774	0.4750	0.4726	0.4702
330	0.4952	0.4931	0.4909	0.4887	0.4865	0.4843	0.4821	0.4799	0.4777	0.4754	0.4732
340	0.4966	0.4946	0.4925	0.4905	0.4884	0.4863	0.4842	0.4821	0.4800	0.4779	0.4758
350	0.4978	0.4959	0.4940	0.4920	0.4901	0.4881	0.4861	0.4841	0.4821	0.4801	0.4781
360	0.4989	0.4971	0.4953	0.4934	0.4916	0.4897	0.4878	0.4859	0.4840	0.4821	0.4802
370	0.5000	0.4982	0.4965	0.4947	0.4929	0.4911	0.4893	0.4875	0.4857	0.4839	0.4821
380	0.5009	0.4992	0.4976	0.4959	0.4942	0.4925	0.4908	0.4890	0.4873	0.4856	0.4838
390	0.5018	0.5002	0.4986	0.4970	0.4953	0.4937	0.4920	0.4904	0.4887	0.4871	0.4854
400	0.5026	0.5010	0.4995	0.4979	0.4964	0.4948	0.4932	0.4916	0.4900	0.4884	0.4868

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(d) Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	0.6340	0.6339	------	------	------	------	------	------	------	------	------
101	0.6340	0.6339	------	------	------	------	------	------	------	------	------
102	0.6340	0.6339	0.6339	------	------	------	------	------	------	------	------
103	0.6340	0.6339	0.6339	------	------	------	------	------	------	------	------
104	0.6340	0.6339	0.6339	------	------	------	------	------	------	------	------
105	0.6340	0.6339	0.6340	------	------	------	------	------	------	------	------
106	0.6340	0.6339	0.6340	------	------	------	------	------	------	------	------
107	0.6340	0.6340	0.6340	------	------	------	------	------	------	------	------
108	0.6340	0.6340	0.6340	0.6342	------	------	------	------	------	------	------
109	0.6340	0.6340	0.6340	0.6342	------	------	------	------	------	------	------
110	0.6340	0.6340	0.6341	0.6342	------	------	------	------	------	------	------
111	0.6340	0.6340	0.6341	0.6342	------	------	------	------	------	------	------
112	0.6340	0.6340	0.6341	0.6343	0.6345	------	------	------	------	------	------
113	0.6340	0.6340	0.6341	0.6343	0.6345	------	------	------	------	------	------
114	0.6340	0.6340	0.6341	0.6343	0.6346	------	------	------	------	------	------
115	0.6340	0.6341	0.6341	0.6343	0.6346	0.6349	------	------	------	------	------
116	0.6340	0.6341	0.6341	0.6343	0.6346	0.6350	------	------	------	------	------
117	0.6340	0.6341	0.6342	0.6343	0.6346	0.6350	------	------	------	------	------
118	0.6340	0.6341	0.6342	0.6344	0.6346	0.6350	------	------	------	------	------
119	0.6340	0.6341	0.6342	0.6344	0.6346	0.6350	0.6355	------	------	------	------
120	0.6340	0.6341	0.6342	0.6344	0.6347	0.6350	0.6355	------	------	------	------
121	0.6340	0.6341	0.6342	0.6344	0.6347	0.6350	0.6355	0.6361	------	------	------
122	0.6340	0.6341	0.6342	0.6344	0.6347	0.6351	0.6355	0.6361	------	------	------
123	0.6340	0.6341	0.6342	0.6344	0.6347	0.6351	0.6355	0.6361	------	------	------
124	0.6340	0.6341	0.6342	0.6344	0.6347	0.6351	0.6355	0.6361	0.6368	------	------
125	0.6340	0.6341	0.6342	0.6345	0.6347	0.6351	0.6355	0.6361	0.6368	------	------
126	0.6340	0.6341	0.6342	0.6345	0.6347	0.6351	0.6355	0.6361	0.6368	0.6376	------
127	0.6340	0.6341	0.6343	0.6345	0.6348	0.6351	0.6355	0.6361	0.6368	0.6376	------
128	0.6340	0.6341	0.6343	0.6345	0.6348	0.6351	0.6355	0.6361	0.6367	0.6375	0.6385
129	0.6340	0.6341	0.6343	0.6345	0.6348	0.6351	0.6356	0.6361	0.6367	0.6375	0.6385
130	0.6340	0.6341	0.6343	0.6345	0.6348	0.6351	0.6356	0.6361	0.6367	0.6375	0.6384
132	0.6340	0.6341	0.6343	0.6345	0.6348	0.6352	0.6356	0.6361	0.6367	0.6374	0.6382
134	0.6340	0.6341	0.6344	0.6345	0.6348	0.6352	0.6356	0.6361	0.6366	0.6373	0.6381
136	0.6340	0.6341	0.6344	0.6346	0.6348	0.6352	0.6356	0.6361	0.6366	0.6373	0.6380
138	0.6340	0.6341	0.6344	0.6346	0.6349	0.6352	0.6356	0.6361	0.6366	0.6372	0.6379
140	0.6340	0.6341	0.6344	0.6346	0.6349	0.6352	0.6356	0.6360	0.6366	0.6372	0.6379
142	0.6340	0.6341	0.6344	0.6346	0.6349	0.6352	0.6356	0.6360	0.6366	0.6371	0.6378
144	0.6340	0.6341	0.6344	0.6346	0.6349	0.6352	0.6356	0.6360	0.6365	0.6371	0.6377
146	0.6340	0.6342	0.6344	0.6346	0.6349	0.6352	0.6356	0.6360	0.6365	0.6371	0.6377
148	0.6340	0.6342	0.6344	0.6346	0.6349	0.6352	0.6356	0.6360	0.6365	0.6370	0.6376
150	0.6340	0.6342	0.6344	0.6346	0.6349	0.6352	0.6356	0.6360	0.6365	0.6370	0.6376

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
128	0.6385	------	------	------	------	------	------	------	------	------	------
129	0.6385	------	------	------	------	------	------	------	------	------	------
130	0.6384	------	------	------	------	------	------	------	------	------	------
132	0.6382	0.6413	------	------	------	------	------	------	------	------	------
134	0.6381	0.6409	------	------	------	------	------	------	------	------	------
136	0.6380	0.6406	0.6446	------	------	------	------	------	------	------	------
138	0.6379	0.6404	0.6439	------	------	------	------	------	------	------	------
140	0.6379	0.6401	0.6434	0.6482	------	------	------	------	------	------	------
142	0.6378	0.6399	0.6429	0.6472	0.6534	------	------	------	------	------	------
144	0.6377	0.6398	0.6425	0.6464	0.6518	0.6593	------	------	------	------	------
146	0.6377	0.6396	0.6422	0.6457	0.6505	0.6570	0.6655	------	------	------	------
148	0.6376	0.6395	0.6419	0.6452	0.6495	0.6552	0.6625	0.6716	------	------	------
150	0.6376	0.6393	0.6416	0.6447	0.6486	0.6537	0.6601	0.6680	0.6774	0.6877	------

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.6340	0.6352	0.6376	0.6416	0.6486	0.6601	0.6774	------	------	------	------
155	0.6340	0.6353	0.6375	0.6411	0.6469	0.6558	0.6686	0.6847	0.7020	0.7186	0.7335
160	0.6340	0.6353	0.6374	0.6407	0.6456	0.6529	0.6629	0.6756	0.6898	0.7042	0.7179
165	0.6340	0.6353	0.6373	0.6403	0.6447	0.6509	0.6590	0.6693	0.6810	0.6933	0.7055
170	0.6340	0.6353	0.6372	0.6400	0.6440	0.6493	0.6562	0.6647	0.6745	0.6851	0.6958
175	0.6340	0.6353	0.6372	0.6398	0.6434	0.6481	0.6541	0.6613	0.6697	0.6788	0.6882
180	0.6340	0.6353	0.6371	0.6396	0.6429	0.6471	0.6524	0.6587	0.6659	0.6738	0.6822
185	0.6340	0.6353	0.6371	0.6394	0.6425	0.6463	0.6510	0.6565	0.6629	0.6699	0.6773
190	0.6340	0.6353	0.6370	0.6392	0.6421	0.6456	0.6499	0.6549	0.6605	0.6667	0.6733
195	0.6340	0.6353	0.6369	0.6391	0.6418	0.6451	0.6490	0.6535	0.6586	0.6641	0.6701
200	0.6340	0.6353	0.6369	0.6390	0.6415	0.6446	0.6482	0.6523	0.6569	0.6620	0.6674
205	0.6340	0.6353	0.6369	0.6388	0.6413	0.6441	0.6475	0.6518	0.6555	0.6601	0.6650
210	0.6340	0.6353	0.6368	0.6387	0.6410	0.6437	0.6469	0.6504	0.6543	0.6586	0.6631
215	0.6340	0.6352	0.6368	0.6386	0.6408	0.6434	0.6463	0.6496	0.6533	0.6572	0.6614
220	0.6340	0.6352	0.6367	0.6385	0.6406	0.6431	0.6459	0.6489	0.6523	0.6560	0.6599
225	0.6340	0.6352	0.6367	0.6384	0.6405	0.6428	0.6454	0.6483	0.6515	0.6549	0.6586
230	0.6340	0.6352	0.6366	0.6384	0.6403	0.6425	0.6450	0.6478	0.6508	0.6540	0.6574
235	0.6339	0.6352	0.6367	0.6383	0.6402	0.6423	0.6447	0.6473	0.6501	0.6532	0.6564
240	0.6339	0.6352	0.6366	0.6382	0.6400	0.6421	0.6444	0.6469	0.6496	0.6525	0.6555
245	0.6339	0.6352	0.6366	0.6381	0.6399	0.6419	0.6441	0.6465	0.6490	0.6518	0.6546
250	0.6339	0.6351	0.6365	0.6380	0.6398	0.6417	0.6438	0.6461	0.6485	0.6511	0.6538
255	0.6339	0.6351	0.6365	0.6380	0.6397	0.6415	0.6435	0.6457	0.6481	0.6506	0.6532
260	0.6339	0.6351	0.6365	0.6379	0.6395	0.6413	0.6433	0.6454	0.6477	0.6501	0.6525
265	0.6339	0.6351	0.6364	0.6378	0.6394	0.6412	0.6431	0.6451	0.6473	0.6496	0.6520
270	0.6339	0.6351	0.6364	0.6378	0.6393	0.6410	0.6429	0.6448	0.6469	0.6491	0.6514
275	0.6339	0.6351	0.6364	0.6378	0.6392	0.6409	0.6427	0.6446	0.6466	0.6487	0.6509
280	0.6339	0.6351	0.6363	0.6377	0.6392	0.6408	0.6425	0.6443	0.6463	0.6483	0.6505
285	0.6339	0.6351	0.6363	0.6376	0.6391	0.6406	0.6423	0.6441	0.6460	0.6480	0.6500
290	0.6339	0.6350	0.6363	0.6376	0.6390	0.6405	0.6421	0.6439	0.6457	0.6477	0.6496
295	0.6339	0.6350	0.6362	0.6375	0.6389	0.6404	0.6420	0.6437	0.6454	0.6473	0.6492
300	0.6339	0.6350	0.6362	0.6375	0.6389	0.6403	0.6418	0.6435	0.6452	0.6470	0.6489
310	0.6339	0.6350	0.6361	0.6374	0.6387	0.6401	0.6415	0.6431	0.6448	0.6465	0.6482
320	0.6339	0.6349	0.6361	0.6373	0.6385	0.6399	0.6413	0.6428	0.6444	0.6460	0.6476
330	0.6339	0.6349	0.6360	0.6372	0.6384	0.6397	0.6411	0.6425	0.6440	0.6455	0.6471
340	0.6339	0.6349	0.6359	0.6371	0.6383	0.6395	0.6408	0.6422	0.6436	0.6451	0.6466

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(d) Concluded. Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
350	0.6338	0.6348	0.6359	0.6370	0.6381	0.6393	0.6406	0.6419	0.6433	0.6447	0.6461
360	0.6338	0.6348	0.6358	0.6369	0.6380	0.6392	0.6404	0.6416	0.6430	0.6443	0.6457
370	0.6338	0.6347	0.6357	0.6368	0.6379	0.6390	0.6402	0.6414	0.6426	0.6439	0.6453
380	0.6338	0.6347	0.6356	0.6367	0.6377	0.6388	0.6400	0.6411	0.6424	0.6436	0.6449
390	0.6337	0.6346	0.6356	0.6366	0.6376	0.6387	0.6398	0.6409	0.6421	0.6433	0.6445
400	0.6337	0.6346	0.6355	0.6365	0.6375	0.6385	0.6396	0.6407	0.6418	0.6430	0.6442

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
155	0.7335	0.7463	0.7569	0.7657	0.7728	0.7787	0.7836	0.7876	0.7910	0.7939	0.7964
160	0.7179	0.7303	0.7412	0.7506	0.7586	0.7654	0.7711	0.7759	0.7801	0.7836	0.7866
165	0.7055	0.7170	0.7276	0.7370	0.7453	0.7526	0.7589	0.7643	0.7690	0.7731	0.7767
170	0.6958	0.7063	0.7162	0.7253	0.7335	0.7409	0.7475	0.7533	0.7584	0.7629	0.7669
175	0.6882	0.6976	0.7067	0.7153	0.7232	0.7305	0.7371	0.7431	0.7484	0.7532	0.7575
180	0.6822	0.6906	0.6989	0.7069	0.7144	0.7214	0.7279	0.7338	0.7392	0.7441	0.7486
185	0.6773	0.6849	0.6924	0.6998	0.7068	0.7135	0.7198	0.7256	0.7310	0.7359	0.7404
190	0.6733	0.6802	0.6870	0.6938	0.7004	0.7067	0.7127	0.7183	0.7235	0.7284	0.7329
195	0.6701	0.6763	0.6825	0.6888	0.6949	0.7008	0.7065	0.7119	0.7169	0.7217	0.7262
200	0.6674	0.6730	0.6787	0.6845	0.6902	0.6957	0.7011	0.7062	0.7111	0.7157	0.7201
205	0.6650	0.6702	0.6755	0.6808	0.6861	0.6913	0.6963	0.7012	0.7059	0.7104	0.7146
210	0.6631	0.6678	0.6727	0.6776	0.6825	0.6874	0.6922	0.6968	0.7013	0.7056	0.7097
215	0.6614	0.6658	0.6703	0.6749	0.6795	0.6840	0.6885	0.6929	0.6972	0.7013	0.7053
220	0.6599	0.6640	0.6682	0.6724	0.6767	0.6810	0.6853	0.6895	0.6935	0.6974	0.7013
225	0.6586	0.6624	0.6663	0.6703	0.6744	0.6784	0.6824	0.6864	0.6902	0.6940	0.6976
230	0.6574	0.6610	0.6647	0.6684	0.6722	0.6761	0.6799	0.6836	0.6873	0.6909	0.6944
235	0.6564	0.6598	0.6632	0.6668	0.6704	0.6740	0.6776	0.6811	0.6846	0.6881	0.6914
240	0.6555	0.6586	0.6619	0.6653	0.6687	0.6721	0.6755	0.6789	0.6822	0.6855	0.6888
245	0.6546	0.6576	0.6607	0.6639	0.6671	0.6704	0.6736	0.6769	0.6801	0.6832	0.6863
250	0.6538	0.6567	0.6597	0.6627	0.6658	0.6689	0.6720	0.6750	0.6781	0.6811	0.6841
255	0.6532	0.6559	0.6587	0.6616	0.6645	0.6675	0.6704	0.6734	0.6763	0.6792	0.6821
260	0.6525	0.6551	0.6578	0.6606	0.6634	0.6662	0.6690	0.6718	0.6747	0.6774	0.6802
265	0.6520	0.6545	0.6570	0.6596	0.6623	0.6650	0.6677	0.6704	0.6731	0.6758	0.6785
270	0.6514	0.6538	0.6563	0.6588	0.6613	0.6639	0.6665	0.6691	0.6717	0.6743	0.6769
275	0.6509	0.6532	0.6556	0.6580	0.6605	0.6629	0.6654	0.6679	0.6705	0.6729	0.6754
280	0.6505	0.6526	0.6549	0.6573	0.6596	0.6620	0.6644	0.6668	0.6693	0.6717	0.6740
285	0.6500	0.6521	0.6543	0.6566	0.6589	0.6612	0.6635	0.6658	0.6681	0.6705	0.6728
290	0.6496	0.6516	0.6538	0.6559	0.6581	0.6604	0.6626	0.6649	0.6671	0.6694	0.6716
295	0.6492	0.6512	0.6533	0.6553	0.6575	0.6596	0.6618	0.6640	0.6661	0.6683	0.6705
300	0.6489	0.6508	0.6528	0.6548	0.6568	0.6589	0.6610	0.6631	0.6652	0.6673	0.6694
310	0.6482	0.6500	0.6519	0.6538	0.6557	0.6577	0.6596	0.6616	0.6636	0.6656	0.6675
320	0.6476	0.6493	0.6511	0.6529	0.6547	0.6565	0.6584	0.6603	0.6621	0.6640	0.6659
330	0.6471	0.6487	0.6503	0.6520	0.6538	0.6555	0.6573	0.6590	0.6608	0.6626	0.6644
340	0.6466	0.6481	0.6497	0.6513	0.6529	0.6546	0.6563	0.6579	0.6596	0.6613	0.6630

350	0.6461	0.6476	0.6490	0.6506	0.6522	0.6538	0.6553	0.6570	0.6586	0.6602	0.6618
360	0.6457	0.6471	0.6485	0.6500	0.6515	0.6530	0.6545	0.6560	0.6576	0.6591	0.6607
370	0.6453	0.6466	0.6480	0.6494	0.6508	0.6523	0.6537	0.6552	0.6567	0.6581	0.6596
380	0.6449	0.6462	0.6475	0.6489	0.6502	0.6516	0.6530	0.6544	0.6558	0.6573	0.6587
390	0.6445	0.6458	0.6470	0.6484	0.6497	0.6510	0.6523	0.6537	0.6551	0.6564	0.6578
400	0.6442	0.6454	0.6466	0.6479	0.6491	0.6504	0.6517	0.6530	0.6543	0.6556	0.6569

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
155	0.7964	0.7985	0.8003	0.8019	0.8034	0.8046	0.8057	0.8067	0.8076	0.8083	0.8090
160	0.7866	0.7893	0.7916	0.7936	0.7954	0.7970	0.7984	0.7997	0.8008	0.8018	0.8027
165	0.7767	0.7798	0.7826	0.7850	0.7871	0.7891	0.7908	0.7923	0.7937	0.7950	0.7961
170	0.7669	0.7704	0.7735	0.7763	0.7788	0.7810	0.7830	0.7848	0.7865	0.7879	0.7893
175	0.7575	0.7613	0.7647	0.7678	0.7706	0.7731	0.7753	0.7773	0.7792	0.7809	0.7824
180	0.7486	0.7526	0.7563	0.7596	0.7626	0.7653	0.7678	0.7700	0.7721	0.7739	0.7757
185	0.7404	0.7446	0.7483	0.7518	0.7550	0.7579	0.7605	0.7629	0.7652	0.7672	0.7691
190	0.7329	0.7371	0.7410	0.7445	0.7478	0.7508	0.7536	0.7562	0.7585	0.7607	0.7627
195	0.7262	0.7303	0.7342	0.7378	0.7411	0.7442	0.7471	0.7497	0.7522	0.7545	0.7566
200	0.7201	0.7242	0.7280	0.7316	0.7350	0.7381	0.7410	0.7437	0.7463	0.7486	0.7509
205	0.7146	0.7186	0.7224	0.7259	0.7293	0.7324	0.7354	0.7381	0.7407	0.7431	0.7454
210	0.7097	0.7136	0.7173	0.7208	0.7241	0.7272	0.7301	0.7329	0.7355	0.7380	0.7403
215	0.7053	0.7090	0.7126	0.7160	0.7193	0.7224	0.7253	0.7281	0.7307	0.7331	0.7355
220	0.7013	0.7049	0.7084	0.7117	0.7149	0.7179	0.7208	0.7236	0.7262	0.7287	0.7310
225	0.6976	0.7012	0.7046	0.7078	0.7109	0.7139	0.7167	0.7194	0.7220	0.7245	0.7268
230	0.6944	0.6978	0.7011	0.7042	0.7072	0.7101	0.7129	0.7156	0.7182	0.7206	0.7229
235	0.6914	0.6947	0.6979	0.7009	0.7039	0.7067	0.7094	0.7121	0.7146	0.7170	0.7193
240	0.6888	0.6919	0.6950	0.6979	0.7008	0.7036	0.7062	0.7088	0.7113	0.7136	0.7159
245	0.6863	0.6894	0.6923	0.6952	0.6980	0.7007	0.7033	0.7058	0.7082	0.7105	0.7128
250	0.6841	0.6870	0.6899	0.6926	0.6953	0.6980	0.7005	0.7030	0.7053	0.7076	0.7098
255	0.6821	0.6849	0.6876	0.6903	0.6929	0.6955	0.6980	0.7004	0.7027	0.7049	0.7071
260	0.6802	0.6829	0.6856	0.6882	0.6907	0.6932	0.6956	0.6979	0.7002	0.7024	0.7045
265	0.6785	0.6811	0.6836	0.6862	0.6886	0.6910	0.6934	0.6957	0.6979	0.7001	0.7021
270	0.6769	0.6794	0.6819	0.6843	0.6867	0.6891	0.6913	0.6936	0.6957	0.6978	0.6999
275	0.6754	0.6778	0.6802	0.6826	0.6849	0.6872	0.6894	0.6916	0.6937	0.6958	0.6978
280	0.6740	0.6764	0.6787	0.6810	0.6833	0.6855	0.6876	0.6898	0.6918	0.6938	0.6958
285	0.6728	0.6751	0.6773	0.6795	0.6817	0.6839	0.6860	0.6880	0.6901	0.6920	0.6940
290	0.6716	0.6738	0.6760	0.6781	0.6803	0.6824	0.6844	0.6864	0.6884	0.6903	0.6922
295	0.6705	0.6726	0.6747	0.6768	0.6789	0.6809	0.6829	0.6849	0.6868	0.6887	0.6906
300	0.6694	0.6715	0.6736	0.6756	0.6776	0.6796	0.6816	0.6835	0.6854	0.6872	0.6890
310	0.6675	0.6695	0.6715	0.6734	0.6753	0.6772	0.6790	0.6809	0.6827	0.6844	0.6862
320	0.6659	0.6677	0.6696	0.6714	0.6732	0.6750	0.6768	0.6786	0.6803	0.6819	0.6836
330	0.6644	0.6661	0.6679	0.6696	0.6714	0.6731	0.6748	0.6764	0.6781	0.6797	0.6813
340	0.6630	0.6647	0.6664	0.6680	0.6697	0.6713	0.6729	0.6745	0.6761	0.6777	0.6792
350	0.6618	0.6634	0.6650	0.6666	0.6682	0.6697	0.6713	0.6728	0.6743	0.6758	0.6773
360	0.6607	0.6622	0.6637	0.6652	0.6668	0.6683	0.6698	0.6712	0.6727	0.6741	0.6756
370	0.6596	0.6611	0.6626	0.6640	0.6655	0.6669	0.6684	0.6698	0.6712	0.6726	0.6739
380	0.6587	0.6601	0.6615	0.6629	0.6643	0.6657	0.6671	0.6684	0.6698	0.6711	0.6725
390	0.6578	0.6591	0.6605	0.6619	0.6632	0.6645	0.6659	0.6672	0.6685	0.6698	0.6711
400	0.6569	0.6583	0.6596	0.6609	0.6622	0.6635	0.6648	0.6660	0.6673	0.6686	0.6698

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(e) Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	0.8332	0.8303	------	------	------	------	------	------	------	------	------
101	0.8332	0.8304	------	------	------	------	------	------	------	------	------
102	0.8332	0.8305	0.8277	------	------	------	------	------	------	------	------
103	0.8332	0.8305	0.8279	------	------	------	------	------	------	------	------
104	0.8332	0.8306	0.8281	------	------	------	------	------	------	------	------
105	0.8332	0.8307	0.8282	------	------	------	------	------	------	------	------
106	0.8332	0.8308	0.8284	------	------	------	------	------	------	------	------
107	0.8332	0.8309	0.8285	------	------	------	------	------	------	------	------
108	0.8332	0.8310	0.8287	0.8264	------	------	------	------	------	------	------
109	0.8332	0.8310	0.8288	0.8266	------	------	------	------	------	------	------
110	0.8332	0.8311	0.8289	0.8268	------	------	------	------	------	------	------
111	0.8332	0.8311	0.8290	0.8270	------	------	------	------	------	------	------
112	0.8332	0.8312	0.8291	0.8272	0.8252	------	------	------	------	------	------
113	0.8332	0.8312	0.8293	0.8273	0.8255	------	------	------	------	------	------
114	0.8332	0.8313	0.8294	0.8275	0.8257	------	------	------	------	------	------
115	0.8332	0.8313	0.8295	0.8276	0.8258	0.8241	------	------	------	------	------
116	0.8332	0.8314	0.8296	0.8278	0.8260	0.8244	------	------	------	------	------
117	0.8332	0.8314	0.8296	0.8279	0.8262	0.8246	------	------	------	------	------
118	0.8332	0.8315	0.8297	0.8280	0.8264	0.8248	------	------	------	------	------
119	0.8332	0.8315	0.8298	0.8282	0.8265	0.8250	0.8235	------	------	------	------
120	0.8332	0.8316	0.8299	0.8283	0.8267	0.8252	0.8237	------	------	------	------
121	0.8332	0.8316	0.8300	0.8284	0.8269	0.8254	0.8240	0.8226	------	------	------
122	0.8332	0.8316	0.8301	0.8285	0.8270	0.8255	0.8242	0.8229	------	------	------
123	0.8332	0.8317	0.8301	0.8286	0.8271	0.8257	0.8243	0.8231	------	------	------
124	0.8332	0.8317	0.8302	0.8287	0.8273	0.8259	0.8245	0.8233	0.8221	------	------
125	0.8332	0.8317	0.8303	0.8288	0.8274	0.8260	0.8247	0.8235	0.8223	------	------
126	0.8332	0.8318	0.8303	0.8289	0.8275	0.8262	0.8249	0.8237	0.8226	0.8215	------
127	0.8332	0.8318	0.8304	0.8290	0.8276	0.8263	0.8251	0.8239	0.8228	0.8217	------
128	0.8332	0.8318	0.8304	0.8291	0.8278	0.8265	0.8252	0.8240	0.8229	0.8219	0.8211
129	0.8332	0.8319	0.8305	0.8292	0.8279	0.8266	0.8254	0.8242	0.8231	0.8221	0.8213
130	0.8332	0.8319	0.8306	0.8293	0.8280	0.8267	0.8255	0.8244	0.8233	0.8223	0.8215
132	0.8332	0.8319	0.8307	0.8294	0.8282	0.8270	0.8258	0.8247	0.8237	0.8227	0.8218
134	0.8332	0.8320	0.8308	0.8296	0.8284	0.8272	0.8261	0.8250	0.8240	0.8231	0.8222
136	0.8332	0.8320	0.8309	0.8297	0.8285	0.8274	0.8264	0.8253	0.8243	0.8234	0.8225
138	0.8332	0.8321	0.8310	0.8298	0.8287	0.8276	0.8266	0.8256	0.8246	0.8237	0.8229
140	0.8332	0.8321	0.8310	0.8299	0.8289	0.8278	0.8268	0.8258	0.8249	0.8240	0.8232
142	0.8332	0.8322	0.8311	0.8300	0.8290	0.8280	0.8270	0.8261	0.8252	0.8243	0.8235
144	0.8332	0.8322	0.8312	0.8302	0.8292	0.8282	0.8272	0.8263	0.8254	0.8246	0.8238
146	0.8332	0.8322	0.8313	0.8303	0.8293	0.8283	0.8274	0.8265	0.8257	0.8248	0.8240
148	0.8332	0.8323	0.8313	0.8303	0.8294	0.8285	0.8276	0.8267	0.8259	0.8251	0.8243
150	0.8332	0.8323	0.8314	0.8304	0.8295	0.8286	0.8278	0.8269	0.8261	0.8253	0.8245

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
128	0.8211	------	------	------	------	------	------	------	------	------	------
129	0.8213	------	------	------	------	------	------	------	------	------	------
130	0.8215	------	------	------	------	------	------	------	------	------	------
132	0.8218	0.8202	------	------	------	------	------	------	------	------	------
134	0.8222	0.8205	------	------	------	------	------	------	------	------	------
136	0.8225	0.8208	0.8199	------	------	------	------	------	------	------	------
138	0.8229	0.8211	0.8200	------	------	------	------	------	------	------	------
140	0.8232	0.8214	0.8202	0.8199	------	------	------	------	------	------	------
142	0.8235	0.8217	0.8204	0.8199	0.8205	------	------	------	------	------	------
144	0.8238	0.8220	0.8206	0.8199	0.8201	0.8216	------	------	------	------	------
146	0.8240	0.8222	0.8208	0.8200	0.8199	0.8208	0.8230	------	------	------	------
148	0.8243	0.8225	0.8211	0.8201	0.8198	0.8203	0.8217	0.8243	------	------	------
150	0.8245	0.8228	0.8213	0.8203	0.8197	0.8199	0.8209	0.8228	0.8255	0.8287	------

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.8332	0.8286	0.8245	0.8213	0.8197	0.8209	0.8255	------	------	------	------
155	0.8332	0.8290	0.8251	0.8220	0.8200	0.8197	0.8218	0.8257	0.8302	0.8339	0.8367
160	0.8332	0.8293	0.8256	0.8226	0.8203	0.8194	0.8200	0.8221	0.8250	0.8280	0.8304
165	0.8332	0.8295	0.8261	0.8231	0.8208	0.8194	0.8192	0.8200	0.8218	0.8238	0.8257
170	0.8332	0.8297	0.8265	0.8236	0.8213	0.8197	0.8189	0.8190	0.8198	0.8210	0.8223
175	0.8332	0.8299	0.8269	0.8241	0.8218	0.8200	0.8189	0.8185	0.8186	0.8192	0.8200
180	0.8332	0.8301	0.8272	0.8246	0.8223	0.8204	0.8191	0.8183	0.8180	0.8181	0.8185
185	0.8332	0.8303	0.8275	0.8250	0.8227	0.8209	0.8194	0.8184	0.8178	0.8175	0.8175
190	0.8332	0.8305	0.8278	0.8254	0.8232	0.8213	0.8198	0.8186	0.8178	0.8172	0.8169
195	0.8332	0.8306	0.8281	0.8257	0.8236	0.8217	0.8201	0.8189	0.8179	0.8171	0.8166
200	0.8332	0.8307	0.8283	0.8260	0.8240	0.8221	0.8205	0.8192	0.8181	0.8172	0.8165
205	0.8333	0.8308	0.8285	0.8263	0.8243	0.8225	0.8209	0.8195	0.8183	0.8174	0.8166
210	0.8333	0.8309	0.8287	0.8266	0.8247	0.8229	0.8213	0.8199	0.8187	0.8176	0.8167
215	0.8333	0.8310	0.8289	0.8269	0.8250	0.8232	0.8217	0.8202	0.8190	0.8179	0.8169
220	0.8333	0.8311	0.8291	0.8271	0.8253	0.8236	0.8220	0.8206	0.8193	0.8182	0.8172
225	0.8333	0.8312	0.8292	0.8273	0.8256	0.8239	0.8224	0.8210	0.8197	0.8185	0.8175
230	0.8333	0.8313	0.8294	0.8275	0.8258	0.8242	0.8227	0.8213	0.8200	0.8189	0.8178
235	0.8333	0.8314	0.8295	0.8277	0.8261	0.8245	0.8230	0.8216	0.8204	0.8192	0.8181
240	0.8333	0.8314	0.8297	0.8279	0.8263	0.8248	0.8233	0.8219	0.8207	0.8195	0.8184
245	0.8333	0.8315	0.8298	0.8281	0.8265	0.8250	0.8236	0.8223	0.8210	0.8199	0.8187
250	0.8333	0.8315	0.8299	0.8283	0.8267	0.8253	0.8239	0.8226	0.8213	0.8201	0.8190
255	0.8333	0.8316	0.8300	0.8284	0.8269	0.8255	0.8241	0.8228	0.8216	0.8205	0.8194
260	0.8333	0.8317	0.8301	0.8286	0.8271	0.8257	0.8244	0.8231	0.8219	0.8208	0.8197
265	0.8333	0.8317	0.8302	0.8287	0.8273	0.8259	0.8246	0.8234	0.8222	0.8210	0.8200
270	0.8333	0.8318	0.8303	0.8289	0.8275	0.8261	0.8248	0.8236	0.8224	0.8213	0.8203
275	0.8333	0.8318	0.8304	0.8290	0.8276	0.8263	0.8251	0.8239	0.8227	0.8216	0.8206
280	0.8333	0.8318	0.8305	0.8291	0.8278	0.8265	0.8253	0.8241	0.8230	0.8219	0.8208
285	0.8333	0.8319	0.8305	0.8292	0.8279	0.8267	0.8255	0.8243	0.8232	0.8222	0.8211
290	0.8333	0.8319	0.8306	0.8293	0.8281	0.8268	0.8257	0.8245	0.8234	0.8224	0.8214
295	0.8333	0.8320	0.8307	0.8294	0.8282	0.8270	0.8258	0.8247	0.8237	0.8226	0.8216
300	0.8333	0.8320	0.8308	0.8295	0.8283	0.8272	0.8260	0.8249	0.8239	0.8229	0.8219
310	0.8333	0.8321	0.8309	0.8297	0.8286	0.8275	0.8264	0.8253	0.8243	0.8233	0.8223
320	0.8333	0.8322	0.8310	0.8299	0.8288	0.8277	0.8267	0.8257	0.8247	0.8237	0.8228
330	0.8334	0.8322	0.8312	0.8301	0.8290	0.8280	0.8270	0.8260	0.8251	0.8241	0.8232
340	0.8334	0.8323	0.8313	0.8302	0.8292	0.8282	0.8273	0.8263	0.8254	0.8245	0.8236

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(e) Concluded. Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
350	0.8334	0.8324	0.8314	0.8304	0.8294	0.8285	0.8275	0.8266	0.8257	0.8249	0.8240
360	0.8335	0.8325	0.8315	0.8306	0.8296	0.8287	0.8278	0.8269	0.8261	0.8252	0.8244
370	0.8336	0.8326	0.8317	0.8307	0.8298	0.8289	0.8281	0.8272	0.8264	0.8255	0.8247
380	0.8336	0.8327	0.8318	0.8309	0.8300	0.8292	0.8283	0.8275	0.8267	0.8259	0.8251
390	0.8337	0.8328	0.8319	0.8311	0.8302	0.8294	0.8286	0.8278	0.8270	0.8262	0.8254
400	0.8338	0.8329	0.8321	0.8313	0.8304	0.8296	0.8288	0.8280	0.8273	0.8265	0.8258

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
155	0.8367	0.8385	0.8394	0.8397	0.8395	0.8389	0.8380	0.8369	0.8357	0.8344	0.8331
160	0.8304	0.8322	0.8333	0.8339	0.8340	0.8337	0.8332	0.8323	0.8314	0.8302	0.8290
165	0.8257	0.8272	0.8284	0.8290	0.8293	0.8292	0.8289	0.8282	0.8275	0.8265	0.8255
170	0.8223	0.8235	0.8244	0.8251	0.8254	0.8254	0.8251	0.8247	0.8241	0.8233	0.8224
175	0.8200	0.8208	0.8215	0.8220	0.8222	0.8222	0.8221	0.8217	0.8212	0.8205	0.8197
180	0.8185	0.8189	0.8193	0.8196	0.8198	0.8197	0.8195	0.8192	0.8187	0.8181	0.8174
185	0.8175	0.8176	0.8177	0.8179	0.8179	0.8178	0.8176	0.8172	0.8168	0.8162	0.8156
190	0.8169	0.8168	0.8167	0.8166	0.8165	0.8163	0.8160	0.8157	0.8152	0.8147	0.8141
195	0.8166	0.8163	0.8160	0.8157	0.8155	0.8152	0.8149	0.8145	0.8140	0.8135	0.8129
200	0.8165	0.8160	0.8156	0.8152	0.8148	0.8144	0.8140	0.8136	0.8131	0.8125	0.8119
205	0.8166	0.8159	0.8153	0.8148	0.8144	0.8139	0.8134	0.8129	0.8124	0.8118	0.8112
210	0.8167	0.8160	0.8153	0.8147	0.8141	0.8136	0.8130	0.8125	0.8119	0.8114	0.8107
215	0.8169	0.8161	0.8153	0.8147	0.8140	0.8134	0.8128	0.8122	0.8116	0.8110	0.8104
220	0.8172	0.8163	0.8155	0.8147	0.8140	0.8134	0.8127	0.8121	0.8115	0.8108	0.8102
225	0.8175	0.8165	0.8157	0.8149	0.8141	0.8134	0.8127	0.8120	0.8114	0.8107	0.8101
230	0.8178	0.8168	0.8159	0.8151	0.8143	0.8135	0.8128	0.8121	0.8114	0.8107	0.8100
235	0.8181	0.8171	0.8162	0.8153	0.8145	0.8137	0.8129	0.8122	0.8115	0.8108	0.8101
240	0.8184	0.8174	0.8164	0.8156	0.8147	0.8139	0.8131	0.8124	0.8116	0.8109	0.8102
245	0.8187	0.8177	0.8167	0.8158	0.8150	0.8141	0.8133	0.8126	0.8118	0.8111	0.8104
250	0.8190	0.8180	0.8170	0.8161	0.8152	0.8144	0.8136	0.8128	0.8120	0.8113	0.8106
255	0.8194	0.8183	0.8174	0.8164	0.8155	0.8147	0.8139	0.8131	0.8123	0.8115	0.8108
260	0.8197	0.8186	0.8177	0.8167	0.8158	0.8150	0.8141	0.8133	0.8126	0.8118	0.8110
265	0.8200	0.8189	0.8180	0.8170	0.8161	0.8153	0.8144	0.8136	0.8128	0.8121	0.8113
270	0.8203	0.8192	0.8183	0.8173	0.8164	0.8156	0.8147	0.8139	0.8131	0.8123	0.8116
275	0.8206	0.8195	0.8186	0.8176	0.8167	0.8159	0.8150	0.8142	0.8134	0.8126	0.8119
280	0.8208	0.8198	0.8189	0.8179	0.8170	0.8162	0.8153	0.8145	0.8137	0.8129	0.8122
285	0.8211	0.8201	0.8192	0.8182	0.8173	0.8165	0.8156	0.8148	0.8140	0.8132	0.8125
290	0.8214	0.8204	0.8194	0.8185	0.8176	0.8168	0.8159	0.8151	0.8143	0.8135	0.8128
295	0.8216	0.8206	0.8197	0.8188	0.8179	0.8171	0.8162	0.8154	0.8146	0.8139	0.8131
300	0.8219	0.8209	0.8200	0.8191	0.8182	0.8174	0.8165	0.8157	0.8149	0.8142	0.8134
310	0.8223	0.8214	0.8205	0.8196	0.8188	0.8179	0.8171	0.8163	0.8155	0.8148	0.8140
320	0.8228	0.8219	0.8210	0.8201	0.8193	0.8185	0.8177	0.8169	0.8161	0.8153	0.8146
330	0.8232	0.8223	0.8215	0.8206	0.8198	0.8190	0.8182	0.8174	0.8167	0.8159	0.8152
340	0.8236	0.8227	0.8219	0.8211	0.8203	0.8195	0.8187	0.8180	0.8172	0.8165	0.8158

350	0.8240	0.8231	0.8223	0.8215	0.8207	0.8200	0.8192	0.8185	0.8177	0.8170	0.8163
360	0.8244	0.8235	0.8227	0.8220	0.8212	0.8204	0.8197	0.8190	0.8183	0.8175	0.8169
370	0.8247	0.8239	0.8231	0.8224	0.8216	0.8209	0.8202	0.8195	0.8188	0.8181	0.8174
380	0.8251	0.8243	0.8235	0.8228	0.8221	0.8213	0.8206	0.8199	0.8192	0.8186	0.8179
390	0.8254	0.8247	0.8239	0.8232	0.8225	0.8218	0.8211	0.8204	0.8197	0.8191	0.8184
400	0.8258	0.8250	0.8243	0.8236	0.8229	0.8222	0.8215	0.8209	0.8202	0.8196	0.8189

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
155	0.8331	0.8317	0.8303	0.8289	0.8275	0.8261	0.8247	0.8233	0.8219	0.8206	0.8193
160	0.8290	0.8278	0.8264	0.8251	0.8237	0.8224	0.8210	0.8196	0.8183	0.8170	0.8156
165	0.8255	0.8243	0.8231	0.8219	0.8206	0.8193	0.8180	0.8166	0.8153	0.8140	0.8127
170	0.8224	0.8213	0.8203	0.8191	0.8179	0.8167	0.8154	0.8142	0.8129	0.8116	0.8103
175	0.8197	0.8188	0.8178	0.8168	0.8157	0.8145	0.8133	0.8121	0.8109	0.8097	0.8085
180	0.8174	0.8166	0.8157	0.8148	0.8138	0.8127	0.8116	0.8105	0.8093	0.8082	0.8070
185	0.8156	0.8148	0.8140	0.8131	0.8122	0.8112	0.8102	0.8091	0.8081	0.8069	0.8058
190	0.8141	0.8134	0.8126	0.8118	0.8109	0.8100	0.8090	0.8080	0.8070	0.8060	0.8049
195	0.8129	0.8122	0.8115	0.8107	0.8099	0.8090	0.8081	0.8071	0.8062	0.8052	0.8042
200	0.8119	0.8113	0.8106	0.8098	0.8090	0.8082	0.8073	0.8065	0.8055	0.8046	0.8036
205	0.8112	0.8106	0.8099	0.8092	0.8084	0.8076	0.8068	0.8059	0.8050	0.8041	0.8032
210	0.8107	0.8101	0.8094	0.8087	0.8079	0.8071	0.8064	0.8055	0.8047	0.8038	0.8029
215	0.8104	0.8097	0.8090	0.8083	0.8076	0.8068	0.8061	0.8053	0.8044	0.8036	0.8028
220	0.8102	0.8095	0.8088	0.8081	0.8074	0.8066	0.8059	0.8051	0.8043	0.8035	0.8027
225	0.8101	0.8094	0.8087	0.8080	0.8072	0.8065	0.8058	0.8050	0.8042	0.8034	0.8026
230	0.8100	0.8093	0.8086	0.8079	0.8072	0.8065	0.8057	0.8050	0.8042	0.8035	0.8027
235	0.8101	0.8094	0.8087	0.8080	0.8073	0.8065	0.8058	0.8050	0.8043	0.8035	0.8028
240	0.8102	0.8095	0.8088	0.8081	0.8073	0.8066	0.8059	0.8051	0.8044	0.8037	0.8029
245	0.8104	0.8096	0.8089	0.8082	0.8075	0.8068	0.8060	0.8053	0.8046	0.8038	0.8031
250	0.8106	0.8098	0.8091	0.8084	0.8077	0.8069	0.8062	0.8055	0.8047	0.8040	0.8033
255	0.8108	0.8100	0.8093	0.8086	0.8079	0.8071	0.8064	0.8057	0.8050	0.8042	0.8035
260	0.8110	0.8103	0.8096	0.8088	0.8081	0.8074	0.8067	0.8060	0.8052	0.8045	0.8038
265	0.8113	0.8106	0.8098	0.8091	0.8084	0.8076	0.8069	0.8062	0.8055	0.8048	0.8041
270	0.8116	0.8108	0.8101	0.8094	0.8086	0.8079	0.8072	0.8065	0.8058	0.8051	0.8044
275	0.8119	0.8111	0.8104	0.8097	0.8089	0.8082	0.8075	0.8068	0.8061	0.8054	0.8047
280	0.8122	0.8114	0.8107	0.8100	0.8092	0.8085	0.8078	0.8071	0.8064	0.8057	0.8050
285	0.8125	0.8117	0.8110	0.8103	0.8095	0.8088	0.8081	0.8074	0.8067	0.8060	0.8053
290	0.8128	0.8120	0.8113	0.8106	0.8098	0.8091	0.8084	0.8077	0.8070	0.8063	0.8056
295	0.8131	0.8123	0.8116	0.8109	0.8102	0.8094	0.8087	0.8080	0.8073	0.8067	0.8060
300	0.8134	0.8127	0.8119	0.8112	0.8105	0.8098	0.8091	0.8084	0.8077	0.8070	0.8063
310	0.8140	0.8133	0.8125	0.8118	0.8111	0.8104	0.8097	0.8090	0.8083	0.8077	0.8070
320	0.8146	0.8139	0.8132	0.8124	0.8117	0.8110	0.8104	0.8097	0.8090	0.8083	0.8077
330	0.8152	0.8145	0.8138	0.8131	0.8124	0.8117	0.8110	0.8103	0.8097	0.8090	0.8083
340	0.8158	0.8150	0.8143	0.8137	0.8130	0.8123	0.8116	0.8110	0.8103	0.8097	0.8090
350	0.8163	0.8156	0.8149	0.8142	0.8136	0.8129	0.8122	0.8116	0.8109	0.8103	0.8097
360	0.8169	0.8162	0.8155	0.8148	0.8142	0.8135	0.8129	0.8122	0.8116	0.8109	0.8103
370	0.8174	0.8167	0.8160	0.8154	0.8147	0.8141	0.8134	0.8128	0.8122	0.8116	0.8109
380	0.8179	0.8172	0.8166	0.8159	0.8153	0.8147	0.8140	0.8134	0.8128	0.8122	0.8116
390	0.8184	0.8178	0.8171	0.8165	0.8158	0.8152	0.8146	0.8140	0.8134	0.8128	0.8122
400	0.8189	0.8183	0.8176	0.8170	0.8164	0.8158	0.8152	0.8146	0.8140	0.8134	0.8128

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(f) Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	1.0000	0.9598	0.9164	0.8687	------	------	------	------	------	------	------
101	1.0000	0.9610	0.9190	0.8730	0.8217	------	------	------	------	------	------
102	1.0000	0.9621	0.9214	0.8772	0.8280	------	------	------	------	------	------
103	1.0000	0.9632	0.9238	0.8811	0.8339	------	------	------	------	------	------
104	1.0000	0.9643	0.9261	0.8848	0.8395	0.7886	------	------	------	------	------
105	1.0000	0.9653	0.9283	0.8884	0.8449	0.7963	------	------	------	------	------
106	1.0000	0.9662	0.9303	0.8918	0.8499	0.8036	------	------	------	------	------
107	1.0000	0.9672	0.9324	0.8951	0.8548	0.8104	0.7602	------	------	------	------
108	1.0000	0.9681	0.9343	0.8982	0.8594	0.8168	0.7692	------	------	------	------
109	1.0000	0.9689	0.9361	0.9013	0.8638	0.8230	0.7776	------	------	------	------
110	1.0000	0.9698	0.9379	0.9042	0.8680	0.8288	0.7855	0.7366	------	------	------
111	1.0000	0.9706	0.9397	0.9069	0.8720	0.8343	0.7930	0.7467	------	------	------
112	1.0000	0.9714	0.9413	0.9096	0.8758	0.8396	0.8000	0.7561	0.7057	------	------
113	1.0000	0.9721	0.9429	0.9122	0.8795	0.8446	0.8067	0.7649	0.7177	------	------
114	1.0000	0.9729	0.9445	0.9146	0.8830	0.8493	0.8130	0.7732	0.7287	0.6769	------
115	1.0000	0.9736	0.9460	0.9170	0.8864	0.8539	0.8190	0.7810	0.7389	0.6907	------
116	1.0000	0.9743	0.9474	0.9193	0.8897	0.8583	0.8247	0.7884	0.7485	0.7034	0.6502
117	1.0000	0.9749	0.9488	0.9215	0.8928	0.8625	0.8302	0.7954	0.7574	0.7150	0.6661
118	1.0000	0.9756	0.9501	0.9236	0.8958	0.8665	0.8354	0.8020	0.7658	0.7258	0.6804
119	1.0000	0.9762	0.9514	0.9257	0.8987	0.8703	0.8403	0.8083	0.7737	0.7359	0.6935
120	1.0000	0.9768	0.9527	0.9276	0.9015	0.8740	0.8451	0.8143	0.7812	0.7453	0.7055
121	1.0000	0.9774	0.9539	0.9296	0.9042	0.8776	0.8496	0.8200	0.7883	0.7541	0.7166
122	1.0000	0.9779	0.9551	0.9314	0.9067	0.8810	0.8539	0.8254	0.7950	0.7624	0.7269
123	1.0000	0.9785	0.9562	0.9332	0.9092	0.8843	0.8581	0.8306	0.8014	0.7703	0.7366
124	1.0000	0.9790	0.9573	0.9349	0.9116	0.8874	0.8621	0.8356	0.8075	0.7777	0.7457
125	1.0000	0.9795	0.9584	0.9366	0.9139	0.8905	0.8660	0.8403	0.8133	0.7848	0.7542
126	1.0000	0.9800	0.9594	0.9382	0.9162	0.8934	0.8697	0.8449	0.8189	0.7915	0.7623
127	1.0000	0.9805	0.9604	0.9397	0.9183	0.8962	0.8732	0.8493	0.8242	0.7978	0.7699
128	1.0000	0.9810	0.9614	0.9412	0.9204	0.8989	0.8766	0.8535	0.8293	0.8039	0.7772
129	1.0000	0.9814	0.9623	0.9427	0.9225	0.9016	0.8799	0.8575	0.8341	0.8097	0.7841
130	1.0000	0.9818	0.9632	0.9441	0.9244	0.9041	0.8831	0.8614	0.8388	0.8153	0.7906
132	1.0000	0.9827	0.9650	0.9468	0.9281	0.9089	0.8891	0.8687	0.8476	0.8257	0.8028
134	1.0000	0.9835	0.9666	0.9493	0.9316	0.9134	0.8948	0.8755	0.8557	0.8352	0.8140
136	1.0000	0.9842	0.9681	0.9517	0.9349	0.9177	0.9000	0.8819	0.8632	0.8440	0.8242
138	1.0000	0.9849	0.9696	0.9539	0.9380	0.9216	0.9049	0.8878	0.8702	0.8522	0.8337
140	1.0000	0.9856	0.9710	0.9561	0.9409	0.9253	0.9095	0.8933	0.8768	0.8598	0.8424
142	1.0000	0.9863	0.9723	0.9581	0.9436	0.9288	0.9138	0.8985	0.8829	0.8669	0.8506
144	1.0000	0.9869	0.9735	0.9599	0.9462	0.9321	0.9179	0.9033	0.8885	0.8735	0.8581
146	1.0000	0.9874	0.9747	0.9617	0.9486	0.9352	0.9217	0.9079	0.8939	0.8796	0.8651
148	1.0000	0.9880	0.9758	0.9634	0.9509	0.9382	0.9253	0.9122	0.8989	0.8854	0.8717
150	1.0000	0.9885	0.9768	0.9650	0.9530	0.9409	0.9287	0.9162	0.9036	0.8908	0.8779

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
115	------	------	------	------	------	------	------	------	------	------	------
116	0.6502	------	------	------	------	------	------	------	------	------	------
117	0.6661	------	------	------	------	------	------	------	------	------	------
118	0.6804	------	------	------	------	------	------	------	------	------	------
119	0.6935	------	------	------	------	------	------	------	------	------	------
120	0.7055	0.5718	------	------	------	------	------	------	------	------	------
121	0.7166	0.5962	------	------	------	------	------	------	------	------	------
122	0.7269	0.6169	------	------	------	------	------	------	------	------	------
123	0.7366	0.6349	------	------	------	------	------	------	------	------	------
124	0.7457	0.6510	0.5015	------	------	------	------	------	------	------	------
125	0.7542	0.6655	0.5381	------	------	------	------	------	------	------	------
126	0.7623	0.6788	0.5660	------	------	------	------	------	------	------	------
127	0.7699	0.6910	0.5890	0.3729	0.2323	0.2452	0.2620	0.2800	0.2986	0.3174	0.3363
128	0.7772	0.7024	0.6088	0.4616	0.2473	0.2530	0.2675	0.2844	0.3022	0.3205	0.3390
129	0.7841	0.7130	0.6263	0.5041	0.2769	0.2635	0.2743	0.2896	0.3064	0.3241	0.3421
130	0.7906	0.7229	0.6421	0.5354	0.3475	0.2783	0.2828	0.2957	0.3113	0.3281	0.3456
132	0.8028	0.7409	0.6696	0.5825	0.4646	0.3346	0.3078	0.3119	0.3235	0.3380	0.3538
134	0.8140	0.7571	0.6930	0.6185	0.5277	0.4191	0.3499	0.3359	0.3401	0.3508	0.3643
136	0.8242	0.7716	0.7136	0.6481	0.5726	0.4863	0.4078	0.3705	0.3629	0.3675	0.3775
138	0.8337	0.7849	0.7318	0.6733	0.6081	0.5362	0.4649	0.4144	0.3927	0.3889	0.3940
140	0.8424	0.7970	0.7481	0.6952	0.6376	0.5757	0.5131	0.4604	0.4283	0.4153	0.4142
142	0.8506	0.8081	0.7629	0.7146	0.6630	0.6084	0.5532	0.5031	0.4662	0.4456	0.4379
144	0.8581	0.8183	0.7763	0.7320	0.6852	0.6364	0.5871	0.5409	0.5032	0.4777	0.4643
146	0.8651	0.8278	0.7886	0.7477	0.7049	0.6608	0.6164	0.5740	0.5374	0.5097	0.4923
148	0.8717	0.8366	0.8000	0.7619	0.7226	0.6823	0.6420	0.6032	0.5684	0.5403	0.5204
150	0.8779	0.8447	0.8104	0.7750	0.7387	0.7017	0.6647	0.6291	0.5965	0.5688	0.5477

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$						
	70	75	80	85	90	95	100
127	0.3363	0.3552	0.3741	0.3930	0.4117	0.4304	0.4491
128	0.3390	0.3576	0.3762	0.3948	0.4134	0.4319	0.4504
129	0.3421	0.3603	0.3786	0.3970	0.4153	0.4336	0.4518
130	0.3456	0.3633	0.3813	0.3993	0.4174	0.4354	0.4535
132	0.3538	0.3705	0.3875	0.4048	0.4222	0.4397	0.4573
134	0.3643	0.3793	0.3951	0.4115	0.4281	0.4450	0.4619
136	0.3775	0.3902	0.4044	0.4195	0.4351	0.4512	0.4675
138	0.3940	0.4035	0.4155	0.4290	0.4435	0.4585	0.4740
140	0.4142	0.4196	0.4289	0.4403	0.4532	0.4671	0.4816
142	0.4379	0.4386	0.4445	0.4535	0.4645	0.4769	0.4902
144	0.4643	0.4602	0.4623	0.4685	0.4774	0.4881	0.5001
146	0.4923	0.4838	0.4822	0.4854	0.4919	0.5007	0.5112
148	0.5204	0.5085	0.5035	0.5038	0.5078	0.5146	0.5234
150	0.5477	0.5335	0.5258	0.5233	0.5249	0.5296	0.5366

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(f) Continued. Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
127	0.4491	0.4861	0.5228	0.5591	0.5952	0.6309	0.6664	0.7016	0.7366	0.7713	0.8058
128	0.4504	0.4870	0.5234	0.5595	0.5953	0.6308	0.6660	0.7010	0.7357	0.7702	0.8044
129	0.4518	0.4881	0.5242	0.5600	0.5955	0.6307	0.6657	0.7004	0.7349	0.7692	0.8032
130	0.4535	0.4894	0.5251	0.5606	0.5958	0.6308	0.6655	0.7000	0.7342	0.7683	0.8020
132	0.4573	0.4924	0.5274	0.5622	0.5969	0.6313	0.6655	0.6994	0.7332	0.7667	0.8000
134	0.4619	0.4961	0.5303	0.5644	0.5984	0.6322	0.6658	0.6993	0.7325	0.7655	0.7984
136	0.4675	0.5005	0.5338	0.5671	0.6004	0.6336	0.6666	0.6995	0.7322	0.7648	0.7971
138	0.4740	0.5057	0.5379	0.5704	0.6029	0.6354	0.6679	0.7002	0.7324	0.7644	0.7963
140	0.4816	0.5117	0.5428	0.5743	0.6060	0.6378	0.6696	0.7013	0.7329	0.7644	0.7958
142	0.4902	0.5186	0.5483	0.5788	0.6096	0.6406	0.6717	0.7028	0.7338	0.7648	0.7956
144	0.5001	0.5264	0.5546	0.5839	0.6138	0.6439	0.6743	0.7047	0.7352	0.7656	0.7959
146	0.5112	0.5351	0.5617	0.5897	0.6185	0.6478	0.6774	0.7071	0.7369	0.7667	0.7965
148	0.5234	0.5448	0.5695	0.5961	0.6237	0.6521	0.6809	0.7099	0.7390	0.7682	0.7974
150	0.5366	0.5554	0.5781	0.6031	0.6296	0.6569	0.6848	0.7130	0.7415	0.7701	0.7987

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
127	0.8058	0.8401	0.8741	0.9080	0.9416	0.9751	1.0084	1.0416	1.0745	1.1073	1.1400
128	0.8044	0.8385	0.8723	0.9060	0.9394	0.9727	1.0057	1.0387	1.0714	1.1040	1.1364
129	0.8032	0.8370	0.8706	0.9040	0.9372	0.9703	1.0032	1.0359	1.0684	1.1008	1.1330
130	0.8020	0.8356	0.8690	0.9022	0.9352	0.9680	1.0007	1.0331	1.0655	1.0976	1.1296
132	0.8000	0.8332	0.8661	0.8988	0.9314	0.9638	0.9960	1.0280	1.0599	1.0917	1.1233
134	0.7984	0.8311	0.8635	0.8958	0.9279	0.9599	0.9917	1.0233	1.0548	1.0861	1.1173
136	0.7971	0.8293	0.8614	0.8932	0.9249	0.9564	0.9878	1.0190	1.0500	1.0809	1.1117
138	0.7963	0.8280	0.8595	0.8909	0.9222	0.9533	0.9842	1.0150	1.0456	1.0761	1.1065
140	0.7958	0.8270	0.8581	0.8890	0.9198	0.9505	0.9810	1.0114	1.0416	1.0717	1.1016
142	0.7956	0.8264	0.8570	0.8875	0.9178	0.9480	0.9781	1.0081	1.0379	1.0676	1.0971
144	0.7959	0.8261	0.8562	0.8862	0.9161	0.9459	0.9756	1.0051	1.0345	1.0638	1.0930
146	0.7965	0.8262	0.8558	0.8854	0.9148	0.9441	0.9734	1.0025	1.0315	1.0604	1.0891
148	0.7974	0.8266	0.8557	0.8848	0.9138	0.9427	0.9715	1.0002	1.0287	1.0572	1.0856
150	0.7987	0.8274	0.8560	0.8846	0.9131	0.9415	0.9699	0.9981	1.0263	1.0544	1.0824

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	1.0000	0.9409	0.8779	0.8104	0.7387	0.6647	0.5965	0.5477	0.5258	0.5249	0.5366
155	1.0000	0.9472	0.8917	0.8335	0.7731	0.7122	0.6554	0.6097	0.5814	0.5707	0.5735
160	1.0000	0.9527	0.9036	0.8529	0.8012	0.7500	0.7021	0.6616	0.6327	0.6169	0.6132
165	1.0000	0.9575	0.9139	0.8694	0.8248	0.7810	0.7402	0.7048	0.6776	0.6602	0.6525
170	1.0000	0.9618	0.9229	0.8837	0.8448	0.8070	0.7719	0.7411	0.7163	0.6990	0.6895
175	1.0000	0.9656	0.9308	0.8961	0.8620	0.8291	0.7987	0.7718	0.7497	0.7334	0.7233
180	1.0000	0.9689	0.9378	0.9070	0.8769	0.8482	0.8216	0.7981	0.7785	0.7636	0.7537
185	1.0000	0.9719	0.9440	0.9166	0.8900	0.8647	0.8415	0.8209	0.8036	0.7902	0.7809
190	1.0000	0.9746	0.9496	0.9250	0.9015	0.8792	0.8588	0.8408	0.8255	0.8136	0.8051
195	1.0000	0.9770	0.9545	0.9326	0.9116	0.8920	0.8740	0.8582	0.8448	0.8343	0.8267
200	1.0000	0.9792	0.9589	0.9393	0.9207	0.9033	0.8875	0.8736	0.8619	0.8526	0.8459
205	1.0000	0.9812	0.9629	0.9454	0.9288	0.9134	0.8995	0.8873	0.8770	0.8690	0.8631
210	1.0000	0.9830	0.9665	0.9508	0.9360	0.9224	0.9102	0.8995	0.8906	0.8836	0.8786
215	1.0000	0.9846	0.9698	0.9557	0.9425	0.9305	0.9197	0.9104	0.9027	0.8967	0.8924
220	1.0000	0.9861	0.9727	0.9601	0.9484	0.9378	0.9283	0.9202	0.9135	0.9084	0.9049
225	1.0000	0.9874	0.9754	0.9642	0.9538	0.9444	0.9361	0.9290	0.9233	0.9191	0.9162
230	1.0000	0.9886	0.9779	0.9678	0.9586	0.9503	0.9431	0.9370	0.9322	0.9287	0.9265
235	1.0000	0.9897	0.9801	0.9711	0.9630	0.9557	0.9495	0.9443	0.9402	0.9374	0.9357
240	1.0000	0.9908	0.9821	0.9742	0.9670	0.9607	0.9553	0.9509	0.9475	0.9453	0.9442
245	1.0000	0.9917	0.9840	0.9770	0.9707	0.9652	0.9605	0.9569	0.9542	0.9525	0.9519
250	1.0000	0.9926	0.9857	0.9795	0.9740	0.9693	0.9654	0.9623	0.9602	0.9591	0.9589
255	1.0000	0.9934	0.9873	0.9818	0.9771	0.9730	0.9698	0.9673	0.9658	0.9651	0.9653
260	1.0000	0.9941	0.9887	0.9840	0.9799	0.9765	0.9738	0.9719	0.9709	0.9706	0.9712
265	1.0000	0.9948	0.9901	0.9860	0.9825	0.9796	0.9775	0.9761	0.9755	0.9756	0.9766
270	1.0000	0.9954	0.9913	0.9878	0.9848	0.9826	0.9809	0.9800	0.9798	0.9803	0.9815
275	1.0000	0.9960	0.9924	0.9895	0.9870	0.9852	0.9841	0.9835	0.9837	0.9845	0.9861
280	1.0000	0.9965	0.9935	0.9910	0.9891	0.9877	0.9870	0.9868	0.9873	0.9885	0.9902
285	1.0000	0.9970	0.9945	0.9924	0.9909	0.9900	0.9896	0.9898	0.9906	0.9921	0.9941
290	1.0000	0.9975	0.9954	0.9938	0.9927	0.9921	0.9921	0.9926	0.9937	0.9954	0.9977
295	1.0000	0.9979	0.9962	0.9950	0.9943	0.9941	0.9944	0.9952	0.9966	0.9985	1.0009
300	1.0000	0.9983	0.9970	0.9961	0.9958	0.9959	0.9965	0.9976	0.9992	1.0013	1.0040
310	1.0000	0.9990	0.9984	0.9982	0.9984	0.9991	1.0002	1.0018	1.0039	1.0064	1.0094
320	1.0000	0.9996	0.9996	0.9999	1.0007	1.0019	1.0035	1.0055	1.0079	1.0107	1.0140
330	1.0000	1.0001	1.0006	1.0015	1.0027	1.0043	1.0062	1.0086	1.0113	1.0145	1.0180
340	1.0000	1.0006	1.0015	1.0028	1.0044	1.0064	1.0087	1.0113	1.0143	1.0177	1.0214
350	1.0000	1.0010	1.0023	1.0040	1.0059	1.0082	1.0108	1.0137	1.0169	1.0205	1.0244
360	1.0000	1.0014	1.0030	1.0050	1.0072	1.0097	1.0126	1.0157	1.0191	1.0229	1.0269
370	1.0000	1.0017	1.0036	1.0058	1.0083	1.0111	1.0141	1.0175	1.0211	1.0250	1.0291
380	1.0000	1.0019	1.0041	1.0066	1.0093	1.0123	1.0155	1.0190	1.0227	1.0267	1.0310
390	1.0000	1.0022	1.0046	1.0073	1.0102	1.0133	1.0167	1.0203	1.0242	1.0283	1.0326
400	1.0000	1.0024	1.0050	1.0079	1.0109	1.0142	1.0177	1.0215	1.0254	1.0296	1.0340

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(f) Concluded. Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	0.5366	0.5554	0.5781	0.6031	0.6296	0.6569	0.6848	0.7130	0.7415	0.7701	0.7987
155	0.5735	0.5853	0.6026	0.6234	0.6465	0.6711	0.6966	0.7228	0.7494	0.7763	0.8034
160	0.6132	0.6186	0.6306	0.6470	0.6664	0.6880	0.7109	0.7348	0.7595	0.7846	0.8101
165	0.6525	0.6532	0.6606	0.6728	0.6887	0.7071	0.7274	0.7490	0.7715	0.7948	0.8186
170	0.6895	0.6872	0.6910	0.6998	0.7124	0.7278	0.7455	0.7647	0.7852	0.8066	0.8287
175	0.7233	0.7193	0.7207	0.7267	0.7366	0.7494	0.7646	0.7816	0.8001	0.8196	0.8400
180	0.7537	0.7489	0.7488	0.7529	0.7605	0.7712	0.7842	0.7992	0.8157	0.8335	0.8522
185	0.7809	0.7758	0.7749	0.7776	0.7837	0.7925	0.8038	0.8170	0.8318	0.8479	0.8651
190	0.8051	0.8002	0.7988	0.8007	0.8056	0.8131	0.8229	0.8345	0.8478	0.8625	0.8783
195	0.8267	0.8221	0.8207	0.8221	0.8261	0.8326	0.8412	0.8516	0.8636	0.8770	0.8915
200	0.8459	0.8419	0.8405	0.8416	0.8452	0.8509	0.8586	0.8680	0.8790	0.8912	0.9046
205	0.8631	0.8596	0.8585	0.8595	0.8628	0.8679	0.8749	0.8836	0.8936	0.9049	0.9174
210	0.8786	0.8756	0.8747	0.8759	0.8789	0.8837	0.8902	0.8982	0.9075	0.9181	0.9297
215	0.8924	0.8901	0.8895	0.8907	0.8937	0.8983	0.9044	0.9119	0.9206	0.9305	0.9414
220	0.9049	0.9031	0.9029	0.9043	0.9073	0.9117	0.9175	0.9246	0.9329	0.9422	0.9525
225	0.9162	0.9149	0.9150	0.9166	0.9197	0.9240	0.9296	0.9364	0.9443	0.9532	0.9630
230	0.9265	0.9256	0.9261	0.9279	0.9310	0.9353	0.9408	0.9474	0.9550	0.9635	0.9729
235	0.9357	0.9353	0.9362	0.9382	0.9414	0.9457	0.9511	0.9575	0.9649	0.9731	0.9821
240	0.9442	0.9442	0.9453	0.9476	0.9509	0.9553	0.9606	0.9669	0.9741	0.9820	0.9907
245	0.9519	0.9523	0.9537	0.9562	0.9596	0.9640	0.9694	0.9755	0.9825	0.9903	0.9988
250	0.9589	0.9597	0.9614	0.9640	0.9676	0.9721	0.9774	0.9835	0.9904	0.9980	1.0062
255	0.9653	0.9664	0.9684	0.9713	0.9750	0.9795	0.9848	0.9909	0.9976	1.0051	1.0131
260	0.9712	0.9726	0.9748	0.9779	0.9817	0.9863	0.9916	0.9977	1.0043	1.0117	1.0196
265	0.9766	0.9783	0.9807	0.9839	0.9879	0.9926	0.9979	1.0039	1.0105	1.0177	1.0255
270	0.9815	0.9835	0.9861	0.9895	0.9936	0.9983	1.0037	1.0097	1.0163	1.0234	1.0310
275	0.9861	0.9883	0.9911	0.9947	0.9988	1.0036	1.0090	1.0150	1.0215	1.0286	1.0361
280	0.9902	0.9927	0.9957	0.9994	1.0037	1.0085	1.0140	1.0199	1.0264	1.0334	1.0408
285	0.9941	0.9967	1.0000	1.0038	1.0081	1.0131	1.0185	1.0245	1.0309	1.0378	1.0452
290	0.9977	1.0005	1.0039	1.0078	1.0123	1.0172	1.0227	1.0287	1.0351	1.0420	1.0492
295	1.0009	1.0039	1.0075	1.0115	1.0160	1.0211	1.0266	1.0326	1.0390	1.0458	1.0530
300	1.0040	1.0071	1.0108	1.0149	1.0196	1.0246	1.0302	1.0361	1.0425	1.0493	1.0564
310	1.0094	1.0128	1.0167	1.0210	1.0258	1.0310	1.0365	1.0425	1.0488	1.0555	1.0626
320	1.0140	1.0177	1.0218	1.0263	1.0311	1.0364	1.0420	1.0479	1.0542	1.0609	1.0678
330	1.0180	1.0219	1.0261	1.0307	1.0357	1.0410	1.0466	1.0526	1.0589	1.0654	1.0722
340	1.0214	1.0255	1.0299	1.0346	1.0396	1.0450	1.0506	1.0566	1.0628	1.0693	1.0760
350	1.0244	1.0286	1.0331	1.0379	1.0430	1.0484	1.0540	1.0599	1.0661	1.0726	1.0792
360	1.0269	1.0312	1.0358	1.0407	1.0459	1.0513	1.0569	1.0628	1.0690	1.0753	1.0819
370	1.0291	1.0335	1.0382	1.0431	1.0483	1.0537	1.0594	1.0653	1.0714	1.0777	1.0842
380	1.0310	1.0355	1.0402	1.0452	1.0504	1.0558	1.0615	1.0673	1.0734	1.0796	1.0861
390	1.0326	1.0372	1.0420	1.0470	1.0522	1.0576	1.0633	1.0691	1.0751	1.0813	1.0876
400	1.0340	1.0387	1.0435	1.0485	1.0537	1.0592	1.0648	1.0705	1.0765	1.0826	1.0889

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	0.7987	0.8274	0.8560	0.8846	0.9131	0.9415	0.9699	0.9981	1.0263	1.0544	1.0824
155	0.8034	0.8307	0.8580	0.8853	0.9126	0.9399	0.9672	0.9944	1.0216	1.0486	1.0757
160	0.8101	0.8359	0.8618	0.8878	0.9139	0.9401	0.9662	0.9924	1.0185	1.0446	1.0706
165	0.8186	0.8428	0.8673	0.8920	0.9169	0.9418	0.9668	0.9919	1.0170	1.0421	1.0671
170	0.8287	0.8513	0.8743	0.8977	0.9212	0.9450	0.9689	0.9928	1.0169	1.0410	1.0651
175	0.8400	0.8610	0.8826	0.9046	0.9269	0.9494	0.9722	0.9950	1.0180	1.0411	1.0642
180	0.8522	0.8717	0.8919	0.9125	0.9335	0.9549	0.9765	0.9983	1.0203	1.0424	1.0645
185	0.8651	0.8831	0.9019	0.9212	0.9411	0.9612	0.9817	1.0025	1.0235	1.0446	1.0658
190	0.8783	0.8950	0.9124	0.9306	0.9492	0.9683	0.9877	1.0074	1.0274	1.0476	1.0679
195	0.8915	0.9070	0.9233	0.9402	0.9578	0.9758	0.9942	1.0129	1.0320	1.0512	1.0707
200	0.9046	0.9190	0.9342	0.9501	0.9666	0.9836	1.0010	1.0189	1.0370	1.0554	1.0740
205	0.9174	0.9308	0.9450	0.9599	0.9755	0.9916	1.0081	1.0251	1.0424	1.0599	1.0777
210	0.9297	0.9422	0.9556	0.9696	0.9843	0.9996	1.0153	1.0314	1.0479	1.0647	1.0818
215	0.9414	0.9532	0.9658	0.9791	0.9931	1.0075	1.0225	1.0379	1.0536	1.0697	1.0860
220	0.9525	0.9637	0.9756	0.9883	1.0015	1.0153	1.0296	1.0443	1.0593	1.0747	1.0904
225	0.9630	0.9737	0.9850	0.9971	1.0097	1.0229	1.0365	1.0506	1.0650	1.0798	1.0948
230	0.9729	0.9831	0.9939	1.0054	1.0175	1.0301	1.0432	1.0567	1.0705	1.0847	1.0992
235	0.9821	0.9919	1.0023	1.0134	1.0250	1.0371	1.0496	1.0626	1.0759	1.0896	1.1035
240	0.9907	1.0002	1.0102	1.0208	1.0320	1.0437	1.0558	1.0683	1.0811	1.0943	1.1078
245	0.9988	1.0079	1.0176	1.0279	1.0387	1.0499	1.0616	1.0737	1.0861	1.0988	1.1118
250	1.0062	1.0151	1.0245	1.0345	1.0449	1.0558	1.0671	1.0788	1.0908	1.1031	1.1158
255	1.0131	1.0218	1.0310	1.0406	1.0508	1.0614	1.0723	1.0836	1.0953	1.1073	1.1195
260	1.0196	1.0280	1.0370	1.0464	1.0563	1.0665	1.0772	1.0882	1.0995	1.1112	1.1230
265	1.0255	1.0338	1.0425	1.0517	1.0614	1.0714	1.0818	1.0925	1.1035	1.1148	1.1264
270	1.0310	1.0391	1.0477	1.0567	1.0661	1.0759	1.0861	1.0965	1.1072	1.1183	1.1295
275	1.0361	1.0441	1.0525	1.0614	1.0706	1.0801	1.0900	1.1002	1.1107	1.1215	1.1325
280	1.0408	1.0487	1.0570	1.0657	1.0747	1.0841	1.0937	1.1037	1.1140	1.1245	1.1352
285	1.0452	1.0530	1.0611	1.0696	1.0785	1.0877	1.0972	1.1070	1.1170	1.1273	1.1378
290	1.0492	1.0569	1.0649	1.0733	1.0820	1.0911	1.1004	1.1100	1.1198	1.1298	1.1401
295	1.0530	1.0605	1.0685	1.0767	1.0853	1.0942	1.1033	1.1127	1.1224	1.1322	1.1423
300	1.0564	1.0639	1.0717	1.0799	1.0883	1.0971	1.1060	1.1153	1.1248	1.1344	1.1443
310	1.0626	1.0699	1.0776	1.0855	1.0937	1.1022	1.1109	1.1198	1.1290	1.1383	1.1479
320	1.0678	1.0750	1.0825	1.0902	1.0983	1.1065	1.1150	1.1236	1.1325	1.1416	1.1508
330	1.0722	1.0793	1.0867	1.0943	1.1021	1.1101	1.1184	1.1268	1.1354	1.1442	1.1532
340	1.0760	1.0830	1.0902	1.0977	1.1053	1.1132	1.1212	1.1294	1.1378	1.1464	1.1551
350	1.0792	1.0861	1.0932	1.1005	1.1080	1.1157	1.1236	1.1316	1.1398	1.1481	1.1566
360	1.0819	1.0887	1.0957	1.1029	1.1102	1.1178	1.1255	1.1333	1.1413	1.1494	1.1577
370	1.0842	1.0909	1.0978	1.1048	1.1121	1.1194	1.1270	1.1347	1.1425	1.1504	1.1585
380	1.0861	1.0927	1.0995	1.1064	1.1135	1.1208	1.1282	1.1357	1.1433	1.1511	1.1590
390	1.0876	1.0942	1.1009	1.1077	1.1147	1.1218	1.1291	1.1364	1.1439	1.1516	1.1593
400	1.0889	1.0954	1.1020	1.1087	1.1156	1.1226	1.1297	1.1369	1.1443	1.1518	1.1593

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(g) Plenum enthalpy, H_0/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	858.19	846.73	834.22	820.34	------	------	------	------	------	------	------
101	861.68	850.42	838.17	824.64	809.33	------	------	------	------	------	------
102	865.18	854.11	842.11	828.91	814.08	------	------	------	------	------	------
103	868.68	857.80	846.03	833.15	818.77	------	------	------	------	------	------
104	872.18	861.48	849.94	837.36	823.41	807.51	------	------	------	------	------
105	875.68	865.15	853.84	841.55	827.99	812.67	------	------	------	------	------
106	879.17	868.82	857.73	845.71	832.52	817.73	------	------	------	------	------
107	882.67	872.49	861.60	849.85	837.01	822.71	806.34	------	------	------	------
108	886.17	876.15	865.46	853.97	841.46	827.61	811.91	------	------	------	------
109	889.67	879.81	869.32	858.07	845.87	832.44	817.35	------	------	------	------
110	893.17	883.46	873.16	862.14	850.24	837.21	822.68	805.98	------	------	------
111	896.66	887.11	876.99	866.20	854.58	841.93	827.90	811.96	------	------	------
112	900.16	890.76	880.82	870.24	858.90	846.59	833.03	817.77	799.99	------	------
113	903.66	894.40	884.64	874.27	863.18	851.20	838.07	823.43	806.60	------	------
114	907.16	898.04	888.44	878.28	867.43	855.76	843.05	828.96	812.96	794.03	------
115	910.66	901.68	892.24	882.27	871.66	860.28	847.95	834.37	819.11	801.36	------
116	914.16	905.31	896.04	886.25	875.87	864.77	852.78	839.67	825.07	808.33	788.22
117	917.65	908.95	899.82	890.22	880.05	869.21	857.56	844.89	830.87	815.01	796.36
118	921.15	912.57	903.60	894.17	884.21	873.63	862.29	850.01	836.54	821.44	804.01
119	924.65	916.20	907.37	898.11	888.35	878.01	866.96	855.06	842.08	827.66	811.25
120	928.15	919.82	911.13	902.04	892.47	882.36	871.59	860.04	847.50	833.70	818.17
121	931.65	923.44	914.89	905.95	896.57	886.68	876.18	864.95	852.83	839.58	824.82
122	935.14	927.06	918.64	909.86	900.66	890.97	880.73	869.81	858.07	845.31	831.24
123	938.64	930.67	922.39	913.76	904.73	895.24	885.23	874.60	863.22	850.93	837.46
124	942.14	934.28	926.13	917.64	908.78	899.49	889.71	879.35	868.30	856.43	843.51
125	945.64	937.89	929.86	921.52	912.82	903.71	894.15	884.05	873.31	861.82	849.40
126	949.14	941.50	933.59	925.38	916.84	907.91	898.56	888.70	878.26	867.13	855.16
127	952.64	945.10	937.31	929.24	920.84	912.09	902.93	893.31	883.15	872.35	860.80
128	956.13	948.71	941.03	933.09	924.84	916.25	907.28	897.88	887.98	877.50	866.33
129	959.63	952.31	944.75	936.93	928.82	920.39	911.61	902.42	892.76	882.57	871.76
130	963.13	955.91	948.46	940.76	932.79	924.52	915.91	906.92	897.50	887.58	877.09
132	970.13	963.10	955.86	948.40	940.69	932.71	924.44	915.82	906.84	897.43	887.53
134	977.12	970.28	963.25	956.01	948.55	940.85	932.88	924.61	916.02	907.06	897.69
136	984.12	977.46	970.62	963.60	956.37	948.93	941.24	933.30	925.06	916.51	907.60
138	991.12	984.63	977.98	971.16	964.15	956.95	949.53	941.88	933.98	925.80	917.31
140	998.11	991.79	985.32	978.69	971.90	964.93	957.76	950.39	942.79	934.94	926.83
142	1005.11	998.95	992.65	986.20	979.61	972.85	965.93	958.81	951.49	943.96	936.20
144	1012.11	1006.10	999.96	993.70	987.29	980.74	974.03	967.16	960.11	952.86	945.41
146	1019.10	1013.24	1007.27	1001.17	994.95	988.59	982.09	975.44	968.64	961.66	954.50
148	1026.10	1020.38	1014.56	1008.62	1002.57	996.40	990.10	983.67	977.09	970.36	963.47
150	1033.10	1027.52	1021.84	1016.06	1010.18	1004.18	998.07	991.83	985.47	978.97	972.33

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
116	788.22	------	------	------	------	------	------	------	------	------	------
117	796.36	------	------	------	------	------	------	------	------	------	------
118	804.01	------	------	------	------	------	------	------	------	------	------
119	811.25	------	------	------	------	------	------	------	------	------	------
120	818.17	763.78	------	------	------	------	------	------	------	------	------
121	824.82	775.66	------	------	------	------	------	------	------	------	------
122	831.24	786.06	------	------	------	------	------	------	------	------	------
123	837.46	795.46	------	------	------	------	------	------	------	------	------
124	843.51	804.14	737.03	------	------	------	------	------	------	------	------
125	849.40	812.27	755.30	------	------	------	------	------	------	------	------
126	855.16	819.95	769.48	------	------	------	------	------	------	------	------
127	860.80	827.27	781.51	667.83	520.10	503.56	493.71	486.81	481.62	477.54	474.25
128	866.33	834.29	792.17	718.63	544.60	519.89	507.26	498.89	492.76	488.03	484.26
129	871.76	841.05	801.87	741.64	581.36	538.49	521.80	511.53	504.26	498.76	494.43
130	877.09	847.60	810.85	758.56	643.42	560.56	537.63	524.84	516.17	509.76	504.79
132	887.53	860.13	827.25	784.61	719.58	621.32	574.78	554.09	541.52	532.76	526.18
134	897.69	872.06	842.14	805.45	756.61	686.83	621.32	587.95	569.46	557.38	548.68
136	907.60	883.49	855.95	823.41	783.10	730.97	671.13	626.62	600.44	583.94	572.48
138	917.31	894.53	868.94	839.52	804.67	762.37	713.06	666.87	634.02	612.47	597.69
140	926.83	905.22	881.29	854.32	823.36	787.29	746.05	703.79	668.27	642.44	624.18
142	936.20	915.63	893.12	868.15	840.13	808.40	772.90	735.50	700.78	672.64	651.44
144	945.41	925.79	904.51	881.23	855.53	827.04	795.72	762.57	730.19	701.72	678.70
146	954.50	935.73	915.55	893.69	869.90	843.94	815.80	786.10	756.37	728.82	705.16
148	963.47	945.48	926.27	905.66	883.46	859.54	833.91	806.99	779.75	753.68	730.25
150	972.33	955.06	936.73	917.20	896.37	874.14	850.55	825.90	800.83	776.40	753.72

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$						
	70	75	80	85	90	95	100
127	474.25	471.56	469.33	467.48	465.93	464.63	463.55
128	484.26	481.19	478.65	476.54	474.78	473.30	472.06
129	494.43	490.93	488.05	485.66	483.66	481.98	480.57
130	504.79	500.80	497.54	494.85	492.59	490.70	489.10
132	526.18	521.03	516.88	513.48	510.64	508.26	506.26
134	548.68	542.04	536.79	532.52	529.00	526.06	523.58
136	572.48	563.97	557.36	552.07	547.74	544.14	541.11
138	597.69	586.92	578.70	572.19	566.91	562.56	558.91
140	624.18	610.87	600.80	592.91	586.56	581.35	577.00
142	651.44	635.63	623.60	614.19	606.66	600.51	595.39
144	678.70	660.79	646.89	635.95	627.17	620.01	614.08
146	705.16	685.83	670.36	657.99	648.00	639.81	633.02
148	730.25	710.23	693.66	680.09	668.97	659.80	652.15
150	753.72	733.62	716.42	701.96	689.91	679.84	671.39

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(g) Continued. Plenum enthalpy, H_o/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
127	463.55	461.94	460.89	460.31	460.09	460.17	460.52	461.08	461.83	462.75	463.81
128	472.06	470.17	468.92	468.16	467.79	467.76	467.99	468.46	469.13	469.97	470.97
129	480.57	478.41	476.93	475.98	475.47	475.30	475.42	475.79	476.37	477.14	478.07
130	489.10	486.64	484.92	483.78	483.11	482.80	482.81	483.08	483.57	484.26	485.12
132	506.26	503.12	500.89	499.34	498.32	497.73	497.49	497.54	497.85	498.37	499.08
134	523.58	519.69	516.88	514.87	513.47	512.57	512.06	511.89	512.00	512.34	512.90
136	541.11	536.37	532.92	530.40	528.60	527.36	526.57	526.15	526.04	526.20	526.59
138	558.91	553.21	549.04	545.97	543.73	542.12	541.03	540.35	540.02	539.98	540.19
140	577.00	570.23	565.28	561.61	558.88	556.88	555.46	554.51	553.94	553.69	553.72
142	595.39	587.45	581.64	577.32	574.08	571.66	569.89	568.65	567.82	567.36	567.20
144	614.08	604.87	598.15	593.12	589.33	586.47	584.34	582.78	581.69	581.00	580.63
146	633.02	622.48	614.79	609.02	604.65	601.32	598.80	596.92	595.55	594.62	594.04
148	652.15	640.26	631.55	625.02	620.04	616.22	613.29	611.07	609.41	608.23	607.44
150	671.39	658.16	648.43	641.10	635.49	631.16	627.81	625.24	623.28	621.84	620.82

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
127	463.81	465.00	466.30	467.71	469.21	470.80	472.46	474.19	475.99	477.84	479.76
128	470.97	472.10	473.35	474.70	476.16	477.70	479.33	481.02	482.79	484.61	486.49
129	478.07	479.13	480.33	481.64	483.05	484.55	486.13	487.79	489.52	491.31	493.17
130	485.12	486.12	487.26	488.51	489.87	491.33	492.87	494.50	496.19	497.95	499.78
132	499.08	499.95	500.97	502.12	503.38	504.75	506.20	507.75	509.37	511.07	512.83
134	512.90	513.63	514.52	515.55	516.71	517.98	519.35	520.82	522.37	523.99	525.69
136	526.59	527.18	527.94	528.85	529.90	531.07	532.35	533.73	535.20	536.75	538.38
138	540.19	540.62	541.24	542.03	542.97	544.03	545.22	546.51	547.90	549.38	550.94
140	553.72	553.99	554.46	555.12	555.94	556.89	557.98	559.18	560.49	561.89	563.38
142	567.20	567.29	567.62	568.14	568.83	569.68	570.66	571.77	572.99	574.31	575.72
144	580.63	580.55	580.72	581.09	581.66	582.39	583.27	584.28	585.41	586.65	587.98
146	594.04	593.78	593.78	594.01	594.44	595.05	595.82	596.73	597.76	598.92	600.17
148	607.44	606.98	606.81	606.89	607.18	607.67	608.32	609.13	610.07	611.14	612.31
150	620.82	620.17	619.82	619.74	619.89	620.25	620.79	621.49	622.33	623.31	624.40

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	1033.10	1004.18	972.33	936.73	896.37	850.55	800.83	753.72	716.42	689.91	671.39
155	1050.59	1023.49	994.08	961.90	926.47	887.64	846.33	805.55	769.57	740.89	719.22
160	1068.08	1042.62	1015.34	985.96	954.30	920.41	884.94	849.54	816.65	788.35	765.35
165	1085.57	1061.61	1036.19	1009.18	980.53	950.37	919.19	888.03	858.37	831.65	808.74
170	1103.06	1080.47	1056.70	1031.73	1005.55	978.34	950.48	922.68	895.89	871.11	849.07
175	1120.56	1099.21	1076.93	1053.72	1029.63	1004.82	979.63	954.54	930.21	907.35	886.52
180	1138.05	1117.85	1096.91	1075.25	1052.95	1030.17	1007.16	984.31	962.08	940.99	921.45
185	1155.54	1136.41	1116.68	1096.40	1075.66	1054.60	1033.43	1012.46	992.04	972.53	954.26
190	1173.03	1154.88	1136.26	1117.22	1097.85	1078.28	1058.70	1039.34	1020.47	1002.37	985.29
195	1190.53	1173.28	1155.67	1137.75	1119.61	1101.35	1083.15	1065.18	1047.66	1030.81	1014.84
200	1208.02	1191.62	1174.94	1158.04	1140.99	1123.90	1106.90	1090.16	1073.84	1058.11	1043.13
205	1225.51	1209.91	1194.08	1178.10	1162.04	1146.00	1130.08	1114.42	1099.16	1084.43	1070.37
210	1243.01	1228.14	1213.11	1197.98	1182.82	1167.71	1152.76	1138.07	1123.75	1109.93	1096.71
215	1260.50	1246.32	1232.03	1217.68	1203.34	1189.09	1175.01	1161.19	1147.73	1134.73	1122.27
220	1277.99	1264.46	1250.85	1237.23	1223.65	1210.17	1196.88	1183.85	1171.17	1158.91	1147.15
225	1295.49	1282.56	1269.60	1256.64	1243.76	1230.99	1218.43	1206.12	1194.15	1182.57	1171.45
230	1312.98	1300.62	1288.26	1275.93	1263.69	1251.58	1239.68	1228.03	1216.71	1205.75	1195.23
235	1330.47	1318.66	1306.85	1295.11	1283.46	1271.96	1260.67	1249.63	1238.90	1228.53	1218.55
240	1347.97	1336.66	1325.38	1314.18	1303.09	1292.16	1281.43	1270.96	1260.78	1250.93	1241.46
245	1365.46	1354.63	1343.85	1333.16	1322.59	1312.18	1301.98	1292.03	1282.36	1273.01	1264.01
250	1382.95	1372.58	1362.27	1352.05	1341.97	1332.05	1322.34	1312.87	1303.68	1294.79	1286.23
255	1400.45	1390.50	1380.63	1370.87	1361.24	1351.78	1342.53	1333.51	1324.76	1316.30	1308.16
260	1417.94	1408.41	1398.95	1389.61	1380.41	1371.39	1362.56	1353.97	1345.63	1337.57	1329.81
265	1435.44	1426.29	1417.23	1408.29	1399.50	1390.88	1382.45	1374.26	1366.31	1358.62	1351.23
270	1452.94	1444.15	1435.47	1426.91	1418.49	1410.25	1402.21	1394.39	1386.80	1379.47	1372.42
275	1470.43	1462.00	1453.67	1445.47	1437.42	1429.54	1421.85	1414.38	1407.13	1400.14	1393.41
280	1487.93	1479.83	1471.84	1463.98	1456.27	1448.73	1441.38	1434.23	1427.32	1420.64	1414.21
285	1505.43	1497.65	1489.98	1482.44	1475.05	1467.83	1460.80	1453.97	1447.36	1440.98	1434.84
290	1522.93	1515.45	1508.09	1500.86	1493.78	1486.86	1480.13	1473.60	1467.28	1461.18	1455.32
295	1540.43	1533.24	1526.17	1519.23	1512.44	1505.82	1499.38	1493.13	1487.08	1481.25	1475.64
300	1557.94	1551.02	1544.23	1537.57	1531.06	1524.71	1518.54	1512.56	1506.77	1501.20	1495.84
310	1592.95	1586.55	1580.28	1574.14	1568.14	1562.31	1556.64	1551.16	1545.86	1540.75	1535.85
320	1627.96	1622.05	1616.25	1610.58	1605.06	1599.69	1594.49	1589.45	1584.60	1579.92	1575.44
330	1662.99	1657.51	1652.15	1646.92	1641.84	1636.89	1632.11	1627.49	1623.03	1618.75	1614.64
340	1698.03	1692.96	1688.00	1683.17	1678.48	1673.93	1669.53	1665.29	1661.20	1657.28	1653.52
350	1733.09	1728.39	1723.80	1719.35	1715.02	1710.83	1706.79	1702.89	1699.14	1695.55	1692.12
360	1768.16	1763.81	1759.57	1755.45	1751.47	1747.61	1743.89	1740.32	1736.88	1733.60	1730.46
370	1803.25	1799.22	1795.30	1791.51	1787.83	1784.29	1780.87	1777.59	1774.45	1771.45	1768.58
380	1838.36	1834.64	1831.02	1827.52	1824.14	1820.88	1817.74	1814.74	1811.87	1809.13	1806.52
390	1873.50	1870.06	1866.72	1863.49	1860.38	1857.39	1854.52	1851.77	1849.15	1846.66	1844.29
400	1908.67	1905.49	1902.42	1899.45	1896.59	1893.85	1891.22	1888.72	1886.33	1884.06	1881.92

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(g) Concluded. Plenum enthalpy, H_o/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	671.39	658.16	648.43	641.10	635.49	631.16	627.81	625.24	623.28	621.84	620.82
155	719.22	703.04	690.85	681.54	674.33	668.68	664.24	660.74	658.01	655.89	654.28
160	765.35	747.23	733.08	722.00	713.26	706.32	700.77	696.34	692.79	689.97	687.74
165	808.74	789.77	774.36	761.93	751.91	743.80	737.23	731.89	727.55	724.03	721.19
170	849.07	830.10	814.13	800.86	789.89	780.85	773.39	767.23	762.16	757.97	754.54
175	886.52	868.07	852.08	838.42	826.87	817.16	809.01	802.18	796.46	791.68	787.71
180	921.45	903.79	888.13	874.46	862.65	852.53	843.89	836.54	830.31	825.03	820.57
185	954.26	937.50	922.38	908.94	897.12	886.82	877.89	870.18	863.56	857.88	853.03
190	985.29	969.46	954.98	941.93	930.28	919.98	910.92	903.01	896.13	890.15	884.99
195	1014.84	999.90	986.11	973.54	962.18	952.01	942.97	934.98	927.94	921.77	916.39
200	1043.13	1029.05	1015.95	1003.90	992.91	982.97	974.04	966.06	958.97	952.70	947.17
205	1070.37	1057.09	1044.66	1033.15	1022.56	1012.91	1004.17	996.29	989.22	982.92	977.32
210	1096.71	1084.17	1072.39	1061.40	1051.25	1041.92	1033.41	1025.68	1018.71	1012.43	1006.82
215	1122.27	1110.42	1099.24	1088.78	1079.06	1070.08	1061.83	1054.30	1047.45	1041.26	1035.67
220	1147.15	1135.94	1125.34	1115.39	1106.09	1097.46	1089.50	1082.19	1075.50	1069.42	1063.91
225	1171.45	1160.84	1150.78	1141.30	1132.41	1124.14	1116.47	1109.40	1102.90	1096.96	1091.55
230	1195.23	1185.17	1175.61	1166.59	1158.11	1150.18	1142.81	1135.99	1129.69	1123.91	1118.62
235	1218.55	1209.00	1199.92	1191.33	1183.24	1175.65	1168.57	1162.00	1155.92	1150.31	1145.16
240	1241.46	1232.39	1223.76	1215.57	1207.85	1200.59	1193.81	1187.48	1181.62	1176.19	1171.20
245	1264.01	1255.39	1247.17	1239.37	1232.00	1225.06	1218.56	1212.49	1206.84	1201.60	1196.76
250	1286.23	1278.03	1270.21	1262.77	1255.73	1249.10	1242.87	1237.05	1231.61	1226.56	1221.89
255	1308.16	1300.35	1292.89	1285.80	1279.09	1272.75	1266.78	1261.20	1255.98	1251.12	1246.61
260	1329.81	1322.38	1315.27	1308.51	1302.09	1296.03	1290.33	1284.97	1279.96	1275.29	1270.95
265	1351.23	1344.14	1337.36	1330.91	1324.78	1318.99	1313.53	1308.40	1303.59	1299.11	1294.94
270	1372.42	1365.66	1359.19	1353.03	1347.18	1341.64	1336.42	1331.51	1326.90	1322.60	1318.59
275	1393.41	1386.95	1380.78	1374.90	1369.31	1364.02	1359.03	1354.32	1349.91	1345.79	1341.94
280	1414.21	1408.05	1402.16	1396.54	1391.20	1386.14	1381.37	1376.87	1372.64	1368.69	1365.00
285	1434.84	1428.96	1423.33	1417.96	1412.86	1408.03	1403.46	1399.16	1395.12	1391.33	1387.80
290	1455.32	1449.69	1444.32	1439.19	1434.31	1429.70	1425.33	1421.22	1417.35	1413.73	1410.35
295	1475.64	1470.27	1465.13	1460.23	1455.58	1451.16	1446.99	1443.06	1439.36	1435.90	1432.66
300	1495.84	1490.70	1485.79	1481.11	1476.66	1472.44	1468.45	1464.69	1461.16	1457.85	1454.76
310	1535.85	1531.16	1526.67	1522.39	1518.33	1514.48	1510.85	1507.42	1504.20	1501.18	1498.36
320	1575.44	1571.14	1567.04	1563.14	1559.43	1555.92	1552.61	1549.49	1546.56	1543.81	1541.25
330	1614.64	1610.72	1606.97	1603.41	1600.03	1596.84	1593.82	1590.98	1588.32	1585.84	1583.52
340	1653.52	1649.93	1646.52	1643.27	1640.19	1637.29	1634.55	1631.98	1629.57	1627.32	1625.23
350	1692.12	1688.84	1685.72	1682.77	1679.97	1677.33	1674.85	1672.53	1670.35	1668.33	1666.46
360	1730.46	1727.47	1724.63	1721.95	1719.41	1717.02	1714.78	1712.69	1710.73	1708.92	1707.25
370	1768.58	1765.86	1763.29	1760.85	1758.55	1756.40	1754.38	1752.50	1750.76	1749.15	1747.66
380	1806.52	1804.05	1801.71	1799.51	1797.44	1795.50	1793.69	1792.01	1790.46	1789.04	1787.73
390	1844.29	1842.05	1839.94	1837.95	1836.09	1834.36	1832.75	1831.26	1829.89	1828.64	1827.50
400	1881.92	1879.89	1877.99	1876.21	1874.54	1873.00	1871.57	1870.26	1869.07	1867.98	1867.01

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	620.82	620.17	619.82	619.74	619.89	620.25	620.79	621.49	622.33	623.31	624.40
155	654.28	653.11	652.30	651.81	651.59	651.61	651.85	652.27	652.86	653.60	654.48
160	687.74	686.03	684.74	683.82	683.21	682.88	682.80	682.93	683.26	683.75	684.41
165	721.19	718.92	717.14	715.78	714.78	714.10	713.69	713.52	713.57	713.82	714.23
170	754.54	751.74	749.48	747.69	746.29	745.25	744.51	744.04	743.81	743.80	743.99
175	787.71	784.41	781.69	779.47	777.70	776.30	775.24	774.48	773.98	773.71	773.66
180	820.57	816.82	813.69	811.09	808.95	807.22	805.85	804.80	804.04	803.53	803.25
185	853.03	848.90	845.40	842.45	839.98	837.95	836.29	834.97	833.96	833.21	832.71
190	884.99	880.55	876.74	873.49	870.74	868.43	866.51	864.95	863.70	862.73	862.02
195	916.39	911.71	907.65	904.16	901.16	898.61	896.47	894.68	893.22	892.06	891.16
200	947.17	942.32	938.08	934.39	931.20	928.45	926.11	924.13	922.49	921.14	920.07
205	977.32	972.36	967.99	964.16	960.81	957.91	955.40	953.27	951.46	949.96	948.74
210	1006.82	1001.81	997.36	993.43	989.97	986.95	984.32	982.05	980.12	978.48	977.13
215	1035.67	1030.66	1026.18	1022.20	1018.67	1015.56	1012.84	1010.47	1008.43	1006.69	1005.22
220	1063.91	1058.93	1054.46	1050.46	1046.89	1043.73	1040.94	1038.50	1036.38	1034.56	1033.00
225	1091.55	1086.64	1082.21	1078.22	1074.64	1071.46	1068.63	1066.14	1063.96	1062.08	1060.46
230	1118.62	1113.81	1109.43	1105.48	1101.93	1098.74	1095.90	1093.39	1091.18	1089.24	1087.58
235	1145.16	1140.45	1136.16	1132.27	1128.76	1125.59	1122.76	1120.24	1118.01	1116.06	1114.36
240	1171.20	1166.61	1162.42	1158.61	1155.15	1152.02	1149.21	1146.71	1144.48	1142.52	1140.80
245	1196.76	1192.31	1188.23	1184.51	1181.11	1178.04	1175.28	1172.79	1170.58	1168.63	1166.91
250	1221.89	1217.58	1213.62	1209.99	1206.68	1203.68	1200.96	1198.52	1196.33	1194.40	1192.69
255	1246.61	1242.45	1238.61	1235.09	1231.87	1228.94	1226.28	1223.89	1221.74	1219.83	1218.15
260	1270.95	1266.93	1263.22	1259.81	1256.69	1253.84	1251.26	1248.92	1246.82	1244.95	1243.30
265	1294.94	1291.06	1287.49	1284.19	1281.17	1278.41	1275.90	1273.63	1271.59	1269.76	1268.14
270	1318.59	1314.87	1311.42	1308.25	1305.33	1302.66	1300.23	1298.03	1296.05	1294.27	1292.70
275	1341.94	1338.36	1335.05	1331.99	1329.18	1326.61	1324.26	1322.14	1320.22	1318.50	1316.97
280	1365.00	1361.57	1358.39	1355.45	1352.75	1350.27	1348.01	1345.96	1344.11	1342.46	1340.98
285	1387.80	1384.51	1381.46	1378.64	1376.05	1373.67	1371.50	1369.52	1367.75	1366.15	1364.74
290	1410.35	1407.20	1404.28	1401.57	1399.09	1396.81	1394.72	1392.83	1391.13	1389.60	1388.25
295	1432.66	1429.65	1426.85	1424.27	1421.89	1419.71	1417.71	1415.91	1414.28	1412.82	1411.52
300	1454.76	1451.88	1449.21	1446.74	1444.47	1442.38	1440.48	1438.75	1437.20	1435.81	1434.58
310	1498.36	1495.74	1493.31	1491.06	1489.00	1487.10	1485.38	1483.82	1482.42	1481.17	1480.07
320	1541.25	1538.88	1536.67	1534.64	1532.77	1531.07	1529.52	1528.12	1526.87	1525.77	1524.79
330	1583.52	1581.37	1579.38	1577.56	1575.88	1574.36	1572.98	1571.74	1570.64	1569.67	1568.83
340	1625.23	1623.30	1621.52	1619.89	1618.40	1617.05	1615.83	1614.75	1613.79	1612.96	1612.25
350	1666.46	1664.73	1663.14	1661.69	1660.38	1659.20	1658.14	1657.20	1656.39	1655.69	1655.11
360	1707.25	1705.72	1704.31	1703.04	1701.89	1700.87	1699.96	1699.17	1698.49	1697.92	1697.46
370	1747.66	1746.31	1745.08	1743.97	1742.98	1742.11	1741.35	1740.69	1740.15	1739.70	1739.36
380	1787.73	1786.55	1785.49	1784.54	1783.70	1782.97	1782.34	1781.82	1781.40	1781.08	1780.85
390	1827.50	1826.48	1825.57	1824.77	1824.08	1823.48	1822.99	1822.60	1822.30	1822.09	1821.97
400	1867.01	1866.14	1865.38	1864.72	1864.16	1863.70	1863.33	1863.06	1862.87	1862.78	1862.76

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(h) Plenum entropy, S_o/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	*	2	4	5	8	10	12	14	16	18	20
100	11.0688	10.3005	9.5233	9.0217	------	------	------	------	------	------	------
101	11.1036	10.3373	9.5626	9.0645	8.6687	------	------	------	------	------	------
102	11.1380	10.3736	9.6014	9.1066	8.7155	------	------	------	------	------	------
103	11.1722	10.4096	9.6397	9.1480	8.7613	------	------	------	------	------	------
104	11.2060	10.4451	9.6774	9.1887	8.8060	8.4712	------	------	------	------	------
105	11.2394	10.4803	9.7147	9.2287	8.8498	8.5205	------	------	------	------	------
106	11.2726	10.5151	9.7516	9.2682	8.8928	8.5685	------	------	------	------	------
107	11.3054	10.5495	9.7879	9.3071	8.9350	8.6153	8.3188	------	------	------	------
108	11.3380	10.5836	9.8239	9.3454	8.9763	8.6609	8.3707	------	------	------	------
109	11.3702	10.6173	9.8594	9.3831	9.0170	8.7054	8.4208	------	------	------	------
110	11.4022	10.6507	9.8945	9.4204	9.0569	8.7490	8.4695	8.2002	------	------	------
111	11.4338	10.6837	9.9292	9.4571	9.0962	8.7916	8.5167	8.2543	------	------	------
112	11.4652	10.7164	9.9635	9.4933	9.1349	8.8334	8.5627	8.3064	8.0499	------	------
113	11.4963	10.7488	9.9974	9.5291	9.1730	8.8744	8.6076	8.3567	8.1087	------	------
114	11.5271	10.7809	10.0310	9.5644	9.2105	8.9146	8.6514	8.4054	8.1647	7.9157	------
115	11.5577	10.8127	10.0642	9.5993	9.2474	8.9541	8.6942	8.4527	8.2184	7.9797	------
116	11.5880	10.8441	10.0970	9.6338	9.2838	8.9929	8.7361	8.4986	8.2700	8.0401	7.7952
117	11.6180	10.8753	10.1295	9.6678	9.3197	9.0311	8.7771	8.5434	8.3198	8.0974	7.8652
118	11.6478	10.9062	10.1616	9.7015	9.3551	9.0687	8.8173	8.5870	8.3680	8.1522	7.9302
119	11.6773	10.9367	10.1935	9.7347	9.3901	9.1056	8.8568	8.6296	8.4148	8.2047	7.9914
120	11.7066	10.9671	10.2250	9.7676	9.4246	9.1420	8.8955	8.6712	8.4602	8.2552	8.0493
121	11.7356	10.9971	10.2561	9.8001	9.4586	9.1779	8.9336	8.7120	8.5044	8.3040	8.1045
122	11.7644	11.0269	10.2870	9.8322	9.4922	9.2132	8.9710	8.7520	8.5475	8.3512	8.1573
123	11.7929	11.0564	10.3176	9.8640	9.5254	9.2481	9.0078	8.7911	8.5896	8.3970	8.2081
124	11.8213	11.0856	10.3479	9.8955	9.5582	9.2825	9.0440	8.8295	8.6307	8.4415	8.2570
125	11.8494	11.1146	10.3779	9.9266	9.5906	9.3164	9.0797	8.8673	8.6710	8.4849	8.3044
126	11.8772	11.1434	10.4076	9.9574	9.6227	9.3499	9.1148	8.9044	8.7104	8.5272	8.3503
127	11.9049	11.1718	10.4370	9.9879	9.6544	9.3829	9.1494	8.9408	8.7490	8.5684	8.3948
128	11.9323	11.2001	10.4662	10.0181	9.6857	9.4155	9.1835	8.9767	8.7869	8.6088	8.4382
129	11.9595	11.2281	10.4951	10.0480	9.7167	9.4478	9.2172	9.0120	8.8241	8.6483	8.4804
130	11.9866	11.2559	10.5237	10.0776	9.7473	9.4796	9.2504	9.0467	8.8607	8.6870	8.5217
132	12.0400	11.3108	10.5803	10.1359	9.8077	9.5422	9.3155	9.1147	8.9320	8.7621	8.6013
134	12.0926	11.3648	10.6358	10.1931	9.8668	9.6033	9.3790	9.1808	9.0010	8.8346	8.6777
136	12.1444	11.4180	10.6904	10.2493	9.9247	9.6632	9.4409	9.2451	9.0680	8.9046	8.7512
138	12.1955	11.4703	10.7441	10.3045	9.9815	9.7217	9.5014	9.3078	9.1331	8.9724	8.8220
140	12.2458	11.5218	10.7969	10.3587	10.0372	9.7791	9.5606	9.3690	9.1965	9.0382	8.8905
142	12.2954	11.5726	10.8489	10.4120	10.0919	9.8354	9.6185	9.4287	9.2582	9.1021	8.9569
144	12.3444	11.6226	10.9001	10.4644	10.1456	9.8905	9.6752	9.4871	9.3185	9.1644	9.0214
146	12.3926	11.6719	10.9504	10.5159	10.1984	9.9446	9.7308	9.5442	9.3773	9.2250	9.0841
148	12.4402	11.7204	11.0000	10.5666	10.2503	9.9978	9.7853	9.6002	9.4348	9.2842	9.1451
150	12.4872	11.7683	11.0489	10.6165	10.3013	10.0500	9.8388	9.6550	9.4910	9.3420	9.2046

*For these cases, the entropy function is that of gaseous nitrogen whose pressure is 1×10^5 N/m^2 and whose compressibility factor is 1.

