

PHYSICAL AND THERMODYNAMIC
PROPERTIES OF POTASSIUM

E. T. Caldwell

D. M. Waller

The Garrett Corporation

Air Research Manufacturing Division

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FOREWORD

This report was prepared by the AiResearch Manufacturing Company of Arizona, a division of The Garrett Corporation, Phoenix, Arizona, as a part of the SNAP 50/SPUR liquid-potassium Rankine-cycle power-system program. The activities discussed in this report were initiated under United States Air Force Contract AF33(615)-2289 [BPN: 5(6399-657)63409124]. This contract was administered by the Flight Vehicle Power Division, AF Aero Propulsion Laboratory, Research and Technology Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. Mr. C. H. Armbruster was the Project Engineer for the Laboratory, and Mr. R. D. Gruntz directed the SNAP 50/SPUR engineering program at AiResearch.

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This report presents an up-to-date compilation of the physical and thermodynamic properties of potassium.

This report is assigned supplementary report number APS-50-6-R by AiResearch.

This report was submitted by the authors July 1, 1966.

Publication of this report does not constitute Air Force approval of the findings or conclusions of the report. It is published only for the exchange and stimulation of ideas.

ABSTRACT

This report is an up-to-date compilation of potassium physical and thermodynamic properties. Data for the solid phase is presented, where available, over a temperature range from 0°F to the melting point. Liquid and vapor physical properties are tabulated, in most cases, from the melting point to 2400°F . The thermodynamic compilation extends from 740°F to 2340°F and includes superheated vapor properties evaluated at pressures down to 0.1 psia. These properties are presented both on a table and on a Mollier diagram. Listed properties include density, viscosity, surface tension, electrical resistivity, thermal conductivity, specific heat, vapor pressure, latent heats of fusion and vaporization, enthalpy, entropy, acoustic velocity, critical pressure and temperature, thermal neutron absorption and activation cross sections, ionization potential, and relative magnetic susceptibility.

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SYMBOLS AND UNITS

ρ	Electrical resistivity, microhm-in.
t	Temperature, °F
T	Temperature, °R
k	Thermal conductivity, Btu per hr-ft-°F
C_p	Equilibrium specific heat, Btu per lb-°F
d	Density, lb per cu ft
μ	Absolute viscosity, lb per ft-hr
σ	Surface tension, lb per ft
H	Enthalpy, Btu per lb

See Section IV D, page 16, for the symbols used in the FORTRAN program to compile the saturation and superheat properties appearing in the tables of Appendixes I and II.

SECTION I INTRODUCTION

Over the past several years, interest in the use of liquid metals such as potassium, sodium, rubidium, cesium, and others has grown to such an extent that the need for more accurate and more complete information on the physical and thermodynamic properties of these fluids has intensified. As a result, several independent laboratories, including the U. S. Naval Research Laboratory, Battelle Memorial Institute, and MSA Research Corporation, have undertaken considerable experimental work under Air Force and NASA sponsorship to evaluate these properties.

Of all the liquid metals, potassium appears to have the greatest potential value as a Rankine-cycle working fluid. The specific volume-pressure characteristics of potassium vapor permit reasonable turbomachinery sizes and operating pressure levels over a wide range of cycle power output. Good cycle efficiencies can be attained with potassium at temperatures low enough to permit the use of relatively conventional materials of construction such as stainless steel. Substantially higher efficiencies and reduced system weight can ultimately be attained at the higher boiler temperatures permitted by the use of refractory metals. In addition, potassium displays the favorable heat-transfer characteristics of all liquid metals, and its feasibility as a bearing lubricant has been experimentally verified. For these reasons, potassium cycles are under active development or consideration for use in space, marine applications, topping cycles in steam plants, etc., which dictates the need for accurate potassium properties.

An extensive review of the published literature relating to potassium has revealed inconsistencies in the property data, especially in the high-temperature region where experimental techniques are hampered by containment problems and difficulties in temperature measurement. In some instances, the published data is considered reliable over the range of measurement, but is not very useful for cycle calculations encompassing lower and/or higher temperatures.

The purposes of this study were to conduct an exhaustive survey of potassium property data, identify the most reliable sources of information for each property, and compile the resulting data. In some cases, where equal weight was assigned to scattered data points, a least squares curve fit was utilized to establish the working equations used for the compilation. In all cases, selections were made to insure that this document is internally consistent.

The scope of this report is limited to the physical, thermodynamic, and some of the nuclear properties of potassium. For the convenience of the user, all charts, tables, and graphs are presented in appendixes in the final section of the report. Preceding these appendixes a discussion of the physical properties and thermodynamic treatment of potassium is given, along with a list of the references that were actually used to determine or support the property data selected. The list of references is not a complete compilation of everything that was examined during the course of the study.

The data is presented in units that are in common usage in the engineering community of the United States.

This document is intended to be used as a replacement for that portion of Reference 1 which covers potassium. Reference 1 has filled a vital requirement over the past few years in standardizing property data in order that everyone working in the field would be using the same basic data. It is considered to have been very well done. However, since its publication, a great deal of additional work has been done in establishing the property data of potassium (and other liquid metals); accordingly, an updating is very much in order. Weatherford, in Reference 2, also makes this observation. Since References 1 and 2, like this document, do not report any original measurement or property data, they are not listed as a primary source of information but rather the original source was quoted, when applicable. In some cases, the data does indeed agree with Reference 1, but in most cases, additional later measurements have been made which supersede this work. Reference 2 contains some updating and the suggested values in that reference for many properties agree with the choices made herein, whereas in other instances later work again superseded them.

This document is also more complete for potassium than Reference 1 in that more properties over a wider temperature range are included. In particular, the thermodynamic properties are included in the form of superheat tables, saturation tables, equations that can be incorporated directly into a computer program, and a Mollier diagram of substantial size and accuracy. All other properties are reported in the form of graphs, tables, and equations which can be incorporated in a computer program.

Additional property measurements in all instances would, of course, increase the reliability and accuracy of all the property data reported, but several properties in particular need more work before a high confidence can be placed in the selected data. These include critical point values; the electrical resistivity, thermal conductivity, and specific heat of the solid; the specific heat of the liquid at higher temperatures; and the viscosity and thermal conductivity of the saturated vapor.

SECTION II POINT VALUE PROPERTIES

The sources of the point values selected are indicated on Table I, along with the values themselves. The succeeding paragraphs supply amplifying comments and reasons for the selections when appropriate--a practice that will be followed throughout.

The melting point, heat of fusion, atomic weight, density of the solid, ionization potential, and relative magnetic susceptibility are essentially handbook values which were taken from the sources indicated and which are more or less accepted and/or substantiated by later work to the accuracy indicated.

The boiling point and heat of vaporization were taken from Reference 3 for reasons discussed more fully in Section IV. These point values are repeated here for convenience and for internal consistency.

The critical values are taken from the work of Grosse as reported in Reference 4 and other publications by the same author. Novikov, Reference 5, and others have estimated the critical point values of potassium with widely varying results, but the work of Grosse appears to be better substantiated by both the experimental data and by theory.

The nuclear data in Table II is of a different nature than most of the data in this document, but is included because of the widespread interest in the use of potassium with nuclear power sources. References 6 and 7 are the most recent sources known for this information.

SECTION III PHYSICAL PROPERTY DISCUSSION

A. Properties of Solid Potassium

1. Electrical Resistivity

Although the electrical resistivity of solid potassium should be a relatively easy property to measure over a range of temperatures, only a limited number of measurements were found in the literature, and these were limited to a restricted temperature range or were single-point measurements. Sources of data used included References 8, 9, 10, and 11. A straight line equation is considered sufficient to represent the limited data available. The equation derived is:

$$\rho = 2.06 + 0.0096 t$$

where ρ = electrical resistivity, microhm-in.

t = temperature, $^{\circ}\text{F}$

This equation is considered valid over the range from 0°F to the melting point and was used to prepare Table IV and Figure 1.

2. Thermal Conductivity

Very few directly measured values of thermal conductivity for solid potassium were found in the literature. Accordingly, it was decided to estimate this property from the electrical resistivity by means of the Wiedemann-Franz-Lorenz relationship:

$$L_0 = \rho \frac{k}{T}$$

where L_0 = Lorenz constant

ρ = electrical resistivity

k = thermal conductivity

T = absolute temperature

The Lorenz constant for liquid potassium is established in References 9 and 12 as approximately 2.15 watt-ohms per $(^{\circ}\text{K})^2$, which is approximately 13 percent below the theoretical value. It cannot be stated with certainty that the Lorenz constants for liquid and solid potassium are identical; also, the electrical resistivity of the solid is itself not well established. It was considered sufficient to estimate a Lorenz constant for solid

potassium by using the few values of the thermal conductivity of the solid reported in Reference 9 and the curve of the solid-phase electrical resistivity herein. The Lorenz constant thus derived is, in the units employed in this report,

$0.252 \frac{\text{Btu microhm-in.}}{\text{hr-ft } (^{\circ}\text{R})^2}$, or about 18 percent below the theoretical value:

The resulting equation for the thermal conductivity is:

$$k = \frac{459.7 \div t}{8.17 \div 0.0381 t}$$

where k = thermal conductivity, Btu per hr-ft- $^{\circ}\text{F}$

t = temperature, $^{\circ}\text{F}$

This equation was used to generate the data for Table IV and Figure 2.

3. Specific Heat

The primary reference selected for the specific heat of the solid was the work of BML reported in Reference 13. The basic measurement was that of enthalpy, from which an equation of the form $H = At + Bt^2$ was derived. For practical purposes, the specific heat is the first derivative of this equation, and the resulting equation in the units used herein is

$$C_p = 0.1631 \div 2.328 \times 10^{-4} t$$

where C_p = specific heat, Btu per lb- $^{\circ}\text{F}$

t = temperature, $^{\circ}\text{F}$

This equation was used to establish the values in Table IV and Figure 3. The results reported in Reference 14 agree closely at low temperature, but have a slightly higher slope, with the result that they are approximately 1.7 percent higher as the melting point is approached. The difference is not considered significant.

B. Properties of Liquid Potassium

1. Density

Density measurements have been made by many investigators, and good agreement exists among the various sources of data. The following density equation from Reference 3 was selected as the recommended equation, since it accurately correlates the data from the melting point up to 2400°F :

Although there is some scatter, the results of other investigators bracket this curve fairly well over the temperature range from 400°F to 1200°F. In particular, the results of Novikov (Reference 5) are somewhat higher, whereas those of Reference 23 and the older ones of Reference 1 are lower.

Thermal conductivities were calculated as a check from the electrical resistivity reported in the previous section by means of the Wiedemann-Franz-Lorenz relationship. The experimental value of the Lorenz constant as reported by Grosse (Reference 27), which closely agrees with that of Reference 20, was used. These calculated values of thermal conductivity agree closely with values obtained from the above equation.

6. Specific Heat

Numerous investigators have made calorimetric measurements on liquid potassium in order to ascertain the enthalpy and, indirectly, the saturated liquid specific heat as functions of temperature. Below 1000°F, there is good agreement between earlier work at the National Bureau of Standards (Reference 14) and more recent measurements at Battelle Memorial Institute (Reference 13). Both sets of data can be correlated by parabolic equations; however, there is a pronounced deviation between the two curves at higher temperatures, with the experimental B&I values exceeding the extrapolated NBS curve in magnitude.

Three isolated data points obtained at the Naval Research Laboratory (Reference 3) tend to confirm the extrapolated NBS data up to 2000°F. However, the N&L investigators noted that there was a probable error of ±3 percent in their results, due to nonreproducibility in calorimetric measurements. The low precision is believed to stem mainly from the low sample-to-container thermal capacity ratio.

The need for thick-walled containers, coupled with the problem of container oxidation, has rendered precise determination of liquid-heat content extremely difficult at elevated temperatures. For this reason it is considered inadvisable to compute saturated and superheated vapor properties via the liquid path. For the purpose of computing liquid-potassium specific heat up to approximately 1400°F, with cautious extrapolation to higher temperatures, the following equation based on Reference 14 data is recommended:

$$C_p = 0.2023 - 4.33 \times 10^{-5}t + 2.3 \times 10^{-8}t^2$$

where C_p = specific heat, Btu per lb-°F

t = temperature, °F

Specific heat is presented as a function of temperature from the melting point to 2400°F in Table VI and Figure 9.

C. Properties of Saturated Potassium Vapor

1. Vapor Pressure

After an extensive review of potassium vapor pressure information reported in the literature, the equation fitting the smoothed NRL data (Reference 3) was chosen for this compilation. The recommended equation is of the three-term Kirchhoff type ($\log P_{\text{SAT}} = a + b/T + c \log T$). After substituting the numerical constants and solving explicitly for P_{SAT} , the equation becomes:

$$P_{\text{SAT}} = \frac{1.9714 \times 10^7}{(T)^{0.53292}} e^{-\frac{18,717.22}{T}}$$

where P_{SAT} = vapor pressure, psia

T = absolute temperature, $^{\circ}\text{R}$

Although the equation was primarily intended to correlate experimental data above the atmospheric boiling point (1394°F), it is believed to be sufficiently accurate for extrapolation down to approximately 800°F . The vapor pressure curve recommended by BMI (Reference 20) crosses the NRL curve at approximately 1900°F , yielding values that are about 8 percent lower at 800°F and 5 percent higher at 2200°F . Since the NRL thermodynamic property data for potassium had been selected for use elsewhere in this report, it was deemed advisable to utilize the NRL vapor pressure equation for internal consistency.

The recommended vapor pressure data is depicted as a function of temperature (expressed in degrees Fahrenheit) in Table VIII and Figure 10.

2. Specific Volume

The saturated vapor specific volume was computed from the equation:

$$V_G = \frac{0.27446 T}{P_{\text{SAT}}} \left[1 + a P_{\text{SAT}} + b (P_{\text{SAT}})^2 + c (P_{\text{SAT}})^3 + d (P_{\text{SAT}})^4 \right]$$

where V_G = saturated vapor specific volume, cu ft per lb

P_{SAT} = vapor pressure, psia

T = absolute temperature, $^{\circ}\text{R}$

a = second virial coefficient, psia^{-1}

b = third virial coefficient, psia^{-2}

c = fourth virial coefficient, psia^{-3}

The above equation will be recognized as a virial equation of state. The virial coefficients β , γ , and δ are functions of temperature, compatible with the P-V-T data of Reference 3. The governing equations for the virial coefficients are given in Section IV-D of this report.

Vapor specific volume is listed in Table VIII from 800°F to 2300°F and is plotted versus temperature in Figure 11. The specific volume of the superheated vapor can be obtained from the computer printout sheets in Appendix II.