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
116	7.7952	------	------	------	------	------	------	------	------	------	------
117	7.8652	------	------	------	------	------	------	------	------	------	------
118	7.9302	------	------	------	------	------	------	------	------	------	------
119	7.9914	------	------	------	------	------	------	------	------	------	------
120	8.0493	7.4516	------	------	------	------	------	------	------	------	------
121	8.1045	7.5502	------	------	------	------	------	------	------	------	------
122	8.1573	7.6358	------	------	------	------	------	------	------	------	------
123	8.2081	7.7126	------	------	------	------	------	------	------	------	------
124	8.2570	7.7829	7.1345	------	------	------	------	------	------	------	------
125	8.3044	7.8481	7.2813	------	------	------	------	------	------	------	------
126	8.3503	7.9093	7.3943	------	------	------	------	------	------	------	------
127	8.3948	7.9672	7.4894	6.5155	5.3205	5.1622	5.0580	4.9779	4.9118	4.8550	4.8050
128	8.4382	8.0223	7.5730	6.9144	5.5127	5.2903	5.1642	5.0726	4.9992	4.9373	4.8834
129	8.4804	8.0749	7.6485	7.0935	5.7986	5.4351	5.2774	5.1709	5.0887	5.0208	4.9626
130	8.5217	8.1254	7.7179	7.2242	6.2777	5.6054	5.3996	5.2737	5.1806	5.1058	5.0425
132	8.6013	8.2211	7.8431	7.4231	6.8599	6.0690	5.6831	5.4970	5.3742	5.2813	5.2059
134	8.6777	8.3108	7.9551	7.5798	7.1385	6.5618	6.0330	5.7515	5.5842	5.4664	5.3750
136	8.7512	8.3955	8.0573	7.7129	7.3347	6.8889	6.4020	6.0380	5.8136	5.6631	5.5513
138	8.8220	8.4761	8.1522	7.8305	7.4922	7.1182	6.7081	6.3317	6.0587	5.8714	5.7353
140	8.8905	8.5530	8.2410	7.9370	7.6267	7.2975	6.9455	6.5974	6.3052	6.0870	5.9258
142	8.9569	8.6269	8.3249	8.0351	7.7457	7.4473	7.1360	6.8223	6.5357	6.3012	6.1192
144	9.0214	8.6979	8.4046	8.1265	7.8534	7.5776	7.2957	7.0117	6.7414	6.5046	6.3099
146	9.0841	8.7664	8.4807	8.2125	7.9525	7.6942	7.4342	7.1740	6.9220	6.6915	6.4923
148	9.1451	8.8328	8.5537	8.2939	8.0447	7.8003	7.5574	7.3161	7.0811	6.8606	6.6630
150	9.2046	8.8970	8.6238	8.3714	8.1314	7.8983	7.6690	7.4430	7.2226	7.0131	6.8206

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$						
	70	75	80	85	90	95	100
127	4.8050	4.7599	4.7188	4.6810	4.6458	4.6128	4.5818
128	4.8834	4.8354	4.7919	4.7521	4.7152	4.6808	4.6485
129	4.9626	4.9112	4.8651	4.8230	4.7843	4.7484	4.7147
130	5.0425	4.9874	4.9384	4.8940	4.8533	4.8157	4.7806
132	5.2059	5.1419	5.0860	5.0362	4.9911	4.9498	4.9116
134	5.3750	5.2998	5.2356	5.1794	5.1291	5.0835	5.0418
136	5.5513	5.4623	5.3881	5.3242	5.2679	5.2175	5.1717
138	5.7353	5.6298	5.5438	5.4710	5.4079	5.3519	5.3016
140	5.9258	5.8021	5.7028	5.6201	5.5492	5.4871	5.4317
142	6.1192	5.9777	5.8645	5.7710	5.6918	5.6230	5.5622
144	6.3099	6.1536	6.0273	5.9232	5.8352	5.7594	5.6929
146	6.4923	6.3263	6.1893	6.0752	5.9788	5.8959	5.8235
148	6.6630	6.4923	6.3477	6.2255	6.1215	6.0319	5.9536
150	6.8206	6.6493	6.5005	6.3723	6.2620	6.1664	6.0827

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(h) Continued. Plenum entropy, S_o/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
127	4.5818	4.5245	4.4724	4.4245	4.3800	4.3384	4.2993	4.2622	4.2271	4.1935	4.1614
128	4.6485	4.5891	4.5354	4.4861	4.4405	4.3979	4.3579	4.3201	4.2843	4.2502	4.2176
129	4.7147	4.6532	4.5977	4.5470	4.5002	4.4566	4.4157	4.3772	4.3407	4.3060	4.2728
130	4.7806	4.7167	4.6594	4.6072	4.5592	4.5145	4.4728	4.4335	4.3963	4.3610	4.3273
132	4.9116	4.8426	4.7813	4.7260	4.6753	4.6285	4.5848	4.5439	4.5053	4.4687	4.4339
134	5.0418	4.9671	4.9015	4.8427	4.7892	4.7401	4.6944	4.6518	4.6117	4.5737	4.5378
136	5.1717	5.0907	5.0203	4.9578	4.9013	4.8496	4.8019	4.7574	4.7157	4.6764	4.6392
138	5.3016	5.2136	5.1380	5.0715	5.0117	4.9574	4.9074	4.8610	4.8177	4.7770	4.7385
140	5.4317	5.3361	5.2548	5.1839	5.1208	5.0636	5.0113	4.9629	4.9178	4.8756	4.8358
142	5.5622	5.4582	5.3709	5.2954	5.2285	5.1684	5.1136	5.0632	5.0163	4.9726	4.9314
144	5.6929	5.5800	5.4863	5.4059	5.3352	5.2720	5.2146	5.1620	5.1133	5.0679	5.0254
146	5.8235	5.7015	5.6011	5.5156	5.4409	5.3744	5.3144	5.2595	5.2089	5.1619	5.1178
148	5.9536	5.8224	5.7151	5.6244	5.5455	5.4757	5.4129	5.3558	5.3032	5.2545	5.2090
150	6.0827	5.9425	5.8284	5.7323	5.6492	5.5760	5.5104	5.4509	5.3963	5.3458	5.2988

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
127	4.1614	4.1307	4.1011	4.0725	4.0450	4.0184	3.9926	3.9675	3.9432	3.9195	3.8965
128	4.2176	4.1863	4.1563	4.1274	4.0995	4.0725	4.0464	4.0211	3.9965	3.9726	3.9494
129	4.2728	4.2411	4.2107	4.1814	4.1531	4.1258	4.0994	4.0738	4.0489	4.0248	4.0013
130	4.3273	4.2951	4.2642	4.2345	4.2058	4.1782	4.1515	4.1256	4.1004	4.0760	4.0523
132	4.4339	4.4007	4.3689	4.3383	4.3089	4.2806	4.2532	4.2267	4.2011	4.1762	4.1520
134	4.5378	4.5035	4.4707	4.4393	4.4092	4.3801	4.3521	4.3250	4.2988	4.2733	4.2486
136	4.6392	4.6038	4.5701	4.5378	4.5069	4.4771	4.4484	4.4206	4.3938	4.3679	4.3427
138	4.7385	4.7020	4.6672	4.6340	4.6022	4.5717	4.5423	4.5139	4.4865	4.4600	4.4343
140	4.8358	4.7982	4.7624	4.7282	4.6956	4.6642	4.6341	4.6051	4.5771	4.5501	4.5238
142	4.9314	4.8925	4.8556	4.8205	4.7870	4.7549	4.7240	4.6944	4.6658	4.6381	4.6114
144	5.0254	4.9852	4.9473	4.9111	4.8767	4.8438	4.8122	4.7818	4.7526	4.7244	4.6971
146	5.1178	5.0765	5.0373	5.0002	4.9649	4.9311	4.8988	4.8677	4.8378	4.8090	4.7812
148	5.2090	5.1663	5.1260	5.0878	5.0515	5.0169	4.9838	4.9521	4.9216	4.8922	4.8638
150	5.2988	5.2548	5.2133	5.1741	5.1369	5.1014	5.0675	5.0350	5.0039	4.9739	4.9449

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	*	10	20	30	40	50	60	70	80	90	100
150	12.4872	10.0500	9.2046	8.6238	8.1314	7.6690	7.2226	6.8206	6.5005	6.2620	6.0827
155	12.6019	10.1766	9.3472	8.7889	8.3288	7.9123	7.5211	7.1606	6.8492	6.5964	6.3964
160	12.7129	10.2981	9.4822	8.9418	8.5056	8.1205	7.7664	7.4401	7.1482	6.8978	6.6894
165	12.8206	10.4150	9.6105	9.0847	8.6670	8.3049	7.9772	7.6770	7.4050	7.1644	6.9565
170	12.9250	10.5276	9.7330	9.2193	8.8164	8.4719	8.1641	7.8839	7.6291	7.4000	7.1973
175	13.0265	10.6362	9.8503	9.3468	8.9560	8.6255	8.3331	8.0687	7.8281	7.6102	7.4145
180	13.1250	10.7413	9.9629	9.4681	9.0875	8.7683	8.4882	8.2364	8.0077	7.7997	7.6113
185	13.2209	10.8429	10.0712	9.5840	9.2119	8.9022	8.6322	8.3907	8.1719	7.9726	7.7911
190	13.3142	10.9415	10.1756	9.6951	9.3303	9.0285	8.7670	8.5341	8.3235	8.1318	7.9567
195	13.4050	11.0371	10.2765	9.8017	9.4433	9.1484	8.8940	8.6683	8.4648	8.2796	8.1102
200	13.4936	11.1299	10.3741	9.9044	9.5515	9.2625	9.0143	8.7948	8.5974	8.4178	8.2534
205	13.5800	11.2202	10.4686	10.0036	9.6555	9.3717	9.1288	8.9147	8.7224	8.5478	8.3880
210	13.6643	11.3081	10.5603	10.0993	9.7557	9.4763	9.2381	9.0286	8.8410	8.6707	8.5149
215	13.7466	11.3937	10.6493	10.1921	9.8523	9.5770	9.3428	9.1375	8.9538	8.7874	8.6352
220	13.8271	11.4771	10.7359	10.2819	9.9456	9.6739	9.4434	9.2417	9.0616	8.8986	8.7496
225	13.9057	11.5584	10.8201	10.3692	10.0360	9.7675	9.5402	9.3418	9.1649	9.0049	8.8588
230	13.9826	11.6378	10.9021	10.4540	10.1236	9.8580	9.6336	9.4381	9.2640	9.1068	8.9633
235	14.0578	11.7154	10.9821	10.5365	10.2087	9.9457	9.7239	9.5310	9.3595	9.2048	9.0637
240	14.1315	11.7912	11.0601	10.6168	10.2913	10.0307	9.8113	9.6208	9.4516	9.2991	9.1601
245	14.2036	11.8653	11.1363	10.6950	10.3717	10.1133	9.8961	9.7077	9.5406	9.3902	9.2531
250	14.2743	11.9378	11.2107	10.7714	10.4500	10.1936	9.9784	9.7919	9.6268	9.4782	9.3429
255	14.3436	12.0088	11.2835	10.8459	10.5264	10.2717	10.0583	9.8737	9.7103	9.5634	9.4298
260	14.4116	12.0783	11.3546	10.9187	10.6008	10.3478	10.1361	9.9531	9.7913	9.6460	9.5139
265	14.4782	12.1465	11.4242	10.9899	10.6735	10.4221	10.2119	10.0304	9.8701	9.7262	9.5955
270	14.5436	12.2133	11.4924	11.0595	10.7445	10.4945	10.2857	10.1056	9.9467	9.8041	9.6747
275	14.6078	12.2788	11.5592	11.1276	10.8140	10.5653	10.3578	10.1790	10.0213	9.8800	9.7517
280	14.6709	12.3430	11.6247	11.1943	10.8819	10.6344	10.4282	10.2506	10.0941	9.9539	9.8267
285	14.7328	12.4061	11.6889	11.2596	10.9484	10.7021	10.4970	10.3204	10.1650	10.0259	9.8997
290	14.7937	12.4680	11.7519	11.3237	11.0135	10.7683	10.5642	10.3887	10.2343	10.0961	9.9709
295	14.8535	12.5288	11.8137	11.3865	11.0774	10.8331	10.6300	10.4555	10.3020	10.1647	10.0404
300	14.9124	12.5886	11.8744	11.4481	11.1399	10.8966	10.6944	10.5208	10.3682	10.2318	10.1083
310	15.0272	12.7051	11.9926	11.5681	11.2615	11.0199	10.8193	10.6473	10.4964	10.3615	10.2395
320	15.1384	12.8178	12.1068	11.6838	11.3788	11.1386	10.9395	10.7689	10.6193	10.4859	10.3652
330	15.2461	12.9269	12.2173	11.7956	11.4919	11.2530	11.0553	10.8860	10.7376	10.6053	10.4858
340	15.3507	13.0327	12.3243	11.9038	11.6013	11.3636	11.1670	10.9988	10.8516	10.7204	10.6019
350	15.4524	13.1354	12.4281	12.0087	11.7072	11.4706	11.2750	11.1078	10.9615	10.8313	10.7138
360	15.5512	13.2352	12.5289	12.1104	11.8099	11.5742	11.3795	11.2133	11.0679	10.9385	10.8218
370	15.6473	13.3323	12.6268	12.2092	11.9095	11.6747	11.4808	11.3154	11.1708	11.0422	10.9263
380	15.7409	13.4267	12.7220	12.3052	12.0064	11.7722	11.5792	11.4145	11.2706	11.1427	11.0274
390	15.8322	13.5187	12.8148	12.3987	12.1005	11.8671	11.6747	11.5107	11.3674	11.2402	11.1255
400	15.9213	13.6084	12.9051	12.4897	12.1922	11.9594	11.7676	11.6042	11.4616	11.3349	11.2208

*For these cases, the entropy function is that of gaseous nitrogen whose pressure is 1×10^5 N/m^2 and whose compressibility factor is 1.

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(h) Concluded. Plenum entropy, S_0/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	6.0827	5.9425	5.8284	5.7323	5.6492	5.5760	5.5104	5.4509	5.3963	5.3458	5.2988
155	6.3964	6.2369	6.1066	5.9975	5.9039	5.8221	5.7493	5.6837	5.6240	5.5691	5.5182
160	6.6894	6.5175	6.3748	6.2544	6.1511	6.0610	5.9813	5.9097	5.8449	5.7855	5.7307
165	6.9565	6.7794	6.6288	6.5002	6.3890	6.2918	6.2056	6.1285	6.0588	5.9951	5.9365
170	7.1973	7.0202	6.8663	6.7326	6.6158	6.5129	6.4215	6.3396	6.2654	6.1978	6.1357
175	7.4145	7.2403	7.0863	6.9504	6.8302	6.7235	6.6280	6.5422	6.4643	6.3932	6.3279
180	7.6113	7.4416	7.2895	7.1535	7.0318	6.9227	6.8246	6.7358	6.6550	6.5811	6.5131
185	7.7911	7.6264	7.4772	7.3424	7.2207	7.1107	7.0109	6.9201	6.8372	6.7611	6.6910
190	7.9567	7.7968	7.6511	7.5184	7.3976	7.2875	7.1871	7.0952	7.0109	6.9333	6.8615
195	8.1102	7.9550	7.8128	7.6826	7.5633	7.4540	7.3536	7.2613	7.1762	7.0976	7.0246
200	8.2534	8.1026	7.9639	7.8364	7.7189	7.6107	7.5109	7.4187	7.3334	7.2542	7.1805
205	8.3880	8.2411	8.1057	7.9808	7.8654	7.7586	7.6597	7.5680	7.4828	7.4034	7.3293
210	8.5149	8.3716	8.2394	8.1170	8.0037	7.8984	7.8007	7.7097	7.6249	7.5456	7.4715
215	8.6352	8.4951	8.3658	8.2459	8.1345	8.0310	7.9344	7.8444	7.7602	7.6813	7.6073
220	8.7496	8.6125	8.4858	8.3682	8.2588	8.1569	8.0617	7.9726	7.8891	7.8108	7.7372
225	8.8588	8.7244	8.6001	8.4847	8.3772	8.2768	8.1829	8.0949	8.0123	7.9346	7.8614
230	8.9633	8.8314	8.7093	8.5958	8.4901	8.3913	8.2987	8.2118	8.1300	8.0531	7.9804
235	9.0637	8.9339	8.8138	8.7023	8.5982	8.5008	8.4095	8.3237	8.2428	8.1666	8.0946
240	9.1601	9.0324	8.9142	8.8044	8.7018	8.6059	8.5158	8.4310	8.3511	8.2756	8.2042
245	9.2531	9.1272	9.0108	8.9025	8.8014	8.7068	8.6178	8.5341	8.4551	8.3804	8.3096
250	9.3429	9.2187	9.1038	8.9970	8.8973	8.8039	8.7161	8.6333	8.5552	8.4813	8.4112
255	9.4298	9.3071	9.1937	9.0883	8.9898	8.8975	8.8108	8.7290	8.6517	8.5785	8.5091
260	9.5139	9.3926	9.2806	9.1764	9.0792	8.9880	8.9022	8.8213	8.7448	8.6724	8.6036
265	9.5955	9.4755	9.3648	9.2618	9.1656	9.0754	8.9906	8.9106	8.8349	8.7631	8.6950
270	9.6747	9.5560	9.4464	9.3445	9.2493	9.1601	9.0762	8.9970	8.9220	8.8509	8.7834
275	9.7517	9.6342	9.5256	9.4247	9.3306	9.2422	9.1591	9.0807	9.0065	8.9360	8.8691
280	9.8267	9.7102	9.6026	9.5027	9.4094	9.3220	9.2396	9.1619	9.0884	9.0186	8.9522
285	9.8997	9.7842	9.6776	9.5786	9.4861	9.3994	9.3179	9.2408	9.1679	9.0987	9.0329
290	9.9709	9.8563	9.7506	9.6524	9.5607	9.4748	9.3939	9.3176	9.2453	9.1766	9.1113
295	10.0404	9.9267	9.8217	9.7243	9.6334	9.5482	9.4680	9.3922	9.3205	9.2524	9.1876
300	10.1083	9.9953	9.8912	9.7945	9.7043	9.6197	9.5401	9.4650	9.3938	9.3262	9.2619
310	10.2395	10.1280	10.0252	9.9299	9.8410	9.7576	9.6792	9.6051	9.5349	9.4683	9.4049
320	10.3652	10.2550	10.1534	10.0593	9.9715	9.8892	9.8117	9.7386	9.6694	9.6037	9.5411
330	10.4858	10.3767	10.2763	10.1832	10.0964	10.0151	9.9386	9.8663	9.7979	9.7330	9.6711
340	10.6019	10.4938	10.3943	10.3022	10.2163	10.1358	10.0602	9.9887	9.9211	9.8568	9.7957
350	10.7138	10.6066	10.5080	10.4167	10.3316	10.2519	10.1770	10.1063	10.0393	9.9757	9.9152
360	10.8218	10.7154	10.6176	10.5271	10.4427	10.3637	10.2895	10.2194	10.1531	10.0901	10.0301
370	10.9263	10.8206	10.7235	10.6336	10.5499	10.4716	10.3980	10.3285	10.2627	10.2003	10.1408
380	11.0274	10.9224	10.8260	10.7367	10.6536	10.5759	10.5028	10.4339	10.3686	10.3067	10.2477
390	11.1255	11.0212	10.9253	10.8366	10.7540	10.6768	10.6043	10.5358	10.4710	10.4095	10.3510
400	11.2208	11.1170	11.0216	10.9335	10.8514	10.7747	10.7026	10.6346	10.5702	10.5091	10.4510

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	5.2988	5.2548	5.2133	5.1741	5.1369	5.1014	5.0675	5.0350	5.0039	4.9739	4.9449
155	5.5182	5.4708	5.4263	5.3844	5.3447	5.3071	5.2712	5.2369	5.2041	5.1725	5.1422
160	5.7307	5.6798	5.6323	5.5876	5.5455	5.5056	5.4677	5.4316	5.3971	5.3640	5.3322
165	5.9365	5.8823	5.8317	5.7844	5.7398	5.6977	5.6578	5.6199	5.5836	5.5490	5.5158
170	6.1357	6.0782	6.0248	5.9749	5.9279	5.8837	5.8418	5.8021	5.7642	5.7280	5.6934
175	6.3279	6.2676	6.2115	6.1591	6.1100	6.0638	6.0200	5.9785	5.9391	5.9014	5.8655
180	6.5131	6.4502	6.3918	6.3373	6.2861	6.2380	6.1925	6.1494	6.1084	6.0694	6.0321
185	6.6910	6.6260	6.5656	6.5091	6.4562	6.4063	6.3593	6.3147	6.2724	6.2321	6.1936
190	6.8615	6.7948	6.7328	6.6747	6.6202	6.5689	6.5205	6.4746	6.4310	6.3895	6.3500
195	7.0246	6.9567	6.8933	6.8340	6.7783	6.7257	6.6761	6.6291	6.5844	6.5419	6.5013
200	7.1805	7.1117	7.0474	6.9871	6.9304	6.8768	6.8262	6.7782	6.7326	6.6892	6.6477
205	7.3293	7.2601	7.1951	7.1341	7.0766	7.0223	6.9709	6.9221	6.8757	6.8315	6.7893
210	7.4715	7.4020	7.3367	7.2752	7.2172	7.1623	7.1102	7.0608	7.0138	6.9690	6.9261
215	7.6073	7.5378	7.4724	7.4106	7.3522	7.2969	7.2445	7.1946	7.1470	7.1017	7.0583
220	7.7372	7.6678	7.6024	7.5405	7.4820	7.4265	7.3737	7.3235	7.2756	7.2298	7.1861
225	7.8614	7.7923	7.7271	7.6653	7.6067	7.5511	7.4981	7.4477	7.3995	7.3535	7.3095
230	7.9804	7.9118	7.8468	7.7852	7.7266	7.6710	7.6180	7.5675	7.5192	7.4730	7.4287
235	8.0946	8.0264	7.9617	7.9004	7.8420	7.7865	7.7335	7.6830	7.6346	7.5883	7.5439
240	8.2042	8.1365	8.0723	8.0113	7.9532	7.8978	7.8449	7.7944	7.7460	7.6997	7.6552
245	8.3096	8.2425	8.1788	8.1181	8.0603	8.0051	7.9524	7.9020	7.8537	7.8074	7.7629
250	8.4112	8.3446	8.2813	8.2211	8.1636	8.1087	8.0562	8.0059	7.9577	7.9115	7.8671
255	8.5091	8.4431	8.3803	8.3205	8.2633	8.2087	8.1565	8.1064	8.0584	8.0123	7.9679
260	8.6036	8.5382	8.4759	8.4165	8.3597	8.3055	8.2535	8.2036	8.1558	8.1098	8.0656
265	8.6950	8.6301	8.5683	8.5094	8.4530	8.3991	8.3474	8.2978	8.2501	8.2043	8.1602
270	8.7834	8.7191	8.6578	8.5993	8.5433	8.4897	8.4383	8.3890	8.3416	8.2959	8.2520
275	8.8691	8.8053	8.7445	8.6864	8.6309	8.5776	8.5265	8.4774	8.4303	8.3849	8.3411
280	8.9522	8.8890	8.8286	8.7710	8.7158	8.6629	8.6121	8.5633	8.5164	8.4712	8.4276
285	9.0329	8.9702	8.9103	8.8531	8.7982	8.7457	8.6952	8.6467	8.6000	8.5551	8.5117
290	9.1113	9.0491	8.9897	8.9328	8.8784	8.8262	8.7760	8.7278	8.6814	8.6366	8.5935
295	9.1876	9.1259	9.0669	9.0104	8.9564	8.9045	8.8546	8.8067	8.7605	8.7160	8.6731
300	9.2619	9.2006	9.1420	9.0860	9.0322	8.9807	8.9312	8.8835	8.8376	8.7933	8.7506
310	9.4049	9.3444	9.2866	9.2313	9.1783	9.1273	9.0784	9.0313	8.9859	8.9420	8.8997
320	9.5411	9.4814	9.4243	9.3697	9.3173	9.2669	9.2185	9.1719	9.1270	9.0836	9.0417
330	9.6711	9.6121	9.5557	9.5017	9.4499	9.4001	9.3523	9.3062	9.2617	9.2188	9.1773
340	9.7957	9.7373	9.6815	9.6281	9.5768	9.5276	9.4802	9.4345	9.3905	9.3480	9.3069
350	9.9152	9.8574	9.8022	9.7493	9.6985	9.6498	9.6028	9.5576	9.5140	9.4719	9.4311
360	10.0301	9.9729	9.9182	9.8658	9.8155	9.7672	9.7207	9.6758	9.6326	9.5908	9.5504
370	10.1408	10.0841	10.0299	9.9779	9.9281	9.8802	9.8341	9.7896	9.7467	9.7053	9.6652
380	10.2477	10.1914	10.1376	10.0861	10.0367	9.9891	9.9434	9.8993	9.8568	9.8156	9.7759
390	10.3510	10.2951	10.2418	10.1906	10.1415	10.0944	10.0490	10.0052	9.9630	9.9222	9.8827
400	10.4510	10.3955	10.3425	10.2918	10.2430	10.1962	10.1511	10.1077	10.0657	10.0252	9.9860

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(i) Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	3.498	3.697	3.958	4.320	-----	-----	-----	-----	-----	-----	-----
101	3.498	3.691	3.944	4.287	4.784	-----	-----	-----	-----	-----	-----
102	3.498	3.686	3.930	4.256	4.719	-----	-----	-----	-----	-----	-----
103	3.498	3.682	3.916	4.227	4.660	-----	-----	-----	-----	-----	-----
104	3.498	3.677	3.904	4.200	4.606	5.206	-----	-----	-----	-----	-----
105	3.498	3.673	3.891	4.174	4.556	5.107	-----	-----	-----	-----	-----
106	3.498	3.668	3.880	4.150	4.510	5.018	-----	-----	-----	-----	-----
107	3.498	3.664	3.869	4.128	4.468	4.939	5.644	-----	-----	-----	-----
108	3.498	3.660	3.858	4.107	4.429	4.866	5.504	-----	-----	-----	-----
109	3.498	3.656	3.848	4.087	4.392	4.801	5.381	-----	-----	-----	-----
110	3.498	3.653	3.839	4.068	4.358	4.740	5.272	6.076	-----	-----	-----
111	3.498	3.649	3.829	4.050	4.326	4.685	5.174	5.891	-----	-----	-----
112	3.498	3.645	3.821	4.033	4.296	4.634	5.086	5.731	6.750	-----	-----
113	3.498	3.642	3.812	4.017	4.268	4.587	5.007	5.591	6.477	-----	-----
114	3.498	3.639	3.804	4.001	4.242	4.544	4.934	5.467	6.247	7.537	-----
115	3.498	3.635	3.796	3.987	4.217	4.503	4.868	5.356	6.050	7.139	-----
116	3.498	3.632	3.788	3.973	4.194	4.465	4.808	5.257	5.880	6.816	8.442
117	3.498	3.629	3.781	3.959	4.171	4.430	4.752	5.168	5.731	6.547	7.875
118	3.498	3.626	3.774	3.946	4.150	4.396	4.700	5.086	5.599	6.320	7.431
119	3.498	3.624	3.767	3.934	4.130	4.365	4.652	5.012	5.482	6.124	7.073
120	3.498	3.621	3.761	3.922	4.111	4.336	4.607	4.944	5.376	5.954	6.777
121	3.498	3.618	3.755	3.911	4.093	4.308	4.566	4.882	5.281	5.805	6.528
122	3.498	3.616	3.749	3.900	4.076	4.282	4.527	4.824	5.195	5.672	6.315
123	3.498	3.613	3.743	3.890	4.060	4.257	4.490	4.771	5.116	5.554	6.130
124	3.498	3.611	3.737	3.880	4.044	4.234	4.456	4.721	5.044	5.447	5.967
125	3.498	3.608	3.732	3.871	4.029	4.211	4.424	4.675	4.978	5.351	5.824
126	3.498	3.606	3.726	3.861	4.015	4.190	4.393	4.632	4.916	5.263	5.696
127	3.498	3.604	3.721	3.853	4.001	4.170	4.365	4.591	4.860	5.183	5.581
128	3.498	3.602	3.716	3.844	3.988	4.151	4.337	4.553	4.807	5.109	5.477
129	3.498	3.600	3.711	3.836	3.975	4.133	4.312	4.518	4.758	5.042	5.383
130	3.498	3.597	3.707	3.828	3.963	4.115	4.287	4.484	4.712	4.979	5.297
132	3.498	3.594	3.698	3.813	3.940	4.082	4.242	4.422	4.629	4.867	5.145
134	3.498	3.590	3.690	3.799	3.919	4.052	4.201	4.367	4.555	4.769	5.015
136	3.498	3.586	3.682	3.786	3.900	4.025	4.163	4.317	4.489	4.683	4.903
138	3.498	3.583	3.674	3.774	3.882	3.999	4.129	4.272	4.430	4.607	4.806
140	3.498	3.580	3.667	3.762	3.865	3.976	4.097	4.231	4.377	4.539	4.720
142	3.498	3.577	3.661	3.751	3.849	3.954	4.068	4.193	4.329	4.478	4.643
144	3.498	3.574	3.655	3.741	3.834	3.934	4.042	4.158	4.285	4.423	4.574
146	3.498	3.571	3.649	3.732	3.820	3.915	4.017	4.126	4.245	4.373	4.513
148	3.498	3.569	3.643	3.723	3.807	3.897	3.994	4.097	4.208	4.328	4.457
150	3.498	3.566	3.638	3.714	3.795	3.881	3.972	4.070	4.174	4.286	4.406

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
116	8.442	------	------	------	------	------	------	------	------	------	------
117	7.875	------	------	------	------	------	------	------	------	------	------
118	7.431	------	------	------	------	------	------	------	------	------	------
119	7.073	------	------	------	------	------	------	------	------	------	------
120	6.777	12.885	------	------	------	------	------	------	------	------	------
121	6.528	11.029	------	------	------	------	------	------	------	------	------
122	6.315	9.843	------	------	------	------	------	------	------	------	------
123	6.130	9.006	------	------	------	------	------	------	------	------	------
124	5.967	8.379	21.787	------	------	------	------	------	------	------	------
125	5.824	7.888	15.716	------	------	------	------	------	------	------	------
126	5.696	7.491	12.921	------	------	------	------	------	------	------	------
127	5.581	7.162	11.256	136.907	21.310	15.458	13.137	11.839	10.993	10.390	9.933
128	5.477	6.886	10.131	28.577	28.701	17.316	14.003	12.339	11.312	10.605	10.083
129	5.383	6.648	9.311	19.123	48.290	20.087	15.127	12.949	11.691	10.858	10.259
130	5.297	6.443	8.683	15.155	63.736	24.352	16.594	13.695	12.139	11.152	10.462
132	5.145	6.103	7.776	11.425	23.471	35.662	20.859	15.677	13.270	11.874	10.954
134	5.015	5.833	7.148	9.581	15.109	27.097	25.193	18.226	14.712	12.775	11.560
136	4.903	5.612	6.682	8.459	11.770	18.121	23.456	20.167	16.236	13.789	12.252
138	4.806	5.428	6.323	7.695	9.956	13.761	18.508	19.612	17.171	14.702	12.949
140	4.720	5.273	6.035	7.138	8.807	11.360	14.739	17.170	16.864	15.159	13.493
142	4.643	5.139	5.800	6.712	8.009	9.860	12.284	14.603	15.531	14.919	13.704
144	4.574	5.022	5.603	6.375	7.420	8.837	10.646	12.563	13.875	14.092	13.490
146	4.513	4.920	5.436	6.100	6.967	8.094	9.497	11.041	12.345	12.992	12.919
148	4.457	4.830	5.292	5.872	6.606	7.530	8.653	9.905	11.074	11.875	12.148
150	4.406	4.749	5.166	5.679	6.311	7.086	8.010	9.040	10.054	10.865	11.322

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$						
	70	75	80	85	90	95	100
127	9.933	9.574	9.282	9.039	8.833	8.656	8.502
128	10.083	9.679	9.355	9.089	8.865	8.673	8.507
129	10.259	9.803	9.444	9.151	8.907	8.700	8.522
130	10.462	9.948	9.548	9.225	8.960	8.736	8.545
132	10.954	10.297	9.801	9.411	9.096	8.834	8.613
134	11.560	10.725	10.112	9.643	9.269	8.964	8.710
136	12.252	11.216	10.473	9.913	9.475	9.122	8.831
138	12.949	11.733	10.860	10.208	9.703	9.300	8.970
140	13.493	12.201	11.236	10.505	9.938	9.487	9.120
142	13.704	12.520	11.544	10.772	10.161	9.671	9.271
144	13.490	12.596	11.722	10.969	10.345	9.833	9.411
146	12.919	12.399	11.723	11.057	10.463	9.955	9.525
148	12.148	11.972	11.539	11.014	10.494	10.019	9.601
150	11.322	11.403	11.201	10.843	10.427	10.013	9.627

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(i) Continued. Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
127	8.502	8.245	8.039	7.870	7.727	7.605	7.500	7.408	7.326	7.253	7.188
128	8.507	8.234	8.016	7.837	7.688	7.561	7.451	7.356	7.271	7.196	7.129
129	8.522	8.230	7.999	7.811	7.655	7.522	7.408	7.309	7.222	7.144	7.075
130	8.545	8.233	7.989	7.791	7.627	7.489	7.371	7.268	7.178	7.097	7.026
132	8.613	8.259	7.986	7.767	7.588	7.438	7.310	7.200	7.103	7.018	6.942
134	8.710	8.308	8.003	7.763	7.567	7.405	7.267	7.149	7.046	6.955	6.875
136	8.831	8.378	8.039	7.775	7.562	7.386	7.238	7.112	7.003	6.907	6.822
138	8.970	8.463	8.089	7.800	7.569	7.380	7.222	7.088	6.971	6.870	6.781
140	9.120	8.559	8.149	7.836	7.587	7.384	7.216	7.073	6.950	6.843	6.750
142	9.271	8.661	8.217	7.879	7.612	7.396	7.218	7.067	6.937	6.825	6.727
144	9.411	8.760	8.286	7.926	7.643	7.414	7.226	7.067	6.931	6.814	6.711
146	9.525	8.850	8.353	7.974	7.676	7.436	7.238	7.072	6.930	6.807	6.700
148	9.601	8.923	8.412	8.019	7.709	7.459	7.253	7.080	6.932	6.805	6.694
150	9.627	8.971	8.459	8.058	7.740	7.482	7.268	7.090	6.937	6.806	6.692

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
127	7.188	7.129	7.075	7.026	6.981	6.940	6.902	6.866	6.834	6.803	6.774
128	7.129	7.068	7.013	6.962	6.916	6.874	6.835	6.799	6.765	6.734	6.704
129	7.075	7.012	6.955	6.904	6.857	6.813	6.773	6.736	6.702	6.670	6.640
130	7.026	6.962	6.903	6.850	6.802	6.758	6.717	6.679	6.644	6.611	6.581
132	6.942	6.874	6.813	6.757	6.707	6.660	6.617	6.578	6.541	6.507	6.475
134	6.875	6.803	6.739	6.680	6.627	6.578	6.534	6.493	6.454	6.419	6.386
136	6.822	6.746	6.679	6.617	6.562	6.511	6.464	6.421	6.382	6.345	6.311
138	6.781	6.701	6.630	6.566	6.508	6.455	6.406	6.362	6.321	6.283	6.247
140	6.750	6.666	6.592	6.525	6.464	6.409	6.359	6.313	6.270	6.231	6.194
142	6.727	6.640	6.562	6.492	6.429	6.372	6.320	6.272	6.228	6.187	6.150
144	6.711	6.620	6.539	6.467	6.402	6.342	6.288	6.239	6.193	6.151	6.112
146	6.700	6.606	6.522	6.447	6.380	6.319	6.263	6.212	6.165	6.122	6.082
148	6.694	6.597	6.510	6.433	6.363	6.300	6.242	6.190	6.142	6.097	6.056
150	6.692	6.591	6.502	6.422	6.350	6.285	6.226	6.172	6.123	6.077	6.035

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	3.498	3.881	4.406	5.166	6.311	8.010	10.054	11.322	11.201	10.427	9.627
155	3.498	3.843	4.297	4.914	5.766	6.919	8.298	9.494	10.020	9.890	9.445
160	3.498	3.811	4.209	4.722	5.390	6.238	7.227	8.181	8.841	9.076	8.974
165	3.498	3.784	4.135	4.571	5.114	5.772	6.520	7.271	7.886	8.257	8.371
170	3.498	3.759	4.073	4.450	4.902	5.432	6.022	6.622	7.156	7.548	7.767
175	3.498	3.738	4.020	4.350	4.735	5.174	5.654	6.144	6.599	6.969	7.225
180	3.499	3.719	3.974	4.266	4.599	4.971	5.371	5.780	6.168	6.503	6.762
185	3.499	3.703	3.934	4.195	4.487	4.807	5.147	5.494	5.828	6.127	6.373
190	3.499	3.688	3.899	4.134	4.392	4.672	4.966	5.265	5.554	5.820	6.049
195	3.499	3.674	3.868	4.081	4.312	4.559	4.816	5.077	5.330	5.567	5.777
200	3.499	3.662	3.841	4.034	4.242	4.462	4.690	4.920	5.145	5.356	5.548
205	3.499	3.651	3.816	3.993	4.182	4.380	4.583	4.788	4.988	5.178	5.353
210	3.499	3.641	3.794	3.957	4.129	4.308	4.491	4.674	4.854	5.026	5.186
215	3.499	3.632	3.774	3.925	4.082	4.245	4.411	4.577	4.739	4.895	5.041
220	3.499	3.624	3.756	3.896	4.040	4.189	4.341	4.491	4.639	4.782	4.916
225	3.499	3.616	3.740	3.869	4.003	4.140	4.279	4.417	4.552	4.682	4.805
230	3.499	3.610	3.725	3.846	3.970	4.096	4.224	4.350	4.474	4.594	4.708
235	3.499	3.603	3.712	3.824	3.940	4.057	4.174	4.291	4.406	4.516	4.622
240	3.499	3.597	3.700	3.805	3.912	4.021	4.130	4.238	4.344	4.447	4.545
245	3.499	3.592	3.688	3.787	3.888	3.989	4.090	4.191	4.289	4.385	4.476
250	3.499	3.587	3.678	3.771	3.865	3.960	4.054	4.148	4.240	4.328	4.414
255	3.499	3.583	3.668	3.756	3.844	3.933	4.022	4.109	4.195	4.278	4.358
260	3.499	3.579	3.660	3.742	3.825	3.909	3.992	4.074	4.154	4.232	4.306
265	3.499	3.575	3.652	3.729	3.808	3.886	3.964	4.041	4.117	4.190	4.260
270	3.499	3.571	3.644	3.718	3.792	3.866	3.939	4.012	4.082	4.151	4.218
275	3.500	3.568	3.637	3.707	3.777	3.847	3.916	3.984	4.051	4.116	4.179
280	3.500	3.565	3.631	3.697	3.763	3.829	3.895	3.959	4.022	4.084	4.143
285	3.500	3.562	3.625	3.688	3.751	3.813	3.875	3.936	3.996	4.054	4.110
290	3.500	3.559	3.619	3.679	3.739	3.798	3.857	3.915	3.971	4.026	4.080
295	3.500	3.557	3.614	3.671	3.728	3.785	3.840	3.895	3.949	4.001	4.052
300	3.501	3.555	3.609	3.664	3.718	3.772	3.825	3.877	3.928	3.977	4.026
310	3.501	3.551	3.601	3.650	3.700	3.749	3.797	3.844	3.890	3.935	3.979
320	3.502	3.548	3.594	3.639	3.684	3.729	3.773	3.816	3.858	3.899	3.939
330	3.503	3.545	3.587	3.629	3.671	3.712	3.752	3.791	3.830	3.867	3.904
340	3.505	3.544	3.582	3.621	3.659	3.697	3.733	3.770	3.805	3.840	3.873
350	3.506	3.542	3.578	3.614	3.649	3.684	3.718	3.751	3.784	3.815	3.846
360	3.508	3.542	3.575	3.608	3.640	3.672	3.704	3.735	3.765	3.794	3.823
370	3.510	3.541	3.572	3.603	3.633	3.663	3.692	3.721	3.749	3.776	3.803
380	3.513	3.542	3.571	3.599	3.627	3.655	3.682	3.709	3.735	3.760	3.785
390	3.516	3.543	3.570	3.596	3.623	3.648	3.674	3.699	3.723	3.746	3.769
400	3.519	3.544	3.570	3.594	3.619	3.643	3.667	3.690	3.713	3.735	3.756

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(i) Concluded. Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	9.627	8.971	8.459	8.058	7.740	7.482	7.268	7.090	6.937	6.806	6.692
155	9.445	8.944	8.490	8.107	7.788	7.523	7.301	7.113	6.952	6.813	6.692
160	8.974	8.700	8.374	8.057	7.771	7.522	7.306	7.120	6.958	6.817	6.693
165	8.371	8.298	8.120	7.901	7.676	7.463	7.270	7.096	6.942	6.805	6.683
170	7.767	7.829	7.777	7.658	7.506	7.344	7.185	7.035	6.896	6.770	6.655
175	7.225	7.363	7.399	7.363	7.281	7.174	7.056	6.936	6.820	6.709	6.607
180	6.762	6.935	7.026	7.051	7.026	6.969	6.892	6.805	6.714	6.623	6.536
185	6.373	6.558	6.679	6.743	6.762	6.746	6.705	6.650	6.585	6.516	6.445
190	6.049	6.232	6.367	6.455	6.503	6.518	6.508	6.480	6.440	6.391	6.338
195	5.777	5.953	6.091	6.193	6.260	6.297	6.310	6.305	6.285	6.256	6.219
200	5.548	5.713	5.850	5.957	6.035	6.087	6.118	6.130	6.128	6.115	6.093
205	5.353	5.507	5.639	5.747	5.831	5.893	5.935	5.961	5.972	5.973	5.964
210	5.186	5.329	5.454	5.560	5.647	5.714	5.765	5.800	5.822	5.833	5.835
215	5.041	5.174	5.293	5.395	5.481	5.551	5.607	5.649	5.678	5.698	5.709
220	4.916	5.039	5.150	5.248	5.333	5.404	5.462	5.508	5.543	5.569	5.587
225	4.805	4.920	5.024	5.118	5.200	5.270	5.329	5.378	5.417	5.448	5.470
230	4.708	4.815	4.913	5.001	5.080	5.149	5.208	5.258	5.300	5.334	5.360
235	4.622	4.721	4.813	4.897	4.972	5.039	5.098	5.148	5.191	5.227	5.256
240	4.545	4.637	4.724	4.803	4.875	4.940	4.997	5.047	5.091	5.128	5.159
245	4.476	4.562	4.643	4.718	4.787	4.849	4.905	4.955	4.998	5.036	5.068
250	4.414	4.495	4.571	4.642	4.707	4.767	4.821	4.870	4.913	4.951	4.984
255	4.358	4.434	4.505	4.572	4.635	4.692	4.744	4.791	4.834	4.872	4.905
260	4.306	4.378	4.446	4.509	4.568	4.623	4.674	4.719	4.761	4.798	4.832
265	4.260	4.327	4.391	4.452	4.508	4.560	4.609	4.653	4.693	4.730	4.763
270	4.218	4.281	4.342	4.399	4.452	4.502	4.549	4.592	4.631	4.667	4.700
275	4.179	4.239	4.296	4.350	4.401	4.449	4.494	4.535	4.573	4.608	4.640
280	4.143	4.200	4.254	4.306	4.354	4.400	4.443	4.483	4.520	4.554	4.585
285	4.110	4.164	4.215	4.265	4.311	4.355	4.396	4.434	4.470	4.503	4.534
290	4.080	4.131	4.180	4.227	4.271	4.313	4.352	4.389	4.424	4.456	4.486
295	4.052	4.100	4.147	4.191	4.234	4.274	4.312	4.347	4.381	4.412	4.441
300	4.026	4.072	4.116	4.159	4.199	4.238	4.274	4.308	4.341	4.371	4.399
310	3.979	4.021	4.062	4.100	4.137	4.173	4.206	4.238	4.268	4.297	4.323
320	3.939	3.977	4.014	4.050	4.084	4.116	4.147	4.177	4.205	4.231	4.257
330	3.904	3.939	3.973	4.006	4.037	4.067	4.096	4.123	4.149	4.174	4.198
340	3.873	3.905	3.937	3.967	3.996	4.024	4.051	4.076	4.101	4.124	4.146
350	3.846	3.876	3.905	3.933	3.960	3.986	4.011	4.035	4.057	4.079	4.100
360	3.823	3.851	3.878	3.903	3.929	3.953	3.976	3.998	4.019	4.040	4.059
370	3.803	3.828	3.853	3.877	3.901	3.923	3.945	3.966	3.986	4.005	4.023
380	3.785	3.809	3.832	3.855	3.876	3.897	3.918	3.937	3.956	3.974	3.991
390	3.769	3.792	3.814	3.835	3.855	3.875	3.894	3.912	3.930	3.947	3.963
400	3.756	3.777	3.797	3.817	3.836	3.855	3.873	3.890	3.907	3.923	3.938

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	6.692	6.591	6.502	6.422	6.350	6.285	6.226	6.172	6.123	6.077	6.035
155	6.692	6.585	6.491	6.406	6.330	6.262	6.199	6.142	6.090	6.042	5.998
160	6.693	6.583	6.485	6.398	6.319	6.248	6.183	6.124	6.070	6.020	5.974
165	6.683	6.574	6.476	6.388	6.309	6.237	6.171	6.111	6.056	6.005	5.958
170	6.655	6.551	6.457	6.371	6.293	6.222	6.156	6.097	6.041	5.990	5.943
175	6.607	6.511	6.423	6.342	6.268	6.199	6.136	6.077	6.023	5.973	5.927
180	6.536	6.452	6.373	6.300	6.231	6.167	6.107	6.051	5.999	5.951	5.906
185	6.445	6.375	6.308	6.243	6.181	6.123	6.068	6.016	5.968	5.922	5.879
190	6.338	6.283	6.227	6.173	6.120	6.068	6.019	5.972	5.928	5.886	5.846
195	6.219	6.179	6.136	6.091	6.047	6.004	5.961	5.920	5.880	5.842	5.806
200	6.093	6.066	6.035	6.001	5.966	5.930	5.895	5.860	5.825	5.792	5.759
205	5.964	5.949	5.929	5.905	5.878	5.851	5.822	5.793	5.764	5.735	5.707
210	5.835	5.830	5.819	5.804	5.786	5.766	5.744	5.721	5.697	5.673	5.649
215	5.709	5.712	5.710	5.703	5.692	5.678	5.663	5.645	5.627	5.608	5.588
220	5.587	5.597	5.602	5.601	5.597	5.590	5.579	5.567	5.554	5.539	5.524
225	5.470	5.486	5.496	5.502	5.503	5.501	5.496	5.489	5.479	5.469	5.457
230	5.360	5.380	5.395	5.405	5.411	5.413	5.413	5.410	5.405	5.398	5.390
235	5.256	5.280	5.298	5.312	5.321	5.328	5.331	5.332	5.330	5.327	5.322
240	5.159	5.185	5.206	5.223	5.235	5.245	5.251	5.255	5.257	5.257	5.255
245	5.068	5.096	5.119	5.138	5.153	5.165	5.174	5.181	5.185	5.188	5.189
250	4.984	5.012	5.037	5.057	5.075	5.089	5.100	5.109	5.116	5.120	5.124
255	4.905	4.934	4.960	4.982	5.000	5.016	5.029	5.040	5.048	5.055	5.060
260	4.832	4.861	4.887	4.910	4.930	4.947	4.961	4.974	4.984	4.992	4.999
265	4.763	4.793	4.819	4.843	4.863	4.881	4.897	4.910	4.922	4.932	4.940
270	4.700	4.729	4.756	4.779	4.800	4.819	4.836	4.850	4.863	4.873	4.883
275	4.640	4.670	4.696	4.720	4.741	4.761	4.778	4.793	4.806	4.818	4.828
280	4.585	4.614	4.640	4.664	4.686	4.705	4.723	4.738	4.752	4.765	4.776
285	4.534	4.562	4.588	4.612	4.633	4.653	4.671	4.687	4.701	4.714	4.726
290	4.486	4.513	4.539	4.562	4.584	4.604	4.622	4.638	4.653	4.666	4.678
295	4.441	4.468	4.493	4.516	4.537	4.557	4.575	4.592	4.607	4.620	4.633
300	4.399	4.425	4.450	4.473	4.494	4.513	4.531	4.548	4.563	4.577	4.590
310	4.323	4.348	4.372	4.393	4.414	4.433	4.451	4.467	4.482	4.496	4.510
320	4.257	4.280	4.302	4.323	4.343	4.361	4.379	4.395	4.410	4.424	4.437
330	4.198	4.220	4.241	4.261	4.280	4.298	4.314	4.330	4.345	4.359	4.372
340	4.146	4.167	4.187	4.206	4.224	4.241	4.257	4.272	4.286	4.300	4.313
350	4.100	4.120	4.139	4.157	4.174	4.190	4.206	4.220	4.234	4.247	4.260
360	4.059	4.078	4.096	4.113	4.129	4.145	4.160	4.174	4.187	4.200	4.212
370	4.023	4.041	4.058	4.074	4.090	4.104	4.118	4.132	4.145	4.157	4.169
380	3.991	4.008	4.024	4.039	4.054	4.068	4.082	4.095	4.107	4.119	4.130
390	3.963	3.979	3.994	4.009	4.022	4.036	4.049	4.061	4.073	4.084	4.095
400	3.938	3.953	3.967	3.981	3.994	4.007	4.019	4.031	4.043	4.053	4.064

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(j) Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	1.400	1.459	1.535	1.640	-----	-----	-----	-----	-----	-----	-----
101	1.400	1.457	1.531	1.629	1.772	-----	-----	-----	-----	-----	-----
102	1.400	1.456	1.526	1.620	1.752	-----	-----	-----	-----	-----	-----
103	1.400	1.454	1.522	1.611	1.735	-----	-----	-----	-----	-----	-----
104	1.400	1.452	1.518	1.603	1.719	1.890	-----	-----	-----	-----	-----
105	1.400	1.451	1.514	1.595	1.704	1.861	-----	-----	-----	-----	-----
106	1.400	1.450	1.510	1.588	1.691	1.835	-----	-----	-----	-----	-----
107	1.400	1.448	1.507	1.581	1.678	1.812	2.013	-----	-----	-----	-----
108	1.400	1.447	1.504	1.575	1.666	1.791	1.973	-----	-----	-----	-----
109	1.400	1.446	1.501	1.569	1.656	1.772	1.937	-----	-----	-----	-----
110	1.400	1.444	1.498	1.563	1.646	1.754	1.906	2.135	-----	-----	-----
111	1.400	1.443	1.495	1.558	1.636	1.738	1.877	2.082	-----	-----	-----
112	1.400	1.442	1.492	1.552	1.627	1.723	1.852	2.036	2.326	-----	-----
113	1.400	1.441	1.489	1.548	1.619	1.710	1.829	1.995	2.248	-----	-----
114	1.400	1.440	1.487	1.543	1.611	1.697	1.808	1.960	2.182	2.551	-----
115	1.400	1.439	1.485	1.539	1.604	1.685	1.789	1.928	2.126	2.437	-----
116	1.400	1.438	1.482	1.534	1.597	1.674	1.772	1.900	2.077	2.345	2.809
117	1.400	1.437	1.480	1.530	1.591	1.664	1.755	1.874	2.034	2.268	2.647
118	1.400	1.436	1.478	1.527	1.584	1.654	1.740	1.850	1.997	2.202	2.520
119	1.400	1.436	1.476	1.523	1.578	1.645	1.727	1.829	1.963	2.147	2.418
120	1.400	1.435	1.474	1.520	1.573	1.636	1.714	1.810	1.933	2.098	2.333
121	1.400	1.434	1.472	1.516	1.568	1.628	1.702	1.792	1.905	2.055	2.262
122	1.400	1.433	1.470	1.513	1.563	1.621	1.690	1.775	1.881	2.017	2.201
123	1.400	1.432	1.469	1.510	1.558	1.614	1.680	1.760	1.858	1.983	2.148
124	1.400	1.432	1.467	1.507	1.553	1.607	1.670	1.745	1.837	1.953	2.101
125	1.400	1.431	1.465	1.504	1.549	1.600	1.661	1.732	1.818	1.925	2.060
126	1.400	1.430	1.464	1.502	1.545	1.594	1.652	1.720	1.801	1.900	2.024
127	1.400	1.430	1.462	1.499	1.541	1.588	1.644	1.708	1.784	1.877	1.991
128	1.400	1.429	1.461	1.497	1.537	1.583	1.636	1.697	1.769	1.856	1.961
129	1.400	1.428	1.459	1.494	1.533	1.578	1.628	1.687	1.755	1.836	1.934
130	1.400	1.428	1.458	1.492	1.530	1.573	1.621	1.677	1.742	1.818	1.909
132	1.400	1.427	1.456	1.488	1.523	1.563	1.608	1.659	1.718	1.786	1.866
134	1.400	1.425	1.453	1.484	1.517	1.555	1.596	1.644	1.697	1.758	1.829
136	1.400	1.424	1.451	1.480	1.512	1.547	1.586	1.629	1.678	1.733	1.796
138	1.400	1.424	1.449	1.476	1.506	1.539	1.576	1.616	1.661	1.712	1.768
140	1.400	1.423	1.447	1.473	1.502	1.533	1.567	1.605	1.646	1.692	1.744
142	1.400	1.422	1.445	1.470	1.497	1.527	1.559	1.594	1.632	1.675	1.722
144	1.400	1.421	1.443	1.467	1.493	1.521	1.551	1.584	1.620	1.659	1.702
146	1.400	1.420	1.441	1.464	1.489	1.515	1.544	1.575	1.608	1.645	1.685
148	1.400	1.419	1.440	1.462	1.485	1.510	1.537	1.566	1.598	1.632	1.669
150	1.400	1.419	1.438	1.459	1.482	1.506	1.531	1.559	1.588	1.620	1.654

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
116	2.809	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
117	2.647	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	2.520	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
119	2.418	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	2.333	4.078	-----	-----	-----	-----	-----	-----	-----	-----	-----
121	2.262	3.549	-----	-----	-----	-----	-----	-----	-----	-----	-----
122	2.201	3.210	-----	-----	-----	-----	-----	-----	-----	-----	-----
123	2.143	2.971	-----	-----	-----	-----	-----	-----	-----	-----	-----
124	2.101	2.792	6.601	-----	-----	-----	-----	-----	-----	-----	-----
125	2.060	2.652	4.882	-----	-----	-----	-----	-----	-----	-----	-----
126	2.024	2.538	4.088	-----	-----	-----	-----	-----	-----	-----	-----
127	1.991	2.444	3.615	38.361	5.601	4.071	3.464	3.125	2.902	2.744	2.623
128	1.961	2.365	3.294	8.484	7.654	4.630	3.752	3.310	3.037	2.849	2.710
129	1.934	2.297	3.060	5.837	13.079	5.444	4.111	3.526	3.188	2.964	2.802
130	1.909	2.238	2.881	4.719	17.830	6.681	4.568	3.780	3.357	3.089	2.900
132	1.866	2.141	2.622	3.663	7.029	10.052	5.869	4.428	3.761	3.373	3.117
134	1.829	2.063	2.441	3.139	4.702	7.965	7.236	5.245	4.252	3.705	3.362
136	1.796	2.000	2.308	2.818	3.761	5.530	6.916	5.903	4.767	4.067	3.627
138	1.768	1.947	2.205	2.600	3.247	4.319	5.615	5.850	5.115	4.396	3.888
140	1.744	1.902	2.122	2.440	2.919	3.645	4.586	5.230	5.099	4.589	4.100
142	1.722	1.864	2.054	2.318	2.691	3.220	3.903	4.540	4.771	4.571	4.209
144	1.702	1.831	1.998	2.221	2.523	2.929	3.443	3.978	4.332	4.373	4.186
146	1.685	1.801	1.950	2.142	2.392	2.717	3.118	3.554	3.915	4.085	4.051
148	1.669	1.775	1.908	2.076	2.288	2.555	2.878	3.234	3.562	3.782	3.850
150	1.654	1.752	1.872	2.020	2.204	2.428	2.694	2.989	3.276	3.503	3.627

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$						
	70	75	80	85	90	95	100
127	2.623	2.528	2.450	2.385	2.330	2.282	2.240
128	2.710	2.601	2.514	2.442	2.381	2.329	2.283
129	2.802	2.678	2.580	2.500	2.433	2.376	2.327
130	2.900	2.759	2.649	2.560	2.487	2.424	2.371
132	3.117	2.934	2.795	2.686	2.597	2.523	2.460
134	3.362	3.126	2.952	2.818	2.712	2.624	2.551
136	3.627	3.330	3.117	2.955	2.829	2.727	2.642
138	3.888	3.536	3.283	3.094	2.947	2.829	2.732
140	4.100	3.723	3.441	3.227	3.061	2.929	2.820
142	4.209	3.860	3.573	3.346	3.166	3.021	2.903
144	4.186	3.919	3.661	3.438	3.254	3.102	2.977
146	4.051	3.892	3.691	3.493	3.318	3.167	3.039
148	3.850	3.792	3.661	3.505	3.350	3.209	3.084
150	3.627	3.644	3.581	3.473	3.349	3.226	3.111

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(j) Continued. Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
127	2.240	2.170	2.113	2.066	2.025	1.990	1.960	1.933	1.908	1.886	1.866
128	2.283	2.208	2.147	2.096	2.053	2.017	1.984	1.956	1.931	1.908	1.887
129	2.327	2.245	2.180	2.126	2.081	2.043	2.009	1.979	1.952	1.929	1.907
130	2.371	2.283	2.213	2.157	2.109	2.068	2.033	2.002	1.974	1.949	1.927
132	2.460	2.359	2.280	2.216	2.163	2.118	2.079	2.045	2.015	1.988	1.964
134	2.551	2.434	2.345	2.274	2.215	2.166	2.124	2.087	2.054	2.026	2.000
136	2.642	2.509	2.409	2.330	2.265	2.212	2.166	2.126	2.092	2.061	2.033
138	2.732	2.583	2.471	2.384	2.314	2.255	2.206	2.164	2.126	2.094	2.064
140	2.820	2.653	2.531	2.435	2.359	2.297	2.244	2.198	2.159	2.124	2.093
142	2.903	2.721	2.587	2.484	2.402	2.335	2.279	2.231	2.189	2.152	2.120
144	2.977	2.782	2.639	2.529	2.442	2.371	2.312	2.261	2.217	2.179	2.144
146	3.039	2.836	2.686	2.571	2.479	2.404	2.341	2.288	2.242	2.202	2.167
148	3.084	2.881	2.727	2.607	2.512	2.433	2.368	2.313	2.266	2.224	2.187
150	3.111	2.915	2.760	2.638	2.540	2.460	2.392	2.335	2.286	2.243	2.205

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
127	1.866	1.848	1.831	1.816	1.801	1.788	1.775	1.763	1.752	1.742	1.732
128	1.887	1.868	1.850	1.834	1.819	1.805	1.792	1.780	1.768	1.758	1.747
129	1.907	1.887	1.869	1.852	1.837	1.822	1.809	1.796	1.784	1.773	1.762
130	1.927	1.906	1.887	1.870	1.854	1.839	1.825	1.812	1.800	1.788	1.777
132	1.964	1.942	1.922	1.904	1.886	1.871	1.856	1.842	1.829	1.817	1.805
134	2.000	1.976	1.955	1.935	1.917	1.900	1.885	1.870	1.856	1.843	1.831
136	2.033	2.008	1.985	1.965	1.945	1.928	1.911	1.896	1.881	1.868	1.855
138	2.064	2.038	2.014	1.992	1.972	1.953	1.936	1.920	1.905	1.891	1.877
140	2.093	2.065	2.040	2.017	1.996	1.977	1.959	1.942	1.926	1.912	1.898
142	2.120	2.091	2.064	2.040	2.018	1.998	1.979	1.962	1.946	1.930	1.916
144	2.144	2.114	2.086	2.061	2.039	2.018	1.998	1.980	1.963	1.948	1.933
146	2.167	2.135	2.107	2.081	2.057	2.035	2.015	1.997	1.979	1.963	1.948
148	2.187	2.154	2.125	2.098	2.074	2.051	2.031	2.012	1.994	1.977	1.962
150	2.205	2.172	2.141	2.114	2.089	2.066	2.045	2.025	2.007	1.990	1.974

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	1.400	1.506	1.654	1.872	2.204	2.694	3.276	3.627	3.581	3.349	3.111
155	1.400	1.495	1.623	1.800	2.046	2.381	2.778	3.119	3.265	3.223	3.091
160	1.400	1.486	1.598	1.745	1.938	2.184	2.471	2.746	2.934	3.001	2.970
165	1.400	1.479	1.577	1.702	1.858	2.049	2.267	2.484	2.662	2.769	2.801
170	1.400	1.472	1.560	1.667	1.797	1.951	2.122	2.297	2.452	2.565	2.629
175	1.400	1.466	1.545	1.639	1.749	1.876	2.016	2.158	2.290	2.398	2.472
180	1.400	1.461	1.532	1.615	1.710	1.818	1.934	2.053	2.165	2.262	2.337
185	1.400	1.456	1.521	1.595	1.678	1.770	1.869	1.970	2.066	2.153	2.224
190	1.400	1.452	1.511	1.577	1.651	1.732	1.817	1.903	1.987	2.064	2.130
195	1.400	1.448	1.502	1.563	1.628	1.699	1.773	1.849	1.922	1.990	2.051
200	1.400	1.445	1.495	1.550	1.609	1.672	1.737	1.803	1.868	1.929	1.984
205	1.400	1.442	1.488	1.538	1.592	1.648	1.707	1.765	1.823	1.878	1.928
210	1.400	1.439	1.482	1.528	1.577	1.628	1.680	1.733	1.785	1.834	1.879
215	1.400	1.437	1.477	1.519	1.564	1.610	1.657	1.705	1.751	1.796	1.838
220	1.400	1.435	1.472	1.511	1.552	1.594	1.637	1.681	1.723	1.763	1.801
225	1.400	1.433	1.467	1.504	1.541	1.580	1.620	1.659	1.698	1.735	1.770
230	1.400	1.431	1.463	1.497	1.532	1.568	1.604	1.640	1.676	1.710	1.742
235	1.400	1.429	1.460	1.491	1.524	1.557	1.590	1.624	1.656	1.687	1.717
240	1.400	1.428	1.456	1.486	1.516	1.547	1.578	1.609	1.639	1.668	1.695
245	1.400	1.426	1.453	1.481	1.509	1.538	1.567	1.595	1.623	1.650	1.676
250	1.400	1.425	1.450	1.476	1.503	1.530	1.557	1.583	1.609	1.634	1.658
255	1.400	1.423	1.448	1.472	1.497	1.522	1.547	1.572	1.596	1.620	1.642
260	1.400	1.422	1.445	1.468	1.492	1.515	1.539	1.562	1.585	1.607	1.628
265	1.400	1.421	1.443	1.465	1.487	1.509	1.531	1.553	1.574	1.595	1.615
270	1.400	1.420	1.441	1.461	1.482	1.503	1.524	1.545	1.565	1.584	1.603
275	1.400	1.419	1.439	1.458	1.478	1.498	1.518	1.537	1.556	1.574	1.592
280	1.400	1.418	1.437	1.456	1.474	1.493	1.512	1.530	1.548	1.565	1.582
285	1.400	1.417	1.435	1.453	1.471	1.489	1.506	1.523	1.540	1.557	1.572
290	1.400	1.417	1.434	1.451	1.468	1.484	1.501	1.517	1.533	1.549	1.564
295	1.400	1.416	1.432	1.448	1.464	1.480	1.496	1.512	1.527	1.542	1.556
300	1.400	1.415	1.431	1.446	1.461	1.477	1.492	1.507	1.521	1.535	1.548
310	1.400	1.414	1.428	1.442	1.456	1.470	1.484	1.497	1.510	1.523	1.535
320	1.400	1.413	1.426	1.439	1.451	1.464	1.477	1.489	1.501	1.512	1.523
330	1.399	1.411	1.423	1.435	1.447	1.459	1.470	1.482	1.492	1.503	1.513
340	1.399	1.410	1.422	1.433	1.443	1.454	1.465	1.475	1.485	1.495	1.504
350	1.399	1.409	1.420	1.430	1.440	1.450	1.460	1.469	1.478	1.487	1.496
360	1.399	1.408	1.418	1.427	1.437	1.446	1.455	1.464	1.472	1.481	1.489
370	1.398	1.407	1.416	1.425	1.434	1.442	1.451	1.459	1.467	1.475	1.482
380	1.398	1.406	1.415	1.423	1.431	1.439	1.447	1.455	1.462	1.469	1.476
390	1.398	1.405	1.413	1.421	1.429	1.436	1.443	1.450	1.457	1.464	1.471
400	1.397	1.404	1.412	1.419	1.426	1.433	1.440	1.447	1.453	1.459	1.465

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(j) Concluded. Plenum specific-heat ratio, γ_o

Plenum temperature K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	3.111	2.915	2.760	2.638	2.540	2.460	2.392	2.335	2.286	2.243	2.205
155	3.091	2.941	2.805	2.688	2.590	2.508	2.439	2.379	2.327	2.282	2.242
160	2.970	2.888	2.791	2.695	2.608	2.531	2.464	2.405	2.353	2.307	2.267
165	2.801	2.779	2.726	2.660	2.592	2.527	2.467	2.412	2.363	2.319	2.279
170	2.629	2.646	2.631	2.595	2.549	2.499	2.450	2.403	2.359	2.318	2.281
175	2.472	2.512	2.522	2.511	2.485	2.452	2.416	2.378	2.341	2.306	2.272
180	2.337	2.387	2.413	2.420	2.412	2.393	2.369	2.341	2.312	2.283	2.254
185	2.224	2.278	2.312	2.330	2.334	2.328	2.315	2.297	2.275	2.253	2.229
190	2.130	2.183	2.221	2.246	2.259	2.262	2.257	2.247	2.233	2.217	2.199
195	2.051	2.101	2.141	2.169	2.187	2.197	2.199	2.196	2.188	2.177	2.164
200	1.984	2.032	2.070	2.100	2.122	2.136	2.143	2.145	2.142	2.136	2.128
205	1.928	1.972	2.009	2.039	2.062	2.079	2.090	2.095	2.097	2.095	2.090
210	1.879	1.920	1.956	1.985	2.009	2.027	2.040	2.049	2.053	2.055	2.053
215	1.838	1.875	1.909	1.937	1.961	1.980	1.995	2.005	2.012	2.016	2.017
220	1.801	1.836	1.868	1.895	1.918	1.937	1.953	1.965	1.973	1.979	1.982
225	1.770	1.802	1.831	1.857	1.880	1.899	1.915	1.927	1.937	1.944	1.949
230	1.742	1.772	1.799	1.824	1.846	1.864	1.880	1.893	1.904	1.912	1.917
235	1.717	1.745	1.771	1.794	1.815	1.833	1.849	1.862	1.873	1.881	1.888
240	1.695	1.721	1.745	1.767	1.787	1.805	1.820	1.833	1.844	1.853	1.861
245	1.676	1.700	1.723	1.743	1.762	1.779	1.794	1.807	1.818	1.827	1.835
250	1.658	1.681	1.702	1.722	1.740	1.756	1.770	1.783	1.794	1.803	1.812
255	1.642	1.663	1.683	1.702	1.719	1.734	1.748	1.761	1.772	1.781	1.790
260	1.628	1.648	1.667	1.684	1.700	1.715	1.729	1.741	1.751	1.761	1.769
265	1.615	1.633	1.651	1.668	1.683	1.697	1.710	1.722	1.733	1.742	1.750
270	1.603	1.620	1.637	1.653	1.668	1.681	1.694	1.705	1.715	1.724	1.732
275	1.592	1.608	1.624	1.639	1.653	1.666	1.678	1.689	1.699	1.708	1.716
280	1.582	1.597	1.612	1.627	1.640	1.652	1.664	1.674	1.684	1.693	1.701
285	1.572	1.587	1.602	1.615	1.628	1.640	1.651	1.661	1.670	1.679	1.687
290	1.564	1.578	1.592	1.604	1.617	1.628	1.638	1.648	1.657	1.666	1.673
295	1.556	1.569	1.582	1.595	1.606	1.617	1.627	1.637	1.645	1.653	1.661
300	1.548	1.561	1.574	1.585	1.596	1.607	1.617	1.626	1.634	1.642	1.649
310	1.535	1.547	1.558	1.569	1.579	1.589	1.598	1.606	1.614	1.621	1.628
320	1.523	1.534	1.545	1.554	1.564	1.573	1.581	1.589	1.596	1.603	1.610
330	1.513	1.523	1.533	1.542	1.550	1.558	1.566	1.574	1.581	1.587	1.593
340	1.504	1.513	1.522	1.530	1.538	1.546	1.553	1.560	1.567	1.573	1.578
350	1.496	1.504	1.513	1.520	1.528	1.535	1.542	1.548	1.554	1.560	1.565
360	1.489	1.497	1.504	1.511	1.518	1.525	1.531	1.537	1.543	1.548	1.553
370	1.482	1.489	1.496	1.503	1.510	1.516	1.522	1.527	1.533	1.538	1.543
380	1.476	1.483	1.489	1.496	1.502	1.507	1.513	1.518	1.523	1.528	1.533
390	1.471	1.477	1.483	1.489	1.495	1.500	1.505	1.510	1.515	1.519	1.524
400	1.465	1.471	1.477	1.483	1.488	1.493	1.498	1.503	1.507	1.511	1.516

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	2.205	2.172	2.141	2.114	2.089	2.066	2.045	2.025	2.007	1.990	1.974
155	2.242	2.207	2.175	2.146	2.119	2.095	2.073	2.052	2.033	2.015	1.999
160	2.267	2.230	2.198	2.168	2.141	2.116	2.093	2.072	2.052	2.034	2.017
165	2.279	2.244	2.211	2.181	2.154	2.129	2.106	2.084	2.064	2.046	2.029
170	2.281	2.247	2.215	2.187	2.160	2.135	2.112	2.091	2.071	2.053	2.035
175	2.272	2.241	2.212	2.184	2.159	2.135	2.113	2.093	2.073	2.055	2.038
180	2.254	2.227	2.201	2.176	2.152	2.130	2.109	2.090	2.071	2.054	2.037
185	2.229	2.206	2.183	2.161	2.140	2.120	2.101	2.082	2.065	2.048	2.033
190	2.199	2.180	2.161	2.142	2.124	2.106	2.088	2.072	2.055	2.040	2.025
195	2.164	2.150	2.135	2.119	2.103	2.088	2.073	2.058	2.043	2.029	2.015
200	2.128	2.117	2.106	2.093	2.081	2.067	2.054	2.041	2.028	2.016	2.003
205	2.090	2.084	2.075	2.066	2.056	2.045	2.034	2.023	2.012	2.000	1.990
210	2.053	2.049	2.044	2.037	2.030	2.021	2.012	2.003	1.993	1.984	1.974
215	2.017	2.016	2.013	2.008	2.003	1.997	1.990	1.982	1.974	1.966	1.958
220	1.982	1.983	1.982	1.980	1.976	1.972	1.966	1.961	1.954	1.947	1.940
225	1.949	1.951	1.952	1.952	1.950	1.947	1.943	1.939	1.934	1.928	1.923
230	1.917	1.921	1.924	1.925	1.924	1.923	1.920	1.917	1.914	1.909	1.905
235	1.888	1.893	1.896	1.898	1.899	1.899	1.898	1.896	1.893	1.890	1.887
240	1.861	1.866	1.871	1.874	1.875	1.876	1.876	1.875	1.874	1.871	1.869
245	1.835	1.842	1.846	1.850	1.853	1.854	1.855	1.855	1.854	1.853	1.851
250	1.812	1.818	1.824	1.828	1.831	1.833	1.835	1.836	1.836	1.835	1.834
255	1.790	1.796	1.802	1.807	1.811	1.814	1.816	1.817	1.818	1.818	1.817
260	1.769	1.776	1.782	1.787	1.791	1.795	1.797	1.799	1.800	1.801	1.801
265	1.750	1.757	1.764	1.769	1.773	1.777	1.780	1.782	1.784	1.785	1.785
270	1.732	1.740	1.746	1.751	1.756	1.760	1.763	1.766	1.768	1.769	1.770
275	1.716	1.723	1.730	1.735	1.740	1.744	1.748	1.750	1.753	1.755	1.756
280	1.701	1.708	1.714	1.720	1.725	1.729	1.733	1.736	1.738	1.741	1.742
285	1.687	1.694	1.700	1.706	1.711	1.715	1.719	1.722	1.725	1.727	1.729
290	1.673	1.680	1.686	1.692	1.697	1.702	1.705	1.709	1.712	1.714	1.717
295	1.661	1.668	1.674	1.679	1.684	1.689	1.693	1.696	1.700	1.702	1.705
300	1.649	1.656	1.662	1.668	1.673	1.677	1.681	1.685	1.688	1.691	1.693
310	1.628	1.635	1.640	1.646	1.651	1.655	1.659	1.663	1.666	1.669	1.672
320	1.610	1.616	1.621	1.626	1.631	1.636	1.640	1.643	1.647	1.650	1.653
330	1.593	1.599	1.604	1.609	1.614	1.618	1.622	1.626	1.629	1.632	1.635
340	1.578	1.584	1.589	1.594	1.598	1.602	1.606	1.610	1.613	1.616	1.619
350	1.565	1.570	1.575	1.580	1.584	1.588	1.592	1.595	1.599	1.602	1.605
360	1.553	1.558	1.563	1.567	1.571	1.575	1.579	1.582	1.585	1.588	1.591
370	1.543	1.547	1.552	1.556	1.560	1.563	1.567	1.570	1.573	1.576	1.579
380	1.533	1.537	1.541	1.545	1.549	1.553	1.556	1.559	1.562	1.565	1.568
390	1.524	1.528	1.532	1.536	1.539	1.543	1.546	1.549	1.552	1.555	1.557
400	1.516	1.520	1.523	1.527	1.530	1.534	1.537	1.540	1.542	1.545	1.548

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(k) Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
100	203.9	199.6	194.9	189.8	-----	-----	-----	-----	-----	-----	-----
101	204.9	200.7	196.2	191.2	185.6	-----	-----	-----	-----	-----	-----
102	205.9	201.8	197.4	192.6	187.3	-----	-----	-----	-----	-----	-----
103	206.9	202.9	198.7	194.1	188.9	-----	-----	-----	-----	-----	-----
104	207.9	204.0	199.9	195.4	190.5	184.9	-----	-----	-----	-----	-----
105	208.9	205.1	201.1	196.8	192.0	186.7	-----	-----	-----	-----	-----
106	209.9	206.2	202.3	198.1	193.6	188.5	-----	-----	-----	-----	-----
107	210.9	207.3	203.5	199.5	195.0	190.2	184.6	-----	-----	-----	-----
108	211.9	208.4	204.7	200.8	196.5	191.8	186.6	-----	-----	-----	-----
109	212.8	209.5	205.9	202.1	198.0	193.5	188.5	-----	-----	-----	-----
110	213.8	210.5	207.0	203.3	199.4	195.1	190.3	184.9	-----	-----	-----
111	214.8	211.6	208.2	204.6	200.8	196.6	192.1	187.0	-----	-----	-----
112	215.7	212.6	209.3	205.8	202.1	198.2	193.8	189.0	183.5	-----	-----
113	216.7	213.6	210.4	207.1	203.5	199.7	195.5	190.9	185.8	-----	-----
114	217.7	214.7	211.6	208.3	204.8	201.1	197.1	192.8	188.0	182.4	-----
115	218.6	215.7	212.7	209.5	206.1	202.6	198.7	194.6	190.0	184.9	-----
116	219.6	216.7	213.8	210.7	207.4	204.0	200.3	196.4	192.1	187.2	181.6
117	220.5	217.7	214.9	211.9	208.7	205.4	201.9	198.1	194.0	189.5	184.3
118	221.4	218.7	215.9	213.0	210.0	206.8	203.4	199.8	195.9	191.6	186.9
119	222.4	219.7	217.0	214.2	211.2	208.1	204.8	201.4	197.7	193.7	189.2
120	223.3	220.7	218.1	215.3	212.5	209.4	206.3	203.0	199.4	195.6	191.5
121	224.2	221.7	219.1	216.5	213.7	210.8	207.7	204.5	201.2	197.6	193.7
122	225.2	222.7	220.2	217.6	214.9	212.1	209.1	206.1	202.8	199.4	195.7
123	226.1	223.7	221.2	218.7	216.1	213.3	210.5	207.6	204.5	201.2	197.7
124	227.0	224.7	222.3	219.8	217.2	214.6	211.9	209.0	206.1	202.9	199.7
125	227.9	225.6	223.3	220.9	218.4	215.9	213.2	210.5	207.6	204.6	201.5
126	228.8	226.6	224.3	222.0	219.6	217.1	214.5	211.9	209.1	206.3	203.3
127	229.7	227.6	225.3	223.1	220.7	218.3	215.8	213.3	210.6	207.9	205.1
128	230.6	228.5	226.3	224.1	221.9	219.5	217.1	214.7	212.1	209.5	206.8
129	231.5	229.5	227.4	225.2	223.0	220.7	218.4	216.0	213.6	211.0	208.5
130	232.4	230.4	228.3	226.2	224.1	221.9	219.6	217.3	215.0	212.6	210.1
132	234.2	232.3	230.3	228.3	226.3	224.2	222.1	219.9	217.8	215.5	213.2
134	236.0	234.1	232.3	230.4	228.5	226.5	224.5	222.5	220.4	218.4	216.3
136	237.7	236.0	234.2	232.4	230.6	228.7	226.9	225.0	223.0	221.1	219.2
138	239.5	237.8	236.1	234.4	232.7	230.9	229.2	227.4	225.6	223.8	222.0
140	241.2	239.6	238.0	236.4	234.7	233.1	231.4	229.7	228.1	226.4	224.7
142	242.9	241.4	239.9	238.3	236.8	235.2	233.6	232.1	230.5	228.9	227.3
144	244.6	243.2	241.7	240.2	238.8	237.3	235.8	234.3	232.9	231.4	229.9
146	246.3	244.9	243.5	242.1	240.7	239.3	238.0	236.6	235.2	233.8	232.4
148	248.0	246.7	245.4	244.0	242.7	241.4	240.1	238.7	237.4	236.1	234.9
150	249.7	248.4	247.1	245.9	244.6	243.4	242.1	240.9	239.7	238.4	237.2

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	20	25	30	35	40	45	50	55	60	65	70
116	181.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
117	184.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	186.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
119	189.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	191.5	178.4	-----	-----	-----	-----	-----	-----	-----	-----	-----
121	193.7	181.9	-----	-----	-----	-----	-----	-----	-----	-----	-----
122	195.7	185.0	-----	-----	-----	-----	-----	-----	-----	-----	-----
123	197.7	187.8	-----	-----	-----	-----	-----	-----	-----	-----	-----
124	199.7	190.4	178.3	-----	-----	-----	-----	-----	-----	-----	-----
125	201.5	192.9	182.3	-----	-----	-----	-----	-----	-----	-----	-----
126	203.3	195.2	185.8	-----	-----	-----	-----	-----	-----	-----	-----
127	205.1	197.5	188.8	180.9	263.1	296.7	322.5	344.2	363.1	380.0	395.5
128	206.8	199.6	191.7	183.6	241.1	280.6	309.1	332.4	352.5	370.3	386.5
129	208.5	201.6	194.3	186.9	216.0	263.6	295.2	320.3	341.6	360.4	377.4
130	210.1	203.6	196.7	190.0	195.1	245.8	280.8	307.9	330.6	350.3	368.0
132	213.2	207.4	201.3	195.5	192.8	213.7	251.9	282.7	308.0	329.8	349.1
134	216.3	210.9	205.5	200.4	197.1	202.1	227.5	258.5	285.8	309.3	330.1
136	219.2	214.2	209.4	204.9	201.7	202.6	214.7	238.9	265.4	289.7	311.5
138	222.0	217.5	213.0	209.0	206.0	205.7	211.5	226.9	249.1	272.3	294.2
140	224.7	220.5	216.5	212.9	210.1	209.3	212.3	221.8	238.2	258.3	279.1
142	227.3	223.5	219.8	216.5	214.0	212.9	214.6	220.7	232.3	248.5	267.0
144	229.9	226.3	222.9	219.9	217.6	216.5	217.5	221.6	230.0	242.5	258.1
146	232.4	229.1	226.0	223.2	221.1	220.0	220.6	223.5	229.7	239.4	252.2
148	234.9	231.8	228.9	226.4	224.5	223.4	223.7	225.9	230.6	238.2	248.6
150	237.2	234.4	231.7	229.4	227.6	226.7	226.8	228.5	232.3	238.4	246.9

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$						
	70	75	80	85	90	95	100
127	395.5	409.8	423.1	435.6	447.4	458.5	469.2
128	386.5	401.4	415.2	428.1	440.3	451.8	462.7
129	377.4	392.8	407.1	420.5	433.0	444.9	456.1
130	368.0	384.1	399.0	412.8	425.7	437.9	449.4
132	349.1	366.5	382.4	397.1	410.8	423.7	435.8
134	330.1	348.7	365.6	381.2	395.7	409.3	422.1
136	311.5	331.2	349.0	365.5	380.7	394.9	408.2
138	294.2	314.4	332.9	350.0	365.9	380.6	394.5
140	279.1	299.1	317.8	335.3	351.5	366.8	381.1
142	267.0	285.8	304.2	321.6	338.0	353.5	368.1
144	258.1	275.1	292.4	309.4	325.6	341.1	355.9
146	252.2	267.0	282.8	298.8	314.6	329.9	344.5
148	248.6	261.3	275.4	290.2	305.1	319.9	334.2
150	246.9	257.6	270.0	283.3	297.2	311.2	325.1

TABLE I. - Continued. THERMODYNAMIC PROPERTIES OF NITROGEN

(k) Continued. Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
127	469.2	489.1	507.5	524.6	540.7	555.9	570.2	583.9	597.0	609.5	621.5
128	462.7	483.1	501.9	519.4	535.8	551.3	565.9	579.8	593.0	605.7	617.9
129	456.1	477.1	496.3	514.2	530.9	546.6	561.4	575.5	589.0	601.9	614.2
130	449.4	470.9	490.6	508.8	525.8	541.8	556.9	571.2	584.9	597.9	610.5
132	435.8	458.4	478.9	497.9	515.5	532.1	547.6	562.4	576.5	589.9	602.7
134	422.1	445.6	467.0	486.7	505.0	522.1	538.1	553.3	567.8	581.5	594.7
136	408.2	432.8	455.0	475.4	494.3	511.9	528.5	544.1	558.9	573.0	586.5
138	394.5	420.0	443.0	464.0	483.5	501.6	518.6	534.7	549.8	564.3	578.0
140	381.1	407.3	431.0	452.7	472.7	491.3	508.8	525.2	540.7	555.4	569.5
142	368.1	395.0	419.3	441.5	462.0	481.1	498.9	515.6	531.5	546.5	560.9
144	355.9	383.1	407.9	430.6	451.5	470.9	489.1	506.2	522.3	537.6	552.2
146	344.5	371.9	396.9	419.9	441.2	460.9	479.4	496.8	513.2	528.8	543.6
148	334.2	361.4	386.5	409.7	431.2	451.2	469.9	487.6	504.2	520.0	535.1
150	325.1	351.8	376.7	400.0	421.6	441.8	460.7	478.6	495.4	511.4	526.6

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
127	621.5	633.0	644.2	655.0	665.4	675.5	685.3	694.9	704.2	713.2	722.1
128	617.9	629.6	640.9	651.8	662.4	672.6	682.5	692.2	701.5	710.7	719.6
129	614.2	626.1	637.5	648.5	659.2	669.6	679.6	689.3	698.8	708.0	717.0
130	610.5	622.5	634.0	645.2	656.0	666.5	676.6	686.4	696.0	705.3	714.4
132	602.7	615.0	626.9	638.3	649.3	660.0	670.3	680.4	690.1	699.6	708.9
134	594.7	607.3	619.4	631.1	642.4	653.3	663.8	674.0	684.0	693.6	703.0
136	586.5	599.3	611.7	623.7	635.1	646.2	657.0	667.4	677.5	687.3	696.9
138	578.0	591.2	603.8	616.0	627.7	639.0	650.0	660.6	670.8	680.8	690.5
140	569.5	582.9	595.8	608.2	620.1	631.6	642.7	653.5	664.0	674.1	683.9
142	560.9	574.6	587.7	600.3	612.4	624.1	635.4	646.3	656.9	667.2	677.2
144	552.2	566.2	579.5	592.3	604.6	616.5	627.9	639.0	649.8	660.2	670.3
146	543.6	557.8	571.3	584.3	596.8	608.8	620.4	631.7	642.6	653.1	663.4
148	535.1	549.4	563.1	576.3	589.0	601.1	612.9	624.3	635.3	646.0	656.4
150	526.6	541.1	555.0	568.4	581.2	593.5	605.4	616.9	628.1	638.9	649.3