3. Heat of Vaporization

The heat of vaporization was calculated from the Clapeyron equation, using the NRL vapor pressure-temperature relationship. The resulting expression is:

$$H_{FG} = \frac{0.27446 T}{P_{SAT}} \left[\frac{18,717.22}{T} - 0.53299 \right] (V_G - V_F)$$

where H_{FG} = heat of vaporization, Btu per lb

T = absolute temperature, °R

P_{SAT} = vapor pressure, psia

V_G = saturated vapor specific volume, cu ft per lb

V_F = saturated liquid specific volume, cu ft per lb

The saturated liquid specific volume is simply the inverse of the liquid density discussed earlier. A comparison of the heat of vaporization calculated by different investigators reveals rather wide discrepancies at the high-temperature end. For example, the BMI curve (Reference 20) is 18.5 percent lower than the NRL curve at 2200°F, due primarily to differences in the experimental P-V-T data.

Heat of vaporization computed from the above equation is presented in Table VIII and Figure 12.

4. Viscosity

No experimental vapor viscosity data for potassium was located by the authors at the time this report was written. Hence, it was necessary to rely on the following theoretical equation suggested by Grosse (Reference 22) for the purpose of this compilation:

$$\mu = 0.001577 \sqrt{T}$$

where μ = viscosity, lb per ft-hr

T = absolute temperature, °R

The recommended equation is based on kinetic theory and is strictly applicable to the low-pressure monatomic gas only. However, to a first approximation the presence of small concentrations of dimer and tetramer molecules should not appreciably change the viscosity. Weatherford (Reference 1) employed a similar type of equation to calculate the viscosity of saturated potassium vapor. However, his values are approximately 32 percent lower, due apparently to the use of a larger atomic collision diameter.

Vapor viscosities calculated from the Reference 22 equation are listed in Table VIII and plotted in Figure 13.

5. Thermal Conductivity

It was also necessary to calculate thermal conductivity data for the saturated vapor, since adequate experimental data was lacking. The thermal conductivity of the monatomic gas can be readily estimated, like the viscosity, from kinetic theory. However, the saturated vapor consists of a mixture of chemically reacting molecular species over the temperature range of interest, with up to 12 mol percent dimer and tetramer content. Hence, the thermal transport mechanism involves more than simple translational energy exchange between molecules. Since an appreciable fraction of the heat transfer may be due to dissociation, recombination, and diffusion of molecules through the boundary layer, the "equilibrium" thermal conductivity is considerably higher than the "frozen" thermal conductivity.

For the purpose of this compilation, the equilibrium thermal conductivity was estimated from the equilibrium specific heat, by use of the following equation:

$$k = \frac{\mu}{M} (MC_p + 2.48)$$

where k = thermal conductivity, Btu per hr-ft-°F

μ = viscosity, lb per ft-hr

M = vapor molecular weight, lb per lb-mol

C_p = equilibrium vapor specific heat, Btu per lb-°F

The above equation is based on the work of Eucken and Maxwell for estimation of the Prandtl number of a polyatomic gas. The specific heat and molecular weight were obtained from Reference 3 and the computer data described later.

Calculated thermal conductivity for the saturated vapor is presented in Table VIII and Figure 14.

SECTION IV THERMODYNAMIC PROPERTY DISCUSSION

A. Review of Published Data

Several attempts have been made recently to establish the thermodynamic properties of potassium liquid and vapor over an extended range of temperature and pressure. Properties of interest include the specific volume, enthalpy, entropy, and specific heat of the vapor, plus a number of comparable properties for the liquid phase. Unfortunately most of these efforts have met with only limited success because of the lack of reliable experimental data, especially at high temperature.

One of the earliest published compilations of potassium thermodynamic properties (Reference 1) treated the vapor as an ideal gas mixture of monomer and dimer species whose composition varied in a predictable manner with temperature and pressure. Saturated liquid enthalpy at elevated temperature was estimated by extrapolating Bureau of Standards experimental data (Reference 14), and the saturated vapor enthalpy was calculated at each temperature by adding the heat of vaporization to the liquid enthalpy. Internal consistency among the various properties was secured by adjusting the constants in the vapor pressure equation.

The high-temperature data of Reference 1 was in error primarily because the monomer-dimer model could not adequately account for the additional degree of polymerization taking place at high vapor pressures. In recognition of the need for more accurate potassium-vapor properties, several independent projects were initiated to measure the specific volume of potassium vapor at elevated temperatures along with the vapor pressure, density, and heat content of the saturated liquid. Unfortunately, the general lack of agreement in the experimental results thus far has rendered it necessary to scrutinize all published data very carefully.

After a detailed survey of experimentally determined high-temperature potassium thermodynamic properties, it was concluded that the Naval Research Laboratory data (Reference 3) is the best information currently available covering the temperature range from 1400°F to 2500°F. Due to the absence of reliable high-temperature liquid enthalpy data, the NRL investigators wisely chose to compute enthalpies and entropies via the monomer gas path. The P-V-T data for potassium vapor was correlated by a virial equation of state of the following type, which treats the vapor as an imperfect monatomic gas:

$$\frac{PV}{RT} = 1 + \frac{B}{V} + \frac{C}{V^2} + \frac{D}{V^3}$$

The existence of several molecular species in the vapor composition is generally accepted. The thermodynamic treatment of potassium as a so-called ideal gas mixture with shifting chemical composition is perfectly satisfactory provided that all molecular species can be identified and the entropy change associated with shifting composition is taken into account. The thermodynamic computations made for this report were based on a virial equation of state derived from actual P-V-T measurements, which treats the vapor as an imperfect gas having constant molecular weight. All vapor properties were compiled from an ideal monomer gas reference state. In effect, this method automatically takes into account the situation that the potassium is in fact neither a monomeric nor an ideal gas. The virial method was favored in the present case because it expedited the mathematical computations and did not require precise knowledge of the molecular species present in the vapor. Other investigators, including References 3 and 20, have taken a similar approach and have demonstrated essential agreement between the virial and quasi-chemical methods at the pressures within the realm of interest. It is not necessary to compute an entropy of mixing as an explicit step when calculating properties by means of virial coefficients. In effect, the entropy change is automatically taken into account when correcting for gas imperfections. Likewise, the vapor specific heat accounts for energy changes associated with shifting composition.

B. Thermodynamic Computations Employed in This Study

The NRL equation of state requires an iterative solution for specific volume. In order to eliminate the need for an iterative computation and simplify the ensuing equations for enthalpy and entropy corrections from the ideal gas state, the NRL data was refitted to a virial equation of the form:

$$\frac{PV}{RT} = 1 + \beta P + \gamma P^2 + \delta P^3$$

Theoretically, more virial coefficients should be required with the latter type of equation to accommodate the data. However, judicious selection of the pressure exponents enabled the above equation of state to correlate the NRL experimental data with sufficient accuracy. It is noted that a precedent exists in that a similar form of equation with one additional virial coefficient was employed to compile the steam tables.

The coefficients γ and δ are temperature-dependent functions of significance only at saturated vapor temperatures above 1400°F. The governing equations for γ and δ were therefore obtained by a curve fitting the tabulated NRL data.

The second virial coefficient, β , was expressed as a power series expression in reciprocal temperature. A least-squares curve fit was employed to evaluate the numerical constants in the equation. Input values of β at the lower temperatures were estimated by applying the NRL vapor pressure equation in conjunction with the monomer-dimer equilibrium constant data from Reference 30.

It is noted that the NRL vapor pressure equation has been extrapolated several hundred degrees below the temperature range of the experimental data upon which it is based, for the purpose of computing saturated vapor compressibility and heat of vaporization in the low-temperature region. The use of a single vapor pressure equation over the entire temperature range is desirable from the standpoint of internal consistency and continuity. Moreover, the NRL curve appears to adequately describe the scattered experimental data within the range of probable experimental error between 800°F and 1400°F.

It is believed that the saturated and superheated vapor properties of interest to the turbine designer can be computed more accurately via the monomer gas path. However, internal consistency throughout a wide temperature range is of importance for cycle calculations involving heat balances. The predicted enthalpy-temperature relationship for the saturated liquid is considered to be a good test of internal consistency for the equation of state and vapor pressure equation when computing properties from the monomer gas base.

There is good agreement in the liquid specific heat data reported in References 13 and 14 up to about 1000°F. This data, in turn, is closely matched by the output data from the computer program developed for this study. At the present time, there is no way of making a precise check on internal consistency of the thermodynamic equations at higher temperature by the technique described above, due to the lack of reliable calorimetric data.

C. Description of Computer Program

A FORTRAN program has been written to compute and print the thermodynamic properties needed for cycle calculations. The saturated liquid and vapor properties are tabulated first (Appendix I), followed by the superheated gas properties (Appendix II). These tables are the actual computer print-outs and are included in this report along with a Mollier chart constructed from the computer data.

The starting equations in the computer program include those for the vapor pressure, saturated liquid specific volume, and ideal monomer gas properties taken from Reference 3. These are followed by AiResearch-derived equations for the virial coefficients and their first and second derivatives. Finally, the real-gas and saturated liquid properties are computed from the ideal monomer gas base.

D. Computer Equations

<u>List of Symbols</u>		
<u>Calculated Quantities</u>	<u>Symbol</u>	<u>Unit</u>
Saturation pressure	P_{SAT}	psia
Ideal gas enthalpy	H^o	Btu/lb
Ideal gas entropy	S^o	Btu/lb ^o R
Ideal gas specific heat	C_p^o	Btu/lb ^o R
Saturated liquid specific volume	V_F	cu ft/lb
Second virial coefficient	B	psia ⁻¹
Third virial coefficient	γ	psia ⁻²
Fourth virial coefficient	δ	psia ⁻³
Saturated vapor specific volume	V_G	cu ft/lb
Saturated vapor enthalpy	H_G	Btu/lb
Saturated vapor entropy	S_G	Btu/lb ^o R
Enthalpy of vaporization	H_{FG}	Btu/lb
Entropy of vaporization	S_{FG}	Btu/lb ^o R
Saturated liquid enthalpy	H_F	Btu/lb
Saturated liquid entropy	S_F	Btu/lb ^o R
Superheated vapor specific volume	V	cu ft/lb
Superheated vapor enthalpy	H	Btu/lb
Superheated vapor entropy	S	Btu/lb ^o R
Superheated vapor specific heat	C_p	Btu/lb ^o R
Superheated vapor acoustic velocity	A	ft/sec.
<u>Input Quantities</u>		
Temperature	T	^o R
Pressure	P	psia

Saturation pressure:

$$P_{SAT} = \frac{1.9714 \times 10^7}{(T)^{0.53288}} e^{-\frac{18,717.22}{T}} \quad (1)$$

Ideal gas enthalpy:

$$H^o = 998.95 + 0.127T + 24,836 e^{-\frac{39,375}{T}} \quad (2)$$

Ideal gas entropy at 1 atmosphere pressure:

$$S^o = 0.18075 + 0.29243 \log_{10} T + 0.7617 e^{-\frac{31,126}{T}} \quad (3)$$

Ideal gas specific heat:

$$C_p^o = 0.1270 + 2.888 e^{-\frac{28,070}{T}} \quad (4)$$

Saturated liquid specific volume:

$$V_F = \frac{1}{56.099 - 6.9828 \left(\frac{T}{1000}\right) - 0.5942 \left(\frac{T}{1000}\right)^2 + 0.0498 \left(\frac{T}{1000}\right)^3} \quad (5)$$

Second virial coefficient:

$$\begin{aligned} B = & -0.8082855816 + \frac{1.336763701 \times 10^4}{T} - \frac{9.581165848 \times 10^7}{T^2} \\ & + \frac{3.885477962 \times 10^{11}}{T^3} - \frac{9.747784721 \times 10^{14}}{T^4} + \frac{1.548462407 \times 10^{18}}{T^5} \\ & - \frac{1.520716767 \times 10^{21}}{T^6} + \frac{8.441706354 \times 10^{23}}{T^7} - \frac{2.033189468 \times 10^{26}}{T^8} \quad (6) \end{aligned}$$

First derivative of second virial coefficient:

$$\begin{aligned} \frac{dB}{dT} = & - \frac{1.335763701 \times 10^4}{T^2} + \frac{1.915233170 \times 10^5}{T^3} - \frac{1.165643389 \times 10^{12}}{T^4} \\ & + \frac{3.899113885 \times 10^{15}}{T^5} - \frac{7.742312035 \times 10^{18}}{T^6} + \frac{9.124300602 \times 10^{21}}{T^7} \\ & - \frac{5.909194445 \times 10^{24}}{T^8} + \frac{1.626551574 \times 10^{27}}{T^9} \end{aligned} \quad (7)$$

Second derivative of second virial coefficient:

$$\begin{aligned} \frac{d^2B}{dT^2} = & \frac{2.673527402 \times 10^4}{T^3} - \frac{5.748699509 \times 10^5}{T^4} + \frac{4.652573554 \times 10^{12}}{T^5} \\ & - \frac{1.949556944 \times 10^{16}}{T^6} + \frac{4.645387221 \times 10^{19}}{T^7} - \frac{6.387010421 \times 10^{22}}{T^8} \\ & + \frac{4.727355558 \times 10^{25}}{T^9} - \frac{1.463896417 \times 10^{28}}{T^{10}} \end{aligned} \quad (8)$$

Third virial coefficient:

Let $y = T - 1840$

$$\gamma = 2.791 \times 10^{-8} e^{-(4.5737 \times 10^{-3}y + 4.3404 \times 10^{-7}y^2 - 7.6743 \times 10^{-10}y^3)} \quad (9)$$

First derivative of third virial coefficient:

$$\begin{aligned} \frac{d\gamma}{dT} = & 2.791 \times 10^{-8} e^{-(4.5737 \times 10^{-3}y + 4.3404 \times 10^{-7}y^2 - 7.6743 \times 10^{-10}y^3)} \\ & \times \left[1 - 4.5737 \times 10^{-3}y - 8.6808 \times 10^{-7}y^2 + 2.30229 \times 10^{-9}y^3 \right] \end{aligned} \quad (10)$$

Second derivative of third virial coefficient:

$$\frac{d^2}{dT^2} = 2.791 \times 10^{-5} e^{-(4.5737 \times 10^{-3}y - 4.3404 \times 10^{-7}y^2 - 7.8749 \times 10^{-10}y^3)} \\ \times \left[-9.1474 \times 10^{-2} + 1.83145 \times 10^{-3}y + 1.71456 \times 10^{-6}y^2 \right. \\ \left. - 2.03064 \times 10^{-11}y^3 - 3.95715 \times 10^{-15}y^4 + 5.3005 \times 10^{-18}y^5 \right] \quad (11)$$

Fourth virial coefficient:

Let $z = 7.2480$

$$\delta = -1.1138 \times 10^{-10} z e^{-(1.00476 \times 10^{-2}z - 4.6879 \times 10^{-6}z^2)} \quad (12)$$

First derivative of fourth virial coefficient:

$$\frac{d\delta}{dT} = -1.1138 \times 10^{-10} e^{-(1.00476 \times 10^{-2}z - 4.6879 \times 10^{-6}z^2)} \\ \times \left[1 - 1.00476 \times 10^{-2}z + 9.3758 \times 10^{-6}z^2 \right] \quad (13)$$