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	249.7	243.4	237.2	231.7	227.6	226.8	232.3	246.9	270.0	297.2	325.1
155	253.8	248.3	243.0	238.4	235.1	234.3	237.8	247.2	263.1	284.1	307.7
160	257.9	253.0	248.5	244.6	242.0	241.4	243.9	250.6	262.2	278.1	297.3
165	261.9	257.6	253.7	250.5	248.5	248.1	250.2	255.4	264.2	276.7	292.1
170	265.8	262.0	258.7	256.1	254.5	254.4	256.2	260.6	267.7	277.8	290.5
175	269.7	266.4	263.6	261.5	260.3	260.4	262.1	265.9	271.9	280.3	291.0
180	273.5	270.7	268.3	266.6	265.7	266.0	267.7	271.2	276.4	283.7	292.9
185	277.3	274.8	272.8	271.5	271.0	271.4	273.2	276.4	281.1	287.5	295.6
190	281.0	278.9	277.3	276.2	276.0	276.6	278.4	281.4	285.8	291.6	298.8
195	284.7	282.9	281.6	280.9	280.8	281.7	283.5	286.4	290.5	295.8	302.3
200	288.3	286.8	285.8	285.3	285.5	286.5	288.3	291.2	295.1	300.0	306.1
205	291.9	290.7	289.9	289.7	290.0	291.2	293.1	295.9	299.6	304.3	309.9
210	295.4	294.5	293.9	293.9	294.5	295.7	297.6	300.4	304.0	308.5	313.8
215	298.9	298.2	297.9	298.0	298.7	300.1	302.1	304.8	308.3	312.6	317.7
220	302.4	301.8	301.7	302.1	302.9	304.4	306.4	309.2	312.6	316.7	321.5
225	305.8	305.5	305.5	306.0	307.0	308.5	310.6	313.4	316.7	320.7	325.4
230	309.2	309.0	309.2	309.9	311.0	312.6	314.8	317.5	320.8	324.7	329.2
235	312.5	312.5	312.9	313.7	314.9	316.6	318.8	321.5	324.8	328.6	333.0
240	315.8	316.0	316.5	317.4	318.7	320.5	322.7	325.5	328.7	332.4	336.7
245	319.1	319.4	320.0	321.0	322.5	324.3	326.6	329.3	332.5	336.2	340.3
250	322.3	322.8	323.5	324.6	326.1	328.0	330.4	333.1	336.3	339.9	344.0
255	325.5	326.1	327.0	328.2	329.7	331.7	334.1	336.8	340.0	343.6	347.5
260	328.7	329.4	330.3	331.7	333.3	335.3	337.7	340.5	343.6	347.1	351.1
265	331.8	332.6	333.7	335.1	336.8	338.9	341.3	344.0	347.2	350.7	354.5
270	334.9	335.8	337.0	338.5	340.2	342.3	344.8	347.6	350.7	354.2	357.9
275	338.0	339.0	340.2	341.8	343.6	345.8	348.2	351.0	354.1	357.6	361.3
280	341.1	342.1	343.5	345.1	347.0	349.1	351.6	354.4	357.5	360.9	364.6
285	344.1	345.3	346.6	348.3	350.2	352.5	355.0	357.8	360.9	364.3	367.9
290	347.1	348.3	349.8	351.5	353.5	355.7	358.3	361.1	364.2	367.5	371.2
295	350.1	351.4	352.9	354.7	356.7	359.0	361.5	364.3	367.4	370.8	374.4
300	353.0	354.4	356.0	357.8	359.9	362.2	364.7	367.6	370.6	374.0	377.5
310	358.9	360.3	362.0	363.9	366.1	368.4	371.0	373.9	376.9	380.2	383.7
320	364.6	366.2	367.9	369.9	372.1	374.5	377.2	380.0	383.0	386.3	389.8
330	370.2	371.9	373.7	375.8	378.0	380.5	383.1	386.0	389.0	392.3	395.7
340	375.8	377.5	379.4	381.5	383.8	386.3	389.0	391.8	394.9	398.1	401.4
350	381.2	383.0	385.0	387.2	389.5	392.0	394.7	397.6	400.6	403.8	407.1
360	386.6	388.5	390.5	392.7	395.1	397.6	400.3	403.2	406.2	409.3	412.6
370	391.9	393.8	395.9	398.1	400.5	403.1	405.8	408.6	411.6	414.8	418.0
380	397.1	399.1	401.2	403.5	405.9	408.5	411.2	414.0	417.0	420.1	423.4
390	402.2	404.2	406.4	408.7	411.2	413.7	416.4	419.3	422.3	425.4	428.6
400	407.2	409.3	411.5	413.9	416.3	418.9	421.6	424.5	427.4	430.5	433.7

TABLE I. - Concluded. THERMODYNAMIC PROPERTIES OF NITROGEN

(k) Concluded. Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	325.1	351.8	376.7	400.0	421.6	441.8	460.7	478.6	495.4	511.4	526.6
155	307.7	331.9	355.6	378.3	399.7	420.0	439.2	457.3	474.4	490.7	506.3
160	297.3	318.2	339.6	360.9	381.5	401.2	420.1	438.2	455.4	471.8	487.4
165	292.1	309.7	328.6	347.8	367.0	385.8	404.1	421.7	438.6	454.8	470.4
170	290.5	305.3	321.6	338.7	356.2	373.7	391.0	407.9	424.3	440.1	455.5
175	291.0	303.6	317.7	332.8	348.6	364.7	380.8	396.8	412.4	427.7	442.6
180	292.9	303.7	316.0	329.4	343.6	358.3	373.2	388.1	402.9	417.5	431.8
185	295.6	305.1	316.0	327.9	340.7	354.0	367.7	381.6	395.5	409.3	423.0
190	298.8	307.3	317.0	327.7	339.3	351.4	364.0	376.9	389.9	402.9	415.9
195	302.3	310.1	318.8	328.5	339.0	350.1	361.7	373.7	385.8	398.1	410.4
200	306.1	313.1	321.2	330.0	339.7	349.9	360.6	371.7	383.0	394.5	406.2
205	309.9	316.4	323.9	332.0	340.9	350.4	360.3	370.7	381.3	392.1	403.1
210	313.8	319.9	326.8	334.4	342.7	351.5	360.8	370.4	380.4	390.6	401.0
215	317.7	323.4	329.9	337.1	344.8	353.1	361.8	370.8	380.2	389.8	399.7
220	321.5	327.0	333.2	339.9	347.2	355.0	363.1	371.7	380.6	389.7	399.0
225	325.4	330.6	336.5	342.9	349.8	357.1	364.9	373.0	381.4	390.0	398.9
230	329.2	334.2	339.8	345.9	352.5	359.5	366.8	374.5	382.5	390.8	399.2
235	333.0	337.8	343.2	349.0	355.3	362.0	369.0	376.4	384.0	391.9	399.9
240	336.7	341.4	346.6	352.2	358.2	364.6	371.3	378.4	385.7	393.2	400.9
245	340.3	344.9	350.0	355.4	361.2	367.3	373.8	380.5	387.6	394.8	402.2
250	344.0	348.4	353.3	358.6	364.2	370.1	376.3	382.8	389.6	396.5	403.7
255	347.5	351.9	356.6	361.7	367.2	372.9	378.9	385.2	391.7	398.4	405.4
260	351.1	355.3	360.0	364.9	370.2	375.8	381.6	387.7	394.0	400.5	407.1
265	354.5	358.7	363.2	368.1	373.2	378.6	384.3	390.2	396.3	402.6	409.1
270	357.9	362.1	366.5	371.2	376.2	381.5	387.0	392.7	398.7	404.8	411.1
275	361.3	365.4	369.7	374.4	379.2	384.4	389.8	395.3	401.1	407.1	413.2
280	364.6	368.6	372.9	377.5	382.2	387.3	392.5	397.9	403.6	409.4	415.3
285	367.9	371.9	376.1	380.5	385.2	390.1	395.3	400.6	406.1	411.7	417.5
290	371.2	375.1	379.2	383.6	388.2	393.0	398.0	403.2	408.6	414.1	419.8
295	374.4	378.2	382.3	386.6	391.1	395.8	400.8	405.9	411.1	416.5	422.0
300	377.5	381.3	385.4	389.6	394.0	398.7	403.5	408.5	413.6	418.9	424.4
310	383.7	387.4	391.4	395.5	399.8	404.3	409.0	413.8	418.7	423.8	429.0
320	389.8	393.4	397.3	401.3	405.5	409.9	414.4	419.0	423.8	428.7	433.8
330	395.7	399.3	403.0	407.0	411.1	415.3	419.7	424.2	428.9	433.6	438.5
340	401.4	405.0	408.7	412.6	416.6	420.7	425.0	429.4	433.9	438.5	443.2
350	407.1	410.6	414.2	418.0	421.9	426.0	430.2	434.5	438.9	443.4	448.0
360	412.6	416.1	419.7	423.4	427.2	431.2	435.3	439.5	443.8	448.2	452.7
370	418.0	421.5	425.0	428.7	432.4	436.3	440.4	444.5	448.7	452.9	457.3
380	423.4	426.7	430.2	433.8	437.6	441.4	445.3	449.3	453.5	457.7	461.9
390	428.6	431.9	435.4	438.9	442.6	446.4	450.2	454.2	458.2	462.3	466.5
400	433.7	437.0	440.4	443.9	447.5	451.2	455.0	458.9	462.9	466.9	471.0

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	526.6	541.1	555.0	568.4	581.2	593.5	605.4	616.9	628.1	638.9	649.3
155	506.3	521.1	535.4	549.0	562.1	574.8	586.9	598.7	610.1	621.2	631.9
160	487.4	502.5	516.9	530.7	544.0	556.8	569.2	581.2	592.8	604.0	614.9
165	470.4	485.4	499.9	513.7	527.1	540.1	552.6	564.7	576.4	587.7	598.8
170	455.5	470.3	484.6	498.4	511.8	524.7	537.2	549.3	561.1	572.5	583.6
175	442.6	457.1	471.1	484.7	498.0	510.8	523.2	535.3	547.0	558.4	569.5
180	431.8	445.8	459.5	472.8	485.8	498.4	510.7	522.7	534.3	545.6	556.7
185	423.0	436.4	449.7	462.6	475.2	487.6	499.7	511.4	522.9	534.1	545.1
190	415.9	428.8	441.4	453.9	466.2	478.2	490.0	501.6	512.8	523.9	534.7
195	410.4	422.6	434.7	446.8	458.6	470.3	481.7	493.0	504.0	514.8	525.4
200	406.2	417.8	429.4	440.9	452.3	463.5	474.7	485.6	496.4	506.9	517.3
205	403.1	414.1	425.2	436.2	447.1	458.0	468.7	479.3	489.8	500.1	510.3
210	401.0	411.4	422.0	432.5	443.0	453.4	463.8	474.1	484.2	494.2	504.1
215	399.7	409.6	419.6	429.7	439.7	449.8	459.8	469.7	479.5	489.3	498.9
220	399.0	408.4	418.0	427.6	437.3	446.9	456.6	466.1	475.7	485.1	494.5
225	398.9	407.9	417.0	426.2	435.5	444.8	454.0	463.3	472.5	481.7	490.8
230	399.2	407.8	416.6	425.4	434.3	443.2	452.1	461.1	470.0	478.9	487.7
235	399.9	408.2	416.5	425.0	433.6	442.2	450.8	459.4	468.0	476.7	485.2
240	400.9	408.8	416.9	425.0	433.3	441.5	449.9	458.2	466.6	474.9	483.3
245	402.2	409.8	417.5	425.4	433.3	441.3	449.4	457.5	465.6	473.6	481.7
250	403.7	411.0	418.5	426.0	433.7	441.4	449.2	457.0	464.9	472.8	480.6
255	405.4	412.4	419.6	426.9	434.3	441.8	449.4	457.0	464.6	472.2	479.9
260	407.1	414.0	420.9	428.0	435.2	442.5	449.8	457.1	464.5	472.0	479.4
265	409.1	415.7	422.4	429.3	436.3	443.3	450.4	457.6	464.8	472.0	479.2
270	411.1	417.5	424.0	430.7	437.5	444.3	451.2	458.2	465.2	472.2	479.3
275	413.2	419.4	425.8	432.3	438.8	445.5	452.2	459.0	465.8	472.7	479.6
280	415.3	421.4	427.6	433.9	440.3	446.8	453.4	460.0	466.6	473.3	480.0
285	417.5	423.4	429.5	435.7	441.9	448.2	454.6	461.1	467.6	474.1	480.7
290	419.8	425.6	431.5	437.5	443.6	449.8	456.0	462.3	468.7	475.0	481.5
295	422.0	427.7	433.5	439.4	445.3	451.4	457.5	463.6	469.8	476.1	482.4
300	424.4	429.9	435.6	441.3	447.1	453.0	459.0	465.0	471.1	477.3	483.4
310	429.0	434.4	439.8	445.3	450.9	456.6	462.3	468.1	473.9	479.8	485.8
320	433.8	438.9	444.1	449.4	454.8	460.3	465.8	471.4	477.0	482.7	488.4
330	438.5	443.5	448.5	453.7	458.9	464.2	469.5	474.9	480.3	485.8	491.3
340	443.2	448.1	453.0	457.9	463.0	468.1	473.3	478.5	483.8	489.1	494.4
350	448.0	452.6	457.4	462.2	467.1	472.1	477.1	482.2	487.3	492.5	497.7
360	452.7	457.2	461.9	466.6	471.3	476.2	481.0	486.0	490.9	496.0	501.0
370	457.3	461.8	466.3	470.9	475.5	480.2	485.0	489.8	494.6	499.5	504.4
380	461.9	466.3	470.7	475.2	479.7	484.3	489.0	493.6	498.4	503.1	507.9
390	466.5	470.8	475.1	479.5	483.9	488.4	492.9	497.5	502.1	506.8	511.5
400	471.0	475.2	479.4	483.7	488.1	492.5	496.9	501.4	505.9	510.4	515.0

TABLE II. - THERMODYNAMIC PROPERTIES OF HELIUM

(a) Critical-flow factor, C*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	0.7262	0.7368	0.7472	0.7573	0.7669	0.7758	0.7840	0.7912	0.7975	0.8028	0.8070
16	0.7262	0.7352	0.7440	0.7524	0.7603	0.7677	0.7744	0.7804	0.7856	0.7901	0.7938
17	0.7262	0.7339	0.7414	0.7485	0.7551	0.7613	0.7669	0.7719	0.7763	0.7801	0.7833
18	0.7262	0.7328	0.7392	0.7453	0.7509	0.7561	0.7609	0.7651	0.7689	0.7721	0.7749
19	0.7262	0.7320	0.7375	0.7427	0.7475	0.7519	0.7560	0.7596	0.7628	0.7656	0.7679
20	0.7262	0.7312	0.7360	0.7405	0.7446	0.7485	0.7519	0.7550	0.7578	0.7602	0.7622
21	0.7262	0.7306	0.7348	0.7387	0.7423	0.7456	0.7485	0.7512	0.7536	0.7557	0.7574
22	0.7262	0.7301	0.7337	0.7371	0.7402	0.7431	0.7457	0.7480	0.7501	0.7518	0.7534
23	0.7262	0.7296	0.7328	0.7358	0.7385	0.7410	0.7433	0.7453	0.7470	0.7486	0.7499
24	0.7262	0.7292	0.7320	0.7346	0.7370	0.7392	0.7412	0.7429	0.7445	0.7458	0.7469
25	0.7262	0.7289	0.7313	0.7336	0.7357	0.7377	0.7394	0.7409	0.7422	0.7434	0.7444
26	0.7262	0.7286	0.7308	0.7328	0.7346	0.7363	0.7378	0.7391	0.7403	0.7413	0.7421
27	0.7262	0.7283	0.7302	0.7320	0.7337	0.7351	0.7364	0.7376	0.7386	0.7394	0.7402
28	0.7262	0.7281	0.7298	0.7314	0.7328	0.7341	0.7352	0.7362	0.7371	0.7378	0.7384
29	0.7262	0.7279	0.7294	0.7308	0.7320	0.7332	0.7342	0.7350	0.7358	0.7364	0.7369
30	0.7262	0.7277	0.7290	0.7303	0.7314	0.7324	0.7332	0.7340	0.7346	0.7352	0.7356
31	0.7262	0.7275	0.7287	0.7298	0.7308	0.7316	0.7324	0.7330	0.7336	0.7340	0.7344
32	0.7262	0.7274	0.7284	0.7294	0.7302	0.7310	0.7316	0.7322	0.7327	0.7330	0.7333
33	0.7262	0.7272	0.7282	0.7290	0.7298	0.7304	0.7310	0.7314	0.7318	0.7321	0.7324
34	0.7262	0.7271	0.7279	0.7287	0.7293	0.7299	0.7304	0.7308	0.7311	0.7313	0.7315
35	0.7262	0.7270	0.7277	0.7284	0.7289	0.7294	0.7298	0.7302	0.7304	0.7306	0.7307
36	0.7262	0.7269	0.7275	0.7281	0.7286	0.7290	0.7293	0.7296	0.7298	0.7300	0.7300
37	0.7262	0.7268	0.7274	0.7279	0.7283	0.7286	0.7289	0.7291	0.7293	0.7294	0.7294
38	0.7262	0.7267	0.7272	0.7276	0.7280	0.7283	0.7285	0.7287	0.7288	0.7288	0.7288
39	0.7262	0.7267	0.7271	0.7274	0.7277	0.7280	0.7281	0.7283	0.7283	0.7283	0.7283
40	0.7262	0.7266	0.7270	0.7273	0.7275	0.7277	0.7278	0.7279	0.7279	0.7279	0.7278
42	0.7262	0.7265	0.7267	0.7269	0.7271	0.7272	0.7272	0.7272	0.7272	0.7271	0.7270
44	0.7262	0.7264	0.7266	0.7267	0.7267	0.7268	0.7268	0.7267	0.7266	0.7265	0.7263
46	0.7262	0.7263	0.7264	0.7264	0.7264	0.7264	0.7264	0.7263	0.7261	0.7260	0.7258
48	0.7262	0.7262	0.7263	0.7263	0.7262	0.7261	0.7260	0.7259	0.7257	0.7255	0.7253
50	0.7262	0.7262	0.7262	0.7261	0.7260	0.7259	0.7257	0.7255	0.7253	0.7251	0.7249
52	0.7262	0.7261	0.7261	0.7260	0.7258	0.7257	0.7255	0.7253	0.7250	0.7248	0.7245
54	0.7262	0.7261	0.7260	0.7258	0.7257	0.7255	0.7253	0.7250	0.7248	0.7245	0.7242
56	0.7262	0.7261	0.7259	0.7257	0.7255	0.7253	0.7251	0.7248	0.7246	0.7243	0.7240
58	0.7262	0.7260	0.7258	0.7256	0.7254	0.7252	0.7249	0.7247	0.7244	0.7241	0.7237
60	0.7262	0.7260	0.7258	0.7256	0.7253	0.7251	0.7248	0.7245	0.7242	0.7239	0.7236
62	0.7262	0.7260	0.7257	0.7255	0.7252	0.7250	0.7247	0.7244	0.7241	0.7237	0.7234
64	0.7262	0.7260	0.7257	0.7255	0.7252	0.7249	0.7246	0.7243	0.7240	0.7236	0.7233
66	0.7262	0.7259	0.7257	0.7254	0.7251	0.7248	0.7245	0.7242	0.7239	0.7235	0.7232
68	0.7262	0.7259	0.7256	0.7254	0.7251	0.7248	0.7244	0.7241	0.7238	0.7234	0.7231
70	0.7262	0.7259	0.7256	0.7253	0.7250	0.7247	0.7244	0.7240	0.7237	0.7233	0.7230

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	0.7262	0.7758	0.8070	0.8144	0.8048	0.7869	0.7659	0.7444	0.7236	0.7038	0.6853
16	0.7262	0.7677	0.7938	0.8014	0.7950	0.7808	0.7630	0.7441	0.7253	0.7072	0.6900
17	0.7262	0.7613	0.7833	0.7906	0.7863	0.7749	0.7598	0.7432	0.7263	0.7097	0.6938
18	0.7262	0.7561	0.7749	0.7816	0.7787	0.7694	0.7566	0.7420	0.7268	0.7116	0.6968
19	0.7262	0.7519	0.7679	0.7740	0.7720	0.7644	0.7533	0.7405	0.7268	0.7129	0.6993
20	0.7262	0.7485	0.7622	0.7676	0.7661	0.7598	0.7502	0.7388	0.7265	0.7138	0.7012
21	0.7262	0.7456	0.7574	0.7621	0.7610	0.7556	0.7472	0.7371	0.7259	0.7143	0.7026
22	0.7262	0.7431	0.7534	0.7574	0.7565	0.7518	0.7444	0.7353	0.7252	0.7146	0.7038
23	0.7262	0.7410	0.7499	0.7534	0.7525	0.7484	0.7418	0.7336	0.7244	0.7146	0.7046
24	0.7262	0.7392	0.7469	0.7499	0.7491	0.7453	0.7394	0.7320	0.7235	0.7145	0.7052
25	0.7262	0.7377	0.7444	0.7469	0.7460	0.7425	0.7372	0.7304	0.7226	0.7143	0.7056
26	0.7262	0.7363	0.7421	0.7442	0.7433	0.7401	0.7351	0.7289	0.7217	0.7140	0.7059
27	0.7262	0.7351	0.7402	0.7419	0.7409	0.7379	0.7332	0.7274	0.7208	0.7136	0.7060
28	0.7262	0.7341	0.7384	0.7398	0.7388	0.7359	0.7315	0.7261	0.7199	0.7132	0.7060
29	0.7262	0.7332	0.7369	0.7380	0.7369	0.7341	0.7300	0.7249	0.7191	0.7127	0.7060
30	0.7262	0.7324	0.7356	0.7363	0.7352	0.7324	0.7285	0.7237	0.7183	0.7123	0.7060
31	0.7262	0.7316	0.7344	0.7349	0.7336	0.7310	0.7272	0.7227	0.7175	0.7118	0.7058
32	0.7262	0.7310	0.7333	0.7336	0.7323	0.7297	0.7261	0.7217	0.7168	0.7114	0.7057
33	0.7262	0.7304	0.7324	0.7324	0.7310	0.7285	0.7250	0.7208	0.7161	0.7110	0.7056
34	0.7262	0.7299	0.7315	0.7314	0.7299	0.7274	0.7240	0.7200	0.7155	0.7106	0.7054
35	0.7262	0.7294	0.7307	0.7305	0.7289	0.7264	0.7231	0.7193	0.7149	0.7102	0.7053
36	0.7262	0.7290	0.7300	0.7296	0.7280	0.7255	0.7223	0.7186	0.7144	0.7099	0.7051
37	0.7262	0.7286	0.7294	0.7288	0.7272	0.7247	0.7216	0.7179	0.7139	0.7095	0.7049
38	0.7262	0.7283	0.7288	0.7281	0.7264	0.7240	0.7209	0.7174	0.7134	0.7092	0.7048
39	0.7262	0.7280	0.7283	0.7275	0.7258	0.7233	0.7203	0.7168	0.7130	0.7089	0.7047
40	0.7262	0.7277	0.7278	0.7269	0.7251	0.7227	0.7197	0.7163	0.7126	0.7087	0.7045
42	0.7262	0.7272	0.7270	0.7259	0.7241	0.7216	0.7187	0.7155	0.7120	0.7082	0.7043
44	0.7262	0.7268	0.7263	0.7251	0.7232	0.7207	0.7179	0.7148	0.7114	0.7078	0.7041
46	0.7262	0.7264	0.7258	0.7244	0.7224	0.7200	0.7172	0.7142	0.7110	0.7075	0.7040
48	0.7262	0.7261	0.7253	0.7238	0.7218	0.7194	0.7167	0.7137	0.7106	0.7073	0.7039
50	0.7262	0.7259	0.7249	0.7233	0.7212	0.7189	0.7162	0.7133	0.7103	0.7071	0.7038
52	0.7262	0.7257	0.7245	0.7229	0.7208	0.7184	0.7158	0.7130	0.7101	0.7070	0.7038
54	0.7262	0.7255	0.7242	0.7225	0.7204	0.7181	0.7155	0.7127	0.7099	0.7069	0.7038
56	0.7262	0.7253	0.7240	0.7222	0.7201	0.7178	0.7152	0.7125	0.7097	0.7068	0.7039
58	0.7262	0.7252	0.7237	0.7219	0.7198	0.7175	0.7150	0.7124	0.7096	0.7068	0.7039
60	0.7262	0.7251	0.7236	0.7217	0.7196	0.7173	0.7148	0.7123	0.7096	0.7068	0.7040
62	0.7262	0.7250	0.7234	0.7215	0.7194	0.7171	0.7147	0.7122	0.7095	0.7068	0.7041
64	0.7262	0.7249	0.7233	0.7214	0.7193	0.7170	0.7146	0.7121	0.7095	0.7069	0.7042
66	0.7262	0.7248	0.7232	0.7212	0.7191	0.7169	0.7145	0.7121	0.7095	0.7069	0.7043
68	0.7262	0.7248	0.7231	0.7211	0.7190	0.7168	0.7145	0.7120	0.7096	0.7070	0.7045
70	0.7262	0.7247	0.7230	0.7210	0.7190	0.7167	0.7144	0.7120	0.7096	0.7071	0.7046

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(a) Continued. Critical-flow factor, C*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	0.6853	0.6681	0.6521	0.6371	0.6232	0.6102	0.5980	0.5866	0.5759	0.5657	0.5562
16	0.6900	0.6738	0.6586	0.6444	0.6310	0.6185	0.6067	0.5956	0.5851	0.5753	0.5659
17	0.6938	0.6786	0.6643	0.6507	0.6379	0.6259	0.6145	0.6037	0.5935	0.5839	0.5747
18	0.6968	0.6827	0.6691	0.6562	0.6440	0.6324	0.6215	0.6110	0.6012	0.5918	0.5828
19	0.6993	0.6860	0.6733	0.6610	0.6494	0.6383	0.6277	0.6176	0.6081	0.5989	0.5902
20	0.7012	0.6888	0.6768	0.6652	0.6541	0.6435	0.6333	0.6236	0.6143	0.6054	0.5970
21	0.7026	0.6911	0.6798	0.6688	0.6583	0.6481	0.6383	0.6290	0.6200	0.6114	0.6031
22	0.7038	0.6930	0.6823	0.6720	0.6619	0.6522	0.6428	0.6338	0.6251	0.6168	0.6088
23	0.7046	0.6945	0.6845	0.6747	0.6651	0.6558	0.6469	0.6382	0.6298	0.6218	0.6140
24	0.7052	0.6957	0.6863	0.6771	0.6680	0.6591	0.6505	0.6421	0.6341	0.6263	0.6187
25	0.7056	0.6968	0.6879	0.6791	0.6704	0.6620	0.6537	0.6457	0.6379	0.6304	0.6231
26	0.7059	0.6976	0.6892	0.6809	0.6726	0.6646	0.6567	0.6490	0.6415	0.6342	0.6271
27	0.7060	0.6982	0.6903	0.6824	0.6746	0.6669	0.6593	0.6519	0.6447	0.6376	0.6308
28	0.7060	0.6987	0.6912	0.6837	0.6763	0.6689	0.6617	0.6545	0.6476	0.6408	0.6341
29	0.7060	0.6991	0.6920	0.6849	0.6778	0.6707	0.6638	0.6569	0.6502	0.6437	0.6373
30	0.7060	0.6994	0.6927	0.6859	0.6791	0.6724	0.6657	0.6591	0.6527	0.6463	0.6401
31	0.7058	0.6996	0.6932	0.6868	0.6803	0.6739	0.6674	0.6611	0.6549	0.6488	0.6428
32	0.7057	0.6998	0.6937	0.6876	0.6814	0.6752	0.6690	0.6629	0.6569	0.6510	0.6452
33	0.7056	0.6999	0.6941	0.6882	0.6823	0.6764	0.6705	0.6646	0.6588	0.6531	0.6474
34	0.7054	0.7000	0.6945	0.6888	0.6831	0.6774	0.6718	0.6661	0.6605	0.6550	0.6495
35	0.7053	0.7001	0.6948	0.6894	0.6839	0.6784	0.6729	0.6675	0.6621	0.6567	0.6515
36	0.7051	0.7001	0.6950	0.6898	0.6846	0.6793	0.6740	0.6688	0.6635	0.6584	0.6532
37	0.7049	0.7002	0.6953	0.6903	0.6852	0.6801	0.6750	0.6699	0.6649	0.6599	0.6549
38	0.7048	0.7002	0.6955	0.6906	0.6858	0.6808	0.6759	0.6710	0.6661	0.6613	0.6564
39	0.7047	0.7002	0.6956	0.6910	0.6863	0.6815	0.6768	0.6720	0.6673	0.6626	0.6579
40	0.7045	0.7002	0.6958	0.6913	0.6867	0.6821	0.6775	0.6729	0.6683	0.6638	0.6592
42	0.7043	0.7003	0.6961	0.6919	0.6876	0.6833	0.6789	0.6746	0.6703	0.6659	0.6617
44	0.7041	0.7003	0.6964	0.6924	0.6883	0.6842	0.6801	0.6760	0.6719	0.6679	0.6638
46	0.7040	0.7003	0.6966	0.6928	0.6890	0.6851	0.6812	0.6773	0.6734	0.6696	0.6657
48	0.7039	0.7004	0.6968	0.6932	0.6896	0.6859	0.6822	0.6785	0.6748	0.6711	0.6674
50	0.7038	0.7005	0.6971	0.6936	0.6901	0.6866	0.6831	0.6795	0.6760	0.6725	0.6689
52	0.7038	0.7006	0.6973	0.6940	0.6906	0.6872	0.6839	0.6805	0.6771	0.6737	0.6703
54	0.7038	0.7007	0.6975	0.6943	0.6911	0.6878	0.6846	0.6813	0.6781	0.6748	0.6716
56	0.7039	0.7008	0.6978	0.6947	0.6915	0.6884	0.6853	0.6821	0.6790	0.6759	0.6728
58	0.7039	0.7010	0.6980	0.6950	0.6920	0.6890	0.6859	0.6829	0.6799	0.6769	0.6739
60	0.7040	0.7011	0.6982	0.6953	0.6924	0.6895	0.6865	0.6836	0.6807	0.6778	0.6749
62	0.7041	0.7013	0.6985	0.6957	0.6928	0.6900	0.6871	0.6843	0.6815	0.6786	0.6758
64	0.7042	0.7015	0.6987	0.6960	0.6932	0.6905	0.6877	0.6849	0.6822	0.6794	0.6767
66	0.7043	0.7017	0.6990	0.6963	0.6936	0.6909	0.6882	0.6855	0.6829	0.6802	0.6775
68	0.7045	0.7019	0.6992	0.6966	0.6940	0.6914	0.6887	0.6861	0.6835	0.6809	0.6783
70	0.7046	0.7021	0.6995	0.6969	0.6944	0.6918	0.6892	0.6867	0.6842	0.6816	0.6791

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	0.5562	0.5472	0.5386	0.5305	0.5227	0.5154	0.5084	0.5016	0.4952	0.4891	0.4832
16	0.5659	0.5570	0.5486	0.5406	0.5329	0.5256	0.5187	0.5120	0.5057	0.4995	0.4937
17	0.5747	0.5660	0.5578	0.5499	0.5423	0.5351	0.5283	0.5217	0.5153	0.5093	0.5034
18	0.5828	0.5743	0.5662	0.5584	0.5510	0.5439	0.5371	0.5306	0.5243	0.5183	0.5125
19	0.5902	0.5819	0.5739	0.5663	0.5590	0.5521	0.5454	0.5389	0.5327	0.5268	0.5210
20	0.5970	0.5888	0.5811	0.5736	0.5665	0.5596	0.5530	0.5467	0.5405	0.5347	0.5290
21	0.6031	0.5952	0.5876	0.5803	0.5733	0.5666	0.5601	0.5539	0.5478	0.5420	0.5364
22	0.6088	0.6011	0.5937	0.5866	0.5797	0.5731	0.5667	0.5606	0.5546	0.5489	0.5434
23	0.6140	0.6065	0.5993	0.5923	0.5856	0.5791	0.5729	0.5668	0.5610	0.5554	0.5499
24	0.6187	0.6115	0.6044	0.5976	0.5911	0.5847	0.5786	0.5727	0.5670	0.5614	0.5560
25	0.6231	0.6160	0.6092	0.6026	0.5962	0.5900	0.5840	0.5781	0.5725	0.5671	0.5618
26	0.6271	0.6202	0.6136	0.6071	0.6009	0.5948	0.5890	0.5833	0.5777	0.5724	0.5672
27	0.6308	0.6241	0.6176	0.6114	0.6053	0.5994	0.5936	0.5880	0.5826	0.5774	0.5722
28	0.6341	0.6277	0.6214	0.6153	0.6094	0.6036	0.5980	0.5925	0.5872	0.5820	0.5770
29	0.6373	0.6310	0.6249	0.6190	0.6132	0.6075	0.6020	0.5967	0.5915	0.5864	0.5815
30	0.6401	0.6341	0.6281	0.6223	0.6167	0.6112	0.6058	0.6006	0.5955	0.5906	0.5857
31	0.6428	0.6369	0.6311	0.6255	0.6200	0.6146	0.6094	0.6043	0.5993	0.5945	0.5897
32	0.6452	0.6395	0.6339	0.6284	0.6231	0.6179	0.6128	0.6078	0.6029	0.5981	0.5935
33	0.6474	0.6419	0.6365	0.6312	0.6260	0.6209	0.6159	0.6110	0.6062	0.6016	0.5970
34	0.6495	0.6442	0.6389	0.6337	0.6287	0.6237	0.6188	0.6141	0.6094	0.6048	0.6004
35	0.6515	0.6463	0.6411	0.6361	0.6312	0.6263	0.6216	0.6169	0.6124	0.6079	0.6035
36	0.6532	0.6482	0.6432	0.6383	0.6335	0.6288	0.6242	0.6196	0.6152	0.6108	0.6065
37	0.6549	0.6500	0.6452	0.6404	0.6357	0.6311	0.6266	0.6222	0.6178	0.6135	0.6093
38	0.6564	0.6517	0.6470	0.6424	0.6378	0.6333	0.6289	0.6246	0.6203	0.6161	0.6120
39	0.6579	0.6533	0.6487	0.6442	0.6397	0.6354	0.6311	0.6268	0.6226	0.6185	0.6145
40	0.6592	0.6547	0.6503	0.6459	0.6416	0.6373	0.6331	0.6289	0.6249	0.6209	0.6169
42	0.6617	0.6574	0.6532	0.6490	0.6449	0.6408	0.6368	0.6329	0.6290	0.6251	0.6213
44	0.6638	0.6598	0.6558	0.6518	0.6479	0.6440	0.6402	0.6364	0.6326	0.6290	0.6253
46	0.6657	0.6619	0.6581	0.6543	0.6505	0.6468	0.6432	0.6395	0.6360	0.6324	0.6289
48	0.6674	0.6637	0.6601	0.6565	0.6529	0.6494	0.6459	0.6424	0.6389	0.6356	0.6322
50	0.6689	0.6654	0.6620	0.6585	0.6551	0.6517	0.6483	0.6450	0.6417	0.6384	0.6352
52	0.6703	0.6670	0.6636	0.6603	0.6570	0.6538	0.6505	0.6473	0.6441	0.6410	0.6379
54	0.6716	0.6684	0.6652	0.6620	0.6588	0.6557	0.6526	0.6495	0.6464	0.6434	0.6404
56	0.6728	0.6697	0.6666	0.6635	0.6605	0.6574	0.6544	0.6515	0.6485	0.6456	0.6427
58	0.6739	0.6709	0.6679	0.6649	0.6620	0.6591	0.6562	0.6533	0.6504	0.6476	0.6448
60	0.6749	0.6720	0.6691	0.6662	0.6634	0.6606	0.6578	0.6550	0.6522	0.6495	0.6468
62	0.6758	0.6730	0.6702	0.6674	0.6647	0.6620	0.6592	0.6565	0.6539	0.6512	0.6486
64	0.6767	0.6740	0.6713	0.6686	0.6659	0.6633	0.6606	0.6580	0.6554	0.6528	0.6503
66	0.6775	0.6749	0.6723	0.6697	0.6671	0.6645	0.6619	0.6594	0.6569	0.6544	0.6519
68	0.6783	0.6758	0.6732	0.6707	0.6681	0.6656	0.6631	0.6607	0.6582	0.6558	0.6534
70	0.6791	0.6766	0.6741	0.6716	0.6692	0.6667	0.6643	0.6619	0.6595	0.6571	0.6548

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(a) Continued. Critical-flow factor, C*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	0.7262	0.7247	0.7230	0.7210	0.7190	0.7167	0.7144	0.7120	0.7096	0.7071	0.7046
72	0.7262	0.7247	0.7229	0.7210	0.7189	0.7167	0.7144	0.7121	0.7097	0.7072	0.7047
74	0.7262	0.7246	0.7229	0.7209	0.7188	0.7167	0.7144	0.7121	0.7097	0.7073	0.7049
76	0.7262	0.7246	0.7228	0.7209	0.7188	0.7167	0.7144	0.7121	0.7098	0.7074	0.7051
78	0.7262	0.7246	0.7228	0.7208	0.7188	0.7166	0.7144	0.7122	0.7099	0.7076	0.7052
80	0.7262	0.7245	0.7227	0.7208	0.7188	0.7167	0.7145	0.7123	0.7100	0.7077	0.7054
82	0.7262	0.7245	0.7227	0.7208	0.7188	0.7167	0.7145	0.7123	0.7101	0.7078	0.7056
84	0.7262	0.7245	0.7227	0.7208	0.7188	0.7167	0.7146	0.7124	0.7102	0.7080	0.7058
86	0.7262	0.7245	0.7227	0.7208	0.7188	0.7167	0.7146	0.7125	0.7103	0.7081	0.7059
88	0.7262	0.7245	0.7227	0.7208	0.7188	0.7167	0.7147	0.7126	0.7104	0.7083	0.7061
90	0.7262	0.7245	0.7227	0.7208	0.7188	0.7168	0.7147	0.7126	0.7105	0.7084	0.7063
92	0.7262	0.7245	0.7227	0.7208	0.7188	0.7168	0.7148	0.7127	0.7107	0.7086	0.7065
94	0.7262	0.7245	0.7227	0.7208	0.7189	0.7169	0.7149	0.7128	0.7108	0.7087	0.7066
96	0.7262	0.7245	0.7227	0.7208	0.7189	0.7169	0.7149	0.7129	0.7109	0.7089	0.7068
98	0.7262	0.7245	0.7227	0.7208	0.7189	0.7170	0.7150	0.7130	0.7110	0.7090	0.7070
100	0.7262	0.7245	0.7227	0.7208	0.7190	0.7170	0.7151	0.7131	0.7111	0.7092	0.7072
102	0.7262	0.7245	0.7227	0.7209	0.7190	0.7171	0.7152	0.7132	0.7113	0.7093	0.7073
104	0.7262	0.7245	0.7227	0.7209	0.7190	0.7171	0.7152	0.7133	0.7114	0.7095	0.7075
106	0.7262	0.7245	0.7227	0.7209	0.7191	0.7172	0.7153	0.7134	0.7115	0.7096	0.7077
108	0.7262	0.7245	0.7227	0.7209	0.7191	0.7173	0.7154	0.7135	0.7116	0.7097	0.7079
110	0.7262	0.7245	0.7228	0.7210	0.7192	0.7173	0.7155	0.7136	0.7118	0.7099	0.7080
112	0.7262	0.7245	0.7228	0.7210	0.7192	0.7174	0.7156	0.7137	0.7119	0.7100	0.7082
114	0.7262	0.7245	0.7228	0.7210	0.7193	0.7175	0.7156	0.7138	0.7120	0.7102	0.7084
116	0.7262	0.7245	0.7228	0.7211	0.7193	0.7175	0.7157	0.7139	0.7121	0.7103	0.7085
118	0.7262	0.7245	0.7228	0.7211	0.7193	0.7176	0.7158	0.7140	0.7122	0.7105	0.7087
120	0.7262	0.7245	0.7228	0.7211	0.7194	0.7176	0.7159	0.7141	0.7124	0.7106	0.7088
122	0.7262	0.7245	0.7229	0.7212	0.7194	0.7177	0.7160	0.7142	0.7125	0.7107	0.7090
124	0.7262	0.7245	0.7229	0.7212	0.7195	0.7178	0.7161	0.7143	0.7126	0.7109	0.7091
126	0.7262	0.7246	0.7229	0.7212	0.7195	0.7178	0.7161	0.7144	0.7127	0.7110	0.7093
128	0.7262	0.7246	0.7229	0.7213	0.7196	0.7179	0.7162	0.7145	0.7128	0.7111	0.7094
130	0.7262	0.7246	0.7229	0.7213	0.7196	0.7180	0.7163	0.7146	0.7129	0.7113	0.7096
132	0.7262	0.7246	0.7230	0.7213	0.7197	0.7180	0.7164	0.7147	0.7130	0.7114	0.7097
134	0.7262	0.7246	0.7230	0.7214	0.7197	0.7181	0.7164	0.7148	0.7132	0.7115	0.7099
136	0.7262	0.7246	0.7230	0.7214	0.7198	0.7182	0.7165	0.7149	0.7133	0.7116	0.7100
138	0.7262	0.7246	0.7230	0.7214	0.7198	0.7182	0.7166	0.7150	0.7134	0.7118	0.7102
140	0.7262	0.7246	0.7231	0.7215	0.7199	0.7183	0.7167	0.7151	0.7135	0.7119	0.7103
142	0.7262	0.7246	0.7231	0.7215	0.7199	0.7183	0.7168	0.7152	0.7136	0.7120	0.7104
144	0.7262	0.7246	0.7231	0.7215	0.7200	0.7184	0.7168	0.7153	0.7137	0.7121	0.7106
146	0.7262	0.7247	0.7231	0.7216	0.7200	0.7185	0.7169	0.7153	0.7138	0.7122	0.7107
148	0.7262	0.7247	0.7231	0.7216	0.7201	0.7185	0.7170	0.7154	0.7139	0.7124	0.7108
150	0.7262	0.7247	0.7232	0.7216	0.7201	0.7186	0.7171	0.7155	0.7140	0.7125	0.7110

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	0.7046	0.7021	0.6995	0.6969	0.6944	0.6918	0.6892	0.6867	0.6842	0.6816	0.6791
72	0.7047	0.7023	0.6998	0.6972	0.6947	0.6922	0.6897	0.6872	0.6848	0.6823	0.6798
74	0.7049	0.7025	0.7000	0.6976	0.6951	0.6926	0.6902	0.6878	0.6853	0.6829	0.6805
76	0.7051	0.7027	0.7003	0.6979	0.6955	0.6931	0.6907	0.6883	0.6859	0.6835	0.6812
78	0.7052	0.7029	0.7005	0.6982	0.6958	0.6934	0.6911	0.6888	0.6864	0.6841	0.6818
80	0.7054	0.7031	0.7008	0.6985	0.6961	0.6938	0.6915	0.6892	0.6870	0.6847	0.6824
82	0.7056	0.7033	0.7010	0.6987	0.6965	0.6942	0.6920	0.6897	0.6875	0.6852	0.6830
84	0.7058	0.7035	0.7013	0.6990	0.6968	0.6946	0.6924	0.6902	0.6880	0.6858	0.6836
86	0.7059	0.7037	0.7015	0.6993	0.6971	0.6949	0.6928	0.6906	0.6884	0.6863	0.6842
88	0.7061	0.7039	0.7018	0.6996	0.6974	0.6953	0.6932	0.6910	0.6889	0.6868	0.6847
90	0.7063	0.7041	0.7020	0.6999	0.6978	0.6956	0.6935	0.6914	0.6894	0.6873	0.6852
92	0.7065	0.7044	0.7023	0.7002	0.6981	0.6960	0.6939	0.6919	0.6898	0.6878	0.6857
94	0.7066	0.7046	0.7025	0.7004	0.6984	0.6963	0.6943	0.6922	0.6902	0.6882	0.6862
96	0.7068	0.7048	0.7027	0.7007	0.6987	0.6966	0.6946	0.6926	0.6907	0.6887	0.6867
98	0.7070	0.7050	0.7030	0.7010	0.6990	0.6970	0.6950	0.6930	0.6911	0.6891	0.6872
100	0.7072	0.7052	0.7032	0.7012	0.6992	0.6973	0.6953	0.6934	0.6915	0.6895	0.6876
102	0.7073	0.7054	0.7034	0.7015	0.6995	0.6976	0.6957	0.6938	0.6919	0.6900	0.6881
104	0.7075	0.7056	0.7036	0.7017	0.6998	0.6979	0.6960	0.6941	0.6922	0.6904	0.6885
106	0.7077	0.7058	0.7039	0.7020	0.7001	0.6982	0.6963	0.6945	0.6926	0.6908	0.6889
108	0.7079	0.7060	0.7041	0.7022	0.7003	0.6985	0.6966	0.6948	0.6930	0.6912	0.6894
110	0.7080	0.7062	0.7043	0.7024	0.7006	0.6988	0.6969	0.6951	0.6933	0.6915	0.6898
112	0.7082	0.7063	0.7045	0.7027	0.7009	0.6990	0.6972	0.6955	0.6937	0.6919	0.6902
114	0.7084	0.7065	0.7047	0.7029	0.7011	0.6993	0.6975	0.6958	0.6940	0.6923	0.6905
116	0.7085	0.7067	0.7049	0.7031	0.7014	0.6996	0.6978	0.6961	0.6943	0.6926	0.6909
118	0.7087	0.7069	0.7051	0.7034	0.7016	0.6998	0.6981	0.6964	0.6947	0.6930	0.6913
120	0.7088	0.7071	0.7053	0.7036	0.7018	0.7001	0.6984	0.6967	0.6950	0.6933	0.6916
122	0.7090	0.7072	0.7055	0.7038	0.7021	0.7004	0.6987	0.6970	0.6953	0.6937	0.6920
124	0.7091	0.7074	0.7057	0.7040	0.7023	0.7006	0.6989	0.6973	0.6956	0.6940	0.6923
126	0.7093	0.7076	0.7059	0.7042	0.7025	0.7009	0.6992	0.6976	0.6959	0.6943	0.6927
128	0.7094	0.7078	0.7061	0.7044	0.7028	0.7011	0.6995	0.6978	0.6962	0.6946	0.6930
130	0.7096	0.7079	0.7063	0.7046	0.7030	0.7013	0.6997	0.6981	0.6965	0.6949	0.6933
132	0.7097	0.7081	0.7064	0.7048	0.7032	0.7016	0.7000	0.6984	0.6968	0.6952	0.6937
134	0.7099	0.7082	0.7066	0.7050	0.7034	0.7018	0.7002	0.6986	0.6971	0.6955	0.6940
136	0.7100	0.7084	0.7068	0.7052	0.7036	0.7020	0.7005	0.6989	0.6973	0.6958	0.6943
138	0.7102	0.7086	0.7070	0.7054	0.7038	0.7022	0.7007	0.6991	0.6976	0.6961	0.6946
140	0.7103	0.7087	0.7071	0.7056	0.7040	0.7025	0.7009	0.6994	0.6979	0.6964	0.6949
142	0.7104	0.7089	0.7073	0.7058	0.7042	0.7027	0.7012	0.6996	0.6981	0.6966	0.6952
144	0.7106	0.7090	0.7075	0.7059	0.7044	0.7029	0.7014	0.6999	0.6984	0.6969	0.6954
146	0.7107	0.7092	0.7076	0.7061	0.7046	0.7031	0.7016	0.7001	0.6986	0.6972	0.6957
148	0.7108	0.7093	0.7078	0.7063	0.7048	0.7033	0.7018	0.7003	0.6989	0.6974	0.6960
150	0.7110	0.7095	0.7079	0.7065	0.7050	0.7035	0.7020	0.7006	0.6991	0.6977	0.6963

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(a) Continued. Critical-flow factor, C^*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	0.6791	0.6766	0.6741	0.6716	0.6692	0.6667	0.6643	0.6619	0.6595	0.6571	0.6548
72	0.6798	0.6774	0.6749	0.6725	0.6701	0.6678	0.6654	0.6630	0.6607	0.6584	0.6561
74	0.6805	0.6781	0.6758	0.6734	0.6711	0.6687	0.6664	0.6641	0.6619	0.6596	0.6574
76	0.6812	0.6788	0.6765	0.6742	0.6719	0.6697	0.6674	0.6652	0.6629	0.6607	0.6586
78	0.6818	0.6795	0.6773	0.6750	0.6728	0.6706	0.6683	0.6662	0.6640	0.6618	0.6597
80	0.6824	0.6802	0.6780	0.6758	0.6736	0.6714	0.6692	0.6671	0.6650	0.6629	0.6608
82	0.6830	0.6808	0.6787	0.6765	0.6744	0.6722	0.6701	0.6680	0.6659	0.6639	0.6618
84	0.6836	0.6815	0.6793	0.6772	0.6751	0.6730	0.6709	0.6689	0.6668	0.6648	0.6628
86	0.6842	0.6821	0.6800	0.6779	0.6758	0.6738	0.6717	0.6697	0.6677	0.6657	0.6637
88	0.6847	0.6826	0.6806	0.6785	0.6765	0.6745	0.6725	0.6705	0.6685	0.6666	0.6646
90	0.6852	0.6832	0.6812	0.6792	0.6772	0.6752	0.6732	0.6713	0.6693	0.6674	0.6655
92	0.6857	0.6837	0.6817	0.6798	0.6778	0.6759	0.6739	0.6720	0.6701	0.6682	0.6664
94	0.6862	0.6843	0.6823	0.6804	0.6784	0.6765	0.6746	0.6727	0.6709	0.6690	0.6672
96	0.6867	0.6848	0.6828	0.6809	0.6790	0.6771	0.6753	0.6734	0.6716	0.6698	0.6680
98	0.6872	0.6853	0.6834	0.6815	0.6796	0.6778	0.6759	0.6741	0.6723	0.6705	0.6687
100	0.6876	0.6858	0.6839	0.6820	0.6802	0.6784	0.6765	0.6748	0.6730	0.6712	0.6694
102	0.6881	0.6862	0.6844	0.6826	0.6807	0.6789	0.6772	0.6754	0.6736	0.6719	0.6702
104	0.6885	0.6867	0.6849	0.6831	0.6813	0.6795	0.6777	0.6760	0.6743	0.6725	0.6708
106	0.6889	0.6871	0.6853	0.6836	0.6818	0.6801	0.6783	0.6766	0.6749	0.6732	0.6715
108	0.6894	0.6876	0.6858	0.6841	0.6823	0.6806	0.6789	0.6772	0.6755	0.6738	0.6722
110	0.6898	0.6880	0.6863	0.6845	0.6828	0.6811	0.6794	0.6777	0.6761	0.6744	0.6728
112	0.6902	0.6884	0.6867	0.6850	0.6833	0.6816	0.6799	0.6783	0.6766	0.6750	0.6734
114	0.6905	0.6888	0.6871	0.6854	0.6838	0.6821	0.6805	0.6788	0.6772	0.6756	0.6740
116	0.6909	0.6892	0.6875	0.6859	0.6842	0.6826	0.6810	0.6793	0.6777	0.6762	0.6746
118	0.6913	0.6896	0.6880	0.6863	0.6847	0.6831	0.6814	0.6798	0.6783	0.6767	0.6751
120	0.6916	0.6900	0.6884	0.6867	0.6851	0.6835	0.6819	0.6803	0.6788	0.6772	0.6757
122	0.6920	0.6904	0.6887	0.6871	0.6855	0.6840	0.6824	0.6808	0.6793	0.6778	0.6762
124	0.6923	0.6907	0.6891	0.6875	0.6860	0.6844	0.6828	0.6813	0.6798	0.6783	0.6768
126	0.6927	0.6911	0.6895	0.6879	0.6864	0.6848	0.6833	0.6818	0.6803	0.6788	0.6773
128	0.6930	0.6914	0.6899	0.6883	0.6868	0.6852	0.6837	0.6822	0.6807	0.6792	0.6778
130	0.6933	0.6918	0.6902	0.6887	0.6872	0.6856	0.6841	0.6827	0.6812	0.6797	0.6783
132	0.6937	0.6921	0.6906	0.6891	0.6875	0.6860	0.6846	0.6831	0.6816	0.6802	0.6787
134	0.6940	0.6924	0.6909	0.6894	0.6879	0.6864	0.6850	0.6835	0.6821	0.6806	0.6792
136	0.6943	0.6928	0.6913	0.6898	0.6883	0.6868	0.6854	0.6839	0.6825	0.6811	0.6797
138	0.6946	0.6931	0.6916	0.6901	0.6887	0.6872	0.6858	0.6843	0.6829	0.6815	0.6801
140	0.6949	0.6934	0.6919	0.6905	0.6890	0.6876	0.6861	0.6847	0.6833	0.6819	0.6806
142	0.6952	0.6937	0.6922	0.6908	0.6894	0.6879	0.6865	0.6851	0.6837	0.6824	0.6810
144	0.6954	0.6940	0.6925	0.6911	0.6897	0.6883	0.6869	0.6855	0.6841	0.6828	0.6814
146	0.6957	0.6943	0.6929	0.6914	0.6900	0.6886	0.6872	0.6859	0.6845	0.6832	0.6818
148	0.6960	0.6946	0.6932	0.6918	0.6904	0.6890	0.6876	0.6862	0.6849	0.6835	0.6822
150	0.6963	0.6949	0.6935	0.6921	0.6907	0.6893	0.6879	0.6866	0.6853	0.6839	0.6826

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.7262	0.7247	0.7232	0.7216	0.7201	0.7186	0.7171	0.7155	0.7140	0.7125	0.7110
155	0.7262	0.7247	0.7232	0.7217	0.7202	0.7187	0.7172	0.7157	0.7142	0.7128	0.7113
160	0.7262	0.7247	0.7233	0.7218	0.7203	0.7189	0.7174	0.7159	0.7145	0.7130	0.7116
165	0.7262	0.7248	0.7233	0.7219	0.7204	0.7190	0.7176	0.7161	0.7147	0.7133	0.7119
170	0.7262	0.7248	0.7234	0.7220	0.7205	0.7191	0.7177	0.7163	0.7149	0.7135	0.7121
175	0.7262	0.7248	0.7234	0.7220	0.7207	0.7193	0.7179	0.7165	0.7151	0.7138	0.7124
180	0.7262	0.7248	0.7235	0.7221	0.7207	0.7194	0.7180	0.7167	0.7153	0.7140	0.7127
185	0.7262	0.7249	0.7235	0.7222	0.7208	0.7195	0.7182	0.7169	0.7155	0.7142	0.7129
190	0.7262	0.7249	0.7236	0.7222	0.7209	0.7196	0.7183	0.7170	0.7157	0.7145	0.7132
195	0.7262	0.7249	0.7236	0.7223	0.7210	0.7197	0.7185	0.7172	0.7159	0.7147	0.7134
200	0.7262	0.7249	0.7236	0.7224	0.7211	0.7199	0.7186	0.7174	0.7161	0.7149	0.7136
205	0.7262	0.7249	0.7237	0.7224	0.7212	0.7200	0.7187	0.7175	0.7163	0.7151	0.7139
210	0.7262	0.7250	0.7237	0.7225	0.7213	0.7201	0.7189	0.7177	0.7165	0.7153	0.7141
215	0.7262	0.7250	0.7238	0.7226	0.7214	0.7202	0.7190	0.7178	0.7166	0.7154	0.7143
220	0.7262	0.7250	0.7238	0.7226	0.7214	0.7203	0.7191	0.7179	0.7168	0.7156	0.7145
225	0.7262	0.7250	0.7238	0.7227	0.7215	0.7204	0.7192	0.7181	0.7169	0.7158	0.7147
230	0.7262	0.7250	0.7239	0.7227	0.7216	0.7205	0.7193	0.7182	0.7171	0.7160	0.7149
235	0.7262	0.7251	0.7239	0.7228	0.7217	0.7206	0.7194	0.7183	0.7172	0.7161	0.7150
240	0.7262	0.7251	0.7240	0.7228	0.7217	0.7206	0.7195	0.7185	0.7174	0.7163	0.7152
245	0.7262	0.7251	0.7240	0.7229	0.7218	0.7207	0.7196	0.7186	0.7175	0.7164	0.7154
250	0.7262	0.7251	0.7240	0.7229	0.7219	0.7208	0.7197	0.7187	0.7176	0.7166	0.7156
255	0.7262	0.7251	0.7241	0.7230	0.7219	0.7209	0.7198	0.7188	0.7178	0.7167	0.7157
260	0.7262	0.7251	0.7241	0.7230	0.7220	0.7210	0.7199	0.7189	0.7179	0.7169	0.7159
265	0.7262	0.7251	0.7241	0.7231	0.7221	0.7210	0.7200	0.7190	0.7180	0.7170	0.7160
270	0.7262	0.7252	0.7241	0.7231	0.7221	0.7211	0.7201	0.7191	0.7181	0.7171	0.7162
275	0.7262	0.7252	0.7242	0.7232	0.7222	0.7212	0.7202	0.7192	0.7182	0.7173	0.7163
280	0.7262	0.7252	0.7242	0.7232	0.7222	0.7213	0.7203	0.7193	0.7184	0.7174	0.7164
285	0.7262	0.7252	0.7242	0.7233	0.7223	0.7213	0.7204	0.7194	0.7185	0.7175	0.7166
290	0.7262	0.7252	0.7243	0.7233	0.7223	0.7214	0.7205	0.7195	0.7186	0.7176	0.7167
295	0.7262	0.7252	0.7243	0.7233	0.7224	0.7215	0.7205	0.7196	0.7187	0.7178	0.7168
300	0.7262	0.7252	0.7243	0.7234	0.7224	0.7215	0.7206	0.7197	0.7188	0.7179	0.7170
310	0.7262	0.7253	0.7244	0.7234	0.7225	0.7216	0.7207	0.7199	0.7190	0.7181	0.7172
320	0.7262	0.7253	0.7244	0.7235	0.7226	0.7218	0.7209	0.7200	0.7192	0.7183	0.7174
330	0.7262	0.7253	0.7244	0.7236	0.7227	0.7219	0.7210	0.7202	0.7193	0.7185	0.7177
340	0.7262	0.7253	0.7245	0.7236	0.7228	0.7220	0.7211	0.7203	0.7195	0.7187	0.7179
350	0.7262	0.7254	0.7245	0.7237	0.7229	0.7221	0.7213	0.7205	0.7197	0.7189	0.7181
360	0.7262	0.7254	0.7246	0.7238	0.7230	0.7222	0.7214	0.7206	0.7198	0.7190	0.7182
370	0.7262	0.7254	0.7246	0.7238	0.7230	0.7223	0.7215	0.7207	0.7199	0.7192	0.7184
380	0.7262	0.7254	0.7246	0.7239	0.7231	0.7223	0.7216	0.7208	0.7201	0.7193	0.7186
390	0.7262	0.7254	0.7247	0.7239	0.7232	0.7224	0.7217	0.7210	0.7202	0.7195	0.7188
400	0.7262	0.7254	0.7247	0.7240	0.7232	0.7225	0.7218	0.7211	0.7203	0.7196	0.7189

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(a) Concluded. Critical-flow factor, C*

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	0.7110	0.7095	0.7079	0.7065	0.7050	0.7035	0.7020	0.7006	0.6991	0.6977	0.6963
155	0.7113	0.7098	0.7083	0.7069	0.7054	0.7040	0.7025	0.7011	0.6997	0.6983	0.6969
160	0.7116	0.7101	0.7087	0.7073	0.7059	0.7044	0.7030	0.7017	0.7003	0.6989	0.6975
165	0.7119	0.7105	0.7091	0.7077	0.7063	0.7049	0.7035	0.7022	0.7008	0.6995	0.6981
170	0.7121	0.7108	0.7094	0.7080	0.7067	0.7053	0.7040	0.7026	0.7013	0.7000	0.6987
175	0.7124	0.7111	0.7097	0.7084	0.7071	0.7057	0.7044	0.7031	0.7018	0.7005	0.6993
180	0.7127	0.7114	0.7100	0.7087	0.7074	0.7061	0.7048	0.7036	0.7023	0.7010	0.6998
185	0.7129	0.7116	0.7103	0.7091	0.7078	0.7065	0.7052	0.7040	0.7028	0.7015	0.7003
190	0.7132	0.7119	0.7106	0.7094	0.7081	0.7069	0.7056	0.7044	0.7032	0.7020	0.7008
195	0.7134	0.7122	0.7109	0.7097	0.7085	0.7072	0.7060	0.7048	0.7036	0.7024	0.7012
200	0.7136	0.7124	0.7112	0.7100	0.7088	0.7076	0.7064	0.7052	0.7040	0.7029	0.7017
205	0.7139	0.7127	0.7115	0.7103	0.7091	0.7079	0.7067	0.7056	0.7044	0.7033	0.7021
210	0.7141	0.7129	0.7117	0.7105	0.7094	0.7082	0.7071	0.7059	0.7048	0.7037	0.7026
215	0.7143	0.7131	0.7120	0.7108	0.7097	0.7085	0.7074	0.7063	0.7052	0.7041	0.7030
220	0.7145	0.7133	0.7122	0.7111	0.7099	0.7088	0.7077	0.7066	0.7055	0.7044	0.7034
225	0.7147	0.7135	0.7124	0.7113	0.7102	0.7091	0.7080	0.7069	0.7059	0.7048	0.7037
230	0.7149	0.7138	0.7127	0.7116	0.7105	0.7094	0.7083	0.7073	0.7062	0.7051	0.7041
235	0.7150	0.7140	0.7129	0.7118	0.7107	0.7097	0.7086	0.7076	0.7065	0.7055	0.7045
240	0.7152	0.7141	0.7131	0.7120	0.7110	0.7099	0.7089	0.7079	0.7068	0.7058	0.7048
245	0.7154	0.7143	0.7133	0.7122	0.7112	0.7102	0.7092	0.7081	0.7071	0.7061	0.7051
250	0.7156	0.7145	0.7135	0.7125	0.7114	0.7104	0.7094	0.7084	0.7074	0.7064	0.7055
255	0.7157	0.7147	0.7137	0.7127	0.7117	0.7107	0.7097	0.7087	0.7077	0.7067	0.7058
260	0.7159	0.7149	0.7139	0.7129	0.7119	0.7109	0.7099	0.7089	0.7080	0.7070	0.7061
265	0.7160	0.7150	0.7140	0.7131	0.7121	0.7111	0.7102	0.7092	0.7083	0.7073	0.7064
270	0.7162	0.7152	0.7142	0.7133	0.7123	0.7113	0.7104	0.7094	0.7085	0.7076	0.7067
275	0.7163	0.7153	0.7144	0.7134	0.7125	0.7116	0.7106	0.7097	0.7088	0.7078	0.7069
280	0.7164	0.7155	0.7146	0.7136	0.7127	0.7118	0.7108	0.7099	0.7090	0.7081	0.7072
285	0.7166	0.7156	0.7147	0.7138	0.7129	0.7120	0.7110	0.7101	0.7092	0.7084	0.7075
290	0.7167	0.7158	0.7149	0.7140	0.7131	0.7122	0.7113	0.7104	0.7095	0.7086	0.7077
295	0.7168	0.7159	0.7150	0.7141	0.7132	0.7123	0.7115	0.7106	0.7097	0.7088	0.7080
300	0.7170	0.7161	0.7152	0.7143	0.7134	0.7125	0.7117	0.7108	0.7099	0.7091	0.7082
310	0.7172	0.7163	0.7155	0.7146	0.7137	0.7129	0.7120	0.7112	0.7103	0.7095	0.7087
320	0.7174	0.7166	0.7157	0.7149	0.7141	0.7132	0.7124	0.7116	0.7107	0.7099	0.7091
330	0.7177	0.7168	0.7160	0.7152	0.7144	0.7135	0.7127	0.7119	0.7111	0.7103	0.7095
340	0.7179	0.7170	0.7162	0.7154	0.7146	0.7138	0.7131	0.7123	0.7115	0.7107	0.7099
350	0.7181	0.7173	0.7165	0.7157	0.7149	0.7141	0.7134	0.7126	0.7118	0.7111	0.7103
360	0.7182	0.7175	0.7167	0.7159	0.7152	0.7144	0.7137	0.7129	0.7122	0.7114	0.7107
370	0.7184	0.7177	0.7169	0.7162	0.7154	0.7147	0.7139	0.7132	0.7125	0.7117	0.7110
380	0.7186	0.7179	0.7171	0.7164	0.7157	0.7149	0.7142	0.7135	0.7128	0.7121	0.7114
390	0.7188	0.7180	0.7173	0.7166	0.7159	0.7152	0.7145	0.7138	0.7131	0.7124	0.7117
400	0.7189	0.7182	0.7175	0.7168	0.7161	0.7154	0.7147	0.7140	0.7133	0.7127	0.7120

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	0.6963	0.6949	0.6935	0.6921	0.6907	0.6893	0.6879	0.6866	0.6853	0.6839	0.6826
155	0.6969	0.6955	0.6942	0.6928	0.6915	0.6901	0.6888	0.6875	0.6862	0.6849	0.6836
160	0.6975	0.6962	0.6948	0.6935	0.6922	0.6909	0.6896	0.6883	0.6870	0.6857	0.6845
165	0.6981	0.6968	0.6955	0.6942	0.6929	0.6916	0.6904	0.6891	0.6878	0.6866	0.6854
170	0.6987	0.6974	0.6961	0.6949	0.6936	0.6923	0.6911	0.6899	0.6886	0.6874	0.6862
175	0.6993	0.6980	0.6967	0.6955	0.6942	0.6930	0.6918	0.6906	0.6894	0.6882	0.6870
180	0.6998	0.6985	0.6973	0.6961	0.6949	0.6937	0.6925	0.6913	0.6901	0.6889	0.6878
185	0.7003	0.6991	0.6979	0.6967	0.6955	0.6943	0.6931	0.6919	0.6908	0.6896	0.6885
190	0.7008	0.6996	0.6984	0.6972	0.6960	0.6949	0.6937	0.6926	0.6915	0.6903	0.6892
195	0.7012	0.7001	0.6989	0.6978	0.6966	0.6955	0.6943	0.6932	0.6921	0.6910	0.6899
200	0.7017	0.7005	0.6994	0.6983	0.6971	0.6960	0.6949	0.6938	0.6927	0.6916	0.6905
205	0.7021	0.7010	0.6999	0.6988	0.6977	0.6966	0.6955	0.6944	0.6933	0.6922	0.6912
210	0.7026	0.7014	0.7003	0.6992	0.6982	0.6971	0.6960	0.6949	0.6939	0.6928	0.6918
215	0.7030	0.7019	0.7008	0.6997	0.6986	0.6976	0.6965	0.6955	0.6944	0.6934	0.6924
220	0.7034	0.7023	0.7012	0.7002	0.6991	0.6981	0.6970	0.6960	0.6950	0.6939	0.6929
225	0.7037	0.7027	0.7016	0.7006	0.6996	0.6985	0.6975	0.6965	0.6955	0.6945	0.6935
230	0.7041	0.7031	0.7020	0.7010	0.7000	0.6990	0.6980	0.6970	0.6960	0.6950	0.6940
235	0.7045	0.7034	0.7024	0.7014	0.7004	0.6994	0.6984	0.6974	0.6965	0.6955	0.6945
240	0.7048	0.7038	0.7028	0.7018	0.7008	0.6998	0.6989	0.6979	0.6969	0.6960	0.6950
245	0.7051	0.7041	0.7032	0.7022	0.7012	0.7002	0.6993	0.6983	0.6974	0.6964	0.6955
250	0.7055	0.7045	0.7035	0.7025	0.7016	0.7006	0.6997	0.6987	0.6978	0.6969	0.6960
255	0.7058	0.7048	0.7038	0.7029	0.7020	0.7010	0.7001	0.6992	0.6982	0.6973	0.6964
260	0.7061	0.7051	0.7042	0.7032	0.7023	0.7014	0.7005	0.6996	0.6986	0.6977	0.6969
265	0.7064	0.7054	0.7045	0.7036	0.7027	0.7018	0.7008	0.6999	0.6990	0.6982	0.6973
270	0.7067	0.7057	0.7048	0.7039	0.7030	0.7021	0.7012	0.7003	0.6994	0.6986	0.6977
275	0.7069	0.7060	0.7051	0.7042	0.7033	0.7024	0.7016	0.7007	0.6998	0.6989	0.6981
280	0.7072	0.7063	0.7054	0.7045	0.7036	0.7028	0.7019	0.7010	0.7002	0.6993	0.6985
285	0.7075	0.7066	0.7057	0.7048	0.7040	0.7031	0.7022	0.7014	0.7005	0.6997	0.6989
290	0.7077	0.7068	0.7060	0.7051	0.7043	0.7034	0.7026	0.7017	0.7009	0.7000	0.6992
295	0.7080	0.7071	0.7062	0.7054	0.7046	0.7037	0.7029	0.7020	0.7012	0.7004	0.6996
300	0.7082	0.7074	0.7065	0.7057	0.7048	0.7040	0.7032	0.7024	0.7015	0.7007	0.6999
310	0.7087	0.7078	0.7070	0.7062	0.7054	0.7046	0.7038	0.7030	0.7022	0.7014	0.7006
320	0.7091	0.7083	0.7075	0.7067	0.7059	0.7051	0.7043	0.7036	0.7028	0.7020	0.7012
330	0.7095	0.7087	0.7080	0.7072	0.7064	0.7056	0.7049	0.7041	0.7033	0.7026	0.7018
340	0.7099	0.7092	0.7084	0.7076	0.7069	0.7061	0.7054	0.7046	0.7039	0.7031	0.7024
350	0.7103	0.7096	0.7088	0.7081	0.7073	0.7066	0.7059	0.7051	0.7044	0.7037	0.7030
360	0.7107	0.7099	0.7092	0.7085	0.7078	0.7070	0.7063	0.7056	0.7049	0.7042	0.7035
370	0.7110	0.7103	0.7096	0.7089	0.7082	0.7075	0.7068	0.7061	0.7054	0.7047	0.7040
380	0.7114	0.7107	0.7099	0.7093	0.7086	0.7079	0.7072	0.7065	0.7058	0.7051	0.7045
390	0.7117	0.7110	0.7103	0.7096	0.7089	0.7083	0.7076	0.7069	0.7062	0.7056	0.7049
400	0.7120	0.7113	0.7106	0.7100	0.7093	0.7086	0.7080	0.7073	0.7067	0.7060	0.7054

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(b) Nozzle throat velocity, V_t, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	197.3	195.6	194.3	193.5	193.1	193.2	193.7	194.6	195.9	197.5	199.4
16	203.8	202.4	201.4	200.8	200.6	200.8	201.3	202.2	203.4	204.8	206.5
17	210.1	209.0	208.2	207.8	207.7	208.0	208.6	209.4	210.5	211.8	213.4
18	216.2	215.3	214.8	214.5	214.6	214.9	215.5	216.3	217.4	218.6	220.1
19	222.1	221.4	221.1	220.9	221.1	221.5	222.1	223.0	224.0	225.2	226.6
20	227.9	227.4	227.2	227.2	227.4	227.9	228.5	229.4	230.4	231.6	232.9
21	233.5	233.2	233.1	233.2	233.5	234.0	234.7	235.6	236.6	237.7	239.0
22	239.0	238.8	238.8	239.0	239.4	239.9	240.7	241.5	242.5	243.7	244.9
23	244.4	244.3	244.4	244.7	245.1	245.7	246.5	247.3	248.3	249.5	250.7
24	249.6	249.6	249.8	250.2	250.7	251.3	252.1	253.0	254.0	255.1	256.3
25	254.8	254.9	255.1	255.5	256.1	256.8	257.6	258.5	259.5	260.6	261.7
26	259.8	260.0	260.3	260.8	261.4	262.1	262.9	263.8	264.8	265.9	267.1
27	264.8	265.0	265.4	265.9	266.5	267.3	268.1	269.0	270.0	271.1	272.3
28	269.6	270.0	270.4	270.9	271.6	272.4	273.2	274.1	275.1	276.2	277.4
29	274.4	274.8	275.3	275.9	276.5	277.3	278.2	279.1	280.1	281.2	282.3
30	279.1	279.5	280.1	280.7	281.4	282.2	283.1	284.0	285.0	286.1	287.2
31	283.7	284.2	284.7	285.4	286.1	287.0	287.9	288.8	289.8	290.9	292.0
32	288.2	288.8	289.4	290.0	290.8	291.6	292.5	293.5	294.5	295.6	296.7
33	292.7	293.3	293.9	294.6	295.4	296.2	297.2	298.1	299.1	300.2	301.3
34	297.1	297.7	298.4	299.1	299.9	300.8	301.7	302.6	303.7	304.7	305.8
35	301.5	302.1	302.8	303.5	304.3	305.2	306.1	307.1	308.1	309.2	310.3
36	305.7	306.4	307.1	307.9	308.7	309.6	310.5	311.5	312.5	313.6	314.7
37	309.9	310.6	311.4	312.1	313.0	313.9	314.8	315.8	316.8	317.9	319.0
38	314.1	314.8	315.6	316.4	317.2	318.1	319.1	320.0	321.1	322.1	323.2
39	318.2	318.9	319.7	320.5	321.4	322.3	323.2	324.2	325.2	326.3	327.4
40	322.3	323.0	323.8	324.6	325.5	326.4	327.4	328.3	329.4	330.4	331.5
42	330.2	331.0	331.8	332.7	333.5	334.5	335.4	336.4	337.5	338.5	339.6
44	338.0	338.8	339.6	340.5	341.4	342.3	343.3	344.3	345.3	346.4	347.4
46	345.6	346.4	347.3	348.2	349.1	350.0	351.0	352.0	353.0	354.0	355.1
48	353.0	353.9	354.7	355.6	356.6	357.5	358.5	359.5	360.5	361.5	362.6
50	360.3	361.2	362.0	362.9	363.9	364.8	365.8	366.8	367.8	368.8	369.9
52	367.4	368.3	369.2	370.1	371.1	372.0	373.0	374.0	375.0	376.0	377.1
54	374.4	375.3	376.2	377.1	378.1	379.0	380.0	381.0	382.0	383.0	384.1
56	381.3	382.2	383.1	384.0	385.0	385.9	386.9	387.9	388.9	389.9	390.9
58	388.1	389.0	389.9	390.8	391.7	392.7	393.7	394.7	395.7	396.7	397.7
60	394.7	395.6	396.5	397.4	398.4	399.3	400.3	401.3	402.3	403.3	404.3
62	401.2	402.1	403.0	404.0	404.9	405.9	406.9	407.8	408.8	409.8	410.8
64	407.6	408.5	409.5	410.4	411.3	412.3	413.3	414.3	415.2	416.2	417.2
66	414.0	414.9	415.8	416.7	417.7	418.6	419.6	420.6	421.5	422.5	423.5
68	420.2	421.1	422.0	423.0	423.9	424.9	425.8	426.8	427.8	428.7	429.7
70	426.3	427.2	428.2	429.1	430.0	431.0	431.9	432.9	433.9	434.9	435.8

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	197.3	193.2	199.4	211.9	226.9	242.3	257.1	271.2	284.5	297.0	308.9
16	203.8	200.8	206.5	217.6	231.2	245.5	259.6	273.2	286.1	298.3	309.9
17	210.1	208.0	213.4	223.4	235.8	249.2	262.5	275.5	288.0	300.0	311.4
18	216.2	214.9	220.1	229.3	240.8	253.2	265.8	278.3	290.3	301.9	313.1
19	222.1	221.5	226.6	235.2	245.8	257.5	269.4	281.3	293.0	304.2	315.1
20	227.9	227.9	232.9	241.0	251.0	261.9	273.2	284.6	295.8	306.7	317.3
21	233.5	234.0	239.0	246.7	256.2	266.5	277.2	288.1	298.9	309.5	319.8
22	239.0	239.9	244.9	252.4	261.3	271.1	281.4	291.8	302.2	312.4	322.4
23	244.4	245.7	250.7	257.9	266.4	275.8	285.6	295.6	305.6	315.5	325.2
24	249.6	251.3	256.3	263.3	271.5	280.5	289.8	299.4	309.1	318.7	328.1
25	254.8	256.8	261.7	268.6	276.5	285.1	294.2	303.4	312.7	322.0	331.2
26	259.8	262.1	267.1	273.7	281.4	289.8	298.5	307.4	316.4	325.4	334.3
27	264.8	267.3	272.3	278.8	286.3	294.4	302.8	311.4	320.2	328.9	337.6
28	269.6	272.4	277.4	283.8	291.1	298.9	307.1	315.5	324.0	332.4	340.9
29	274.4	277.3	282.3	288.7	295.8	303.5	311.4	319.6	327.8	336.0	344.2
30	279.1	282.2	287.2	293.5	300.5	307.9	315.7	323.6	331.6	339.6	347.7
31	283.7	287.0	292.0	298.2	305.0	312.3	319.9	327.6	335.4	343.3	351.1
32	288.2	291.6	296.7	302.8	309.5	316.7	324.1	331.6	339.3	346.9	354.6
33	292.7	296.2	301.3	307.3	314.0	321.0	328.3	335.6	343.1	350.6	358.1
34	297.1	300.8	305.8	311.8	318.4	325.3	332.4	339.6	346.9	354.2	361.6
35	301.5	305.2	310.3	316.2	322.7	329.4	336.4	343.5	350.7	357.9	365.1
36	305.7	309.6	314.7	320.5	326.9	333.6	340.5	347.4	354.5	361.5	368.6
37	309.9	313.9	319.0	324.8	331.1	337.7	344.4	351.3	358.2	365.2	372.1
38	314.1	318.1	323.2	329.0	335.2	341.7	348.4	355.1	361.9	368.8	375.6
39	318.2	322.3	327.4	333.1	339.3	345.7	352.3	358.9	365.6	372.3	379.1
40	322.3	326.4	331.5	337.2	343.3	349.7	356.1	362.7	369.3	375.9	382.5
42	330.2	334.5	339.6	345.2	351.2	357.4	363.7	370.1	376.6	383.0	389.4
44	338.0	342.3	347.4	353.0	358.9	365.0	371.2	377.4	383.7	390.0	396.2
46	345.6	350.0	355.1	360.6	366.4	372.4	378.5	384.6	390.7	396.8	402.9
48	353.0	357.5	362.6	368.0	373.8	379.6	385.6	391.6	397.6	403.6	409.6
50	360.3	364.8	369.9	375.3	381.0	386.7	392.6	398.5	404.4	410.2	416.1
52	367.4	372.0	377.1	382.4	388.0	393.7	399.5	405.2	411.0	416.8	422.5
54	374.4	379.0	384.1	389.4	394.9	400.5	406.2	411.9	417.6	423.3	428.9
56	381.3	385.9	390.9	396.2	401.7	407.2	412.8	418.4	424.0	429.6	435.2
58	388.1	392.7	397.7	402.9	408.3	413.8	419.3	424.9	430.4	435.9	441.4
60	394.7	399.3	404.3	409.5	414.9	420.3	425.7	431.2	436.6	442.1	447.5
62	401.2	405.9	410.8	416.0	421.3	426.6	432.0	437.4	442.8	448.1	453.5
64	407.6	412.3	417.2	422.4	427.6	432.9	438.2	443.5	448.9	454.1	459.4
66	414.0	418.6	423.5	428.6	433.8	439.0	444.3	449.6	454.8	460.1	465.3
68	420.2	424.9	429.7	434.8	439.9	445.1	450.3	455.5	460.7	465.9	471.0
70	426.3	431.0	435.8	440.9	445.9	451.1	456.2	461.4	466.5	471.7	476.7

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(b) Continued. Nozzle throat velocity, V_t, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	308.9	320.1	330.8	340.9	350.7	360.0	369.0	377.7	386.0	394.1	401.9
16	309.9	321.0	331.5	341.6	351.3	360.6	369.5	378.1	386.4	394.5	402.3
17	311.4	322.2	332.6	342.6	352.2	361.4	370.2	378.8	387.1	395.1	402.9
18	313.1	323.8	334.0	343.8	353.3	362.4	371.2	379.7	387.9	395.9	403.6
19	315.1	325.5	335.6	345.3	354.6	363.6	372.4	380.8	388.9	396.9	404.5
20	317.3	327.5	337.4	347.0	356.2	365.1	373.7	382.0	390.1	398.0	405.6
21	319.8	329.8	339.4	348.8	357.9	366.7	375.2	383.4	391.5	399.2	406.8
22	322.4	332.1	341.6	350.8	359.7	368.4	376.8	385.0	392.9	400.6	408.2
23	325.2	334.7	344.0	353.0	361.8	370.3	378.6	386.6	394.5	402.1	409.6
24	328.1	337.4	346.4	355.3	363.9	372.3	380.5	388.4	396.2	403.8	411.2
25	331.2	340.2	349.1	357.7	366.2	374.4	382.5	390.3	398.0	405.5	412.8
26	334.3	343.1	351.8	360.3	368.6	376.7	384.6	392.4	399.9	407.3	414.5
27	337.6	346.1	354.6	362.9	371.0	379.0	386.8	394.5	401.9	409.2	416.4
28	340.9	349.2	357.5	365.6	373.6	381.4	389.1	396.6	404.0	411.2	418.3
29	344.2	352.4	360.5	368.4	376.3	384.0	391.5	398.9	406.2	413.3	420.3
30	347.7	355.6	363.5	371.3	379.0	386.6	394.0	401.3	408.4	415.5	422.4
31	351.1	358.9	366.6	374.2	381.8	389.2	396.5	403.7	410.7	417.7	424.5
32	354.6	362.2	369.8	377.2	384.6	391.9	399.1	406.2	413.1	420.0	426.7
33	358.1	365.5	372.9	380.3	387.5	394.7	401.7	408.7	415.6	422.3	428.9
34	361.6	368.9	376.1	383.3	390.4	397.5	404.4	411.3	418.0	424.7	431.2
35	365.1	372.2	379.4	386.4	393.4	400.3	407.2	413.9	420.6	427.1	433.6
36	368.6	375.6	382.6	389.5	396.4	403.2	409.9	416.6	423.1	429.6	436.0
37	372.1	379.0	385.8	392.7	399.4	406.1	412.7	419.3	425.7	432.1	438.4
38	375.6	382.4	389.1	395.8	402.5	409.0	415.6	422.0	428.4	434.7	440.9
39	379.1	385.7	392.4	399.0	405.5	412.0	418.4	424.8	431.1	437.3	443.4
40	382.5	389.1	395.6	402.1	408.6	415.0	421.3	427.6	433.8	439.9	445.9
42	389.4	395.8	402.1	408.4	414.7	420.9	427.1	433.2	439.2	445.2	451.1
44	396.2	402.4	408.6	414.8	420.8	426.9	432.9	438.8	444.7	450.6	456.3
46	402.9	409.0	415.0	421.0	427.0	432.9	438.7	444.5	450.3	456.0	461.6
48	409.6	415.5	421.4	427.3	433.1	438.8	444.6	450.2	455.8	461.4	466.9
50	416.1	421.9	427.7	433.4	439.1	444.8	450.4	455.9	461.4	466.9	472.3
52	422.5	428.3	433.9	439.6	445.1	450.7	456.2	461.6	467.0	472.3	477.6
54	428.9	434.5	440.1	445.6	451.1	456.5	461.9	467.3	472.6	477.8	483.0
56	435.2	440.7	446.2	451.6	457.0	462.3	467.6	472.9	478.1	483.3	488.4
58	441.4	446.8	452.2	457.5	462.8	468.1	473.3	478.5	483.6	488.7	493.7
60	447.5	452.8	458.1	463.4	468.6	473.8	478.9	484.0	489.1	494.1	499.0
62	453.5	458.8	464.0	469.2	474.4	479.5	484.5	489.5	494.5	499.4	504.3
64	459.4	464.6	469.8	474.9	480.0	485.1	490.0	495.0	499.9	504.8	509.6
66	465.3	470.4	475.5	480.6	485.6	490.6	495.5	500.4	505.2	510.0	514.8
68	471.0	476.1	481.2	486.2	491.2	496.1	500.9	505.8	510.5	515.3	520.0
70	476.7	481.8	486.8	491.7	496.6	501.5	506.3	511.1	515.8	520.5	525.1

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	401.9	409.5	416.9	424.1	431.1	437.9	444.5	451.0	457.4	463.6	469.7
16	402.3	409.8	417.2	424.4	431.3	438.1	444.8	451.3	457.6	463.8	469.9
17	402.9	410.4	417.7	424.9	431.8	438.6	445.3	451.7	458.1	464.3	470.3
18	403.6	411.1	418.4	425.6	432.5	439.3	445.9	452.3	458.7	464.9	470.9
19	404.5	412.0	419.3	426.4	433.3	440.0	446.6	453.1	459.4	465.6	471.6
20	405.6	413.1	420.3	427.3	434.2	440.9	447.5	453.9	460.2	466.4	472.4
21	406.8	414.2	421.4	428.4	435.3	442.0	448.5	454.9	461.2	467.3	473.3
22	408.2	415.5	422.6	429.6	436.4	443.1	449.6	455.9	462.2	468.3	474.3
23	409.6	416.9	424.0	430.9	437.7	444.3	450.7	457.1	463.3	469.4	475.4
24	411.2	418.4	425.4	432.3	439.0	445.6	452.0	458.3	464.5	470.6	476.5
25	412.8	419.9	426.9	433.7	440.4	446.9	453.3	459.6	465.8	471.8	477.7
26	414.5	421.6	428.5	435.3	441.9	448.4	454.8	461.0	467.1	473.1	479.0
27	416.4	423.4	430.2	436.9	443.5	449.9	456.2	462.4	468.5	474.5	480.3
28	418.3	425.2	432.0	438.6	445.2	451.5	457.8	464.0	470.0	475.9	481.7
29	420.3	427.1	433.8	440.4	446.9	453.2	459.4	465.5	471.5	477.4	483.2
30	422.4	429.1	435.8	442.3	448.7	454.9	461.1	467.2	473.1	479.0	484.7
31	424.5	431.2	437.7	444.2	450.5	456.7	462.9	468.9	474.8	480.6	486.3
32	426.7	433.3	439.8	446.2	452.4	458.6	464.7	470.6	476.5	482.2	487.9
33	428.9	435.5	441.9	448.2	454.4	460.5	466.5	472.4	478.2	484.0	489.6
34	431.2	437.7	444.0	450.3	456.4	462.5	468.4	474.3	480.0	485.7	491.3
35	433.6	440.0	446.2	452.4	458.5	464.5	470.4	476.2	481.9	487.5	493.1
36	436.0	442.3	448.5	454.6	460.6	466.5	472.4	478.1	483.8	489.4	494.9
37	438.4	444.6	450.8	456.8	462.8	468.6	474.4	480.1	485.7	491.3	496.7
38	440.9	447.0	453.1	459.1	464.9	470.8	476.5	482.1	487.7	493.2	498.6
39	443.4	449.5	455.5	461.4	467.2	472.9	478.6	484.2	489.7	495.2	500.6
40	445.9	451.9	457.8	463.7	469.4	475.1	480.8	486.3	491.8	497.2	502.5
42	451.1	456.9	462.7	468.4	474.1	479.6	485.2	490.6	496.0	501.3	506.5
44	456.3	462.0	467.7	473.3	478.8	484.3	489.7	495.0	500.3	505.5	510.7
46	461.6	467.2	472.7	478.2	483.6	489.0	494.3	499.5	504.7	509.8	514.9
48	466.9	472.4	477.8	483.2	488.5	493.7	498.9	504.1	509.2	514.2	519.2
50	472.3	477.6	482.9	488.2	493.4	498.6	503.7	508.7	513.7	518.7	523.6
52	477.6	482.9	488.1	493.3	498.4	503.4	508.5	513.4	518.3	523.2	528.0
54	483.0	488.2	493.3	498.3	503.4	508.3	513.3	518.2	523.0	527.8	532.5
56	488.4	493.4	498.5	503.4	508.4	513.3	518.1	522.9	527.7	532.4	537.1
58	493.7	498.7	503.6	508.5	513.4	518.2	523.0	527.7	532.4	537.0	541.7
60	499.0	503.9	508.8	513.6	518.4	523.1	527.8	532.5	537.1	541.7	546.3
62	504.3	509.2	514.0	518.7	523.4	528.1	532.7	537.3	541.9	546.4	550.9
64	509.6	514.3	519.1	523.8	528.4	533.0	537.6	542.1	546.6	551.1	555.5
66	514.8	519.5	524.2	528.8	533.4	537.9	542.5	546.9	551.3	555.7	560.1
68	520.0	524.6	529.2	533.8	538.3	542.8	547.3	551.7	556.1	560.4	564.7
70	525.1	529.7	534.3	538.8	543.3	547.7	552.1	556.5	560.8	565.1	569.3

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(b) Continued. Nozzle throat velocity, V_t, m/sec

Plenum temperature K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	426.3	431.0	435.8	440.9	445.9	451.1	456.2	461.4	466.5	471.7	476.7
72	432.4	437.0	441.9	446.8	451.9	457.0	462.1	467.2	472.3	477.3	482.4
74	438.3	443.0	447.8	452.7	457.7	462.8	467.9	472.9	477.9	483.0	487.9
76	444.2	448.9	453.6	458.6	463.5	468.5	473.5	478.5	483.5	488.5	493.4
78	450.0	454.7	459.4	464.3	469.2	474.2	479.2	484.1	489.1	494.0	498.8
80	455.8	460.4	465.1	470.0	474.9	479.8	484.7	489.6	494.5	499.4	504.2
82	461.4	466.0	470.7	475.6	480.4	485.3	490.2	495.0	499.9	504.7	509.5
84	467.0	471.6	476.3	481.1	485.9	490.7	495.6	500.4	505.2	510.0	514.8
86	472.5	477.1	481.8	486.5	491.3	496.1	500.9	505.7	510.5	515.2	520.0
88	478.0	482.6	487.2	491.9	496.7	501.5	506.2	511.0	515.7	520.4	525.1
90	483.4	487.9	492.6	497.3	502.0	506.7	511.5	516.2	520.9	525.5	530.2
92	488.7	493.3	497.9	502.5	507.2	511.9	516.6	521.3	526.0	530.6	535.2
94	494.0	498.5	503.1	507.7	512.4	517.1	521.7	526.4	531.0	535.6	540.2
96	499.3	503.7	508.3	512.9	517.5	522.2	526.8	531.4	536.0	540.6	545.1
98	504.4	508.9	513.4	518.0	522.6	527.2	531.8	536.4	541.0	545.5	550.0
100	509.6	514.0	518.5	523.1	527.6	532.2	536.8	541.3	545.9	550.4	554.8
102	514.6	519.1	523.5	528.1	532.6	537.2	541.7	546.2	550.7	555.2	559.6
104	519.6	524.1	528.5	533.0	537.5	542.1	546.6	551.1	555.5	560.0	564.4
106	524.6	529.0	533.5	537.9	542.4	546.9	551.4	555.8	560.3	564.7	569.1
108	529.5	533.9	538.3	542.8	547.3	551.7	556.2	560.6	565.0	569.4	573.7
110	534.4	538.8	543.2	547.6	552.0	556.5	560.9	565.3	569.7	574.0	578.3
112	539.3	543.6	548.0	552.4	556.8	561.2	565.6	570.0	574.3	578.6	582.9
114	544.1	548.4	552.7	557.1	561.5	565.9	570.2	574.6	578.9	583.2	587.5
116	548.8	553.1	557.4	561.8	566.2	570.5	574.9	579.2	583.5	587.7	592.0
118	553.5	557.8	562.1	566.4	570.8	575.1	579.4	583.7	588.0	592.2	596.5
120	558.2	562.5	566.8	571.1	575.4	579.7	584.0	588.2	592.5	596.7	600.9
122	562.8	567.1	571.3	575.6	579.9	584.2	588.5	592.7	596.9	601.1	605.3
124	567.4	571.6	575.9	580.2	584.4	588.7	592.9	597.1	601.3	605.5	609.7
126	572.0	576.2	580.4	584.7	588.9	593.1	597.4	601.6	605.7	609.9	614.0
128	576.5	580.7	584.9	589.1	593.3	597.6	601.7	605.9	610.1	614.2	618.3
130	581.0	585.2	589.4	593.5	597.7	601.9	606.1	610.3	614.4	618.5	622.6
132	585.4	589.6	593.8	597.9	602.1	606.3	610.4	614.6	618.7	622.8	626.8
134	589.8	594.0	598.1	602.3	606.5	610.6	614.7	618.8	622.9	627.0	631.0
136	594.2	598.4	602.5	606.6	610.8	614.9	619.0	623.1	627.1	631.2	635.2
138	598.6	602.7	606.8	610.9	615.0	619.2	623.2	627.3	631.3	635.4	639.3
140	602.9	607.0	611.1	615.2	619.3	623.4	627.4	631.5	635.5	639.5	643.5
142	607.2	611.3	615.4	619.4	623.5	627.6	631.6	635.6	639.6	643.6	647.6
144	611.5	615.5	619.6	623.6	627.7	631.7	635.8	639.8	643.7	647.7	651.6
146	615.7	619.7	623.8	627.8	631.8	635.9	639.9	643.9	647.8	651.8	655.7
148	619.9	623.9	627.9	632.0	636.0	640.0	644.0	647.9	651.9	655.8	659.7
150	624.1	628.1	632.1	636.1	640.1	644.1	648.0	652.0	655.9	659.8	663.7

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	476.7	481.8	486.8	491.7	496.6	501.5	506.3	511.1	515.8	520.5	525.1
72	482.4	487.4	492.3	497.2	502.0	506.9	511.6	516.3	521.0	525.6	530.2
74	487.9	492.9	497.8	502.6	507.4	512.2	516.9	521.5	526.2	530.7	535.3
76	493.4	498.3	503.1	507.9	512.7	517.4	522.1	526.7	531.3	535.8	540.3
78	498.8	503.7	508.5	513.2	518.0	522.6	527.2	531.8	536.3	540.8	545.3
80	504.2	509.0	513.8	518.5	523.1	527.8	532.3	536.9	541.4	545.8	550.2
82	509.5	514.3	519.0	523.7	528.3	532.9	537.4	541.9	546.3	550.8	555.1
84	514.8	519.5	524.1	528.8	533.4	537.9	542.4	546.9	551.3	555.7	560.0
86	520.0	524.6	529.3	533.9	538.4	542.9	547.4	551.8	556.2	560.5	564.8
88	525.1	529.7	534.3	538.9	543.4	547.9	552.3	556.7	561.0	565.3	569.6
90	530.2	534.8	539.3	543.8	548.3	552.8	557.1	561.5	565.8	570.1	574.3
92	535.2	539.8	544.3	548.8	553.2	557.6	562.0	566.3	570.6	574.8	579.0
94	540.2	544.7	549.2	553.6	558.1	562.4	566.8	571.0	575.3	579.5	583.7
96	545.1	549.6	554.1	558.5	562.9	567.2	571.5	575.7	580.0	584.1	588.3
98	550.0	554.4	558.9	563.3	567.6	571.9	576.2	580.4	584.6	588.8	592.9
100	554.8	559.3	563.6	568.0	572.3	576.6	580.8	585.0	589.2	593.3	597.4
102	559.6	564.0	568.4	572.7	577.0	581.2	585.5	589.6	593.8	597.9	601.9
104	564.4	568.7	573.1	577.4	581.6	585.8	590.0	594.2	598.3	602.4	606.4
106	569.1	573.4	577.7	582.0	586.2	590.4	594.6	598.7	602.8	606.8	610.8
108	573.7	578.0	582.3	586.6	590.8	594.9	599.1	603.2	607.2	611.2	615.2
110	578.3	582.6	586.9	591.1	595.3	599.4	603.5	607.6	611.6	615.6	619.6
112	582.9	587.2	591.4	595.6	599.8	603.9	608.0	612.0	616.0	620.0	623.9
114	587.5	591.7	595.9	600.1	604.2	608.3	612.4	616.4	620.4	624.3	628.2
116	592.0	596.2	600.4	604.5	608.6	612.7	616.7	620.7	624.7	628.6	632.5
118	596.5	600.6	604.8	608.9	613.0	617.0	621.1	625.0	629.0	632.9	636.8
120	600.9	605.1	609.2	613.3	617.3	621.4	625.4	629.3	633.2	637.1	641.0
122	605.3	609.4	613.5	617.6	621.6	625.6	629.6	633.6	637.5	641.3	645.1
124	609.7	613.8	617.9	621.9	625.9	629.9	633.9	637.8	641.6	645.5	649.3
126	614.0	618.1	622.1	626.2	630.2	634.1	638.1	641.9	645.8	649.6	653.4
128	618.3	622.4	626.4	630.4	634.4	638.3	642.2	646.1	649.9	653.7	657.5
130	622.6	626.6	630.6	634.6	638.6	642.5	646.4	650.2	654.0	657.8	661.6
132	626.8	630.8	634.8	638.8	642.7	646.6	650.5	654.3	658.1	661.9	665.6
134	631.0	635.0	639.0	642.9	646.9	650.7	654.6	658.4	662.2	665.9	669.7
136	635.2	639.2	643.1	647.1	651.0	654.8	658.6	662.4	666.2	669.9	673.6
138	639.3	643.3	647.2	651.1	655.0	658.9	662.7	666.5	670.2	673.9	677.6
140	643.5	647.4	651.3	655.2	659.1	662.9	666.7	670.4	674.2	677.9	681.5
142	647.6	651.5	655.4	659.3	663.1	666.9	670.7	674.4	678.1	681.8	685.5
144	651.6	655.5	659.4	663.3	667.1	670.9	674.6	678.4	682.0	685.7	689.4
146	655.7	659.6	663.4	667.2	671.0	674.8	678.6	682.3	685.9	689.6	693.2
148	659.7	663.6	667.4	671.2	675.0	678.7	682.5	686.2	689.8	693.5	697.1
150	663.7	667.5	671.4	675.1	678.9	682.6	686.4	690.0	693.7	697.3	700.9