Second derivative of fourth virial coefficient:

$$\frac{d^2\delta}{dT^2} = -1.1138 \times 10^{-10} e^{-(1.00476 \times 10^{-2}z - 4.6879 \times 10^{-6}z^2)} \\ \times \left[-2.0095 \times 10^{-2} + 1.2906 \times 10^{-4}z - 1.8541 \times 10^{-7}z^2 + 8.7906 \times 10^{-11}z^3 \right] \quad (14)$$

Saturated vapor specific volume:

$$v_G = \frac{0.2236 T}{P_{SAT}} \left[1 + \frac{1}{2} P_{SAT} + \frac{1}{3} P_{SAT}^2 + \frac{1}{4} P_{SAT}^3 \right] \quad (15)$$

Saturated vapor enthalpy:

$$h_G = h^0 - 0.05979 T^2 P_{SAT} \left[\frac{dh}{dT} + \frac{P_{SAT}}{2} \frac{d^2}{dT} + \frac{P_{SAT}^2}{3} \frac{d^3}{dT} \right] \quad (16)$$

Saturated vapor entropy:

$$s_G = s^0 - 0.05979 \left[2.30259 \log_{10} \left(\frac{P_{SAT}}{14.6959} \right) + P_{SAT} \left(2 + T \frac{ds}{dT} \right) + \frac{P_{SAT}^2}{2} \left(7 + T \frac{d^2}{dT} \right) + \frac{P_{SAT}^3}{3} \left(6 + T \frac{d^3}{dT} \right) \right] \quad (17)$$

Enthalpy of vaporization:

$$h_{FG} = 0.18505 P_{SAT} \left[\frac{18.717.22}{T} - 0.53299 \right] (v_G - v_F) \quad (18)$$

Entropy of vaporization:

$$s_{FG} = \frac{h_{FG}}{T} \quad (19)$$

Saturated liquid enthalpy:

$$h_F = h_G - h_{FG} \quad (20)$$

Saturated liquid entropy:

$$S_f = S_G - S_{FG} \quad (21)$$

Superheated vapor specific volume:

$$v = \frac{0.27445T}{P} \left[1 + 3P + \gamma P^2 + \delta P^3 \right] \quad (22)$$

Superheated vapor enthalpy:

$$H = H^o - 0.05079 T^2 P \left[\frac{ds}{dT} + \frac{P}{2} \frac{d\gamma}{dT} + \frac{P^2}{5} \frac{d\delta}{dT} \right] \quad (23)$$

Superheated vapor entropy:

$$S = S^o - 0.05079 \left[2.30259 \log_{10} \left(\frac{P}{14.6959} \right) + P \left(3 + T \frac{ds}{dT} \right) + \frac{P^2}{2} \left(\gamma + T \frac{d\gamma}{dT} \right) + \frac{P^5}{5} \left(\delta + T \frac{d\delta}{dT} \right) \right] \quad (24)$$

Superheated vapor specific heat at constant pressure:

$$C_p = C_p^o - 0.05079 P T \left[2 \frac{ds}{dT} + T \frac{d^2s}{dT^2} + P \frac{d\gamma}{dT} + \frac{P}{2} T \frac{d^2\gamma}{dT^2} + \frac{2P^2}{5} \frac{d\delta}{dT} + \frac{P^4}{5} T \frac{d^2\delta}{dT^2} \right] \quad (25)$$

Superheated vapor acoustic velocity:

$$A = \sqrt{\frac{32.17 \text{ ft}^2}{\frac{1}{524.607} \left(\frac{1}{P^2} - \gamma - 25P^3 \right) - \frac{T}{776.155 C_p} \left[\frac{\gamma}{T} + 0.274257 \frac{d\gamma}{dT} + \gamma^2 \frac{d^2\gamma}{dT^2} \right]}}$$

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SECTION V
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TABLE I

SUMMARY OF POTASSIUM POINT VALUE PROPERTIES

<u>PROPERTY</u>	<u>VALUE</u>	<u>REFERENCE</u>
Melting point	145.8°F	30
Heat of fusion	25.7 Stu per lb	13
Atomic weight	39.100	31
Density of the Solid at 68°F	53.7 lbs per cu ft	11
Atmospheric boiling point	1394°F	3
Heat of vaporization at the boiling point	829.1 Btu per lb	3
Critical pressure	3380 psia	4
Critical temperature	3950°F	4
Critical density	10.6 lbs per cu ft	4
Ionization potential	4.339 volts	27
*Relative magnetic susceptibility at 64.4°F	5.75 x 10 ⁻⁸ (MKS dimensionless)	11

*Defined as $\frac{\mu}{\mu_v} - 1$

Where μ = permeability of potassium, henry per meter

μ_v = permeability of free space = 1.257×10^{-6} henry per meter

TABLE II.

NUCLEAR DATA FOR POTASSIUM

Isotope	Concentration in Natural Mixture (Weight percent)	Absorption Cross Section (barns)	Activation Cross Section (barns)	Remarks
Natural mixture	----	2.07 ± 0.07	----	----
K^{39}	93.08	1.94 ± 0.15	3 ± 2	n, γ reaction 1.3×10^8 year half-life
K^{40}	0.012	70 ± 20	3.8 ± 0.7	n, p reaction
K^{41}	6.91	1.24 ± 0.10	1.30 ± 0.15	n, γ reaction 12.46-hour half- life

NOTE: This information was obtained from References 6 and 7 (absorption and activation cross sections with thermal neutrons of 2200 meters per second velocity).

TABLE III
SOURCES OF INFORMATION ON PHYSICAL
PROPERTIES OF SOLID POTASSIUM

Property and Equation (t, °F throughout)	Primary Reference	Other References	Remarks
Electrical resistivity, ρ , microhm- inch $\rho = 2.06 + 0.0096t$	8, 9	10	Raw data from both References 8 and 9 were used to develop equation. Correlation with Reference 10 is 8.4%.
Thermal Conductivity, k, Btu per hr-°F-ft $k = \frac{459.7 + t}{8.17 + 0.0381t}$		9, 25	Estimated from the electrical resistivity by using the Wiedemann-Franz-Lorentz relation- ship and the two values reported in Reference 9 for the thermal conductivity of the solid.
Specific heat, C_p , Btu per lb-°F $C_p = 0.1631 + 2.328 \times 10^{-4}t$	13	14	Equation taken from Reference 13. Values in Reference 14 agree within 2 percent.