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(b) Continued. Nozzle throat velocity, V_t, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	525.1	529.7	534.3	538.8	543.3	547.7	552.1	556.5	560.8	565.1	569.3
72	530.2	534.8	539.3	543.7	548.2	552.6	556.9	561.2	565.5	569.8	574.0
74	535.3	539.8	544.2	548.7	553.0	557.4	561.7	566.0	570.2	574.4	578.6
76	540.3	544.8	549.2	553.5	557.9	562.2	566.4	570.7	574.9	579.0	583.2
78	545.3	549.7	554.1	558.4	562.7	566.9	571.2	575.4	579.5	583.6	587.7
80	550.2	554.6	558.9	563.2	567.5	571.7	575.9	580.0	584.1	588.2	592.3
82	555.1	559.5	563.7	568.0	572.2	576.4	580.5	584.6	588.7	592.8	596.8
84	560.0	564.3	568.5	572.7	576.9	581.1	585.2	589.2	593.3	597.3	601.3
86	564.8	569.1	573.3	577.5	581.6	585.7	589.8	593.8	597.8	601.8	605.7
88	569.6	573.8	578.0	582.1	586.2	590.3	594.4	598.4	602.3	606.3	610.2
90	574.3	578.5	582.7	586.8	590.8	594.9	598.9	602.9	606.8	610.7	614.6
92	579.0	583.2	587.3	591.4	595.4	599.4	603.4	607.4	611.3	615.2	619.0
94	583.7	587.8	591.9	595.9	600.0	603.9	607.9	611.8	615.7	619.5	623.4
96	588.3	592.4	596.4	600.5	604.5	608.4	612.3	616.2	620.1	623.9	627.7
98	592.9	596.9	601.0	605.0	608.9	612.9	616.8	620.6	624.5	628.3	632.0
100	597.4	601.5	605.5	609.4	613.4	617.3	621.2	625.0	628.8	632.6	636.3
102	601.9	605.9	609.9	613.9	617.8	621.7	625.5	629.3	633.1	636.9	640.6
104	606.4	610.4	614.3	618.3	622.2	626.0	629.8	633.6	637.4	641.1	644.8
106	610.8	614.8	618.7	622.6	626.5	630.3	634.1	637.9	641.6	645.3	649.0
108	615.2	619.2	623.1	627.0	630.8	634.6	638.4	642.1	645.9	649.5	653.2
110	619.6	623.5	627.4	631.3	635.1	638.9	642.6	646.4	650.1	653.7	657.4
112	623.9	627.8	631.7	635.5	639.3	643.1	646.8	650.5	654.2	657.9	661.5
114	628.2	632.1	636.0	639.8	643.6	647.3	651.0	654.7	658.4	662.0	665.6
116	632.5	636.4	640.2	644.0	647.8	651.5	655.2	658.8	662.5	666.1	669.7
118	636.8	640.6	644.4	648.2	651.9	655.6	659.3	662.9	666.6	670.2	673.7
120	641.0	644.8	648.6	652.3	656.0	659.7	663.4	667.0	670.6	674.2	677.7
122	645.1	648.9	652.7	656.4	660.2	663.8	667.5	671.1	674.7	678.2	681.7
124	649.3	653.1	656.8	660.5	664.2	667.9	671.5	675.1	678.7	682.2	685.7
126	653.4	657.2	660.9	664.6	668.3	671.9	675.5	679.1	682.6	686.2	689.7
128	657.5	661.3	665.0	668.7	672.3	675.9	679.5	683.1	686.6	690.1	693.6
130	661.6	665.3	669.0	672.7	676.3	679.9	683.5	687.0	690.5	694.0	697.5
132	665.6	669.3	673.0	676.7	680.3	683.9	687.4	691.0	694.5	697.9	701.4
134	669.7	673.3	677.0	680.6	684.2	687.8	691.3	694.9	698.3	701.8	705.2
136	673.6	677.3	681.0	684.6	688.2	691.7	695.2	698.7	702.2	705.6	709.1
138	677.6	681.3	684.9	688.5	692.1	695.6	699.1	702.6	706.0	709.5	712.9
140	681.5	685.2	688.8	692.4	695.9	699.5	702.9	706.4	709.9	713.3	716.7
142	685.5	689.1	692.7	696.2	699.8	703.3	706.8	710.2	713.7	717.1	720.4
144	689.4	693.0	696.5	700.1	703.6	707.1	710.6	714.0	717.4	720.8	724.2
146	693.2	696.8	700.4	703.9	707.4	710.9	714.4	717.8	721.2	724.6	727.9
148	697.1	700.6	704.2	707.7	711.2	714.7	718.1	721.5	724.9	728.3	731.6
150	700.9	704.5	708.0	711.5	715.0	718.4	721.8	725.2	728.6	732.0	735.3

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	624.1	628.1	632.1	636.1	640.1	644.1	648.0	652.0	655.9	659.8	663.7
155	634.4	638.4	642.3	646.3	650.2	654.2	658.1	662.0	665.9	669.7	673.5
160	644.5	648.5	652.4	656.3	660.2	664.1	668.0	671.8	675.7	679.5	683.3
165	654.5	658.4	662.3	666.2	670.0	673.9	677.7	681.5	685.3	689.1	692.8
170	664.4	668.2	672.1	675.9	679.7	683.5	687.3	691.1	694.8	698.6	702.3
175	674.1	677.9	681.7	685.5	689.3	693.0	696.8	700.5	704.2	707.9	711.6
180	683.6	687.4	691.2	694.9	698.7	702.4	706.1	709.8	713.5	717.1	720.8
185	693.1	696.8	700.5	704.3	708.0	711.6	715.3	719.0	722.6	726.2	729.8
190	702.4	706.1	709.8	713.4	717.1	720.8	724.4	728.0	731.6	735.2	738.8
195	711.6	715.2	718.9	722.5	726.2	729.8	733.4	737.0	740.5	744.1	747.6
200	720.6	724.3	727.9	731.5	735.1	738.7	742.2	745.8	749.3	752.8	756.3
205	729.6	733.2	736.8	740.3	743.9	747.5	751.0	754.5	758.0	761.5	765.0
210	738.4	742.0	745.5	749.1	752.6	756.1	759.6	763.1	766.6	770.1	773.5
215	747.2	750.7	754.2	757.7	761.2	764.7	768.2	771.6	775.1	778.5	781.9
220	755.8	759.3	762.8	766.3	769.8	773.2	776.6	780.1	783.5	786.9	790.2
225	764.3	767.8	771.3	774.7	778.2	781.6	785.0	788.4	791.8	795.1	798.5
230	772.8	776.2	779.7	783.1	786.5	789.9	793.3	796.6	800.0	803.3	806.6
235	781.1	784.6	788.0	791.4	794.7	798.1	801.5	804.8	808.1	811.4	814.7
240	789.4	792.8	796.2	799.5	802.9	806.2	809.6	812.9	816.2	819.5	822.7
245	797.6	800.9	804.3	807.6	811.0	814.3	817.6	820.9	824.1	827.4	830.6
250	805.7	809.0	812.3	815.7	819.0	822.3	825.5	828.8	832.0	835.3	838.5
255	813.7	817.0	820.3	823.6	826.9	830.1	833.4	836.6	839.8	843.0	846.2
260	821.6	824.9	828.2	831.5	834.7	838.0	841.2	844.4	847.6	850.8	853.9
265	829.5	832.8	836.0	839.3	842.5	845.7	848.9	852.1	855.2	858.4	861.5
270	837.3	840.5	843.8	847.0	850.2	853.4	856.5	859.7	862.8	866.0	869.1
275	845.0	848.2	851.4	854.6	857.8	861.0	864.1	867.2	870.4	873.5	876.6
280	852.6	855.8	859.0	862.2	865.4	868.5	871.6	874.7	877.8	880.9	884.0
285	860.2	863.4	866.6	869.7	872.8	876.0	879.1	882.2	885.2	888.3	891.4
290	867.7	870.9	874.0	877.2	880.3	883.4	886.4	889.5	892.6	895.6	898.7
295	875.2	878.3	881.4	884.5	887.6	890.7	893.8	896.8	899.8	902.9	905.9
300	882.6	885.7	888.8	891.9	894.9	898.0	901.0	904.0	907.1	910.1	913.1
310	897.2	900.2	903.3	906.3	909.3	912.4	915.4	918.4	921.3	924.3	927.2
320	911.5	914.5	917.6	920.6	923.5	926.5	929.5	932.4	935.4	938.3	941.2
330	925.6	928.6	931.6	934.6	937.5	940.5	943.4	946.3	949.2	952.1	955.0
340	939.6	942.5	945.5	948.4	951.3	954.2	957.1	960.0	962.8	965.7	968.5
350	953.3	956.2	959.1	962.0	964.9	967.7	970.6	973.4	976.3	979.1	981.9
360	966.8	969.7	972.6	975.4	978.3	981.1	983.9	986.7	989.5	992.3	995.1
370	980.1	983.0	985.8	988.7	991.5	994.3	997.1	999.8	1002.6	1005.4	1008.1
380	993.3	996.1	998.9	1001.7	1004.5	1007.3	1010.0	1012.8	1015.5	1018.2	1020.9
390	1006.3	1009.1	1011.8	1014.6	1017.4	1020.1	1022.8	1025.5	1028.2	1030.9	1033.6
400	1019.1	1021.9	1024.6	1027.3	1030.1	1032.8	1035.5	1038.2	1040.8	1043.5	1046.2

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(b) Concluded. Nozzle throat velocity, V_t, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	663.7	667.5	671.4	675.1	678.9	682.6	686.4	690.0	693.7	697.3	700.9
155	673.5	677.4	681.1	684.9	688.6	692.3	696.0	699.6	703.2	706.8	710.3
160	683.3	687.0	690.8	694.5	698.2	701.8	705.4	709.0	712.6	716.2	719.7
165	692.8	696.6	700.3	703.9	707.6	711.2	714.8	718.3	721.9	725.4	728.9
170	702.3	706.0	709.6	713.2	716.8	720.4	724.0	727.5	731.0	734.5	737.9
175	711.6	715.2	718.8	722.4	726.0	729.5	733.1	736.6	740.0	743.5	746.9
180	720.8	724.4	727.9	731.5	735.0	738.6	742.0	745.5	748.9	752.3	755.7
185	729.8	733.4	736.9	740.5	744.0	747.4	750.9	754.3	757.7	761.1	764.5
190	738.8	742.3	745.8	749.3	752.8	756.2	759.6	763.0	766.4	769.8	773.1
195	747.6	751.1	754.6	758.0	761.5	764.9	768.3	771.6	775.0	778.3	781.6
200	756.3	759.8	763.2	766.7	770.1	773.5	776.8	780.2	783.5	786.8	790.0
205	765.0	768.4	771.8	775.2	778.6	781.9	785.3	788.6	791.9	795.1	798.4
210	773.5	776.9	780.3	783.6	787.0	790.3	793.6	796.9	800.2	803.4	806.6
215	781.9	785.3	788.6	792.0	795.3	798.6	801.9	805.1	808.4	811.6	814.8
220	790.2	793.6	796.9	800.2	803.5	806.8	810.0	813.3	816.5	819.7	822.8
225	798.5	801.8	805.1	808.4	811.7	814.9	818.1	821.3	824.5	827.7	830.8
230	806.6	809.9	813.2	816.5	819.7	822.9	826.1	829.3	832.5	835.6	838.7
235	814.7	818.0	821.2	824.5	827.7	830.9	834.0	837.2	840.3	843.4	846.5
240	822.7	826.0	829.2	832.4	835.6	838.7	841.9	845.0	848.1	851.2	854.3
245	830.6	833.8	837.0	840.2	843.4	846.5	849.7	852.8	855.9	858.9	862.0
250	838.5	841.7	844.8	848.0	851.1	854.2	857.4	860.4	863.5	866.6	869.6
255	846.2	849.4	852.5	855.7	858.8	861.9	865.0	868.0	871.1	874.1	877.1
260	853.9	857.1	860.2	863.3	866.4	869.5	872.5	875.6	878.6	881.6	884.6
265	861.5	864.7	867.8	870.9	873.9	877.0	880.0	883.0	886.0	889.0	892.0
270	869.1	872.2	875.3	878.3	881.4	884.4	887.4	890.4	893.4	896.4	899.3
275	876.6	879.7	882.7	885.8	888.8	891.8	894.8	897.8	900.7	903.7	906.6
280	884.0	887.1	890.1	893.1	896.1	899.1	902.1	905.1	908.0	910.9	913.8
285	891.4	894.4	897.4	900.4	903.4	906.4	909.3	912.3	915.2	918.1	921.0
290	898.7	901.7	904.7	907.6	910.6	913.6	916.5	919.4	922.3	925.2	928.1
295	905.9	908.9	911.9	914.8	917.8	920.7	923.6	926.5	929.4	932.3	935.2
300	913.1	916.0	919.0	921.9	924.9	927.8	930.7	933.6	936.4	939.3	942.1
310	927.2	930.2	933.1	936.0	938.9	941.8	944.7	947.5	950.3	953.2	956.0
320	941.2	944.1	947.0	949.9	952.7	955.6	958.4	961.2	964.0	966.8	969.6
330	955.0	957.8	960.7	963.5	966.4	969.2	972.0	974.7	977.5	980.3	983.0
340	968.5	971.3	974.2	977.0	979.8	982.6	985.3	988.1	990.8	993.5	996.3
350	981.9	984.7	987.5	990.3	993.0	995.8	998.5	1001.2	1003.9	1006.6	1009.3
360	995.1	997.8	1000.6	1003.4	1006.1	1008.8	1011.5	1014.2	1016.9	1019.5	1022.2
370	1008.1	1010.8	1013.5	1016.3	1019.0	1021.7	1024.3	1027.0	1029.7	1032.3	1034.9
380	1020.9	1023.6	1026.3	1029.0	1031.7	1034.4	1037.0	1039.7	1042.3	1044.9	1047.5
390	1033.6	1036.3	1039.0	1041.6	1044.3	1046.9	1049.5	1052.1	1054.7	1057.3	1059.9
400	1046.2	1048.8	1051.4	1054.1	1056.7	1059.3	1061.9	1064.5	1067.1	1069.6	1072.2

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	700.9	704.5	708.0	711.5	715.0	718.4	721.8	725.2	728.6	732.0	735.3
155	710.3	713.9	717.4	720.8	724.3	727.7	731.1	734.5	737.8	741.1	744.4
160	719.7	723.2	726.6	730.1	733.5	736.9	740.2	743.6	746.9	750.2	753.4
165	728.9	732.3	735.8	739.2	742.5	745.9	749.2	752.5	755.8	759.1	762.3
170	737.9	741.4	744.8	748.1	751.5	754.8	758.1	761.4	764.6	767.9	771.1
175	746.9	750.3	753.7	757.0	760.3	763.6	766.9	770.1	773.4	776.6	779.7
180	755.7	759.1	762.4	765.7	769.0	772.3	775.5	778.8	782.0	785.1	788.3
185	764.5	767.8	771.1	774.4	777.7	780.9	784.1	787.3	790.5	793.6	796.8
190	773.1	776.4	779.7	782.9	786.2	789.4	792.6	795.7	798.9	802.0	805.1
195	781.6	784.9	788.1	791.4	794.6	797.8	800.9	804.1	807.2	810.3	813.4
200	790.0	793.3	796.5	799.7	802.9	806.1	809.2	812.3	815.4	818.5	821.6
205	798.4	801.6	804.8	808.0	811.1	814.3	817.4	820.5	823.6	826.6	829.7
210	806.6	809.8	813.0	816.1	819.3	822.4	825.5	828.6	831.6	834.7	837.7
215	814.8	817.9	821.1	824.2	827.3	830.4	833.5	836.5	839.6	842.6	845.6
220	822.8	826.0	829.1	832.2	835.3	838.4	841.4	844.5	847.5	850.5	853.4
225	830.8	833.9	837.0	840.1	843.2	846.2	849.3	852.3	855.3	858.2	861.2
230	838.7	841.8	844.9	848.0	851.0	854.0	857.0	860.0	863.0	866.0	868.9
235	846.5	849.6	852.7	855.7	858.8	861.8	864.7	867.7	870.7	873.6	876.5
240	854.3	857.4	860.4	863.4	866.4	869.4	872.4	875.3	878.2	881.2	884.1
245	862.0	865.0	868.0	871.0	874.0	877.0	879.9	882.9	885.8	888.7	891.5
250	869.6	872.6	875.6	878.6	881.5	884.5	887.4	890.3	893.2	896.1	899.0
255	877.1	880.1	883.1	886.1	889.0	891.9	894.8	897.7	900.6	903.5	906.3
260	884.6	887.6	890.5	893.5	896.4	899.3	902.2	905.1	907.9	910.8	913.6
265	892.0	895.0	897.9	900.8	903.7	906.6	909.5	912.3	915.2	918.0	920.8
270	899.3	902.3	905.2	908.1	911.0	913.9	916.7	919.5	922.4	925.2	928.0
275	906.6	909.5	912.4	915.3	918.2	921.0	923.9	926.7	929.5	932.3	935.1
280	913.8	916.7	919.6	922.5	925.3	928.2	931.0	933.8	936.6	939.4	942.1
285	921.0	923.9	926.7	929.6	932.4	935.2	938.0	940.8	943.6	946.4	949.1
290	928.1	931.0	933.8	936.6	939.5	942.3	945.0	947.8	950.6	953.3	956.1
295	935.2	938.0	940.8	943.6	946.4	949.2	952.0	954.8	957.5	960.2	962.9
300	942.1	945.0	947.8	950.6	953.4	956.1	958.9	961.6	964.4	967.1	969.8
310	956.0	958.8	961.5	964.3	967.1	969.8	972.5	975.2	977.9	980.6	983.3
320	969.6	972.4	975.1	977.8	980.6	983.3	986.0	988.6	991.3	994.0	996.6
330	983.0	985.7	988.5	991.2	993.9	996.5	999.2	1001.9	1004.5	1007.1	1009.7
340	996.3	999.0	1001.6	1004.3	1007.0	1009.6	1012.3	1014.9	1017.5	1020.1	1022.7
350	1009.3	1012.0	1014.6	1017.3	1019.9	1022.6	1025.2	1027.8	1030.4	1032.9	1035.5
360	1022.2	1024.8	1027.5	1030.1	1032.7	1035.3	1037.9	1040.5	1043.0	1045.6	1048.1
370	1034.9	1037.5	1040.2	1042.7	1045.3	1047.9	1050.5	1053.0	1055.5	1058.1	1060.6
380	1047.5	1050.1	1052.7	1055.2	1057.8	1060.3	1062.9	1065.4	1067.9	1070.4	1072.9
390	1059.9	1062.5	1065.0	1067.6	1070.1	1072.6	1075.1	1077.6	1080.1	1082.6	1085.1
400	1072.2	1074.7	1077.2	1079.8	1082.3	1084.8	1087.3	1089.7	1092.2	1094.7	1097.1

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(c) Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	0.4871	0.4849	0.4820	0.4783	0.4739	0.4688	0.4632	0.4571	0.4506	0.4439	0.4371
16	0.4871	0.4850	0.4822	0.4789	0.4750	0.4706	0.4657	0.4605	0.4550	0.4493	0.4434
17	0.4871	0.4851	0.4825	0.4794	0.4759	0.4720	0.4677	0.4632	0.4584	0.4534	0.4483
18	0.4871	0.4851	0.4827	0.4798	0.4767	0.4731	0.4693	0.4652	0.4610	0.4566	0.4521
19	0.4871	0.4852	0.4829	0.4802	0.4773	0.4741	0.4706	0.4669	0.4631	0.4592	0.4551
20	0.4871	0.4852	0.4830	0.4805	0.4778	0.4748	0.4717	0.4683	0.4649	0.4613	0.4576
21	0.4871	0.4853	0.4832	0.4808	0.4782	0.4755	0.4726	0.4695	0.4664	0.4631	0.4597
22	0.4871	0.4853	0.4833	0.4811	0.4786	0.4761	0.4734	0.4706	0.4676	0.4646	0.4615
23	0.4871	0.4854	0.4834	0.4813	0.4790	0.4766	0.4741	0.4715	0.4687	0.4659	0.4631
24	0.4871	0.4854	0.4836	0.4815	0.4793	0.4771	0.4747	0.4722	0.4697	0.4671	0.4644
25	0.4871	0.4855	0.4837	0.4817	0.4796	0.4775	0.4753	0.4729	0.4705	0.4681	0.4656
26	0.4871	0.4855	0.4838	0.4819	0.4799	0.4779	0.4758	0.4736	0.4713	0.4690	0.4666
27	0.4871	0.4856	0.4839	0.4821	0.4802	0.4782	0.4762	0.4741	0.4720	0.4698	0.4675
28	0.4871	0.4856	0.4840	0.4822	0.4804	0.4785	0.4766	0.4746	0.4726	0.4705	0.4684
29	0.4871	0.4856	0.4841	0.4824	0.4806	0.4788	0.4770	0.4751	0.4731	0.4711	0.4691
30	0.4871	0.4857	0.4841	0.4825	0.4808	0.4791	0.4773	0.4755	0.4736	0.4717	0.4698
31	0.4871	0.4857	0.4842	0.4826	0.4810	0.4793	0.4777	0.4759	0.4741	0.4723	0.4705
32	0.4871	0.4857	0.4843	0.4828	0.4812	0.4796	0.4780	0.4763	0.4745	0.4728	0.4710
33	0.4871	0.4858	0.4844	0.4829	0.4814	0.4798	0.4782	0.4766	0.4749	0.4733	0.4716
34	0.4871	0.4858	0.4844	0.4830	0.4815	0.4800	0.4784	0.4769	0.4753	0.4737	0.4721
35	0.4871	0.4858	0.4845	0.4831	0.4817	0.4802	0.4787	0.4772	0.4757	0.4741	0.4725
36	0.4871	0.4859	0.4846	0.4832	0.4818	0.4804	0.4789	0.4775	0.4760	0.4745	0.4730
37	0.4871	0.4859	0.4846	0.4833	0.4819	0.4805	0.4791	0.4777	0.4763	0.4748	0.4734
38	0.4871	0.4859	0.4847	0.4834	0.4820	0.4807	0.4793	0.4780	0.4766	0.4752	0.4738
39	0.4871	0.4859	0.4847	0.4835	0.4822	0.4809	0.4795	0.4782	0.4769	0.4755	0.4741
40	0.4871	0.4860	0.4848	0.4835	0.4823	0.4810	0.4797	0.4784	0.4771	0.4758	0.4744
42	0.4871	0.4860	0.4849	0.4837	0.4825	0.4813	0.4800	0.4788	0.4776	0.4763	0.4751
44	0.4871	0.4861	0.4850	0.4838	0.4827	0.4815	0.4803	0.4791	0.4780	0.4768	0.4756
46	0.4871	0.4861	0.4850	0.4840	0.4829	0.4817	0.4806	0.4795	0.4783	0.4773	0.4761
48	0.4871	0.4861	0.4851	0.4841	0.4830	0.4819	0.4809	0.4798	0.4787	0.4777	0.4766
50	0.4871	0.4862	0.4852	0.4842	0.4832	0.4821	0.4811	0.4801	0.4790	0.4780	0.4770
52	0.4871	0.4862	0.4852	0.4843	0.4833	0.4823	0.4813	0.4803	0.4793	0.4783	0.4774
54	0.4871	0.4862	0.4853	0.4844	0.4834	0.4825	0.4815	0.4806	0.4796	0.4786	0.4777
56	0.4871	0.4863	0.4854	0.4845	0.4835	0.4826	0.4817	0.4808	0.4799	0.4789	0.4780
58	0.4871	0.4863	0.4854	0.4845	0.4837	0.4828	0.4819	0.4810	0.4801	0.4792	0.4783
60	0.4871	0.4863	0.4855	0.4846	0.4838	0.4829	0.4820	0.4812	0.4803	0.4794	0.4786
62	0.4871	0.4863	0.4855	0.4847	0.4839	0.4830	0.4822	0.4814	0.4805	0.4797	0.4788
64	0.4871	0.4864	0.4856	0.4848	0.4840	0.4832	0.4823	0.4815	0.4807	0.4799	0.4791
66	0.4871	0.4864	0.4856	0.4848	0.4840	0.4833	0.4825	0.4817	0.4809	0.4801	0.4793
68	0.4871	0.4864	0.4856	0.4849	0.4841	0.4834	0.4826	0.4818	0.4811	0.4803	0.4795
70	0.4871	0.4864	0.4857	0.4849	0.4842	0.4835	0.4827	0.4820	0.4812	0.4805	0.4797

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	0.4871	0.4688	0.4371	0.4030	0.3733	0.3494	0.3306	0.3157	0.3038	0.2942	0.2863
16	0.4871	0.4706	0.4434	0.4139	0.3870	0.3645	0.3461	0.3312	0.3190	0.3089	0.3005
17	0.4871	0.4720	0.4483	0.4223	0.3980	0.3770	0.3593	0.3445	0.3322	0.3218	0.3131
18	0.4871	0.4731	0.4521	0.4290	0.4070	0.3874	0.3705	0.3561	0.3438	0.3334	0.3244
19	0.4871	0.4741	0.4551	0.4344	0.4144	0.3961	0.3801	0.3661	0.3541	0.3436	0.3346
20	0.4871	0.4748	0.4576	0.4388	0.4205	0.4035	0.3883	0.3749	0.3632	0.3528	0.3438
21	0.4871	0.4755	0.4597	0.4425	0.4256	0.4098	0.3955	0.3826	0.3712	0.3611	0.3521
22	0.4871	0.4761	0.4615	0.4457	0.4300	0.4153	0.4017	0.3894	0.3783	0.3684	0.3596
23	0.4871	0.4766	0.4631	0.4483	0.4338	0.4200	0.4071	0.3954	0.3847	0.3751	0.3664
24	0.4871	0.4771	0.4644	0.4507	0.4371	0.4241	0.4119	0.4007	0.3904	0.3811	0.3726
25	0.4871	0.4775	0.4656	0.4527	0.4399	0.4277	0.4162	0.4054	0.3956	0.3865	0.3782
26	0.4871	0.4779	0.4666	0.4545	0.4425	0.4309	0.4199	0.4097	0.4002	0.3914	0.3833
27	0.4871	0.4782	0.4675	0.4561	0.4447	0.4337	0.4233	0.4135	0.4044	0.3959	0.3880
28	0.4871	0.4785	0.4684	0.4576	0.4468	0.4363	0.4264	0.4170	0.4082	0.4000	0.3923
29	0.4871	0.4788	0.4691	0.4589	0.4486	0.4386	0.4291	0.4201	0.4116	0.4037	0.3963
30	0.4871	0.4791	0.4698	0.4600	0.4502	0.4407	0.4316	0.4230	0.4148	0.4071	0.3999
31	0.4871	0.4793	0.4705	0.4611	0.4517	0.4426	0.4339	0.4256	0.4177	0.4102	0.4032
32	0.4871	0.4796	0.4710	0.4621	0.4531	0.4443	0.4359	0.4279	0.4203	0.4131	0.4063
33	0.4871	0.4798	0.4716	0.4630	0.4543	0.4459	0.4378	0.4301	0.4228	0.4158	0.4092
34	0.4871	0.4800	0.4721	0.4638	0.4555	0.4474	0.4396	0.4322	0.4250	0.4183	0.4118
35	0.4871	0.4802	0.4725	0.4646	0.4566	0.4488	0.4412	0.4340	0.4271	0.4206	0.4143
36	0.4871	0.4804	0.4730	0.4653	0.4576	0.4500	0.4428	0.4358	0.4291	0.4227	0.4167
37	0.4871	0.4805	0.4734	0.4659	0.4585	0.4512	0.4442	0.4374	0.4309	0.4247	0.4188
38	0.4871	0.4807	0.4738	0.4666	0.4594	0.4523	0.4455	0.4389	0.4326	0.4266	0.4208
39	0.4871	0.4809	0.4741	0.4671	0.4602	0.4533	0.4467	0.4403	0.4342	0.4283	0.4227
40	0.4871	0.4810	0.4744	0.4677	0.4609	0.4543	0.4479	0.4416	0.4357	0.4300	0.4245
42	0.4871	0.4813	0.4751	0.4687	0.4623	0.4560	0.4500	0.4441	0.4384	0.4330	0.4278
44	0.4871	0.4815	0.4756	0.4696	0.4635	0.4576	0.4518	0.4462	0.4408	0.4357	0.4307
46	0.4871	0.4817	0.4761	0.4704	0.4646	0.4590	0.4535	0.4482	0.4430	0.4381	0.4333
48	0.4871	0.4819	0.4766	0.4711	0.4656	0.4602	0.4550	0.4499	0.4450	0.4402	0.4357
50	0.4871	0.4821	0.4770	0.4717	0.4665	0.4614	0.4564	0.4515	0.4468	0.4422	0.4378
52	0.4871	0.4823	0.4774	0.4723	0.4673	0.4624	0.4576	0.4529	0.4484	0.4440	0.4398
54	0.4871	0.4825	0.4777	0.4729	0.4681	0.4634	0.4588	0.4543	0.4499	0.4457	0.4416
56	0.4871	0.4826	0.4780	0.4734	0.4688	0.4642	0.4598	0.4555	0.4513	0.4472	0.4432
58	0.4871	0.4828	0.4783	0.4739	0.4694	0.4651	0.4608	0.4566	0.4525	0.4486	0.4448
60	0.4871	0.4829	0.4786	0.4743	0.4700	0.4658	0.4617	0.4576	0.4537	0.4499	0.4462
62	0.4871	0.4830	0.4788	0.4747	0.4706	0.4665	0.4625	0.4586	0.4548	0.4511	0.4475
64	0.4871	0.4832	0.4791	0.4751	0.4711	0.4671	0.4633	0.4595	0.4558	0.4522	0.4487
66	0.4871	0.4833	0.4793	0.4755	0.4716	0.4677	0.4640	0.4603	0.4568	0.4533	0.4499
68	0.4871	0.4834	0.4795	0.4758	0.4720	0.4683	0.4647	0.4611	0.4576	0.4543	0.4510
70	0.4871	0.4835	0.4797	0.4761	0.4724	0.4688	0.4653	0.4619	0.4585	0.4552	0.4520

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(c) Continued. Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	0.2863	0.2797	0.2742	0.2695	0.2655	0.2621	0.2591	0.2565	0.2542	0.2522	0.2504
16	0.3005	0.2934	0.2873	0.2822	0.2777	0.2738	0.2704	0.2674	0.2647	0.2623	0.2602
17	0.3131	0.3056	0.2992	0.2936	0.2887	0.2845	0.2807	0.2774	0.2744	0.2717	0.2693
18	0.3244	0.3167	0.3099	0.3041	0.2989	0.2943	0.2902	0.2866	0.2834	0.2804	0.2777
19	0.3346	0.3267	0.3198	0.3137	0.3082	0.3034	0.2991	0.2952	0.2917	0.2886	0.2857
20	0.3438	0.3358	0.3287	0.3225	0.3169	0.3119	0.3074	0.3033	0.2996	0.2962	0.2932
21	0.3521	0.3441	0.3370	0.3306	0.3249	0.3197	0.3150	0.3108	0.3069	0.3034	0.3002
22	0.3596	0.3516	0.3445	0.3381	0.3323	0.3270	0.3222	0.3178	0.3139	0.3102	0.3068
23	0.3664	0.3585	0.3514	0.3450	0.3391	0.3338	0.3289	0.3244	0.3204	0.3166	0.3131
24	0.3726	0.3648	0.3578	0.3514	0.3455	0.3401	0.3352	0.3306	0.3265	0.3226	0.3190
25	0.3782	0.3706	0.3636	0.3573	0.3514	0.3460	0.3410	0.3365	0.3322	0.3283	0.3246
26	0.3833	0.3759	0.3690	0.3627	0.3569	0.3515	0.3465	0.3419	0.3376	0.3337	0.3300
27	0.3880	0.3807	0.3740	0.3678	0.3620	0.3566	0.3517	0.3471	0.3427	0.3387	0.3350
28	0.3923	0.3852	0.3786	0.3725	0.3668	0.3614	0.3565	0.3519	0.3476	0.3435	0.3398
29	0.3963	0.3893	0.3829	0.3768	0.3712	0.3659	0.3610	0.3564	0.3521	0.3481	0.3443
30	0.3999	0.3931	0.3868	0.3809	0.3753	0.3701	0.3653	0.3607	0.3564	0.3523	0.3485
31	0.4032	0.3967	0.3905	0.3847	0.3792	0.3741	0.3692	0.3647	0.3604	0.3564	0.3526
32	0.4063	0.3999	0.3939	0.3882	0.3828	0.3778	0.3730	0.3685	0.3643	0.3602	0.3565
33	0.4092	0.4029	0.3970	0.3915	0.3862	0.3812	0.3765	0.3721	0.3679	0.3639	0.3601
34	0.4118	0.4058	0.4000	0.3945	0.3894	0.3845	0.3798	0.3755	0.3713	0.3673	0.3636
35	0.4143	0.4084	0.4028	0.3974	0.3924	0.3875	0.3830	0.3786	0.3745	0.3706	0.3669
36	0.4167	0.4108	0.4054	0.4001	0.3952	0.3904	0.3859	0.3817	0.3776	0.3737	0.3700
37	0.4188	0.4131	0.4078	0.4027	0.3978	0.3932	0.3887	0.3845	0.3805	0.3766	0.3730
38	0.4208	0.4154	0.4101	0.4051	0.4003	0.3957	0.3914	0.3872	0.3832	0.3794	0.3758
39	0.4227	0.4174	0.4122	0.4073	0.4026	0.3981	0.3939	0.3898	0.3859	0.3821	0.3785
40	0.4245	0.4193	0.4142	0.4094	0.4048	0.4004	0.3962	0.3922	0.3883	0.3846	0.3811
42	0.4278	0.4228	0.4180	0.4133	0.4089	0.4047	0.4006	0.3967	0.3929	0.3893	0.3859
44	0.4307	0.4259	0.4213	0.4169	0.4126	0.4085	0.4046	0.4008	0.3971	0.3936	0.3902
46	0.4333	0.4287	0.4243	0.4200	0.4160	0.4120	0.4081	0.4045	0.4009	0.3975	0.3942
48	0.4357	0.4313	0.4270	0.4229	0.4190	0.4151	0.4114	0.4079	0.4044	0.4011	0.3979
50	0.4378	0.4336	0.4295	0.4255	0.4217	0.4180	0.4145	0.4110	0.4076	0.4044	0.4013
52	0.4398	0.4357	0.4317	0.4279	0.4242	0.4206	0.4172	0.4138	0.4106	0.4074	0.4044
54	0.4416	0.4376	0.4338	0.4301	0.4265	0.4231	0.4197	0.4165	0.4133	0.4102	0.4072
56	0.4432	0.4394	0.4357	0.4321	0.4287	0.4253	0.4220	0.4189	0.4158	0.4128	0.4099
58	0.4448	0.4411	0.4375	0.4340	0.4306	0.4274	0.4242	0.4211	0.4181	0.4152	0.4124
60	0.4462	0.4426	0.4391	0.4357	0.4325	0.4293	0.4262	0.4232	0.4203	0.4175	0.4147
62	0.4475	0.4440	0.4406	0.4374	0.4342	0.4311	0.4281	0.4252	0.4223	0.4196	0.4169
64	0.4487	0.4454	0.4421	0.4389	0.4358	0.4328	0.4298	0.4270	0.4242	0.4215	0.4189
66	0.4499	0.4466	0.4434	0.4403	0.4373	0.4343	0.4315	0.4287	0.4260	0.4234	0.4208
68	0.4510	0.4478	0.4446	0.4416	0.4387	0.4358	0.4330	0.4303	0.4277	0.4251	0.4226
70	0.4520	0.4489	0.4458	0.4429	0.4400	0.4372	0.4345	0.4318	0.4292	0.4267	0.4242

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	0.2504	0.2488	0.2474	0.2461	0.2450	0.2440	0.2430	0.2422	0.2414	0.2407	0.2401
16	0.2602	0.2583	0.2566	0.2551	0.2537	0.2524	0.2512	0.2502	0.2492	0.2483	0.2475
17	0.2693	0.2671	0.2651	0.2633	0.2617	0.2602	0.2588	0.2576	0.2564	0.2554	0.2544
18	0.2777	0.2753	0.2731	0.2711	0.2693	0.2676	0.2660	0.2646	0.2633	0.2620	0.2609
19	0.2857	0.2831	0.2807	0.2784	0.2764	0.2745	0.2728	0.2712	0.2697	0.2683	0.2671
20	0.2932	0.2903	0.2878	0.2854	0.2832	0.2812	0.2793	0.2775	0.2759	0.2744	0.2730
21	0.3002	0.2972	0.2945	0.2920	0.2896	0.2874	0.2854	0.2835	0.2818	0.2801	0.2786
22	0.3068	0.3037	0.3009	0.2982	0.2957	0.2934	0.2913	0.2893	0.2874	0.2856	0.2840
23	0.3131	0.3099	0.3069	0.3041	0.3015	0.2991	0.2969	0.2948	0.2928	0.2909	0.2892
24	0.3190	0.3157	0.3126	0.3098	0.3071	0.3046	0.3022	0.3000	0.2980	0.2960	0.2942
25	0.3246	0.3213	0.3181	0.3151	0.3124	0.3098	0.3073	0.3051	0.3029	0.3009	0.2990
26	0.3300	0.3265	0.3233	0.3202	0.3174	0.3147	0.3122	0.3099	0.3077	0.3056	0.3036
27	0.3350	0.3315	0.3282	0.3251	0.3222	0.3195	0.3169	0.3145	0.3122	0.3100	0.3080
28	0.3398	0.3362	0.3329	0.3298	0.3268	0.3240	0.3214	0.3189	0.3166	0.3144	0.3123
29	0.3443	0.3407	0.3373	0.3342	0.3312	0.3284	0.3257	0.3232	0.3208	0.3185	0.3164
30	0.3485	0.3450	0.3416	0.3384	0.3354	0.3325	0.3298	0.3273	0.3248	0.3225	0.3203
31	0.3526	0.3490	0.3456	0.3424	0.3394	0.3365	0.3338	0.3312	0.3287	0.3263	0.3241
32	0.3565	0.3529	0.3495	0.3462	0.3432	0.3403	0.3375	0.3349	0.3324	0.3300	0.3278
33	0.3601	0.3565	0.3531	0.3499	0.3468	0.3439	0.3412	0.3385	0.3360	0.3336	0.3313
34	0.3636	0.3600	0.3566	0.3534	0.3503	0.3474	0.3446	0.3420	0.3394	0.3370	0.3347
35	0.3669	0.3633	0.3599	0.3567	0.3537	0.3507	0.3479	0.3453	0.3427	0.3403	0.3379
36	0.3700	0.3665	0.3631	0.3599	0.3569	0.3539	0.3511	0.3485	0.3459	0.3434	0.3411
37	0.3730	0.3695	0.3661	0.3630	0.3599	0.3570	0.3542	0.3515	0.3489	0.3465	0.3441
38	0.3758	0.3724	0.3690	0.3659	0.3628	0.3599	0.3571	0.3544	0.3519	0.3494	0.3470
39	0.3785	0.3751	0.3718	0.3686	0.3656	0.3627	0.3599	0.3573	0.3547	0.3522	0.3498
40	0.3811	0.3777	0.3744	0.3713	0.3683	0.3654	0.3626	0.3600	0.3574	0.3549	0.3526
42	0.3859	0.3826	0.3794	0.3763	0.3733	0.3705	0.3677	0.3651	0.3625	0.3601	0.3577
44	0.3902	0.3870	0.3839	0.3808	0.3779	0.3751	0.3724	0.3698	0.3673	0.3648	0.3625
46	0.3942	0.3911	0.3880	0.3850	0.3822	0.3794	0.3767	0.3742	0.3717	0.3693	0.3669
48	0.3979	0.3948	0.3918	0.3889	0.3861	0.3834	0.3808	0.3782	0.3758	0.3734	0.3711
50	0.4013	0.3982	0.3953	0.3925	0.3897	0.3871	0.3845	0.3820	0.3796	0.3772	0.3749
52	0.4044	0.4014	0.3986	0.3958	0.3931	0.3905	0.3880	0.3855	0.3831	0.3808	0.3785
54	0.4072	0.4044	0.4016	0.3989	0.3962	0.3937	0.3912	0.3888	0.3864	0.3841	0.3819
56	0.4099	0.4071	0.4044	0.4017	0.3991	0.3966	0.3942	0.3918	0.3895	0.3873	0.3851
58	0.4124	0.4096	0.4070	0.4044	0.4019	0.3994	0.3970	0.3947	0.3924	0.3902	0.3880
60	0.4147	0.4121	0.4095	0.4069	0.4044	0.4020	0.3996	0.3974	0.3951	0.3930	0.3908
62	0.4169	0.4143	0.4117	0.4092	0.4068	0.4044	0.4021	0.3999	0.3977	0.3955	0.3935
64	0.4189	0.4163	0.4138	0.4114	0.4091	0.4067	0.4044	0.4022	0.4001	0.3980	0.3959
66	0.4208	0.4183	0.4158	0.4135	0.4112	0.4089	0.4067	0.4045	0.4024	0.4003	0.3983
68	0.4226	0.4201	0.4177	0.4154	0.4131	0.4109	0.4087	0.4066	0.4045	0.4025	0.4005
70	0.4242	0.4219	0.4195	0.4172	0.4150	0.4128	0.4107	0.4086	0.4066	0.4046	0.4026

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(c) Continued. Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	0.4871	0.4835	0.4797	0.4761	0.4724	0.4688	0.4653	0.4619	0.4585	0.4552	0.4520
72	0.4871	0.4836	0.4799	0.4764	0.4728	0.4693	0.4659	0.4625	0.4593	0.4561	0.4529
74	0.4871	0.4837	0.4801	0.4767	0.4732	0.4698	0.4665	0.4632	0.4600	0.4569	0.4538
76	0.4871	0.4837	0.4803	0.4769	0.4736	0.4703	0.4670	0.4638	0.4607	0.4577	0.4547
78	0.4871	0.4838	0.4805	0.4772	0.4739	0.4707	0.4675	0.4644	0.4614	0.4584	0.4555
80	0.4871	0.4839	0.4806	0.4774	0.4742	0.4711	0.4680	0.4650	0.4620	0.4591	0.4563
82	0.4871	0.4840	0.4808	0.4777	0.4745	0.4715	0.4684	0.4655	0.4626	0.4597	0.4570
84	0.4871	0.4840	0.4809	0.4779	0.4748	0.4718	0.4689	0.4660	0.4632	0.4604	0.4577
86	0.4871	0.4841	0.4811	0.4781	0.4751	0.4722	0.4693	0.4665	0.4637	0.4610	0.4583
88	0.4871	0.4842	0.4812	0.4783	0.4754	0.4725	0.4697	0.4669	0.4642	0.4615	0.4589
90	0.4871	0.4842	0.4813	0.4784	0.4756	0.4728	0.4701	0.4674	0.4647	0.4621	0.4595
92	0.4871	0.4843	0.4814	0.4786	0.4759	0.4731	0.4704	0.4678	0.4652	0.4626	0.4601
94	0.4871	0.4843	0.4815	0.4788	0.4761	0.4734	0.4708	0.4682	0.4656	0.4631	0.4607
96	0.4871	0.4844	0.4817	0.4789	0.4763	0.4737	0.4711	0.4685	0.4660	0.4636	0.4612
98	0.4871	0.4845	0.4818	0.4791	0.4765	0.4739	0.4714	0.4689	0.4665	0.4640	0.4617
100	0.4871	0.4845	0.4819	0.4792	0.4767	0.4742	0.4717	0.4693	0.4668	0.4645	0.4622
102	0.4871	0.4846	0.4820	0.4794	0.4769	0.4744	0.4720	0.4696	0.4672	0.4649	0.4626
104	0.4871	0.4846	0.4821	0.4795	0.4771	0.4747	0.4723	0.4699	0.4676	0.4653	0.4631
106	0.4871	0.4846	0.4821	0.4797	0.4773	0.4749	0.4725	0.4702	0.4679	0.4657	0.4635
108	0.4871	0.4847	0.4822	0.4798	0.4775	0.4751	0.4728	0.4705	0.4683	0.4661	0.4639
110	0.4871	0.4847	0.4823	0.4799	0.4776	0.4753	0.4730	0.4708	0.4686	0.4664	0.4643
112	0.4871	0.4848	0.4824	0.4801	0.4778	0.4755	0.4733	0.4711	0.4689	0.4668	0.4647
114	0.4871	0.4848	0.4825	0.4802	0.4780	0.4757	0.4735	0.4714	0.4692	0.4671	0.4651
116	0.4871	0.4848	0.4826	0.4803	0.4781	0.4759	0.4737	0.4716	0.4695	0.4675	0.4654
118	0.4871	0.4849	0.4826	0.4804	0.4782	0.4761	0.4740	0.4719	0.4698	0.4678	0.4658
120	0.4871	0.4849	0.4827	0.4805	0.4784	0.4763	0.4742	0.4721	0.4701	0.4681	0.4661
122	0.4871	0.4850	0.4828	0.4806	0.4785	0.4764	0.4744	0.4723	0.4703	0.4684	0.4664
124	0.4871	0.4850	0.4828	0.4807	0.4786	0.4766	0.4746	0.4726	0.4706	0.4687	0.4668
126	0.4871	0.4850	0.4829	0.4808	0.4787	0.4768	0.4748	0.4728	0.4708	0.4689	0.4671
128	0.4871	0.4850	0.4830	0.4809	0.4789	0.4769	0.4749	0.4730	0.4711	0.4692	0.4674
130	0.4871	0.4851	0.4830	0.4810	0.4790	0.4771	0.4751	0.4732	0.4713	0.4695	0.4676
132	0.4871	0.4851	0.4831	0.4811	0.4791	0.4772	0.4753	0.4734	0.4715	0.4697	0.4679
134	0.4871	0.4851	0.4831	0.4812	0.4792	0.4773	0.4755	0.4736	0.4718	0.4700	0.4682
136	0.4871	0.4852	0.4832	0.4813	0.4793	0.4775	0.4756	0.4738	0.4720	0.4702	0.4684
138	0.4871	0.4852	0.4833	0.4813	0.4794	0.4776	0.4758	0.4740	0.4722	0.4704	0.4687
140	0.4871	0.4852	0.4833	0.4814	0.4795	0.4777	0.4759	0.4741	0.4724	0.4707	0.4689
142	0.4871	0.4852	0.4834	0.4815	0.4796	0.4779	0.4761	0.4743	0.4726	0.4709	0.4692
144	0.4871	0.4853	0.4834	0.4816	0.4797	0.4780	0.4762	0.4745	0.4728	0.4711	0.4694
146	0.4871	0.4853	0.4835	0.4816	0.4798	0.4781	0.4764	0.4747	0.4730	0.4713	0.4696
148	0.4871	0.4853	0.4835	0.4817	0.4799	0.4782	0.4765	0.4748	0.4731	0.4715	0.4699
150	0.4871	0.4853	0.4836	0.4818	0.4800	0.4783	0.4766	0.4750	0.4733	0.4717	0.4701

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	0.4520	0.4489	0.4458	0.4429	0.4400	0.4372	0.4345	0.4318	0.4292	0.4267	0.4242
72	0.4529	0.4499	0.4469	0.4440	0.4412	0.4385	0.4358	0.4332	0.4307	0.4282	0.4258
74	0.4538	0.4509	0.4480	0.4452	0.4424	0.4397	0.4371	0.4346	0.4321	0.4297	0.4273
76	0.4547	0.4518	0.4490	0.4462	0.4435	0.4409	0.4384	0.4359	0.4334	0.4311	0.4288
78	0.4555	0.4527	0.4499	0.4472	0.4446	0.4420	0.4395	0.4371	0.4347	0.4324	0.4301
80	0.4563	0.4535	0.4508	0.4482	0.4456	0.4431	0.4406	0.4382	0.4359	0.4336	0.4314
82	0.4570	0.4543	0.4516	0.4490	0.4465	0.4441	0.4417	0.4393	0.4370	0.4348	0.4326
84	0.4577	0.4550	0.4524	0.4499	0.4474	0.4450	0.4427	0.4404	0.4381	0.4359	0.4338
86	0.4583	0.4557	0.4532	0.4507	0.4483	0.4459	0.4436	0.4414	0.4392	0.4370	0.4349
88	0.4589	0.4564	0.4539	0.4515	0.4491	0.4468	0.4445	0.4423	0.4402	0.4380	0.4360
90	0.4595	0.4571	0.4546	0.4522	0.4499	0.4476	0.4454	0.4432	0.4411	0.4390	0.4370
92	0.4601	0.4577	0.4553	0.4529	0.4507	0.4484	0.4462	0.4441	0.4420	0.4400	0.4379
94	0.4607	0.4583	0.4559	0.4536	0.4514	0.4492	0.4470	0.4449	0.4429	0.4409	0.4389
96	0.4612	0.4588	0.4565	0.4543	0.4521	0.4499	0.4478	0.4457	0.4437	0.4417	0.4398
98	0.4617	0.4594	0.4571	0.4549	0.4527	0.4506	0.4485	0.4465	0.4445	0.4426	0.4406
100	0.4622	0.4599	0.4577	0.4555	0.4534	0.4513	0.4492	0.4472	0.4453	0.4434	0.4415
102	0.4626	0.4604	0.4582	0.4561	0.4540	0.4519	0.4499	0.4479	0.4460	0.4441	0.4423
104	0.4631	0.4609	0.4587	0.4566	0.4546	0.4526	0.4506	0.4486	0.4467	0.4449	0.4430
106	0.4635	0.4614	0.4592	0.4572	0.4551	0.4532	0.4512	0.4493	0.4474	0.4456	0.4438
108	0.4639	0.4618	0.4597	0.4577	0.4557	0.4537	0.4518	0.4499	0.4481	0.4463	0.4445
110	0.4643	0.4622	0.4602	0.4582	0.4562	0.4543	0.4524	0.4505	0.4487	0.4469	0.4452
112	0.4647	0.4627	0.4606	0.4587	0.4567	0.4548	0.4530	0.4511	0.4493	0.4476	0.4458
114	0.4651	0.4631	0.4611	0.4591	0.4572	0.4553	0.4535	0.4517	0.4499	0.4482	0.4465
116	0.4654	0.4634	0.4615	0.4596	0.4577	0.4559	0.4540	0.4523	0.4505	0.4488	0.4471
118	0.4658	0.4638	0.4619	0.4600	0.4582	0.4563	0.4545	0.4528	0.4511	0.4494	0.4477
120	0.4661	0.4642	0.4623	0.4604	0.4586	0.4568	0.4550	0.4533	0.4516	0.4499	0.4483
122	0.4664	0.4645	0.4627	0.4608	0.4590	0.4573	0.4555	0.4538	0.4521	0.4505	0.4489
124	0.4668	0.4649	0.4630	0.4612	0.4594	0.4577	0.4560	0.4543	0.4526	0.4510	0.4494
126	0.4671	0.4652	0.4634	0.4616	0.4599	0.4581	0.4564	0.4548	0.4531	0.4515	0.4499
128	0.4674	0.4655	0.4637	0.4620	0.4602	0.4585	0.4569	0.4552	0.4536	0.4520	0.4505
130	0.4676	0.4658	0.4641	0.4623	0.4606	0.4589	0.4573	0.4557	0.4541	0.4525	0.4510
132	0.4679	0.4661	0.4644	0.4627	0.4610	0.4593	0.4577	0.4561	0.4545	0.4530	0.4514
134	0.4682	0.4664	0.4647	0.4630	0.4614	0.4597	0.4581	0.4565	0.4550	0.4534	0.4519
136	0.4684	0.4667	0.4650	0.4633	0.4617	0.4601	0.4585	0.4569	0.4554	0.4539	0.4524
138	0.4687	0.4670	0.4653	0.4637	0.4620	0.4604	0.4589	0.4573	0.4558	0.4543	0.4528
140	0.4689	0.4673	0.4656	0.4640	0.4624	0.4608	0.4592	0.4577	0.4562	0.4547	0.4533
142	0.4692	0.4675	0.4659	0.4643	0.4627	0.4611	0.4596	0.4581	0.4566	0.4551	0.4537
144	0.4694	0.4678	0.4662	0.4646	0.4630	0.4615	0.4599	0.4585	0.4570	0.4555	0.4541
146	0.4696	0.4680	0.4664	0.4649	0.4633	0.4618	0.4603	0.4588	0.4574	0.4559	0.4545
148	0.4699	0.4683	0.4667	0.4651	0.4636	0.4621	0.4606	0.4592	0.4577	0.4563	0.4549
150	0.4701	0.4685	0.4669	0.4654	0.4639	0.4624	0.4609	0.4595	0.4581	0.4567	0.4553

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(c) Continued. Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	0.4242	0.4219	0.4195	0.4172	0.4150	0.4128	0.4107	0.4086	0.4066	0.4046	0.4026
72	0.4258	0.4235	0.4212	0.4190	0.4168	0.4146	0.4125	0.4105	0.4085	0.4065	0.4046
74	0.4273	0.4250	0.4228	0.4206	0.4184	0.4163	0.4143	0.4123	0.4103	0.4084	0.4065
76	0.4288	0.4265	0.4243	0.4221	0.4200	0.4180	0.4159	0.4140	0.4120	0.4101	0.4083
78	0.4301	0.4279	0.4257	0.4236	0.4215	0.4195	0.4175	0.4156	0.4137	0.4118	0.4100
80	0.4314	0.4292	0.4271	0.4250	0.4230	0.4210	0.4190	0.4171	0.4152	0.4134	0.4116
82	0.4326	0.4305	0.4284	0.4263	0.4243	0.4224	0.4205	0.4186	0.4167	0.4149	0.4131
84	0.4338	0.4317	0.4296	0.4276	0.4256	0.4237	0.4218	0.4200	0.4182	0.4164	0.4146
86	0.4349	0.4328	0.4308	0.4288	0.4269	0.4250	0.4231	0.4213	0.4195	0.4178	0.4160
88	0.4360	0.4339	0.4319	0.4300	0.4281	0.4262	0.4244	0.4226	0.4208	0.4191	0.4174
90	0.4370	0.4350	0.4330	0.4311	0.4292	0.4274	0.4256	0.4238	0.4221	0.4204	0.4187
92	0.4379	0.4360	0.4341	0.4322	0.4303	0.4285	0.4267	0.4250	0.4233	0.4216	0.4199
94	0.4389	0.4369	0.4351	0.4332	0.4314	0.4296	0.4278	0.4261	0.4244	0.4228	0.4211
96	0.4398	0.4379	0.4360	0.4342	0.4324	0.4306	0.4289	0.4272	0.4255	0.4239	0.4223
98	0.4406	0.4388	0.4369	0.4351	0.4334	0.4316	0.4299	0.4282	0.4266	0.4250	0.4234
100	0.4415	0.4396	0.4378	0.4360	0.4343	0.4326	0.4309	0.4292	0.4276	0.4260	0.4245
102	0.4423	0.4404	0.4387	0.4369	0.4352	0.4335	0.4318	0.4302	0.4286	0.4270	0.4255
104	0.4430	0.4412	0.4395	0.4377	0.4361	0.4344	0.4327	0.4311	0.4296	0.4280	0.4265
106	0.4438	0.4420	0.4403	0.4386	0.4369	0.4352	0.4336	0.4320	0.4305	0.4290	0.4274
108	0.4445	0.4427	0.4410	0.4393	0.4377	0.4361	0.4345	0.4329	0.4314	0.4299	0.4284
110	0.4452	0.4435	0.4418	0.4401	0.4385	0.4369	0.4353	0.4338	0.4322	0.4307	0.4293
112	0.4458	0.4441	0.4425	0.4408	0.4392	0.4376	0.4361	0.4346	0.4331	0.4316	0.4301
114	0.4465	0.4448	0.4432	0.4415	0.4400	0.4384	0.4369	0.4354	0.4339	0.4324	0.4310
116	0.4471	0.4455	0.4438	0.4422	0.4407	0.4391	0.4376	0.4361	0.4346	0.4332	0.4318
118	0.4477	0.4461	0.4445	0.4429	0.4413	0.4398	0.4383	0.4368	0.4354	0.4340	0.4326
120	0.4483	0.4467	0.4451	0.4435	0.4420	0.4405	0.4390	0.4376	0.4361	0.4347	0.4333
122	0.4489	0.4473	0.4457	0.4442	0.4427	0.4412	0.4397	0.4383	0.4368	0.4354	0.4341
124	0.4494	0.4478	0.4463	0.4448	0.4433	0.4418	0.4404	0.4389	0.4375	0.4361	0.4348
126	0.4499	0.4484	0.4469	0.4454	0.4439	0.4424	0.4410	0.4396	0.4382	0.4368	0.4355
128	0.4505	0.4489	0.4474	0.4459	0.4445	0.4430	0.4416	0.4402	0.4388	0.4375	0.4362
130	0.4510	0.4494	0.4480	0.4465	0.4450	0.4436	0.4422	0.4408	0.4395	0.4381	0.4368
132	0.4514	0.4499	0.4485	0.4470	0.4456	0.4442	0.4428	0.4414	0.4401	0.4388	0.4375
134	0.4519	0.4504	0.4490	0.4475	0.4461	0.4447	0.4434	0.4420	0.4407	0.4394	0.4381
136	0.4524	0.4509	0.4495	0.4481	0.4467	0.4453	0.4439	0.4426	0.4413	0.4400	0.4387
138	0.4528	0.4514	0.4500	0.4485	0.4472	0.4458	0.4445	0.4431	0.4418	0.4405	0.4393
140	0.4533	0.4518	0.4504	0.4490	0.4477	0.4463	0.4450	0.4437	0.4424	0.4411	0.4399
142	0.4537	0.4523	0.4509	0.4495	0.4481	0.4468	0.4455	0.4442	0.4429	0.4417	0.4404
144	0.4541	0.4527	0.4513	0.4500	0.4486	0.4473	0.4460	0.4447	0.4434	0.4422	0.4410
146	0.4545	0.4531	0.4518	0.4504	0.4491	0.4478	0.4465	0.4452	0.4440	0.4427	0.4415
148	0.4549	0.4535	0.4522	0.4508	0.4495	0.4482	0.4470	0.4457	0.4445	0.4432	0.4420
150	0.4553	0.4539	0.4526	0.4513	0.4500	0.4487	0.4474	0.4462	0.4449	0.4437	0.4425

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.4871	0.4853	0.4836	0.4818	0.4800	0.4783	0.4766	0.4750	0.4733	0.4717	0.4701
155	0.4871	0.4854	0.4837	0.4819	0.4802	0.4786	0.4770	0.4753	0.4737	0.4722	0.4706
160	0.4871	0.4854	0.4838	0.4821	0.4804	0.4788	0.4773	0.4757	0.4741	0.4726	0.4711
165	0.4871	0.4855	0.4839	0.4822	0.4806	0.4791	0.4776	0.4760	0.4745	0.4730	0.4715
170	0.4871	0.4855	0.4840	0.4824	0.4808	0.4793	0.4778	0.4763	0.4749	0.4734	0.4720
175	0.4871	0.4856	0.4840	0.4825	0.4810	0.4795	0.4781	0.4766	0.4752	0.4738	0.4724
180	0.4871	0.4856	0.4841	0.4826	0.4812	0.4797	0.4783	0.4769	0.4755	0.4741	0.4728
185	0.4871	0.4857	0.4842	0.4828	0.4813	0.4799	0.4785	0.4772	0.4758	0.4745	0.4731
190	0.4871	0.4857	0.4843	0.4829	0.4815	0.4801	0.4787	0.4774	0.4761	0.4748	0.4735
195	0.4871	0.4857	0.4843	0.4830	0.4816	0.4802	0.4789	0.4776	0.4763	0.4751	0.4738
200	0.4871	0.4858	0.4844	0.4831	0.4817	0.4804	0.4791	0.4779	0.4766	0.4754	0.4741
205	0.4871	0.4858	0.4845	0.4832	0.4819	0.4806	0.4793	0.4781	0.4768	0.4756	0.4744
210	0.4871	0.4858	0.4845	0.4833	0.4820	0.4807	0.4795	0.4783	0.4771	0.4759	0.4747
215	0.4871	0.4859	0.4846	0.4833	0.4821	0.4809	0.4796	0.4784	0.4773	0.4761	0.4750
220	0.4871	0.4859	0.4847	0.4834	0.4822	0.4810	0.4798	0.4786	0.4775	0.4764	0.4752
225	0.4871	0.4859	0.4847	0.4835	0.4823	0.4811	0.4800	0.4788	0.4777	0.4766	0.4755
230	0.4871	0.4859	0.4848	0.4836	0.4824	0.4813	0.4801	0.4790	0.4779	0.4768	0.4757
235	0.4871	0.4860	0.4848	0.4837	0.4825	0.4814	0.4803	0.4791	0.4781	0.4770	0.4759
240	0.4871	0.4860	0.4849	0.4837	0.4826	0.4815	0.4804	0.4793	0.4783	0.4772	0.4762
245	0.4871	0.4860	0.4849	0.4838	0.4827	0.4816	0.4805	0.4794	0.4784	0.4774	0.4764
250	0.4871	0.4860	0.4849	0.4839	0.4828	0.4817	0.4806	0.4796	0.4786	0.4776	0.4766
255	0.4871	0.4861	0.4850	0.4839	0.4829	0.4818	0.4808	0.4797	0.4787	0.4778	0.4768
260	0.4871	0.4861	0.4850	0.4840	0.4829	0.4819	0.4809	0.4799	0.4789	0.4779	0.4770
265	0.4871	0.4861	0.4851	0.4840	0.4830	0.4820	0.4810	0.4800	0.4790	0.4781	0.4771
270	0.4871	0.4861	0.4851	0.4841	0.4831	0.4821	0.4811	0.4801	0.4792	0.4783	0.4773
275	0.4871	0.4861	0.4851	0.4841	0.4832	0.4822	0.4812	0.4803	0.4793	0.4784	0.4775
280	0.4871	0.4862	0.4852	0.4842	0.4832	0.4823	0.4813	0.4804	0.4794	0.4785	0.4777
285	0.4871	0.4862	0.4852	0.4842	0.4833	0.4824	0.4814	0.4805	0.4796	0.4786	0.4778
290	0.4871	0.4862	0.4852	0.4843	0.4834	0.4824	0.4815	0.4806	0.4797	0.4788	0.4780
295	0.4871	0.4862	0.4853	0.4843	0.4834	0.4825	0.4816	0.4807	0.4798	0.4789	0.4781
300	0.4871	0.4862	0.4853	0.4844	0.4835	0.4826	0.4817	0.4808	0.4799	0.4791	0.4783
310	0.4871	0.4862	0.4854	0.4845	0.4836	0.4827	0.4819	0.4810	0.4801	0.4793	0.4785
320	0.4871	0.4863	0.4854	0.4846	0.4837	0.4829	0.4820	0.4812	0.4804	0.4795	0.4787
330	0.4871	0.4863	0.4855	0.4846	0.4838	0.4830	0.4822	0.4814	0.4806	0.4798	0.4790
340	0.4871	0.4863	0.4855	0.4847	0.4839	0.4831	0.4823	0.4815	0.4807	0.4800	0.4792
350	0.4871	0.4863	0.4856	0.4848	0.4840	0.4832	0.4824	0.4817	0.4809	0.4802	0.4794
360	0.4871	0.4864	0.4856	0.4848	0.4841	0.4833	0.4826	0.4818	0.4811	0.4803	0.4796
370	0.4871	0.4864	0.4856	0.4849	0.4842	0.4834	0.4827	0.4820	0.4812	0.4805	0.4798
380	0.4871	0.4864	0.4857	0.4850	0.4842	0.4835	0.4828	0.4821	0.4814	0.4807	0.4800
390	0.4871	0.4864	0.4857	0.4850	0.4843	0.4836	0.4829	0.4822	0.4815	0.4809	0.4802
400	0.4871	0.4864	0.4857	0.4851	0.4844	0.4837	0.4830	0.4823	0.4817	0.4810	0.4803

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(c) Concluded. Critical pressure ratio, p_t/p_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	0.4701	0.4685	0.4669	0.4654	0.4639	0.4624	0.4609	0.4595	0.4581	0.4567	0.4553
155	0.4706	0.4691	0.4675	0.4661	0.4646	0.4631	0.4617	0.4603	0.4589	0.4575	0.4562
160	0.4711	0.4696	0.4681	0.4667	0.4652	0.4638	0.4624	0.4611	0.4597	0.4584	0.4571
165	0.4715	0.4701	0.4687	0.4672	0.4658	0.4645	0.4631	0.4618	0.4605	0.4592	0.4579
170	0.4720	0.4706	0.4692	0.4678	0.4664	0.4651	0.4638	0.4625	0.4612	0.4599	0.4587
175	0.4724	0.4710	0.4696	0.4683	0.4670	0.4657	0.4644	0.4631	0.4618	0.4606	0.4594
180	0.4728	0.4714	0.4701	0.4688	0.4675	0.4662	0.4649	0.4637	0.4625	0.4613	0.4601
185	0.4731	0.4718	0.4705	0.4692	0.4680	0.4667	0.4655	0.4643	0.4631	0.4619	0.4607
190	0.4735	0.4722	0.4709	0.4697	0.4684	0.4672	0.4660	0.4648	0.4637	0.4625	0.4614
195	0.4738	0.4725	0.4713	0.4701	0.4689	0.4677	0.4665	0.4654	0.4642	0.4631	0.4619
200	0.4741	0.4729	0.4717	0.4705	0.4693	0.4681	0.4670	0.4658	0.4647	0.4636	0.4625
205	0.4744	0.4732	0.4720	0.4709	0.4697	0.4686	0.4674	0.4663	0.4652	0.4641	0.4631
210	0.4747	0.4735	0.4724	0.4712	0.4701	0.4690	0.4679	0.4668	0.4657	0.4646	0.4636
215	0.4750	0.4738	0.4727	0.4716	0.4705	0.4694	0.4683	0.4672	0.4661	0.4651	0.4641
220	0.4752	0.4741	0.4730	0.4719	0.4708	0.4697	0.4687	0.4676	0.4666	0.4656	0.4645
225	0.4755	0.4744	0.4733	0.4722	0.4711	0.4701	0.4691	0.4680	0.4670	0.4660	0.4650
230	0.4757	0.4746	0.4736	0.4725	0.4715	0.4704	0.4694	0.4684	0.4674	0.4664	0.4654
235	0.4759	0.4749	0.4738	0.4728	0.4718	0.4708	0.4698	0.4688	0.4678	0.4668	0.4658
240	0.4762	0.4751	0.4741	0.4731	0.4721	0.4711	0.4701	0.4691	0.4682	0.4672	0.4663
245	0.4764	0.4754	0.4743	0.4733	0.4724	0.4714	0.4704	0.4695	0.4685	0.4676	0.4666
250	0.4766	0.4756	0.4746	0.4736	0.4726	0.4717	0.4707	0.4698	0.4688	0.4679	0.4670
255	0.4768	0.4758	0.4748	0.4739	0.4729	0.4720	0.4710	0.4701	0.4692	0.4683	0.4674
260	0.4770	0.4760	0.4750	0.4741	0.4732	0.4722	0.4713	0.4704	0.4695	0.4686	0.4677
265	0.4771	0.4762	0.4753	0.4743	0.4734	0.4725	0.4716	0.4707	0.4698	0.4689	0.4681
270	0.4773	0.4764	0.4755	0.4745	0.4736	0.4727	0.4718	0.4710	0.4701	0.4692	0.4684
275	0.4775	0.4766	0.4757	0.4748	0.4739	0.4730	0.4721	0.4712	0.4704	0.4695	0.4687
280	0.4777	0.4767	0.4759	0.4750	0.4741	0.4732	0.4724	0.4715	0.4707	0.4698	0.4690
285	0.4778	0.4769	0.4760	0.4752	0.4743	0.4734	0.4726	0.4718	0.4709	0.4701	0.4693
290	0.4780	0.4771	0.4762	0.4754	0.4745	0.4737	0.4728	0.4720	0.4712	0.4704	0.4696
295	0.4781	0.4772	0.4764	0.4755	0.4747	0.4739	0.4731	0.4722	0.4714	0.4706	0.4698
300	0.4783	0.4774	0.4766	0.4757	0.4749	0.4741	0.4733	0.4725	0.4717	0.4709	0.4701
310	0.4785	0.4777	0.4769	0.4761	0.4753	0.4745	0.4737	0.4729	0.4721	0.4714	0.4706
320	0.4787	0.4780	0.4772	0.4764	0.4756	0.4748	0.4741	0.4733	0.4726	0.4718	0.4711
330	0.4790	0.4782	0.4775	0.4767	0.4759	0.4752	0.4744	0.4737	0.4730	0.4722	0.4715
340	0.4792	0.4784	0.4777	0.4770	0.4763	0.4755	0.4748	0.4741	0.4734	0.4727	0.4719
350	0.4794	0.4787	0.4780	0.4773	0.4766	0.4758	0.4751	0.4744	0.4737	0.4730	0.4723
360	0.4796	0.4789	0.4782	0.4775	0.4768	0.4761	0.4754	0.4748	0.4741	0.4734	0.4727
370	0.4798	0.4791	0.4784	0.4778	0.4771	0.4764	0.4757	0.4751	0.4744	0.4737	0.4731
380	0.4800	0.4793	0.4786	0.4780	0.4773	0.4767	0.4760	0.4754	0.4747	0.4741	0.4734
390	0.4802	0.4795	0.4788	0.4782	0.4776	0.4769	0.4763	0.4756	0.4750	0.4744	0.4738
400	0.4803	0.4797	0.4790	0.4784	0.4778	0.4772	0.4765	0.4759	0.4753	0.4747	0.4741

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	0.4553	0.4539	0.4526	0.4513	0.4500	0.4487	0.4474	0.4462	0.4449	0.4437	0.4425
155	0.4562	0.4549	0.4536	0.4523	0.4510	0.4498	0.4485	0.4473	0.4461	0.4449	0.4438
160	0.4571	0.4558	0.4545	0.4532	0.4520	0.4508	0.4496	0.4484	0.4472	0.4460	0.4449
165	0.4579	0.4566	0.4554	0.4541	0.4529	0.4517	0.4506	0.4494	0.4482	0.4471	0.4460
170	0.4587	0.4574	0.4562	0.4550	0.4538	0.4526	0.4515	0.4504	0.4492	0.4481	0.4470
175	0.4594	0.4582	0.4570	0.4558	0.4546	0.4535	0.4524	0.4513	0.4502	0.4491	0.4480
180	0.4601	0.4589	0.4577	0.4566	0.4554	0.4543	0.4532	0.4521	0.4510	0.4500	0.4489
185	0.4607	0.4596	0.4584	0.4573	0.4562	0.4551	0.4540	0.4529	0.4519	0.4508	0.4498
190	0.4614	0.4602	0.4591	0.4580	0.4569	0.4558	0.4548	0.4537	0.4527	0.4517	0.4507
195	0.4619	0.4608	0.4597	0.4587	0.4576	0.4565	0.4555	0.4545	0.4535	0.4524	0.4515
200	0.4625	0.4614	0.4604	0.4593	0.4583	0.4572	0.4562	0.4552	0.4542	0.4532	0.4522
205	0.4631	0.4620	0.4609	0.4599	0.4589	0.4579	0.4569	0.4559	0.4549	0.4539	0.4530
210	0.4636	0.4625	0.4615	0.4605	0.4595	0.4585	0.4575	0.4565	0.4556	0.4546	0.4537
215	0.4641	0.4630	0.4620	0.4610	0.4600	0.4591	0.4581	0.4571	0.4562	0.4553	0.4543
220	0.4645	0.4635	0.4625	0.4616	0.4606	0.4596	0.4587	0.4577	0.4568	0.4559	0.4550
225	0.4650	0.4640	0.4630	0.4621	0.4611	0.4602	0.4592	0.4583	0.4574	0.4565	0.4556
230	0.4654	0.4645	0.4635	0.4626	0.4616	0.4607	0.4598	0.4589	0.4580	0.4571	0.4562
235	0.4658	0.4649	0.4640	0.4630	0.4621	0.4612	0.4603	0.4594	0.4585	0.4576	0.4568
240	0.4663	0.4653	0.4644	0.4635	0.4626	0.4617	0.4608	0.4599	0.4590	0.4582	0.4573
245	0.4666	0.4657	0.4648	0.4639	0.4630	0.4621	0.4613	0.4604	0.4595	0.4587	0.4578
250	0.4670	0.4661	0.4652	0.4643	0.4634	0.4626	0.4617	0.4609	0.4600	0.4592	0.4584
256	0.4674	0.4665	0.4656	0.4647	0.4639	0.4630	0.4622	0.4613	0.4605	0.4597	0.4589
260	0.4677	0.4668	0.4660	0.4651	0.4643	0.4634	0.4626	0.4618	0.4609	0.4601	0.4593
265	0.4681	0.4672	0.4663	0.4655	0.4647	0.4638	0.4630	0.4622	0.4614	0.4606	0.4598
270	0.4684	0.4675	0.4667	0.4659	0.4650	0.4642	0.4634	0.4626	0.4618	0.4610	0.4602
275	0.4687	0.4678	0.4670	0.4662	0.4654	0.4646	0.4638	0.4630	0.4622	0.4614	0.4607
280	0.4690	0.4682	0.4673	0.4665	0.4657	0.4649	0.4642	0.4634	0.4626	0.4618	0.4611
285	0.4693	0.4685	0.4677	0.4669	0.4661	0.4653	0.4645	0.4637	0.4630	0.4622	0.4615
290	0.4696	0.4688	0.4680	0.4672	0.4664	0.4656	0.4649	0.4641	0.4634	0.4626	0.4619
295	0.4698	0.4690	0.4683	0.4675	0.4667	0.4660	0.4652	0.4645	0.4637	0.4630	0.4623
300	0.4701	0.4693	0.4685	0.4678	0.4670	0.4663	0.4655	0.4648	0.4641	0.4633	0.4626
310	0.4706	0.4698	0.4691	0.4684	0.4676	0.4669	0.4662	0.4654	0.4647	0.4640	0.4633
320	0.4711	0.4703	0.4696	0.4689	0.4682	0.4675	0.4668	0.4661	0.4654	0.4647	0.4640
330	0.4715	0.4708	0.4701	0.4694	0.4687	0.4680	0.4673	0.4666	0.4659	0.4653	0.4646
340	0.4719	0.4713	0.4706	0.4699	0.4692	0.4685	0.4678	0.4672	0.4665	0.4659	0.4652
350	0.4723	0.4717	0.4710	0.4703	0.4697	0.4690	0.4683	0.4677	0.4670	0.4664	0.4658
360	0.4727	0.4721	0.4714	0.4707	0.4701	0.4695	0.4688	0.4682	0.4675	0.4669	0.4663
370	0.4731	0.4724	0.4718	0.4712	0.4705	0.4699	0.4693	0.4686	0.4680	0.4674	0.4668
380	0.4734	0.4728	0.4722	0.4715	0.4709	0.4703	0.4697	0.4691	0.4685	0.4679	0.4673
390	0.4738	0.4731	0.4725	0.4719	0.4713	0.4707	0.4701	0.4695	0.4689	0.4683	0.4677
400	0.4741	0.4735	0.4729	0.4723	0.4717	0.4711	0.4705	0.4699	0.4693	0.4688	0.4682

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(d) Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	0.6495	0.6518	0.6547	0.6581	0.6619	0.6660	0.6702	0.6744	0.6787	0.6829	0.6869
16	0.6495	0.6517	0.6543	0.6573	0.6608	0.6643	0.6681	0.6718	0.6756	0.6793	0.6829
17	0.6495	0.6516	0.6540	0.6568	0.6598	0.6630	0.6664	0.6697	0.6731	0.6764	0.6797
18	0.6495	0.6515	0.6537	0.6563	0.6591	0.6620	0.6650	0.6680	0.6711	0.6741	0.6771
19	0.6495	0.6514	0.6535	0.6558	0.6584	0.6611	0.6638	0.6666	0.6694	0.6722	0.6749
20	0.6495	0.6513	0.6533	0.6555	0.6579	0.6603	0.6628	0.6654	0.6680	0.6705	0.6730
21	0.6495	0.6512	0.6531	0.6552	0.6573	0.6597	0.6620	0.6644	0.6668	0.6691	0.6715
22	0.6495	0.6511	0.6529	0.6549	0.6569	0.6591	0.6613	0.6635	0.6657	0.6679	0.6701
23	0.6495	0.6511	0.6528	0.6546	0.6566	0.6586	0.6606	0.6627	0.6648	0.6669	0.6689
24	0.6495	0.6510	0.6527	0.6544	0.6562	0.6582	0.6601	0.6620	0.6640	0.6659	0.6679
25	0.6495	0.6510	0.6525	0.6542	0.6559	0.6578	0.6596	0.6614	0.6633	0.6651	0.6669
26	0.6495	0.6509	0.6524	0.6540	0.6557	0.6574	0.6591	0.6609	0.6626	0.6644	0.6661
27	0.6495	0.6509	0.6523	0.6539	0.6554	0.6570	0.6587	0.6604	0.6620	0.6637	0.6653
28	0.6495	0.6508	0.6522	0.6537	0.6552	0.6567	0.6583	0.6599	0.6615	0.6631	0.6647
29	0.6495	0.6508	0.6521	0.6535	0.6550	0.6565	0.6580	0.6595	0.6610	0.6625	0.6641
30	0.6495	0.6508	0.6521	0.6534	0.6548	0.6562	0.6577	0.6591	0.6606	0.6620	0.6635
31	0.6495	0.6507	0.6520	0.6533	0.6546	0.6560	0.6574	0.6588	0.6602	0.6616	0.6630
32	0.6495	0.6507	0.6519	0.6532	0.6545	0.6558	0.6571	0.6585	0.6598	0.6612	0.6625
33	0.6495	0.6507	0.6518	0.6531	0.6543	0.6556	0.6569	0.6582	0.6595	0.6608	0.6620
34	0.6495	0.6506	0.6518	0.6530	0.6542	0.6554	0.6566	0.6579	0.6591	0.6604	0.6616
35	0.6495	0.6506	0.6517	0.6529	0.6540	0.6552	0.6564	0.6576	0.6588	0.6601	0.6613
36	0.6495	0.6506	0.6517	0.6528	0.6539	0.6551	0.6562	0.6574	0.6586	0.6597	0.6609
37	0.6495	0.6506	0.6516	0.6527	0.6538	0.6549	0.6560	0.6572	0.6583	0.6594	0.6606
38	0.6495	0.6505	0.6516	0.6526	0.6537	0.6548	0.6558	0.6570	0.6581	0.6592	0.6602
39	0.6495	0.6505	0.6515	0.6525	0.6536	0.6546	0.6557	0.6568	0.6578	0.6589	0.6600
40	0.6495	0.6505	0.6515	0.6525	0.6535	0.6545	0.6555	0.6565	0.6576	0.6586	0.6597
42	0.6495	0.6504	0.6514	0.6523	0.6533	0.6543	0.6552	0.6562	0.6572	0.6582	0.6592
44	0.6495	0.6504	0.6513	0.6522	0.6531	0.6540	0.6550	0.6559	0.6569	0.6578	0.6587
46	0.6495	0.6504	0.6512	0.6521	0.6530	0.6538	0.6547	0.6556	0.6565	0.6574	0.6583
48	0.6495	0.6503	0.6512	0.6520	0.6528	0.6537	0.6545	0.6554	0.6562	0.6571	0.6579
50	0.6495	0.6503	0.6511	0.6519	0.6527	0.6535	0.6543	0.6551	0.6559	0.6568	0.6576
52	0.6495	0.6503	0.6510	0.6518	0.6526	0.6534	0.6541	0.6549	0.6557	0.6564	0.6573
54	0.6495	0.6503	0.6510	0.6517	0.6525	0.6532	0.6540	0.6547	0.6554	0.6562	0.6570
56	0.6495	0.6502	0.6509	0.6517	0.6524	0.6531	0.6538	0.6545	0.6552	0.6560	0.6567
58	0.6495	0.6502	0.6509	0.6516	0.6523	0.6530	0.6537	0.6544	0.6550	0.6557	0.6565
60	0.6495	0.6502	0.6509	0.6515	0.6522	0.6529	0.6535	0.6542	0.6549	0.6555	0.6562
62	0.6495	0.6502	0.6508	0.6515	0.6521	0.6528	0.6534	0.6541	0.6547	0.6553	0.6560
64	0.6495	0.6501	0.6508	0.6514	0.6520	0.6527	0.6533	0.6539	0.6545	0.6552	0.6558
66	0.6495	0.6501	0.6507	0.6514	0.6520	0.6526	0.6532	0.6538	0.6544	0.6550	0.6556
68	0.6495	0.6501	0.6507	0.6513	0.6519	0.6525	0.6531	0.6537	0.6543	0.6548	0.6554
70	0.6495	0.6501	0.6507	0.6513	0.6518	0.6524	0.6530	0.6535	0.6541	0.6547	0.6553

Plenum emperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	0.6495	0.6660	0.6869	0.7048	0.7177	0.7267	0.7330	0.7376	0.7409	0.7435	0.7455
16	0.6495	0.6643	0.6829	0.6994	0.7121	0.7214	0.7283	0.7333	0.7371	0.7401	0.7425
17	0.6495	0.6630	0.6797	0.6948	0.7070	0.7165	0.7237	0.7291	0.7333	0.7367	0.7393
18	0.6495	0.6620	0.6771	0.6910	0.7026	0.7120	0.7194	0.7251	0.7296	0.7332	0.7362
19	0.6495	0.6611	0.6749	0.6877	0.6988	0.7079	0.7153	0.7213	0.7260	0.7299	0.7331
20	0.6495	0.6603	0.6730	0.6850	0.6955	0.7043	0.7116	0.7177	0.7226	0.7267	0.7300
21	0.6495	0.6597	0.6715	0.6826	0.6925	0.7010	0.7082	0.7143	0.7193	0.7236	0.7271
22	0.6495	0.6591	0.6701	0.6805	0.6899	0.6981	0.7052	0.7112	0.7163	0.7206	0.7242
23	0.6495	0.6586	0.6689	0.6787	0.6876	0.6955	0.7023	0.7083	0.7134	0.7178	0.7215
24	0.6495	0.6582	0.6679	0.6771	0.6856	0.6931	0.6998	0.7056	0.7107	0.7151	0.7189
25	0.6495	0.6578	0.6669	0.6757	0.6838	0.6910	0.6975	0.7031	0.7082	0.7126	0.7164
26	0.6495	0.6574	0.6661	0.6745	0.6821	0.6891	0.6953	0.7009	0.7058	0.7102	0.7141
27	0.6495	0.6570	0.6653	0.6733	0.6807	0.6873	0.6934	0.6988	0.7036	0.7080	0.7119
28	0.6495	0.6567	0.6647	0.6723	0.6793	0.6857	0.6916	0.6969	0.7016	0.7059	0.7098
29	0.6495	0.6565	0.6641	0.6713	0.6781	0.6843	0.6899	0.6951	0.6997	0.7040	0.7078
30	0.6495	0.6562	0.6635	0.6705	0.6770	0.6830	0.6884	0.6934	0.6980	0.7021	0.7059
31	0.6495	0.6560	0.6630	0.6697	0.6760	0.6817	0.6870	0.6919	0.6964	0.7004	0.7042
32	0.6495	0.6558	0.6625	0.6690	0.6750	0.6806	0.6857	0.6905	0.6948	0.6988	0.7025
33	0.6495	0.6556	0.6620	0.6683	0.6741	0.6795	0.6845	0.6891	0.6934	0.6973	0.7009
34	0.6495	0.6554	0.6616	0.6677	0.6733	0.6786	0.6834	0.6879	0.6921	0.6959	0.6995
35	0.6495	0.6552	0.6613	0.6671	0.6726	0.6777	0.6824	0.6868	0.6908	0.6946	0.6981
36	0.6495	0.6551	0.6609	0.6665	0.6719	0.6768	0.6814	0.6857	0.6896	0.6933	0.6968
37	0.6495	0.6549	0.6606	0.6660	0.6712	0.6760	0.6805	0.6847	0.6885	0.6922	0.6956
38	0.6495	0.6548	0.6602	0.6656	0.6706	0.6753	0.6796	0.6837	0.6875	0.6911	0.6944
39	0.6495	0.6546	0.6600	0.6651	0.6700	0.6746	0.6788	0.6828	0.6865	0.6900	0.6933
40	0.6495	0.6545	0.6597	0.6647	0.6694	0.6739	0.6781	0.6819	0.6856	0.6890	0.6922
42	0.6495	0.6543	0.6592	0.6639	0.6684	0.6727	0.6767	0.6804	0.6839	0.6872	0.6903
44	0.6495	0.6540	0.6587	0.6632	0.6675	0.6716	0.6754	0.6790	0.6823	0.6855	0.6885
46	0.6495	0.6538	0.6583	0.6626	0.6667	0.6706	0.6743	0.6777	0.6809	0.6840	0.6869
48	0.6495	0.6537	0.6579	0.6620	0.6660	0.6697	0.6732	0.6765	0.6797	0.6826	0.6854
50	0.6495	0.6535	0.6576	0.6615	0.6653	0.6689	0.6723	0.6755	0.6785	0.6813	0.6841
52	0.6495	0.6534	0.6573	0.6611	0.6647	0.6681	0.6714	0.6745	0.6774	0.6802	0.6828
54	0.6495	0.6532	0.6570	0.6606	0.6641	0.6674	0.6706	0.6736	0.6764	0.6791	0.6817
56	0.6495	0.6531	0.6567	0.6602	0.6636	0.6668	0.6699	0.6728	0.6755	0.6781	0.6806
58	0.6495	0.6530	0.6565	0.6598	0.6631	0.6662	0.6692	0.6720	0.6747	0.6772	0.6796
60	0.6495	0.6529	0.6562	0.6595	0.6627	0.6657	0.6685	0.6713	0.6739	0.6763	0.6787
62	0.6495	0.6528	0.6560	0.6592	0.6622	0.6652	0.6679	0.6706	0.6731	0.6755	0.6778
64	0.6495	0.6527	0.6558	0.6589	0.6618	0.6647	0.6674	0.6700	0.6724	0.6748	0.6770
66	0.6495	0.6526	0.6556	0.6586	0.6615	0.6642	0.6669	0.6694	0.6718	0.6741	0.6763
68	0.6495	0.6525	0.6554	0.6583	0.6611	0.6638	0.6664	0.6688	0.6712	0.6734	0.6756
70	0.6495	0.6524	0.6553	0.6581	0.6608	0.6634	0.6659	0.6683	0.6706	0.6728	0.6749

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(d) Continued. Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	0.7455	0.7472	0.7485	0.7496	0.7505	0.7513	0.7520	0.7525	0.7530	0.7535	0.7539
16	0.7425	0.7444	0.7459	0.7472	0.7483	0.7493	0.7501	0.7508	0.7514	0.7520	0.7524
17	0.7393	0.7415	0.7433	0.7448	0.7461	0.7472	0.7481	0.7490	0.7497	0.7503	0.7509
18	0.7362	0.7386	0.7406	0.7423	0.7438	0.7450	0.7461	0.7471	0.7479	0.7486	0.7493
19	0.7331	0.7357	0.7379	0.7398	0.7414	0.7428	0.7440	0.7451	0.7460	0.7469	0.7476
20	0.7300	0.7329	0.7353	0.7373	0.7391	0.7406	0.7419	0.7431	0.7442	0.7451	0.7459
21	0.7271	0.7301	0.7326	0.7348	0.7367	0.7384	0.7399	0.7411	0.7423	0.7433	0.7442
22	0.7242	0.7274	0.7301	0.7324	0.7344	0.7362	0.7378	0.7392	0.7404	0.7415	0.7425
23	0.7215	0.7248	0.7276	0.7300	0.7322	0.7340	0.7357	0.7372	0.7385	0.7397	0.7408
24	0.7189	0.7222	0.7251	0.7277	0.7299	0.7319	0.7337	0.7352	0.7367	0.7379	0.7391
25	0.7164	0.7198	0.7228	0.7254	0.7278	0.7298	0.7317	0.7333	0.7348	0.7362	0.7374
26	0.7141	0.7175	0.7205	0.7232	0.7256	0.7278	0.7297	0.7314	0.7330	0.7344	0.7357
27	0.7119	0.7153	0.7184	0.7211	0.7236	0.7258	0.7278	0.7296	0.7312	0.7327	0.7340
28	0.7098	0.7132	0.7163	0.7191	0.7216	0.7239	0.7259	0.7278	0.7294	0.7310	0.7324
29	0.7078	0.7112	0.7143	0.7172	0.7197	0.7220	0.7241	0.7260	0.7277	0.7293	0.7308
30	0.7059	0.7093	0.7125	0.7153	0.7179	0.7202	0.7223	0.7243	0.7260	0.7277	0.7292
31	0.7042	0.7076	0.7107	0.7135	0.7161	0.7185	0.7206	0.7226	0.7244	0.7261	0.7276
32	0.7025	0.7059	0.7090	0.7118	0.7144	0.7168	0.7190	0.7210	0.7228	0.7245	0.7261
33	0.7009	0.7043	0.7073	0.7102	0.7128	0.7152	0.7174	0.7194	0.7213	0.7230	0.7246
34	0.6995	0.7028	0.7058	0.7086	0.7112	0.7136	0.7158	0.7179	0.7198	0.7215	0.7232
35	0.6981	0.7013	0.7043	0.7071	0.7097	0.7121	0.7143	0.7164	0.7183	0.7201	0.7217
36	0.6968	0.7000	0.7029	0.7057	0.7083	0.7107	0.7129	0.7150	0.7169	0.7187	0.7204
37	0.6956	0.6987	0.7016	0.7044	0.7069	0.7093	0.7115	0.7136	0.7155	0.7173	0.7190
38	0.6944	0.6975	0.7003	0.7031	0.7056	0.7080	0.7102	0.7123	0.7142	0.7160	0.7177
39	0.6933	0.6963	0.6991	0.7018	0.7044	0.7067	0.7089	0.7110	0.7129	0.7148	0.7165
40	0.6922	0.6952	0.6980	0.7007	0.7032	0.7055	0.7077	0.7098	0.7117	0.7135	0.7153
42	0.6903	0.6932	0.6959	0.6985	0.7009	0.7032	0.7054	0.7074	0.7094	0.7112	0.7129
44	0.6885	0.6913	0.6940	0.6965	0.6989	0.7011	0.7032	0.7053	0.7072	0.7090	0.7107
46	0.6869	0.6896	0.6922	0.6947	0.6970	0.6992	0.7013	0.7033	0.7052	0.7070	0.7087
48	0.6854	0.6881	0.6906	0.6930	0.6952	0.6974	0.6994	0.7014	0.7033	0.7051	0.7068
50	0.6841	0.6866	0.6891	0.6914	0.6936	0.6958	0.6978	0.6997	0.7015	0.7033	0.7050
52	0.6828	0.6853	0.6877	0.6900	0.6921	0.6942	0.6962	0.6981	0.6999	0.7016	0.7033
54	0.6817	0.6841	0.6864	0.6886	0.6908	0.6928	0.6947	0.6966	0.6984	0.7000	0.7017
56	0.6806	0.6830	0.6852	0.6874	0.6895	0.6915	0.6934	0.6952	0.6969	0.6986	0.7002
58	0.6796	0.6819	0.6841	0.6862	0.6883	0.6902	0.6921	0.6939	0.6956	0.6972	0.6988
60	0.6787	0.6810	0.6831	0.6852	0.6871	0.6890	0.6909	0.6926	0.6943	0.6959	0.6975
62	0.6778	0.6800	0.6821	0.6842	0.6861	0.6880	0.6897	0.6915	0.6931	0.6947	0.6963
64	0.6770	0.6792	0.6812	0.6832	0.6851	0.6869	0.6887	0.6904	0.6920	0.6936	0.6951
66	0.6763	0.6784	0.6804	0.6823	0.6842	0.6860	0.6877	0.6893	0.6909	0.6925	0.6940
68	0.6756	0.6776	0.6796	0.6815	0.6833	0.6850	0.6867	0.6884	0.6899	0.6914	0.6929
70	0.6749	0.6769	0.6788	0.6807	0.6825	0.6842	0.6858	0.6874	0.6890	0.6905	0.6919

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	0.7539	0.7542	0.7545	0.7548	0.7550	0.7552	0.7554	0.7556	0.7557	0.7559	0.7560
16	0.7524	0.7529	0.7532	0.7536	0.7539	0.7541	0.7544	0.7546	0.7548	0.7550	0.7552
17	0.7509	0.7514	0.7519	0.7523	0.7526	0.7530	0.7533	0.7535	0.7538	0.7540	0.7542
18	0.7493	0.7499	0.7504	0.7509	0.7513	0.7517	0.7521	0.7524	0.7527	0.7530	0.7532
19	0.7476	0.7483	0.7489	0.7495	0.7499	0.7504	0.7508	0.7512	0.7515	0.7519	0.7522
20	0.7459	0.7467	0.7474	0.7480	0.7485	0.7491	0.7495	0.7500	0.7504	0.7507	0.7511
21	0.7442	0.7451	0.7458	0.7465	0.7471	0.7477	0.7482	0.7487	0.7491	0.7495	0.7499
22	0.7425	0.7434	0.7442	0.7450	0.7457	0.7463	0.7469	0.7474	0.7479	0.7483	0.7488
23	0.7408	0.7418	0.7427	0.7435	0.7442	0.7449	0.7455	0.7461	0.7466	0.7471	0.7476
24	0.7391	0.7401	0.7411	0.7420	0.7428	0.7435	0.7442	0.7448	0.7454	0.7459	0.7464
25	0.7374	0.7385	0.7395	0.7404	0.7413	0.7421	0.7428	0.7435	0.7441	0.7447	0.7452
26	0.7357	0.7369	0.7379	0.7389	0.7398	0.7407	0.7414	0.7422	0.7428	0.7435	0.7440
27	0.7340	0.7353	0.7364	0.7374	0.7384	0.7393	0.7401	0.7408	0.7416	0.7422	0.7428
28	0.7324	0.7337	0.7348	0.7359	0.7369	0.7379	0.7387	0.7395	0.7403	0.7410	0.7416
29	0.7308	0.7321	0.7333	0.7345	0.7355	0.7365	0.7374	0.7382	0.7390	0.7398	0.7404
30	0.7292	0.7306	0.7318	0.7330	0.7341	0.7351	0.7361	0.7369	0.7378	0.7385	0.7393
31	0.7276	0.7290	0.7304	0.7316	0.7327	0.7338	0.7347	0.7357	0.7365	0.7373	0.7381
32	0.7261	0.7276	0.7289	0.7302	0.7313	0.7324	0.7334	0.7344	0.7353	0.7361	0.7369
33	0.7246	0.7261	0.7275	0.7288	0.7300	0.7311	0.7321	0.7331	0.7340	0.7349	0.7357
34	0.7232	0.7247	0.7261	0.7274	0.7286	0.7298	0.7309	0.7319	0.7328	0.7337	0.7346
35	0.7217	0.7233	0.7247	0.7261	0.7273	0.7285	0.7296	0.7307	0.7316	0.7326	0.7334
36	0.7204	0.7219	0.7234	0.7248	0.7261	0.7273	0.7284	0.7295	0.7305	0.7314	0.7323
37	0.7190	0.7206	0.7221	0.7235	0.7248	0.7260	0.7272	0.7283	0.7293	0.7303	0.7312
38	0.7177	0.7193	0.7208	0.7222	0.7236	0.7248	0.7260	0.7271	0.7282	0.7291	0.7301
39	0.7165	0.7181	0.7196	0.7210	0.7224	0.7236	0.7248	0.7260	0.7270	0.7280	0.7290
40	0.7153	0.7169	0.7184	0.7198	0.7212	0.7225	0.7237	0.7248	0.7259	0.7269	0.7279
42	0.7129	0.7146	0.7161	0.7176	0.7189	0.7202	0.7215	0.7227	0.7238	0.7248	0.7258
44	0.7107	0.7124	0.7139	0.7154	0.7168	0.7181	0.7194	0.7206	0.7217	0.7228	0.7238
46	0.7087	0.7103	0.7119	0.7133	0.7147	0.7161	0.7174	0.7186	0.7197	0.7208	0.7219
48	0.7068	0.7084	0.7099	0.7114	0.7128	0.7141	0.7154	0.7167	0.7178	0.7189	0.7200
50	0.7050	0.7066	0.7081	0.7096	0.7110	0.7123	0.7136	0.7148	0.7160	0.7171	0.7182
52	0.7033	0.7049	0.7064	0.7078	0.7092	0.7106	0.7119	0.7131	0.7143	0.7154	0.7165
54	0.7017	0.7033	0.7048	0.7062	0.7076	0.7089	0.7102	0.7114	0.7126	0.7138	0.7149
56	0.7002	0.7017	0.7032	0.7047	0.7060	0.7074	0.7087	0.7099	0.7111	0.7122	0.7133
58	0.6988	0.7003	0.7018	0.7032	0.7046	0.7059	0.7072	0.7084	0.7096	0.7107	0.7118
60	0.6975	0.6990	0.7005	0.7018	0.7032	0.7045	0.7057	0.7070	0.7081	0.7093	0.7104
62	0.6963	0.6977	0.6992	0.7006	0.7019	0.7032	0.7044	0.7056	0.7068	0.7079	0.7090
64	0.6951	0.6965	0.6980	0.6993	0.7007	0.7019	0.7031	0.7043	0.7055	0.7066	0.7077
66	0.6940	0.6954	0.6968	0.6982	0.6995	0.7007	0.7020	0.7031	0.7042	0.7054	0.7064
68	0.6929	0.6943	0.6957	0.6970	0.6983	0.6996	0.7008	0.7020	0.7031	0.7042	0.7052
70	0.6919	0.6933	0.6947	0.6960	0.6973	0.6985	0.6997	0.7009	0.7020	0.7031	0.7041

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(d) Continued. Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	0.6495	0.6524	0.6553	0.6581	0.6608	0.6634	0.6659	0.6683	0.6706	0.6728	0.6749
72	0.6495	0.6523	0.6551	0.6579	0.6605	0.6630	0.6655	0.6678	0.6700	0.6722	0.6742
74	0.6495	0.6523	0.6549	0.6576	0.6602	0.6627	0.6651	0.6673	0.6695	0.6716	0.6736
76	0.6495	0.6522	0.6548	0.6574	0.6599	0.6623	0.6647	0.6669	0.6690	0.6711	0.6731
78	0.6495	0.6521	0.6547	0.6572	0.6597	0.6620	0.6643	0.6665	0.6686	0.6706	0.6725
80	0.6495	0.6521	0.6546	0.6570	0.6594	0.6617	0.6639	0.6661	0.6681	0.6701	0.6720
82	0.6495	0.6520	0.6544	0.6569	0.6592	0.6614	0.6636	0.6657	0.6677	0.6696	0.6715
84	0.6495	0.6519	0.6543	0.6567	0.6590	0.6612	0.6633	0.6653	0.6673	0.6692	0.6710
86	0.6495	0.6519	0.6542	0.6565	0.6588	0.6609	0.6630	0.6650	0.6669	0.6688	0.6706
88	0.6495	0.6518	0.6541	0.6564	0.6586	0.6607	0.6627	0.6647	0.6666	0.6684	0.6701
90	0.6495	0.6518	0.6540	0.6562	0.6584	0.6604	0.6624	0.6643	0.6662	0.6680	0.6697
92	0.6495	0.6517	0.6539	0.6560	0.6582	0.6602	0.6622	0.6640	0.6659	0.6676	0.6693
94	0.6495	0.6517	0.6538	0.6559	0.6580	0.6600	0.6619	0.6638	0.6655	0.6673	0.6689
96	0.6495	0.6517	0.6537	0.6558	0.6578	0.6598	0.6617	0.6635	0.6652	0.6669	0.6686
98	0.6495	0.6516	0.6537	0.6557	0.6577	0.6596	0.6614	0.6632	0.6649	0.6666	0.6682
100	0.6495	0.6516	0.6536	0.6555	0.6575	0.6594	0.6612	0.6630	0.6647	0.6663	0.6679
102	0.6495	0.6515	0.6535	0.6554	0.6574	0.6592	0.6610	0.6627	0.6644	0.6660	0.6676
104	0.6495	0.6515	0.6534	0.6553	0.6572	0.6590	0.6608	0.6625	0.6641	0.6657	0.6673
106	0.6495	0.6515	0.6534	0.6552	0.6571	0.6588	0.6606	0.6622	0.6639	0.6654	0.6670
108	0.6495	0.6514	0.6533	0.6551	0.6569	0.6587	0.6604	0.6620	0.6636	0.6652	0.6667
110	0.6495	0.6514	0.6532	0.6550	0.6568	0.6585	0.6602	0.6618	0.6634	0.6649	0.6664
112	0.6495	0.6514	0.6532	0.6549	0.6567	0.6584	0.6600	0.6616	0.6632	0.6647	0.6661
114	0.6495	0.6513	0.6531	0.6548	0.6566	0.6582	0.6598	0.6614	0.6629	0.6644	0.6658
116	0.6495	0.6513	0.6530	0.6547	0.6564	0.6581	0.6597	0.6612	0.6627	0.6642	0.6656
118	0.6495	0.6513	0.6530	0.6547	0.6563	0.6579	0.6595	0.6610	0.6625	0.6639	0.6653
120	0.6495	0.6512	0.6529	0.6546	0.6562	0.6578	0.6594	0.6609	0.6623	0.6637	0.6651
122	0.6495	0.6512	0.6529	0.6545	0.6561	0.6577	0.6592	0.6607	0.6621	0.6635	0.6649
124	0.6495	0.6512	0.6528	0.6544	0.6560	0.6576	0.6591	0.6605	0.6619	0.6633	0.6646
126	0.6495	0.6512	0.6528	0.6543	0.6559	0.6574	0.6589	0.6603	0.6617	0.6631	0.6644
128	0.6495	0.6511	0.6527	0.6543	0.6558	0.6573	0.6588	0.6602	0.6616	0.6629	0.6642
130	0.6495	0.6511	0.6527	0.6542	0.6557	0.6572	0.6586	0.6600	0.6614	0.6627	0.6640
132	0.6495	0.6511	0.6526	0.6541	0.6556	0.6571	0.6585	0.6599	0.6612	0.6625	0.6638
134	0.6495	0.6511	0.6526	0.6541	0.6555	0.6570	0.6584	0.6597	0.6611	0.6624	0.6636
136	0.6495	0.6510	0.6525	0.6540	0.6554	0.6569	0.6583	0.6596	0.6609	0.6622	0.6634
138	0.6495	0.6510	0.6525	0.6539	0.6553	0.6568	0.6581	0.6595	0.6608	0.6620	0.6632
140	0.6495	0.6510	0.6525	0.6539	0.6553	0.6567	0.6580	0.6593	0.6606	0.6619	0.6631
142	0.6495	0.6510	0.6524	0.6538	0.6552	0.6566	0.6579	0.6592	0.6605	0.6617	0.6629
144	0.6495	0.6510	0.6524	0.6538	0.6551	0.6565	0.6578	0.6591	0.6603	0.6615	0.6627
146	0.6495	0.6509	0.6523	0.6537	0.6550	0.6564	0.6577	0.6590	0.6602	0.6614	0.6626
148	0.6495	0.6509	0.6523	0.6537	0.6550	0.6563	0.6576	0.6588	0.6601	0.6612	0.6624
150	0.6495	0.6509	0.6523	0.6536	0.6549	0.6562	0.6575	0.6587	0.6599	0.6611	0.6622

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	0.6749	0.6769	0.6788	0.6807	0.6825	0.6842	0.6858	0.6874	0.6890	0.6905	0.6919
72	0.6742	0.6762	0.6781	0.6799	0.6817	0.6834	0.6850	0.6866	0.6881	0.6895	0.6910
74	0.6736	0.6756	0.6774	0.6792	0.6809	0.6826	0.6842	0.6857	0.6872	0.6887	0.6901
76	0.6731	0.6749	0.6768	0.6785	0.6802	0.6818	0.6834	0.6849	0.6864	0.6878	0.6892
78	0.6725	0.6744	0.6762	0.6779	0.6795	0.6811	0.6827	0.6842	0.6856	0.6870	0.6884
80	0.6720	0.6738	0.6756	0.6773	0.6789	0.6805	0.6820	0.6835	0.6849	0.6863	0.6876
82	0.6715	0.6733	0.6750	0.6767	0.6783	0.6798	0.6813	0.6828	0.6842	0.6855	0.6869
84	0.6710	0.6728	0.6745	0.6761	0.6777	0.6792	0.6807	0.6821	0.6835	0.6848	0.6861
86	0.6706	0.6723	0.6740	0.6756	0.6771	0.6786	0.6801	0.6815	0.6828	0.6842	0.6855
88	0.6701	0.6718	0.6735	0.6751	0.6766	0.6781	0.6795	0.6809	0.6822	0.6835	0.6848
90	0.6697	0.6714	0.6730	0.6746	0.6761	0.6775	0.6789	0.6803	0.6816	0.6829	0.6842
92	0.6693	0.6710	0.6726	0.6741	0.6756	0.6770	0.6784	0.6797	0.6810	0.6823	0.6836
94	0.6689	0.6706	0.6721	0.6736	0.6751	0.6765	0.6779	0.6792	0.6805	0.6818	0.6830
96	0.6686	0.6702	0.6717	0.6732	0.6746	0.6760	0.6774	0.6787	0.6800	0.6812	0.6824
98	0.6682	0.6698	0.6713	0.6728	0.6742	0.6756	0.6769	0.6782	0.6795	0.6807	0.6819
100	0.6679	0.6694	0.6709	0.6724	0.6738	0.6751	0.6764	0.6777	0.6790	0.6802	0.6813
102	0.6676	0.6691	0.6706	0.6720	0.6734	0.6747	0.6760	0.6773	0.6785	0.6797	0.6808
104	0.6673	0.6688	0.6702	0.6716	0.6730	0.6743	0.6756	0.6768	0.6780	0.6792	0.6803
106	0.6670	0.6684	0.6699	0.6712	0.6726	0.6739	0.6752	0.6764	0.6776	0.6787	0.6799
108	0.6667	0.6681	0.6695	0.6709	0.6722	0.6735	0.6748	0.6760	0.6771	0.6783	0.6794
110	0.6664	0.6678	0.6692	0.6705	0.6719	0.6731	0.6744	0.6756	0.6767	0.6779	0.6790
112	0.6661	0.6675	0.6689	0.6702	0.6715	0.6728	0.6740	0.6752	0.6763	0.6775	0.6786
114	0.6658	0.6672	0.6686	0.6699	0.6712	0.6724	0.6736	0.6748	0.6759	0.6771	0.6781
116	0.6656	0.6670	0.6683	0.6696	0.6709	0.6721	0.6733	0.6744	0.6756	0.6767	0.6777
118	0.6653	0.6667	0.6680	0.6693	0.6705	0.6718	0.6729	0.6741	0.6752	0.6763	0.6773
120	0.6651	0.6664	0.6677	0.6690	0.6702	0.6714	0.6726	0.6737	0.6748	0.6759	0.6770
122	0.6649	0.6662	0.6675	0.6687	0.6699	0.6711	0.6723	0.6734	0.6745	0.6756	0.6766
124	0.6646	0.6660	0.6672	0.6685	0.6697	0.6708	0.6720	0.6731	0.6742	0.6752	0.6762
126	0.6644	0.6657	0.6670	0.6682	0.6694	0.6705	0.6717	0.6728	0.6738	0.6749	0.6759
128	0.6642	0.6655	0.6667	0.6679	0.6691	0.6703	0.6714	0.6725	0.6735	0.6745	0.6756
130	0.6640	0.6653	0.6665	0.6677	0.6688	0.6700	0.6711	0.6722	0.6732	0.6742	0.6752
132	0.6638	0.6651	0.6663	0.6674	0.6686	0.6697	0.6708	0.6719	0.6729	0.6739	0.6749
134	0.6636	0.6648	0.6660	0.6672	0.6683	0.6694	0.6705	0.6716	0.6726	0.6736	0.6746
136	0.6634	0.6646	0.6658	0.6670	0.6681	0.6692	0.6703	0.6713	0.6723	0.6733	0.6743
138	0.6632	0.6644	0.6656	0.6668	0.6679	0.6689	0.6700	0.6710	0.6720	0.6730	0.6740
140	0.6631	0.6643	0.6654	0.6665	0.6676	0.6687	0.6698	0.6708	0.6718	0.6728	0.6737
142	0.6629	0.6641	0.6652	0.6663	0.6674	0.6685	0.6695	0.6705	0.6715	0.6725	0.6734
144	0.6627	0.6639	0.6650	0.6661	0.6672	0.6682	0.6693	0.6703	0.6713	0.6722	0.6731
146	0.6626	0.6637	0.6648	0.6659	0.6670	0.6680	0.6690	0.6700	0.6710	0.6720	0.6729
148	0.6624	0.6635	0.6646	0.6657	0.6668	0.6678	0.6688	0.6698	0.6708	0.6717	0.6726
150	0.6622	0.6634	0.6645	0.6655	0.6666	0.6676	0.6686	0.6696	0.6705	0.6715	0.6724

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(d) Continued. Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	0.6919	0.6933	0.6947	0.6960	0.6973	0.6985	0.6997	0.7009	0.7020	0.7031	0.7041
72	0.6910	0.6923	0.6937	0.6950	0.6962	0.6975	0.6986	0.6998	0.7009	0.7020	0.7030
74	0.6901	0.6914	0.6927	0.6940	0.6953	0.6965	0.6976	0.6988	0.6999	0.7010	0.7020
76	0.6892	0.6905	0.6918	0.6931	0.6943	0.6955	0.6967	0.6978	0.6989	0.7000	0.7010
78	0.6884	0.6897	0.6910	0.6922	0.6934	0.6946	0.6958	0.6969	0.6979	0.6990	0.7000
80	0.6876	0.6889	0.6902	0.6914	0.6926	0.6937	0.6949	0.6960	0.6970	0.6981	0.6991
82	0.6869	0.6881	0.6894	0.6906	0.6918	0.6929	0.6940	0.6951	0.6962	0.6972	0.6982
84	0.6861	0.6874	0.6886	0.6898	0.6910	0.6921	0.6932	0.6943	0.6954	0.6964	0.6974
86	0.6855	0.6867	0.6879	0.6891	0.6902	0.6914	0.6925	0.6935	0.6946	0.6956	0.6965
88	0.6848	0.6860	0.6872	0.6884	0.6895	0.6906	0.6917	0.6928	0.6938	0.6948	0.6958
90	0.6842	0.6854	0.6866	0.6877	0.6888	0.6899	0.6910	0.6920	0.6930	0.6940	0.6950
92	0.6836	0.6848	0.6859	0.6871	0.6882	0.6893	0.6903	0.6913	0.6923	0.6933	0.6943
94	0.6830	0.6842	0.6853	0.6864	0.6875	0.6886	0.6896	0.6907	0.6916	0.6926	0.6936
96	0.6824	0.6836	0.6847	0.6858	0.6869	0.6880	0.6890	0.6900	0.6910	0.6919	0.6929
98	0.6819	0.6830	0.6841	0.6852	0.6863	0.6874	0.6884	0.6894	0.6904	0.6913	0.6922
100	0.6813	0.6825	0.6836	0.6847	0.6857	0.6868	0.6878	0.6888	0.6897	0.6907	0.6916
102	0.6808	0.6820	0.6831	0.6841	0.6852	0.6862	0.6872	0.6882	0.6891	0.6901	0.6910
104	0.6803	0.6815	0.6826	0.6836	0.6847	0.6857	0.6867	0.6876	0.6886	0.6895	0.6904
106	0.6799	0.6810	0.6821	0.6831	0.6841	0.6851	0.6861	0.6871	0.6880	0.6889	0.6898
108	0.6794	0.6805	0.6816	0.6826	0.6836	0.6846	0.6856	0.6865	0.6875	0.6884	0.6893
110	0.6790	0.6801	0.6811	0.6821	0.6831	0.6841	0.6851	0.6860	0.6869	0.6878	0.6887
112	0.6786	0.6796	0.6807	0.6817	0.6827	0.6836	0.6846	0.6855	0.6864	0.6873	0.6882
114	0.6781	0.6792	0.6802	0.6812	0.6822	0.6832	0.6841	0.6850	0.6859	0.6868	0.6877
116	0.6777	0.6788	0.6798	0.6808	0.6818	0.6827	0.6837	0.6846	0.6855	0.6863	0.6872
118	0.6773	0.6784	0.6794	0.6804	0.6813	0.6823	0.6832	0.6841	0.6850	0.6859	0.6867
120	0.6770	0.6780	0.6790	0.6800	0.6809	0.6819	0.6828	0.6837	0.6845	0.6854	0.6862
122	0.6766	0.6776	0.6786	0.6796	0.6805	0.6814	0.6824	0.6832	0.6841	0.6850	0.6858
124	0.6762	0.6772	0.6782	0.6792	0.6801	0.6810	0.6819	0.6828	0.6837	0.6845	0.6854
126	0.6759	0.6769	0.6779	0.6788	0.6797	0.6807	0.6815	0.6824	0.6833	0.6841	0.6849
128	0.6756	0.6765	0.6775	0.6784	0.6794	0.6803	0.6812	0.6820	0.6829	0.6837	0.6845
130	0.6752	0.6762	0.6772	0.6781	0.6790	0.6799	0.6808	0.6816	0.6825	0.6833	0.6841
132	0.6749	0.6759	0.6768	0.6777	0.6786	0.6795	0.6804	0.6813	0.6821	0.6829	0.6837
134	0.6746	0.6756	0.6765	0.6774	0.6783	0.6792	0.6800	0.6809	0.6817	0.6825	0.6833
136	0.6743	0.6752	0.6762	0.6771	0.6780	0.6788	0.6797	0.6805	0.6813	0.6821	0.6829
138	0.6740	0.6749	0.6759	0.6768	0.6776	0.6785	0.6793	0.6802	0.6810	0.6818	0.6826
140	0.6737	0.6746	0.6756	0.6764	0.6773	0.6782	0.6790	0.6798	0.6806	0.6814	0.6822
142	0.6734	0.6743	0.6753	0.6761	0.6770	0.6779	0.6787	0.6795	0.6803	0.6811	0.6819
144	0.6731	0.6741	0.6750	0.6758	0.6767	0.6775	0.6784	0.6792	0.6800	0.6807	0.6815
146	0.6729	0.6738	0.6747	0.6755	0.6764	0.6772	0.6781	0.6789	0.6796	0.6804	0.6812
148	0.6726	0.6735	0.6744	0.6753	0.6761	0.6769	0.6777	0.6785	0.6793	0.6801	0.6808
150	0.6724	0.6733	0.6741	0.6750	0.6758	0.6766	0.6775	0.6782	0.6790	0.6798	0.6805

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.6495	0.6509	0.6523	0.6536	0.6549	0.6562	0.6575	0.6587	0.6599	0.6611	0.6622
155	0.6495	0.6509	0.6522	0.6535	0.6547	0.6560	0.6572	0.6584	0.6596	0.6608	0.6619
160	0.6495	0.6508	0.6521	0.6534	0.6546	0.6558	0.6570	0.6582	0.6593	0.6604	0.6615
165	0.6495	0.6508	0.6520	0.6532	0.6544	0.6556	0.6568	0.6579	0.6590	0.6601	0.6612
170	0.6495	0.6507	0.6520	0.6531	0.6543	0.6554	0.6566	0.6577	0.6588	0.6598	0.6609
175	0.6495	0.6507	0.6519	0.6530	0.6542	0.6553	0.6564	0.6575	0.6585	0.6596	0.6606
180	0.6495	0.6507	0.6518	0.6529	0.6540	0.6551	0.6562	0.6573	0.6583	0.6593	0.6603
185	0.6495	0.6507	0.6518	0.6529	0.6539	0.6550	0.6560	0.6571	0.6581	0.6591	0.6600
190	0.6495	0.6506	0.6517	0.6528	0.6538	0.6548	0.6558	0.6569	0.6579	0.6588	0.6598
195	0.6495	0.6506	0.6517	0.6527	0.6537	0.6547	0.6557	0.6567	0.6577	0.6586	0.6595
200	0.6495	0.6506	0.6516	0.6526	0.6536	0.6546	0.6555	0.6565	0.6575	0.6584	0.6593
205	0.6495	0.6505	0.6516	0.6525	0.6535	0.6545	0.6554	0.6564	0.6573	0.6582	0.6591
210	0.6495	0.6505	0.6515	0.6525	0.6534	0.6544	0.6553	0.6562	0.6571	0.6580	0.6589
215	0.6495	0.6505	0.6515	0.6524	0.6533	0.6543	0.6552	0.6560	0.6570	0.6578	0.6587
220	0.6495	0.6505	0.6514	0.6523	0.6533	0.6542	0.6550	0.6559	0.6568	0.6576	0.6585
225	0.6495	0.6505	0.6514	0.6523	0.6532	0.6541	0.6549	0.6558	0.6566	0.6575	0.6583
230	0.6495	0.6504	0.6513	0.6522	0.6531	0.6540	0.6548	0.6556	0.6565	0.6573	0.6581
235	0.6495	0.6504	0.6513	0.6522	0.6530	0.6539	0.6547	0.6555	0.6564	0.6572	0.6579
240	0.6495	0.6504	0.6513	0.6521	0.6530	0.6538	0.6546	0.6554	0.6562	0.6570	0.6578
245	0.6495	0.6504	0.6512	0.6521	0.6529	0.6537	0.6545	0.6553	0.6560	0.6569	0.6576
250	0.6495	0.6504	0.6512	0.6520	0.6528	0.6536	0.6544	0.6552	0.6559	0.6567	0.6575
255	0.6495	0.6503	0.6512	0.6520	0.6528	0.6535	0.6543	0.6551	0.6558	0.6566	0.6573
260	0.6495	0.6503	0.6511	0.6519	0.6527	0.6535	0.6542	0.6550	0.6557	0.6565	0.6572
265	0.6495	0.6503	0.6511	0.6519	0.6526	0.6534	0.6541	0.6549	0.6556	0.6563	0.6571
270	0.6495	0.6503	0.6511	0.6518	0.6526	0.6533	0.6541	0.6548	0.6555	0.6562	0.6569
275	0.6495	0.6503	0.6510	0.6518	0.6525	0.6533	0.6540	0.6547	0.6554	0.6561	0.6568
280	0.6495	0.6503	0.6510	0.6518	0.6525	0.6532	0.6539	0.6546	0.6553	0.6560	0.6567
285	0.6495	0.6503	0.6510	0.6517	0.6524	0.6531	0.6538	0.6545	0.6552	0.6558	0.6566
290	0.6495	0.6503	0.6510	0.6517	0.6524	0.6531	0.6538	0.6544	0.6551	0.6557	0.6564
295	0.6495	0.6502	0.6509	0.6516	0.6523	0.6530	0.6537	0.6544	0.6550	0.6556	0.6563
300	0.6495	0.6502	0.6509	0.6516	0.6523	0.6530	0.6536	0.6543	0.6549	0.6556	0.6562
310	0.6495	0.6502	0.6509	0.6515	0.6522	0.6529	0.6535	0.6541	0.6548	0.6554	0.6560
320	0.6495	0.6502	0.6508	0.6515	0.6521	0.6528	0.6534	0.6540	0.6546	0.6552	0.6558
330	0.6495	0.6502	0.6508	0.6514	0.6521	0.6527	0.6533	0.6539	0.6545	0.6550	0.6556
340	0.6495	0.6501	0.6508	0.6514	0.6520	0.6526	0.6532	0.6537	0.6543	0.6549	0.6554
350	0.6495	0.6501	0.6507	0.6513	0.6519	0.6525	0.6531	0.6536	0.6542	0.6547	0.6553
360	0.6495	0.6501	0.6507	0.6513	0.6518	0.6524	0.6530	0.6535	0.6541	0.6546	0.6551
370	0.6495	0.6501	0.6507	0.6512	0.6518	0.6523	0.6529	0.6534	0.6539	0.6545	0.6550
380	0.6495	0.6501	0.6506	0.6512	0.6517	0.6523	0.6528	0.6533	0.6538	0.6543	0.6549
390	0.6495	0.6501	0.6506	0.6511	0.6517	0.6522	0.6527	0.6532	0.6537	0.6542	0.6547
400	0.6495	0.6501	0.6506	0.6511	0.6516	0.6521	0.6526	0.6531	0.6536	0.6541	0.6546

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(d) Concluded. Critical density ratio, ρ_t/ρ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	0.6622	0.6634	0.6645	0.6655	0.6666	0.6676	0.6686	0.6696	0.6705	0.6715	0.6724
155	0.6619	0.6630	0.6640	0.6651	0.6661	0.6671	0.6681	0.6690	0.6699	0.6709	0.6717
160	0.6615	0.6626	0.6636	0.6646	0.6656	0.6666	0.6676	0.6685	0.6694	0.6703	0.6712
165	0.6612	0.6622	0.6632	0.6642	0.6652	0.6662	0.6671	0.6680	0.6689	0.6698	0.6706
170	0.6609	0.6619	0.6629	0.6638	0.6648	0.6657	0.6666	0.6675	0.6684	0.6693	0.6701
175	0.6606	0.6616	0.6625	0.6635	0.6644	0.6653	0.6662	0.6671	0.6679	0.6688	0.6696
180	0.6603	0.6613	0.6622	0.6631	0.6640	0.6649	0.6658	0.6667	0.6675	0.6683	0.6691
185	0.6600	0.6610	0.6619	0.6628	0.6637	0.6646	0.6654	0.6663	0.6671	0.6679	0.6687
190	0.6598	0.6607	0.6616	0.6625	0.6634	0.6642	0.6651	0.6659	0.6667	0.6675	0.6682
195	0.6595	0.6604	0.6613	0.6622	0.6630	0.6639	0.6647	0.6655	0.6663	0.6671	0.6678
200	0.6593	0.6602	0.6610	0.6619	0.6627	0.6636	0.6644	0.6652	0.6659	0.6667	0.6674
205	0.6591	0.6599	0.6608	0.6616	0.6624	0.6633	0.6640	0.6648	0.6656	0.6663	0.6671
210	0.6589	0.6597	0.6605	0.6614	0.6622	0.6630	0.6637	0.6645	0.6653	0.6660	0.6667
215	0.6587	0.6595	0.6603	0.6611	0.6619	0.6627	0.6634	0.6642	0.6649	0.6657	0.6664
220	0.6585	0.6593	0.6601	0.6609	0.6617	0.6624	0.6632	0.6639	0.6646	0.6653	0.6660
225	0.6583	0.6591	0.6599	0.6607	0.6614	0.6622	0.6629	0.6636	0.6643	0.6650	0.6657
230	0.6581	0.6589	0.6597	0.6604	0.6612	0.6619	0.6626	0.6634	0.6641	0.6647	0.6654
235	0.6579	0.6587	0.6595	0.6602	0.6610	0.6617	0.6624	0.6631	0.6638	0.6645	0.6651
240	0.6578	0.6585	0.6593	0.6600	0.6607	0.6615	0.6622	0.6628	0.6635	0.6642	0.6648
245	0.6576	0.6584	0.6591	0.6598	0.6605	0.6612	0.6619	0.6626	0.6633	0.6639	0.6646
250	0.6575	0.6582	0.6589	0.6596	0.6603	0.6610	0.6617	0.6624	0.6630	0.6637	0.6643
255	0.6573	0.6580	0.6588	0.6595	0.6601	0.6608	0.6615	0.6621	0.6628	0.6634	0.6641
260	0.6572	0.6579	0.6586	0.6593	0.6600	0.6606	0.6613	0.6619	0.6626	0.6632	0.6638
265	0.6571	0.6577	0.6584	0.6591	0.6598	0.6604	0.6611	0.6617	0.6623	0.6630	0.6636
270	0.6569	0.6576	0.6583	0.6589	0.6596	0.6602	0.6609	0.6615	0.6621	0.6627	0.6633
275	0.6568	0.6575	0.6581	0.6588	0.6594	0.6601	0.6607	0.6613	0.6619	0.6625	0.6631
280	0.6567	0.6573	0.6580	0.6586	0.6593	0.6599	0.6605	0.6611	0.6617	0.6623	0.6629
285	0.6566	0.6572	0.6579	0.6585	0.6591	0.6597	0.6603	0.6609	0.6615	0.6621	0.6627
290	0.6564	0.6571	0.6577	0.6583	0.6590	0.6596	0.6602	0.6608	0.6614	0.6619	0.6625
295	0.6563	0.6570	0.6576	0.6582	0.6588	0.6594	0.6600	0.6606	0.6612	0.6617	0.6623
300	0.6562	0.6569	0.6575	0.6581	0.6587	0.6593	0.6599	0.6604	0.6610	0.6616	0.6621
310	0.6560	0.6566	0.6572	0.6578	0.6584	0.6590	0.6596	0.6601	0.6607	0.6612	0.6618
320	0.6558	0.6564	0.6570	0.6576	0.6581	0.6587	0.6593	0.6598	0.6604	0.6609	0.6614
330	0.6556	0.6562	0.6568	0.6574	0.6579	0.6585	0.6590	0.6595	0.6601	0.6606	0.6611
340	0.6554	0.6560	0.6566	0.6571	0.6577	0.6582	0.6587	0.6593	0.6598	0.6603	0.6608
350	0.6553	0.6558	0.6564	0.6569	0.6575	0.6580	0.6585	0.6590	0.6595	0.6600	0.6605
360	0.6551	0.6557	0.6562	0.6567	0.6573	0.6578	0.6583	0.6588	0.6593	0.6597	0.6602
370	0.6550	0.6555	0.6560	0.6566	0.6571	0.6576	0.6581	0.6585	0.6590	0.6595	0.6600
380	0.6549	0.6554	0.6558	0.6564	0.6569	0.6574	0.6578	0.6583	0.6588	0.6593	0.6597
390	0.6547	0.6552	0.6557	0.6562	0.6567	0.6572	0.6576	0.6581	0.6586	0.6590	0.6595
400	0.6546	0.6551	0.6556	0.6561	0.6565	0.6570	0.6575	0.6579	0.6584	0.6588	0.6593

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	0.6724	0.6733	0.6741	0.6750	0.6758	0.6766	0.6775	0.6782	0.6790	0.6798	0.6805
155	0.6717	0.6726	0.6735	0.6743	0.6751	0.6759	0.6767	0.6775	0.6783	0.6790	0.6798
160	0.6712	0.6720	0.6729	0.6737	0.6745	0.6753	0.6761	0.6768	0.6776	0.6783	0.6790
165	0.6706	0.6715	0.6723	0.6731	0.6739	0.6747	0.6754	0.6762	0.6769	0.6776	0.6783
170	0.6701	0.6709	0.6717	0.6725	0.6733	0.6741	0.6748	0.6755	0.6763	0.6770	0.6777
175	0.6696	0.6704	0.6712	0.6720	0.6727	0.6735	0.6742	0.6749	0.6757	0.6764	0.6770
180	0.6691	0.6699	0.6707	0.6715	0.6722	0.6729	0.6737	0.6744	0.6751	0.6758	0.6764
185	0.6687	0.6695	0.6702	0.6710	0.6717	0.6724	0.6731	0.6738	0.6745	0.6752	0.6759
190	0.6682	0.6690	0.6698	0.6705	0.6712	0.6719	0.6726	0.6733	0.6740	0.6747	0.6753
195	0.6678	0.6686	0.6693	0.6701	0.6708	0.6715	0.6722	0.6728	0.6735	0.6741	0.6748
200	0.6674	0.6682	0.6689	0.6696	0.6703	0.6710	0.6717	0.6724	0.6730	0.6737	0.6743
205	0.6671	0.6678	0.6685	0.6692	0.6699	0.6706	0.6712	0.6719	0.6725	0.6732	0.6738
210	0.6667	0.6674	0.6681	0.6688	0.6695	0.6702	0.6708	0.6715	0.6721	0.6727	0.6733
215	0.6664	0.6671	0.6678	0.6684	0.6691	0.6698	0.6704	0.6710	0.6717	0.6723	0.6729
220	0.6660	0.6667	0.6674	0.6681	0.6687	0.6694	0.6700	0.6706	0.6713	0.6719	0.6725
225	0.6657	0.6664	0.6671	0.6677	0.6684	0.6690	0.6696	0.6703	0.6709	0.6715	0.6721
230	0.6654	0.6661	0.6667	0.6674	0.6680	0.6687	0.6693	0.6699	0.6705	0.6711	0.6717
235	0.6651	0.6658	0.6664	0.6671	0.6677	0.6683	0.6689	0.6695	0.6701	0.6707	0.6713
240	0.6648	0.6655	0.6661	0.6668	0.6674	0.6680	0.6686	0.6692	0.6698	0.6703	0.6709
245	0.6646	0.6652	0.6658	0.6665	0.6671	0.6677	0.6683	0.6688	0.6694	0.6700	0.6706
250	0.6643	0.6649	0.6656	0.6662	0.6668	0.6674	0.6679	0.6685	0.6691	0.6697	0.6702
255	0.6641	0.6647	0.6653	0.6659	0.6665	0.6671	0.6676	0.6682	0.6688	0.6693	0.6699
260	0.6638	0.6644	0.6650	0.6656	0.6662	0.6668	0.6674	0.6679	0.6685	0.6690	0.6696
265	0.6636	0.6642	0.6648	0.6654	0.6659	0.6665	0.6671	0.6676	0.6682	0.6687	0.6692
270	0.6633	0.6639	0.6645	0.6651	0.6657	0.6662	0.6668	0.6673	0.6679	0.6684	0.6689
275	0.6631	0.6637	0.6643	0.6649	0.6654	0.6660	0.6665	0.6671	0.6676	0.6681	0.6686
280	0.6629	0.6635	0.6641	0.6646	0.6652	0.6657	0.6663	0.6668	0.6673	0.6678	0.6684
285	0.6627	0.6633	0.6638	0.6644	0.6649	0.6655	0.6660	0.6665	0.6671	0.6676	0.6681
290	0.6625	0.6631	0.6636	0.6642	0.6647	0.6652	0.6658	0.6663	0.6668	0.6673	0.6678
295	0.6623	0.6629	0.6634	0.6640	0.6645	0.6650	0.6655	0.6661	0.6666	0.6671	0.6676
300	0.6621	0.6627	0.6632	0.6637	0.6643	0.6648	0.6653	0.6658	0.6663	0.6668	0.6673
310	0.6618	0.6623	0.6628	0.6633	0.6639	0.6644	0.6649	0.6654	0.6659	0.6663	0.6668
320	0.6614	0.6619	0.6625	0.6630	0.6635	0.6640	0.6645	0.6649	0.6654	0.6659	0.6664
330	0.6611	0.6616	0.6621	0.6626	0.6631	0.6636	0.6641	0.6645	0.6650	0.6655	0.6659
340	0.6608	0.6613	0.6618	0.6623	0.6627	0.6632	0.6637	0.6642	0.6646	0.6651	0.6655
350	0.6605	0.6610	0.6615	0.6619	0.6624	0.6629	0.6633	0.6638	0.6642	0.6647	0.6651
360	0.6602	0.6607	0.6612	0.6616	0.6621	0.6626	0.6630	0.6635	0.6639	0.6643	0.6648
370	0.6600	0.6604	0.6609	0.6613	0.6618	0.6622	0.6627	0.6631	0.6636	0.6640	0.6644
380	0.6597	0.6602	0.6606	0.6611	0.6615	0.6619	0.6624	0.6628	0.6632	0.6637	0.6641
390	0.6595	0.6599	0.6604	0.6608	0.6612	0.6617	0.6621	0.6625	0.6629	0.6633	0.6637
400	0.6593	0.6597	0.6601	0.6606	0.6610	0.6614	0.6618	0.6622	0.6626	0.6630	0.6634

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(e) Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	0.7500	0.7470	0.7443	0.7418	0.7396	0.7375	0.7355	0.7336	0.7317	0.7300	0.7284
16	0.7500	0.7473	0.7447	0.7424	0.7403	0.7382	0.7363	0.7345	0.7327	0.7311	0.7295
17	0.7500	0.7475	0.7451	0.7429	0.7409	0.7389	0.7371	0.7353	0.7336	0.7320	0.7304
18	0.7500	0.7476	0.7454	0.7433	0.7414	0.7395	0.7378	0.7361	0.7344	0.7329	0.7313
19	0.7500	0.7478	0.7457	0.7437	0.7418	0.7401	0.7384	0.7367	0.7352	0.7336	0.7322
20	0.7500	0.7479	0.7459	0.7440	0.7423	0.7406	0.7389	0.7374	0.7358	0.7344	0.7329
21	0.7500	0.7480	0.7461	0.7443	0.7426	0.7410	0.7394	0.7379	0.7365	0.7350	0.7336
22	0.7500	0.7481	0.7463	0.7446	0.7429	0.7414	0.7399	0.7384	0.7370	0.7356	0.7343
23	0.7500	0.7482	0.7465	0.7448	0.7433	0.7418	0.7403	0.7389	0.7376	0.7362	0.7349
24	0.7500	0.7483	0.7466	0.7451	0.7436	0.7421	0.7407	0.7394	0.7380	0.7367	0.7355
25	0.7500	0.7484	0.7468	0.7453	0.7438	0.7425	0.7411	0.7398	0.7385	0.7372	0.7360
26	0.7500	0.7484	0.7469	0.7455	0.7441	0.7428	0.7414	0.7402	0.7389	0.7377	0.7365
27	0.7500	0.7485	0.7471	0.7457	0.7443	0.7430	0.7418	0.7405	0.7393	0.7381	0.7370
28	0.7500	0.7486	0.7472	0.7458	0.7445	0.7432	0.7421	0.7409	0.7397	0.7385	0.7374
29	0.7500	0.7486	0.7473	0.7460	0.7447	0.7435	0.7423	0.7412	0.7400	0.7389	0.7378
30	0.7500	0.7487	0.7474	0.7461	0.7449	0.7437	0.7426	0.7415	0.7404	0.7393	0.7382
31	0.7500	0.7487	0.7475	0.7463	0.7451	0.7439	0.7428	0.7417	0.7407	0.7396	0.7386
32	0.7500	0.7488	0.7475	0.7464	0.7452	0.7441	0.7431	0.7420	0.7409	0.7399	0.7389
33	0.7500	0.7488	0.7476	0.7465	0.7454	0.7443	0.7433	0.7422	0.7412	0.7402	0.7392
34	0.7500	0.7488	0.7477	0.7466	0.7455	0.7445	0.7434	0.7425	0.7415	0.7405	0.7395
35	0.7500	0.7489	0.7478	0.7467	0.7457	0.7446	0.7436	0.7427	0.7417	0.7408	0.7398
36	0.7500	0.7489	0.7478	0.7468	0.7458	0.7448	0.7438	0.7429	0.7419	0.7410	0.7401
37	0.7500	0.7489	0.7479	0.7469	0.7459	0.7449	0.7440	0.7431	0.7422	0.7413	0.7404
38	0.7500	0.7490	0.7480	0.7470	0.7460	0.7451	0.7441	0.7433	0.7424	0.7415	0.7406
39	0.7500	0.7490	0.7480	0.7471	0.7461	0.7452	0.7443	0.7434	0.7426	0.7417	0.7408
40	0.7500	0.7490	0.7481	0.7471	0.7462	0.7453	0.7444	0.7436	0.7427	0.7419	0.7411
42	0.7500	0.7491	0.7482	0.7473	0.7464	0.7456	0.7447	0.7439	0.7431	0.7423	0.7415
44	0.7500	0.7491	0.7483	0.7474	0.7466	0.7458	0.7450	0.7442	0.7434	0.7426	0.7419
46	0.7500	0.7492	0.7483	0.7475	0.7467	0.7460	0.7452	0.7444	0.7437	0.7430	0.7422
48	0.7500	0.7492	0.7484	0.7476	0.7469	0.7461	0.7454	0.7446	0.7439	0.7432	0.7425
50	0.7500	0.7492	0.7485	0.7477	0.7470	0.7463	0.7456	0.7449	0.7442	0.7435	0.7428
52	0.7500	0.7493	0.7485	0.7478	0.7471	0.7464	0.7457	0.7451	0.7444	0.7437	0.7431
54	0.7500	0.7493	0.7486	0.7479	0.7472	0.7466	0.7459	0.7453	0.7446	0.7440	0.7434
56	0.7500	0.7493	0.7487	0.7480	0.7473	0.7467	0.7461	0.7454	0.7448	0.7442	0.7436
58	0.7500	0.7493	0.7487	0.7481	0.7474	0.7468	0.7462	0.7456	0.7450	0.7444	0.7438
60	0.7500	0.7494	0.7487	0.7481	0.7475	0.7469	0.7463	0.7457	0.7452	0.7446	0.7440
62	0.7500	0.7494	0.7488	0.7482	0.7476	0.7470	0.7465	0.7459	0.7453	0.7447	0.7442
64	0.7500	0.7494	0.7488	0.7483	0.7477	0.7471	0.7466	0.7460	0.7455	0.7449	0.7444
66	0.7500	0.7494	0.7489	0.7483	0.7478	0.7472	0.7467	0.7461	0.7456	0.7451	0.7445
68	0.7500	0.7494	0.7489	0.7484	0.7478	0.7473	0.7468	0.7462	0.7457	0.7452	0.7447
70	0.7500	0.7495	0.7489	0.7484	0.7479	0.7474	0.7469	0.7464	0.7459	0.7454	0.7449

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	0.7500	0.7375	0.7284	0.7215	0.7163	0.7119	0.7079	0.7043	0.7009	0.6977	0.6948
16	0.7500	0.7382	0.7295	0.7226	0.7174	0.7131	0.7093	0.7058	0.7026	0.6995	0.6967
17	0.7500	0.7389	0.7304	0.7236	0.7183	0.7140	0.7103	0.7069	0.7038	0.7008	0.6981
18	0.7500	0.7395	0.7313	0.7246	0.7192	0.7148	0.7111	0.7077	0.7047	0.7018	0.6991
19	0.7500	0.7401	0.7322	0.7255	0.7201	0.7156	0.7118	0.7085	0.7054	0.7026	0.6999
20	0.7500	0.7406	0.7329	0.7264	0.7209	0.7163	0.7125	0.7091	0.7061	0.7033	0.7006
21	0.7500	0.7410	0.7336	0.7272	0.7218	0.7171	0.7132	0.7098	0.7067	0.7039	0.7013
22	0.7500	0.7414	0.7343	0.7280	0.7226	0.7180	0.7140	0.7105	0.7074	0.7045	0.7019
23	0.7500	0.7418	0.7349	0.7288	0.7234	0.7188	0.7147	0.7112	0.7080	0.7052	0.7025
24	0.7500	0.7421	0.7355	0.7295	0.7242	0.7196	0.7155	0.7119	0.7087	0.7058	0.7031
25	0.7500	0.7425	0.7360	0.7302	0.7250	0.7203	0.7163	0.7126	0.7094	0.7065	0.7038
26	0.7500	0.7428	0.7365	0.7309	0.7257	0.7211	0.7170	0.7134	0.7101	0.7071	0.7044
27	0.7500	0.7430	0.7370	0.7315	0.7264	0.7219	0.7178	0.7141	0.7108	0.7078	0.7051
28	0.7500	0.7432	0.7374	0.7321	0.7271	0.7226	0.7185	0.7149	0.7115	0.7085	0.7057
29	0.7500	0.7435	0.7378	0.7326	0.7278	0.7233	0.7193	0.7156	0.7123	0.7092	0.7064
30	0.7500	0.7437	0.7382	0.7331	0.7284	0.7240	0.7200	0.7164	0.7130	0.7099	0.7071
31	0.7500	0.7439	0.7386	0.7336	0.7290	0.7247	0.7207	0.7171	0.7137	0.7106	0.7078
32	0.7500	0.7441	0.7389	0.7341	0.7296	0.7253	0.7214	0.7178	0.7145	0.7113	0.7085
33	0.7500	0.7443	0.7392	0.7345	0.7301	0.7259	0.7221	0.7185	0.7152	0.7121	0.7092
34	0.7500	0.7445	0.7395	0.7349	0.7306	0.7265	0.7227	0.7191	0.7158	0.7128	0.7099
35	0.7500	0.7446	0.7398	0.7353	0.7311	0.7271	0.7233	0.7198	0.7165	0.7135	0.7106
36	0.7500	0.7448	0.7401	0.7357	0.7316	0.7276	0.7239	0.7204	0.7172	0.7141	0.7113
37	0.7500	0.7449	0.7404	0.7361	0.7320	0.7282	0.7245	0.7211	0.7178	0.7148	0.7120
38	0.7500	0.7451	0.7406	0.7364	0.7324	0.7287	0.7251	0.7217	0.7185	0.7155	0.7126
39	0.7500	0.7452	0.7408	0.7367	0.7328	0.7291	0.7256	0.7222	0.7191	0.7161	0.7133
40	0.7500	0.7453	0.7411	0.7371	0.7332	0.7296	0.7261	0.7228	0.7197	0.7167	0.7139
42	0.7500	0.7456	0.7415	0.7376	0.7340	0.7305	0.7271	0.7239	0.7208	0.7179	0.7151
44	0.7500	0.7458	0.7419	0.7382	0.7346	0.7313	0.7280	0.7249	0.7219	0.7190	0.7163
46	0.7500	0.7460	0.7422	0.7387	0.7353	0.7320	0.7288	0.7258	0.7229	0.7201	0.7174
48	0.7500	0.7461	0.7425	0.7391	0.7358	0.7327	0.7296	0.7267	0.7239	0.7211	0.7185
50	0.7500	0.7463	0.7428	0.7395	0.7364	0.7333	0.7304	0.7275	0.7247	0.7221	0.7195
52	0.7500	0.7464	0.7431	0.7399	0.7369	0.7339	0.7310	0.7283	0.7256	0.7230	0.7205
54	0.7500	0.7466	0.7434	0.7403	0.7373	0.7345	0.7317	0.7290	0.7264	0.7238	0.7214
56	0.7500	0.7467	0.7436	0.7406	0.7378	0.7350	0.7323	0.7297	0.7271	0.7246	0.7222
58	0.7500	0.7468	0.7438	0.7409	0.7382	0.7355	0.7328	0.7303	0.7278	0.7254	0.7231
60	0.7500	0.7469	0.7440	0.7412	0.7385	0.7359	0.7334	0.7309	0.7285	0.7261	0.7238
62	0.7500	0.7470	0.7442	0.7415	0.7389	0.7363	0.7339	0.7315	0.7291	0.7268	0.7246
64	0.7500	0.7471	0.7444	0.7418	0.7392	0.7368	0.7343	0.7320	0.7297	0.7274	0.7253
66	0.7500	0.7472	0.7445	0.7420	0.7395	0.7371	0.7348	0.7325	0.7302	0.7281	0.7259
68	0.7500	0.7473	0.7447	0.7422	0.7398	0.7375	0.7352	0.7330	0.7308	0.7286	0.7265
70	0.7500	0.7474	0.7449	0.7425	0.7401	0.7378	0.7356	0.7334	0.7313	0.7292	0.7271

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(e) Continued. Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	0.6948	0.6920	0.6894	0.6869	0.6845	0.6823	0.6801	0.6781	0.6761	0.6742	0.6723
16	0.6967	0.6940	0.6915	0.6891	0.6868	0.6846	0.6825	0.6805	0.6785	0.6766	0.6748
17	0.6981	0.6955	0.6930	0.6906	0.6884	0.6862	0.6842	0.6822	0.6803	0.6784	0.6766
18	0.6991	0.6965	0.6941	0.6918	0.6896	0.6875	0.6854	0.6835	0.6816	0.6798	0.6780
19	0.6999	0.6974	0.6950	0.6927	0.6906	0.6885	0.6865	0.6845	0.6827	0.6809	0.6791
20	0.7006	0.6982	0.6958	0.6935	0.6914	0.6893	0.6873	0.6854	0.6835	0.6818	0.6800
21	0.7013	0.6988	0.6965	0.6942	0.6921	0.6900	0.6881	0.6862	0.6843	0.6825	0.6808
22	0.7019	0.6995	0.6971	0.6949	0.6928	0.6907	0.6888	0.6869	0.6850	0.6833	0.6815
23	0.7025	0.7001	0.6977	0.6955	0.6934	0.6913	0.6894	0.6875	0.6857	0.6839	0.6822
24	0.7031	0.7007	0.6983	0.6961	0.6940	0.6920	0.6900	0.6881	0.6863	0.6846	0.6829
25	0.7038	0.7013	0.6989	0.6967	0.6946	0.6926	0.6906	0.6887	0.6869	0.6852	0.6835
26	0.7044	0.7019	0.6995	0.6973	0.6952	0.6931	0.6912	0.6893	0.6875	0.6858	0.6841
27	0.7051	0.7025	0.7002	0.6979	0.6958	0.6937	0.6918	0.6899	0.6881	0.6864	0.6847
28	0.7057	0.7032	0.7008	0.6985	0.6964	0.6943	0.6924	0.6905	0.6887	0.6870	0.6853
29	0.7064	0.7038	0.7014	0.6991	0.6970	0.6949	0.6930	0.6911	0.6893	0.6875	0.6859
30	0.7071	0.7045	0.7021	0.6998	0.6976	0.6956	0.6936	0.6917	0.6899	0.6881	0.6865
31	0.7078	0.7052	0.7027	0.7004	0.6983	0.6962	0.6942	0.6923	0.6905	0.6887	0.6870
32	0.7085	0.7059	0.7034	0.7011	0.6989	0.6968	0.6948	0.6929	0.6911	0.6893	0.6877
33	0.7092	0.7066	0.7041	0.7017	0.6995	0.6974	0.6955	0.6936	0.6917	0.6900	0.6883
34	0.7099	0.7072	0.7047	0.7024	0.7002	0.6981	0.6961	0.6942	0.6923	0.6906	0.6889
35	0.7106	0.7079	0.7054	0.7031	0.7008	0.6987	0.6967	0.6948	0.6930	0.6912	0.6895
36	0.7113	0.7086	0.7061	0.7037	0.7015	0.6994	0.6974	0.6954	0.6936	0.6918	0.6901
37	0.7120	0.7093	0.7068	0.7044	0.7022	0.7000	0.6980	0.6961	0.6942	0.6924	0.6907
38	0.7126	0.7100	0.7074	0.7051	0.7028	0.7007	0.6987	0.6967	0.6948	0.6931	0.6913
39	0.7133	0.7106	0.7081	0.7057	0.7035	0.7013	0.6993	0.6973	0.6955	0.6937	0.6920
40	0.7139	0.7113	0.7087	0.7064	0.7041	0.7020	0.6999	0.6980	0.6961	0.6943	0.6926
42	0.7151	0.7125	0.7100	0.7077	0.7054	0.7033	0.7012	0.6993	0.6974	0.6956	0.6938
44	0.7163	0.7137	0.7113	0.7089	0.7067	0.7045	0.7025	0.7005	0.6986	0.6968	0.6951
46	0.7174	0.7149	0.7125	0.7101	0.7079	0.7058	0.7037	0.7017	0.6999	0.6981	0.6963
48	0.7185	0.7160	0.7136	0.7113	0.7091	0.7070	0.7049	0.7030	0.7011	0.6993	0.6975
50	0.7195	0.7171	0.7147	0.7124	0.7102	0.7081	0.7061	0.7041	0.7023	0.7005	0.6987
52	0.7205	0.7181	0.7157	0.7135	0.7113	0.7093	0.7073	0.7053	0.7034	0.7016	0.6999
54	0.7214	0.7190	0.7167	0.7145	0.7124	0.7103	0.7084	0.7064	0.7046	0.7028	0.7010
56	0.7222	0.7199	0.7177	0.7155	0.7134	0.7114	0.7094	0.7075	0.7057	0.7039	0.7021
58	0.7231	0.7208	0.7186	0.7164	0.7144	0.7124	0.7104	0.7086	0.7067	0.7050	0.7033
60	0.7238	0.7216	0.7194	0.7173	0.7153	0.7133	0.7114	0.7096	0.7078	0.7060	0.7043
62	0.7246	0.7224	0.7203	0.7182	0.7162	0.7143	0.7124	0.7105	0.7087	0.7070	0.7053
64	0.7253	0.7231	0.7210	0.7190	0.7171	0.7151	0.7133	0.7115	0.7097	0.7080	0.7063
66	0.7259	0.7238	0.7218	0.7198	0.7179	0.7160	0.7141	0.7124	0.7106	0.7089	0.7073
68	0.7265	0.7245	0.7225	0.7206	0.7187	0.7168	0.7150	0.7132	0.7115	0.7098	0.7082
70	0.7271	0.7251	0.7232	0.7213	0.7194	0.7176	0.7158	0.7141	0.7124	0.7107	0.7091

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	0.6723	0.6705	0.6688	0.6671	0.6654	0.6638	0.6623	0.6607	0.6592	0.6578	0.6563
16	0.6748	0.6731	0.6714	0.6697	0.6681	0.6666	0.6651	0.6636	0.6621	0.6607	0.6593
17	0.6766	0.6749	0.6733	0.6716	0.6701	0.6685	0.6670	0.6656	0.6641	0.6628	0.6614
18	0.6780	0.6763	0.6747	0.6731	0.6715	0.6700	0.6685	0.6671	0.6657	0.6643	0.6629
19	0.6791	0.6774	0.6758	0.6742	0.6726	0.6711	0.6697	0.6682	0.6668	0.6655	0.6641
20	0.6800	0.6784	0.6767	0.6751	0.6736	0.6721	0.6706	0.6692	0.6678	0.6665	0.6651
21	0.6808	0.6792	0.6775	0.6760	0.6744	0.6729	0.6715	0.6701	0.6687	0.6673	0.6660
22	0.6815	0.6799	0.6783	0.6767	0.6752	0.6737	0.6722	0.6708	0.6694	0.6681	0.6668
23	0.6822	0.6806	0.6789	0.6774	0.6759	0.6744	0.6729	0.6715	0.6701	0.6688	0.6675
24	0.6829	0.6812	0.6796	0.6780	0.6765	0.6750	0.6736	0.6722	0.6708	0.6695	0.6681
25	0.6835	0.6818	0.6802	0.6787	0.6771	0.6757	0.6742	0.6728	0.6714	0.6701	0.6688
26	0.6841	0.6824	0.6808	0.6793	0.6778	0.6763	0.6748	0.6734	0.6721	0.6707	0.6694
27	0.6847	0.6830	0.6814	0.6799	0.6784	0.6769	0.6755	0.6740	0.6727	0.6713	0.6700
28	0.6853	0.6836	0.6820	0.6805	0.6790	0.6775	0.6761	0.6747	0.6733	0.6719	0.6706
29	0.6859	0.6842	0.6826	0.6811	0.6796	0.6781	0.6767	0.6753	0.6739	0.6725	0.6712
30	0.6865	0.6848	0.6832	0.6817	0.6802	0.6787	0.6773	0.6759	0.6745	0.6731	0.6718
31	0.6870	0.6854	0.6838	0.6823	0.6808	0.6793	0.6779	0.6764	0.6751	0.6737	0.6724
32	0.6877	0.6860	0.6844	0.6829	0.6814	0.6799	0.6784	0.6770	0.6757	0.6743	0.6730
33	0.6883	0.6866	0.6850	0.6835	0.6820	0.6805	0.6790	0.6776	0.6763	0.6749	0.6736
34	0.6889	0.6872	0.6856	0.6841	0.6826	0.6811	0.6796	0.6782	0.6769	0.6755	0.6742
35	0.6895	0.6878	0.6862	0.6847	0.6832	0.6817	0.6803	0.6789	0.6775	0.6761	0.6748
36	0.6901	0.6884	0.6868	0.6853	0.6838	0.6823	0.6809	0.6795	0.6781	0.6767	0.6754
37	0.6907	0.6891	0.6874	0.6859	0.6844	0.6829	0.6815	0.6801	0.6787	0.6774	0.6760
38	0.6913	0.6897	0.6881	0.6865	0.6850	0.6835	0.6821	0.6807	0.6793	0.6780	0.6766
39	0.6920	0.6903	0.6887	0.6871	0.6856	0.6841	0.6827	0.6813	0.6799	0.6786	0.6773
40	0.6926	0.6909	0.6893	0.6877	0.6862	0.6847	0.6833	0.6819	0.6805	0.6792	0.6779
42	0.6938	0.6921	0.6905	0.6890	0.6874	0.6859	0.6845	0.6831	0.6817	0.6804	0.6791
44	0.6951	0.6934	0.6918	0.6902	0.6886	0.6872	0.6857	0.6843	0.6829	0.6816	0.6803
46	0.6963	0.6946	0.6930	0.6914	0.6899	0.6884	0.6869	0.6855	0.6841	0.6828	0.6815
48	0.6975	0.6958	0.6942	0.6926	0.6911	0.6896	0.6881	0.6867	0.6853	0.6840	0.6827
50	0.6987	0.6970	0.6954	0.6938	0.6923	0.6908	0.6893	0.6879	0.6865	0.6852	0.6838
52	0.6999	0.6982	0.6966	0.6950	0.6934	0.6919	0.6905	0.6891	0.6877	0.6863	0.6850
54	0.7010	0.6993	0.6977	0.6961	0.6946	0.6931	0.6916	0.6902	0.6888	0.6875	0.6862
56	0.7021	0.7005	0.6988	0.6973	0.6957	0.6942	0.6928	0.6914	0.6900	0.6886	0.6873
58	0.7033	0.7016	0.6999	0.6984	0.6968	0.6953	0.6939	0.6925	0.6911	0.6898	0.6884
60	0.7043	0.7027	0.7010	0.6994	0.6979	0.6964	0.6950	0.6936	0.6922	0.6909	0.6895
62	0.7053	0.7037	0.7021	0.7005	0.6990	0.6975	0.6961	0.6947	0.6933	0.6919	0.6906
64	0.7063	0.7047	0.7031	0.7016	0.7001	0.6986	0.6971	0.6957	0.6943	0.6930	0.6917
66	0.7073	0.7057	0.7041	0.7026	0.7011	0.6996	0.6982	0.6967	0.6954	0.6941	0.6927
68	0.7082	0.7066	0.7050	0.7035	0.7020	0.7006	0.6992	0.6978	0.6964	0.6951	0.6938
70	0.7091	0.7075	0.7060	0.7045	0.7030	0.7015	0.7001	0.6988	0.6974	0.6961	0.6948

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(e) Continued. Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	0.7500	0.7474	0.7449	0.7425	0.7401	0.7378	0.7356	0.7334	0.7313	0.7292	0.7271
72	0.7500	0.7475	0.7450	0.7427	0.7404	0.7382	0.7360	0.7338	0.7317	0.7297	0.7277
74	0.7500	0.7475	0.7451	0.7429	0.7406	0.7385	0.7363	0.7342	0.7322	0.7302	0.7282
76	0.7500	0.7476	0.7453	0.7430	0.7409	0.7387	0.7367	0.7346	0.7326	0.7307	0.7288
78	0.7500	0.7477	0.7454	0.7432	0.7411	0.7390	0.7370	0.7350	0.7330	0.7311	0.7293
80	0.7500	0.7477	0.7455	0.7434	0.7413	0.7393	0.7373	0.7354	0.7334	0.7316	0.7297
82	0.7500	0.7478	0.7456	0.7436	0.7415	0.7395	0.7376	0.7357	0.7338	0.7320	0.7302
84	0.7500	0.7478	0.7457	0.7437	0.7417	0.7398	0.7379	0.7360	0.7342	0.7324	0.7306
86	0.7500	0.7479	0.7458	0.7438	0.7419	0.7400	0.7381	0.7363	0.7345	0.7328	0.7310
88	0.7500	0.7479	0.7459	0.7440	0.7421	0.7402	0.7384	0.7366	0.7348	0.7331	0.7314
90	0.7500	0.7480	0.7460	0.7441	0.7423	0.7404	0.7386	0.7369	0.7352	0.7335	0.7318
92	0.7500	0.7480	0.7461	0.7442	0.7424	0.7406	0.7389	0.7372	0.7355	0.7338	0.7322
94	0.7500	0.7481	0.7462	0.7443	0.7426	0.7408	0.7391	0.7374	0.7358	0.7341	0.7325
96	0.7500	0.7481	0.7463	0.7445	0.7427	0.7410	0.7393	0.7377	0.7360	0.7344	0.7328
98	0.7500	0.7481	0.7463	0.7446	0.7429	0.7412	0.7395	0.7379	0.7363	0.7347	0.7332
100	0.7500	0.7482	0.7464	0.7447	0.7430	0.7414	0.7397	0.7381	0.7366	0.7350	0.7335
102	0.7500	0.7482	0.7465	0.7448	0.7432	0.7415	0.7399	0.7384	0.7368	0.7353	0.7338
104	0.7500	0.7483	0.7465	0.7449	0.7433	0.7417	0.7401	0.7386	0.7371	0.7356	0.7341
106	0.7500	0.7483	0.7466	0.7450	0.7434	0.7418	0.7403	0.7388	0.7373	0.7358	0.7344
108	0.7500	0.7483	0.7467	0.7451	0.7435	0.7420	0.7405	0.7390	0.7375	0.7361	0.7346
110	0.7500	0.7484	0.7467	0.7452	0.7436	0.7421	0.7406	0.7392	0.7377	0.7363	0.7349
112	0.7500	0.7484	0.7468	0.7452	0.7438	0.7423	0.7408	0.7394	0.7379	0.7365	0.7351
114	0.7500	0.7484	0.7469	0.7453	0.7439	0.7424	0.7410	0.7395	0.7381	0.7368	0.7354
116	0.7500	0.7484	0.7469	0.7454	0.7440	0.7425	0.7411	0.7397	0.7383	0.7370	0.7356
118	0.7500	0.7485	0.7470	0.7455	0.7441	0.7426	0.7413	0.7399	0.7385	0.7372	0.7359
120	0.7500	0.7485	0.7470	0.7456	0.7442	0.7428	0.7414	0.7400	0.7387	0.7374	0.7361
122	0.7500	0.7485	0.7471	0.7456	0.7442	0.7429	0.7415	0.7402	0.7389	0.7376	0.7363
124	0.7500	0.7485	0.7471	0.7457	0.7443	0.7430	0.7417	0.7403	0.7391	0.7378	0.7365
126	0.7500	0.7486	0.7472	0.7458	0.7444	0.7431	0.7418	0.7405	0.7392	0.7380	0.7367
128	0.7500	0.7486	0.7472	0.7458	0.7445	0.7432	0.7419	0.7406	0.7394	0.7381	0.7369
130	0.7500	0.7486	0.7472	0.7459	0.7446	0.7433	0.7420	0.7408	0.7395	0.7383	0.7371
132	0.7500	0.7486	0.7473	0.7460	0.7447	0.7434	0.7422	0.7409	0.7397	0.7385	0.7373
134	0.7500	0.7487	0.7473	0.7460	0.7447	0.7435	0.7423	0.7410	0.7398	0.7386	0.7375
136	0.7500	0.7487	0.7474	0.7461	0.7448	0.7436	0.7424	0.7412	0.7400	0.7388	0.7376
138	0.7500	0.7487	0.7474	0.7461	0.7449	0.7437	0.7425	0.7413	0.7401	0.7390	0.7378
140	0.7500	0.7487	0.7474	0.7462	0.7450	0.7438	0.7426	0.7414	0.7403	0.7391	0.7380
142	0.7500	0.7487	0.7475	0.7462	0.7450	0.7439	0.7427	0.7415	0.7404	0.7393	0.7381
144	0.7500	0.7487	0.7475	0.7463	0.7451	0.7440	0.7428	0.7416	0.7405	0.7394	0.7383
146	0.7500	0.7488	0.7476	0.7464	0.7452	0.7440	0.7429	0.7418	0.7406	0.7395	0.7384
148	0.7500	0.7488	0.7476	0.7464	0.7452	0.7441	0.7430	0.7419	0.7408	0.7397	0.7386
150	0.7500	0.7488	0.7476	0.7464	0.7453	0.7442	0.7431	0.7420	0.7409	0.7398	0.7387

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	0.7271	0.7251	0.7232	0.7213	0.7194	0.7176	0.7158	0.7141	0.7124	0.7107	0.7091
72	0.7277	0.7257	0.7238	0.7219	0.7201	0.7183	0.7166	0.7149	0.7132	0.7115	0.7099
74	0.7282	0.7263	0.7244	0.7226	0.7208	0.7190	0.7173	0.7156	0.7140	0.7124	0.7108
76	0.7288	0.7269	0.7250	0.7232	0.7215	0.7197	0.7180	0.7164	0.7147	0.7131	0.7116
78	0.7293	0.7274	0.7256	0.7238	0.7221	0.7204	0.7187	0.7171	0.7155	0.7139	0.7124
80	0.7297	0.7279	0.7261	0.7244	0.7227	0.7210	0.7194	0.7178	0.7162	0.7146	0.7131
82	0.7302	0.7284	0.7267	0.7249	0.7233	0.7216	0.7200	0.7184	0.7169	0.7153	0.7138
84	0.7306	0.7289	0.7272	0.7255	0.7238	0.7222	0.7206	0.7190	0.7175	0.7160	0.7145
86	0.7310	0.7293	0.7276	0.7260	0.7244	0.7228	0.7212	0.7197	0.7181	0.7167	0.7152
88	0.7314	0.7297	0.7281	0.7265	0.7249	0.7233	0.7218	0.7202	0.7188	0.7173	0.7159
90	0.7318	0.7301	0.7285	0.7269	0.7254	0.7238	0.7223	0.7208	0.7193	0.7179	0.7165
92	0.7322	0.7305	0.7290	0.7274	0.7258	0.7243	0.7228	0.7214	0.7199	0.7185	0.7171
94	0.7325	0.7309	0.7294	0.7278	0.7263	0.7248	0.7233	0.7219	0.7205	0.7191	0.7177
96	0.7328	0.7313	0.7297	0.7282	0.7267	0.7253	0.7238	0.7224	0.7210	0.7196	0.7182
98	0.7332	0.7316	0.7301	0.7286	0.7272	0.7257	0.7243	0.7229	0.7215	0.7201	0.7188
100	0.7335	0.7320	0.7305	0.7290	0.7276	0.7262	0.7248	0.7234	0.7220	0.7207	0.7193
102	0.7338	0.7323	0.7308	0.7294	0.7280	0.7266	0.7252	0.7238	0.7225	0.7212	0.7198
104	0.7341	0.7326	0.7312	0.7298	0.7284	0.7270	0.7256	0.7243	0.7229	0.7216	0.7203
106	0.7344	0.7329	0.7315	0.7301	0.7287	0.7274	0.7260	0.7247	0.7234	0.7221	0.7208
108	0.7346	0.7332	0.7318	0.7304	0.7291	0.7277	0.7264	0.7251	0.7238	0.7226	0.7213
110	0.7349	0.7335	0.7321	0.7308	0.7294	0.7281	0.7268	0.7255	0.7242	0.7230	0.7218
112	0.7351	0.7338	0.7324	0.7311	0.7298	0.7285	0.7272	0.7259	0.7247	0.7234	0.7222
114	0.7354	0.7340	0.7327	0.7314	0.7301	0.7288	0.7275	0.7263	0.7251	0.7238	0.7226
116	0.7356	0.7343	0.7330	0.7317	0.7304	0.7291	0.7279	0.7267	0.7254	0.7242	0.7230
118	0.7359	0.7345	0.7333	0.7320	0.7307	0.7295	0.7282	0.7270	0.7258	0.7246	0.7234
120	0.7361	0.7348	0.7335	0.7323	0.7310	0.7298	0.7286	0.7274	0.7262	0.7250	0.7238
122	0.7363	0.7350	0.7338	0.7325	0.7313	0.7301	0.7289	0.7277	0.7265	0.7254	0.7242
124	0.7365	0.7352	0.7340	0.7328	0.7316	0.7304	0.7292	0.7280	0.7269	0.7257	0.7246
126	0.7367	0.7355	0.7342	0.7330	0.7318	0.7307	0.7295	0.7283	0.7272	0.7261	0.7249
128	0.7369	0.7357	0.7345	0.7333	0.7321	0.7309	0.7298	0.7286	0.7275	0.7264	0.7253
130	0.7371	0.7359	0.7347	0.7335	0.7324	0.7312	0.7301	0.7289	0.7278	0.7267	0.7256
132	0.7373	0.7361	0.7349	0.7338	0.7326	0.7315	0.7303	0.7292	0.7281	0.7270	0.7260
134	0.7375	0.7363	0.7351	0.7340	0.7329	0.7317	0.7306	0.7295	0.7284	0.7274	0.7263
136	0.7376	0.7365	0.7353	0.7342	0.7331	0.7320	0.7309	0.7298	0.7287	0.7277	0.7266
138	0.7378	0.7367	0.7355	0.7344	0.7333	0.7322	0.7311	0.7301	0.7290	0.7279	0.7269
140	0.7380	0.7368	0.7357	0.7346	0.7335	0.7325	0.7314	0.7303	0.7293	0.7282	0.7272
142	0.7381	0.7370	0.7359	0.7348	0.7338	0.7327	0.7316	0.7306	0.7295	0.7285	0.7275
144	0.7383	0.7372	0.7361	0.7350	0.7340	0.7329	0.7319	0.7308	0.7298	0.7288	0.7278
146	0.7384	0.7374	0.7363	0.7352	0.7342	0.7331	0.7321	0.7311	0.7301	0.7290	0.7281
148	0.7386	0.7375	0.7365	0.7354	0.7344	0.7333	0.7323	0.7313	0.7303	0.7293	0.7283
150	0.7387	0.7377	0.7366	0.7356	0.7346	0.7335	0.7325	0.7315	0.7305	0.7296	0.7286

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(e) Continued. Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	0.7091	0.7075	0.7060	0.7045	0.7030	0.7015	0.7001	0.6988	0.6974	0.6961	0.6948
72	0.7099	0.7084	0.7069	0.7054	0.7039	0.7025	0.7011	0.6997	0.6984	0.6971	0.6958
74	0.7108	0.7092	0.7077	0.7062	0.7048	0.7034	0.7020	0.7006	0.6993	0.6980	0.6967
76	0.7116	0.7101	0.7086	0.7071	0.7057	0.7043	0.7029	0.7015	0.7002	0.6989	0.6977
78	0.7124	0.7109	0.7094	0.7079	0.7065	0.7051	0.7038	0.7024	0.7011	0.6998	0.6986
80	0.7131	0.7116	0.7102	0.7087	0.7073	0.7060	0.7046	0.7033	0.7020	0.7007	0.6995
82	0.7138	0.7124	0.7109	0.7095	0.7081	0.7068	0.7054	0.7041	0.7028	0.7016	0.7003
84	0.7145	0.7131	0.7117	0.7103	0.7089	0.7075	0.7062	0.7049	0.7036	0.7024	0.7012
86	0.7152	0.7138	0.7124	0.7110	0.7096	0.7083	0.7070	0.7057	0.7044	0.7032	0.7020
88	0.7159	0.7144	0.7131	0.7117	0.7103	0.7090	0.7077	0.7065	0.7052	0.7040	0.7028
90	0.7165	0.7151	0.7137	0.7124	0.7110	0.7097	0.7085	0.7072	0.7060	0.7047	0.7035
92	0.7171	0.7157	0.7144	0.7130	0.7117	0.7104	0.7092	0.7079	0.7067	0.7055	0.7043
94	0.7177	0.7163	0.7150	0.7137	0.7124	0.7111	0.7098	0.7086	0.7074	0.7062	0.7050
96	0.7182	0.7169	0.7156	0.7143	0.7130	0.7117	0.7105	0.7093	0.7081	0.7069	0.7057
98	0.7188	0.7175	0.7162	0.7149	0.7136	0.7124	0.7111	0.7099	0.7087	0.7076	0.7064
100	0.7193	0.7180	0.7167	0.7155	0.7142	0.7130	0.7118	0.7106	0.7094	0.7082	0.7071
102	0.7198	0.7186	0.7173	0.7160	0.7148	0.7136	0.7124	0.7112	0.7100	0.7089	0.7077
104	0.7203	0.7191	0.7178	0.7166	0.7154	0.7142	0.7130	0.7118	0.7106	0.7095	0.7084
106	0.7208	0.7196	0.7183	0.7171	0.7159	0.7147	0.7135	0.7124	0.7112	0.7101	0.7090
108	0.7213	0.7201	0.7188	0.7176	0.7164	0.7153	0.7141	0.7130	0.7118	0.7107	0.7096
110	0.7218	0.7205	0.7193	0.7181	0.7170	0.7158	0.7146	0.7135	0.7124	0.7113	0.7102
112	0.7222	0.7210	0.7198	0.7186	0.7175	0.7163	0.7152	0.7140	0.7129	0.7118	0.7108
114	0.7226	0.7214	0.7203	0.7191	0.7179	0.7168	0.7157	0.7146	0.7135	0.7124	0.7113
116	0.7230	0.7219	0.7207	0.7195	0.7184	0.7173	0.7162	0.7151	0.7140	0.7129	0.7119
118	0.7234	0.7223	0.7211	0.7200	0.7189	0.7178	0.7167	0.7156	0.7145	0.7134	0.7124
120	0.7238	0.7227	0.7215	0.7204	0.7193	0.7182	0.7171	0.7161	0.7150	0.7140	0.7129
122	0.7242	0.7231	0.7220	0.7208	0.7197	0.7187	0.7176	0.7165	0.7155	0.7144	0.7134
124	0.7246	0.7235	0.7224	0.7213	0.7202	0.7191	0.7180	0.7170	0.7159	0.7149	0.7139
126	0.7249	0.7238	0.7227	0.7217	0.7206	0.7195	0.7185	0.7174	0.7164	0.7154	0.7144
128	0.7253	0.7242	0.7231	0.7220	0.7210	0.7199	0.7189	0.7179	0.7169	0.7158	0.7149
130	0.7256	0.7245	0.7235	0.7224	0.7214	0.7203	0.7193	0.7183	0.7173	0.7163	0.7153
132	0.7260	0.7249	0.7238	0.7228	0.7218	0.7207	0.7197	0.7187	0.7177	0.7167	0.7157
134	0.7263	0.7252	0.7242	0.7231	0.7221	0.7211	0.7201	0.7191	0.7181	0.7171	0.7162
136	0.7266	0.7256	0.7245	0.7235	0.7225	0.7215	0.7205	0.7195	0.7185	0.7176	0.7166
138	0.7269	0.7259	0.7248	0.7238	0.7228	0.7218	0.7209	0.7199	0.7189	0.7180	0.7170
140	0.7272	0.7262	0.7252	0.7242	0.7232	0.7222	0.7212	0.7203	0.7193	0.7184	0.7174
142	0.7275	0.7265	0.7255	0.7245	0.7235	0.7225	0.7216	0.7206	0.7197	0.7187	0.7178
144	0.7278	0.7268	0.7258	0.7248	0.7238	0.7229	0.7219	0.7210	0.7200	0.7191	0.7182
146	0.7281	0.7271	0.7261	0.7251	0.7242	0.7232	0.7223	0.7213	0.7204	0.7195	0.7186
148	0.7283	0.7273	0.7264	0.7254	0.7245	0.7235	0.7226	0.7217	0.7207	0.7198	0.7189
150	0.7286	0.7276	0.7267	0.7257	0.7248	0.7238	0.7229	0.7220	0.7211	0.7202	0.7193

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	0.7500	0.7488	0.7476	0.7464	0.7453	0.7442	0.7431	0.7420	0.7409	0.7398	0.7387
155	0.7500	0.7488	0.7477	0.7466	0.7454	0.7443	0.7433	0.7422	0.7412	0.7401	0.7391
160	0.7500	0.7489	0.7478	0.7467	0.7456	0.7445	0.7435	0.7425	0.7414	0.7404	0.7394
165	0.7500	0.7489	0.7478	0.7468	0.7457	0.7447	0.7437	0.7427	0.7417	0.7407	0.7397
170	0.7500	0.7489	0.7479	0.7469	0.7458	0.7448	0.7439	0.7429	0.7419	0.7410	0.7400
175	0.7500	0.7490	0.7480	0.7470	0.7460	0.7450	0.7440	0.7431	0.7421	0.7412	0.7403
180	0.7500	0.7490	0.7480	0.7470	0.7461	0.7451	0.7442	0.7433	0.7424	0.7414	0.7405
185	0.7500	0.7490	0.7481	0.7471	0.7462	0.7453	0.7443	0.7435	0.7426	0.7417	0.7408
190	0.7500	0.7491	0.7481	0.7472	0.7463	0.7454	0.7445	0.7436	0.7428	0.7419	0.7410
195	0.7500	0.7491	0.7482	0.7473	0.7464	0.7455	0.7446	0.7438	0.7429	0.7421	0.7412
200	0.7500	0.7491	0.7482	0.7473	0.7465	0.7456	0.7447	0.7439	0.7431	0.7423	0.7415
205	0.7500	0.7491	0.7483	0.7474	0.7466	0.7457	0.7449	0.7441	0.7433	0.7425	0.7417
210	0.7500	0.7491	0.7483	0.7475	0.7466	0.7458	0.7450	0.7442	0.7434	0.7426	0.7419
215	0.7500	0.7492	0.7483	0.7475	0.7467	0.7459	0.7451	0.7443	0.7436	0.7428	0.7420
220	0.7500	0.7492	0.7484	0.7476	0.7468	0.7460	0.7452	0.7444	0.7437	0.7430	0.7422
225	0.7500	0.7492	0.7484	0.7476	0.7469	0.7461	0.7453	0.7446	0.7439	0.7431	0.7424
230	0.7500	0.7492	0.7485	0.7477	0.7469	0.7462	0.7454	0.7447	0.7440	0.7433	0.7425
235	0.7500	0.7492	0.7485	0.7477	0.7470	0.7463	0.7455	0.7448	0.7441	0.7434	0.7427
240	0.7500	0.7493	0.7485	0.7478	0.7471	0.7463	0.7456	0.7449	0.7442	0.7435	0.7428
245	0.7500	0.7493	0.7485	0.7478	0.7471	0.7464	0.7457	0.7450	0.7443	0.7437	0.7430
250	0.7500	0.7493	0.7486	0.7479	0.7472	0.7465	0.7458	0.7451	0.7444	0.7438	0.7431
255	0.7500	0.7493	0.7486	0.7479	0.7472	0.7465	0.7459	0.7452	0.7445	0.7439	0.7433
260	0.7500	0.7493	0.7486	0.7480	0.7473	0.7466	0.7460	0.7453	0.7446	0.7440	0.7434
265	0.7500	0.7493	0.7487	0.7480	0.7473	0.7467	0.7460	0.7454	0.7447	0.7441	0.7435
270	0.7500	0.7493	0.7487	0.7480	0.7474	0.7467	0.7461	0.7455	0.7448	0.7442	0.7436
275	0.7500	0.7494	0.7487	0.7481	0.7474	0.7468	0.7462	0.7455	0.7449	0.7443	0.7437
280	0.7500	0.7494	0.7487	0.7481	0.7475	0.7469	0.7462	0.7456	0.7450	0.7444	0.7438
285	0.7500	0.7494	0.7488	0.7481	0.7475	0.7469	0.7463	0.7457	0.7451	0.7445	0.7439
290	0.7500	0.7494	0.7488	0.7482	0.7476	0.7470	0.7464	0.7458	0.7452	0.7446	0.7440
295	0.7500	0.7494	0.7488	0.7482	0.7476	0.7470	0.7464	0.7458	0.7453	0.7447	0.7441
300	0.7500	0.7494	0.7488	0.7482	0.7476	0.7471	0.7465	0.7459	0.7453	0.7448	0.7442
310	0.7500	0.7494	0.7489	0.7483	0.7477	0.7472	0.7466	0.7460	0.7455	0.7449	0.7444
320	0.7500	0.7494	0.7489	0.7483	0.7478	0.7472	0.7467	0.7462	0.7456	0.7451	0.7446
330	0.7500	0.7495	0.7489	0.7484	0.7479	0.7473	0.7468	0.7463	0.7458	0.7452	0.7447
340	0.7500	0.7495	0.7490	0.7484	0.7479	0.7474	0.7469	0.7464	0.7459	0.7454	0.7449
350	0.7500	0.7495	0.7490	0.7485	0.7480	0.7475	0.7470	0.7465	0.7460	0.7455	0.7450
360	0.7500	0.7495	0.7490	0.7485	0.7480	0.7476	0.7471	0.7466	0.7461	0.7456	0.7452
370	0.7500	0.7495	0.7490	0.7486	0.7481	0.7476	0.7472	0.7467	0.7462	0.7458	0.7453
380	0.7500	0.7495	0.7491	0.7486	0.7481	0.7477	0.7472	0.7468	0.7463	0.7459	0.7454
390	0.7500	0.7495	0.7491	0.7486	0.7482	0.7477	0.7473	0.7469	0.7464	0.7460	0.7455
400	0.7500	0.7496	0.7491	0.7487	0.7482	0.7478	0.7474	0.7469	0.7465	0.7461	0.7456

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(e) Concluded. Critical temperature ratio, T_t/T_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	0.7387	0.7377	0.7366	0.7356	0.7346	0.7335	0.7325	0.7315	0.7305	0.7296	0.7286
155	0.7391	0.7381	0.7370	0.7360	0.7350	0.7340	0.7331	0.7321	0.7311	0.7302	0.7292
160	0.7394	0.7384	0.7374	0.7364	0.7355	0.7345	0.7336	0.7326	0.7317	0.7307	0.7298
165	0.7397	0.7387	0.7378	0.7368	0.7359	0.7349	0.7340	0.7331	0.7322	0.7313	0.7304
170	0.7400	0.7391	0.7381	0.7372	0.7363	0.7354	0.7345	0.7336	0.7327	0.7318	0.7309
175	0.7403	0.7394	0.7385	0.7375	0.7366	0.7358	0.7349	0.7340	0.7331	0.7323	0.7314
180	0.7405	0.7396	0.7388	0.7379	0.7370	0.7361	0.7353	0.7344	0.7336	0.7327	0.7319
185	0.7408	0.7399	0.7390	0.7382	0.7373	0.7365	0.7356	0.7348	0.7340	0.7332	0.7323
190	0.7410	0.7402	0.7393	0.7385	0.7376	0.7368	0.7360	0.7352	0.7344	0.7336	0.7328
195	0.7412	0.7404	0.7396	0.7388	0.7379	0.7371	0.7363	0.7355	0.7347	0.7340	0.7332
200	0.7415	0.7406	0.7398	0.7390	0.7382	0.7374	0.7367	0.7359	0.7351	0.7343	0.7336
205	0.7417	0.7409	0.7401	0.7393	0.7385	0.7377	0.7370	0.7362	0.7354	0.7347	0.7339
210	0.7419	0.7411	0.7403	0.7395	0.7388	0.7380	0.7373	0.7365	0.7358	0.7350	0.7343
215	0.7420	0.7413	0.7405	0.7398	0.7390	0.7383	0.7375	0.7368	0.7361	0.7354	0.7346
220	0.7422	0.7415	0.7407	0.7400	0.7393	0.7385	0.7378	0.7371	0.7364	0.7357	0.7350
225	0.7424	0.7416	0.7409	0.7402	0.7395	0.7388	0.7381	0.7374	0.7367	0.7360	0.7353
230	0.7425	0.7418	0.7411	0.7404	0.7397	0.7390	0.7383	0.7376	0.7369	0.7363	0.7356
235	0.7427	0.7420	0.7413	0.7406	0.7399	0.7392	0.7386	0.7379	0.7372	0.7365	0.7359
240	0.7428	0.7422	0.7415	0.7408	0.7401	0.7394	0.7388	0.7381	0.7375	0.7368	0.7362
245	0.7430	0.7423	0.7416	0.7410	0.7403	0.7397	0.7390	0.7384	0.7377	0.7371	0.7364
250	0.7431	0.7425	0.7418	0.7411	0.7405	0.7399	0.7392	0.7386	0.7379	0.7373	0.7367
255	0.7433	0.7426	0.7420	0.7413	0.7407	0.7400	0.7394	0.7388	0.7382	0.7375	0.7369
260	0.7434	0.7427	0.7421	0.7415	0.7409	0.7402	0.7396	0.7390	0.7384	0.7378	0.7372
265	0.7435	0.7429	0.7423	0.7416	0.7410	0.7404	0.7398	0.7392	0.7386	0.7380	0.7374
270	0.7436	0.7430	0.7424	0.7418	0.7412	0.7406	0.7400	0.7394	0.7388	0.7382	0.7376
275	0.7437	0.7431	0.7425	0.7419	0.7413	0.7407	0.7402	0.7396	0.7390	0.7384	0.7378
280	0.7438	0.7432	0.7427	0.7421	0.7415	0.7409	0.7403	0.7397	0.7392	0.7386	0.7380
285	0.7439	0.7434	0.7428	0.7422	0.7416	0.7411	0.7405	0.7399	0.7394	0.7388	0.7382
290	0.7440	0.7435	0.7429	0.7423	0.7418	0.7412	0.7406	0.7401	0.7395	0.7390	0.7384
295	0.7441	0.7436	0.7430	0.7425	0.7419	0.7413	0.7408	0.7402	0.7397	0.7392	0.7386
300	0.7442	0.7437	0.7431	0.7426	0.7420	0.7415	0.7409	0.7404	0.7399	0.7393	0.7388
310	0.7444	0.7439	0.7433	0.7428	0.7423	0.7418	0.7412	0.7407	0.7402	0.7397	0.7391
320	0.7446	0.7441	0.7436	0.7430	0.7425	0.7420	0.7415	0.7410	0.7405	0.7400	0.7395
330	0.7447	0.7442	0.7437	0.7432	0.7427	0.7422	0.7417	0.7412	0.7408	0.7403	0.7398
340	0.7449	0.7444	0.7439	0.7434	0.7429	0.7425	0.7420	0.7415	0.7410	0.7405	0.7401
350	0.7450	0.7445	0.7441	0.7436	0.7431	0.7427	0.7422	0.7417	0.7413	0.7408	0.7403
360	0.7452	0.7447	0.7443	0.7438	0.7433	0.7429	0.7424	0.7420	0.7415	0.7410	0.7406
370	0.7453	0.7448	0.7444	0.7440	0.7435	0.7431	0.7426	0.7422	0.7417	0.7413	0.7408
380	0.7454	0.7450	0.7445	0.7441	0.7437	0.7432	0.7428	0.7424	0.7419	0.7415	0.7411
390	0.7455	0.7451	0.7447	0.7443	0.7438	0.7434	0.7430	0.7426	0.7421	0.7417	0.7413
400	0.7456	0.7452	0.7448	0.7444	0.7440	0.7436	0.7431	0.7427	0.7423	0.7419	0.7415

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	0.7286	0.7276	0.7267	0.7257	0.7248	0.7238	0.7229	0.7220	0.7211	0.7202	0.7193
155	0.7292	0.7283	0.7273	0.7264	0.7255	0.7246	0.7237	0.7228	0.7219	0.7210	0.7202
160	0.7298	0.7289	0.7280	0.7271	0.7262	0.7253	0.7244	0.7236	0.7227	0.7218	0.7210
165	0.7304	0.7295	0.7286	0.7277	0.7268	0.7260	0.7251	0.7243	0.7234	0.7226	0.7217
170	0.7309	0.7300	0.7292	0.7283	0.7275	0.7266	0.7258	0.7249	0.7241	0.7233	0.7225
175	0.7314	0.7306	0.7297	0.7289	0.7280	0.7272	0.7264	0.7256	0.7248	0.7240	0.7232
180	0.7319	0.7311	0.7302	0.7294	0.7286	0.7278	0.7270	0.7262	0.7254	0.7246	0.7238
185	0.7323	0.7315	0.7307	0.7299	0.7291	0.7283	0.7276	0.7268	0.7260	0.7252	0.7245
190	0.7328	0.7320	0.7312	0.7304	0.7296	0.7289	0.7281	0.7273	0.7266	0.7258	0.7251
195	0.7332	0.7324	0.7316	0.7309	0.7301	0.7294	0.7286	0.7279	0.7271	0.7264	0.7257
200	0.7336	0.7328	0.7321	0.7313	0.7306	0.7298	0.7291	0.7284	0.7276	0.7269	0.7262
205	0.7339	0.7332	0.7325	0.7317	0.7310	0.7303	0.7296	0.7288	0.7281	0.7274	0.7267
210	0.7343	0.7336	0.7329	0.7321	0.7314	0.7307	0.7300	0.7293	0.7286	0.7279	0.7272
215	0.7346	0.7339	0.7332	0.7325	0.7318	0.7311	0.7304	0.7297	0.7291	0.7284	0.7277
220	0.7350	0.7343	0.7336	0.7329	0.7322	0.7315	0.7308	0.7302	0.7295	0.7288	0.7282
225	0.7353	0.7346	0.7339	0.7332	0.7326	0.7319	0.7312	0.7306	0.7299	0.7293	0.7286
230	0.7356	0.7349	0.7342	0.7336	0.7329	0.7323	0.7316	0.7310	0.7303	0.7297	0.7290
235	0.7359	0.7352	0.7346	0.7339	0.7333	0.7326	0.7320	0.7313	0.7307	0.7301	0.7294
240	0.7362	0.7355	0.7349	0.7342	0.7336	0.7330	0.7323	0.7317	0.7311	0.7305	0.7298
245	0.7364	0.7358	0.7352	0.7345	0.7339	0.7333	0.7327	0.7320	0.7314	0.7308	0.7302
250	0.7367	0.7361	0.7354	0.7348	0.7342	0.7336	0.7330	0.7324	0.7318	0.7312	0.7306
255	0.7369	0.7363	0.7357	0.7351	0.7345	0.7339	0.7333	0.7327	0.7321	0.7315	0.7309
260	0.7372	0.7366	0.7360	0.7354	0.7348	0.7342	0.7336	0.7330	0.7324	0.7318	0.7313
265	0.7374	0.7368	0.7362	0.7356	0.7350	0.7345	0.7339	0.7333	0.7327	0.7322	0.7316
270	0.7376	0.7370	0.7365	0.7359	0.7353	0.7347	0.7342	0.7336	0.7330	0.7325	0.7319
275	0.7378	0.7373	0.7367	0.7361	0.7356	0.7350	0.7344	0.7339	0.7333	0.7328	0.7322
280	0.7380	0.7375	0.7369	0.7364	0.7358	0.7352	0.7347	0.7341	0.7336	0.7331	0.7325
285	0.7382	0.7377	0.7371	0.7366	0.7360	0.7355	0.7349	0.7344	0.7339	0.7333	0.7328
290	0.7384	0.7379	0.7373	0.7368	0.7363	0.7357	0.7352	0.7347	0.7341	0.7336	0.7331
295	0.7386	0.7381	0.7375	0.7370	0.7365	0.7360	0.7354	0.7349	0.7344	0.7339	0.7333
300	0.7388	0.7383	0.7377	0.7372	0.7367	0.7362	0.7357	0.7351	0.7346	0.7341	0.7336
310	0.7391	0.7386	0.7381	0.7376	0.7371	0.7366	0.7361	0.7356	0.7351	0.7346	0.7341
320	0.7395	0.7390	0.7385	0.7380	0.7375	0.7370	0.7365	0.7360	0.7355	0.7350	0.7346
330	0.7398	0.7393	0.7388	0.7383	0.7378	0.7374	0.7369	0.7364	0.7359	0.7355	0.7350
340	0.7401	0.7396	0.7391	0.7387	0.7382	0.7377	0.7373	0.7368	0.7363	0.7359	0.7354
350	0.7403	0.7399	0.7394	0.7390	0.7385	0.7381	0.7376	0.7371	0.7367	0.7363	0.7358
360	0.7406	0.7401	0.7397	0.7393	0.7388	0.7384	0.7379	0.7375	0.7371	0.7366	0.7362
370	0.7408	0.7404	0.7400	0.7395	0.7391	0.7387	0.7382	0.7378	0.7374	0.7370	0.7365
380	0.7411	0.7406	0.7402	0.7398	0.7394	0.7390	0.7385	0.7381	0.7377	0.7373	0.7369
390	0.7413	0.7409	0.7405	0.7400	0.7396	0.7392	0.7388	0.7384	0.7380	0.7376	0.7372
400	0.7415	0.7411	0.7407	0.7403	0.7399	0.7395	0.7391	0.7387	0.7383	0.7379	0.7375

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(f) Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	1.0000	0.9803	0.9645	0.9525	0.9442	0.9395	0.9382	0.9399	0.9445	0.9518	0.9615
16	1.0000	0.9842	0.9717	0.9624	0.9563	0.9531	0.9527	0.9547	0.9592	0.9658	0.9743
17	1.0000	0.9873	0.9775	0.9704	0.9660	0.9640	0.9644	0.9668	0.9713	0.9774	0.9853
18	1.0000	0.9899	0.9822	0.9769	0.9739	0.9729	0.9740	0.9768	0.9812	0.9872	0.9945
19	1.0000	0.9919	0.9860	0.9822	0.9803	0.9803	0.9818	0.9850	0.9895	0.9953	1.0023
20	1.0000	0.9937	0.9892	0.9866	0.9857	0.9863	0.9884	0.9918	0.9964	1.0021	1.0088
21	1.0000	0.9951	0.9919	0.9903	0.9901	0.9914	0.9938	0.9975	1.0022	1.0078	1.0144
22	1.0000	0.9963	0.9941	0.9934	0.9939	0.9956	0.9984	1.0022	1.0070	1.0126	1.0190
23	1.0000	0.9974	0.9960	0.9960	0.9970	0.9992	1.0023	1.0063	1.0111	1.0167	1.0229
24	1.0000	0.9982	0.9976	0.9982	0.9997	1.0022	1.0055	1.0097	1.0146	1.0201	1.0263
25	1.0000	0.9990	0.9990	1.0000	1.0020	1.0047	1.0083	1.0126	1.0175	1.0230	1.0291
26	1.0000	0.9996	1.0002	1.0016	1.0039	1.0069	1.0107	1.0150	1.0200	1.0255	1.0315
27	1.0000	1.0002	1.0012	1.0030	1.0056	1.0088	1.0127	1.0171	1.0221	1.0276	1.0335
28	1.0000	1.0006	1.0021	1.0042	1.0070	1.0104	1.0144	1.0189	1.0239	1.0293	1.0352
29	1.0000	1.0011	1.0028	1.0052	1.0082	1.0118	1.0159	1.0204	1.0254	1.0308	1.0366
30	1.0000	1.0014	1.0034	1.0061	1.0093	1.0130	1.0171	1.0217	1.0267	1.0321	1.0378
31	1.0000	1.0017	1.0040	1.0068	1.0102	1.0140	1.0182	1.0228	1.0278	1.0332	1.0388
32	1.0000	1.0020	1.0045	1.0075	1.0110	1.0149	1.0191	1.0238	1.0288	1.0341	1.0396
33	1.0000	1.0022	1.0049	1.0081	1.0116	1.0156	1.0199	1.0246	1.0296	1.0348	1.0403
34	1.0000	1.0024	1.0053	1.0086	1.0122	1.0163	1.0206	1.0253	1.0302	1.0354	1.0409
35	1.0000	1.0026	1.0056	1.0090	1.0127	1.0168	1.0212	1.0258	1.0308	1.0359	1.0413
36	1.0000	1.0027	1.0059	1.0094	1.0132	1.0173	1.0217	1.0263	1.0312	1.0363	1.0417
37	1.0000	1.0029	1.0061	1.0097	1.0135	1.0177	1.0221	1.0267	1.0316	1.0367	1.0419
38	1.0000	1.0030	1.0063	1.0099	1.0138	1.0180	1.0224	1.0271	1.0319	1.0369	1.0421
39	1.0000	1.0031	1.0065	1.0102	1.0141	1.0183	1.0227	1.0273	1.0321	1.0371	1.0423
40	1.0000	1.0032	1.0067	1.0104	1.0143	1.0185	1.0229	1.0275	1.0323	1.0372	1.0423
42	1.0000	1.0033	1.0069	1.0107	1.0147	1.0189	1.0233	1.0278	1.0325	1.0374	1.0424
44	1.0000	1.0034	1.0071	1.0109	1.0149	1.0191	1.0235	1.0280	1.0326	1.0373	1.0422
46	1.0000	1.0035	1.0072	1.0110	1.0151	1.0192	1.0235	1.0280	1.0325	1.0372	1.0420
48	1.0000	1.0036	1.0073	1.0111	1.0151	1.0193	1.0235	1.0279	1.0324	1.0370	1.0416
50	1.0000	1.0036	1.0073	1.0112	1.0151	1.0192	1.0235	1.0278	1.0322	1.0367	1.0412
52	1.0000	1.0036	1.0073	1.0112	1.0151	1.0192	1.0233	1.0276	1.0319	1.0363	1.0408
54	1.0000	1.0036	1.0073	1.0111	1.0151	1.0191	1.0232	1.0273	1.0316	1.0359	1.0403
56	1.0000	1.0036	1.0073	1.0111	1.0150	1.0189	1.0230	1.0271	1.0313	1.0355	1.0398
58	1.0000	1.0036	1.0073	1.0110	1.0149	1.0188	1.0227	1.0268	1.0309	1.0351	1.0393
60	1.0000	1.0036	1.0072	1.0109	1.0147	1.0186	1.0225	1.0265	1.0305	1.0346	1.0387
62	1.0000	1.0035	1.0072	1.0108	1.0146	1.0184	1.0222	1.0262	1.0301	1.0341	1.0382
64	1.0000	1.0035	1.0071	1.0107	1.0144	1.0182	1.0220	1.0258	1.0297	1.0337	1.0376
66	1.0000	1.0035	1.0070	1.0106	1.0143	1.0180	1.0217	1.0255	1.0293	1.0332	1.0371
68	1.0000	1.0034	1.0069	1.0105	1.0141	1.0177	1.0214	1.0252	1.0289	1.0327	1.0365
70	1.0000	1.0034	1.0069	1.0104	1.0139	1.0175	1.0211	1.0248	1.0285	1.0322	1.0360