TABLE IV
PROPERTIES OF SOLID POTASSIUM

Temperature (°F)	Electrical Resistivity (Microhm-inch)	Thermal Conductivity (Btu per hr-ft-°F)	Specific Heat (Btu per lb-°F)
0	2.06	56.3	0.1631
25	2.30	53.1	0.1689
50	2.54	50.6	0.1747
75	2.78	48.5	0.1806
100	3.02	46.7	0.1864
125	3.26	45.2	0.1922
145.8	3.46	44.2	0.1970

TABLE V

SOURCES OF INFORMATION ON PHYSICAL
PROPERTIES OF LIQUID POTASSIUM

Property and Equation (t , $^{\circ}\text{F}$ throughout)	Primary Reference	Other References	Remarks
Density, d , lb per cu ft $d = 52.768 - 7.4975 \times 10^{-3}t$ $- 5.2255 \times 10^{-7}t^2 + 4.98 \times 10^{-11}t^3$	3	15, 16, 17, 18, 19, 8	All references are in good agreement. Reference 8 gives values up to 2 percent higher in the range from 1100°F to 2400°F .
Viscosity, μ , lb per ft-hr $\mu = \frac{388.57}{t + 142.7} + 0.0676$	20	19, 21, 5, 22	Raw data of Reference 20 was used to develop equation. Other results bracket the equation.
Surface tension, σ , lb per ft $\sigma = 8.4029 \times 10^{-3} - 2.8149 \times 10^{-5}t$	34	24, 25, 32	Reference 24 data as reported in Reference 26 gives excellent agreement.
Electrical resistivity, ρ , microhm-in. $\rho = 2.6978 + 1.4055 \times 10^{-2}t$ $- 2.0398 \times 10^{-6}t^2 + 3.5792 \times 10^{-9}t^3$	8	20, 26, 9, 10, 28, 27	Reference 8 raw data has a standard deviation of 1.0 percent. Other references give good agreement.
Thermal conductivity, k , $\frac{\text{Btu}}{\text{hr-ft-}^{\circ}\text{F}}$ $k = 32.5 - 1.33 \times 10^{-2}t$ $+ 1.9 \times 10^{-6}t^2$	20	8, 26, 1, 29	The equation shown is an approximation of the data in Reference 20. Scatter in available data is of the order of 5 percent.
Specific Heat, C_p , Btu per lb- $^{\circ}\text{F}$ $C_p = 0.2023 - 4.33 \times 10^{-5}t$ $+ 2.3 \times 10^{-8}t^2$	14	13, 3	The equation is based on data of Reference 14. Correlation with other work at temperatures below 1400°F is good, but confirmed high-temperature data is not available. Three isolated points of Reference 3 tend to substantiate the curve.

TABLE VI
PROPERTIES OF LIQUID POTASSIUM

Temperature (°F)	Density (lb per cu ft)	Viscosity (lb per ft-hr)	Surface Tension (lb per ft)	Electrical Resistivity (microhm-in.)	Thermal Conductivity (Btu per hr-ft-°F)	Specific Heat (Btu per lb-°F)
145.8	51.664	1.4145	0.007993	4.715	30.6	0.1964
200	51.247	1.2014	0.007840	5.456	29.9	0.1945
300	50.473	0.9453	0.007558	6.827	28.7	0.1914
400	49.686	0.7836	0.007277	8.223	27.5	0.1887
500	48.894	0.6722	0.006995	9.653	26.3	0.1864
600	48.091	0.5908	0.006714	11.170	25.2	0.1846
700	47.280	0.5287	0.006433	12.765	24.1	0.1833
800	46.459	0.4798	0.006151	14.469	23.1	0.1824
900	45.630	0.4403	0.005870	16.304	22.1	0.1819
1000	44.794	0.4076	0.005588	18.292	21.1	0.1820
1100	43.951	0.3803	0.005307	20.454	20.2	0.1825
1200	43.100	0.3570	0.005025	22.811	19.3	0.1834
1300	42.242	0.3369	0.004744	25.386	18.4	0.1849
1400	41.373	0.3195	0.004462	28.198	17.6	0.1868
1500	40.508	0.3041	0.004181	31.271	16.8	0.1891
1600	39.631	0.2906	0.003899	34.624	16.1	0.1914
1700	38.748	0.2785	0.003618	38.281	15.4	0.1958
1800	37.859	0.2676	0.003336	42.262	14.7	0.1989
1900	36.968	0.2578	0.003055	46.566	14.1	0.2030
2000	36.069	0.2489	0.002773	51.282	13.5	0.2077
2100	35.167	0.2409	0.002492	56.365	13.0	0.2128
2200	34.260	0.2339	0.002210	61.858	12.5	0.2183
2300	33.350	0.2267	0.001929	67.782	12.0	0.2244
2400	32.435	0.2204	0.001647	74.160	11.5	0.2309

TABLE VII

SOURCES OF INFORMATION ON PROPERTIES
OF SATURATED POTASSIUM VAPOR

Property and Equation (T, °R Throughout)	Primary Ref- erence	Other Ref- erence	Remarks
Vapor pressure, P_{SAT} , psia $P_{SAT} = \frac{1.9714 \times 10^7}{(T)^{0.53299}} e^{-\frac{18,717.22}{T}}$	3	20	Reference 3 vapor pressure equation was extrapolated down to 740°R. Reference 20 curve is about 8 percent lower at 800°R and 5 percent higher at 2200°R. Recommended equation is consistent with thermodynamic computations.
Specific volume, V_G , cu ft per lb $V_G = \frac{0.2746T}{P_{SAT}} \left[1 + 8P_{SAT} + \gamma (P_{SAT})^2 + \delta (P_{SAT})^3 \right]$	3	30	Virial coefficients δ , γ , and δ derived as functions of temperature, primarily from Reference 3 data. Low-temperature values of δ were determined for monomer-dimer mixture by using Reference 30 equilibrium constants.
Heat of vaporization, H_{FG} , Btu per lb $H_{FG} = 0.18505 P_{SAT} \left[\frac{18,717.22}{T} - 0.53299 \right] (V_G - V_F)$			Heat of vaporization calculated from vapor pressure equation of Reference 3 in conjunction with modified equation of state. Reference 1 data is 7 percent higher at 2200°R.
Viscosity, μ , lb per ft-hr $\mu = 0.001577 \sqrt{T}$	22	1	Equation is based on kinetic theory, with an atomic diameter of 4.374 Å assumed. Calculated values from Reference 1 are approximately 32 percent lower.
Thermal conductivity, k , Btu per hr-ft-°F $k = \frac{\mu}{M} (MC_p + 2.48)$		3	Equation is based on work of Eucken and Maxwell for estimation of Prandtl number. Equilibrium molecular weight and specific heat were obtained from Reference 3.

TABLE VIII
PROPERTIES OF SATURATED POTASSIUM VAPOR

Temperature (°F)	Vapor Pressure (psia)	Specific Volume (cu ft per lb)	Heat of Vaporization (Btu per lb)	Viscosity (lb per ft-hr)	Thermal Conductivity (Btu per hr-ft-°F)
800	0.1547	2207	904.7	0.0560	0.0132
900	0.443	826	895.2	0.0581	0.0143
1000	1.095	355	884.0	0.0602	0.0158
1100	2.405	170.8	871.5	0.0622	0.0177
1200	4.79	90.0	857.9	0.0642	0.0199
1300	8.82	51.2	843.4	0.0661	0.0218
1400	15.18	30.96	828.1	0.0680	0.0233
1500	24.66	19.76	812.4	0.0698	0.0245
1600	38.2	13.20	796.8	0.0715	0.0255
1700	56.7	9.18	781.4	0.0733	0.0263
1800	81.2	6.60	766.4	0.0750	0.0268
1900	112.8	4.90	751.7	0.0766	0.0271
2000	152.3	3.72	736.9	0.0782	0.0272
2100	201	2.896	721.9	0.0797	0.0273
2200	259	2.296	706.4	0.0813	0.0276
2300	328	1.850	689.6	0.0828	0.0282