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	1.0000	0.9395	0.9615	1.0387	1.1463	1.2676	1.3942	1.5224	1.6505	1.7776	1.9035
16	1.0000	0.9531	0.9743	1.0413	1.1358	1.2443	1.3592	1.4767	1.5948	1.7125	1.8293
17	1.0000	0.9640	0.9853	1.0448	1.1285	1.2260	1.3306	1.4385	1.5476	1.6568	1.7656
18	1.0000	0.9729	0.9945	1.0484	1.1235	1.2117	1.3072	1.4064	1.5075	1.6091	1.7105
19	1.0000	0.9803	1.0023	1.0520	1.1201	1.2003	1.2878	1.3794	1.4731	1.5678	1.6627
20	1.0000	0.9863	1.0088	1.0552	1.1177	1.1912	1.2717	1.3564	1.4436	1.5320	1.6209
21	1.0000	0.9914	1.0144	1.0581	1.1160	1.1838	1.2582	1.3368	1.4181	1.5008	1.5843
22	1.0000	0.9956	1.0190	1.0607	1.1147	1.1777	1.2468	1.3200	1.3960	1.4736	1.5520
23	1.0000	0.9992	1.0229	1.0628	1.1137	1.1725	1.2370	1.3055	1.3767	1.4496	1.5235
24	1.0000	1.0022	1.0263	1.0647	1.1129	1.1681	1.2286	1.2929	1.3598	1.4284	1.4982
25	1.0000	1.0047	1.0291	1.0662	1.1121	1.1643	1.2213	1.2818	1.3448	1.4096	1.4756
26	1.0000	1.0069	1.0315	1.0675	1.1114	1.1609	1.2148	1.2720	1.3316	1.3929	1.4554
27	1.0000	1.0088	1.0335	1.0685	1.1106	1.1579	1.2091	1.2633	1.3197	1.3779	1.4373
28	1.0000	1.0104	1.0352	1.0693	1.1099	1.1551	1.2039	1.2554	1.3091	1.3644	1.4209
29	1.0000	1.0118	1.0366	1.0700	1.1092	1.1526	1.1992	1.2484	1.2995	1.3522	1.4061
30	1.0000	1.0130	1.0378	1.0704	1.1084	1.1502	1.1949	1.2419	1.2908	1.3412	1.3926
31	1.0000	1.0140	1.0388	1.0708	1.1076	1.1479	1.1909	1.2360	1.2829	1.3311	1.3803
32	1.0000	1.0149	1.0396	1.0710	1.1068	1.1458	1.1872	1.2306	1.2756	1.3218	1.3690
33	1.0000	1.0156	1.0403	1.0711	1.1059	1.1437	1.1838	1.2256	1.2688	1.3133	1.3586
34	1.0000	1.0163	1.0409	1.0711	1.1050	1.1417	1.1805	1.2209	1.2626	1.3054	1.3491
35	1.0000	1.0168	1.0413	1.0710	1.1042	1.1398	1.1774	1.2165	1.2568	1.2981	1.3402
36	1.0000	1.0173	1.0417	1.0708	1.1033	1.1380	1.1745	1.2124	1.2513	1.2912	1.3319
37	1.0000	1.0177	1.0419	1.0706	1.1024	1.1362	1.1717	1.2085	1.2462	1.2848	1.3242
38	1.0000	1.0180	1.0421	1.0704	1.1014	1.1345	1.1690	1.2048	1.2414	1.2788	1.3169
39	1.0000	1.0183	1.0423	1.0701	1.1005	1.1328	1.1665	1.2012	1.2369	1.2732	1.3101
40	1.0000	1.0185	1.0423	1.0697	1.0996	1.1312	1.1640	1.1979	1.2325	1.2679	1.3037
42	1.0000	1.0189	1.0424	1.0690	1.0977	1.1280	1.1594	1.1916	1.2245	1.2580	1.2920
44	1.0000	1.0191	1.0422	1.0681	1.0959	1.1250	1.1550	1.1858	1.2172	1.2491	1.2814
46	1.0000	1.0192	1.0420	1.0671	1.0940	1.1221	1.1510	1.1805	1.2105	1.2410	1.2717
48	1.0000	1.0193	1.0416	1.0662	1.0922	1.1193	1.1471	1.1755	1.2043	1.2335	1.2629
50	1.0000	1.0192	1.0412	1.0652	1.0904	1.1166	1.1435	1.1708	1.1986	1.2266	1.2548
52	1.0000	1.0192	1.0408	1.0641	1.0887	1.1140	1.1400	1.1664	1.1932	1.2201	1.2473
54	1.0000	1.0191	1.0403	1.0631	1.0870	1.1116	1.1367	1.1623	1.1881	1.2141	1.2403
56	1.0000	1.0189	1.0398	1.0621	1.0853	1.1092	1.1336	1.1584	1.1833	1.2085	1.2338
58	1.0000	1.0188	1.0393	1.0610	1.0837	1.1069	1.1306	1.1546	1.1788	1.2032	1.2277
60	1.0000	1.0186	1.0387	1.0600	1.0821	1.1048	1.1278	1.1511	1.1746	1.1982	1.2219
62	1.0000	1.0184	1.0382	1.0590	1.0806	1.1026	1.1251	1.1477	1.1706	1.1935	1.2165
64	1.0000	1.0182	1.0376	1.0580	1.0791	1.1006	1.1225	1.1445	1.1667	1.1890	1.2114
66	1.0000	1.0180	1.0371	1.0571	1.0777	1.0987	1.1199	1.1414	1.1631	1.1848	1.2065
68	1.0000	1.0177	1.0365	1.0561	1.0763	1.0968	1.1175	1.1385	1.1596	1.1807	1.2019
70	1.0000	1.0175	1.0360	1.0552	1.0749	1.0949	1.1152	1.1357	1.1562	1.1769	1.1975

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(f) Continued. Plenum compressibility factor, Z_0

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	1.9035	2.0279	2.1508	2.2723	2.3924	2.5111	2.6285	2.7446	2.8596	2.9734	3.0861
16	1.8293	1.9451	2.0596	2.1730	2.2851	2.3960	2.5057	2.6143	2.7219	2.8284	2.9339
17	1.7656	1.8736	1.9807	2.0867	2.1917	2.2957	2.3987	2.5006	2.6016	2.7017	2.8008
18	1.7105	1.8116	1.9119	2.0114	2.1100	2.2078	2.3047	2.4006	2.4958	2.5900	2.6835
19	1.6627	1.7574	1.8516	1.9452	2.0381	2.1303	2.2216	2.3122	2.4021	2.4911	2.5795
20	1.6209	1.7099	1.7985	1.8868	1.9744	2.0615	2.1479	2.2336	2.3186	2.4030	2.4867
21	1.5843	1.6680	1.7516	1.8349	1.9178	2.0002	2.0820	2.1633	2.2440	2.3241	2.4035
22	1.5520	1.6309	1.7099	1.7887	1.8672	1.9453	2.0230	2.1002	2.1769	2.2531	2.3287
23	1.5235	1.5980	1.6727	1.7474	1.8218	1.8961	1.9699	2.0434	2.1164	2.1889	2.2610
24	1.4982	1.5686	1.6394	1.7103	1.7811	1.8516	1.9220	1.9920	2.0616	2.1308	2.1996
25	1.4756	1.5424	1.6095	1.6769	1.7442	1.8115	1.8785	1.9453	2.0118	2.0780	2.1437
26	1.4554	1.5188	1.5826	1.6467	1.7109	1.7750	1.8391	1.9029	1.9665	2.0297	2.0927
27	1.4373	1.4975	1.5583	1.6194	1.6806	1.7419	1.8031	1.8642	1.9250	1.9857	2.0460
28	1.4209	1.4783	1.5362	1.5945	1.6530	1.7116	1.7702	1.8287	1.8871	1.9452	2.0031
29	1.4061	1.4608	1.5161	1.5719	1.6279	1.6840	1.7401	1.7962	1.8522	1.9080	1.9637
30	1.3926	1.4449	1.4978	1.5512	1.6048	1.6586	1.7125	1.7663	1.8201	1.8738	1.9273
31	1.3803	1.4304	1.4811	1.5322	1.5837	1.6353	1.6870	1.7388	1.7905	1.8421	1.8936
32	1.3690	1.4171	1.4657	1.5148	1.5642	1.6138	1.6635	1.7133	1.7631	1.8128	1.8625
33	1.3586	1.4048	1.4515	1.4987	1.5462	1.5939	1.6418	1.6898	1.7377	1.7857	1.8336
34	1.3491	1.3935	1.4384	1.4838	1.5296	1.5755	1.6217	1.6679	1.7142	1.7604	1.8067
35	1.3402	1.3830	1.4263	1.4700	1.5141	1.5585	1.6030	1.6476	1.6923	1.7369	1.7816
36	1.3319	1.3732	1.4150	1.4572	1.4998	1.5426	1.5856	1.6287	1.6718	1.7150	1.7582
37	1.3242	1.3641	1.4045	1.4453	1.4864	1.5278	1.5693	1.6110	1.6528	1.6946	1.7363
38	1.3169	1.3556	1.3947	1.4342	1.4739	1.5140	1.5542	1.5945	1.6349	1.6754	1.7159
39	1.3101	1.3476	1.3855	1.4237	1.4623	1.5010	1.5399	1.5790	1.6182	1.6574	1.6966
40	1.3037	1.3401	1.3768	1.4139	1.4513	1.4889	1.5266	1.5645	1.6025	1.6405	1.6786
42	1.2920	1.3263	1.3610	1.3960	1.4312	1.4667	1.5022	1.5380	1.5738	1.6097	1.6456
44	1.2814	1.3140	1.3469	1.3800	1.4134	1.4469	1.4805	1.5143	1.5482	1.5822	1.6161
46	1.2717	1.3028	1.3341	1.3656	1.3973	1.4291	1.4611	1.4932	1.5253	1.5575	1.5898
48	1.2629	1.2926	1.3225	1.3525	1.3827	1.4131	1.4435	1.4740	1.5046	1.5353	1.5660
50	1.2548	1.2833	1.3119	1.3406	1.3695	1.3985	1.4276	1.4567	1.4859	1.5151	1.5444
52	1.2473	1.2747	1.3021	1.3297	1.3574	1.3851	1.4130	1.4409	1.4688	1.4968	1.5248
54	1.2403	1.2667	1.2931	1.3196	1.3462	1.3729	1.3996	1.4263	1.4531	1.4800	1.5068
56	1.2338	1.2592	1.2847	1.3103	1.3359	1.3615	1.3872	1.4130	1.4387	1.4645	1.4903
58	1.2277	1.2523	1.2769	1.3016	1.3263	1.3510	1.3758	1.4006	1.4254	1.4502	1.4750
60	1.2219	1.2457	1.2696	1.2934	1.3173	1.3412	1.3652	1.3891	1.4130	1.4370	1.4609
62	1.2165	1.2396	1.2627	1.2858	1.3089	1.3321	1.3552	1.3784	1.4015	1.4246	1.4477
64	1.2114	1.2338	1.2562	1.2786	1.3011	1.3235	1.3459	1.3683	1.3907	1.4131	1.4355
66	1.2065	1.2283	1.2501	1.2719	1.2937	1.3154	1.3372	1.3589	1.3806	1.4023	1.4240
68	1.2019	1.2231	1.2443	1.2655	1.2867	1.3078	1.3289	1.3500	1.3711	1.3922	1.4132
70	1.1975	1.2182	1.2388	1.2594	1.2800	1.3006	1.3212	1.3417	1.3622	1.3826	1.4031

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	3.0861	3.1978	3.3085	3.4182	3.5270	3.6350	3.7421	3.8484	3.9540	4.0588	4.1629
16	2.9339	3.0385	3.1422	3.2450	3.3469	3.4481	3.5485	3.6481	3.7471	3.8453	3.9429
17	2.8008	2.8991	2.9966	3.0932	3.1891	3.2842	3.3787	3.4724	3.5655	3.6580	3.7498
18	2.6835	2.7762	2.8681	2.9593	3.0497	3.1395	3.2286	3.3171	3.4050	3.4923	3.5790
19	2.5795	2.6671	2.7540	2.8403	2.9259	3.0108	3.0952	3.1790	3.2622	3.3448	3.4269
20	2.4867	2.5697	2.6522	2.7340	2.8152	2.8958	2.9758	3.0554	3.1343	3.2128	3.2907
21	2.4035	2.4824	2.5608	2.6385	2.7157	2.7924	2.8685	2.9442	3.0193	3.0940	3.1682
22	2.3287	2.4038	2.4784	2.5524	2.6260	2.6990	2.7716	2.8437	2.9154	2.9866	3.0573
23	2.2610	2.3326	2.4038	2.4744	2.5446	2.6144	2.6837	2.7526	2.8210	2.8890	2.9566
24	2.1996	2.2680	2.3360	2.4035	2.4706	2.5374	2.6036	2.6695	2.7350	2.8001	2.8649
25	2.1437	2.2092	2.2742	2.3388	2.4031	2.4670	2.5305	2.5937	2.6564	2.7188	2.7809
26	2.0927	2.1554	2.2177	2.2797	2.3413	2.4026	2.4635	2.5241	2.5843	2.6443	2.7038
27	2.0460	2.1061	2.1659	2.2254	2.2845	2.3434	2.4019	2.4601	2.5180	2.5756	2.6329
28	2.0031	2.0608	2.1182	2.1754	2.2323	2.2889	2.3451	2.4011	2.4569	2.5123	2.5674
29	1.9637	2.0191	2.0743	2.1293	2.1840	2.2385	2.2927	2.3466	2.4003	2.4537	2.5069
30	1.9273	1.9806	2.0338	2.0867	2.1394	2.1919	2.2442	2.2962	2.3479	2.3994	2.4507
31	1.8936	1.9450	1.9962	2.0473	2.0981	2.1487	2.1991	2.2493	2.2992	2.3490	2.3985
32	1.8625	1.9120	1.9614	2.0106	2.0597	2.1085	2.1572	2.2057	2.2539	2.3020	2.3498
33	1.8336	1.8813	1.9290	1.9765	2.0239	2.0711	2.1182	2.1650	2.2117	2.2582	2.3045
34	1.8067	1.8528	1.8989	1.9448	1.9906	2.0363	2.0818	2.1271	2.1723	2.2173	2.2621
35	1.7816	1.8262	1.8707	1.9152	1.9595	2.0037	2.0477	2.0916	2.1354	2.1789	2.2224
36	1.7582	1.8014	1.8444	1.8875	1.9304	1.9732	2.0158	2.0584	2.1008	2.1430	2.1851
37	1.7363	1.7781	1.8198	1.8615	1.9031	1.9446	1.9859	2.0272	2.0683	2.1093	2.1501
38	1.7159	1.7563	1.7968	1.8372	1.8775	1.9177	1.9578	1.9979	2.0378	2.0776	2.1173
39	1.6966	1.7359	1.7751	1.8143	1.8534	1.8925	1.9314	1.9703	2.0091	2.0477	2.0863
40	1.6786	1.7167	1.7547	1.7928	1.8308	1.8687	1.9065	1.9443	1.9820	2.0196	2.0570
42	1.6456	1.6815	1.7175	1.7534	1.7893	1.8251	1.8609	1.8966	1.9323	1.9679	2.0033
44	1.6161	1.6502	1.6842	1.7182	1.7522	1.7862	1.8201	1.8540	1.8878	1.9215	1.9552
46	1.5898	1.6221	1.6544	1.6866	1.7189	1.7512	1.7834	1.8156	1.8478	1.8799	1.9119
48	1.5660	1.5967	1.6274	1.6582	1.6889	1.7196	1.7503	1.7810	1.8116	1.8422	1.8727
50	1.5444	1.5737	1.6031	1.6324	1.6617	1.6910	1.7203	1.7496	1.7788	1.8080	1.8371
52	1.5248	1.5528	1.5808	1.6089	1.6369	1.6649	1.6930	1.7209	1.7489	1.7768	1.8047
54	1.5068	1.5337	1.5605	1.5874	1.6143	1.6411	1.6680	1.6948	1.7216	1.7483	1.7750
56	1.4903	1.5161	1.5419	1.5677	1.5935	1.6192	1.6450	1.6707	1.6965	1.7221	1.7478
58	1.4750	1.4998	1.5247	1.5495	1.5743	1.5991	1.6238	1.6486	1.6733	1.6980	1.7227
60	1.4609	1.4848	1.5087	1.5327	1.5565	1.5804	1.6043	1.6281	1.6520	1.6757	1.6995
62	1.4477	1.4708	1.4939	1.5170	1.5401	1.5631	1.5862	1.6092	1.6321	1.6551	1.6780
64	1.4355	1.4578	1.4802	1.5025	1.5248	1.5470	1.5693	1.5915	1.6137	1.6359	1.6580
66	1.4240	1.4456	1.4673	1.4889	1.5104	1.5320	1.5535	1.5750	1.5965	1.6180	1.6394
68	1.4132	1.4342	1.4552	1.4761	1.4970	1.5179	1.5388	1.5596	1.5804	1.6012	1.6219
70	1.4031	1.4234	1.4438	1.4641	1.4844	1.5047	1.5250	1.5452	1.5653	1.5855	1.6056

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(f) Continued. Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	1.0000	1.0175	1.0360	1.0552	1.0749	1.0949	1.1152	1.1357	1.1562	1.1769	1.1975
72	1.0000	1.0173	1.0355	1.0543	1.0736	1.0932	1.1130	1.1330	1.1531	1.1732	1.1933
74	1.0000	1.0171	1.0349	1.0534	1.0723	1.0915	1.1109	1.1304	1.1500	1.1697	1.1893
76	1.0000	1.0168	1.0344	1.0526	1.0711	1.0899	1.1088	1.1279	1.1471	1.1663	1.1855
78	1.0000	1.0166	1.0339	1.0517	1.0699	1.0883	1.1068	1.1255	1.1443	1.1630	1.1818
80	1.0000	1.0164	1.0334	1.0509	1.0687	1.0867	1.1049	1.1232	1.1416	1.1599	1.1783
82	1.0000	1.0162	1.0329	1.0501	1.0676	1.0853	1.1031	1.1210	1.1390	1.1570	1.1749
84	1.0000	1.0160	1.0324	1.0493	1.0665	1.0838	1.1013	1.1189	1.1365	1.1541	1.1717
86	1.0000	1.0157	1.0320	1.0486	1.0654	1.0824	1.0996	1.1168	1.1341	1.1513	1.1686
88	1.0000	1.0155	1.0315	1.0478	1.0644	1.0811	1.0979	1.1148	1.1318	1.1487	1.1656
90	1.0000	1.0153	1.0311	1.0471	1.0634	1.0798	1.0963	1.1129	1.1295	1.1461	1.1627
92	1.0000	1.0151	1.0306	1.0464	1.0624	1.0785	1.0948	1.1111	1.1274	1.1437	1.1599
94	1.0000	1.0149	1.0302	1.0457	1.0615	1.0773	1.0933	1.1093	1.1253	1.1413	1.1573
96	1.0000	1.0147	1.0298	1.0451	1.0605	1.0761	1.0918	1.1075	1.1232	1.1390	1.1547
98	1.0000	1.0145	1.0294	1.0444	1.0596	1.0750	1.0904	1.1058	1.1213	1.1367	1.1522
100	1.0000	1.0143	1.0290	1.0438	1.0588	1.0739	1.0890	1.1042	1.1194	1.1346	1.1498
102	1.0000	1.0141	1.0286	1.0432	1.0579	1.0728	1.0877	1.1026	1.1176	1.1325	1.1474
104	1.0000	1.0140	1.0282	1.0426	1.0571	1.0717	1.0864	1.1011	1.1158	1.1305	1.1451
106	1.0000	1.0138	1.0278	1.0420	1.0563	1.0707	1.0851	1.0996	1.1141	1.1285	1.1430
108	1.0000	1.0136	1.0274	1.0414	1.0555	1.0697	1.0839	1.0982	1.1124	1.1266	1.1408
110	1.0000	1.0134	1.0271	1.0409	1.0548	1.0687	1.0827	1.0968	1.1108	1.1248	1.1388
112	1.0000	1.0133	1.0267	1.0403	1.0540	1.0678	1.0816	1.0954	1.1092	1.1230	1.1368
114	1.0000	1.0131	1.0264	1.0398	1.0533	1.0669	1.0805	1.0941	1.1077	1.1213	1.1348
116	1.0000	1.0130	1.0261	1.0393	1.0526	1.0660	1.0794	1.0928	1.1062	1.1196	1.1329
118	1.0000	1.0128	1.0257	1.0388	1.0519	1.0651	1.0783	1.0915	1.1047	1.1179	1.1311
120	1.0000	1.0126	1.0254	1.0383	1.0513	1.0643	1.0773	1.0903	1.1033	1.1163	1.1293
122	1.0000	1.0125	1.0251	1.0378	1.0506	1.0634	1.0763	1.0891	1.1020	1.1148	1.1276
124	1.0000	1.0123	1.0248	1.0374	1.0500	1.0626	1.0753	1.0880	1.1006	1.1133	1.1259
126	1.0000	1.0122	1.0245	1.0369	1.0494	1.0618	1.0743	1.0869	1.0993	1.1118	1.1243
128	1.0000	1.0121	1.0242	1.0365	1.0488	1.0611	1.0734	1.0858	1.0981	1.1104	1.1227
130	1.0000	1.0119	1.0239	1.0360	1.0482	1.0603	1.0725	1.0847	1.0969	1.1090	1.1211
132	1.0000	1.0118	1.0237	1.0356	1.0476	1.0596	1.0716	1.0836	1.0957	1.1076	1.1196
134	1.0000	1.0116	1.0234	1.0352	1.0470	1.0589	1.0708	1.0826	1.0945	1.1063	1.1181
136	1.0000	1.0115	1.0231	1.0348	1.0465	1.0582	1.0699	1.0816	1.0933	1.1050	1.1167
138	1.0000	1.0114	1.0229	1.0344	1.0459	1.0575	1.0691	1.0807	1.0922	1.1038	1.1153
140	1.0000	1.0113	1.0226	1.0340	1.0454	1.0568	1.0683	1.0797	1.0911	1.1025	1.1139
142	1.0000	1.0111	1.0224	1.0336	1.0449	1.0562	1.0675	1.0788	1.0901	1.1013	1.1126
144	1.0000	1.0110	1.0221	1.0332	1.0444	1.0556	1.0667	1.0779	1.0890	1.1002	1.1113
146	1.0000	1.0109	1.0219	1.0329	1.0439	1.0549	1.0660	1.0770	1.0880	1.0990	1.1100
148	1.0000	1.0108	1.0216	1.0325	1.0434	1.0543	1.0652	1.0762	1.0870	1.0979	1.1087
150	1.0000	1.0107	1.0214	1.0322	1.0429	1.0537	1.0645	1.0753	1.0861	1.0968	1.1075

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	1.1975	1.2182	1.2388	1.2594	1.2800	1.3006	1.3212	1.3417	1.3622	1.3826	1.4031
72	1.1933	1.2134	1.2336	1.2537	1.2738	1.2938	1.3138	1.3338	1.3537	1.3736	1.3935
74	1.1893	1.2090	1.2286	1.2482	1.2678	1.2873	1.3068	1.3263	1.3457	1.3651	1.3844
76	1.1855	1.2047	1.2239	1.2430	1.2621	1.2812	1.3002	1.3192	1.3381	1.3570	1.3758
78	1.1818	1.2006	1.2193	1.2380	1.2567	1.2753	1.2939	1.3124	1.3309	1.3493	1.3677
80	1.1783	1.1967	1.2150	1.2333	1.2515	1.2697	1.2879	1.3059	1.3240	1.3420	1.3599
82	1.1749	1.1929	1.2108	1.2287	1.2466	1.2644	1.2821	1.2998	1.3174	1.3350	1.3526
84	1.1717	1.1893	1.2069	1.2244	1.2418	1.2592	1.2766	1.2939	1.3112	1.3284	1.3455
86	1.1686	1.1858	1.2030	1.2202	1.2373	1.2543	1.2713	1.2883	1.3052	1.3220	1.3388
88	1.1656	1.1825	1.1994	1.2162	1.2329	1.2496	1.2663	1.2829	1.2994	1.3159	1.3323
90	1.1627	1.1793	1.1958	1.2123	1.2287	1.2451	1.2614	1.2777	1.2939	1.3101	1.3262
92	1.1599	1.1762	1.1924	1.2086	1.2247	1.2408	1.2568	1.2727	1.2886	1.3045	1.3202
94	1.1573	1.1732	1.1891	1.2050	1.2208	1.2366	1.2523	1.2680	1.2835	1.2991	1.3146
96	1.1547	1.1703	1.1860	1.2016	1.2171	1.2326	1.2480	1.2634	1.2787	1.2939	1.3091
98	1.1522	1.1676	1.1829	1.1982	1.2135	1.2287	1.2438	1.2589	1.2739	1.2889	1.3038
100	1.1498	1.1649	1.1800	1.1950	1.2100	1.2249	1.2398	1.2546	1.2694	1.2841	1.2988
102	1.1474	1.1623	1.1771	1.1919	1.2066	1.2213	1.2360	1.2505	1.2650	1.2795	1.2939
104	1.1451	1.1598	1.1744	1.1889	1.2034	1.2178	1.2322	1.2465	1.2608	1.2750	1.2892
106	1.1430	1.1573	1.1717	1.1860	1.2003	1.2145	1.2286	1.2427	1.2567	1.2707	1.2846
108	1.1408	1.1550	1.1691	1.1832	1.1972	1.2112	1.2251	1.2390	1.2528	1.2665	1.2802
110	1.1388	1.1527	1.1666	1.1805	1.1943	1.2080	1.2217	1.2354	1.2489	1.2625	1.2759
112	1.1368	1.1505	1.1642	1.1778	1.1914	1.2050	1.2184	1.2319	1.2452	1.2586	1.2718
114	1.1348	1.1483	1.1618	1.1753	1.1887	1.2020	1.2153	1.2285	1.2417	1.2548	1.2678
116	1.1329	1.1463	1.1595	1.1728	1.1860	1.1991	1.2122	1.2252	1.2382	1.2511	1.2640
118	1.1311	1.1442	1.1573	1.1704	1.1834	1.1963	1.2092	1.2220	1.2348	1.2475	1.2602
120	1.1293	1.1423	1.1552	1.1680	1.1808	1.1936	1.2063	1.2189	1.2315	1.2441	1.2566
122	1.1276	1.1404	1.1531	1.1657	1.1784	1.1910	1.2035	1.2159	1.2284	1.2407	1.2530
124	1.1259	1.1385	1.1510	1.1635	1.1760	1.1884	1.2007	1.2130	1.2253	1.2375	1.2496
126	1.1243	1.1367	1.1491	1.1614	1.1737	1.1859	1.1981	1.2102	1.2223	1.2343	1.2463
128	1.1227	1.1349	1.1471	1.1593	1.1714	1.1835	1.1955	1.2075	1.2194	1.2312	1.2430
130	1.1211	1.1332	1.1452	1.1572	1.1692	1.1811	1.1930	1.2048	1.2165	1.2282	1.2399
132	1.1196	1.1315	1.1434	1.1553	1.1671	1.1788	1.1905	1.2022	1.2138	1.2253	1.2368
134	1.1181	1.1299	1.1416	1.1533	1.1650	1.1766	1.1881	1.1996	1.2111	1.2225	1.2338
136	1.1167	1.1283	1.1399	1.1514	1.1629	1.1744	1.1858	1.1972	1.2085	1.2197	1.2309
138	1.1153	1.1268	1.1382	1.1496	1.1610	1.1723	1.1835	1.1947	1.2059	1.2170	1.2281
140	1.1139	1.1252	1.1365	1.1478	1.1590	1.1702	1.1813	1.1924	1.2034	1.2144	1.2253
142	1.1126	1.1238	1.1349	1.1461	1.1571	1.1682	1.1792	1.1901	1.2010	1.2119	1.2227
144	1.1113	1.1223	1.1334	1.1443	1.1553	1.1662	1.1771	1.1879	1.1986	1.2094	1.2200
146	1.1100	1.1209	1.1318	1.1427	1.1535	1.1643	1.1750	1.1857	1.1963	1.2069	1.2175
148	1.1087	1.1195	1.1303	1.1410	1.1517	1.1624	1.1730	1.1836	1.1941	1.2045	1.2150
150	1.1075	1.1182	1.1289	1.1395	1.1500	1.1606	1.1710	1.1815	1.1919	1.2022	1.2125

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(f) Continued. Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	1.4031	1.4234	1.4438	1.4641	1.4844	1.5047	1.5250	1.5452	1.5653	1.5855	1.6056
72	1.3935	1.4133	1.4331	1.4529	1.4726	1.4923	1.5119	1.5316	1.5512	1.5707	1.5903
74	1.3844	1.4037	1.4230	1.4422	1.4614	1.4806	1.4997	1.5188	1.5378	1.5568	1.5758
76	1.3758	1.3946	1.4134	1.4321	1.4508	1.4695	1.4881	1.5067	1.5252	1.5437	1.5622
78	1.3677	1.3860	1.4043	1.4226	1.4408	1.4590	1.4771	1.4952	1.5133	1.5313	1.5493
80	1.3599	1.3779	1.3957	1.4135	1.4313	1.4490	1.4667	1.4844	1.5020	1.5195	1.5371
82	1.3526	1.3701	1.3875	1.4049	1.4222	1.4396	1.4568	1.4740	1.4912	1.5084	1.5255
84	1.3455	1.3626	1.3797	1.3967	1.4136	1.4305	1.4474	1.4642	1.4810	1.4977	1.5144
86	1.3388	1.3555	1.3722	1.3888	1.4054	1.4219	1.4384	1.4549	1.4713	1.4876	1.5039
88	1.3323	1.3487	1.3650	1.3813	1.3975	1.4137	1.4299	1.4459	1.4620	1.4780	1.4939
90	1.3262	1.3422	1.3582	1.3741	1.3900	1.4059	1.4217	1.4374	1.4531	1.4688	1.4844
92	1.3202	1.3360	1.3516	1.3673	1.3828	1.3984	1.4138	1.4292	1.4446	1.4600	1.4752
94	1.3146	1.3300	1.3454	1.3607	1.3759	1.3911	1.4063	1.4214	1.4365	1.4515	1.4665
96	1.3091	1.3242	1.3393	1.3543	1.3693	1.3842	1.3991	1.4139	1.4287	1.4434	1.4581
98	1.3038	1.3187	1.3335	1.3482	1.3629	1.3776	1.3922	1.4067	1.4212	1.4356	1.4501
100	1.2988	1.3133	1.3279	1.3424	1.3568	1.3712	1.3855	1.3998	1.4140	1.4282	1.4423
102	1.2939	1.3082	1.3225	1.3367	1.3509	1.3650	1.3791	1.3931	1.4071	1.4210	1.4349
104	1.2892	1.3032	1.3173	1.3313	1.3452	1.3591	1.3729	1.3867	1.4004	1.4141	1.4277
106	1.2846	1.2985	1.3123	1.3260	1.3397	1.3533	1.3669	1.3805	1.3940	1.4074	1.4208
108	1.2802	1.2938	1.3074	1.3209	1.3344	1.3478	1.3612	1.3745	1.3878	1.4010	1.4142
110	1.2759	1.2894	1.3027	1.3160	1.3293	1.3425	1.3556	1.3687	1.3818	1.3948	1.4077
112	1.2718	1.2850	1.2982	1.3113	1.3243	1.3373	1.3502	1.3631	1.3760	1.3888	1.4015
114	1.2678	1.2808	1.2938	1.3067	1.3195	1.3323	1.3450	1.3577	1.3704	1.3830	1.3955
116	1.2640	1.2768	1.2895	1.3022	1.3149	1.3275	1.3400	1.3525	1.3650	1.3774	1.3897
118	1.2602	1.2728	1.2854	1.2979	1.3104	1.3228	1.3351	1.3474	1.3597	1.3719	1.3841
120	1.2566	1.2690	1.2814	1.2937	1.3060	1.3182	1.3304	1.3425	1.3546	1.3667	1.3786
122	1.2530	1.2653	1.2775	1.2897	1.3018	1.3138	1.3258	1.3378	1.3497	1.3615	1.3734
124	1.2496	1.2617	1.2737	1.2857	1.2977	1.3095	1.3214	1.3332	1.3449	1.3566	1.3682
126	1.2463	1.2582	1.2701	1.2819	1.2937	1.3054	1.3171	1.3287	1.3403	1.3518	1.3633
128	1.2430	1.2548	1.2665	1.2782	1.2898	1.3013	1.3129	1.3243	1.3357	1.3471	1.3585
130	1.2399	1.2515	1.2631	1.2746	1.2860	1.2974	1.3088	1.3201	1.3314	1.3426	1.3538
132	1.2368	1.2483	1.2597	1.2710	1.2823	1.2936	1.3048	1.3160	1.3271	1.3382	1.3492
134	1.2338	1.2452	1.2564	1.2676	1.2788	1.2899	1.3010	1.3120	1.3230	1.3339	1.3448
136	1.2309	1.2421	1.2532	1.2643	1.2753	1.2863	1.2972	1.3081	1.3189	1.3297	1.3405
138	1.2281	1.2391	1.2501	1.2610	1.2719	1.2828	1.2935	1.3043	1.3150	1.3256	1.3363
140	1.2253	1.2362	1.2471	1.2579	1.2686	1.2793	1.2900	1.3006	1.3112	1.3217	1.3322
142	1.2227	1.2334	1.2441	1.2548	1.2654	1.2760	1.2865	1.2970	1.3074	1.3178	1.3282
144	1.2200	1.2307	1.2412	1.2518	1.2623	1.2727	1.2831	1.2935	1.3038	1.3141	1.3243
146	1.2175	1.2280	1.2384	1.2488	1.2592	1.2695	1.2798	1.2901	1.3003	1.3104	1.3205
148	1.2150	1.2254	1.2357	1.2460	1.2562	1.2664	1.2766	1.2867	1.2968	1.3068	1.3168
150	1.2125	1.2228	1.2330	1.2432	1.2533	1.2634	1.2735	1.2835	1.2934	1.3033	1.3132

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	1.0000	1.0107	1.0214	1.0322	1.0429	1.0537	1.0645	1.0753	1.0861	1.0968	1.1075
155	1.0000	1.0104	1.0208	1.0313	1.0418	1.0523	1.0628	1.0733	1.0837	1.0942	1.1046
160	1.0000	1.0101	1.0203	1.0305	1.0407	1.0510	1.0612	1.0714	1.0815	1.0917	1.1018
165	1.0000	1.0099	1.0198	1.0298	1.0397	1.0497	1.0596	1.0695	1.0795	1.0893	1.0992
170	1.0000	1.0097	1.0193	1.0290	1.0387	1.0484	1.0581	1.0678	1.0775	1.0871	1.0967
175	1.0000	1.0094	1.0189	1.0283	1.0378	1.0473	1.0567	1.0662	1.0756	1.0850	1.0944
180	1.0000	1.0092	1.0184	1.0277	1.0369	1.0462	1.0554	1.0646	1.0738	1.0830	1.0921
185	1.0000	1.0090	1.0180	1.0271	1.0361	1.0451	1.0541	1.0631	1.0721	1.0810	1.0900
190	1.0000	1.0088	1.0176	1.0265	1.0353	1.0441	1.0529	1.0617	1.0704	1.0792	1.0879
195	1.0000	1.0086	1.0172	1.0259	1.0345	1.0431	1.0517	1.0603	1.0689	1.0774	1.0860
200	1.0000	1.0084	1.0169	1.0253	1.0338	1.0422	1.0506	1.0590	1.0674	1.0757	1.0841
205	1.0000	1.0083	1.0165	1.0248	1.0331	1.0413	1.0495	1.0578	1.0660	1.0741	1.0823
210	1.0000	1.0081	1.0162	1.0243	1.0324	1.0405	1.0485	1.0566	1.0646	1.0726	1.0806
215	1.0000	1.0079	1.0159	1.0238	1.0317	1.0396	1.0475	1.0554	1.0633	1.0711	1.0789
220	1.0000	1.0078	1.0156	1.0233	1.0311	1.0388	1.0466	1.0543	1.0620	1.0697	1.0774
225	1.0000	1.0076	1.0153	1.0229	1.0305	1.0381	1.0457	1.0533	1.0608	1.0683	1.0759
230	1.0000	1.0075	1.0150	1.0224	1.0299	1.0374	1.0448	1.0522	1.0596	1.0670	1.0744
235	1.0000	1.0073	1.0147	1.0220	1.0294	1.0367	1.0440	1.0513	1.0585	1.0658	1.0730
240	1.0000	1.0072	1.0144	1.0216	1.0288	1.0360	1.0432	1.0503	1.0574	1.0646	1.0717
245	1.0000	1.0071	1.0142	1.0212	1.0283	1.0353	1.0424	1.0494	1.0564	1.0634	1.0704
250	1.0000	1.0070	1.0139	1.0209	1.0278	1.0347	1.0416	1.0485	1.0554	1.0623	1.0691
255	1.0000	1.0068	1.0137	1.0205	1.0273	1.0341	1.0409	1.0477	1.0544	1.0612	1.0679
260	1.0000	1.0067	1.0134	1.0202	1.0268	1.0335	1.0402	1.0469	1.0535	1.0601	1.0667
265	1.0000	1.0066	1.0132	1.0198	1.0264	1.0330	1.0395	1.0461	1.0526	1.0591	1.0656
270	1.0000	1.0065	1.0130	1.0195	1.0260	1.0324	1.0389	1.0453	1.0517	1.0581	1.0645
275	1.0000	1.0064	1.0128	1.0192	1.0255	1.0319	1.0382	1.0446	1.0509	1.0572	1.0635
280	1.0000	1.0063	1.0126	1.0189	1.0251	1.0314	1.0376	1.0439	1.0501	1.0563	1.0624
285	1.0000	1.0062	1.0124	1.0186	1.0247	1.0309	1.0370	1.0432	1.0493	1.0554	1.0615
290	1.0000	1.0061	1.0122	1.0183	1.0244	1.0304	1.0365	1.0425	1.0485	1.0545	1.0605
295	1.0000	1.0060	1.0120	1.0180	1.0240	1.0299	1.0359	1.0418	1.0478	1.0537	1.0596
300	1.0000	1.0059	1.0118	1.0177	1.0236	1.0295	1.0354	1.0412	1.0470	1.0529	1.0587
310	1.0000	1.0057	1.0115	1.0172	1.0229	1.0286	1.0343	1.0400	1.0457	1.0513	1.0570
320	1.0000	1.0056	1.0112	1.0167	1.0223	1.0278	1.0333	1.0389	1.0444	1.0499	1.0553
330	1.0000	1.0054	1.0109	1.0163	1.0217	1.0271	1.0324	1.0378	1.0431	1.0485	1.0538
340	1.0000	1.0053	1.0106	1.0158	1.0211	1.0263	1.0316	1.0368	1.0420	1.0472	1.0524
350	1.0000	1.0051	1.0103	1.0154	1.0205	1.0256	1.0307	1.0358	1.0409	1.0459	1.0510
360	1.0000	1.0050	1.0100	1.0150	1.0200	1.0250	1.0299	1.0349	1.0398	1.0448	1.0497
370	1.0000	1.0049	1.0098	1.0146	1.0195	1.0244	1.0292	1.0340	1.0389	1.0437	1.0485
380	1.0000	1.0048	1.0095	1.0143	1.0190	1.0238	1.0285	1.0332	1.0379	1.0426	1.0473
390	1.0000	1.0047	1.0093	1.0140	1.0186	1.0232	1.0278	1.0324	1.0370	1.0416	1.0462
400	1.0000	1.0046	1.0091	1.0136	1.0182	1.0227	1.0272	1.0317	1.0362	1.0406	1.0451

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(f) Concluded. Plenum compressibility factor, Z_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	1.1075	1.1182	1.1289	1.1395	1.1500	1.1606	1.1710	1.1815	1.1919	1.2022	1.2125
155	1.1046	1.1150	1.1253	1.1356	1.1459	1.1561	1.1663	1.1765	1.1866	1.1967	1.2067
160	1.1018	1.1119	1.1220	1.1320	1.1420	1.1520	1.1619	1.1718	1.1816	1.1914	1.2012
165	1.0992	1.1090	1.1188	1.1286	1.1383	1.1480	1.1577	1.1673	1.1769	1.1864	1.1959
170	1.0967	1.1063	1.1159	1.1254	1.1348	1.1443	1.1537	1.1631	1.1724	1.1817	1.1910
175	1.0944	1.1037	1.1130	1.1223	1.1315	1.1407	1.1499	1.1591	1.1682	1.1772	1.1863
180	1.0921	1.1012	1.1103	1.1194	1.1284	1.1374	1.1463	1.1552	1.1641	1.1730	1.1818
185	1.0900	1.0989	1.1077	1.1166	1.1254	1.1342	1.1429	1.1516	1.1603	1.1689	1.1775
190	1.0879	1.0966	1.1053	1.1139	1.1225	1.1311	1.1396	1.1481	1.1566	1.1651	1.1735
195	1.0860	1.0945	1.1029	1.1114	1.1198	1.1282	1.1365	1.1448	1.1531	1.1614	1.1696
200	1.0841	1.0924	1.1007	1.1089	1.1172	1.1254	1.1335	1.1417	1.1498	1.1579	1.1659
205	1.0823	1.0904	1.0985	1.1066	1.1147	1.1227	1.1307	1.1387	1.1466	1.1545	1.1624
210	1.0806	1.0885	1.0965	1.1044	1.1123	1.1201	1.1280	1.1358	1.1435	1.1513	1.1590
215	1.0789	1.0867	1.0945	1.1023	1.1100	1.1177	1.1254	1.1330	1.1406	1.1482	1.1557
220	1.0774	1.0850	1.0926	1.1002	1.1078	1.1153	1.1228	1.1303	1.1378	1.1452	1.1526
225	1.0759	1.0833	1.0908	1.0983	1.1057	1.1131	1.1204	1.1278	1.1351	1.1424	1.1496
230	1.0744	1.0817	1.0891	1.0964	1.1036	1.1109	1.1181	1.1253	1.1325	1.1397	1.1468
235	1.0730	1.0802	1.0874	1.0946	1.1017	1.1088	1.1159	1.1230	1.1300	1.1370	1.1440
240	1.0717	1.0787	1.0858	1.0928	1.0998	1.1068	1.1138	1.1207	1.1276	1.1345	1.1414
245	1.0704	1.0773	1.0842	1.0911	1.0980	1.1049	1.1117	1.1185	1.1253	1.1321	1.1388
250	1.0691	1.0759	1.0827	1.0895	1.0963	1.1030	1.1097	1.1164	1.1231	1.1297	1.1363
255	1.0679	1.0746	1.0813	1.0879	1.0946	1.1012	1.1078	1.1144	1.1209	1.1275	1.1340
260	1.0667	1.0733	1.0799	1.0864	1.0930	1.0995	1.1059	1.1124	1.1188	1.1253	1.1317
265	1.0656	1.0721	1.0785	1.0850	1.0914	1.0978	1.1042	1.1105	1.1168	1.1232	1.1295
270	1.0645	1.0709	1.0772	1.0836	1.0899	1.0962	1.1024	1.1087	1.1149	1.1211	1.1273
275	1.0635	1.0697	1.0760	1.0822	1.0884	1.0946	1.1008	1.1069	1.1130	1.1191	1.1252
280	1.0624	1.0686	1.0747	1.0809	1.0870	1.0931	1.0991	1.1052	1.1112	1.1172	1.1232
285	1.0615	1.0675	1.0736	1.0796	1.0856	1.0916	1.0976	1.1035	1.1095	1.1154	1.1213
290	1.0605	1.0665	1.0724	1.0784	1.0843	1.0902	1.0961	1.1019	1.1078	1.1136	1.1194
295	1.0596	1.0655	1.0713	1.0772	1.0830	1.0888	1.0946	1.1004	1.1061	1.1119	1.1176
300	1.0587	1.0645	1.0702	1.0760	1.0817	1.0875	1.0932	1.0989	1.1045	1.1102	1.1158
310	1.0570	1.0626	1.0682	1.0738	1.0793	1.0849	1.0904	1.0960	1.1015	1.1070	1.1125
320	1.0553	1.0608	1.0662	1.0717	1.0771	1.0825	1.0879	1.0933	1.0986	1.1039	1.1093
330	1.0538	1.0591	1.0644	1.0697	1.0750	1.0802	1.0855	1.0907	1.0959	1.1011	1.1063
340	1.0524	1.0575	1.0627	1.0678	1.0730	1.0781	1.0832	1.0883	1.0933	1.0984	1.1034
350	1.0510	1.0560	1.0610	1.0661	1.0711	1.0760	1.0810	1.0860	1.0909	1.0958	1.1007
360	1.0497	1.0546	1.0595	1.0644	1.0692	1.0741	1.0789	1.0838	1.0886	1.0934	1.0982
370	1.0485	1.0532	1.0580	1.0628	1.0675	1.0723	1.0770	1.0817	1.0864	1.0911	1.0958
380	1.0473	1.0520	1.0566	1.0613	1.0659	1.0705	1.0751	1.0797	1.0843	1.0889	1.0934
390	1.0462	1.0507	1.0553	1.0598	1.0643	1.0688	1.0733	1.0778	1.0823	1.0868	1.0912
400	1.0451	1.0495	1.0540	1.0584	1.0628	1.0673	1.0717	1.0760	1.0804	1.0848	1.0891

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	1.2125	1.2228	1.2330	1.2432	1.2533	1.2634	1.2735	1.2835	1.2934	1.3033	1.3132
155	1.2067	1.2167	1.2266	1.2365	1.2463	1.2561	1.2659	1.2756	1.2853	1.2950	1.3046
160	1.2012	1.2109	1.2205	1.2302	1.2397	1.2493	1.2588	1.2683	1.2777	1.2871	1.2964
165	1.1959	1.2054	1.2148	1.2242	1.2335	1.2428	1.2521	1.2613	1.2705	1.2796	1.2887
170	1.1910	1.2002	1.2094	1.2185	1.2276	1.2367	1.2457	1.2547	1.2636	1.2726	1.2814
175	1.1863	1.1953	1.2042	1.2131	1.2220	1.2308	1.2397	1.2484	1.2572	1.2659	1.2745
180	1.1818	1.1906	1.1993	1.2080	1.2167	1.2253	1.2339	1.2425	1.2510	1.2595	1.2680
185	1.1775	1.1861	1.1946	1.2031	1.2116	1.2200	1.2284	1.2368	1.2451	1.2534	1.2617
190	1.1735	1.1819	1.1902	1.1985	1.2068	1.2150	1.2232	1.2314	1.2396	1.2477	1.2558
195	1.1696	1.1778	1.1860	1.1941	1.2022	1.2102	1.2183	1.2263	1.2342	1.2422	1.2501
200	1.1659	1.1739	1.1819	1.1899	1.1978	1.2057	1.2135	1.2214	1.2291	1.2369	1.2446
205	1.1624	1.1702	1.1780	1.1858	1.1936	1.2013	1.2090	1.2167	1.2243	1.2319	1.2395
210	1.1590	1.1667	1.1743	1.1820	1.1895	1.1971	1.2046	1.2122	1.2196	1.2271	1.2345
215	1.1557	1.1633	1.1708	1.1782	1.1857	1.1931	1.2005	1.2078	1.2152	1.2225	1.2297
220	1.1526	1.1600	1.1674	1.1747	1.1820	1.1893	1.1965	1.2037	1.2109	1.2181	1.2252
225	1.1496	1.1569	1.1641	1.1713	1.1784	1.1856	1.1927	1.1997	1.2068	1.2138	1.2208
230	1.1468	1.1539	1.1610	1.1680	1.1750	1.1820	1.1890	1.1959	1.2028	1.2097	1.2166
235	1.1440	1.1510	1.1579	1.1648	1.1717	1.1786	1.1854	1.1923	1.1991	1.2058	1.2126
240	1.1414	1.1482	1.1550	1.1618	1.1686	1.1753	1.1820	1.1887	1.1954	1.2020	1.2087
245	1.1388	1.1455	1.1522	1.1589	1.1655	1.1722	1.1788	1.1853	1.1919	1.1984	1.2049
250	1.1363	1.1429	1.1495	1.1561	1.1626	1.1691	1.1756	1.1821	1.1885	1.1949	1.2013
255	1.1340	1.1405	1.1469	1.1534	1.1598	1.1662	1.1725	1.1789	1.1852	1.1915	1.1978
260	1.1317	1.1380	1.1444	1.1507	1.1570	1.1633	1.1696	1.1758	1.1821	1.1883	1.1945
265	1.1295	1.1357	1.1420	1.1482	1.1544	1.1606	1.1668	1.1729	1.1790	1.1851	1.1912
270	1.1273	1.1335	1.1396	1.1458	1.1519	1.1579	1.1640	1.1701	1.1761	1.1821	1.1881
275	1.1252	1.1313	1.1374	1.1434	1.1494	1.1554	1.1614	1.1673	1.1732	1.1791	1.1850
280	1.1232	1.1292	1.1352	1.1411	1.1470	1.1529	1.1588	1.1646	1.1705	1.1763	1.1821
285	1.1213	1.1272	1.1330	1.1389	1.1447	1.1505	1.1563	1.1621	1.1678	1.1735	1.1793
290	1.1194	1.1252	1.1310	1.1367	1.1425	1.1482	1.1539	1.1596	1.1652	1.1709	1.1765
295	1.1176	1.1233	1.1290	1.1347	1.1403	1.1459	1.1516	1.1571	1.1627	1.1683	1.1738
300	1.1158	1.1214	1.1271	1.1326	1.1382	1.1438	1.1493	1.1548	1.1603	1.1658	1.1712
310	1.1125	1.1179	1.1234	1.1288	1.1342	1.1396	1.1450	1.1503	1.1557	1.1610	1.1663
320	1.1093	1.1146	1.1199	1.1251	1.1304	1.1356	1.1409	1.1461	1.1513	1.1565	1.1616
330	1.1063	1.1114	1.1166	1.1217	1.1268	1.1319	1.1370	1.1421	1.1471	1.1522	1.1572
340	1.1034	1.1085	1.1135	1.1185	1.1234	1.1284	1.1334	1.1383	1.1432	1.1481	1.1530
350	1.1007	1.1056	1.1105	1.1154	1.1202	1.1251	1.1299	1.1347	1.1395	1.1443	1.1491
360	1.0982	1.1030	1.1077	1.1125	1.1172	1.1219	1.1266	1.1313	1.1360	1.1407	1.1453
370	1.0958	1.1004	1.1051	1.1097	1.1143	1.1189	1.1235	1.1281	1.1327	1.1372	1.1418
380	1.0934	1.0980	1.1025	1.1071	1.1116	1.1161	1.1206	1.1250	1.1295	1.1339	1.1384
390	1.0912	1.0957	1.1001	1.1045	1.1090	1.1133	1.1177	1.1221	1.1265	1.1308	1.1352
400	1.0891	1.0935	1.0978	1.1021	1.1065	1.1108	1.1150	1.1193	1.1236	1.1278	1.1321

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(g) Plenum enthalpy, H_0/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	44.49	43.49	42.55	41.67	40.88	40.15	39.51	38.94	38.45	38.03	37.69
16	46.99	46.07	45.22	44.43	43.70	43.05	42.46	41.94	41.48	41.09	40.75
17	49.49	48.65	47.87	47.15	46.49	45.89	45.35	44.87	44.45	44.08	43.76
18	51.99	51.22	50.50	49.84	49.24	48.69	48.20	47.75	47.36	47.02	46.72
19	54.49	53.78	53.12	52.51	51.96	51.46	51.00	50.59	50.23	49.91	49.64
20	56.99	56.33	55.73	55.17	54.66	54.19	53.78	53.40	53.07	52.77	52.51
21	59.49	58.88	58.32	57.81	57.34	56.91	56.52	56.18	55.87	55.59	55.35
22	61.99	61.43	60.91	60.43	60.00	59.60	59.25	58.93	58.64	58.39	58.17
23	64.49	63.97	63.49	63.05	62.65	62.28	61.95	61.66	61.39	61.16	60.96
24	66.99	66.51	66.06	65.65	65.28	64.95	64.64	64.37	64.12	63.91	63.72
25	69.49	69.04	68.63	68.25	67.91	67.59	67.31	67.06	66.84	66.64	66.47
26	71.99	71.57	71.19	70.84	70.52	70.23	69.97	69.74	69.54	69.35	69.20
27	74.49	74.10	73.75	73.42	73.13	72.86	72.62	72.41	72.22	72.05	71.91
28	76.99	76.63	76.30	76.00	75.73	75.48	75.26	75.06	74.89	74.74	74.61
29	79.49	79.15	78.85	78.57	78.32	78.09	77.89	77.71	77.55	77.41	77.29
30	81.99	81.68	81.39	81.14	80.90	80.70	80.51	80.35	80.20	80.08	79.97
31	84.49	84.20	83.94	83.70	83.49	83.29	83.12	82.97	82.84	82.73	82.63
32	86.99	86.72	86.48	86.26	86.06	85.89	85.73	85.59	85.47	85.37	85.29
33	89.49	89.24	89.02	88.81	88.63	88.47	88.33	88.21	88.10	88.01	87.93
34	91.99	91.76	91.55	91.37	91.20	91.05	90.92	90.81	90.72	90.64	90.57
35	94.49	94.28	94.09	93.91	93.76	93.63	93.51	93.41	93.33	93.26	93.20
36	96.99	96.79	96.62	96.46	96.32	96.20	96.10	96.01	95.94	95.88	95.83
37	99.49	99.31	99.15	99.01	98.88	98.77	98.68	98.60	98.54	98.49	98.45
38	101.99	101.82	101.68	101.55	101.43	101.34	101.25	101.19	101.13	101.09	101.06
39	104.49	104.34	104.20	104.09	103.99	103.90	103.83	103.77	103.72	103.69	103.67
40	106.99	106.85	106.73	106.62	106.53	106.46	106.40	106.35	106.31	106.29	106.27
42	111.99	111.88	111.78	111.69	111.62	111.57	111.53	111.49	111.47	111.46	111.46
44	116.99	116.90	116.82	116.76	116.71	116.67	116.64	116.63	116.62	116.63	116.64
46	121.99	121.92	121.86	121.82	121.78	121.76	121.75	121.75	121.76	121.78	121.80
48	126.99	126.94	126.90	126.87	126.85	126.85	126.85	126.86	126.89	126.92	126.95
50	131.99	131.96	131.93	131.92	131.92	131.93	131.94	131.97	132.00	132.04	132.09
52	136.99	136.97	136.96	136.97	136.98	137.00	137.03	137.07	137.11	137.16	137.22
54	141.99	141.99	141.99	142.01	142.03	142.07	142.11	142.16	142.21	142.27	142.34
56	146.99	147.00	147.02	147.05	147.09	147.13	147.18	147.24	147.31	147.38	147.46
58	151.99	152.01	152.05	152.09	152.13	152.19	152.25	152.32	152.39	152.48	152.56
60	156.99	157.03	157.07	157.12	157.18	157.24	157.32	157.39	157.48	157.57	157.66
62	161.99	162.04	162.09	162.15	162.22	162.30	162.38	162.46	162.56	162.65	162.76
64	166.99	167.05	167.11	167.18	167.26	167.34	167.43	167.53	167.63	167.73	167.84
66	171.99	172.06	172.13	172.21	172.30	172.39	172.49	172.59	172.70	172.81	172.93
68	176.99	177.07	177.15	177.24	177.33	177.43	177.54	177.65	177.76	177.88	178.01
70	181.99	182.08	182.17	182.26	182.37	182.47	182.59	182.70	182.83	182.95	183.08

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	44.49	40.15	37.69	36.88	37.20	38.17	39.50	41.03	42.69	44.43	46.21
16	46.99	43.05	40.75	39.89	40.07	40.90	42.11	43.55	45.13	46.81	48.54
17	49.49	45.89	43.76	42.89	42.96	43.66	44.76	46.11	47.62	49.23	50.91
18	51.99	48.69	46.72	45.86	45.85	46.45	47.45	48.71	50.14	51.69	53.32
19	54.49	51.46	49.64	48.81	48.74	49.25	50.16	51.34	52.70	54.19	55.77
20	56.99	54.19	52.51	51.72	51.63	52.07	52.90	54.00	55.29	56.72	58.25
21	59.49	56.91	55.35	54.61	54.50	54.89	55.65	56.68	57.91	59.28	60.75
22	61.99	59.60	58.17	57.47	57.36	57.71	58.41	59.38	60.55	61.86	63.28
23	64.49	62.28	60.96	60.31	60.21	60.52	61.18	62.09	63.20	64.47	65.84
24	66.99	64.95	63.72	63.13	63.03	63.33	63.95	64.82	65.88	67.09	68.42
25	69.49	67.59	66.47	65.93	65.85	66.14	66.72	67.55	68.56	69.73	71.01
26	71.99	70.23	69.20	68.71	68.65	68.93	69.49	70.28	71.26	72.38	73.63
27	74.49	72.86	71.91	71.47	71.43	71.71	72.26	73.02	73.96	75.05	76.26
28	76.99	75.48	74.61	74.22	74.20	74.49	75.02	75.76	76.67	77.73	78.90
29	79.49	78.09	77.29	76.95	76.96	77.25	77.78	78.50	79.39	80.41	81.55
30	81.99	80.70	79.97	79.67	79.71	80.01	80.53	81.24	82.10	83.10	84.21
31	84.49	83.29	82.63	82.38	82.44	82.75	83.27	83.97	84.82	85.79	86.87
32	86.99	85.89	85.29	85.08	85.16	85.49	86.01	86.70	87.53	88.49	89.55
33	89.49	88.47	87.93	87.76	87.88	88.22	88.74	89.43	90.25	91.18	92.22
34	91.99	91.05	90.57	90.44	90.58	90.93	91.46	92.15	92.96	93.88	94.90
35	94.49	93.63	93.20	93.11	93.28	93.64	94.18	94.86	95.67	96.58	97.59
36	96.99	96.20	95.83	95.77	95.96	96.35	96.89	97.57	98.37	99.28	100.27
37	99.49	98.77	98.45	98.43	98.64	99.04	99.60	100.28	101.08	101.97	102.95
38	101.99	101.34	101.06	101.08	101.31	101.73	102.29	102.98	103.77	104.66	105.64
39	104.49	103.90	103.67	103.72	103.98	104.41	104.98	105.68	106.47	107.35	108.32
40	106.99	106.46	106.27	106.35	106.64	107.09	107.67	108.37	109.16	110.04	111.00
42	111.99	111.57	111.46	111.61	111.94	112.42	113.02	113.73	114.53	115.41	116.36
44	116.99	116.67	116.64	116.84	117.21	117.73	118.35	119.08	119.88	120.76	121.71
46	121.99	121.76	121.80	122.05	122.47	123.01	123.66	124.40	125.22	126.11	127.05
48	126.99	126.85	126.95	127.26	127.71	128.28	128.96	129.71	130.54	131.43	132.38
50	131.99	131.93	132.09	132.44	132.93	133.54	134.23	135.01	135.85	136.75	137.70
52	136.99	137.00	137.22	137.62	138.14	138.78	139.50	140.29	141.14	142.05	143.00
54	141.99	142.07	142.34	142.78	143.34	144.00	144.74	145.55	146.42	147.34	148.30
56	146.99	147.13	147.46	147.93	148.52	149.21	149.98	150.80	151.69	152.61	153.58
58	151.99	152.19	152.56	153.08	153.70	154.41	155.20	156.04	156.94	157.88	158.86
60	156.99	157.24	157.66	158.21	158.86	159.60	160.41	161.27	162.18	163.13	164.12
62	161.99	162.30	162.76	163.34	164.02	164.78	165.61	166.49	167.41	168.38	169.37
64	166.99	167.34	167.84	168.46	169.17	169.95	170.80	171.69	172.63	173.61	174.62
66	171.99	172.39	172.93	173.57	174.31	175.11	175.98	176.89	177.84	178.83	179.85
68	176.99	177.43	178.01	178.68	179.44	180.27	181.15	182.08	183.05	184.05	185.08
70	181.99	182.47	183.08	183.79	184.57	185.42	186.32	187.26	188.24	189.25	190.29

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(g) Continued. Plenum enthalpy, H_o/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	46.21	48.03	49.86	51.71	53.56	55.41	57.27	59.12	60.96	62.81	64.64
16	48.54	50.32	52.11	53.93	55.75	57.58	59.41	61.24	63.07	64.89	66.71
17	50.91	52.64	54.40	56.18	57.98	59.78	61.59	63.40	65.21	67.01	68.82
18	53.32	55.01	56.73	58.48	60.24	62.02	63.80	65.59	67.38	69.17	70.96
19	55.77	57.41	59.09	60.80	62.54	64.29	66.05	67.81	69.58	71.35	73.12
20	58.25	59.84	61.48	63.16	64.86	66.58	68.32	70.06	71.81	73.56	75.32
21	60.75	62.30	63.90	65.54	67.21	68.91	70.62	72.34	74.07	75.80	77.54
22	63.28	64.79	66.35	67.95	69.59	71.26	72.94	74.64	76.35	78.06	79.78
23	65.84	67.30	68.82	70.39	72.00	73.64	75.29	76.97	78.65	80.35	82.05
24	68.42	69.83	71.32	72.85	74.43	76.03	77.67	79.32	80.98	82.65	84.34
25	71.01	72.39	73.83	75.33	76.88	78.46	80.06	81.69	83.33	84.98	86.65
26	73.63	74.96	76.37	77.84	79.35	80.90	82.48	84.08	85.70	87.33	88.98
27	76.26	77.55	78.93	80.36	81.84	83.36	84.92	86.49	88.09	89.70	91.33
28	78.90	80.16	81.50	82.90	84.35	85.85	87.37	88.93	90.50	92.09	93.70
29	81.55	82.78	84.09	85.46	86.88	88.35	89.85	91.38	92.93	94.50	96.09
30	84.21	85.41	86.69	88.03	89.43	90.87	92.34	93.85	95.38	96.93	98.49
31	86.87	88.05	89.30	90.62	91.98	93.40	94.85	96.33	97.84	99.37	100.92
32	89.55	90.70	91.92	93.21	94.56	95.94	97.37	98.83	100.32	101.83	103.36
33	92.22	93.35	94.55	95.82	97.14	98.50	99.91	101.35	102.81	104.30	105.81
34	94.90	96.01	97.19	98.43	99.73	101.08	102.46	103.88	105.32	106.79	108.28
35	97.59	98.68	99.84	101.06	102.34	103.66	105.02	106.42	107.84	109.29	110.77
36	100.27	101.34	102.49	103.69	104.95	106.25	107.59	108.97	110.38	111.81	113.26
37	102.95	104.01	105.14	106.33	107.57	108.85	110.17	111.53	112.92	114.34	115.77
38	105.64	106.68	107.80	108.97	110.19	111.46	112.76	114.11	115.48	116.88	118.30
39	108.32	109.36	110.46	111.61	112.82	114.07	115.36	116.69	118.04	119.42	120.83
40	111.00	112.03	113.12	114.26	115.46	116.69	117.97	119.28	120.62	121.98	123.37
42	116.36	117.37	118.44	119.57	120.74	121.95	123.19	124.48	125.79	127.12	128.49
44	121.71	122.71	123.77	124.88	126.03	127.22	128.44	129.70	130.98	132.30	133.63
46	127.05	128.05	129.10	130.19	131.32	132.50	133.70	134.94	136.20	137.49	138.80
48	132.38	133.38	134.42	135.50	136.62	137.78	138.97	140.19	141.43	142.70	144.00
50	137.70	138.69	139.73	140.81	141.92	143.07	144.25	145.45	146.68	147.93	149.21
52	143.00	144.00	145.04	146.12	147.22	148.36	149.53	150.72	151.93	153.17	154.43
54	148.30	149.30	150.34	151.41	152.52	153.65	154.81	155.99	157.19	158.42	159.67
56	153.58	154.59	155.63	156.71	157.81	158.93	160.09	161.26	162.46	163.67	164.91
58	158.86	159.87	160.92	161.99	163.09	164.22	165.37	166.53	167.72	168.93	170.16
60	164.12	165.14	166.19	167.27	168.37	169.50	170.64	171.81	172.99	174.19	175.41
62	169.37	170.40	171.46	172.54	173.64	174.77	175.91	177.08	178.26	179.45	180.67
64	174.62	175.65	176.72	177.80	178.91	180.03	181.18	182.34	183.52	184.71	185.92
66	179.85	180.90	181.97	183.06	184.17	185.30	186.44	187.60	188.78	189.97	191.18
68	185.08	186.13	187.21	188.30	189.42	190.55	191.70	192.86	194.04	195.23	196.43
70	190.29	191.36	192.44	193.54	194.66	195.80	196.95	198.11	199.29	200.48	201.68

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	64.64	66.47	68.30	70.11	71.92	73.73	75.52	77.31	79.09	80.87	82.64
16	66.71	68.53	70.34	72.14	73.94	75.73	77.52	79.29	81.07	82.83	84.59
17	68.82	70.62	72.41	74.21	75.99	77.77	79.55	81.31	83.08	84.83	86.58
18	70.96	72.74	74.52	76.30	78.07	79.84	81.61	83.36	85.12	86.86	88.60
19	73.12	74.89	76.66	78.43	80.19	81.94	83.70	85.44	87.19	88.92	90.65
20	75.32	77.07	78.83	80.58	82.32	84.07	85.81	87.55	89.28	91.01	92.73
21	77.54	79.28	81.01	82.75	84.49	86.22	87.95	89.68	91.40	93.12	94.83
22	79.78	81.50	83.23	84.95	86.67	88.39	90.11	91.82	93.54	95.24	96.95
23	82.05	83.75	85.46	87.17	88.88	90.58	92.29	94.00	95.70	97.39	99.09
24	84.34	86.02	87.72	89.41	91.10	92.80	94.49	96.19	97.88	99.56	101.25
25	86.65	88.32	89.99	91.67	93.35	95.03	96.71	98.40	100.07	101.75	103.43
26	88.98	90.63	92.29	93.95	95.62	97.29	98.95	100.62	102.29	103.96	105.63
27	91.33	92.96	94.60	96.25	97.90	99.56	101.21	102.87	104.53	106.18	107.84
28	93.70	95.31	96.94	98.57	100.21	101.85	103.49	105.14	106.78	108.43	110.07
29	96.09	97.68	99.29	100.91	102.53	104.16	105.79	107.42	109.05	110.69	112.32
30	98.49	100.07	101.66	103.26	104.87	106.48	108.10	109.72	111.34	112.96	114.59
31	100.92	102.48	104.05	105.63	107.23	108.82	110.43	112.03	113.64	115.25	116.87
32	103.36	104.90	106.46	108.02	109.60	111.18	112.77	114.37	115.96	117.56	119.16
33	105.81	107.34	108.88	110.43	111.99	113.56	115.13	116.71	118.30	119.89	121.48
34	108.28	109.79	111.31	112.85	114.39	115.95	117.51	119.08	120.65	122.23	123.81
35	110.77	112.26	113.76	115.28	116.81	118.35	119.90	121.46	123.02	124.58	126.15
36	113.26	114.74	116.23	117.73	119.25	120.77	122.31	123.85	125.40	126.95	128.51
37	115.77	117.23	118.71	120.20	121.70	123.21	124.73	126.26	127.79	129.33	130.88
38	118.30	119.74	121.20	122.67	124.16	125.66	127.16	128.68	130.20	131.73	133.27
39	120.83	122.26	123.70	125.16	126.63	128.12	129.61	131.11	132.62	134.14	135.66
40	123.37	124.78	126.21	127.66	129.12	130.59	132.07	133.56	135.06	136.57	138.08
42	128.49	129.87	131.27	132.69	134.12	135.57	137.02	138.49	139.96	141.45	142.94
44	133.63	134.99	136.36	137.76	139.16	140.58	142.02	143.46	144.91	146.37	147.84
46	138.80	140.14	141.49	142.86	144.24	145.64	147.05	148.47	149.90	151.34	152.79
48	144.00	145.31	146.64	147.99	149.35	150.73	152.12	153.52	154.93	156.35	157.78
50	149.21	150.50	151.81	153.14	154.49	155.84	157.21	158.60	159.99	161.39	162.80
52	154.43	155.71	157.00	158.32	159.64	160.98	162.34	163.70	165.07	166.46	167.85
54	159.67	160.93	162.21	163.51	164.82	166.14	167.48	168.83	170.18	171.55	172.93
56	164.91	166.16	167.43	168.71	170.01	171.32	172.64	173.98	175.32	176.67	178.03
58	170.16	171.40	172.66	173.93	175.21	176.51	177.82	179.14	180.47	181.81	183.16
60	175.41	176.64	177.89	179.15	180.43	181.72	183.01	184.32	185.64	186.97	188.30
62	180.67	181.89	183.13	184.39	185.65	186.93	188.22	189.51	190.82	192.14	193.46
64	185.92	187.14	188.38	189.62	190.88	192.15	193.43	194.72	196.01	197.32	198.63
66	191.18	192.39	193.62	194.86	196.12	197.38	198.65	199.93	201.22	202.51	203.82
68	196.43	197.64	198.87	200.11	201.35	202.61	203.87	205.15	206.43	207.72	209.01
70	201.68	202.89	204.12	205.35	206.59	207.84	209.10	210.37	211.64	212.93	214.22

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(g) Continued. Plenum enthalpy, H_o/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	181.99	182.47	183.08	183.79	184.57	185.42	186.32	187.26	188.24	189.25	190.29
72	186.99	187.51	188.15	188.88	189.69	190.56	191.48	192.43	193.43	194.45	195.50
74	191.99	192.55	193.22	193.98	194.80	195.69	196.63	197.60	198.61	199.64	200.70
76	196.99	197.58	198.28	199.06	199.91	200.82	201.77	202.76	203.78	204.83	205.90
78	201.99	202.62	203.34	204.15	205.02	205.94	206.91	207.91	208.95	210.01	211.09
80	206.99	207.65	208.40	209.23	210.12	211.06	212.04	213.06	214.11	215.18	216.27
82	211.99	212.68	213.46	214.31	215.22	216.17	217.17	218.20	219.26	220.34	221.44
84	216.99	217.71	218.51	219.38	220.31	221.28	222.30	223.34	224.41	225.50	226.61
86	221.99	222.74	223.56	224.45	225.40	226.39	227.41	228.47	229.55	230.65	231.77
88	226.99	227.76	228.61	229.52	230.48	231.49	232.53	233.60	234.69	235.80	236.93
90	231.99	232.79	233.66	234.59	235.57	236.59	237.64	238.72	239.82	240.94	242.08
92	236.99	237.81	238.70	239.65	240.64	241.68	242.74	243.84	244.95	246.08	247.23
94	241.99	242.83	243.75	244.71	245.72	246.77	247.85	248.95	250.07	251.22	252.37
96	246.99	247.86	248.79	249.77	250.79	251.86	252.95	254.06	255.20	256.35	257.51
98	251.99	252.88	253.83	254.82	255.86	256.94	258.04	259.17	260.31	261.47	262.65
100	256.99	257.90	258.86	259.88	260.93	262.02	263.13	264.27	265.42	266.60	267.78
102	261.99	262.92	263.90	264.93	266.00	267.10	268.22	269.37	270.53	271.71	272.91
104	266.99	267.94	268.94	269.98	271.06	272.17	273.31	274.47	275.64	276.83	278.03
106	271.99	272.96	273.97	275.03	276.12	277.25	278.39	279.56	280.74	281.94	283.15
108	276.99	277.97	279.00	280.08	281.18	282.32	283.47	284.65	285.84	287.05	288.26
110	281.99	282.99	284.04	285.12	286.24	287.39	288.55	289.74	290.94	292.15	293.38
112	286.99	288.01	289.07	290.17	291.30	292.45	293.63	294.82	296.03	297.26	298.49
114	291.99	293.02	294.10	295.21	296.35	297.52	298.70	299.91	301.13	302.35	303.59
116	296.99	298.04	299.13	300.25	301.40	302.58	303.78	304.99	306.21	307.45	308.70
118	301.99	303.05	304.15	305.29	306.45	307.64	308.85	310.07	311.30	312.55	313.80
120	306.99	308.07	309.18	310.33	311.50	312.70	313.91	315.14	316.38	317.64	318.90
122	311.99	313.08	314.21	315.37	316.55	317.76	318.98	320.22	321.47	322.73	323.99
124	316.99	318.09	319.23	320.40	321.60	322.81	324.04	325.29	326.55	327.81	329.09
126	321.99	323.11	324.26	325.44	326.64	327.87	329.11	330.36	331.62	332.90	334.18
128	326.99	328.12	329.28	330.47	331.69	332.92	334.17	335.43	336.70	337.98	339.27
130	331.99	333.13	334.31	335.51	336.73	337.97	339.23	340.49	341.77	343.06	344.35
132	336.99	338.14	339.33	340.54	341.77	343.02	344.28	345.56	346.85	348.14	349.44
134	341.99	343.16	344.35	345.57	346.81	348.07	349.34	350.62	351.92	353.22	354.52
136	346.99	348.17	349.37	350.60	351.85	353.12	354.39	355.68	356.98	358.29	359.60
138	351.99	353.18	354.39	355.63	356.89	358.16	359.45	360.74	362.05	363.36	364.68
140	356.99	358.19	359.41	360.66	361.93	363.21	364.50	365.80	367.12	368.44	369.76
142	361.99	363.20	364.43	365.69	366.96	368.25	369.55	370.86	372.18	373.50	374.84
144	366.99	368.21	369.45	370.72	372.00	373.29	374.60	375.92	377.24	378.57	379.91
146	371.99	373.22	374.47	375.74	377.03	378.33	379.65	380.97	382.30	383.64	384.98
148	376.99	378.23	379.49	380.77	382.07	383.38	384.70	386.03	387.36	388.70	390.05
150	381.99	383.24	384.51	385.80	387.10	388.42	389.74	391.08	392.42	393.77	395.12

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	190.29	191.36	192.44	193.54	194.66	195.80	196.95	198.11	199.29	200.48	201.68
72	195.50	196.57	197.67	198.78	199.90	201.04	202.20	203.36	204.54	205.73	206.93
74	200.70	201.78	202.88	204.00	205.13	206.28	207.43	208.60	209.79	210.98	212.18
76	205.90	206.99	208.10	209.22	210.36	211.51	212.67	213.84	215.03	216.22	217.42
78	211.09	212.18	213.30	214.43	215.57	216.73	217.90	219.07	220.26	221.46	222.66
80	216.27	217.37	218.50	219.64	220.79	221.95	223.12	224.30	225.49	226.69	227.90
82	221.44	222.56	223.69	224.84	225.99	227.16	228.34	229.52	230.72	231.92	233.13
84	226.61	227.74	228.88	230.03	231.19	232.37	233.55	234.74	235.94	237.14	238.35
86	231.77	232.91	234.06	235.22	236.39	237.57	238.75	239.95	241.15	242.36	243.57
88	236.93	238.07	239.23	240.40	241.58	242.76	243.96	245.16	246.36	247.57	248.79
90	242.08	243.24	244.40	245.58	246.76	247.95	249.15	250.36	251.57	252.78	254.01
92	247.23	248.39	249.57	250.75	251.94	253.14	254.34	255.55	256.77	257.99	259.22
94	252.37	253.54	254.72	255.91	257.11	258.32	259.53	260.74	261.96	263.19	264.42
96	257.51	258.69	259.88	261.08	262.28	263.49	264.71	265.93	267.16	268.39	269.62
98	262.65	263.83	265.03	266.23	267.45	268.66	269.89	271.11	272.34	273.58	274.82
100	267.78	268.97	270.18	271.39	272.61	273.83	275.06	276.29	277.53	278.77	280.01
102	272.91	274.11	275.32	276.54	277.76	278.99	280.23	281.46	282.71	283.95	285.20
104	278.03	279.24	280.46	281.68	282.91	284.15	285.39	286.63	287.88	289.13	290.38
106	283.15	284.37	285.59	286.82	288.06	289.30	290.55	291.80	293.05	294.31	295.56
108	288.26	289.49	290.72	291.96	293.20	294.45	295.71	296.96	298.22	299.48	300.74
110	293.38	294.61	295.85	297.09	298.35	299.60	300.86	302.12	303.38	304.65	305.91
112	298.49	299.73	300.97	302.23	303.48	304.74	306.01	307.27	308.54	309.81	311.08
114	303.59	304.84	306.09	307.35	308.62	309.88	311.15	312.42	313.70	314.97	316.25
116	308.70	309.95	311.21	312.48	313.75	315.02	316.29	317.57	318.85	320.13	321.41
118	313.80	315.06	316.33	317.60	318.87	320.15	321.43	322.71	324.00	325.28	326.57
120	318.90	320.17	321.44	322.72	324.00	325.28	326.57	327.85	329.14	330.43	331.72
122	323.99	325.27	326.55	327.83	329.12	330.41	331.70	332.99	334.28	335.58	336.87
124	329.09	330.37	331.65	332.94	334.24	335.53	336.83	338.13	339.42	340.72	342.02
126	334.18	335.47	336.76	338.05	339.35	340.65	341.95	343.26	344.56	345.86	347.17
128	339.27	340.56	341.86	343.16	344.46	345.77	347.08	348.39	349.69	351.00	352.31
130	344.35	345.65	346.96	348.27	349.57	350.89	352.20	353.51	354.83	356.14	357.45
132	349.44	350.75	352.05	353.37	354.68	356.00	357.32	358.64	359.95	361.27	362.59
134	354.52	355.83	357.15	358.47	359.79	361.11	362.43	363.76	365.08	366.40	367.72
136	359.60	360.92	362.24	363.57	364.89	366.22	367.55	368.87	370.20	371.53	372.86
138	364.68	366.01	367.33	368.66	369.99	371.32	372.66	373.99	375.32	376.65	377.99
140	369.76	371.09	372.42	373.76	375.09	376.43	377.77	379.10	380.44	381.78	383.11
142	374.84	376.17	377.51	378.85	380.19	381.53	382.87	384.21	385.56	386.90	388.24
144	379.91	381.25	382.59	383.94	385.28	386.63	387.98	389.32	390.67	392.01	393.36
146	384.98	386.33	387.67	389.02	390.38	391.73	393.08	394.43	395.78	397.13	398.48
148	390.05	391.40	392.76	394.11	395.47	396.82	398.18	399.53	400.89	402.24	403.60
150	395.12	396.48	397.83	399.19	400.55	401.92	403.28	404.64	406.00	407.35	408.71

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(g) Continued. Plenum enthalpy, H_o/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	201.68	202.89	204.12	205.35	206.59	207.84	209.10	210.37	211.64	212.93	214.22
72	206.93	208.14	209.36	210.59	211.83	213.08	214.33	215.60	216.87	218.14	219.43
74	212.18	213.39	214.61	215.84	217.07	218.32	219.57	220.83	222.09	223.36	224.64
76	217.42	218.63	219.85	221.08	222.31	223.55	224.80	226.06	227.32	228.59	229.86
78	222.66	223.87	225.09	226.32	227.55	228.79	230.04	231.29	232.55	233.81	235.08
80	227.90	229.11	230.33	231.56	232.79	234.03	235.27	236.52	237.78	239.04	240.31
82	233.13	234.34	235.56	236.79	238.02	239.26	240.51	241.76	243.01	244.27	245.54
84	238.35	239.57	240.79	242.02	243.26	244.50	245.74	246.99	248.24	249.50	250.76
86	243.57	244.80	246.02	247.25	248.49	249.73	250.97	252.22	253.47	254.73	255.99
88	248.79	250.02	251.24	252.48	253.71	254.96	256.20	257.45	258.70	259.96	261.22
90	254.01	255.23	256.46	257.70	258.94	260.18	261.43	262.68	263.93	265.19	266.45
92	259.22	260.45	261.68	262.92	264.16	265.40	266.65	267.90	269.16	270.41	271.67
94	264.42	265.65	266.89	268.13	269.38	270.62	271.87	273.12	274.38	275.64	276.90
96	269.62	270.86	272.10	273.34	274.59	275.84	277.09	278.34	279.60	280.86	282.12
98	274.82	276.06	277.30	278.55	279.80	281.05	282.31	283.56	284.82	286.08	287.34
100	280.01	281.26	282.50	283.75	285.01	286.26	287.52	288.78	290.04	291.30	292.56
102	285.20	286.45	287.70	288.95	290.21	291.47	292.73	293.99	295.25	296.51	297.78
104	290.38	291.64	292.89	294.15	295.41	296.67	297.93	299.19	300.46	301.73	302.99
106	295.56	296.82	298.08	299.34	300.60	301.87	303.13	304.40	305.67	306.93	308.20
108	300.74	302.00	303.27	304.53	305.80	307.06	308.33	309.60	310.87	312.14	313.41
110	305.91	307.18	308.45	309.72	310.99	312.26	313.53	314.80	316.07	317.35	318.62
112	311.08	312.35	313.62	314.90	316.17	317.45	318.72	320.00	321.27	322.55	323.82
114	316.25	317.52	318.80	320.08	321.35	322.63	323.91	325.19	326.47	327.75	329.02
116	321.41	322.69	323.97	325.25	326.53	327.82	329.10	330.38	331.66	332.94	334.22
118	326.57	327.85	329.14	330.42	331.71	332.99	334.28	335.56	336.85	338.13	339.42
120	331.72	333.01	334.30	335.59	336.88	338.17	339.46	340.75	342.04	343.32	344.61
122	336.87	338.17	339.46	340.76	342.05	343.34	344.64	345.93	347.22	348.51	349.80
124	342.02	343.32	344.62	345.92	347.22	348.51	349.81	351.11	352.40	353.69	354.99
126	347.17	348.47	349.78	351.08	352.38	353.68	354.98	356.28	357.58	358.87	360.17
128	352.31	353.62	354.93	356.23	357.54	358.84	360.15	361.45	362.75	364.05	365.35
130	357.45	358.76	360.08	361.39	362.70	364.01	365.31	366.62	367.92	369.23	370.53
132	362.59	363.91	365.22	366.54	367.85	369.16	370.47	371.78	373.09	374.40	375.71
134	367.72	369.05	370.37	371.68	373.00	374.32	375.63	376.95	378.26	379.57	380.88
136	372.86	374.18	375.51	376.83	378.15	379.47	380.79	382.11	383.42	384.74	386.05
138	377.99	379.32	380.64	381.97	383.30	384.62	385.94	387.27	388.58	389.90	391.22
140	383.11	384.45	385.78	387.11	388.44	389.77	391.10	392.42	393.74	395.06	396.38
142	388.24	389.58	390.91	392.25	393.58	394.91	396.24	397.57	398.90	400.22	401.55
144	393.36	394.70	396.04	397.38	398.72	400.06	401.39	402.72	404.05	405.38	406.71
146	398.48	399.83	401.17	402.51	403.86	405.20	406.53	407.87	409.20	410.53	411.86
148	403.60	404.95	406.30	407.64	408.99	410.33	411.67	413.01	414.35	415.69	417.02
150	408.71	410.07	411.42	412.77	414.12	415.47	416.81	418.16	419.50	420.84	422.17

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	381.99	383.24	384.51	385.80	387.10	388.42	389.74	391.08	392.42	393.77	395.12
155	394.49	395.76	397.05	398.36	399.68	401.01	402.35	403.70	405.06	406.42	407.79
160	406.99	408.28	409.59	410.91	412.25	413.60	414.96	416.32	417.69	419.07	420.44
165	419.49	420.80	422.13	423.47	424.82	426.19	427.56	428.93	430.32	431.70	433.09
170	431.99	433.32	434.66	436.02	437.39	438.77	440.15	441.54	442.94	444.34	445.74
175	444.49	445.84	447.20	448.57	449.95	451.34	452.74	454.14	455.55	456.96	458.37
180	456.99	458.35	459.73	461.12	462.51	463.92	465.33	466.74	468.16	469.58	471.00
185	469.49	470.87	472.26	473.66	475.07	476.49	477.91	479.33	480.76	482.19	483.63
190	481.99	483.38	484.79	486.20	487.62	489.05	490.48	491.92	493.36	494.80	496.24
195	494.49	495.90	497.32	498.74	500.18	501.61	503.06	504.50	505.95	507.41	508.86
200	506.99	508.41	509.84	511.28	512.72	514.17	515.63	517.08	518.54	520.00	521.47
205	519.49	520.92	522.37	523.82	525.27	526.73	528.20	529.66	531.13	532.60	534.07
210	531.99	533.44	534.89	536.35	537.82	539.29	540.76	542.24	543.71	545.19	546.67
215	544.49	545.95	547.41	548.88	550.36	551.84	553.32	554.81	556.29	557.78	559.27
220	556.99	558.46	559.93	561.42	562.90	564.39	565.88	567.37	568.87	570.36	571.86
225	569.49	570.97	572.45	573.95	575.44	576.94	578.44	579.94	581.44	582.94	584.45
230	581.99	583.48	584.97	586.47	587.98	589.48	590.99	592.50	594.01	595.52	597.03
235	594.49	595.99	597.49	599.00	600.51	602.03	603.54	605.06	606.58	608.10	609.61
240	606.99	608.50	610.01	611.53	613.05	614.57	616.10	617.62	619.14	620.67	622.19
245	619.49	621.01	622.53	624.05	625.58	627.11	628.64	630.18	631.71	633.24	634.77
250	631.99	633.52	635.05	636.58	638.12	639.65	641.19	642.73	644.27	645.81	647.34
255	644.49	646.02	647.56	649.10	650.65	652.19	653.74	655.28	656.83	658.37	659.91
260	656.99	658.53	660.08	661.63	663.18	664.73	666.28	667.83	669.38	670.93	672.48
265	669.49	671.04	672.59	674.15	675.71	677.26	678.82	680.38	681.94	683.49	685.05
270	681.99	683.55	685.11	686.67	688.23	689.80	691.36	692.93	694.49	696.05	697.61
275	694.49	696.05	697.62	699.19	700.76	702.33	703.90	705.47	707.04	708.61	710.18
280	706.99	708.56	710.14	711.71	713.29	714.86	716.44	718.02	719.59	721.16	722.74
285	719.49	721.07	722.65	724.23	725.81	727.39	728.98	730.56	732.14	733.72	735.30
290	731.99	733.57	735.16	736.75	738.34	739.92	741.51	743.10	744.68	746.27	747.85
295	744.49	746.08	747.67	749.27	750.86	752.45	754.05	755.64	757.23	758.82	760.41
300	756.99	758.59	760.19	761.78	763.38	764.98	766.58	768.18	769.77	771.37	772.96
310	781.99	783.60	785.21	786.82	788.43	790.04	791.64	793.25	794.86	796.46	798.06
320	806.99	808.61	810.23	811.85	813.47	815.09	816.70	818.32	819.94	821.55	823.16
330	831.99	833.62	835.25	836.88	838.51	840.13	841.76	843.39	845.01	846.63	848.25
340	856.99	858.63	860.27	861.91	863.54	865.18	866.81	868.45	870.08	871.71	873.34
350	881.99	883.64	885.29	886.93	888.58	890.22	891.87	893.51	895.15	896.79	898.42
360	906.99	908.65	910.30	911.96	913.61	915.26	916.91	918.56	920.21	921.86	923.50
370	931.99	933.65	935.32	936.98	938.64	940.30	941.96	943.62	945.27	946.92	948.57
380	956.99	958.66	960.33	962.00	963.67	965.34	967.00	968.67	970.33	971.99	973.64
390	981.99	983.67	985.35	987.02	988.70	990.37	992.05	993.72	995.38	997.05	998.71
400	1006.99	1008.68	1010.36	1012.04	1013.73	1015.41	1017.08	1018.76	1020.43	1022.11	1023.78

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(g) Concluded. Plenum enthalpy, H_o/R, K

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	395.12	396.48	397.83	399.19	400.55	401.92	403.28	404.64	406.00	407.35	408.71
155	407.79	409.16	410.53	411.90	413.27	414.64	416.01	417.38	418.75	420.12	421.49
160	420.44	421.83	423.21	424.59	425.97	427.36	428.74	430.12	431.50	432.88	434.26
165	433.09	434.49	435.88	437.27	438.67	440.06	441.46	442.85	444.24	445.63	447.01
170	445.74	447.14	448.54	449.95	451.35	452.76	454.16	455.56	456.96	458.36	459.76
175	458.37	459.79	461.20	462.62	464.03	465.45	466.86	468.27	469.68	471.09	472.49
180	471.00	472.43	473.85	475.28	476.70	478.12	479.55	480.97	482.39	483.80	485.22
185	483.63	485.06	486.50	487.93	489.36	490.80	492.23	493.66	495.08	496.51	497.93
190	496.24	497.69	499.13	500.58	502.02	503.46	504.90	506.34	507.77	509.21	510.64
195	508.86	510.31	511.76	513.22	514.67	516.12	517.57	519.01	520.46	521.90	523.34
200	521.47	522.93	524.39	525.85	527.31	528.77	530.23	531.68	533.13	534.58	536.03
205	534.07	535.54	537.01	538.48	539.95	541.41	542.88	544.34	545.80	547.26	548.71
210	546.67	548.15	549.63	551.10	552.58	554.05	555.53	557.00	558.46	559.93	561.39
215	559.27	560.75	562.24	563.72	565.21	566.69	568.17	569.65	571.12	572.59	574.06
220	571.86	573.35	574.85	576.34	577.83	579.32	580.81	582.29	583.77	585.25	586.73
225	584.45	585.95	587.45	588.95	590.45	591.94	593.44	594.93	596.42	597.90	599.39
230	597.03	598.54	600.05	601.56	603.06	604.56	606.06	607.56	609.06	610.55	612.04
235	609.61	611.13	612.65	614.16	615.67	617.18	618.69	620.19	621.69	623.19	624.69
240	622.19	623.72	625.24	626.76	628.28	629.79	631.31	632.82	634.33	635.83	637.33
245	634.77	636.30	637.83	639.35	640.88	642.40	643.92	645.44	646.95	648.47	649.97
250	647.34	648.88	650.41	651.95	653.48	655.01	656.53	658.06	659.58	661.09	662.61
255	659.91	661.46	663.00	664.54	666.07	667.61	669.14	670.67	672.20	673.72	675.24
260	672.43	674.03	675.58	677.12	678.67	680.21	681.74	683.28	684.81	686.34	687.87
265	685.05	686.60	688.16	689.71	691.26	692.80	694.35	695.89	697.42	698.96	700.49
270	697.61	699.17	700.73	702.29	703.84	705.39	706.94	708.49	710.03	711.57	713.11
275	710.16	711.74	713.31	714.87	716.43	717.98	719.54	721.09	722.64	724.18	725.73
280	722.74	724.31	725.88	727.44	729.01	730.57	732.13	733.69	735.24	736.79	738.34
285	735.30	736.87	738.45	740.02	741.59	743.15	744.72	746.28	747.84	749.39	750.95
290	747.85	749.43	751.01	752.59	754.16	755.74	757.31	758.87	760.44	762.00	763.55
295	760.41	761.99	763.58	765.16	766.74	768.32	769.89	771.46	773.03	774.59	776.16
300	772.96	774.55	776.14	777.73	779.31	780.89	782.47	784.05	785.62	787.19	788.76
310	798.06	799.66	801.26	802.86	804.45	806.04	807.63	809.21	810.80	812.37	813.95
320	823.16	824.77	826.38	827.98	829.58	831.18	832.78	834.37	835.96	837.55	839.13
330	848.25	849.87	851.48	853.10	854.71	856.31	857.92	859.52	861.12	862.71	864.31
340	873.34	874.96	876.59	878.21	879.83	881.44	883.05	884.66	886.27	887.87	889.47
350	898.42	900.05	901.68	903.31	904.94	906.56	908.18	909.80	911.41	913.02	914.63
360	923.50	925.14	926.78	928.41	930.05	931.68	933.30	934.93	936.55	938.16	939.78
370	948.57	950.22	951.87	953.51	955.15	956.78	958.42	960.05	961.68	963.30	964.92
380	973.64	975.30	976.95	978.60	980.24	981.89	983.53	985.17	986.80	988.43	990.06
390	998.71	1000.37	1002.03	1003.69	1005.34	1006.99	1008.63	1010.28	1011.92	1013.56	1015.19
400	1023.78	1025.44	1027.11	1028.77	1030.43	1032.08	1033.74	1035.38	1037.03	1038.68	1040.32

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	408.71	410.07	411.42	412.77	414.12	415.47	416.81	418.16	419.50	420.84	422.17
155	421.49	422.86	424.22	425.58	426.94	428.30	429.65	431.00	432.35	433.70	435.04
160	434.26	435.63	437.01	438.38	439.74	441.11	442.47	443.83	445.19	446.55	447.90
165	447.01	448.40	449.78	451.16	452.54	453.91	455.28	456.65	458.02	459.38	460.75
170	459.76	461.15	462.54	463.93	465.32	466.70	468.08	469.46	470.84	472.21	473.58
175	472.49	473.89	475.29	476.69	478.09	479.48	480.87	482.26	483.64	485.02	486.40
180	485.22	486.63	488.04	489.44	490.85	492.25	493.64	495.04	496.43	497.82	499.20
185	497.93	499.35	500.77	502.18	503.60	505.00	506.41	507.81	509.21	510.61	512.00
190	510.64	512.07	513.49	514.92	516.34	517.75	519.17	520.58	521.98	523.39	524.79
195	523.34	524.77	526.21	527.64	529.07	530.49	531.91	533.33	534.74	536.16	537.56
200	536.03	537.47	538.91	540.35	541.79	543.22	544.65	546.07	547.50	548.92	550.33
205	548.71	550.17	551.61	553.06	554.50	555.94	557.38	558.81	560.24	561.67	563.09
210	561.39	562.85	564.31	565.76	567.21	568.66	570.10	571.54	572.98	574.41	575.84
215	574.06	575.53	576.99	578.45	579.91	581.36	582.81	584.26	585.70	587.14	588.58
220	586.73	588.20	589.67	591.14	592.60	594.06	595.52	596.97	598.42	599.87	601.31
225	599.39	600.87	602.34	603.82	605.29	606.76	608.22	609.68	611.14	612.59	614.04
230	612.04	613.53	615.01	616.49	617.97	619.44	620.91	622.38	623.84	625.30	626.76
235	624.69	626.18	627.67	629.16	630.64	632.12	633.60	635.07	636.54	638.01	639.47
240	637.33	638.83	640.33	641.82	643.31	644.80	646.28	647.76	649.24	650.71	652.18
245	649.97	651.48	652.98	654.48	655.98	657.47	658.96	660.44	661.92	663.40	664.88
250	662.61	664.12	665.63	667.13	668.64	670.13	671.63	673.12	674.61	676.09	677.57
255	675.24	676.76	678.27	679.78	681.29	682.79	684.29	685.79	687.28	688.77	690.26
260	687.87	689.39	690.91	692.43	693.94	695.45	696.95	698.46	699.95	701.45	702.94
265	700.49	702.02	703.54	705.06	706.58	708.10	709.61	711.12	712.62	714.12	715.62
270	713.11	714.64	716.17	717.70	719.22	720.74	722.26	723.77	725.28	726.79	728.29
275	725.73	727.26	728.80	730.33	731.86	733.39	734.91	736.43	737.94	739.45	740.96
280	738.34	739.88	741.42	742.96	744.49	746.02	747.55	749.07	750.59	752.11	753.62
285	750.95	752.50	754.04	755.58	757.12	758.66	760.19	761.72	763.24	764.76	766.28
290	763.55	765.11	766.66	768.20	769.75	771.29	772.82	774.36	775.89	777.41	778.94
295	776.16	777.71	779.27	780.82	782.37	783.92	785.46	786.99	788.53	790.06	791.59
300	788.76	790.32	791.88	793.44	794.99	796.54	798.06	799.63	801.17	802.70	804.23
310	813.95	815.52	817.09	818.66	820.22	821.78	823.33	824.88	826.43	827.97	829.52
320	839.13	840.71	842.29	843.86	845.44	847.00	848.57	850.13	851.68	853.23	854.78
330	864.31	865.90	867.48	869.06	870.64	872.22	873.79	875.36	876.92	878.48	880.04
340	889.47	891.07	892.66	894.25	895.84	897.42	899.00	900.58	902.15	903.72	905.28
350	914.63	916.23	917.83	919.43	921.03	922.62	924.20	925.79	927.37	928.94	930.52
360	939.78	941.39	943.00	944.60	946.20	947.80	949.40	950.99	952.58	954.16	955.74
370	964.92	966.54	968.16	969.77	971.38	972.98	974.58	976.18	977.77	979.37	980.95
380	990.06	991.68	993.31	994.92	996.54	998.15	999.76	1001.36	1002.96	1004.56	1006.16
390	1015.19	1016.82	1018.45	1020.07	1021.70	1023.31	1024.93	1026.54	1028.15	1029.75	1031.35
400	1040.32	1041.95	1043.59	1045.22	1046.85	1048.47	1050.09	1051.71	1053.32	1054.93	1056.54

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(h) Plenum entropy, S_0/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	*	2	4	6	8	10	12	14	16	18	20
15	7.6465	6.9072	6.1700	5.7232	5.3973	5.1390	4.9250	4.7424	4.5839	4.4444	4.3204
16	7.8079	7.0742	6.3425	5.9010	5.5798	5.3258	5.1153	4.9358	4.7795	4.6415	4.5185
17	7.9595	7.2304	6.5033	6.0659	5.7486	5.4981	5.2906	5.1136	4.9593	4.8229	4.7010
18	8.1024	7.3772	6.6538	6.2199	5.9058	5.6581	5.4532	5.2783	5.1259	4.9909	4.8701
19	8.2375	7.5156	6.7954	6.3644	6.0530	5.8077	5.6050	5.4319	5.2811	5.1474	5.0276
20	8.3658	7.6467	6.9290	6.5006	6.1914	5.9482	5.7473	5.5759	5.4264	5.2940	5.1751
21	8.4877	7.7711	7.0557	6.6293	6.3221	6.0807	5.8813	5.7114	5.5631	5.4318	5.3138
22	8.6040	7.8894	7.1760	6.7515	6.4459	6.2060	6.0081	5.8393	5.6922	5.5618	5.4447
23	8.7152	8.0024	7.2907	6.8677	6.5636	6.3251	6.1283	5.9607	5.8145	5.6850	5.5686
24	8.8216	8.1104	7.4002	6.9786	6.6758	6.4384	6.2427	6.0761	5.9308	5.8020	5.6863
25	8.9236	8.2138	7.5049	7.0846	6.7829	6.5466	6.3519	6.1860	6.0416	5.9135	5.7984
26	9.0217	8.3131	7.6054	7.1862	6.8855	6.6501	6.4562	6.2911	6.1474	6.0199	5.9055
27	9.1160	8.4086	7.7019	7.2836	6.9838	6.7493	6.5561	6.3918	6.2486	6.1218	6.0078
28	9.2069	8.5005	7.7947	7.3773	7.0783	6.8445	6.6521	6.4884	6.3458	6.2195	6.1060
29	9.2947	8.5891	7.8842	7.4676	7.1693	6.9361	6.7443	6.5812	6.4391	6.3133	6.2003
30	9.3794	8.6747	7.9705	7.5546	7.2570	7.0244	6.8332	6.6706	6.5290	6.4036	6.2910
31	9.4614	8.7574	8.0539	7.6386	7.3416	7.1096	6.9189	6.7567	6.6156	6.4906	6.3783
32	9.5408	8.8374	8.1346	7.7198	7.4234	7.1919	7.0016	6.8399	6.6992	6.5745	6.4626
33	9.6177	8.9150	8.2127	7.7985	7.5025	7.2715	7.0816	6.9203	6.7799	6.6556	6.5441
34	9.6923	8.9901	8.2884	7.8747	7.5791	7.3485	7.1591	6.9981	6.8581	6.7341	6.6228
35	9.7648	9.0631	8.3618	7.9486	7.6534	7.4232	7.2341	7.0735	6.9338	6.8101	6.6991
36	9.8352	9.1340	8.4331	8.0203	7.7256	7.4957	7.3069	7.1466	7.0072	6.8838	6.7731
37	9.9037	9.2029	8.5025	8.0900	7.7956	7.5661	7.3776	7.2176	7.0785	6.9553	6.8448
38	9.9704	9.2700	8.5699	8.1578	7.8637	7.6345	7.4463	7.2866	7.1477	7.0248	6.9145
39	10.0353	9.3353	8.6355	8.2237	7.9300	7.7011	7.5132	7.3537	7.2150	7.0923	6.9822
40	10.0986	9.3989	8.6995	8.2880	7.9945	7.7658	7.5782	7.4190	7.2805	7.1530	7.0481
42	10.2206	9.5215	8.8226	8.4117	8.1187	7.8905	7.7033	7.5445	7.4065	7.2844	7.1748
44	10.3369	9.6383	8.9400	8.5295	8.2370	8.0092	7.8224	7.6639	7.5262	7.4044	7.2952
46	10.4480	9.7499	9.0520	8.6419	8.3498	8.1224	7.9359	7.7778	7.6404	7.5189	7.4100
48	10.5544	9.8567	9.1592	8.7494	8.4577	8.2306	8.0444	7.8866	7.7495	7.6283	7.5196
50	10.6565	9.9591	9.2619	8.8525	8.5610	8.3342	8.1484	7.9908	7.8539	7.7329	7.6245
52	10.7545	10.0575	9.3606	8.9515	8.6603	8.4337	8.2481	8.0907	7.9541	7.8333	7.7251
54	10.8489	10.1521	9.4555	9.0466	8.7557	8.5293	8.3439	8.1868	8.0504	7.9298	7.8217
56	10.9398	10.2433	9.5469	9.1383	8.8475	8.6214	8.4362	8.2793	8.1430	8.0226	7.9147
58	11.0275	10.3313	9.6351	9.2266	8.9361	8.7102	8.5251	8.3684	8.2323	8.1120	8.0043
60	11.1123	10.4162	9.7202	9.3120	9.0216	8.7959	8.6110	8.4544	8.3184	8.1983	8.0907
62	11.1943	10.4984	9.8026	9.3945	9.1043	8.8787	8.6940	8.5375	8.4017	8.2817	8.1742
64	11.2736	10.5779	9.8823	9.4743	9.1843	8.9588	8.7742	8.6179	8.4822	8.3624	8.2550
66	11.3506	10.6550	9.9595	9.5517	9.2618	9.0365	8.8520	8.6958	8.5602	8.4405	8.3332
68	11.4252	10.7298	10.0344	9.6267	9.3369	9.1117	8.9274	8.7713	8.6358	8.5162	8.4090
70	11.4977	10.8024	10.1071	9.6996	9.4099	9.1848	9.0006	8.8446	8.7092	8.5896	8.4825

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	*	10	20	30	40	50	60	70	80	90	100
15	7.6465	5.1390	4.3204	3.8635	3.5719	3.3679	3.2142	3.0920	2.9910	2.9050	2.8302
16	7.8079	5.3258	4.5185	4.0582	3.7572	3.5439	3.3826	3.2544	3.1486	3.0586	2.9805
17	7.9595	5.4981	4.7010	4.2399	3.9323	3.7114	3.5434	3.4096	3.2992	3.2056	3.1243
18	8.1024	5.6581	4.8701	4.4097	4.0977	3.8708	3.6970	3.5582	3.4435	3.3463	3.2620
19	8.2375	5.8077	5.0276	4.5689	4.2541	4.0225	3.8437	3.7004	3.5819	3.4813	3.3942
20	8.3658	5.9482	5.1751	4.7185	4.4021	4.1669	3.9841	3.8368	3.7147	3.6110	3.5212
21	8.4877	6.0807	5.3138	4.8594	4.5422	4.3045	4.1183	3.9676	3.8423	3.7358	3.6434
22	8.6040	6.2060	5.4447	4.9926	4.6752	4.4356	4.2468	4.0932	3.9650	3.8559	3.7612
23	8.7152	6.3251	5.5686	5.1188	4.8017	4.5608	4.3698	4.2138	4.0832	3.9717	3.8748
24	8.8216	6.4384	5.6863	5.2388	4.9221	4.6804	4.4878	4.3297	4.1970	4.0834	3.9845
25	8.9236	6.5466	5.7984	5.3530	5.0369	4.7948	4.6010	4.4412	4.3066	4.1912	4.0906
26	9.0217	6.6501	5.9055	5.4620	5.1467	4.9043	4.7096	4.5485	4.4124	4.2953	4.1931
27	9.1160	6.7493	6.0078	5.5663	5.2518	5.0094	4.8140	4.6519	4.5144	4.3959	4.2923
28	9.2069	6.8445	6.1060	5.6662	5.3526	5.1103	4.9145	4.7515	4.6130	4.4932	4.3883
29	9.2947	6.9361	6.2003	5.7621	5.4493	5.2073	5.0112	4.8476	4.7082	4.5874	4.4813
30	9.3794	7.0244	6.2910	5.8543	5.5424	5.3007	5.1045	4.9404	4.8002	4.6785	4.5715
31	9.4614	7.1096	6.3783	5.9431	5.6321	5.3907	5.1945	5.0300	4.8892	4.7668	4.6590
32	9.5408	7.1919	6.4626	6.0288	5.7186	5.4776	5.2814	5.1167	4.9754	4.8524	4.7438
33	9.6177	7.2715	6.5441	6.1115	5.8021	5.5615	5.3654	5.2005	5.0590	4.9354	4.8262
34	9.6923	7.3485	6.6228	6.1914	5.8828	5.6427	5.4467	5.2818	5.1399	5.0159	4.9062
35	9.7648	7.4232	6.6991	6.2688	5.9609	5.7213	5.5255	5.3605	5.2184	5.0941	4.9839
36	9.8352	7.4957	6.7731	6.3438	6.0366	5.7974	5.6018	5.4369	5.2947	5.1701	5.0595
37	9.9037	7.5661	6.8448	6.4165	6.1100	5.8712	5.6759	5.5110	5.3687	5.2439	5.1331
38	9.9704	7.6345	6.9145	6.4871	6.1813	5.9429	5.7478	5.5830	5.4407	5.3157	5.2046
39	10.0353	7.7011	6.9822	6.5557	6.2505	6.0125	5.8177	5.6531	5.5107	5.3856	5.2743
40	10.0986	7.7658	7.0481	6.6224	6.3178	6.0803	5.8857	5.7212	5.5788	5.4537	5.3422
42	10.2206	7.8905	7.1748	6.7506	6.4470	6.2103	6.0163	5.8521	5.7098	5.5846	5.4729
44	10.3369	8.0092	7.2952	6.8723	6.5698	6.3338	6.1403	5.9764	5.8344	5.7092	5.5974
46	10.4480	8.1224	7.4100	6.9883	6.6866	6.4513	6.2584	6.0948	5.9530	5.8279	5.7161
48	10.5544	8.2306	7.5196	7.0989	6.7981	6.5635	6.3710	6.2078	6.0662	5.9413	5.8295
50	10.6565	8.3342	7.6245	7.2048	6.9047	6.6707	6.4787	6.3159	6.1745	6.0497	5.9380
52	10.7545	8.4337	7.7251	7.3063	7.0069	6.7734	6.5819	6.4194	6.2783	6.1537	6.0421
54	10.8489	8.5293	7.8217	7.4037	7.1050	6.8720	6.6809	6.5187	6.3779	6.2535	6.1420
56	10.9398	8.6214	7.9147	7.4974	7.1993	6.9668	6.7761	6.6142	6.4737	6.3494	6.2381
58	11.0275	8.7102	8.0043	7.5876	7.2901	7.0580	6.8677	6.7062	6.5658	6.4418	6.3306
60	11.1123	8.7959	8.0907	7.6747	7.3776	7.1460	6.9560	6.7948	6.6547	6.5309	6.4199
62	11.1943	8.8787	8.1742	7.7587	7.4621	7.2309	7.0412	6.8803	6.7405	6.6168	6.5060
64	11.2736	8.9588	8.2550	7.8400	7.5439	7.3130	7.1236	6.9630	6.8234	6.6999	6.5892
66	11.3506	9.0365	8.3332	7.9187	7.6230	7.3924	7.2034	7.0429	6.9035	6.7803	6.6697
68	11.4252	9.1117	8.4090	7.9950	7.6996	7.4694	7.2806	7.1204	6.9812	6.8581	6.7477
70	11.4977	9.1848	8.4825	8.0689	7.7739	7.5440	7.3554	7.1955	7.0565	6.9336	6.8234

*For these cases, the entropy function is that of gaseous helium whose pressure is 1×10^5 N/m^2 and whose compressibility factor is 1.

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(h) Continued. Plenum entropy, S_o/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	2.8302	2.7639	2.7045	2.6505	2.6012	2.5556	2.5133	2.4739	2.4369	2.4020	2.3691
16	2.9805	2.9115	2.8497	2.7937	2.7425	2.6953	2.6516	2.6108	2.5726	2.5366	2.5026
17	3.1243	3.0526	2.9885	2.9305	2.8776	2.8289	2.7837	2.7417	2.7023	2.6653	2.6303
18	3.2620	3.1878	3.1215	3.0616	3.0070	2.9567	2.9103	2.8670	2.8265	2.7884	2.7525
19	3.3942	3.3175	3.2491	3.1873	3.1311	3.0794	3.0316	2.9871	2.9456	2.9065	2.8697
20	3.5212	3.4422	3.3717	3.3082	3.2503	3.1972	3.1482	3.1025	3.0599	3.0200	2.9823
21	3.6434	3.5622	3.4898	3.4245	3.3651	3.3106	3.2603	3.2136	3.1700	3.1291	3.0906
22	3.7612	3.6779	3.6036	3.5367	3.4758	3.4200	3.3685	3.3207	3.2761	3.2343	3.1949
23	3.8748	3.7896	3.7135	3.6450	3.5827	3.5256	3.4730	3.4241	3.3785	3.3358	3.2957
24	3.9845	3.8974	3.8197	3.7497	3.6860	3.6277	3.5740	3.5241	3.4776	3.4340	3.3931
25	4.0906	4.0018	3.9225	3.8511	3.7861	3.7266	3.6717	3.6209	3.5735	3.5291	3.4873
26	4.1931	4.1027	4.0220	3.9493	3.8831	3.8224	3.7665	3.7147	3.6664	3.6212	3.5787
27	4.2923	4.2005	4.1185	4.0445	3.9771	3.9154	3.8585	3.8058	3.7566	3.7107	3.6674
28	4.3883	4.2953	4.2121	4.1369	4.0684	4.0057	3.9479	3.8943	3.8443	3.7975	3.7536
29	4.4813	4.3872	4.3029	4.2266	4.1571	4.0935	4.0347	3.9803	3.9295	3.8820	3.8374
30	4.5715	4.4764	4.3910	4.3138	4.2434	4.1788	4.1192	4.0640	4.0125	3.9643	3.9190
31	4.6590	4.5629	4.4767	4.3985	4.3273	4.2618	4.2015	4.1454	4.0932	4.0444	3.9985
32	4.7438	4.6470	4.5599	4.4810	4.4089	4.3427	4.2816	4.2248	4.1720	4.1225	4.0760
33	4.8262	4.7287	4.6409	4.5612	4.4884	4.4215	4.3596	4.3022	4.2487	4.1986	4.1515
34	4.9062	4.8081	4.7196	4.6393	4.5658	4.4982	4.4358	4.3777	4.3236	4.2729	4.2253
35	4.9839	4.8853	4.7963	4.7153	4.6413	4.5731	4.5100	4.4514	4.3967	4.3455	4.2973
36	5.0595	4.9605	4.8709	4.7895	4.7148	4.6461	4.5825	4.5233	4.4681	4.4163	4.3677
37	5.1331	5.0336	4.9437	4.8617	4.7866	4.7173	4.6532	4.5935	4.5378	4.4856	4.4365
38	5.2046	5.1049	5.0145	4.9322	4.8566	4.7869	4.7223	4.6621	4.6060	4.5533	4.5037
39	5.2743	5.1743	5.0836	5.0009	4.9249	4.8548	4.7898	4.7292	4.6726	4.6195	4.5695
40	5.3422	5.2419	5.1510	5.0679	4.9916	4.9211	4.8557	4.7948	4.7378	4.6843	4.6339
42	5.4729	5.3723	5.2809	5.1973	5.1204	5.0493	4.9832	4.9216	4.8639	4.8097	4.7586
44	5.5974	5.4966	5.4049	5.3209	5.2435	5.1719	5.1052	5.0430	4.9848	4.9300	4.8783
46	5.7161	5.6151	5.5232	5.4389	5.3612	5.2892	5.2222	5.1595	5.1007	5.0454	4.9932
48	5.8295	5.7285	5.6364	5.5520	5.4740	5.4017	5.3343	5.2712	5.2121	5.1563	5.1037
50	5.9380	5.8370	5.7449	5.6603	5.5822	5.5096	5.4420	5.3786	5.3191	5.2631	5.2101
52	6.0421	5.9411	5.8490	5.7644	5.6861	5.6134	5.5455	5.4819	5.4222	5.3658	5.3125
54	6.1420	6.0411	5.9490	5.8643	5.7860	5.7132	5.6452	5.5814	5.5214	5.4649	5.4113
56	6.2381	6.1373	6.0453	5.9606	5.8822	5.8093	5.7412	5.6773	5.6172	5.5604	5.5067
58	6.3306	6.2300	6.1380	6.0533	5.9749	5.9020	5.8338	5.7698	5.7096	5.6527	5.5988
60	6.4199	6.3193	6.2274	6.1428	6.0644	5.9914	5.9232	5.8592	5.7988	5.7418	5.6878
62	6.5060	6.4055	6.3137	6.2292	6.1508	6.0779	6.0096	5.9456	5.8852	5.8281	5.7740
64	6.5892	6.4889	6.3972	6.3127	6.2344	6.1615	6.0933	6.0291	5.9687	5.9116	5.8574
66	6.6697	6.5696	6.4780	6.3936	6.3153	6.2424	6.1742	6.1101	6.0497	5.9925	5.9382
68	6.7477	6.6477	6.5562	6.4719	6.3937	6.3209	6.2527	6.1886	6.1281	6.0709	6.0167
70	6.8234	6.7234	6.6320	6.5478	6.4697	6.3969	6.3288	6.2647	6.2043	6.1471	6.0928

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	2.3691	2.3378	2.3081	2.2797	2.2526	2.2267	2.2017	2.1778	2.1547	2.1324	2.1109
16	2.5026	2.4704	2.4398	2.4106	2.3827	2.3560	2.3303	2.3057	2.2820	2.2591	2.2370
17	2.6303	2.5972	2.5657	2.5357	2.5071	2.4797	2.4534	2.4281	2.4038	2.3803	2.3577
18	2.7525	2.7185	2.6863	2.6555	2.6262	2.5981	2.5712	2.5453	2.5204	2.4965	2.4733
19	2.8697	2.8349	2.8018	2.7704	2.7404	2.7117	2.6841	2.6577	2.6323	2.6078	2.5842
20	2.9823	2.9467	2.9129	2.8807	2.8500	2.8207	2.7926	2.7657	2.7397	2.7147	2.6907
21	3.0906	3.0542	3.0196	2.9868	2.9555	2.9256	2.8969	2.8695	2.8430	2.8176	2.7931
22	3.1949	3.1578	3.1225	3.0890	3.0571	3.0266	2.9974	2.9695	2.9426	2.9167	2.8917
23	3.2957	3.2577	3.2218	3.1877	3.1552	3.1241	3.0944	3.0659	3.0386	3.0122	2.9868
24	3.3931	3.3544	3.3178	3.2830	3.2499	3.2183	3.1881	3.1591	3.1313	3.1046	3.0788
25	3.4873	3.4480	3.4107	3.3753	3.3417	3.3095	3.2788	3.2493	3.2211	3.1939	3.1677
26	3.5787	3.5387	3.5008	3.4648	3.4305	3.3979	3.3667	3.3367	3.3080	3.2804	3.2538
27	3.6674	3.6267	3.5882	3.5516	3.5168	3.4836	3.4519	3.4215	3.3924	3.3644	3.3374
28	3.7536	3.7122	3.6731	3.6359	3.6006	3.5669	3.5347	3.5039	3.4743	3.4459	3.4186
29	3.8374	3.7954	3.7556	3.7179	3.6821	3.6479	3.6152	3.5840	3.5540	3.5252	3.4975
30	3.9190	3.8764	3.8360	3.7978	3.7614	3.7267	3.6936	3.6619	3.6316	3.6024	3.5743
31	3.9985	3.9552	3.9143	3.8755	3.8387	3.8035	3.7700	3.7379	3.7071	3.6775	3.6491
32	4.0760	4.0321	3.9907	3.9514	3.9140	3.8784	3.8445	3.8119	3.7808	3.7508	3.7220
33	4.1515	4.1071	4.0652	4.0254	3.9876	3.9515	3.9171	3.8842	3.8527	3.8224	3.7932
34	4.2253	4.1804	4.1379	4.0976	4.0594	4.0229	3.9881	3.9548	3.9229	3.8922	3.8627
35	4.2973	4.2519	4.2089	4.1682	4.1295	4.0926	4.0574	4.0237	3.9915	3.9605	3.9307
36	4.3677	4.3218	4.2784	4.2372	4.1981	4.1608	4.1252	4.0912	4.0585	4.0272	3.9971
37	4.4365	4.3901	4.3463	4.3047	4.2652	4.2275	4.1915	4.1571	4.1242	4.0925	4.0621
38	4.5037	4.4569	4.4127	4.3707	4.3308	4.2928	4.2564	4.2217	4.1884	4.1564	4.1257
39	4.5695	4.5223	4.4777	4.4353	4.3951	4.3567	4.3200	4.2849	4.2513	4.2190	4.1880
40	4.6339	4.5863	4.5413	4.4986	4.4580	4.4193	4.3823	4.3469	4.3130	4.2804	4.2491
42	4.7586	4.7104	4.6647	4.6213	4.5800	4.5407	4.5031	4.4671	4.4326	4.3995	4.3677
44	4.8783	4.8295	4.7832	4.7392	4.6973	4.6574	4.6193	4.5827	4.5477	4.5141	4.4818
46	4.9932	4.9439	4.8971	4.8526	4.8102	4.7698	4.7311	4.6941	4.6586	4.6245	4.5917
48	5.1037	5.0539	5.0067	4.9617	4.9189	4.8780	4.8389	4.8015	4.7656	4.7311	4.6978
50	5.2101	5.1599	5.1123	5.0669	5.0237	4.9825	4.9430	4.9051	4.8688	4.8339	4.8003
52	5.3125	5.2621	5.2141	5.1684	5.1249	5.0832	5.0434	5.0052	4.9686	4.9333	4.8994
54	5.4113	5.3606	5.3123	5.2664	5.2225	5.1806	5.1405	5.1020	5.0650	5.0295	4.9952
56	5.5067	5.4557	5.4072	5.3610	5.3169	5.2748	5.2343	5.1956	5.1583	5.1225	5.0880
58	5.5988	5.5476	5.4990	5.4526	5.4082	5.3658	5.3252	5.2862	5.2487	5.2127	5.1779
60	5.6878	5.6365	5.5877	5.5411	5.4966	5.4541	5.4132	5.3740	5.3363	5.3001	5.2651
62	5.7740	5.7226	5.6736	5.6269	5.5823	5.5395	5.4985	5.4592	5.4213	5.3848	5.3497
64	5.8574	5.8059	5.7569	5.7100	5.6653	5.6224	5.5813	5.5418	5.5037	5.4671	5.4318
66	5.9382	5.8867	5.8376	5.7907	5.7458	5.7028	5.6616	5.6219	5.5838	5.5470	5.5116
68	6.0167	5.9651	5.9159	5.8689	5.8240	5.7809	5.7396	5.6998	5.6616	5.6247	5.5891
70	6.0928	6.0412	5.9919	5.9449	5.8999	5.8568	5.8154	5.7755	5.7372	5.7002	5.6646

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(h) Continued. Plenum entropy, S_o/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	*	10	20	30	40	50	60	70	80	90	100
70	11.4977	9.1848	8.4825	8.0689	7.7739	7.5440	7.3554	7.1955	7.0565	6.9336	6.8234
72	11.5681	9.2558	8.5540	8.1407	7.8460	7.6164	7.4281	7.2683	7.1296	7.0068	6.8967
74	11.6366	9.3248	8.6234	8.2105	7.9161	7.6867	7.4987	7.3391	7.2005	7.0779	6.9680
76	11.7033	9.3919	8.6909	8.2784	7.9842	7.7551	7.5673	7.4079	7.2695	7.1470	7.0372
78	11.7682	9.4573	8.7566	8.3444	8.0505	7.8217	7.6340	7.4748	7.3366	7.2143	7.1046
80	11.8315	9.5210	8.8207	8.4087	8.1151	7.8865	7.6990	7.5400	7.4019	7.2797	7.1702
82	11.8932	9.5831	8.8831	8.4714	8.1780	7.9496	7.7623	7.6035	7.4655	7.3435	7.2341
84	11.9535	9.6437	8.9440	8.5326	8.2394	8.0111	7.8240	7.6654	7.5275	7.4057	7.2964
86	12.0123	9.7028	9.0034	8.5922	8.2993	8.0712	7.8842	7.7257	7.5880	7.4663	7.3571
88	12.0698	9.7606	9.0614	8.6505	8.3577	8.1298	7.9430	7.7847	7.6471	7.5255	7.4164
90	12.1260	9.8171	9.1181	8.7074	8.4148	8.1871	8.0005	7.8422	7.7048	7.5833	7.4743
92	12.1809	9.8723	9.1736	8.7630	8.4706	8.2431	8.0566	7.8985	7.7611	7.6397	7.5309
94	12.2347	9.9263	9.2278	8.8174	8.5252	8.2978	8.1114	7.9534	7.8162	7.6949	7.5862
96	12.2873	9.9791	9.2809	8.8707	8.5786	8.3513	8.1651	8.0072	7.8701	7.7489	7.6403
98	12.3388	10.0309	9.3328	8.9228	8.6309	8.4037	8.2176	8.0599	7.9229	7.8018	7.6932
100	12.3894	10.0816	9.3837	8.9739	8.6821	8.4551	8.2691	8.1114	7.9745	7.8535	7.7450
102	12.4389	10.1313	9.4336	9.0239	8.7322	8.5054	8.3195	8.1619	8.0251	7.9042	7.7958
104	12.4874	10.1801	9.4825	9.0729	8.7814	8.5546	8.3689	8.2114	8.0747	7.9539	7.8455
106	12.5350	10.2279	9.5304	9.1210	8.8296	8.6029	8.4173	8.2599	8.1233	8.0025	7.8943
108	12.5818	10.2748	9.5775	9.1682	8.8769	8.6503	8.4648	8.3075	8.1710	8.0503	7.9421
110	12.6276	10.3208	9.6237	9.2145	8.9233	8.6968	8.5114	8.3542	8.2177	8.0971	7.9890
112	12.6727	10.3660	9.6690	9.2599	8.9688	8.7425	8.5571	8.4000	8.2636	8.1431	8.0351
114	12.7169	10.4104	9.7135	9.3045	9.0136	8.7873	8.6020	8.4450	8.3087	8.1882	8.0802
116	12.7604	10.4540	9.7572	9.3484	9.0575	8.8313	8.6461	8.4892	8.3529	8.2325	8.1246
118	12.8031	10.4968	9.8002	9.3915	9.1007	8.8746	8.6894	8.5326	8.3964	8.2761	8.1682
120	12.8452	10.5390	9.8425	9.4338	9.1431	8.9171	8.7320	8.5752	8.4391	8.3189	8.2111
122	12.8865	10.5804	9.8840	9.4754	9.1848	8.9589	8.7739	8.6172	8.4811	8.3609	8.2532
124	12.9271	10.6212	9.9249	9.5164	9.2259	9.0000	8.8151	8.6584	8.5224	8.4023	8.2946
126	12.9671	10.6613	9.9650	9.5567	9.2662	9.0404	8.8556	8.6990	8.5631	8.4430	8.3353
128	13.0065	10.7008	10.0046	9.5963	9.3059	9.0802	8.8954	8.7389	8.6030	8.4830	8.3754
130	13.0453	10.7396	10.0436	9.6353	9.3450	9.1194	8.9346	8.7782	8.6424	8.5224	8.4149
132	13.0834	10.7779	10.0819	9.6737	9.3835	9.1579	8.9732	8.8168	8.6811	8.5611	8.4537
134	13.1210	10.8156	10.1197	9.7116	9.4214	9.1959	9.0113	8.8549	8.7192	8.5993	8.4919
136	13.1581	10.8527	10.1569	9.7488	9.4587	9.2333	9.0487	8.8924	8.7567	8.6369	8.5295
138	13.1946	10.8893	10.1935	9.7856	9.4955	9.2701	9.0856	8.9293	8.7937	8.6739	8.5666
140	13.2305	10.9253	10.2296	9.8217	9.5318	9.3064	9.1219	8.9657	8.8302	8.7104	8.6031
142	13.2660	10.9608	10.2652	9.8574	9.5675	9.3422	9.1578	9.0016	8.8661	8.7464	8.6391
144	13.3010	10.9959	10.3003	9.8926	9.6027	9.3774	9.1931	9.0369	8.9015	8.7818	8.6746
146	13.3354	11.0304	10.3349	9.9272	9.6374	9.4122	9.2279	9.0718	8.9364	8.8168	8.7096
148	13.3695	11.0645	10.3691	9.9614	9.6717	9.4465	9.2622	9.1062	8.9708	8.8512	8.7441
150	13.4030	11.0981	10.4027	9.9952	9.7054	9.4803	9.2961	9.1401	9.0048	8.8852	8.7781

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	6.8234	6.7234	6.6320	6.5478	6.4697	6.3969	6.3288	6.2647	6.2043	6.1471	6.0928
72	6.8967	6.7969	6.7056	6.6215	6.5435	6.4708	6.4027	6.3386	6.2782	6.2210	6.1667
74	6.9680	6.8683	6.7771	6.6931	6.6152	6.5425	6.4745	6.4105	6.3501	6.2929	6.2386
76	7.0372	6.9377	6.8466	6.7627	6.6848	6.6123	6.5443	6.4803	6.4199	6.3628	6.3085
78	7.1046	7.0052	6.9142	6.8304	6.7526	6.6801	6.6122	6.5482	6.4879	6.4308	6.3766
80	7.1702	7.0709	6.9800	6.8963	6.8186	6.7461	6.6783	6.6144	6.5541	6.4970	6.4428
82	7.2341	7.1349	7.0441	6.9605	6.8829	6.8105	6.7427	6.6789	6.6186	6.5616	6.5074
84	7.2964	7.1973	7.1066	7.0230	6.9455	6.8732	6.8055	6.7417	6.6815	6.6245	6.5704
86	7.3571	7.2581	7.1676	7.0841	7.0066	6.9344	6.8667	6.8030	6.7429	6.6859	6.6318
88	7.4164	7.3175	7.2270	7.1436	7.0663	6.9941	6.9265	6.8629	6.8028	6.7459	6.6918
90	7.4743	7.3755	7.2851	7.2018	7.1245	7.0524	6.9849	6.9213	6.8613	6.8044	6.7504
92	7.5309	7.4322	7.3419	7.2587	7.1814	7.1094	7.0419	6.9784	6.9184	6.8616	6.8076
94	7.5862	7.4876	7.3974	7.3142	7.2371	7.1651	7.0977	7.0342	6.9743	6.9175	6.8636
96	7.6403	7.5418	7.4516	7.3686	7.2915	7.2196	7.1522	7.0888	7.0290	6.9722	6.9183
98	7.6932	7.5948	7.5047	7.4217	7.3447	7.2729	7.2056	7.1423	7.0824	7.0258	6.9719
100	7.7450	7.6467	7.5567	7.4738	7.3969	7.3251	7.2578	7.1946	7.1348	7.0782	7.0244
102	7.7958	7.6975	7.6076	7.5248	7.4479	7.3762	7.3090	7.2458	7.1861	7.1295	7.0757
104	7.8455	7.7473	7.6575	7.5747	7.4979	7.4263	7.3592	7.2960	7.2363	7.1798	7.1261
106	7.8943	7.7962	7.7064	7.6237	7.5469	7.4754	7.4083	7.3452	7.2856	7.2291	7.1754
108	7.9421	7.8441	7.7544	7.6717	7.5950	7.5235	7.4565	7.3934	7.3339	7.2774	7.2238
110	7.9890	7.8910	7.8014	7.7188	7.6422	7.5707	7.5038	7.4407	7.3812	7.3248	7.2712
112	8.0351	7.9371	7.8476	7.7650	7.6885	7.6171	7.5501	7.4872	7.4277	7.3714	7.3178
114	8.0802	7.9824	7.8929	7.8104	7.7339	7.6625	7.5957	7.5328	7.4733	7.4170	7.3635
116	8.1246	8.0268	7.9374	7.8550	7.7785	7.7072	7.6404	7.5775	7.5181	7.4619	7.4084
118	8.1682	8.0705	7.9811	7.8987	7.8223	7.7511	7.6843	7.6215	7.5621	7.5059	7.4525
120	8.2111	8.1134	8.0241	7.9417	7.8654	7.7942	7.7275	7.6647	7.6054	7.5492	7.4958
122	8.2532	8.1556	8.0663	7.9840	7.9077	7.8366	7.7699	7.7071	7.6479	7.5917	7.5384
124	8.2946	8.1970	8.1078	8.0256	7.9493	7.8782	7.8116	7.7489	7.6897	7.6336	7.5803
126	8.3353	8.2378	8.1486	8.0665	7.9903	7.9192	7.8526	7.7899	7.7308	7.6747	7.6214
128	8.3754	8.2779	8.1888	8.1067	8.0305	7.9595	7.8929	7.8303	7.7712	7.7152	7.6619
130	8.4149	8.3174	8.2283	8.1463	8.0701	7.9991	7.9326	7.8701	7.8110	7.7550	7.7018
132	8.4537	8.3563	8.2672	8.1852	8.1091	8.0382	7.9717	7.9092	7.8501	7.7942	7.7410
134	8.4919	8.3946	8.3056	8.2235	8.1475	8.0766	8.0102	7.9477	7.8886	7.8327	7.7796
136	8.5295	8.4322	8.3433	8.2613	8.1853	8.1144	8.0480	7.9856	7.9266	7.8707	7.8176
138	8.5666	8.4693	8.3804	8.2985	8.2225	8.1517	8.0854	8.0229	7.9640	7.9081	7.8551
140	8.6031	8.5059	8.4170	8.3352	8.2592	8.1884	8.1221	8.0597	8.0008	7.9450	7.8919
142	8.6391	8.5420	8.4531	8.3713	8.2954	8.2246	8.1583	8.0960	8.0371	7.9813	7.9283
144	8.6746	8.5775	8.4887	8.4069	8.3310	8.2603	8.1940	8.1317	8.0728	8.0171	7.9641
146	8.7096	8.6125	8.5237	8.4419	8.3661	8.2954	8.2292	8.1669	8.1081	8.0524	7.9994
148	8.7441	8.6470	8.5583	8.4765	8.4008	8.3301	8.2639	8.2016	8.1428	8.0871	8.0342
150	8.7781	8.6811	8.5924	8.5107	8.4349	8.3643	8.2981	8.2359	8.1771	8.1214	8.0686

*For these cases, the entropy function is that of gaseous helium whose pressure is 1×10^5 N/m^2 and whose compressibility factor is 1.

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(h) Continued. Plenum entropy, S_o/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	6.0928	6.0412	5.9919	5.9449	5.8999	5.8568	5.8154	5.7755	5.7372	5.7002	5.6646
72	6.1667	6.1151	6.0658	6.0188	5.9737	5.9305	5.8891	5.8492	5.8107	5.7737	5.7379
74	6.2386	6.1869	6.1377	6.0906	6.0455	6.0023	5.9608	5.9208	5.8823	5.8452	5.8094
76	6.3085	6.2569	6.2076	6.1605	6.1154	6.0721	6.0306	5.9906	5.9520	5.9149	5.8790
78	6.3766	6.3249	6.2756	6.2285	6.1834	6.1402	6.0986	6.0585	6.0200	5.9828	5.9468
80	6.4428	6.3912	6.3419	6.2948	6.2497	6.2064	6.1648	6.1248	6.0862	6.0489	6.0130
82	6.5074	6.4558	6.4066	6.3595	6.3144	6.2711	6.2295	6.1894	6.1508	6.1135	6.0775
84	6.5704	6.5188	6.4696	6.4225	6.3774	6.3341	6.2925	6.2524	6.2138	6.1765	6.1405
86	6.6318	6.5803	6.5311	6.4840	6.4389	6.3957	6.3540	6.3140	6.2753	6.2380	6.2020
88	6.6918	6.6403	6.5911	6.5441	6.4990	6.4558	6.4141	6.3741	6.3354	6.2981	6.2621
90	6.7504	6.6989	6.6498	6.6028	6.5577	6.5145	6.4729	6.4328	6.3942	6.3569	6.3208
92	6.8076	6.7562	6.7071	6.6601	6.6151	6.5719	6.5303	6.4902	6.4516	6.4143	6.3783
94	6.8636	6.8122	6.7631	6.7162	6.6712	6.6280	6.5864	6.5464	6.5078	6.4705	6.4344
96	6.9183	6.8670	6.8180	6.7711	6.7261	6.6829	6.6414	6.6013	6.5627	6.5255	6.4894
98	6.9719	6.9206	6.8716	6.8247	6.7798	6.7366	6.6951	6.6551	6.6165	6.5793	6.5432
100	7.0244	6.9731	6.9241	6.8773	6.8324	6.7893	6.7478	6.7078	6.6692	6.6320	6.5960
102	7.0757	7.0245	6.9756	6.9288	6.8839	6.8408	6.7993	6.7594	6.7209	6.6836	6.6476
104	7.1261	7.0749	7.0260	6.9792	6.9344	6.8913	6.8499	6.8100	6.7714	6.7342	6.6982
106	7.1754	7.1243	7.0754	7.0287	6.9839	6.9408	6.8994	6.8595	6.8210	6.7838	6.7479
108	7.2238	7.1727	7.1239	7.0772	7.0324	6.9894	6.9480	6.9082	6.8697	6.8325	6.7966
110	7.2712	7.2202	7.1714	7.1248	7.0800	7.0370	6.9957	6.9558	6.9174	6.8803	6.8443
112	7.3178	7.2668	7.2181	7.1714	7.1267	7.0838	7.0425	7.0027	6.9642	6.9271	6.8912
114	7.3635	7.3125	7.2639	7.2173	7.1726	7.1297	7.0884	7.0486	7.0102	6.9731	6.9372
116	7.4084	7.3575	7.3088	7.2623	7.2176	7.1748	7.1335	7.0937	7.0554	7.0183	6.9824
118	7.4525	7.4016	7.3530	7.3065	7.2619	7.2190	7.1778	7.1381	7.0997	7.0627	7.0269
120	7.4958	7.4450	7.3964	7.3499	7.3053	7.2625	7.2213	7.1816	7.1433	7.1063	7.0705
122	7.5384	7.4876	7.4390	7.3926	7.3481	7.3053	7.2641	7.2244	7.1862	7.1492	7.1134
124	7.5803	7.5295	7.4810	7.4346	7.3901	7.3473	7.3062	7.2665	7.2283	7.1913	7.1555
126	7.6214	7.5707	7.5222	7.4758	7.4314	7.3886	7.3475	7.3079	7.2697	7.2328	7.1970
128	7.6619	7.6112	7.5628	7.5164	7.4720	7.4293	7.3882	7.3486	7.3104	7.2735	7.2378
130	7.7018	7.6511	7.6027	7.5564	7.5120	7.4693	7.4283	7.3887	7.3505	7.3136	7.2780
132	7.7410	7.6904	7.6420	7.5957	7.5513	7.5087	7.4677	7.4281	7.3900	7.3531	7.3175
134	7.7796	7.7290	7.6807	7.6344	7.5901	7.5475	7.5065	7.4670	7.4288	7.3920	7.3564
136	7.8176	7.7670	7.7187	7.6725	7.6282	7.5856	7.5447	7.5052	7.4671	7.4303	7.3947
138	7.8551	7.8045	7.7562	7.7101	7.6658	7.6232	7.5823	7.5428	7.5048	7.4680	7.4324
140	7.8919	7.8414	7.7932	7.7470	7.7028	7.6602	7.6193	7.5799	7.5419	7.5051	7.4696
142	7.9283	7.8778	7.8296	7.7835	7.7392	7.6967	7.6559	7.6165	7.5784	7.5417	7.5062
144	7.9641	7.9137	7.8655	7.8194	7.7752	7.7327	7.6918	7.6525	7.6145	7.5778	7.5423
146	7.9994	7.9490	7.9008	7.8548	7.8106	7.7681	7.7273	7.6880	7.6500	7.6133	7.5778
148	8.0342	7.9838	7.9357	7.8897	7.8455	7.8031	7.7623	7.7230	7.6850	7.6484	7.6129
150	8.0686	8.0182	7.9701	7.9241	7.8799	7.8376	7.7968	7.7575	7.7196	7.6829	7.6475

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	*	10	20	30	40	50	60	70	80	90	100
150	13.4030	11.0981	10.4027	9.9952	9.7054	9.4803	9.2961	9.1401	9.0048	8.8852	8.7781
155	13.4850	11.1802	10.4850	10.0775	9.7879	9.5629	9.3788	9.2229	9.0876	8.9682	8.8612
160	13.5644	11.2597	10.5646	10.1573	9.8678	9.6429	9.4588	9.3030	9.1679	9.0485	8.9415
165	13.6413	11.3368	10.6418	10.2345	9.9451	9.7203	9.5364	9.3806	9.2456	9.1262	9.0194
170	13.7159	11.4115	10.7166	10.3095	10.0202	9.7954	9.6116	9.4559	9.3209	9.2017	9.0949
175	13.7884	11.4841	10.7893	10.3822	10.0930	9.8683	9.6846	9.5290	9.3940	9.2749	9.1681
180	13.8588	11.5546	10.8599	10.4529	10.1638	9.9392	9.7555	9.5999	9.4651	9.3460	9.2393
185	13.9273	11.6232	10.9286	10.5217	10.2326	10.0081	9.8244	9.6689	9.5341	9.4151	9.3085
190	13.9940	11.6900	10.9954	10.5886	10.2995	10.0751	9.8915	9.7361	9.6013	9.4823	9.3758
195	14.0589	11.7550	11.0605	10.6537	10.3647	10.1404	9.9568	9.8015	9.6667	9.5478	9.4413
200	14.1222	11.8183	11.1239	10.7172	10.4283	10.2039	10.0205	9.8652	9.7305	9.6116	9.5051
205	14.1840	11.8801	11.1858	10.7791	10.4902	10.2660	10.0825	9.9273	9.7927	9.6738	9.5674
210	14.2442	11.9404	11.2461	10.8395	10.5507	10.3265	10.1431	9.9879	9.8533	9.7345	9.6281
215	14.3030	11.9993	11.3050	10.8985	10.6097	10.3855	10.2022	10.0470	9.9125	9.7937	9.6874
220	14.3605	12.0568	11.3626	10.9561	10.6674	10.4433	10.2599	10.1048	9.9703	9.8516	9.7453
225	14.4167	12.1131	11.4189	11.0124	10.7238	10.4997	10.3164	10.1613	10.0268	9.9081	9.8019
230	14.4716	12.1681	11.4739	11.0675	10.7789	10.5548	10.3716	10.2165	10.0821	9.9634	9.8572
235	14.5254	12.2219	11.5278	11.1214	10.8328	10.6088	10.4256	10.2705	10.1361	10.0175	9.9113
240	14.5780	12.2745	11.5805	11.1741	10.8856	10.6616	10.4784	10.3234	10.1891	10.0704	9.9643
245	14.6296	12.3261	11.6321	11.2258	10.9373	10.7133	10.5302	10.3752	10.2409	10.1223	10.0161
250	14.6801	12.3767	11.6827	11.2764	10.9879	10.7640	10.5808	10.4259	10.2916	10.1731	10.0669
255	14.7296	12.4262	11.7323	11.3260	11.0375	10.8136	10.6305	10.4756	10.3413	10.2228	10.1167
260	14.7781	12.4748	11.7809	11.3746	11.0862	10.8623	10.6792	10.5244	10.3901	10.2716	10.1655
265	14.8258	12.5224	11.8285	11.4223	11.1339	10.9101	10.7270	10.5722	10.4379	10.3195	10.2134
270	14.8725	12.5692	11.8753	11.4691	11.1808	10.9569	10.7739	10.6191	10.4849	10.3664	10.2604
275	14.9184	12.6151	11.9212	11.5151	11.2267	11.0029	10.8199	10.6651	10.5309	10.4125	10.3065
280	14.9634	12.6602	11.9663	11.5602	11.2719	11.0481	10.8651	10.7103	10.5762	10.4577	10.3517
285	15.0076	12.7044	12.0106	11.6045	11.3162	11.0924	10.9095	10.7547	10.6206	10.5022	10.3962
290	15.0511	12.7479	12.0542	11.6481	11.3598	11.1360	10.9531	10.7983	10.6642	10.5458	10.4399
295	15.0939	12.7907	12.0969	11.6909	11.4026	11.1789	10.9959	10.8412	10.7071	10.5887	10.4828
300	15.1359	12.8327	12.1390	11.7329	11.4447	11.2210	11.0381	10.8834	10.7493	10.6309	10.5250
310	15.2179	12.9147	12.2210	11.8150	11.5268	11.3031	11.1203	10.9656	10.8315	10.7132	10.6073
320	15.2972	12.9941	12.3005	11.8945	11.6063	11.3827	11.1998	11.0452	10.9111	10.7929	10.6870
330	15.3742	13.0711	12.3775	11.9715	11.6834	11.4597	11.2769	11.1223	10.9883	10.8700	10.7642
340	15.4488	13.1458	12.4522	12.0462	11.7581	11.5345	11.3517	11.1971	11.0631	10.9449	10.8391
350	15.5213	13.2183	12.5247	12.1188	11.8307	11.6071	11.4243	11.2698	11.1358	11.0176	10.9118
360	15.5917	13.2887	12.5952	12.1893	11.9012	11.6776	11.4949	11.3403	11.2064	11.0882	10.9824
370	15.6602	13.3572	12.6637	12.2578	11.9698	11.7462	11.5635	11.4090	11.2751	11.1569	11.0511
380	15.7269	13.4239	12.7304	12.3246	12.0365	11.8130	11.6303	11.4758	11.3419	11.2237	11.1180
390	15.7918	13.4889	12.7954	12.3896	12.1015	11.8780	11.6954	11.5409	11.4070	11.2888	11.1831
400	15.8551	13.5522	12.8587	12.4529	12.1649	11.9414	11.7588	11.6043	11.4704	11.3523	11.2466

*For these cases, the entropy function is that of gaseous helium whose pressure is 1×10^5 N/m^2 and whose compressibility factor is 1.

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(h) Concluded. Plenum entropy, S_o/R

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	8.7781	8.6811	8.5924	8.5107	8.4349	8.3643	8.2981	8.2359	8.1771	8.1214	8.0686
155	8.8612	8.7642	8.6756	8.5940	8.5183	8.4477	8.3816	8.3195	8.2608	8.2052	8.1524
160	8.9415	8.8447	8.7561	8.6746	8.5990	8.5285	8.4624	8.4003	8.3417	8.2862	8.2334
165	9.0194	8.9226	8.8341	8.7526	8.6771	8.6067	8.5407	8.4787	8.4201	8.3646	8.3119
170	9.0949	8.9981	8.9097	8.8283	8.7528	8.6825	8.6166	8.5546	8.4961	8.4407	8.3880
175	9.1681	9.0715	8.9831	8.9017	8.8263	8.7560	8.6902	8.6283	8.5698	8.5144	8.4619
180	9.2393	9.1427	9.0544	8.9731	8.8977	8.8275	8.7617	8.6998	8.6414	8.5861	8.5335
185	9.3085	9.2119	9.1237	9.0424	8.9671	8.8969	8.8312	8.7693	8.7110	8.6557	8.6032
190	9.3758	9.2793	9.1911	9.1099	9.0346	8.9644	8.8987	8.8370	8.7787	8.7234	8.6710
195	9.4413	9.3448	9.2567	9.1755	9.1003	9.0302	8.9645	8.9028	8.8445	8.7894	8.7370
200	9.5051	9.4087	9.3206	9.2395	9.1643	9.0943	9.0287	8.9670	8.9087	8.8536	8.8012
205	9.5674	9.4710	9.3830	9.3019	9.2267	9.1567	9.0911	9.0295	8.9713	8.9162	8.8639
210	9.6281	9.5318	9.4438	9.3627	9.2876	9.2176	9.1521	9.0905	9.0323	8.9773	8.9250
215	9.6874	9.5911	9.5031	9.4221	9.3470	9.2771	9.2116	9.1500	9.0919	9.0369	8.9846
220	9.7453	9.6490	9.5611	9.4801	9.4051	9.3352	9.2697	9.2081	9.1501	9.0951	9.0428
225	9.8019	9.7056	9.6177	9.5368	9.4618	9.3919	9.3265	9.2650	9.2069	9.1519	9.0997
230	9.8572	9.7610	9.6731	9.5922	9.5172	9.4474	9.3820	9.3205	9.2625	9.2075	9.1554
235	9.9113	9.8151	9.7273	9.6464	9.5715	9.5016	9.4363	9.3748	9.3168	9.2619	9.2098
240	9.9643	9.8681	9.7803	9.6995	9.6246	9.5548	9.4894	9.4280	9.3700	9.3151	9.2630
245	10.0161	9.9200	9.8322	9.7514	9.6765	9.6067	9.5414	9.4800	9.4221	9.3672	9.3151
250	10.0669	9.9709	9.8831	9.8023	9.7274	9.6577	9.5924	9.5310	9.4731	9.4183	9.3662
255	10.1167	10.0207	9.9329	9.8522	9.7773	9.7076	9.6423	9.5810	9.5231	9.4683	9.4162
260	10.1655	10.0695	9.9818	9.9010	9.8262	9.7565	9.6913	9.6299	9.5721	9.5173	9.4653
265	10.2134	10.1174	10.0297	9.9490	9.8742	9.8045	9.7393	9.6780	9.6201	9.5653	9.5133
270	10.2604	10.1644	10.0767	9.9960	9.9212	9.8516	9.7864	9.7251	9.6672	9.6125	9.5605
275	10.3065	10.2105	10.1229	10.0422	9.9674	9.8978	9.8326	9.7713	9.7135	9.6588	9.6068
280	10.3517	10.2558	10.1682	10.0875	10.0128	9.9431	9.8780	9.8167	9.7589	9.7042	9.6523
285	10.3962	10.3003	10.2127	10.1320	10.0573	9.9877	9.9225	9.8613	9.8035	9.7488	9.6969
290	10.4399	10.3440	10.2564	10.1757	10.1010	10.0314	9.9663	9.9051	9.8473	9.7927	9.7408
295	10.4828	10.3869	10.2993	10.2187	10.1440	10.0745	10.0093	9.9481	9.8904	9.8357	9.7838
300	10.5250	10.4291	10.3416	10.2610	10.1863	10.1167	10.0516	9.9904	9.9327	9.8781	9.8262
310	10.6073	10.5115	10.4239	10.3434	10.2687	10.1992	10.1341	10.0730	10.0153	9.9606	9.9088
320	10.6870	10.5912	10.5037	10.4231	10.3485	10.2790	10.2140	10.1528	10.0952	10.0406	9.9888
330	10.7642	10.6684	10.5809	10.5004	10.4258	10.3563	10.2913	10.2302	10.1726	10.1180	10.0662
340	10.8391	10.7433	10.6559	10.5754	10.5008	10.4314	10.3664	10.3053	10.2476	10.1931	10.1414
350	10.9118	10.8161	10.7286	10.6481	10.5736	10.5042	10.4392	10.3781	10.3205	10.2660	10.2143
360	10.9824	10.8867	10.7993	10.7189	10.6443	10.5749	10.5100	10.4489	10.3913	10.3368	10.2851
370	11.0511	10.9554	10.8680	10.7876	10.7131	10.6437	10.5788	10.5178	10.4602	10.4057	10.3540
380	11.1180	11.0223	10.9349	10.8545	10.7800	10.7107	10.6457	10.5847	10.5272	10.4727	10.4211
390	11.1831	11.0875	11.0001	10.9197	10.8452	10.7759	10.7110	10.6500	10.5924	10.5380	10.4863
400	11.2466	11.1509	11.0636	10.9832	10.9087	10.8394	10.7745	10.7135	10.6560	10.6016	10.5499

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	8.0686	8.0182	7.9701	7.9241	7.8799	7.8376	7.7968	7.7575	7.7196	7.6829	7.6475
155	8.1524	8.1021	8.0540	8.0081	7.9640	7.9217	7.8810	7.8417	7.8039	7.7673	7.7319
160	8.2334	8.1832	8.1352	8.0893	8.0453	8.0030	7.9624	7.9232	7.8854	7.8489	7.8135
165	8.3119	8.2618	8.2138	8.1680	8.1240	8.0818	8.0412	8.0021	7.9643	7.9279	7.8926
170	8.3880	8.3379	8.2900	8.2442	8.2004	8.1582	8.1176	8.0786	8.0409	8.0044	7.9692
175	8.4619	8.4118	8.3640	8.3182	8.2744	8.2323	8.1918	8.1527	8.1151	8.0787	8.0435
180	8.5335	8.4835	8.4358	8.3901	8.3463	8.3042	8.2637	8.2248	8.1872	8.1508	8.1157
185	8.6032	8.5532	8.5055	8.4599	8.4161	8.3741	8.3337	8.2948	8.2572	8.2209	8.1858
190	8.6710	8.6211	8.5734	8.5278	8.4841	8.4421	8.4017	8.3628	8.3253	8.2891	8.2540
195	8.7370	8.6871	8.6395	8.5939	8.5502	8.5083	8.4680	8.4291	8.3916	8.3554	8.3204
200	8.8012	8.7514	8.7038	8.6583	8.6146	8.5727	8.5324	8.4936	8.4562	8.4200	8.3850
205	8.8639	8.8141	8.7665	8.7210	8.6774	8.6356	8.5953	8.5565	8.5191	8.4830	8.4480
210	8.9250	8.8752	8.8277	8.7822	8.7387	8.6968	8.6566	8.6179	8.5805	8.5444	8.5095
215	8.9846	8.9349	8.8874	8.8420	8.7984	8.7566	8.7165	8.6777	8.6404	8.6043	8.5694
220	9.0428	8.9931	8.9457	8.9003	8.8568	8.8150	8.7749	8.7362	8.6989	8.6628	8.6280
225	9.0997	9.0501	9.0026	8.9573	8.9138	8.8721	8.8320	8.7933	8.7560	8.7200	8.6852
230	9.1554	9.1057	9.0583	9.0130	8.9696	8.9279	8.8878	8.8491	8.8119	8.7759	8.7411
235	9.2098	9.1601	9.1128	9.0675	9.0241	8.9824	8.9423	8.9037	8.8665	8.8305	8.7958
240	9.2630	9.2134	9.1661	9.1208	9.0774	9.0358	8.9957	8.9572	8.9199	8.8840	8.8493
245	9.3151	9.2656	9.2183	9.1730	9.1296	9.0880	9.0480	9.0094	8.9723	8.9364	8.9016
250	9.3662	9.3166	9.2694	9.2241	9.1808	9.1392	9.0992	9.0607	9.0235	8.9876	8.9529
255	9.4162	9.3667	9.3194	9.2742	9.2309	9.1893	9.1494	9.1109	9.0737	9.0379	9.0032
260	9.4653	9.4157	9.3685	9.3233	9.2800	9.2385	9.1985	9.1600	9.1229	9.0871	9.0524
265	9.5133	9.4639	9.4166	9.3715	9.3282	9.2867	9.2467	9.2083	9.1712	9.1354	9.1007
270	9.5605	9.5111	9.4638	9.4187	9.3755	9.3339	9.2940	9.2556	9.2185	9.1827	9.1481
275	9.6068	9.5574	9.5102	9.4651	9.4218	9.3803	9.3404	9.3020	9.2650	9.2292	9.1946
280	9.6523	9.6028	9.5557	9.5106	9.4674	9.4259	9.3860	9.3476	9.3106	9.2748	9.2402
285	9.6969	9.6475	9.6003	9.5553	9.5121	9.4706	9.4307	9.3924	9.3553	9.3196	9.2850
290	9.7408	9.6914	9.6442	9.5992	9.5560	9.5145	9.4747	9.4363	9.3993	9.3636	9.3291
295	9.7838	9.7345	9.6873	9.6423	9.5991	9.5577	9.5179	9.4795	9.4425	9.4068	9.3723
300	9.8262	9.7768	9.7297	9.6847	9.6416	9.6001	9.5603	9.5220	9.4850	9.4493	9.4148
310	9.9088	9.8595	9.8124	9.7674	9.7243	9.6829	9.6431	9.6048	9.5679	9.5322	9.4977
320	9.9888	9.9395	9.8924	9.8474	9.8043	9.7630	9.7232	9.6850	9.6480	9.6124	9.5780
330	10.0662	10.0169	9.9699	9.9250	9.8819	9.8406	9.8008	9.7626	9.7257	9.6901	9.6557
340	10.1414	10.0921	10.0451	10.0002	9.9571	9.9158	9.8761	9.8379	9.8010	9.7654	9.7310
350	10.2143	10.1650	10.1181	10.0732	10.0301	9.9889	9.9492	9.9110	9.8741	9.8386	9.8042
360	10.2851	10.2359	10.1890	10.1441	10.1011	10.0598	10.0201	9.9820	9.9451	9.9096	9.8752
370	10.3540	10.3048	10.2579	10.2130	10.1700	10.1288	10.0891	10.0510	10.0142	9.9786	9.9443
380	10.4211	10.3719	10.3250	10.2801	10.2371	10.1959	10.1563	10.1181	10.0814	10.0458	10.0115
390	10.4863	10.4372	10.3903	10.3454	10.3025	10.2613	10.2217	10.1835	10.1468	10.1113	10.0770
400	10.5499	10.5008	10.4539	10.4091	10.3662	10.3250	10.2854	10.2473	10.2105	10.1750	10.1407

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(i) Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	2.500	2.594	2.686	2.773	2.853	2.923	2.983	3.030	3.066	3.089	3.100
16	2.500	2.582	2.661	2.736	2.804	2.865	2.918	2.962	2.996	3.022	3.038
17	2.500	2.572	2.642	2.707	2.766	2.820	2.866	2.906	2.939	2.964	2.983
18	2.500	2.564	2.625	2.683	2.735	2.782	2.824	2.860	2.891	2.916	2.935
19	2.500	2.557	2.612	2.663	2.709	2.752	2.789	2.822	2.851	2.875	2.894
20	2.500	2.552	2.601	2.646	2.688	2.726	2.760	2.790	2.817	2.839	2.858
21	2.500	2.547	2.591	2.632	2.670	2.704	2.736	2.763	2.788	2.809	2.827
22	2.500	2.543	2.583	2.620	2.655	2.686	2.714	2.740	2.763	2.783	2.800
23	2.500	2.539	2.576	2.610	2.641	2.670	2.696	2.720	2.741	2.760	2.776
24	2.500	2.536	2.569	2.601	2.630	2.656	2.680	2.702	2.722	2.740	2.755
25	2.500	2.533	2.564	2.593	2.619	2.644	2.666	2.687	2.705	2.722	2.737
26	2.500	2.531	2.559	2.586	2.610	2.633	2.654	2.673	2.690	2.706	2.720
27	2.500	2.528	2.555	2.580	2.602	2.624	2.643	2.661	2.677	2.692	2.706
28	2.500	2.526	2.551	2.574	2.595	2.615	2.633	2.650	2.665	2.680	2.692
29	2.500	2.525	2.548	2.569	2.589	2.607	2.625	2.640	2.655	2.668	2.680
30	2.500	2.523	2.544	2.565	2.583	2.601	2.617	2.632	2.645	2.658	2.670
31	2.500	2.522	2.542	2.561	2.578	2.594	2.610	2.624	2.637	2.649	2.660
32	2.500	2.520	2.539	2.557	2.573	2.589	2.603	2.616	2.629	2.640	2.651
33	2.500	2.519	2.537	2.554	2.569	2.584	2.597	2.610	2.622	2.632	2.643
34	2.500	2.518	2.535	2.551	2.565	2.579	2.592	2.604	2.615	2.625	2.635
35	2.500	2.517	2.533	2.548	2.562	2.575	2.587	2.598	2.609	2.619	2.628
36	2.500	2.516	2.531	2.545	2.558	2.571	2.582	2.593	2.603	2.613	2.622
37	2.500	2.515	2.529	2.543	2.555	2.567	2.578	2.589	2.598	2.607	2.616
38	2.500	2.514	2.528	2.541	2.553	2.564	2.574	2.584	2.594	2.602	2.610
39	2.500	2.514	2.527	2.539	2.550	2.561	2.571	2.580	2.589	2.597	2.605
40	2.500	2.513	2.525	2.537	2.548	2.558	2.567	2.577	2.585	2.593	2.601
42	2.500	2.512	2.523	2.533	2.543	2.553	2.562	2.570	2.578	2.585	2.592
44	2.500	2.511	2.521	2.531	2.540	2.548	2.556	2.564	2.571	2.578	2.585
46	2.500	2.510	2.519	2.528	2.536	2.544	2.552	2.559	2.566	2.572	2.578
48	2.500	2.509	2.518	2.526	2.534	2.541	2.548	2.554	2.561	2.567	2.572
50	2.500	2.508	2.516	2.524	2.531	2.538	2.544	2.550	2.556	2.562	2.567
52	2.500	2.508	2.515	2.522	2.529	2.535	2.541	2.547	2.552	2.558	2.563
54	2.500	2.507	2.514	2.521	2.527	2.533	2.538	2.544	2.549	2.554	2.558
56	2.500	2.507	2.513	2.519	2.525	2.530	2.536	2.541	2.546	2.550	2.555
58	2.500	2.506	2.512	2.518	2.523	2.529	2.533	2.538	2.543	2.547	2.551
60	2.500	2.506	2.511	2.517	2.522	2.527	2.531	2.536	2.540	2.544	2.548
62	2.500	2.505	2.511	2.516	2.521	2.525	2.530	2.534	2.538	2.542	2.545
64	2.500	2.505	2.510	2.515	2.519	2.524	2.528	2.532	2.536	2.539	2.543
66	2.500	2.505	2.509	2.514	2.518	2.522	2.526	2.530	2.534	2.537	2.540
68	2.500	2.505	2.509	2.513	2.517	2.521	2.525	2.528	2.532	2.535	2.538
70	2.500	2.504	2.508	2.512	2.516	2.520	2.523	2.527	2.530	2.533	2.536

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	2.500	2.923	3.100	3.022	2.857	2.706	2.586	2.492	2.417	2.357	2.307
16	2.500	2.865	3.038	3.008	2.882	2.747	2.632	2.539	2.464	2.403	2.352
17	2.500	2.820	2.983	2.985	2.893	2.778	2.671	2.580	2.506	2.444	2.391
18	2.500	2.782	2.935	2.958	2.895	2.799	2.702	2.616	2.542	2.480	2.428
19	2.500	2.752	2.894	2.930	2.889	2.812	2.726	2.646	2.575	2.514	2.461
20	2.500	2.726	2.858	2.902	2.879	2.818	2.744	2.671	2.603	2.544	2.491
21	2.500	2.704	2.827	2.876	2.866	2.820	2.757	2.691	2.628	2.570	2.519
22	2.500	2.686	2.800	2.851	2.852	2.818	2.766	2.707	2.649	2.594	2.544
23	2.500	2.670	2.776	2.828	2.837	2.813	2.771	2.719	2.666	2.615	2.567
24	2.500	2.656	2.755	2.807	2.821	2.806	2.772	2.728	2.680	2.633	2.588
25	2.500	2.644	2.737	2.788	2.806	2.798	2.772	2.734	2.692	2.648	2.606
26	2.500	2.633	2.720	2.771	2.792	2.789	2.769	2.738	2.701	2.661	2.621
27	2.500	2.624	2.706	2.755	2.778	2.779	2.765	2.739	2.707	2.671	2.635
28	2.500	2.615	2.692	2.740	2.764	2.770	2.760	2.739	2.711	2.680	2.646
29	2.500	2.607	2.680	2.727	2.752	2.760	2.754	2.738	2.714	2.686	2.656
30	2.500	2.601	2.670	2.714	2.740	2.750	2.748	2.735	2.715	2.691	2.664
31	2.500	2.594	2.660	2.703	2.729	2.741	2.741	2.732	2.716	2.694	2.670
32	2.500	2.589	2.651	2.692	2.718	2.732	2.734	2.728	2.715	2.696	2.675
33	2.500	2.584	2.643	2.683	2.709	2.723	2.727	2.723	2.713	2.698	2.679
34	2.500	2.579	2.635	2.674	2.699	2.714	2.720	2.719	2.711	2.698	2.681
35	2.500	2.575	2.628	2.666	2.691	2.706	2.713	2.714	2.708	2.697	2.683
36	2.500	2.571	2.622	2.658	2.683	2.699	2.707	2.708	2.704	2.696	2.684
37	2.500	2.567	2.616	2.651	2.675	2.691	2.700	2.703	2.701	2.694	2.684
38	2.500	2.564	2.610	2.644	2.668	2.684	2.694	2.698	2.697	2.692	2.683
39	2.500	2.561	2.605	2.638	2.661	2.678	2.688	2.693	2.693	2.689	2.682
40	2.500	2.558	2.601	2.632	2.655	2.671	2.682	2.688	2.689	2.687	2.681
42	2.500	2.553	2.592	2.622	2.644	2.660	2.671	2.678	2.681	2.681	2.677
44	2.500	2.548	2.585	2.612	2.633	2.649	2.661	2.668	2.673	2.674	2.673
46	2.500	2.544	2.578	2.604	2.624	2.639	2.651	2.659	2.665	2.667	2.667
48	2.500	2.541	2.572	2.597	2.616	2.631	2.642	2.651	2.657	2.661	2.662
50	2.500	2.538	2.567	2.590	2.608	2.623	2.634	2.643	2.650	2.654	2.656
52	2.500	2.535	2.563	2.584	2.602	2.616	2.627	2.636	2.643	2.647	2.651
54	2.500	2.533	2.558	2.579	2.595	2.609	2.620	2.629	2.636	2.641	2.645
56	2.500	2.530	2.555	2.574	2.590	2.603	2.614	2.623	2.630	2.635	2.639
58	2.500	2.529	2.551	2.570	2.585	2.597	2.608	2.617	2.624	2.630	2.634
60	2.500	2.527	2.548	2.566	2.580	2.592	2.603	2.611	2.618	2.624	2.629
62	2.500	2.525	2.545	2.562	2.576	2.588	2.598	2.606	2.613	2.619	2.624
64	2.500	2.524	2.543	2.559	2.572	2.583	2.593	2.601	2.608	2.614	2.619
66	2.500	2.522	2.540	2.556	2.568	2.579	2.589	2.597	2.604	2.610	2.615
68	2.500	2.521	2.538	2.553	2.565	2.575	2.585	2.592	2.599	2.605	2.611
70	2.500	2.520	2.536	2.550	2.562	2.572	2.581	2.589	2.595	2.601	2.606

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(i) Continued. Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	2.307	2.265	2.229	2.197	2.169	2.144	2.122	2.101	2.083	2.065	2.049
16	2.352	2.308	2.271	2.239	2.210	2.185	2.162	2.141	2.122	2.105	2.089
17	2.391	2.347	2.309	2.276	2.247	2.221	2.197	2.176	2.157	2.139	2.123
18	2.428	2.383	2.344	2.310	2.280	2.253	2.229	2.208	2.188	2.170	2.154
19	2.461	2.415	2.376	2.341	2.310	2.283	2.259	2.237	2.217	2.198	2.181
20	2.491	2.446	2.406	2.370	2.339	2.311	2.286	2.264	2.243	2.225	2.207
21	2.519	2.474	2.434	2.398	2.367	2.338	2.313	2.290	2.269	2.249	2.232
22	2.544	2.500	2.460	2.424	2.392	2.364	2.338	2.314	2.293	2.273	2.255
23	2.567	2.524	2.484	2.449	2.417	2.388	2.362	2.338	2.316	2.296	2.278
24	2.588	2.546	2.507	2.472	2.440	2.411	2.385	2.360	2.338	2.318	2.299
25	2.606	2.565	2.528	2.494	2.462	2.433	2.406	2.382	2.360	2.339	2.320
26	2.621	2.583	2.547	2.514	2.483	2.454	2.427	2.403	2.381	2.360	2.341
27	2.635	2.599	2.565	2.532	2.502	2.474	2.447	2.423	2.400	2.380	2.360
28	2.646	2.613	2.580	2.549	2.520	2.492	2.466	2.442	2.420	2.399	2.379
29	2.656	2.625	2.594	2.565	2.536	2.509	2.484	2.460	2.438	2.417	2.398
30	2.664	2.635	2.607	2.578	2.551	2.525	2.500	2.477	2.455	2.435	2.415
31	2.670	2.644	2.617	2.591	2.565	2.540	2.516	2.493	2.472	2.451	2.432
32	2.675	2.651	2.627	2.602	2.577	2.553	2.530	2.508	2.487	2.467	2.448
33	2.679	2.657	2.635	2.612	2.589	2.566	2.544	2.522	2.502	2.482	2.463
34	2.681	2.662	2.642	2.620	2.599	2.577	2.556	2.535	2.515	2.496	2.478
35	2.683	2.666	2.647	2.628	2.607	2.587	2.567	2.547	2.528	2.509	2.491
36	2.684	2.669	2.652	2.634	2.615	2.596	2.577	2.558	2.540	2.522	2.504
37	2.684	2.671	2.656	2.639	2.622	2.604	2.586	2.568	2.551	2.533	2.516
38	2.683	2.672	2.659	2.644	2.628	2.611	2.594	2.577	2.560	2.544	2.528
39	2.682	2.673	2.661	2.647	2.633	2.617	2.602	2.586	2.570	2.554	2.538
40	2.681	2.673	2.662	2.650	2.637	2.623	2.608	2.593	2.578	2.563	2.548
42	2.677	2.672	2.664	2.654	2.643	2.631	2.619	2.606	2.592	2.579	2.565
44	2.673	2.669	2.663	2.656	2.647	2.638	2.627	2.616	2.604	2.592	2.580
46	2.667	2.666	2.662	2.656	2.650	2.642	2.633	2.623	2.613	2.602	2.591
48	2.662	2.661	2.659	2.655	2.650	2.644	2.637	2.629	2.620	2.611	2.601
50	2.656	2.657	2.656	2.653	2.650	2.645	2.639	2.632	2.625	2.617	2.609
52	2.651	2.652	2.652	2.651	2.648	2.645	2.640	2.635	2.629	2.622	2.615
54	2.645	2.647	2.648	2.648	2.646	2.644	2.640	2.636	2.631	2.626	2.620
56	2.639	2.642	2.644	2.644	2.644	2.642	2.640	2.637	2.633	2.628	2.623
58	2.634	2.637	2.640	2.641	2.641	2.640	2.639	2.636	2.633	2.630	2.626
60	2.629	2.633	2.635	2.637	2.638	2.638	2.637	2.635	2.633	2.630	2.627
62	2.624	2.628	2.631	2.633	2.634	2.635	2.635	2.634	2.632	2.630	2.628
64	2.619	2.623	2.627	2.629	2.631	2.632	2.632	2.632	2.631	2.630	2.628
66	2.615	2.619	2.623	2.625	2.628	2.629	2.630	2.630	2.630	2.629	2.627
68	2.611	2.615	2.619	2.622	2.624	2.626	2.627	2.628	2.628	2.627	2.627
70	2.606	2.611	2.615	2.618	2.621	2.623	2.624	2.625	2.626	2.626	2.625

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	2.049	2.034	2.021	2.008	1.995	1.984	1.973	1.962	1.952	1.942	1.933
16	2.089	2.074	2.060	2.047	2.035	2.023	2.012	2.002	1.992	1.982	1.973
17	2.123	2.108	2.094	2.081	2.069	2.057	2.046	2.036	2.026	2.017	2.008
18	2.154	2.138	2.124	2.111	2.098	2.087	2.076	2.065	2.056	2.046	2.037
19	2.181	2.166	2.151	2.138	2.125	2.114	2.102	2.092	2.082	2.073	2.064
20	2.207	2.191	2.177	2.163	2.150	2.138	2.127	2.116	2.106	2.097	2.088
21	2.232	2.215	2.200	2.186	2.173	2.161	2.150	2.139	2.129	2.119	2.110
22	2.255	2.238	2.223	2.209	2.195	2.183	2.171	2.160	2.150	2.140	2.131
23	2.278	2.261	2.245	2.230	2.216	2.204	2.192	2.181	2.170	2.160	2.150
24	2.299	2.282	2.266	2.251	2.237	2.224	2.212	2.200	2.189	2.179	2.169
25	2.320	2.303	2.286	2.271	2.257	2.243	2.231	2.219	2.208	2.198	2.188
26	2.341	2.323	2.306	2.291	2.276	2.262	2.250	2.238	2.226	2.216	2.206
27	2.360	2.342	2.325	2.310	2.295	2.281	2.268	2.256	2.244	2.233	2.223
28	2.379	2.361	2.344	2.328	2.313	2.299	2.286	2.274	2.262	2.251	2.240
29	2.398	2.379	2.362	2.346	2.331	2.317	2.304	2.291	2.279	2.268	2.257
30	2.415	2.397	2.380	2.364	2.348	2.334	2.321	2.308	2.296	2.284	2.274
31	2.432	2.414	2.397	2.381	2.365	2.351	2.337	2.324	2.312	2.301	2.290
32	2.448	2.430	2.413	2.397	2.382	2.367	2.354	2.341	2.328	2.317	2.305
33	2.463	2.446	2.429	2.413	2.397	2.383	2.369	2.356	2.344	2.332	2.321
34	2.478	2.460	2.444	2.428	2.413	2.398	2.385	2.372	2.359	2.347	2.336
35	2.491	2.474	2.458	2.442	2.427	2.413	2.399	2.386	2.374	2.362	2.351
36	2.504	2.488	2.472	2.456	2.441	2.427	2.414	2.401	2.388	2.376	2.365
37	2.516	2.500	2.484	2.469	2.455	2.441	2.427	2.414	2.402	2.390	2.379
38	2.528	2.512	2.497	2.482	2.467	2.454	2.440	2.428	2.416	2.404	2.393
39	2.538	2.523	2.508	2.494	2.480	2.466	2.453	2.441	2.428	2.417	2.406
40	2.548	2.533	2.519	2.505	2.491	2.478	2.465	2.453	2.441	2.429	2.418
42	2.565	2.552	2.538	2.525	2.512	2.500	2.487	2.476	2.464	2.453	2.442
44	2.580	2.567	2.555	2.543	2.531	2.519	2.507	2.496	2.485	2.474	2.464
46	2.591	2.580	2.569	2.558	2.547	2.536	2.525	2.515	2.504	2.494	2.484
48	2.601	2.591	2.581	2.571	2.561	2.551	2.541	2.531	2.521	2.512	2.502
50	2.609	2.600	2.592	2.582	2.573	2.564	2.555	2.546	2.536	2.527	2.518
52	2.615	2.608	2.600	2.592	2.584	2.575	2.567	2.558	2.550	2.541	2.533
54	2.620	2.613	2.607	2.599	2.592	2.585	2.577	2.569	2.561	2.554	2.546
56	2.623	2.618	2.612	2.606	2.599	2.593	2.586	2.579	2.572	2.564	2.557
58	2.626	2.621	2.616	2.611	2.605	2.599	2.593	2.587	2.580	2.574	2.567
60	2.627	2.623	2.619	2.614	2.610	2.604	2.599	2.593	2.588	2.582	2.576
62	2.628	2.625	2.621	2.617	2.613	2.609	2.604	2.599	2.594	2.589	2.583
64	2.628	2.625	2.623	2.619	2.616	2.612	2.608	2.604	2.599	2.595	2.590
66	2.627	2.626	2.623	2.621	2.618	2.615	2.611	2.607	2.604	2.599	2.595
68	2.627	2.625	2.624	2.622	2.619	2.617	2.614	2.610	2.607	2.603	2.600
70	2.625	2.625	2.623	2.622	2.620	2.618	2.615	2.613	2.610	2.607	2.603

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(i) Continued. Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	2.500	2.520	2.536	2.550	2.562	2.572	2.581	2.589	2.595	2.601	2.606
72	2.500	2.519	2.535	2.548	2.559	2.569	2.577	2.585	2.591	2.597	2.603
74	2.500	2.518	2.533	2.545	2.556	2.566	2.574	2.581	2.588	2.594	2.599
76	2.500	2.517	2.531	2.543	2.554	2.563	2.571	2.578	2.584	2.590	2.595
78	2.500	2.516	2.530	2.541	2.551	2.560	2.568	2.575	2.581	2.587	2.592
80	2.500	2.515	2.528	2.540	2.549	2.558	2.565	2.572	2.578	2.584	2.589
82	2.500	2.515	2.527	2.538	2.547	2.555	2.563	2.569	2.575	2.581	2.586
84	2.500	2.514	2.526	2.536	2.545	2.553	2.560	2.567	2.573	2.578	2.583
86	2.500	2.513	2.525	2.535	2.544	2.551	2.558	2.564	2.570	2.575	2.580
88	2.500	2.513	2.524	2.533	2.542	2.549	2.556	2.562	2.568	2.573	2.578
90	2.500	2.512	2.523	2.532	2.540	2.547	2.554	2.560	2.565	2.570	2.575
92	2.500	2.512	2.522	2.531	2.539	2.546	2.552	2.558	2.563	2.568	2.573
94	2.500	2.511	2.521	2.530	2.537	2.544	2.550	2.556	2.561	2.566	2.570
96	2.500	2.511	2.520	2.529	2.536	2.543	2.549	2.554	2.559	2.564	2.568
98	2.500	2.510	2.520	2.528	2.535	2.541	2.547	2.552	2.557	2.562	2.566
100	2.500	2.510	2.519	2.527	2.533	2.540	2.545	2.551	2.556	2.560	2.564
102	2.500	2.510	2.518	2.526	2.532	2.538	2.544	2.549	2.554	2.558	2.562
104	2.500	2.509	2.517	2.525	2.531	2.537	2.543	2.548	2.552	2.557	2.561
106	2.500	2.509	2.517	2.524	2.530	2.536	2.541	2.546	2.551	2.555	2.559
108	2.500	2.509	2.516	2.523	2.529	2.535	2.540	2.545	2.549	2.553	2.557
110	2.500	2.508	2.516	2.522	2.528	2.534	2.539	2.543	2.548	2.552	2.556
112	2.500	2.508	2.515	2.522	2.527	2.533	2.538	2.542	2.546	2.550	2.554
114	2.500	2.508	2.515	2.521	2.527	2.532	2.536	2.541	2.545	2.549	2.553
116	2.500	2.508	2.514	2.520	2.526	2.531	2.535	2.540	2.544	2.548	2.551
118	2.500	2.507	2.514	2.520	2.525	2.530	2.534	2.539	2.543	2.546	2.550
120	2.500	2.507	2.513	2.519	2.524	2.529	2.533	2.538	2.541	2.545	2.549
122	2.500	2.507	2.513	2.519	2.524	2.528	2.533	2.537	2.540	2.544	2.547
124	2.500	2.507	2.513	2.518	2.523	2.527	2.532	2.536	2.539	2.543	2.546
126	2.500	2.506	2.512	2.517	2.522	2.527	2.531	2.535	2.538	2.542	2.545
128	2.500	2.506	2.512	2.517	2.522	2.526	2.530	2.534	2.537	2.541	2.544
130	2.500	2.506	2.512	2.516	2.521	2.525	2.529	2.533	2.536	2.540	2.543
132	2.500	2.506	2.511	2.516	2.520	2.525	2.528	2.532	2.536	2.539	2.542
134	2.500	2.506	2.511	2.516	2.520	2.524	2.528	2.531	2.535	2.538	2.541
136	2.500	2.506	2.511	2.515	2.519	2.523	2.527	2.531	2.534	2.537	2.540
138	2.500	2.505	2.510	2.515	2.519	2.523	2.526	2.530	2.533	2.536	2.539
140	2.500	2.505	2.510	2.514	2.518	2.522	2.526	2.529	2.532	2.535	2.538
142	2.500	2.505	2.510	2.514	2.518	2.522	2.525	2.528	2.531	2.534	2.537
144	2.500	2.505	2.509	2.514	2.518	2.521	2.525	2.528	2.531	2.534	2.536
146	2.500	2.505	2.509	2.513	2.517	2.521	2.524	2.527	2.530	2.533	2.536
148	2.500	2.505	2.509	2.513	2.517	2.520	2.523	2.526	2.529	2.532	2.535
150	2.500	2.505	2.509	2.513	2.516	2.520	2.523	2.526	2.529	2.531	2.534

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	2.606	2.611	2.615	2.618	2.621	2.623	2.624	2.625	2.626	2.626	2.625
72	2.603	2.607	2.611	2.614	2.617	2.620	2.621	2.623	2.624	2.624	2.624
74	2.599	2.603	2.607	2.611	2.614	2.616	2.618	2.620	2.621	2.622	2.622
76	2.595	2.600	2.604	2.608	2.611	2.613	2.616	2.617	2.619	2.620	2.620
78	2.592	2.597	2.601	2.604	2.608	2.610	2.613	2.615	2.616	2.618	2.619
80	2.589	2.593	2.597	2.601	2.604	2.607	2.610	2.612	2.614	2.615	2.616
82	2.586	2.590	2.594	2.598	2.601	2.604	2.607	2.609	2.611	2.613	2.614
84	2.583	2.587	2.592	2.595	2.599	2.602	2.604	2.607	2.609	2.611	2.612
86	2.580	2.585	2.589	2.592	2.596	2.599	2.602	2.604	2.606	2.608	2.610
88	2.578	2.582	2.586	2.590	2.593	2.596	2.599	2.602	2.604	2.606	2.608
90	2.575	2.579	2.583	2.587	2.591	2.594	2.597	2.599	2.602	2.604	2.606
92	2.573	2.577	2.581	2.585	2.588	2.591	2.594	2.597	2.599	2.602	2.604
94	2.570	2.575	2.579	2.582	2.586	2.589	2.592	2.594	2.597	2.599	2.601
96	2.568	2.572	2.576	2.580	2.583	2.586	2.589	2.592	2.595	2.597	2.599
98	2.566	2.570	2.574	2.578	2.581	2.584	2.587	2.590	2.593	2.595	2.597
100	2.564	2.568	2.572	2.576	2.579	2.582	2.585	2.588	2.590	2.593	2.595
102	2.562	2.566	2.570	2.574	2.577	2.580	2.583	2.586	2.588	2.591	2.593
104	2.561	2.564	2.568	2.572	2.575	2.578	2.581	2.584	2.586	2.589	2.591
106	2.559	2.563	2.566	2.570	2.573	2.576	2.579	2.582	2.584	2.587	2.589
108	2.557	2.561	2.565	2.568	2.571	2.574	2.577	2.580	2.582	2.585	2.587
110	2.556	2.559	2.563	2.566	2.569	2.572	2.575	2.578	2.581	2.583	2.585
112	2.554	2.558	2.561	2.564	2.568	2.571	2.573	2.576	2.579	2.581	2.584
114	2.553	2.556	2.560	2.563	2.566	2.569	2.572	2.574	2.577	2.579	2.582
116	2.551	2.555	2.558	2.561	2.564	2.567	2.570	2.573	2.575	2.578	2.580
118	2.550	2.553	2.557	2.560	2.563	2.566	2.568	2.571	2.574	2.576	2.578
120	2.549	2.552	2.555	2.558	2.561	2.564	2.567	2.569	2.572	2.574	2.577
122	2.547	2.551	2.554	2.557	2.560	2.563	2.565	2.568	2.570	2.573	2.575
124	2.546	2.549	2.553	2.556	2.558	2.561	2.564	2.566	2.569	2.571	2.574
126	2.545	2.548	2.551	2.554	2.557	2.560	2.562	2.565	2.568	2.570	2.572
128	2.544	2.547	2.550	2.553	2.556	2.558	2.561	2.564	2.566	2.568	2.571
130	2.543	2.546	2.549	2.552	2.555	2.557	2.560	2.562	2.565	2.567	2.569
132	2.542	2.545	2.548	2.551	2.553	2.556	2.558	2.561	2.563	2.566	2.568
134	2.541	2.544	2.547	2.549	2.552	2.555	2.557	2.560	2.562	2.564	2.567
136	2.540	2.543	2.546	2.548	2.551	2.554	2.556	2.558	2.561	2.563	2.565
138	2.539	2.542	2.545	2.547	2.550	2.552	2.555	2.557	2.560	2.562	2.564
140	2.538	2.541	2.544	2.546	2.549	2.551	2.554	2.556	2.558	2.561	2.563
142	2.537	2.540	2.543	2.545	2.548	2.550	2.553	2.555	2.557	2.559	2.562
144	2.536	2.539	2.542	2.544	2.547	2.549	2.552	2.554	2.556	2.558	2.560
146	2.536	2.538	2.541	2.543	2.546	2.548	2.551	2.553	2.555	2.557	2.559
148	2.535	2.538	2.540	2.543	2.545	2.547	2.550	2.552	2.554	2.556	2.558
150	2.534	2.537	2.539	2.542	2.544	2.546	2.549	2.551	2.553	2.555	2.557

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(i) Continued. Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	2.625	2.625	2.623	2.622	2.620	2.618	2.615	2.613	2.610	2.607	2.603
72	2.624	2.624	2.623	2.622	2.620	2.619	2.617	2.614	2.612	2.609	2.606
74	2.622	2.622	2.622	2.621	2.620	2.619	2.617	2.616	2.614	2.611	2.609
76	2.620	2.621	2.621	2.620	2.620	2.619	2.618	2.616	2.615	2.613	2.611
78	2.619	2.619	2.619	2.619	2.619	2.618	2.618	2.617	2.615	2.614	2.612
80	2.616	2.617	2.618	2.618	2.618	2.618	2.617	2.617	2.616	2.614	2.613
82	2.614	2.615	2.616	2.617	2.617	2.617	2.617	2.616	2.616	2.615	2.614
84	2.612	2.613	2.614	2.615	2.616	2.616	2.616	2.616	2.615	2.615	2.614
86	2.610	2.611	2.613	2.614	2.614	2.615	2.615	2.615	2.615	2.615	2.614
88	2.608	2.609	2.611	2.612	2.613	2.613	2.614	2.614	2.614	2.614	2.614
90	2.606	2.607	2.609	2.610	2.611	2.612	2.613	2.613	2.613	2.613	2.613
92	2.604	2.605	2.607	2.608	2.609	2.610	2.611	2.612	2.612	2.613	2.613
94	2.601	2.603	2.605	2.606	2.608	2.609	2.610	2.611	2.611	2.612	2.612
96	2.599	2.601	2.603	2.605	2.606	2.607	2.608	2.609	2.610	2.611	2.611
98	2.597	2.599	2.601	2.603	2.604	2.606	2.607	2.608	2.609	2.609	2.610
100	2.595	2.597	2.599	2.601	2.602	2.604	2.605	2.606	2.607	2.608	2.609
102	2.593	2.595	2.597	2.599	2.601	2.602	2.604	2.605	2.606	2.607	2.608
104	2.591	2.593	2.595	2.597	2.599	2.601	2.602	2.603	2.605	2.606	2.607
106	2.589	2.591	2.593	2.595	2.597	2.599	2.600	2.602	2.603	2.604	2.605
108	2.587	2.589	2.592	2.594	2.595	2.597	2.599	2.600	2.602	2.603	2.604
110	2.585	2.588	2.590	2.592	2.594	2.595	2.597	2.599	2.600	2.601	2.603
112	2.584	2.586	2.588	2.590	2.592	2.594	2.595	2.597	2.599	2.600	2.601
114	2.582	2.584	2.586	2.588	2.590	2.592	2.594	2.595	2.597	2.598	2.600
116	2.580	2.582	2.585	2.587	2.589	2.590	2.592	2.594	2.596	2.597	2.598
118	2.578	2.581	2.583	2.585	2.587	2.589	2.591	2.592	2.594	2.596	2.597
120	2.577	2.579	2.581	2.583	2.585	2.587	2.589	2.591	2.593	2.594	2.596
122	2.575	2.578	2.580	2.582	2.584	2.586	2.588	2.589	2.591	2.593	2.594
124	2.574	2.576	2.578	2.580	2.582	2.584	2.586	2.588	2.590	2.591	2.593
126	2.572	2.574	2.577	2.579	2.581	2.583	2.585	2.586	2.588	2.590	2.591
128	2.571	2.573	2.575	2.577	2.579	2.581	2.583	2.585	2.587	2.588	2.590
130	2.569	2.572	2.574	2.576	2.578	2.580	2.582	2.584	2.585	2.587	2.589
132	2.568	2.570	2.572	2.574	2.576	2.578	2.580	2.582	2.584	2.586	2.587
134	2.567	2.569	2.571	2.573	2.575	2.577	2.579	2.581	2.582	2.584	2.586
136	2.565	2.568	2.570	2.572	2.574	2.576	2.578	2.579	2.581	2.583	2.585
138	2.564	2.566	2.568	2.570	2.572	2.574	2.576	2.578	2.580	2.582	2.583
140	2.563	2.565	2.567	2.569	2.571	2.573	2.575	2.577	2.579	2.580	2.582
142	2.562	2.564	2.566	2.568	2.570	2.572	2.574	2.575	2.577	2.579	2.581
144	2.560	2.563	2.565	2.567	2.569	2.571	2.572	2.574	2.576	2.578	2.579
146	2.559	2.561	2.563	2.565	2.567	2.569	2.571	2.573	2.575	2.577	2.578
148	2.558	2.560	2.562	2.564	2.566	2.568	2.570	2.572	2.574	2.575	2.577
150	2.557	2.559	2.561	2.563	2.565	2.567	2.569	2.571	2.572	2.574	2.576

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	2.500	2.505	2.509	2.513	2.516	2.520	2.523	2.526	2.529	2.531	2.534
155	2.500	2.504	2.508	2.512	2.515	2.519	2.522	2.524	2.527	2.530	2.532
160	2.500	2.504	2.508	2.511	2.514	2.518	2.520	2.523	2.526	2.528	2.531
165	2.500	2.504	2.507	2.511	2.514	2.517	2.519	2.522	2.524	2.527	2.529
170	2.500	2.504	2.507	2.510	2.513	2.516	2.518	2.521	2.523	2.526	2.528
175	2.500	2.503	2.507	2.510	2.512	2.515	2.517	2.520	2.522	2.524	2.527
180	2.500	2.503	2.506	2.509	2.512	2.514	2.517	2.519	2.521	2.523	2.525
185	2.500	2.503	2.506	2.509	2.511	2.514	2.516	2.518	2.520	2.522	2.524
190	2.500	2.503	2.506	2.508	2.511	2.513	2.515	2.517	2.519	2.521	2.523
195	2.500	2.503	2.505	2.508	2.510	2.512	2.514	2.516	2.518	2.520	2.522
200	2.500	2.503	2.505	2.507	2.510	2.512	2.514	2.516	2.518	2.519	2.521
205	2.500	2.502	2.505	2.507	2.509	2.511	2.513	2.515	2.517	2.519	2.520
210	2.500	2.502	2.505	2.507	2.509	2.511	2.513	2.514	2.516	2.518	2.520
215	2.500	2.502	2.504	2.506	2.508	2.510	2.512	2.514	2.516	2.517	2.519
220	2.500	2.502	2.504	2.506	2.508	2.510	2.512	2.513	2.515	2.517	2.518
225	2.500	2.502	2.504	2.506	2.508	2.509	2.511	2.513	2.514	2.516	2.517
230	2.500	2.502	2.504	2.506	2.507	2.509	2.511	2.512	2.514	2.515	2.517
235	2.500	2.502	2.504	2.505	2.507	2.509	2.510	2.512	2.513	2.515	2.516
240	2.500	2.502	2.504	2.505	2.507	2.508	2.510	2.511	2.513	2.514	2.516
245	2.500	2.502	2.503	2.505	2.507	2.508	2.510	2.511	2.512	2.514	2.515
250	2.500	2.502	2.503	2.505	2.506	2.508	2.509	2.511	2.512	2.513	2.514
255	2.500	2.502	2.503	2.505	2.506	2.508	2.509	2.510	2.511	2.513	2.514
260	2.500	2.502	2.503	2.505	2.506	2.507	2.509	2.510	2.511	2.512	2.514
265	2.500	2.502	2.503	2.504	2.506	2.507	2.508	2.510	2.511	2.512	2.513
270	2.500	2.501	2.503	2.504	2.506	2.507	2.508	2.509	2.510	2.512	2.513
275	2.500	2.501	2.503	2.504	2.505	2.507	2.508	2.509	2.510	2.511	2.512
280	2.500	2.501	2.503	2.504	2.505	2.506	2.507	2.509	2.510	2.511	2.512
285	2.500	2.501	2.503	2.504	2.505	2.506	2.507	2.508	2.509	2.510	2.512
290	2.500	2.501	2.502	2.504	2.505	2.506	2.507	2.508	2.509	2.510	2.511
295	2.500	2.501	2.502	2.504	2.505	2.506	2.507	2.508	2.509	2.510	2.511
300	2.500	2.501	2.502	2.503	2.505	2.506	2.507	2.508	2.509	2.510	2.511
310	2.500	2.501	2.502	2.503	2.504	2.505	2.506	2.507	2.508	2.509	2.510
320	2.500	2.501	2.502	2.503	2.504	2.505	2.506	2.507	2.508	2.509	2.509
330	2.500	2.501	2.502	2.503	2.504	2.505	2.506	2.506	2.507	2.508	2.509
340	2.500	2.501	2.502	2.503	2.504	2.504	2.505	2.506	2.507	2.508	2.508
350	2.500	2.501	2.502	2.503	2.503	2.504	2.505	2.506	2.506	2.507	2.508
360	2.500	2.501	2.502	2.502	2.503	2.504	2.505	2.505	2.506	2.507	2.508
370	2.500	2.501	2.502	2.502	2.503	2.504	2.504	2.505	2.506	2.507	2.507
380	2.500	2.501	2.501	2.502	2.503	2.504	2.504	2.505	2.506	2.506	2.507
390	2.500	2.501	2.501	2.502	2.503	2.503	2.504	2.505	2.505	2.506	2.507
400	2.500	2.501	2.501	2.502	2.503	2.503	2.504	2.504	2.505	2.506	2.506

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(i) Concluded. Plenum specific heat, $C_{p,o}/R$

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	2.534	2.537	2.539	2.542	2.544	2.546	2.549	2.551	2.553	2.555	2.557
155	2.532	2.535	2.537	2.540	2.542	2.544	2.546	2.548	2.551	2.553	2.555
160	2.531	2.533	2.535	2.538	2.540	2.542	2.544	2.546	2.548	2.550	2.552
165	2.529	2.532	2.534	2.536	2.538	2.540	2.542	2.544	2.546	2.548	2.550
170	2.528	2.530	2.532	2.534	2.536	2.538	2.540	2.542	2.544	2.546	2.548
175	2.527	2.529	2.531	2.533	2.535	2.537	2.539	2.540	2.542	2.544	2.546
180	2.525	2.527	2.529	2.531	2.533	2.535	2.537	2.539	2.540	2.542	2.544
185	2.524	2.526	2.528	2.530	2.532	2.534	2.535	2.537	2.539	2.541	2.542
190	2.523	2.525	2.527	2.529	2.530	2.532	2.534	2.536	2.537	2.539	2.541
195	2.522	2.524	2.526	2.527	2.529	2.531	2.533	2.534	2.536	2.537	2.539
200	2.521	2.523	2.525	2.526	2.528	2.530	2.531	2.533	2.534	2.536	2.538
205	2.520	2.522	2.524	2.525	2.527	2.529	2.530	2.532	2.533	2.535	2.536
210	2.520	2.521	2.523	2.524	2.526	2.527	2.529	2.530	2.532	2.533	2.535
215	2.519	2.520	2.522	2.523	2.525	2.526	2.528	2.529	2.531	2.532	2.534
220	2.518	2.520	2.521	2.523	2.524	2.525	2.527	2.528	2.530	2.531	2.532
225	2.517	2.519	2.520	2.522	2.523	2.525	2.526	2.527	2.529	2.530	2.531
230	2.517	2.518	2.520	2.521	2.522	2.524	2.525	2.526	2.528	2.529	2.530
235	2.516	2.518	2.519	2.520	2.522	2.523	2.524	2.525	2.527	2.528	2.529
240	2.516	2.517	2.518	2.520	2.521	2.522	2.523	2.525	2.526	2.527	2.528
245	2.515	2.516	2.518	2.519	2.520	2.521	2.523	2.524	2.525	2.526	2.527
250	2.514	2.516	2.517	2.518	2.519	2.521	2.522	2.523	2.524	2.525	2.527
255	2.514	2.515	2.516	2.518	2.519	2.520	2.521	2.522	2.523	2.525	2.526
260	2.514	2.515	2.516	2.517	2.518	2.519	2.520	2.522	2.523	2.524	2.525
265	2.513	2.514	2.515	2.517	2.518	2.519	2.520	2.521	2.522	2.523	2.524
270	2.513	2.514	2.515	2.516	2.517	2.518	2.519	2.520	2.521	2.522	2.524
275	2.512	2.513	2.514	2.516	2.517	2.518	2.519	2.520	2.521	2.522	2.523
280	2.512	2.513	2.514	2.515	2.516	2.517	2.518	2.519	2.520	2.521	2.522
285	2.512	2.513	2.514	2.515	2.516	2.517	2.518	2.519	2.520	2.521	2.522
290	2.511	2.512	2.513	2.514	2.515	2.516	2.517	2.518	2.519	2.520	2.521
295	2.511	2.512	2.513	2.514	2.515	2.516	2.517	2.518	2.518	2.519	2.520
300	2.511	2.511	2.512	2.513	2.514	2.515	2.516	2.517	2.518	2.519	2.520
310	2.510	2.511	2.512	2.513	2.514	2.514	2.515	2.516	2.517	2.518	2.519
320	2.509	2.510	2.511	2.512	2.513	2.514	2.514	2.515	2.516	2.517	2.518
330	2.509	2.510	2.511	2.511	2.512	2.513	2.514	2.515	2.515	2.516	2.517
340	2.508	2.509	2.510	2.511	2.512	2.512	2.513	2.514	2.515	2.515	2.516
350	2.508	2.509	2.509	2.510	2.511	2.512	2.512	2.513	2.514	2.515	2.515
360	2.508	2.508	2.509	2.510	2.510	2.511	2.512	2.513	2.513	2.514	2.515
370	2.507	2.508	2.509	2.509	2.510	2.511	2.511	2.512	2.513	2.513	2.514
380	2.507	2.508	2.508	2.509	2.510	2.510	2.511	2.511	2.512	2.513	2.513
390	2.507	2.507	2.508	2.508	2.509	2.510	2.510	2.511	2.512	2.512	2.513
400	2.506	2.507	2.507	2.508	2.509	2.509	2.510	2.510	2.511	2.512	2.512