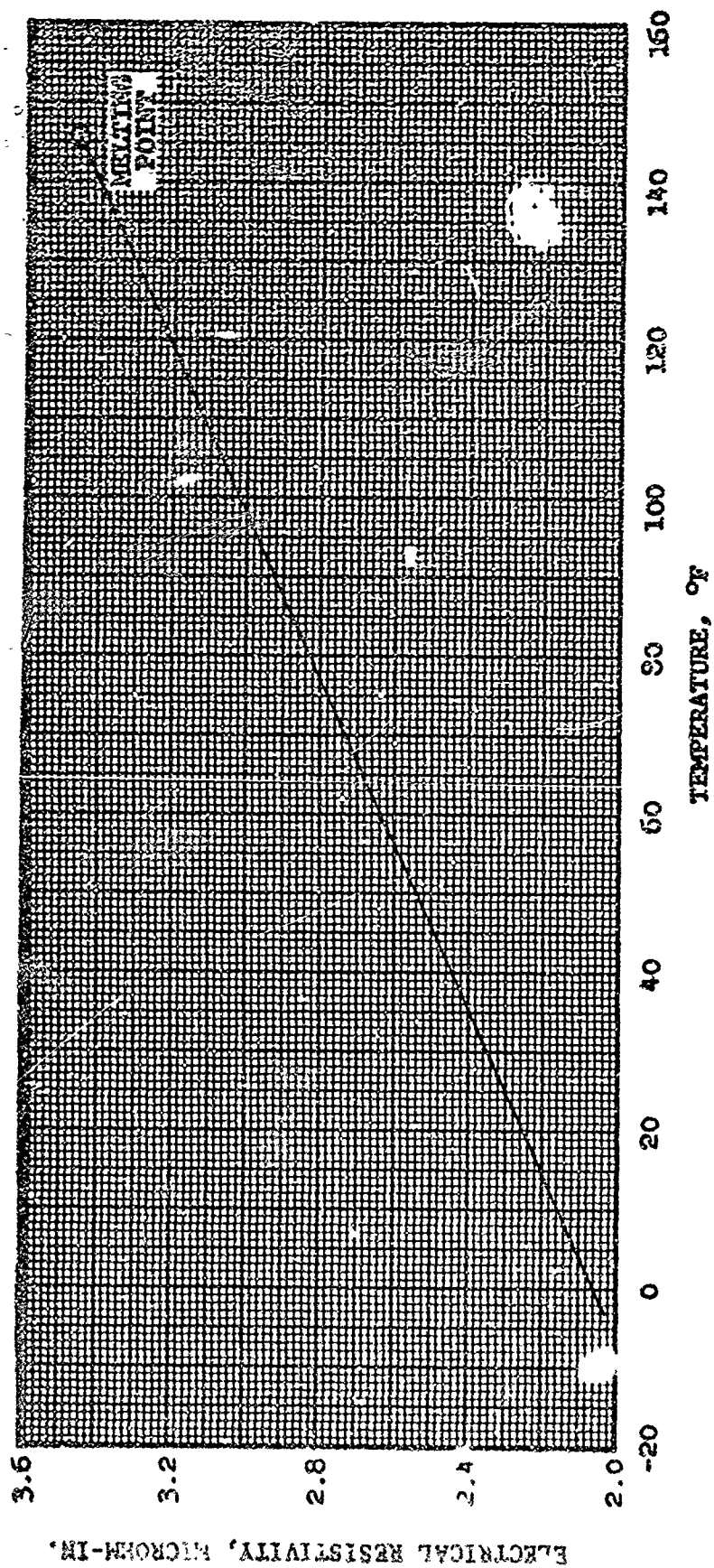


FIGURE 1. ELECTRICAL RESISTIVITY OF SOLID POTASSIUM

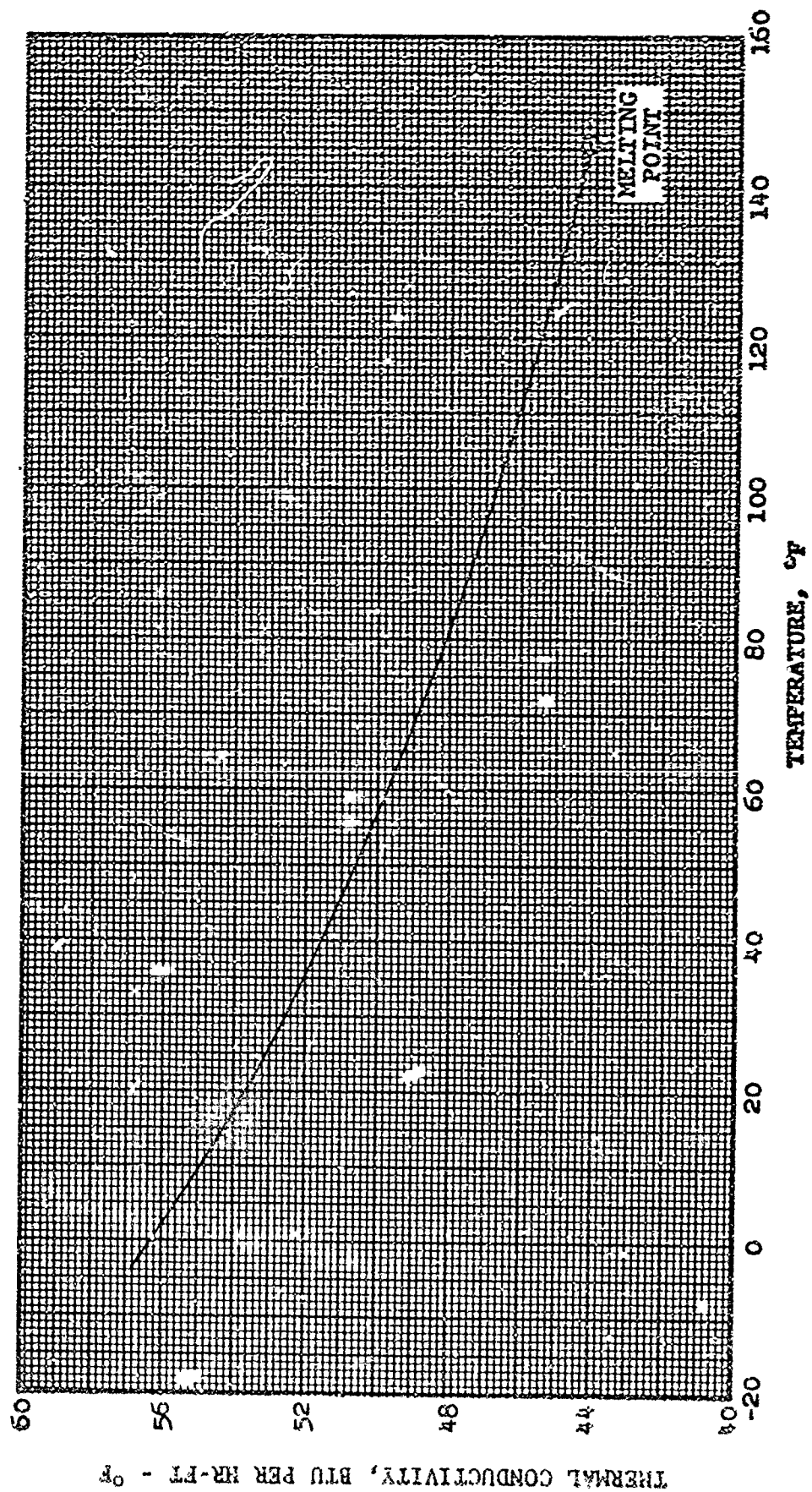


FIGURE 2. THERMAL CONDUCTIVITY OF SOLID POTASSIUM