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	2.557	2.559	2.561	2.563	2.565	2.567	2.569	2.571	2.572	2.574	2.576
155	2.555	2.557	2.559	2.560	2.562	2.564	2.566	2.568	2.570	2.571	2.573
160	2.552	2.554	2.556	2.558	2.560	2.562	2.563	2.565	2.567	2.569	2.570
165	2.550	2.552	2.554	2.556	2.557	2.559	2.561	2.563	2.564	2.566	2.568
170	2.548	2.550	2.551	2.553	2.555	2.557	2.558	2.560	2.562	2.563	2.565
175	2.546	2.548	2.549	2.551	2.553	2.555	2.556	2.558	2.559	2.561	2.563
180	2.544	2.546	2.547	2.549	2.551	2.552	2.554	2.556	2.557	2.559	2.560
185	2.542	2.544	2.546	2.547	2.549	2.550	2.552	2.554	2.555	2.557	2.558
190	2.541	2.542	2.544	2.545	2.547	2.549	2.550	2.552	2.553	2.555	2.556
195	2.539	2.541	2.542	2.544	2.545	2.547	2.548	2.550	2.551	2.553	2.554
200	2.538	2.539	2.541	2.542	2.544	2.545	2.547	2.548	2.550	2.551	2.552
205	2.536	2.538	2.539	2.541	2.542	2.544	2.545	2.546	2.548	2.549	2.551
210	2.535	2.536	2.538	2.539	2.541	2.542	2.543	2.545	2.546	2.548	2.549
215	2.534	2.535	2.536	2.538	2.539	2.541	2.542	2.543	2.545	2.546	2.547
220	2.532	2.534	2.535	2.537	2.538	2.539	2.541	2.542	2.543	2.545	2.546
225	2.531	2.533	2.534	2.535	2.537	2.538	2.539	2.541	2.542	2.543	2.544
230	2.530	2.532	2.533	2.534	2.535	2.537	2.538	2.539	2.541	2.542	2.543
235	2.529	2.531	2.532	2.533	2.534	2.536	2.537	2.538	2.539	2.541	2.542
240	2.528	2.530	2.531	2.532	2.533	2.534	2.536	2.537	2.538	2.539	2.541
245	2.527	2.529	2.530	2.531	2.532	2.533	2.535	2.536	2.537	2.538	2.539
250	2.527	2.528	2.529	2.530	2.531	2.532	2.534	2.535	2.536	2.537	2.538
255	2.526	2.527	2.528	2.529	2.530	2.531	2.533	2.534	2.535	2.536	2.537
260	2.525	2.526	2.527	2.528	2.529	2.531	2.532	2.533	2.534	2.535	2.536
265	2.524	2.525	2.526	2.527	2.529	2.530	2.531	2.532	2.533	2.534	2.535
270	2.524	2.525	2.526	2.527	2.528	2.529	2.530	2.531	2.532	2.533	2.534
275	2.523	2.524	2.525	2.526	2.527	2.528	2.529	2.530	2.531	2.532	2.533
280	2.522	2.523	2.524	2.525	2.526	2.527	2.528	2.529	2.530	2.531	2.532
285	2.522	2.523	2.524	2.524	2.525	2.526	2.527	2.528	2.529	2.530	2.531
290	2.521	2.522	2.523	2.524	2.525	2.526	2.527	2.528	2.529	2.530	2.531
295	2.520	2.521	2.522	2.523	2.524	2.525	2.526	2.527	2.528	2.529	2.530
300	2.520	2.521	2.522	2.523	2.523	2.524	2.525	2.526	2.527	2.528	2.529
310	2.519	2.520	2.521	2.521	2.522	2.523	2.524	2.525	2.526	2.527	2.528
320	2.518	2.519	2.519	2.520	2.521	2.522	2.523	2.524	2.525	2.525	2.526
330	2.517	2.518	2.519	2.519	2.520	2.521	2.522	2.523	2.523	2.524	2.525
340	2.516	2.517	2.518	2.518	2.519	2.520	2.521	2.522	2.522	2.523	2.524
350	2.515	2.516	2.517	2.518	2.518	2.519	2.520	2.521	2.521	2.522	2.523
360	2.515	2.515	2.516	2.517	2.517	2.518	2.519	2.520	2.520	2.521	2.522
370	2.514	2.515	2.515	2.516	2.517	2.517	2.518	2.519	2.519	2.520	2.521
380	2.513	2.514	2.515	2.515	2.516	2.517	2.517	2.518	2.519	2.519	2.520
390	2.513	2.513	2.514	2.515	2.515	2.516	2.517	2.517	2.518	2.518	2.519
400	2.512	2.513	2.513	2.514	2.515	2.515	2.516	2.517	2.517	2.518	2.518

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(j) Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	1.667	1.730	1.792	1.852	1.906	1.954	1.995	2.027	2.051	2.067	2.073
16	1.667	1.722	1.776	1.826	1.873	1.914	1.950	1.980	2.003	2.020	2.031
17	1.667	1.715	1.762	1.806	1.847	1.883	1.915	1.942	1.964	1.981	1.993
18	1.667	1.710	1.751	1.790	1.826	1.858	1.886	1.910	1.931	1.948	1.961
19	1.667	1.705	1.742	1.777	1.808	1.837	1.862	1.885	1.904	1.920	1.933
20	1.667	1.702	1.735	1.765	1.794	1.819	1.842	1.863	1.881	1.896	1.908
21	1.667	1.698	1.728	1.756	1.781	1.805	1.826	1.844	1.861	1.875	1.887
22	1.667	1.695	1.722	1.748	1.771	1.792	1.811	1.829	1.844	1.857	1.869
23	1.667	1.693	1.718	1.741	1.762	1.781	1.799	1.815	1.829	1.842	1.853
24	1.667	1.691	1.713	1.735	1.754	1.772	1.788	1.803	1.816	1.828	1.839
25	1.667	1.689	1.710	1.729	1.747	1.764	1.779	1.793	1.805	1.816	1.826
26	1.667	1.687	1.706	1.724	1.741	1.756	1.770	1.783	1.795	1.806	1.815
27	1.667	1.686	1.704	1.720	1.736	1.750	1.763	1.775	1.786	1.796	1.805
28	1.667	1.684	1.701	1.716	1.731	1.744	1.756	1.768	1.778	1.788	1.796
29	1.667	1.683	1.699	1.713	1.727	1.739	1.751	1.761	1.771	1.780	1.788
30	1.667	1.682	1.697	1.710	1.723	1.734	1.745	1.755	1.765	1.773	1.781
31	1.667	1.681	1.695	1.707	1.719	1.730	1.740	1.750	1.759	1.767	1.774
32	1.667	1.680	1.693	1.705	1.716	1.726	1.736	1.745	1.753	1.761	1.768
33	1.667	1.679	1.691	1.703	1.713	1.723	1.732	1.741	1.748	1.756	1.763
34	1.667	1.679	1.690	1.701	1.711	1.720	1.728	1.737	1.744	1.751	1.758
35	1.667	1.678	1.689	1.699	1.708	1.717	1.725	1.733	1.740	1.747	1.753
36	1.667	1.677	1.688	1.697	1.706	1.714	1.722	1.729	1.736	1.743	1.749
37	1.667	1.677	1.686	1.695	1.704	1.712	1.719	1.726	1.733	1.739	1.745
38	1.667	1.676	1.685	1.694	1.702	1.710	1.717	1.723	1.730	1.735	1.741
39	1.667	1.676	1.684	1.693	1.700	1.707	1.714	1.721	1.727	1.732	1.737
40	1.667	1.675	1.684	1.691	1.699	1.706	1.712	1.718	1.724	1.729	1.734
42	1.667	1.675	1.682	1.689	1.696	1.702	1.708	1.714	1.719	1.724	1.729
44	1.667	1.674	1.681	1.687	1.693	1.699	1.705	1.710	1.715	1.719	1.724
46	1.667	1.673	1.680	1.685	1.691	1.696	1.701	1.706	1.711	1.715	1.719
48	1.667	1.673	1.679	1.684	1.689	1.694	1.699	1.703	1.707	1.711	1.715
50	1.667	1.672	1.678	1.683	1.687	1.692	1.696	1.701	1.704	1.708	1.712
52	1.667	1.672	1.677	1.681	1.686	1.690	1.694	1.698	1.702	1.705	1.709
54	1.667	1.671	1.676	1.680	1.685	1.689	1.692	1.696	1.699	1.703	1.706
56	1.667	1.671	1.675	1.680	1.683	1.687	1.691	1.694	1.697	1.700	1.703
58	1.667	1.671	1.675	1.679	1.682	1.686	1.689	1.692	1.695	1.698	1.701
60	1.667	1.671	1.674	1.678	1.681	1.685	1.688	1.691	1.694	1.696	1.699
62	1.667	1.670	1.674	1.677	1.680	1.683	1.686	1.689	1.692	1.695	1.697
64	1.667	1.670	1.673	1.677	1.680	1.682	1.685	1.688	1.691	1.693	1.695
66	1.667	1.670	1.673	1.676	1.679	1.682	1.684	1.687	1.689	1.692	1.694
68	1.667	1.670	1.673	1.675	1.678	1.681	1.683	1.686	1.688	1.690	1.692
70	1.667	1.670	1.672	1.675	1.678	1.680	1.682	1.685	1.687	1.689	1.691

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	1.667	1.954	2.073	2.013	1.891	1.779	1.691	1.622	1.567	1.523	1.487
16	1.667	1.914	2.031	2.005	1.911	1.811	1.727	1.658	1.602	1.557	1.520
17	1.667	1.883	1.993	1.991	1.922	1.836	1.757	1.690	1.635	1.589	1.551
18	1.667	1.858	1.961	1.973	1.925	1.854	1.782	1.719	1.664	1.618	1.579
19	1.667	1.837	1.933	1.955	1.923	1.866	1.803	1.743	1.691	1.646	1.606
20	1.667	1.819	1.908	1.937	1.918	1.873	1.818	1.764	1.714	1.670	1.631
21	1.667	1.805	1.887	1.919	1.910	1.876	1.830	1.781	1.734	1.692	1.654
22	1.667	1.792	1.869	1.903	1.902	1.876	1.838	1.794	1.752	1.712	1.675
23	1.667	1.781	1.853	1.888	1.892	1.874	1.842	1.805	1.766	1.729	1.694
24	1.667	1.772	1.839	1.874	1.882	1.870	1.845	1.813	1.778	1.743	1.710
25	1.667	1.764	1.826	1.861	1.872	1.865	1.846	1.818	1.788	1.756	1.725
26	1.667	1.756	1.815	1.849	1.862	1.860	1.845	1.822	1.795	1.766	1.738
27	1.667	1.750	1.805	1.838	1.853	1.853	1.843	1.824	1.800	1.775	1.748
28	1.667	1.744	1.796	1.828	1.844	1.847	1.840	1.825	1.804	1.782	1.758
29	1.667	1.739	1.788	1.819	1.836	1.841	1.836	1.824	1.807	1.787	1.765
30	1.667	1.734	1.781	1.811	1.828	1.834	1.832	1.823	1.809	1.791	1.772
31	1.667	1.730	1.774	1.803	1.821	1.828	1.828	1.821	1.809	1.794	1.777
32	1.667	1.726	1.768	1.796	1.814	1.822	1.823	1.819	1.809	1.796	1.781
33	1.667	1.723	1.763	1.790	1.807	1.816	1.819	1.816	1.808	1.797	1.784
34	1.667	1.720	1.758	1.784	1.801	1.811	1.814	1.813	1.807	1.798	1.786
35	1.667	1.717	1.753	1.778	1.795	1.805	1.810	1.810	1.805	1.798	1.787
36	1.667	1.714	1.749	1.773	1.790	1.800	1.806	1.806	1.803	1.797	1.788
37	1.667	1.712	1.745	1.768	1.785	1.795	1.801	1.803	1.801	1.796	1.789
38	1.667	1.710	1.741	1.764	1.780	1.791	1.797	1.799	1.799	1.795	1.789
39	1.667	1.707	1.737	1.759	1.775	1.786	1.793	1.796	1.796	1.793	1.788
40	1.667	1.706	1.734	1.755	1.771	1.782	1.789	1.793	1.793	1.792	1.787
42	1.667	1.702	1.729	1.748	1.763	1.774	1.781	1.786	1.788	1.788	1.785
44	1.667	1.699	1.724	1.742	1.756	1.767	1.775	1.780	1.783	1.783	1.782
46	1.667	1.696	1.719	1.737	1.750	1.760	1.768	1.774	1.777	1.779	1.779
48	1.667	1.694	1.715	1.732	1.744	1.755	1.762	1.768	1.772	1.774	1.775
50	1.667	1.692	1.712	1.727	1.739	1.749	1.757	1.763	1.767	1.770	1.771
52	1.667	1.690	1.709	1.723	1.735	1.744	1.752	1.758	1.762	1.766	1.768
54	1.667	1.689	1.706	1.720	1.731	1.740	1.747	1.753	1.758	1.761	1.764
56	1.667	1.687	1.703	1.716	1.727	1.736	1.743	1.749	1.754	1.757	1.760
58	1.667	1.686	1.701	1.713	1.724	1.732	1.739	1.745	1.750	1.754	1.757
60	1.667	1.685	1.699	1.711	1.720	1.729	1.735	1.741	1.746	1.750	1.753
62	1.667	1.683	1.697	1.708	1.718	1.725	1.732	1.738	1.743	1.747	1.750
64	1.667	1.682	1.695	1.706	1.715	1.722	1.729	1.735	1.739	1.743	1.747
66	1.667	1.682	1.694	1.704	1.712	1.720	1.726	1.731	1.736	1.740	1.744
68	1.667	1.681	1.692	1.702	1.710	1.717	1.723	1.729	1.733	1.737	1.741
70	1.667	1.680	1.691	1.700	1.708	1.715	1.721	1.726	1.731	1.735	1.738

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(j) Continued. Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	1.487	1.457	1.432	1.410	1.391	1.374	1.359	1.346	1.334	1.323	1.313
16	1.520	1.488	1.462	1.438	1.418	1.400	1.385	1.371	1.358	1.346	1.336
17	1.551	1.518	1.490	1.466	1.445	1.426	1.410	1.395	1.381	1.369	1.358
18	1.579	1.546	1.517	1.492	1.470	1.451	1.434	1.418	1.404	1.391	1.380
19	1.606	1.573	1.543	1.518	1.495	1.475	1.457	1.441	1.426	1.413	1.401
20	1.631	1.598	1.568	1.542	1.519	1.498	1.480	1.463	1.448	1.434	1.422
21	1.654	1.621	1.591	1.565	1.541	1.520	1.501	1.484	1.469	1.455	1.442
22	1.675	1.642	1.613	1.586	1.563	1.541	1.522	1.505	1.489	1.474	1.461
23	1.694	1.662	1.633	1.607	1.583	1.562	1.542	1.524	1.508	1.493	1.480
24	1.710	1.680	1.651	1.626	1.602	1.581	1.561	1.543	1.527	1.512	1.498
25	1.725	1.696	1.668	1.643	1.620	1.599	1.579	1.561	1.545	1.529	1.515
26	1.738	1.710	1.684	1.659	1.636	1.615	1.596	1.578	1.562	1.546	1.532
27	1.748	1.722	1.698	1.674	1.652	1.631	1.612	1.594	1.578	1.562	1.548
28	1.758	1.733	1.710	1.687	1.666	1.646	1.627	1.610	1.593	1.578	1.564
29	1.765	1.743	1.721	1.699	1.679	1.660	1.641	1.624	1.608	1.593	1.578
30	1.772	1.751	1.731	1.710	1.691	1.672	1.654	1.637	1.621	1.606	1.592
31	1.777	1.758	1.739	1.720	1.701	1.683	1.666	1.650	1.634	1.619	1.606
32	1.781	1.764	1.746	1.729	1.711	1.694	1.677	1.661	1.646	1.632	1.618
33	1.784	1.769	1.753	1.736	1.720	1.703	1.687	1.672	1.657	1.643	1.630
34	1.786	1.772	1.758	1.743	1.727	1.712	1.697	1.682	1.668	1.654	1.641
35	1.787	1.776	1.762	1.748	1.734	1.720	1.705	1.691	1.677	1.664	1.651
36	1.788	1.778	1.766	1.753	1.740	1.726	1.713	1.699	1.686	1.674	1.661
37	1.789	1.780	1.769	1.757	1.745	1.732	1.720	1.707	1.694	1.682	1.670
38	1.789	1.781	1.771	1.761	1.749	1.738	1.726	1.714	1.702	1.690	1.679
39	1.788	1.781	1.773	1.763	1.753	1.742	1.731	1.720	1.709	1.697	1.686
40	1.787	1.782	1.774	1.766	1.756	1.746	1.736	1.726	1.715	1.704	1.694
42	1.785	1.781	1.776	1.769	1.761	1.753	1.744	1.735	1.725	1.716	1.706
44	1.782	1.780	1.776	1.770	1.764	1.757	1.750	1.742	1.734	1.725	1.717
46	1.779	1.777	1.775	1.771	1.766	1.761	1.754	1.748	1.741	1.733	1.726
48	1.775	1.775	1.773	1.770	1.767	1.762	1.757	1.752	1.746	1.739	1.733
50	1.771	1.772	1.771	1.769	1.767	1.763	1.759	1.755	1.750	1.744	1.738
52	1.768	1.769	1.769	1.768	1.766	1.763	1.760	1.756	1.752	1.748	1.743
54	1.764	1.765	1.766	1.766	1.765	1.763	1.760	1.758	1.754	1.750	1.746
56	1.760	1.762	1.763	1.763	1.763	1.762	1.760	1.758	1.755	1.752	1.749
58	1.757	1.759	1.760	1.761	1.761	1.760	1.759	1.758	1.756	1.753	1.750
60	1.753	1.756	1.757	1.758	1.759	1.759	1.758	1.757	1.756	1.754	1.751
62	1.750	1.753	1.754	1.756	1.757	1.757	1.757	1.756	1.755	1.754	1.752
64	1.747	1.749	1.752	1.753	1.754	1.755	1.755	1.755	1.754	1.753	1.752
66	1.744	1.747	1.749	1.751	1.752	1.753	1.754	1.754	1.753	1.753	1.752
68	1.741	1.744	1.746	1.748	1.750	1.751	1.752	1.752	1.752	1.752	1.751
70	1.738	1.741	1.744	1.746	1.748	1.749	1.750	1.751	1.751	1.751	1.751

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	1.313	1.304	1.296	1.288	1.281	1.274	1.268	1.262	1.257	1.252	1.247
16	1.336	1.326	1.317	1.309	1.302	1.295	1.288	1.282	1.276	1.271	1.266
17	1.358	1.348	1.339	1.330	1.322	1.315	1.308	1.301	1.295	1.289	1.284
18	1.380	1.369	1.359	1.350	1.342	1.334	1.327	1.320	1.314	1.308	1.302
19	1.401	1.390	1.380	1.370	1.361	1.353	1.346	1.338	1.332	1.325	1.319
20	1.422	1.410	1.399	1.390	1.380	1.372	1.364	1.356	1.349	1.343	1.337
21	1.442	1.430	1.419	1.408	1.399	1.390	1.382	1.374	1.367	1.360	1.353
22	1.461	1.449	1.437	1.427	1.417	1.408	1.399	1.391	1.384	1.377	1.370
23	1.480	1.467	1.455	1.445	1.435	1.425	1.416	1.408	1.400	1.393	1.386
24	1.498	1.485	1.473	1.462	1.452	1.442	1.433	1.424	1.416	1.409	1.402
25	1.515	1.502	1.490	1.479	1.468	1.458	1.449	1.440	1.432	1.424	1.417
26	1.532	1.519	1.507	1.495	1.484	1.474	1.465	1.456	1.448	1.440	1.432
27	1.548	1.535	1.522	1.511	1.500	1.490	1.480	1.471	1.463	1.454	1.447
28	1.564	1.550	1.538	1.526	1.515	1.505	1.495	1.486	1.477	1.469	1.461
29	1.578	1.565	1.552	1.541	1.530	1.519	1.509	1.500	1.491	1.483	1.475
30	1.592	1.579	1.566	1.555	1.544	1.533	1.523	1.514	1.505	1.496	1.488
31	1.606	1.592	1.580	1.568	1.557	1.547	1.537	1.527	1.518	1.510	1.502
32	1.618	1.605	1.593	1.581	1.570	1.559	1.549	1.540	1.531	1.522	1.514
33	1.630	1.617	1.605	1.593	1.582	1.572	1.562	1.552	1.543	1.535	1.527
34	1.641	1.628	1.616	1.605	1.594	1.584	1.574	1.564	1.555	1.547	1.539
35	1.651	1.639	1.627	1.616	1.605	1.595	1.585	1.576	1.567	1.558	1.550
36	1.661	1.649	1.638	1.627	1.616	1.606	1.596	1.587	1.578	1.569	1.561
37	1.670	1.659	1.647	1.637	1.626	1.616	1.607	1.597	1.589	1.580	1.572
38	1.679	1.667	1.657	1.646	1.636	1.626	1.617	1.608	1.599	1.590	1.582
39	1.686	1.676	1.665	1.655	1.645	1.635	1.626	1.617	1.608	1.600	1.592
40	1.694	1.683	1.673	1.663	1.654	1.644	1.635	1.626	1.618	1.610	1.602
42	1.706	1.697	1.687	1.678	1.669	1.660	1.652	1.643	1.635	1.627	1.619
44	1.717	1.708	1.700	1.691	1.683	1.674	1.666	1.658	1.651	1.643	1.636
46	1.726	1.718	1.710	1.702	1.695	1.687	1.679	1.672	1.664	1.657	1.650
48	1.733	1.726	1.719	1.712	1.705	1.698	1.691	1.684	1.677	1.670	1.663
50	1.738	1.732	1.726	1.720	1.713	1.707	1.701	1.694	1.688	1.681	1.675
52	1.743	1.738	1.732	1.727	1.721	1.715	1.709	1.703	1.697	1.691	1.686
54	1.746	1.742	1.737	1.732	1.727	1.722	1.716	1.711	1.706	1.700	1.695
56	1.749	1.745	1.741	1.736	1.732	1.727	1.723	1.718	1.713	1.708	1.703
58	1.750	1.747	1.744	1.740	1.736	1.732	1.728	1.723	1.719	1.715	1.710
60	1.751	1.749	1.746	1.743	1.739	1.736	1.732	1.728	1.724	1.720	1.716
62	1.752	1.750	1.747	1.745	1.742	1.739	1.736	1.732	1.729	1.725	1.721
64	1.752	1.750	1.748	1.746	1.744	1.741	1.738	1.735	1.732	1.729	1.726
66	1.752	1.751	1.749	1.747	1.745	1.743	1.741	1.738	1.735	1.733	1.730
68	1.751	1.750	1.749	1.748	1.746	1.744	1.742	1.740	1.738	1.735	1.733
70	1.751	1.750	1.749	1.748	1.747	1.745	1.744	1.742	1.740	1.738	1.735

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(j) Continued. Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	1.667	1.680	1.691	1.700	1.708	1.715	1.721	1.726	1.731	1.735	1.738
72	1.667	1.679	1.690	1.699	1.706	1.713	1.718	1.724	1.728	1.732	1.735
74	1.667	1.679	1.689	1.697	1.704	1.711	1.716	1.721	1.726	1.729	1.733
76	1.667	1.678	1.688	1.696	1.703	1.709	1.714	1.719	1.723	1.727	1.731
78	1.667	1.678	1.687	1.694	1.701	1.707	1.712	1.717	1.721	1.725	1.728
80	1.667	1.677	1.686	1.693	1.700	1.705	1.710	1.715	1.719	1.723	1.726
82	1.667	1.677	1.685	1.692	1.698	1.704	1.709	1.713	1.717	1.721	1.724
84	1.667	1.676	1.684	1.691	1.697	1.702	1.707	1.711	1.715	1.719	1.722
86	1.667	1.676	1.683	1.690	1.696	1.701	1.706	1.710	1.714	1.717	1.720
88	1.667	1.675	1.683	1.689	1.695	1.700	1.704	1.708	1.712	1.715	1.719
90	1.667	1.675	1.682	1.688	1.694	1.698	1.703	1.707	1.710	1.714	1.717
92	1.667	1.675	1.681	1.687	1.693	1.697	1.702	1.705	1.709	1.712	1.715
94	1.667	1.674	1.681	1.687	1.692	1.696	1.700	1.704	1.708	1.711	1.714
96	1.667	1.674	1.680	1.686	1.691	1.695	1.699	1.703	1.706	1.709	1.712
98	1.667	1.674	1.680	1.685	1.690	1.694	1.698	1.702	1.705	1.708	1.711
100	1.667	1.673	1.679	1.684	1.689	1.693	1.697	1.701	1.704	1.707	1.710
102	1.667	1.673	1.679	1.684	1.688	1.692	1.696	1.700	1.703	1.706	1.708
104	1.667	1.673	1.678	1.683	1.688	1.692	1.695	1.698	1.702	1.705	1.707
106	1.667	1.673	1.678	1.683	1.687	1.691	1.694	1.698	1.701	1.703	1.706
108	1.667	1.672	1.678	1.682	1.686	1.690	1.693	1.697	1.700	1.702	1.705
110	1.667	1.672	1.677	1.682	1.686	1.689	1.693	1.696	1.699	1.701	1.704
112	1.667	1.672	1.677	1.681	1.685	1.689	1.692	1.695	1.698	1.700	1.703
114	1.667	1.672	1.677	1.681	1.684	1.688	1.691	1.694	1.697	1.699	1.702
116	1.667	1.672	1.676	1.680	1.684	1.687	1.690	1.693	1.696	1.699	1.701
118	1.667	1.672	1.676	1.680	1.683	1.687	1.690	1.693	1.695	1.698	1.700
120	1.667	1.671	1.676	1.679	1.683	1.686	1.689	1.692	1.694	1.697	1.699
122	1.667	1.671	1.675	1.679	1.682	1.686	1.688	1.691	1.694	1.696	1.698
124	1.667	1.671	1.675	1.679	1.682	1.685	1.688	1.690	1.693	1.695	1.698
126	1.667	1.671	1.675	1.678	1.682	1.685	1.687	1.690	1.692	1.695	1.697
128	1.667	1.671	1.675	1.678	1.681	1.684	1.687	1.689	1.692	1.694	1.696
130	1.667	1.671	1.674	1.678	1.681	1.684	1.686	1.689	1.691	1.693	1.695
132	1.667	1.671	1.674	1.677	1.680	1.683	1.686	1.688	1.690	1.693	1.695
134	1.667	1.670	1.674	1.677	1.680	1.683	1.685	1.688	1.690	1.692	1.694
136	1.667	1.670	1.674	1.677	1.680	1.682	1.685	1.687	1.689	1.691	1.693
138	1.667	1.670	1.674	1.677	1.679	1.682	1.684	1.687	1.689	1.691	1.693
140	1.667	1.670	1.673	1.676	1.679	1.681	1.684	1.686	1.688	1.690	1.692
142	1.667	1.670	1.673	1.676	1.679	1.681	1.683	1.686	1.688	1.690	1.692
144	1.667	1.670	1.673	1.676	1.678	1.681	1.683	1.685	1.687	1.689	1.691
146	1.667	1.670	1.673	1.676	1.678	1.680	1.683	1.685	1.687	1.689	1.691
148	1.667	1.670	1.673	1.675	1.678	1.680	1.682	1.684	1.686	1.688	1.690
150	1.667	1.670	1.673	1.675	1.678	1.680	1.682	1.684	1.686	1.688	1.689

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	1.738	1.741	1.744	1.746	1.748	1.749	1.750	1.751	1.751	1.751	1.751
72	1.735	1.738	1.741	1.743	1.745	1.747	1.748	1.749	1.749	1.750	1.750
74	1.733	1.736	1.739	1.741	1.743	1.745	1.746	1.747	1.748	1.748	1.749
76	1.731	1.734	1.736	1.739	1.741	1.743	1.744	1.745	1.746	1.747	1.747
78	1.728	1.731	1.734	1.737	1.739	1.741	1.742	1.744	1.745	1.745	1.746
80	1.726	1.729	1.732	1.734	1.737	1.739	1.740	1.742	1.743	1.744	1.745
82	1.724	1.727	1.730	1.732	1.735	1.737	1.738	1.740	1.741	1.742	1.743
84	1.722	1.725	1.728	1.730	1.733	1.735	1.737	1.738	1.740	1.741	1.742
86	1.720	1.723	1.726	1.729	1.731	1.733	1.735	1.736	1.738	1.739	1.740
88	1.719	1.722	1.724	1.727	1.729	1.731	1.733	1.735	1.736	1.738	1.739
90	1.717	1.720	1.723	1.725	1.727	1.729	1.731	1.733	1.735	1.736	1.737
92	1.715	1.718	1.721	1.723	1.726	1.728	1.730	1.732	1.733	1.735	1.736
94	1.714	1.717	1.719	1.722	1.724	1.726	1.728	1.730	1.732	1.733	1.735
96	1.712	1.715	1.718	1.720	1.722	1.725	1.727	1.728	1.730	1.732	1.733
98	1.711	1.714	1.716	1.719	1.721	1.723	1.725	1.727	1.729	1.730	1.732
100	1.710	1.712	1.715	1.717	1.720	1.722	1.724	1.725	1.727	1.729	1.730
102	1.708	1.711	1.714	1.716	1.718	1.720	1.722	1.724	1.726	1.727	1.729
104	1.707	1.710	1.712	1.715	1.717	1.719	1.721	1.723	1.724	1.726	1.728
106	1.706	1.709	1.711	1.713	1.715	1.718	1.720	1.721	1.723	1.725	1.726
108	1.705	1.707	1.710	1.712	1.714	1.716	1.718	1.720	1.722	1.723	1.725
110	1.704	1.706	1.709	1.711	1.713	1.715	1.717	1.719	1.721	1.722	1.724
112	1.703	1.705	1.708	1.710	1.712	1.714	1.716	1.718	1.719	1.721	1.723
114	1.702	1.704	1.707	1.709	1.711	1.713	1.715	1.716	1.718	1.720	1.721
116	1.701	1.703	1.706	1.708	1.710	1.712	1.714	1.715	1.717	1.719	1.720
118	1.700	1.702	1.705	1.707	1.709	1.711	1.712	1.714	1.716	1.718	1.719
120	1.699	1.701	1.704	1.706	1.708	1.710	1.711	1.713	1.715	1.717	1.718
122	1.698	1.701	1.703	1.705	1.707	1.709	1.710	1.712	1.714	1.715	1.717
124	1.698	1.700	1.702	1.704	1.706	1.708	1.709	1.711	1.713	1.714	1.716
126	1.697	1.699	1.701	1.703	1.705	1.707	1.708	1.710	1.712	1.713	1.715
128	1.696	1.698	1.700	1.702	1.704	1.706	1.708	1.709	1.711	1.712	1.714
130	1.695	1.697	1.699	1.701	1.703	1.705	1.707	1.708	1.710	1.712	1.713
132	1.695	1.697	1.699	1.701	1.702	1.704	1.706	1.707	1.709	1.711	1.712
134	1.694	1.696	1.698	1.700	1.702	1.703	1.705	1.707	1.708	1.710	1.711
136	1.693	1.695	1.697	1.699	1.701	1.702	1.704	1.706	1.707	1.709	1.710
138	1.693	1.695	1.697	1.698	1.700	1.702	1.703	1.705	1.707	1.708	1.710
140	1.692	1.694	1.696	1.698	1.699	1.701	1.703	1.704	1.706	1.707	1.709
142	1.692	1.693	1.695	1.697	1.699	1.700	1.702	1.703	1.705	1.706	1.708
144	1.691	1.693	1.695	1.696	1.698	1.700	1.701	1.703	1.704	1.706	1.707
146	1.691	1.692	1.694	1.696	1.697	1.699	1.700	1.702	1.703	1.705	1.706
148	1.690	1.692	1.693	1.695	1.697	1.698	1.700	1.701	1.703	1.704	1.706
150	1.689	1.691	1.693	1.695	1.696	1.698	1.699	1.701	1.702	1.703	1.705

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(j) Continued. Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	1.751	1.750	1.749	1.748	1.747	1.745	1.744	1.742	1.740	1.738	1.735
72	1.750	1.749	1.749	1.748	1.747	1.746	1.745	1.743	1.741	1.739	1.738
74	1.749	1.748	1.748	1.748	1.747	1.746	1.745	1.744	1.742	1.741	1.739
76	1.747	1.748	1.747	1.747	1.747	1.746	1.745	1.744	1.743	1.742	1.741
78	1.746	1.746	1.747	1.747	1.746	1.746	1.745	1.745	1.744	1.743	1.741
80	1.745	1.745	1.746	1.746	1.746	1.745	1.745	1.745	1.744	1.743	1.742
82	1.743	1.744	1.744	1.745	1.745	1.745	1.745	1.744	1.744	1.743	1.743
84	1.742	1.743	1.743	1.744	1.744	1.744	1.744	1.744	1.744	1.743	1.743
86	1.740	1.741	1.742	1.743	1.743	1.743	1.744	1.744	1.743	1.743	1.743
88	1.739	1.740	1.741	1.742	1.742	1.743	1.743	1.743	1.743	1.743	1.743
90	1.737	1.739	1.740	1.740	1.741	1.742	1.742	1.742	1.742	1.743	1.742
92	1.736	1.737	1.738	1.739	1.740	1.741	1.741	1.742	1.742	1.742	1.742
94	1.735	1.736	1.737	1.738	1.739	1.740	1.740	1.741	1.741	1.741	1.742
96	1.733	1.734	1.736	1.737	1.738	1.738	1.739	1.740	1.740	1.741	1.741
98	1.732	1.733	1.734	1.735	1.736	1.737	1.738	1.739	1.739	1.740	1.740
100	1.730	1.732	1.733	1.734	1.735	1.736	1.737	1.738	1.739	1.739	1.740
102	1.729	1.730	1.732	1.733	1.734	1.735	1.736	1.737	1.738	1.738	1.739
104	1.728	1.729	1.730	1.732	1.733	1.734	1.735	1.736	1.737	1.737	1.738
106	1.726	1.728	1.729	1.730	1.732	1.733	1.734	1.735	1.736	1.736	1.737
108	1.725	1.727	1.728	1.729	1.731	1.732	1.733	1.734	1.735	1.735	1.736
110	1.724	1.725	1.727	1.728	1.729	1.731	1.732	1.733	1.734	1.734	1.735
112	1.723	1.724	1.726	1.727	1.728	1.729	1.731	1.732	1.733	1.734	1.734
114	1.721	1.723	1.724	1.726	1.727	1.728	1.729	1.731	1.732	1.733	1.733
116	1.720	1.722	1.723	1.725	1.726	1.727	1.728	1.730	1.731	1.732	1.732
118	1.719	1.721	1.722	1.724	1.725	1.726	1.727	1.728	1.730	1.731	1.732
120	1.718	1.720	1.721	1.722	1.724	1.725	1.726	1.727	1.729	1.730	1.731
122	1.717	1.719	1.720	1.721	1.723	1.724	1.725	1.726	1.728	1.729	1.730
124	1.716	1.717	1.719	1.720	1.722	1.723	1.724	1.725	1.727	1.728	1.729
126	1.715	1.716	1.718	1.719	1.721	1.722	1.723	1.724	1.726	1.727	1.728
128	1.714	1.716	1.717	1.718	1.720	1.721	1.722	1.723	1.725	1.726	1.727
130	1.713	1.715	1.716	1.717	1.719	1.720	1.721	1.723	1.724	1.725	1.726
132	1.712	1.714	1.715	1.716	1.718	1.719	1.720	1.722	1.723	1.724	1.725
134	1.711	1.713	1.714	1.716	1.717	1.718	1.719	1.721	1.722	1.723	1.724
136	1.710	1.712	1.713	1.715	1.716	1.717	1.719	1.720	1.721	1.722	1.723
138	1.710	1.711	1.712	1.714	1.715	1.716	1.718	1.719	1.720	1.721	1.722
140	1.709	1.710	1.712	1.713	1.714	1.715	1.717	1.718	1.719	1.720	1.721
142	1.708	1.709	1.711	1.712	1.713	1.715	1.716	1.717	1.718	1.719	1.721
144	1.707	1.709	1.710	1.711	1.713	1.714	1.715	1.716	1.717	1.719	1.720
146	1.706	1.708	1.709	1.710	1.712	1.713	1.714	1.715	1.717	1.718	1.719
148	1.706	1.707	1.708	1.710	1.711	1.712	1.713	1.715	1.716	1.717	1.718
150	1.705	1.706	1.708	1.709	1.710	1.711	1.713	1.714	1.715	1.716	1.717

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	1.667	1.670	1.673	1.675	1.678	1.680	1.682	1.684	1.686	1.688	1.689
155	1.667	1.670	1.672	1.675	1.677	1.679	1.681	1.683	1.685	1.687	1.688
160	1.667	1.669	1.672	1.674	1.676	1.678	1.680	1.682	1.684	1.686	1.687
165	1.667	1.669	1.672	1.674	1.676	1.678	1.680	1.681	1.683	1.685	1.686
170	1.667	1.669	1.671	1.673	1.675	1.677	1.679	1.681	1.682	1.684	1.685
175	1.667	1.669	1.671	1.673	1.675	1.677	1.678	1.680	1.681	1.683	1.684
180	1.667	1.669	1.671	1.673	1.674	1.676	1.678	1.679	1.681	1.682	1.684
185	1.667	1.669	1.671	1.672	1.674	1.676	1.677	1.679	1.680	1.681	1.683
190	1.667	1.669	1.670	1.672	1.674	1.675	1.677	1.678	1.680	1.681	1.682
195	1.667	1.669	1.670	1.672	1.673	1.675	1.676	1.678	1.679	1.680	1.681
200	1.667	1.668	1.670	1.672	1.673	1.675	1.676	1.677	1.678	1.680	1.681
205	1.667	1.668	1.670	1.671	1.673	1.674	1.675	1.677	1.678	1.679	1.680
210	1.667	1.668	1.670	1.671	1.673	1.674	1.675	1.676	1.677	1.679	1.680
215	1.667	1.668	1.670	1.671	1.672	1.674	1.675	1.676	1.677	1.678	1.679
220	1.667	1.668	1.669	1.671	1.672	1.673	1.674	1.676	1.677	1.678	1.679
225	1.667	1.668	1.669	1.671	1.672	1.673	1.674	1.675	1.676	1.677	1.678
230	1.667	1.668	1.669	1.670	1.672	1.673	1.674	1.675	1.676	1.677	1.678
235	1.667	1.668	1.669	1.670	1.671	1.673	1.674	1.675	1.676	1.676	1.677
240	1.667	1.668	1.669	1.670	1.671	1.672	1.673	1.674	1.675	1.676	1.677
245	1.667	1.668	1.669	1.670	1.671	1.672	1.673	1.674	1.675	1.676	1.677
250	1.667	1.668	1.669	1.670	1.671	1.672	1.673	1.674	1.675	1.675	1.676
255	1.667	1.668	1.669	1.670	1.671	1.672	1.673	1.673	1.674	1.675	1.676
260	1.667	1.668	1.669	1.670	1.671	1.672	1.672	1.673	1.674	1.675	1.676
265	1.667	1.668	1.669	1.670	1.670	1.671	1.672	1.673	1.674	1.675	1.675
270	1.667	1.668	1.669	1.669	1.670	1.671	1.672	1.673	1.674	1.674	1.675
275	1.667	1.668	1.669	1.669	1.670	1.671	1.672	1.673	1.673	1.674	1.675
280	1.667	1.668	1.668	1.669	1.670	1.671	1.672	1.672	1.673	1.674	1.675
285	1.667	1.668	1.668	1.669	1.670	1.671	1.672	1.672	1.673	1.674	1.674
290	1.667	1.668	1.668	1.669	1.670	1.671	1.671	1.672	1.673	1.673	1.674
295	1.667	1.667	1.668	1.669	1.670	1.670	1.671	1.672	1.673	1.673	1.674
300	1.667	1.667	1.668	1.669	1.670	1.670	1.671	1.672	1.672	1.673	1.674
310	1.667	1.667	1.668	1.669	1.669	1.670	1.671	1.671	1.672	1.673	1.673
320	1.667	1.667	1.668	1.669	1.669	1.670	1.671	1.671	1.672	1.672	1.673
330	1.667	1.667	1.668	1.669	1.669	1.670	1.670	1.671	1.671	1.672	1.673
340	1.667	1.667	1.668	1.668	1.669	1.670	1.670	1.671	1.671	1.672	1.672
350	1.667	1.667	1.668	1.668	1.669	1.669	1.670	1.670	1.671	1.672	1.672
360	1.667	1.667	1.668	1.668	1.669	1.669	1.670	1.670	1.671	1.671	1.672
370	1.667	1.667	1.668	1.668	1.669	1.669	1.670	1.670	1.671	1.671	1.672
380	1.667	1.667	1.668	1.668	1.669	1.669	1.670	1.670	1.670	1.671	1.671
390	1.667	1.667	1.668	1.668	1.668	1.669	1.669	1.670	1.670	1.671	1.671
400	1.667	1.667	1.668	1.668	1.668	1.669	1.669	1.670	1.670	1.670	1.671

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(j) Concluded. Plenum specific-heat ratio, γ_o

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	1.689	1.691	1.693	1.695	1.696	1.698	1.699	1.701	1.702	1.703	1.705
155	1.688	1.690	1.692	1.693	1.695	1.696	1.698	1.699	1.700	1.702	1.703
160	1.687	1.689	1.690	1.692	1.693	1.695	1.696	1.698	1.699	1.700	1.702
165	1.686	1.688	1.689	1.691	1.692	1.693	1.695	1.696	1.697	1.699	1.700
170	1.685	1.687	1.688	1.690	1.691	1.692	1.694	1.695	1.696	1.697	1.699
175	1.684	1.686	1.687	1.689	1.690	1.691	1.692	1.694	1.695	1.696	1.697
180	1.684	1.685	1.686	1.688	1.689	1.690	1.691	1.693	1.694	1.695	1.696
185	1.683	1.684	1.685	1.687	1.688	1.689	1.690	1.691	1.693	1.694	1.695
190	1.682	1.683	1.685	1.686	1.687	1.688	1.689	1.690	1.692	1.693	1.694
195	1.681	1.683	1.684	1.685	1.686	1.687	1.688	1.690	1.691	1.692	1.693
200	1.681	1.682	1.683	1.684	1.685	1.686	1.688	1.689	1.690	1.691	1.692
205	1.680	1.681	1.683	1.684	1.685	1.686	1.687	1.688	1.689	1.690	1.691
210	1.680	1.681	1.682	1.683	1.684	1.685	1.686	1.687	1.688	1.689	1.690
215	1.679	1.680	1.681	1.682	1.683	1.684	1.685	1.686	1.687	1.688	1.689
220	1.679	1.680	1.681	1.682	1.683	1.684	1.685	1.686	1.687	1.687	1.688
225	1.678	1.679	1.680	1.681	1.682	1.683	1.684	1.685	1.686	1.687	1.688
230	1.678	1.679	1.680	1.681	1.682	1.682	1.683	1.684	1.685	1.686	1.687
235	1.677	1.678	1.679	1.680	1.681	1.682	1.683	1.684	1.685	1.685	1.686
240	1.677	1.678	1.679	1.680	1.681	1.681	1.682	1.683	1.684	1.685	1.686
245	1.677	1.678	1.678	1.679	1.680	1.681	1.682	1.683	1.683	1.684	1.685
250	1.676	1.677	1.678	1.679	1.680	1.680	1.681	1.682	1.683	1.684	1.684
255	1.676	1.677	1.678	1.678	1.679	1.680	1.681	1.682	1.682	1.683	1.684
260	1.676	1.677	1.677	1.678	1.679	1.680	1.680	1.681	1.682	1.683	1.683
265	1.675	1.676	1.677	1.678	1.678	1.679	1.680	1.681	1.681	1.682	1.683
270	1.675	1.676	1.677	1.677	1.678	1.679	1.680	1.680	1.681	1.682	1.682
275	1.675	1.676	1.676	1.677	1.678	1.678	1.679	1.680	1.681	1.681	1.682
280	1.675	1.675	1.676	1.677	1.677	1.678	1.679	1.679	1.680	1.681	1.681
285	1.674	1.675	1.676	1.676	1.677	1.678	1.678	1.679	1.680	1.680	1.681
290	1.674	1.675	1.675	1.676	1.677	1.677	1.678	1.679	1.679	1.680	1.681
295	1.674	1.675	1.675	1.676	1.676	1.677	1.678	1.678	1.679	1.680	1.680
300	1.674	1.674	1.675	1.676	1.676	1.677	1.677	1.678	1.679	1.679	1.680
310	1.673	1.674	1.675	1.675	1.676	1.676	1.677	1.677	1.678	1.679	1.679
320	1.673	1.674	1.674	1.675	1.675	1.676	1.676	1.677	1.677	1.678	1.679
330	1.673	1.673	1.674	1.674	1.675	1.675	1.676	1.676	1.677	1.677	1.678
340	1.672	1.673	1.673	1.674	1.674	1.675	1.675	1.676	1.676	1.677	1.677
350	1.672	1.673	1.673	1.673	1.674	1.674	1.675	1.675	1.676	1.676	1.677
360	1.672	1.672	1.673	1.673	1.674	1.674	1.675	1.675	1.676	1.676	1.676
370	1.672	1.672	1.672	1.673	1.673	1.674	1.674	1.675	1.675	1.676	1.676
380	1.671	1.672	1.672	1.673	1.673	1.673	1.674	1.674	1.675	1.675	1.676
390	1.671	1.671	1.672	1.672	1.673	1.673	1.674	1.674	1.674	1.675	1.675
400	1.671	1.671	1.672	1.672	1.672	1.673	1.673	1.674	1.674	1.674	1.675

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	1.705	1.706	1.708	1.709	1.710	1.711	1.713	1.714	1.715	1.716	1.717
155	1.703	1.704	1.706	1.707	1.708	1.710	1.711	1.712	1.713	1.714	1.715
160	1.702	1.703	1.704	1.705	1.707	1.708	1.709	1.710	1.711	1.712	1.714
165	1.700	1.701	1.703	1.704	1.705	1.706	1.707	1.708	1.710	1.711	1.712
170	1.699	1.700	1.701	1.702	1.703	1.705	1.706	1.707	1.708	1.709	1.710
175	1.697	1.698	1.700	1.701	1.702	1.703	1.704	1.705	1.706	1.707	1.709
180	1.696	1.697	1.698	1.699	1.701	1.702	1.703	1.704	1.705	1.706	1.707
185	1.695	1.696	1.697	1.698	1.699	1.700	1.701	1.703	1.704	1.705	1.706
190	1.694	1.695	1.696	1.697	1.698	1.699	1.700	1.701	1.702	1.703	1.704
195	1.693	1.694	1.695	1.696	1.697	1.698	1.699	1.700	1.701	1.702	1.703
200	1.692	1.693	1.694	1.695	1.696	1.697	1.698	1.699	1.700	1.701	1.702
205	1.691	1.692	1.693	1.694	1.695	1.696	1.697	1.698	1.699	1.700	1.701
210	1.690	1.691	1.692	1.693	1.694	1.695	1.696	1.697	1.698	1.699	1.699
215	1.689	1.690	1.691	1.692	1.693	1.694	1.695	1.696	1.697	1.697	1.698
220	1.688	1.689	1.690	1.691	1.692	1.693	1.694	1.695	1.696	1.696	1.697
225	1.688	1.689	1.689	1.690	1.691	1.692	1.693	1.694	1.695	1.696	1.696
230	1.687	1.688	1.689	1.690	1.690	1.691	1.692	1.693	1.694	1.695	1.695
235	1.686	1.687	1.688	1.689	1.690	1.690	1.691	1.692	1.693	1.694	1.695
240	1.686	1.686	1.687	1.688	1.689	1.690	1.691	1.691	1.692	1.693	1.694
245	1.685	1.686	1.687	1.687	1.688	1.689	1.690	1.691	1.691	1.692	1.693
250	1.684	1.685	1.686	1.687	1.688	1.688	1.689	1.690	1.691	1.691	1.692
255	1.684	1.685	1.685	1.686	1.687	1.688	1.688	1.689	1.690	1.691	1.691
260	1.683	1.684	1.685	1.686	1.686	1.687	1.688	1.689	1.689	1.690	1.691
265	1.683	1.684	1.684	1.685	1.686	1.686	1.687	1.688	1.689	1.689	1.690
270	1.682	1.683	1.684	1.684	1.685	1.686	1.687	1.687	1.688	1.689	1.689
275	1.682	1.683	1.683	1.684	1.685	1.685	1.686	1.687	1.687	1.688	1.689
280	1.681	1.682	1.683	1.683	1.684	1.685	1.685	1.686	1.687	1.687	1.688
285	1.681	1.682	1.682	1.683	1.684	1.684	1.685	1.686	1.686	1.687	1.688
290	1.681	1.681	1.682	1.683	1.683	1.684	1.684	1.685	1.686	1.686	1.687
295	1.680	1.681	1.682	1.682	1.683	1.683	1.684	1.685	1.685	1.686	1.687
300	1.680	1.681	1.681	1.682	1.682	1.683	1.684	1.684	1.685	1.685	1.686
310	1.679	1.680	1.680	1.681	1.682	1.682	1.683	1.683	1.684	1.684	1.685
320	1.679	1.679	1.680	1.680	1.681	1.681	1.682	1.682	1.683	1.684	1.684
330	1.678	1.679	1.679	1.680	1.680	1.681	1.681	1.682	1.682	1.683	1.683
340	1.677	1.678	1.678	1.679	1.679	1.680	1.681	1.681	1.682	1.682	1.683
350	1.677	1.677	1.678	1.678	1.679	1.679	1.680	1.680	1.681	1.681	1.682
360	1.676	1.677	1.677	1.678	1.678	1.679	1.679	1.680	1.680	1.681	1.681
370	1.676	1.676	1.677	1.677	1.678	1.678	1.679	1.679	1.680	1.680	1.681
380	1.676	1.676	1.676	1.677	1.677	1.678	1.678	1.679	1.679	1.680	1.680
390	1.675	1.676	1.676	1.676	1.677	1.677	1.678	1.678	1.679	1.679	1.679
400	1.675	1.675	1.676	1.676	1.676	1.677	1.677	1.678	1.678	1.679	1.679

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(k) Plenum speed of sound, a_0, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	2	4	6	8	10	12	14	16	18	20
15	227.9	227.8	228.8	230.8	233.6	237.3	241.6	246.6	252.2	258.2	264.6
16	235.4	235.6	236.8	238.9	241.6	245.1	249.2	253.7	258.8	264.2	269.9
17	242.6	243.2	244.5	246.6	249.4	252.7	256.5	260.8	265.4	270.4	275.7
18	249.6	250.4	251.9	254.1	256.8	260.0	263.6	267.7	272.0	276.7	281.6
19	256.5	257.5	259.1	261.3	264.0	267.1	270.6	274.4	278.6	282.9	287.5
20	263.1	264.3	266.0	268.3	270.9	274.0	277.4	281.1	285.0	289.2	293.5
21	269.6	271.0	272.8	275.0	277.7	280.7	284.0	287.5	291.3	295.3	299.4
22	276.0	277.4	279.3	281.6	284.2	287.2	290.4	293.9	297.5	301.3	305.3
23	282.2	283.7	285.7	288.0	290.6	293.5	296.7	300.0	303.6	307.3	311.1
24	288.2	289.9	291.9	294.2	296.9	299.7	302.8	306.1	309.5	313.1	316.8
25	294.2	295.9	298.0	300.3	302.9	305.8	308.8	312.0	315.4	318.9	322.5
26	300.0	301.8	303.9	306.3	308.9	311.7	314.7	317.8	321.1	324.5	328.0
27	305.7	307.6	309.7	312.1	314.7	317.5	320.4	323.5	326.7	330.1	333.5
28	311.3	313.3	315.4	317.8	320.4	323.1	326.0	329.1	332.2	335.5	338.9
29	316.9	318.8	321.0	323.4	326.0	328.7	331.6	334.6	337.7	340.9	344.1
30	322.3	324.3	326.5	328.9	331.4	334.1	337.0	339.9	343.0	346.1	349.4
31	327.6	329.6	331.9	334.3	336.8	339.5	342.3	345.2	348.2	351.3	354.5
32	332.8	334.9	337.1	339.5	342.1	344.8	347.5	350.4	353.4	356.4	359.5
33	338.0	340.1	342.3	344.7	347.3	349.9	352.7	355.5	358.5	361.5	364.5
34	343.1	345.2	347.5	349.9	352.4	355.0	357.7	360.6	363.5	366.4	369.4
35	348.1	350.2	352.5	354.9	357.4	360.0	362.7	365.5	368.4	371.3	374.3
36	353.0	355.2	357.5	359.8	362.4	365.0	367.6	370.4	373.2	376.1	379.0
37	357.9	360.1	362.3	364.7	367.2	369.8	372.5	375.2	378.0	380.9	383.8
38	362.7	364.9	367.2	369.5	372.0	374.6	377.2	380.0	382.7	385.5	388.4
39	367.4	369.6	371.9	374.3	376.8	379.3	381.9	384.6	387.4	390.2	393.0
40	372.1	374.3	376.6	379.0	381.4	384.0	386.6	389.3	392.0	394.7	397.5
42	381.3	383.5	385.8	388.2	390.6	393.1	395.7	398.3	401.0	403.7	406.4
44	390.3	392.5	394.8	397.1	399.6	402.0	404.6	407.2	409.8	412.4	415.1
46	399.1	401.3	403.6	405.9	408.3	410.8	413.3	415.8	418.4	421.0	423.6
48	407.6	409.9	412.1	414.5	416.8	419.3	421.7	424.2	426.8	429.4	431.9
50	416.0	418.3	420.5	422.8	425.2	427.6	430.0	432.5	435.0	437.5	440.1
52	424.3	426.5	428.7	431.0	433.4	435.8	438.2	440.6	443.1	445.6	448.1
54	432.4	434.6	436.8	439.1	441.4	443.8	446.2	448.6	451.0	453.5	455.9
56	440.3	442.5	444.7	447.0	449.3	451.6	454.0	456.4	458.8	461.2	463.6
58	448.1	450.3	452.5	454.7	457.0	459.3	461.7	464.0	466.4	468.8	471.2
60	455.8	457.9	460.1	462.4	464.6	466.9	469.2	471.6	473.9	476.3	478.7
62	463.3	465.5	467.6	469.9	472.1	474.4	476.7	479.0	481.3	483.6	486.0
64	470.7	472.9	475.0	477.2	479.5	481.7	484.0	486.3	488.5	490.9	493.2
66	478.0	480.1	482.3	484.5	486.7	488.9	491.2	493.4	495.7	498.0	500.3
68	485.2	487.3	489.5	491.6	493.8	496.0	498.3	500.5	502.7	505.0	507.3
70	492.3	494.4	496.5	498.7	500.8	503.0	505.2	507.5	509.7	511.9	514.2

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
15	227.9	237.3	264.6	300.2	337.2	372.1	404.0	433.1	459.9	484.5	507.5
16	235.4	245.1	269.9	302.2	336.6	369.9	401.0	429.7	456.2	480.8	503.8
17	242.6	252.7	275.7	305.2	337.1	368.8	398.9	427.0	453.2	477.6	500.5
18	249.6	260.0	281.6	308.8	338.6	368.6	397.6	425.0	450.8	475.0	497.7
19	256.5	267.1	287.5	313.0	340.9	369.3	397.1	423.8	449.0	472.9	495.4
20	263.1	274.0	293.5	317.5	343.7	370.7	397.4	423.2	447.8	471.3	493.5
21	269.6	280.7	299.4	322.2	346.9	372.6	398.2	423.1	447.2	470.2	492.1
22	276.0	287.2	305.3	327.0	350.5	375.0	399.5	423.6	447.0	469.5	491.1
23	282.2	293.5	311.1	331.9	354.4	377.7	401.3	424.6	447.3	469.3	490.4
24	288.2	299.7	316.8	336.8	358.4	380.8	403.4	425.9	448.0	469.4	490.2
25	294.2	305.8	322.5	341.8	362.6	384.1	405.9	427.6	449.0	470.0	490.3
26	300.0	311.7	328.0	346.8	366.8	387.5	408.6	429.6	450.4	470.8	490.7
27	305.7	317.5	333.5	351.7	371.1	391.1	411.5	431.9	452.1	472.0	491.4
28	311.3	323.1	338.9	356.6	375.4	394.9	414.6	434.4	454.0	473.4	492.4
29	316.9	328.7	344.1	361.5	379.8	398.7	417.8	437.0	456.1	475.1	493.7
30	322.3	334.1	349.4	366.3	384.2	402.5	421.1	439.8	458.5	476.9	495.1
31	327.6	339.5	354.5	371.1	388.5	406.4	424.6	442.8	460.9	479.0	496.8
32	332.8	344.8	359.5	375.8	392.9	410.4	428.1	445.8	463.6	481.2	498.6
33	338.0	349.9	364.5	380.5	397.2	414.3	431.6	449.0	466.3	483.5	500.6
34	343.1	355.0	369.4	385.2	401.6	418.3	435.2	452.2	469.1	486.0	502.7
35	348.1	360.0	374.3	389.7	405.9	422.3	438.8	455.5	472.1	488.6	504.9
36	353.0	365.0	379.0	394.3	410.1	426.2	442.5	458.8	475.0	491.2	507.3
37	357.9	369.8	383.8	398.8	414.4	430.2	446.2	462.1	478.1	494.0	509.7
38	362.7	374.6	388.4	403.2	418.6	434.1	449.8	465.5	481.2	496.8	512.3
39	367.4	379.3	393.0	407.6	422.7	438.1	453.5	468.9	484.3	499.7	514.9
40	372.1	384.0	397.5	412.0	426.9	442.0	457.2	472.4	487.5	502.6	517.5
42	381.3	393.1	406.4	420.5	435.0	449.7	464.5	479.2	493.9	508.5	523.0
44	390.3	402.0	415.1	428.9	443.1	457.4	471.8	486.1	500.4	514.6	528.7
46	399.1	410.8	423.6	437.1	451.0	465.0	479.0	493.0	506.9	520.7	534.4
48	407.6	419.3	431.9	445.2	458.8	472.5	486.1	499.8	513.4	526.9	540.2
50	416.0	427.6	440.1	453.1	466.4	479.8	493.2	506.6	519.9	533.1	546.1
52	424.3	435.8	448.1	460.9	474.0	487.1	500.2	513.3	526.3	539.2	552.0
54	432.4	443.8	455.9	468.6	481.4	494.3	507.2	520.0	532.8	545.4	558.0
56	440.3	451.6	463.6	476.1	488.7	501.4	514.0	526.6	539.2	551.6	563.9
58	448.1	459.3	471.2	483.5	495.9	508.3	520.8	533.2	545.5	557.7	569.8
60	455.8	466.9	478.7	490.7	503.0	515.2	527.5	539.7	551.8	563.8	575.7
62	463.3	474.4	486.0	497.9	509.9	522.0	534.1	546.1	558.0	569.9	581.6
64	470.7	481.7	493.2	504.9	516.8	528.8	540.7	552.5	564.2	575.9	587.4
66	478.0	488.9	500.3	511.9	523.6	535.4	547.1	558.8	570.4	581.8	593.2
68	485.2	496.0	507.3	518.7	530.3	541.9	553.5	565.0	576.4	587.8	599.0
70	492.3	503.0	514.2	525.5	536.9	548.4	559.8	571.2	582.5	593.6	604.7

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(k) Continued. Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
15	507.5	529.0	549.2	568.3	586.4	603.7	620.2	636.1	651.3	665.9	680.1
16	503.8	525.3	545.6	564.8	583.0	600.4	617.0	633.0	648.3	663.0	677.3
17	500.5	522.0	542.3	561.6	579.9	597.3	614.0	630.1	645.5	660.3	674.6
18	497.7	519.2	539.4	558.7	577.0	594.5	611.3	627.4	642.9	657.8	672.2
19	495.4	516.7	536.9	556.1	574.5	592.0	608.8	624.9	640.4	655.4	669.9
20	493.5	514.6	534.7	553.9	572.2	589.7	606.5	622.6	638.2	653.2	667.7
21	492.1	513.0	532.9	552.0	570.2	587.7	604.4	620.6	636.2	651.2	665.7
22	491.1	511.7	531.4	550.4	568.5	585.9	602.6	618.8	634.3	649.3	663.9
23	490.4	510.8	530.3	549.0	567.1	584.4	601.1	617.1	632.7	647.7	662.2
24	490.2	510.2	529.5	548.0	565.9	583.1	599.7	615.7	631.2	646.2	660.7
25	490.3	510.0	529.0	547.3	565.0	582.1	598.6	614.5	630.0	644.9	659.4
26	490.7	510.0	528.7	546.9	564.4	581.3	597.7	613.5	628.9	643.8	658.2
27	491.4	510.4	528.8	546.7	564.0	580.7	597.0	612.7	628.0	642.8	657.2
28	492.4	511.0	529.1	546.7	563.8	580.4	596.5	612.1	627.3	642.1	656.4
29	493.7	511.9	529.7	547.0	563.9	580.3	596.2	611.7	626.8	641.4	655.7
30	495.1	513.0	530.4	547.5	564.1	580.3	596.1	611.5	626.4	641.0	655.2
31	496.8	514.3	531.4	548.2	564.6	580.6	596.2	611.4	626.3	640.7	654.8
32	498.6	515.7	532.6	549.1	565.3	581.1	596.5	611.6	626.3	640.6	654.6
33	500.6	517.4	533.9	550.2	566.1	581.7	596.9	611.8	626.4	640.6	654.5
34	502.7	519.2	535.4	551.4	567.1	582.5	597.5	612.3	626.7	640.8	654.6
35	504.9	521.1	537.1	552.8	568.3	583.4	598.3	612.9	627.1	641.1	654.8
36	507.3	523.2	538.9	554.3	569.6	584.5	599.2	613.6	627.7	641.5	655.1
37	509.7	525.3	540.8	556.0	571.0	585.7	600.2	614.5	628.4	642.1	655.5
38	512.3	527.6	542.8	557.8	572.5	587.1	601.4	615.4	629.2	642.8	656.1
39	514.9	530.0	544.9	559.6	574.2	588.5	602.6	616.5	630.2	643.6	656.8
40	517.5	532.4	547.1	561.6	575.9	590.1	604.0	617.7	631.2	644.5	657.6
42	523.0	537.4	551.7	565.8	579.7	593.5	607.1	620.5	633.7	646.7	659.5
44	528.7	542.6	556.5	570.2	583.8	597.2	610.5	623.5	636.4	649.2	661.7
46	534.4	548.0	561.5	574.9	588.1	601.2	614.1	626.9	639.5	652.0	664.3
48	540.2	553.5	566.7	579.7	592.6	605.4	618.1	630.6	642.9	655.1	667.2
50	546.1	559.1	572.0	584.7	597.3	609.8	622.2	634.4	646.5	658.5	670.3
52	552.0	564.7	577.3	589.8	602.1	614.4	626.5	638.4	650.3	662.0	673.6
54	558.0	570.4	582.7	594.9	607.0	619.0	630.9	642.6	654.3	665.8	677.2
56	563.9	576.1	588.2	600.2	612.0	623.8	635.4	647.0	658.4	669.7	680.9
58	569.8	581.8	593.7	605.4	617.1	628.6	640.1	651.4	662.6	673.7	684.7
60	575.7	587.5	599.2	610.7	622.2	633.5	644.8	655.9	666.9	677.8	688.7
62	581.6	593.2	604.7	616.0	627.3	638.5	649.5	660.5	671.3	682.1	692.7
64	587.4	598.8	610.1	621.4	632.4	643.4	654.3	665.1	675.8	686.4	696.9
66	593.2	604.5	615.6	626.7	637.6	648.4	659.2	669.8	680.3	690.7	701.1
68	599.0	610.1	621.1	632.0	642.8	653.4	664.0	674.5	684.9	695.2	705.4
70	604.7	615.7	626.5	637.3	647.9	658.5	668.9	679.2	689.5	699.6	709.7

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
15	680.1	693.8	707.0	719.8	732.3	744.4	756.2	767.7	779.0	789.9	800.6
16	677.3	691.1	704.4	717.3	729.9	742.1	754.0	765.6	776.9	787.9	798.7
17	674.6	688.5	701.9	714.9	727.6	739.9	751.8	763.5	774.9	786.0	796.8
18	672.2	686.1	699.6	712.7	725.4	737.8	749.8	761.5	773.0	784.1	795.0
19	669.9	683.8	697.4	710.5	723.3	735.7	747.8	759.6	771.1	782.4	793.3
20	667.7	681.7	695.3	708.5	721.4	733.8	746.0	757.8	769.4	780.7	791.7
21	665.7	679.8	693.4	706.6	719.5	732.0	744.2	756.1	767.7	779.1	790.1
22	663.9	678.0	691.6	704.9	717.8	730.4	742.6	754.5	766.2	777.5	788.6
23	662.2	676.3	690.0	703.3	716.2	728.8	741.0	753.0	764.7	776.1	787.2
24	660.7	674.8	688.5	701.8	714.7	727.3	739.6	751.6	763.3	774.7	785.9
25	659.4	673.5	687.1	700.4	713.4	726.0	738.3	750.3	762.0	773.5	784.7
26	658.2	672.3	685.9	699.2	712.1	724.8	737.1	749.1	760.8	772.3	783.5
27	657.2	671.2	684.9	698.1	711.0	723.6	735.9	748.0	759.7	771.2	782.4
28	656.4	670.3	683.9	697.2	710.1	722.7	734.9	747.0	758.7	770.2	781.4
29	655.7	669.6	683.1	696.3	709.2	721.8	734.1	746.1	757.8	769.3	780.5
30	655.2	669.0	682.5	695.6	708.5	721.0	733.3	745.3	757.0	768.5	779.7
31	654.8	668.6	682.0	695.1	707.9	720.4	732.6	744.6	756.3	767.7	779.0
32	654.6	668.3	681.6	694.6	707.4	719.9	732.0	744.0	755.7	767.1	778.3
33	654.5	668.1	681.4	694.3	707.0	719.4	731.6	743.5	755.1	766.6	777.8
34	654.6	668.1	681.2	694.1	706.8	719.1	731.2	743.1	754.7	766.1	777.3
35	654.8	668.1	681.2	694.1	706.6	718.9	731.0	742.8	754.4	765.8	776.9
36	655.1	668.4	681.4	694.1	706.6	718.8	730.8	742.6	754.2	765.5	776.6
37	655.5	668.7	681.6	694.3	706.7	718.9	730.8	742.5	754.0	765.3	776.4
38	656.1	669.2	682.0	694.5	706.9	719.0	730.9	742.5	754.0	765.2	776.3
39	656.8	669.7	682.4	694.9	707.2	719.2	731.0	742.6	754.0	765.2	776.2
40	657.6	670.4	683.0	695.4	707.6	719.5	731.3	742.8	754.1	765.3	776.2
42	659.5	672.1	684.4	696.6	708.6	720.4	732.0	743.4	754.6	765.7	776.6
44	661.7	674.1	686.3	698.2	710.0	721.7	733.1	744.4	755.5	766.4	777.2
46	664.3	676.4	688.4	700.2	711.8	723.2	734.5	745.7	756.6	767.4	778.1
48	667.2	679.1	690.8	702.4	713.8	725.1	736.2	747.2	758.0	768.7	779.2
50	670.3	682.0	693.5	704.9	716.2	727.3	738.2	749.1	759.7	770.3	780.7
52	673.6	685.1	696.4	707.6	718.7	729.7	740.5	751.1	761.7	772.1	782.4
54	677.2	688.4	699.6	710.6	721.5	732.3	742.9	753.4	763.8	774.1	784.3
56	680.9	691.9	702.9	713.7	724.5	735.1	745.6	755.9	766.2	776.3	786.4
58	684.7	695.6	706.4	717.0	727.6	738.0	748.4	758.6	768.7	778.7	788.6
60	688.7	699.4	710.0	720.5	730.9	741.2	751.4	761.5	771.4	781.3	791.1
62	692.7	703.3	713.7	724.1	734.3	744.5	754.5	764.5	774.3	784.1	793.7
64	696.9	707.3	717.6	727.7	737.9	747.9	757.8	767.6	777.3	786.9	796.5
66	701.1	711.3	721.5	731.5	741.5	751.4	761.1	770.8	780.4	789.9	799.4
68	705.4	715.5	725.5	735.4	745.2	755.0	764.6	774.2	783.7	793.1	802.4
70	709.7	719.7	729.5	739.3	749.0	758.6	768.2	777.6	787.0	796.3	805.5

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(k) Continued. Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
70	492.3	503.0	514.2	525.5	536.9	548.4	559.8	571.2	582.5	593.8	604.7
72	499.3	509.9	521.0	532.2	543.5	554.8	566.1	577.3	588.4	599.5	610.4
74	506.1	516.7	527.7	538.8	549.9	561.1	572.3	583.4	594.4	605.3	616.1
76	512.9	523.5	534.3	545.3	556.3	567.4	578.4	589.3	600.2	611.0	621.7
78	519.6	530.1	540.8	551.7	562.6	573.5	584.4	595.3	606.0	616.7	627.2
80	526.3	536.6	547.3	558.0	568.8	579.6	590.4	601.1	611.8	622.3	632.8
82	532.8	543.1	553.6	564.3	575.0	585.7	596.4	607.0	617.5	627.9	638.2
84	539.3	549.5	559.9	570.5	581.1	591.7	602.2	612.7	623.1	633.5	643.7
86	545.6	555.8	566.1	576.6	587.1	597.6	608.0	618.4	628.7	639.0	649.1
88	551.9	562.0	572.3	582.7	593.1	603.4	613.8	624.1	634.3	644.4	654.4
90	558.2	568.2	578.4	588.7	599.0	609.2	619.5	629.7	639.8	649.8	659.8
92	564.4	574.3	584.4	594.6	604.8	615.0	625.1	635.2	645.3	655.2	665.0
94	570.5	580.3	590.4	600.5	610.6	620.7	630.7	640.7	650.7	660.5	670.3
96	576.5	586.3	596.3	606.3	616.3	626.3	636.3	646.2	656.0	665.8	675.5
98	582.5	592.2	602.1	612.0	622.0	631.9	641.8	651.6	661.4	671.1	680.6
100	588.4	598.1	607.9	617.7	627.6	637.4	647.2	657.0	666.7	676.3	685.8
102	594.2	603.9	613.6	623.4	633.1	642.9	652.6	662.3	671.9	681.4	690.9
104	600.0	609.6	619.2	628.9	638.7	648.3	658.0	667.6	677.1	686.5	695.9
106	605.8	615.3	624.9	634.5	644.1	653.7	663.3	672.8	682.3	691.6	700.9
108	611.5	620.9	630.4	640.0	649.5	659.1	668.6	678.0	687.4	696.7	705.9
110	617.1	626.5	635.9	645.4	654.9	664.4	673.8	683.2	692.5	701.7	710.8
112	622.7	632.0	641.4	650.8	660.2	669.6	679.0	688.3	697.5	706.7	715.8
114	628.2	637.5	646.8	656.2	665.5	674.8	684.1	693.3	702.5	711.6	720.6
116	633.7	642.9	652.2	661.5	670.7	680.0	689.2	698.4	707.5	716.5	725.5
118	639.1	648.3	657.5	666.7	675.9	685.1	694.3	703.4	712.4	721.4	730.3
120	644.5	653.6	662.8	671.9	681.1	690.2	699.3	708.4	717.3	726.2	735.1
122	649.9	658.9	668.0	677.1	686.2	695.3	704.3	713.3	722.2	731.0	739.8
124	655.2	664.2	673.2	682.3	691.3	700.3	709.3	718.2	727.0	735.8	744.5
126	660.5	669.4	678.4	687.4	696.3	705.3	714.2	723.0	731.8	740.6	749.2
128	665.7	674.6	683.5	692.4	701.3	710.2	719.1	727.9	736.6	745.3	753.9
130	670.9	679.7	688.6	697.4	706.3	715.1	723.9	732.7	741.3	750.0	758.5
132	676.0	684.8	693.6	702.4	711.2	720.0	728.7	737.4	746.0	754.6	763.1
134	681.1	689.8	698.6	707.4	716.1	724.8	733.5	742.1	750.7	759.2	767.7
136	686.2	694.9	703.6	712.3	721.0	729.6	738.3	746.8	755.4	763.8	772.2
138	691.2	699.8	708.5	717.2	725.8	734.4	743.0	751.5	760.0	768.4	776.8
140	696.2	704.8	713.4	722.0	730.6	739.2	747.7	756.2	764.6	772.9	781.2
142	701.1	709.7	718.3	726.8	735.4	743.9	752.3	760.8	769.1	777.5	785.7
144	706.1	714.6	723.1	731.6	740.1	748.5	757.0	765.3	773.7	781.9	790.2
146	710.9	719.4	727.9	736.3	744.8	753.2	761.6	769.9	778.2	786.4	794.6
148	715.8	724.2	732.6	741.1	749.5	757.8	766.1	774.4	782.7	790.8	799.0
150	720.6	729.0	737.4	745.7	754.1	762.4	770.7	778.9	787.1	795.2	803.3

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
70	604.7	615.7	626.5	637.3	647.9	658.5	668.9	679.2	689.5	699.6	709.7
72	610.4	621.2	632.0	642.6	653.1	663.5	673.8	684.0	694.1	704.1	714.0
74	616.1	626.8	637.3	647.8	658.2	668.5	678.7	688.7	698.7	708.6	718.4
76	621.7	632.2	642.7	653.1	663.3	673.5	683.5	693.5	703.4	713.2	722.9
78	627.2	637.7	648.0	658.3	668.4	678.5	688.4	698.3	708.0	717.7	727.3
80	632.8	643.1	653.3	663.5	673.5	683.4	693.3	703.0	712.7	722.3	731.7
82	638.2	648.5	658.6	668.6	678.6	688.4	698.1	707.8	717.3	726.8	736.2
84	643.7	653.8	663.8	673.8	683.6	693.3	703.0	712.5	722.0	731.4	740.6
86	649.1	659.1	669.1	678.9	688.6	698.3	707.8	717.3	726.6	735.9	745.1
88	654.4	664.4	674.2	684.0	693.6	703.2	712.6	722.0	731.3	740.5	749.6
90	659.8	669.6	679.4	689.0	698.6	708.0	717.4	726.7	735.9	745.0	754.0
92	665.0	674.8	684.5	694.0	703.5	712.9	722.2	731.4	740.5	749.5	758.5
94	670.3	680.0	689.5	699.0	708.4	717.7	726.9	736.0	745.1	754.0	762.9
96	675.5	685.1	694.6	704.0	713.3	722.5	731.6	740.7	749.6	758.5	767.3
98	680.6	690.2	699.6	708.9	718.1	727.3	736.3	745.3	754.2	763.0	771.7
100	685.8	695.2	704.5	713.8	723.0	732.0	741.0	749.9	758.7	767.5	776.1
102	690.9	700.2	709.5	718.7	727.8	736.8	745.7	754.5	763.3	771.9	780.5
104	695.9	705.2	714.4	723.5	732.5	741.5	750.3	759.1	767.8	776.4	784.9
106	700.9	710.1	719.3	728.3	737.3	746.1	754.9	763.6	772.2	780.8	789.3
108	705.9	715.0	724.1	733.1	742.0	750.8	759.5	768.1	776.7	785.2	793.6
110	710.8	719.9	728.9	737.8	746.7	755.4	764.1	772.6	781.2	789.6	797.9
112	715.8	724.8	733.7	742.5	751.3	760.0	768.6	777.1	785.6	793.9	802.2
114	720.6	729.6	738.4	747.2	755.9	764.6	773.1	781.6	790.0	798.3	806.5
116	725.5	734.4	743.2	751.9	760.5	769.1	777.6	786.0	794.4	802.6	810.8
118	730.3	739.1	747.9	756.5	765.1	773.6	782.1	790.4	798.7	806.9	815.1
120	735.1	743.8	752.5	761.1	769.7	778.1	786.5	794.8	803.1	811.2	819.3
122	739.8	748.5	757.2	765.7	774.2	782.6	790.9	799.2	807.4	815.5	823.5
124	744.5	753.2	761.8	770.3	778.7	787.1	795.3	803.5	811.7	819.7	827.7
126	749.2	757.8	766.3	774.8	783.2	791.5	799.7	807.9	816.0	824.0	831.9
128	753.9	762.4	770.9	779.3	787.6	795.9	804.1	812.2	820.2	828.2	836.1
130	758.5	767.0	775.4	783.8	792.0	800.3	808.4	816.5	824.4	832.4	840.2
132	763.1	771.6	779.9	788.2	796.4	804.6	812.7	820.7	828.7	836.5	844.4
134	767.7	776.1	784.4	792.6	800.8	808.9	817.0	825.0	832.9	840.7	848.5
136	772.2	780.6	788.8	797.0	805.2	813.2	821.2	829.2	837.0	844.8	852.6
138	776.8	785.0	793.3	801.4	809.5	817.5	825.5	833.4	841.2	849.0	856.6
140	781.2	789.5	797.7	805.8	813.8	821.8	829.7	837.6	845.3	853.1	860.7
142	785.7	793.9	802.0	810.1	818.1	826.0	833.9	841.7	849.5	857.1	864.7
144	790.2	798.3	806.4	814.4	822.4	830.3	838.1	845.9	853.6	861.2	868.8
146	794.6	802.7	810.7	818.7	826.6	834.5	842.2	850.0	857.6	865.2	872.8
148	799.0	807.0	815.0	823.0	830.8	838.6	846.4	854.1	861.7	869.3	876.8
150	803.3	811.3	819.3	827.2	835.0	842.8	850.5	858.2	865.7	873.3	880.7

TABLE II. - Continued. THERMODYNAMIC PROPERTIES OF HELIUM

(k) Continued. Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
70	709.7	719.7	729.5	739.3	749.0	758.6	768.2	777.8	787.0	796.3	805.5
72	714.0	723.9	733.6	743.3	752.9	762.4	771.8	781.1	790.4	799.6	808.7
74	718.4	728.2	737.8	747.3	756.8	766.2	775.5	784.7	793.9	803.0	812.0
76	722.9	732.5	742.0	751.4	760.8	770.1	779.3	788.4	797.4	806.4	815.3
78	727.3	736.8	746.2	755.5	764.8	774.0	783.1	792.1	801.1	809.9	818.7
80	731.7	741.1	750.4	759.7	768.8	777.9	786.9	795.9	804.7	813.5	822.2
82	736.2	745.5	754.7	763.8	772.9	781.9	790.8	799.7	808.4	817.1	825.8
84	740.6	749.9	759.0	768.0	777.0	785.9	794.7	803.5	812.2	820.8	829.3
86	745.1	754.2	763.3	772.2	781.1	789.9	798.7	807.3	815.9	824.5	832.9
88	749.6	758.6	767.6	776.4	785.2	794.0	802.6	811.2	819.7	828.2	836.6
90	754.0	763.0	771.8	780.6	789.4	798.0	806.6	815.1	823.6	831.9	840.3
92	758.5	767.3	776.1	784.9	793.5	802.1	810.6	819.0	827.4	835.7	844.0
94	762.9	771.7	780.4	789.1	797.6	806.1	814.6	822.9	831.3	839.5	847.7
96	767.3	776.1	784.7	793.3	801.8	810.2	818.6	826.9	835.1	843.3	851.4
98	771.7	780.4	789.0	797.5	805.9	814.3	822.6	830.8	839.0	847.1	855.2
100	776.1	784.7	793.2	801.7	810.1	818.4	826.6	834.8	842.9	850.9	858.9
102	780.5	789.1	797.5	805.9	814.2	822.4	830.6	838.7	846.8	854.8	862.7
104	784.9	793.4	801.8	810.1	818.3	826.5	834.6	842.7	850.7	858.6	866.5
106	789.3	797.7	806.0	814.3	822.4	830.6	838.6	846.6	854.6	862.4	870.2
108	793.6	802.0	810.2	818.4	826.6	834.6	842.6	850.6	858.4	866.3	874.0
110	797.9	806.2	814.4	822.6	830.7	838.7	846.6	854.5	862.3	870.1	877.8
112	802.2	810.5	818.6	826.7	834.8	842.7	850.6	858.4	866.2	873.9	881.6
114	806.5	814.7	822.8	830.9	838.8	846.7	854.6	862.4	870.1	877.8	885.4
116	810.8	818.9	827.0	835.0	842.9	850.8	858.6	866.3	874.0	881.6	889.2
118	815.1	823.1	831.2	839.1	847.0	854.8	862.5	870.2	877.8	885.4	892.9
120	819.3	827.3	835.3	843.2	851.0	858.8	866.5	874.1	881.7	889.2	896.7
122	823.5	831.5	839.4	847.3	855.0	862.8	870.4	878.0	885.6	893.1	900.5
124	827.7	835.7	843.5	851.3	859.1	866.7	874.4	881.9	889.4	896.9	904.2
126	831.9	839.8	847.6	855.4	863.1	870.7	878.3	885.8	893.2	900.7	908.0
128	836.1	843.9	851.7	859.4	867.1	874.7	882.2	889.7	897.1	904.4	911.7
130	840.2	848.0	855.8	863.4	871.0	878.6	886.1	893.5	900.9	908.2	915.5
132	844.4	852.1	859.8	867.4	875.0	882.5	890.0	897.4	904.7	912.0	919.2
134	848.5	856.2	863.8	871.4	879.0	886.4	893.8	901.2	908.5	915.7	922.9
136	852.6	860.2	867.9	875.4	882.9	890.3	897.7	905.0	912.3	919.5	926.7
138	856.6	864.3	871.8	879.4	886.8	894.2	901.5	908.8	916.1	923.2	930.4
140	860.7	868.3	875.8	883.3	890.7	898.1	905.4	912.6	919.8	927.0	934.0
142	864.7	872.3	879.8	887.2	894.6	901.9	909.2	916.4	923.6	930.7	937.7
144	868.8	876.3	883.7	891.1	898.5	905.8	913.0	920.2	927.3	934.4	941.4
146	872.8	880.3	887.7	895.0	902.3	909.6	916.8	923.9	931.0	938.1	945.1
148	876.8	884.2	891.6	898.9	906.2	913.4	920.6	927.7	934.7	941.8	948.7
150	880.7	888.1	895.5	902.8	910.0	917.2	924.3	931.4	938.5	945.4	952.4

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	0	10	20	30	40	50	60	70	80	90	100
150	720.6	729.0	737.4	745.7	754.1	762.4	770.7	778.9	787.1	795.2	803.3
155	732.5	740.8	749.1	757.3	765.6	773.8	781.9	790.1	798.1	806.2	814.1
160	744.2	752.4	760.6	768.7	776.9	785.0	793.0	801.0	809.0	816.9	824.8
165	755.8	763.9	771.9	780.0	788.0	796.0	803.9	811.9	819.7	827.6	835.3
170	767.2	775.1	783.1	791.0	799.0	806.9	814.7	822.5	830.3	838.0	845.7
175	778.4	786.2	794.1	802.0	809.8	817.6	825.4	833.1	840.8	848.4	856.0
180	789.4	797.2	805.0	812.7	820.5	828.2	835.9	843.5	851.1	858.6	866.1
185	800.3	808.0	815.7	823.4	831.0	838.6	846.2	853.8	861.3	868.7	876.1
190	811.0	818.6	826.3	833.8	841.4	848.9	856.4	863.9	871.3	878.7	886.0
195	821.6	829.2	836.7	844.2	851.7	859.1	866.6	873.9	881.3	888.6	895.8
200	832.1	839.6	847.0	854.4	861.8	869.2	876.5	883.8	891.1	898.3	905.5
205	842.4	849.8	857.2	864.5	871.9	879.2	886.4	893.6	900.8	908.0	915.1
210	852.6	860.0	867.3	874.5	881.8	889.0	896.2	903.3	910.5	917.5	924.6
215	862.7	870.0	877.2	884.4	891.6	898.7	905.8	912.9	920.0	927.0	933.9
220	872.7	879.9	887.0	894.2	901.3	908.4	915.4	922.4	929.4	936.3	943.2
225	882.6	889.7	896.8	903.8	910.9	917.9	924.9	931.8	938.7	945.6	952.4
230	892.3	899.4	906.4	913.4	920.4	927.3	934.2	941.1	947.9	954.7	961.5
235	902.0	908.9	915.9	922.8	929.7	936.6	943.5	950.3	957.1	963.8	970.5
240	911.5	918.4	925.3	932.2	939.0	945.9	952.6	959.4	966.1	972.8	979.5
245	921.0	927.8	934.6	941.5	948.2	955.0	961.7	968.4	975.1	981.7	988.3
250	930.3	937.1	943.9	950.6	957.4	964.0	970.7	977.4	984.0	990.5	997.1
255	939.6	946.3	953.0	959.7	966.4	973.0	979.6	986.2	992.8	999.3	1005.8
260	948.7	955.4	962.1	968.7	975.3	981.9	988.5	995.0	1001.5	1008.0	1014.4
265	957.8	964.4	971.0	977.6	984.2	990.7	997.2	1003.7	1010.1	1016.5	1022.9
270	966.8	973.4	979.9	986.5	993.0	999.4	1005.9	1012.3	1018.7	1025.1	1031.4
275	975.7	982.2	988.7	995.2	1001.7	1008.1	1014.5	1020.9	1027.2	1033.5	1039.8
280	984.5	991.0	997.5	1003.9	1010.3	1016.7	1023.0	1029.3	1035.6	1041.9	1048.1
285	993.3	999.7	1006.1	1012.5	1018.8	1025.2	1031.5	1037.7	1044.0	1050.2	1056.4
290	1002.0	1008.3	1014.7	1021.0	1027.3	1033.6	1039.9	1046.1	1052.3	1058.4	1064.6
295	1010.6	1016.9	1023.2	1029.5	1035.7	1042.0	1048.2	1054.3	1060.5	1066.6	1072.7
300	1019.1	1025.4	1031.6	1037.9	1044.1	1050.3	1056.4	1062.6	1068.7	1074.7	1080.8
310	1036.0	1042.1	1048.3	1054.4	1060.6	1066.7	1072.7	1078.8	1084.8	1090.8	1096.8
320	1052.5	1058.6	1064.7	1070.8	1076.8	1082.8	1088.8	1094.8	1100.7	1106.6	1112.5
330	1068.8	1074.9	1080.9	1086.8	1092.8	1098.7	1104.6	1110.5	1116.4	1122.2	1128.0
340	1084.9	1090.9	1096.8	1102.7	1108.5	1114.4	1120.2	1126.0	1131.8	1137.6	1143.3
350	1100.8	1106.6	1112.5	1118.3	1124.1	1129.8	1135.6	1141.3	1147.0	1152.7	1158.4
360	1116.4	1122.2	1127.9	1133.7	1139.4	1145.1	1150.8	1156.4	1162.1	1167.7	1173.3
370	1131.8	1137.5	1143.2	1148.9	1154.5	1160.1	1165.8	1171.4	1176.9	1182.5	1188.0
380	1147.0	1152.6	1158.2	1163.8	1169.4	1175.0	1180.5	1186.1	1191.6	1197.1	1202.5
390	1162.0	1167.5	1173.1	1178.6	1184.2	1189.7	1195.1	1200.6	1206.1	1211.5	1216.9
400	1176.8	1182.3	1187.8	1193.2	1198.7	1204.1	1209.6	1215.0	1220.4	1225.7	1231.1

TABLE II. - Concluded. THERMODYNAMIC PROPERTIES OF HELIUM

(k) Concluded. Plenum speed of sound, a_o, m/sec

Plenum temperature, K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	100	110	120	130	140	150	160	170	180	190	200
150	803.3	811.3	819.3	827.2	835.0	842.8	850.5	858.2	865.7	873.3	880.7
155	814.1	822.0	829.9	837.7	845.4	853.1	860.7	868.3	875.8	883.2	890.6
160	824.8	832.6	840.4	848.1	855.7	863.3	870.8	878.3	885.7	893.0	900.3
165	835.3	843.0	850.7	858.3	865.9	873.3	880.8	888.2	895.5	902.8	910.0
170	845.7	853.3	860.9	868.4	875.9	883.3	890.6	897.9	905.2	912.4	919.5
175	856.0	863.5	871.0	878.4	885.8	893.1	900.4	907.6	914.8	921.9	929.0
180	866.1	873.6	881.0	888.3	895.6	902.9	910.1	917.2	924.3	931.3	938.3
185	876.1	883.5	890.8	898.1	905.3	912.5	919.6	926.7	933.7	940.7	947.6
190	886.0	893.3	900.6	907.8	914.9	922.0	929.0	936.0	943.0	949.9	956.8
195	895.8	903.0	910.2	917.3	924.4	931.4	938.4	945.3	952.2	959.1	965.8
200	905.5	912.6	919.7	926.8	933.8	940.7	947.7	954.5	961.3	968.1	974.8
205	915.1	922.2	929.2	936.2	943.1	950.0	956.8	963.6	970.4	977.1	983.8
210	924.6	931.6	938.5	945.4	952.3	959.1	965.9	972.6	979.3	986.0	992.6
215	933.9	940.9	947.8	954.6	961.4	968.2	974.9	981.6	988.2	994.8	1001.3
220	943.2	950.1	956.9	963.7	970.4	977.1	983.8	990.4	997.0	1003.5	1010.0
225	952.4	959.2	966.0	972.7	979.4	986.0	992.6	999.2	1005.7	1012.2	1018.6
230	961.5	968.3	975.0	981.6	988.2	994.8	1001.4	1007.9	1014.3	1020.8	1027.2
235	970.5	977.2	983.9	990.5	997.0	1003.6	1010.0	1016.5	1022.9	1029.3	1035.6
240	979.5	986.1	992.7	999.2	1005.7	1012.2	1018.6	1025.0	1031.4	1037.7	1044.0
245	988.3	994.9	1001.4	1007.9	1014.4	1020.8	1027.2	1033.5	1039.8	1046.1	1052.3
250	997.1	1003.6	1010.1	1016.5	1022.9	1029.3	1035.6	1041.9	1048.2	1054.4	1060.6
255	1005.8	1012.2	1018.7	1025.0	1031.4	1037.7	1044.0	1050.2	1056.5	1062.6	1068.8
260	1014.4	1020.8	1027.2	1033.5	1039.8	1046.1	1052.3	1058.5	1064.7	1070.8	1076.9
265	1022.9	1029.3	1035.6	1041.9	1048.1	1054.4	1060.6	1066.7	1072.8	1078.9	1085.0
270	1031.4	1037.7	1044.0	1050.2	1056.4	1062.6	1068.7	1074.8	1080.9	1087.0	1093.0
275	1039.8	1046.1	1052.3	1058.5	1064.6	1070.8	1076.9	1082.9	1089.0	1095.0	1100.9
280	1048.1	1054.3	1060.5	1066.7	1072.8	1078.9	1084.9	1090.9	1096.9	1102.9	1108.8
285	1056.4	1062.6	1068.7	1074.8	1080.9	1086.9	1092.9	1098.9	1104.8	1110.8	1116.6
290	1064.6	1070.7	1076.8	1082.9	1088.9	1094.9	1100.8	1106.8	1112.7	1118.6	1124.4
295	1072.7	1078.8	1084.8	1090.9	1096.8	1102.8	1108.7	1114.6	1120.5	1126.3	1132.1
300	1080.8	1086.8	1092.8	1098.8	1104.7	1110.7	1116.5	1122.4	1128.2	1134.0	1139.8
310	1096.8	1102.7	1108.6	1114.5	1120.4	1126.2	1132.0	1137.8	1143.6	1149.3	1155.0
320	1112.5	1118.4	1124.2	1130.0	1135.8	1141.6	1147.3	1153.0	1158.7	1164.3	1170.0
330	1128.0	1133.8	1139.6	1145.3	1151.0	1156.7	1162.4	1168.0	1173.6	1179.2	1184.7
340	1143.3	1149.0	1154.7	1160.4	1166.0	1171.6	1177.2	1182.8	1188.3	1193.9	1199.4
350	1158.4	1164.0	1169.7	1175.3	1180.8	1186.4	1191.9	1197.4	1202.9	1208.3	1213.8
360	1173.3	1178.9	1184.4	1190.0	1195.5	1201.0	1206.4	1211.8	1217.3	1222.7	1228.0
370	1188.0	1193.5	1199.0	1204.5	1209.9	1215.3	1220.7	1226.1	1231.5	1236.8	1242.1
380	1202.5	1208.0	1213.4	1218.8	1224.2	1229.6	1234.9	1240.2	1245.5	1250.8	1256.0
390	1216.9	1222.3	1227.6	1233.0	1238.3	1243.6	1248.9	1254.1	1259.4	1264.6	1269.8
400	1231.1	1236.4	1241.7	1247.0	1252.3	1257.5	1262.7	1267.9	1273.1	1278.3	1283.4

Plenum temperature K	Plenum pressure, $N/m^2 \times 10^{-5}$										
	200	210	220	230	240	250	260	270	280	290	300
150	880.7	888.1	895.5	902.8	910.0	917.2	924.3	931.4	938.5	945.4	952.4
155	890.6	897.9	905.2	912.4	919.5	926.6	933.7	940.7	947.7	954.6	961.4
160	900.3	907.6	914.8	921.9	929.0	936.0	943.0	949.9	956.8	963.6	970.4
165	910.0	917.1	924.2	931.3	938.3	945.3	952.2	959.0	965.8	972.6	979.3
170	919.5	926.6	933.6	940.6	947.6	954.4	961.3	968.1	974.8	981.5	988.2
175	929.0	936.0	942.9	949.9	956.7	963.5	970.3	977.0	983.7	990.3	996.9
180	938.3	945.3	952.2	959.0	965.8	972.6	979.3	985.9	992.5	999.1	1005.6
185	947.6	954.5	961.3	968.1	974.8	981.5	988.1	994.7	1001.3	1007.8	1014.3
190	956.8	963.6	970.3	977.0	983.7	990.3	996.9	1003.5	1010.0	1016.4	1022.8
195	965.8	972.6	979.3	985.9	992.6	999.1	1005.6	1012.1	1018.6	1025.0	1031.3
200	974.8	981.5	988.2	994.8	1001.3	1007.8	1014.3	1020.7	1027.1	1033.4	1039.8
205	983.8	990.4	997.0	1003.5	1010.0	1016.5	1022.9	1029.2	1035.6	1041.9	1048.1
210	992.6	999.2	1005.7	1012.2	1018.6	1025.0	1031.4	1037.7	1044.0	1050.2	1056.4
215	1001.3	1007.9	1014.3	1020.8	1027.1	1033.5	1039.8	1046.1	1052.3	1058.5	1064.7
220	1010.0	1016.5	1022.9	1029.3	1035.6	1041.9	1048.2	1054.4	1060.6	1066.7	1072.8
225	1018.6	1025.0	1031.4	1037.7	1044.0	1050.3	1056.5	1062.6	1068.8	1074.9	1080.9
230	1027.2	1033.5	1039.8	1046.1	1052.3	1058.5	1064.7	1070.8	1076.9	1083.0	1089.0
235	1035.6	1041.9	1048.2	1054.4	1060.6	1066.8	1072.9	1078.9	1085.0	1091.0	1097.0
240	1044.0	1050.3	1056.5	1062.7	1068.8	1074.9	1081.0	1087.0	1093.0	1099.0	1104.9
245	1052.3	1058.5	1064.7	1070.8	1076.9	1083.0	1089.0	1095.0	1101.0	1106.9	1112.8
250	1060.6	1066.7	1072.9	1079.0	1085.0	1091.0	1097.0	1103.0	1108.9	1114.8	1120.6
255	1068.8	1074.9	1081.0	1087.0	1093.0	1099.0	1104.9	1110.8	1116.7	1122.6	1128.4
260	1076.9	1083.0	1089.0	1095.0	1101.0	1106.9	1112.8	1118.7	1124.5	1130.3	1136.1
265	1085.0	1091.0	1097.0	1102.9	1108.9	1114.8	1120.6	1126.4	1132.2	1138.0	1143.7
270	1093.0	1099.0	1104.9	1110.8	1116.7	1122.6	1128.4	1134.2	1139.9	1145.7	1151.4
275	1100.9	1106.9	1112.8	1118.6	1124.5	1130.3	1136.1	1141.8	1147.6	1153.2	1158.9
280	1108.8	1114.7	1120.6	1126.4	1132.2	1138.0	1143.7	1149.4	1155.1	1160.8	1166.4
285	1116.6	1122.5	1128.3	1134.1	1139.9	1145.6	1151.3	1157.0	1162.7	1168.3	1173.9
290	1124.4	1130.2	1136.0	1141.8	1147.5	1153.2	1158.9	1164.5	1170.1	1175.7	1181.3
295	1132.1	1137.9	1143.7	1149.4	1155.1	1160.7	1166.4	1172.0	1177.6	1183.1	1188.6
300	1139.8	1145.5	1151.3	1156.9	1162.6	1168.2	1173.8	1179.4	1185.0	1190.5	1196.0
310	1155.0	1160.7	1166.3	1171.9	1177.5	1183.1	1188.6	1194.1	1199.6	1205.0	1210.5
320	1170.0	1175.6	1181.1	1186.7	1192.2	1197.7	1203.2	1208.6	1214.0	1219.4	1224.8
330	1184.7	1190.3	1195.8	1201.3	1206.7	1212.2	1217.6	1222.9	1228.3	1233.6	1238.9
340	1199.4	1204.8	1210.3	1215.7	1221.1	1226.4	1231.8	1237.1	1242.4	1247.7	1252.9
350	1213.8	1219.2	1224.6	1229.9	1235.3	1240.6	1245.9	1251.1	1256.4	1261.6	1266.8
360	1228.0	1233.4	1238.7	1244.0	1249.3	1254.5	1259.8	1265.0	1270.2	1275.3	1280.5
370	1242.1	1247.4	1252.7	1257.9	1263.1	1268.3	1273.5	1278.7	1283.8	1288.9	1294.0
380	1256.0	1261.3	1266.5	1271.7	1276.8	1282.0	1287.1	1292.2	1297.3	1302.3	1307.4
390	1269.8	1275.0	1280.1	1285.3	1290.4	1295.5	1300.6	1305.6	1310.6	1315.6	1320.6
400	1283.4	1288.5	1293.7	1298.7	1303.8	1308.8	1313.9	1318.9	1323.9	1328.8	1333.8