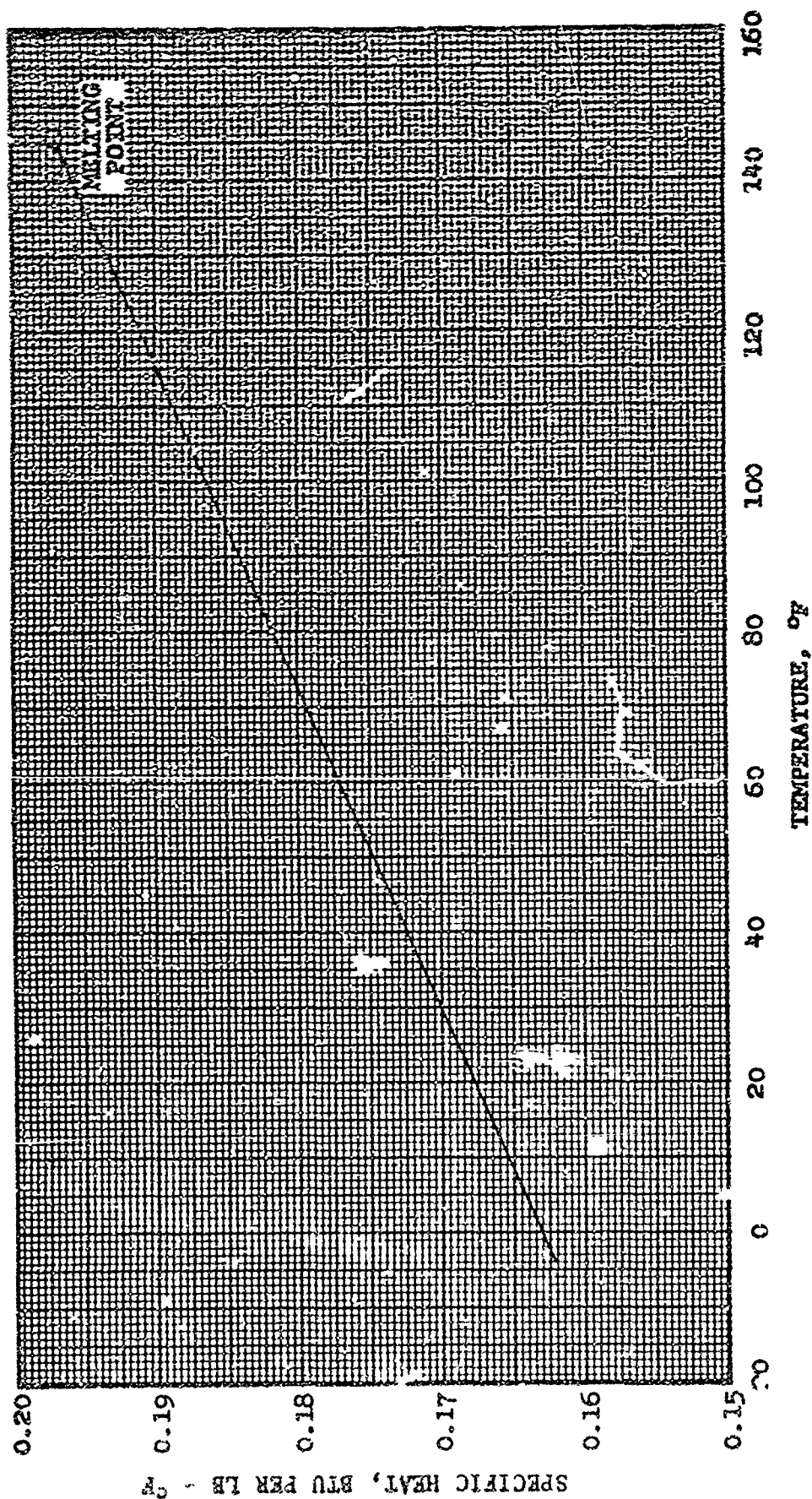


FIGURE 3. SPECIFIC HEAT OF SOLID POTASSIUM

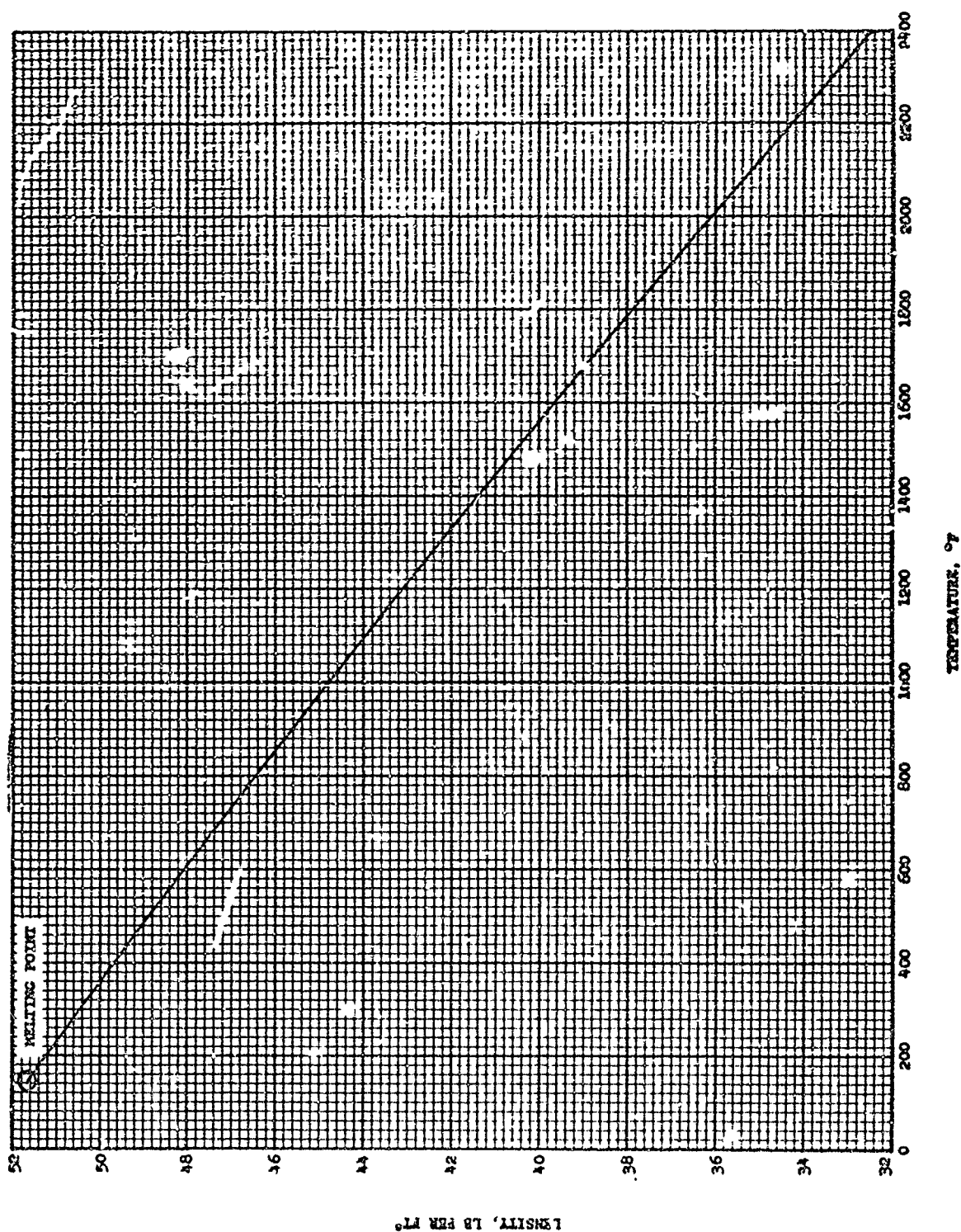


FIGURE 4. DENSITY OF LIQUID POTASSIUM

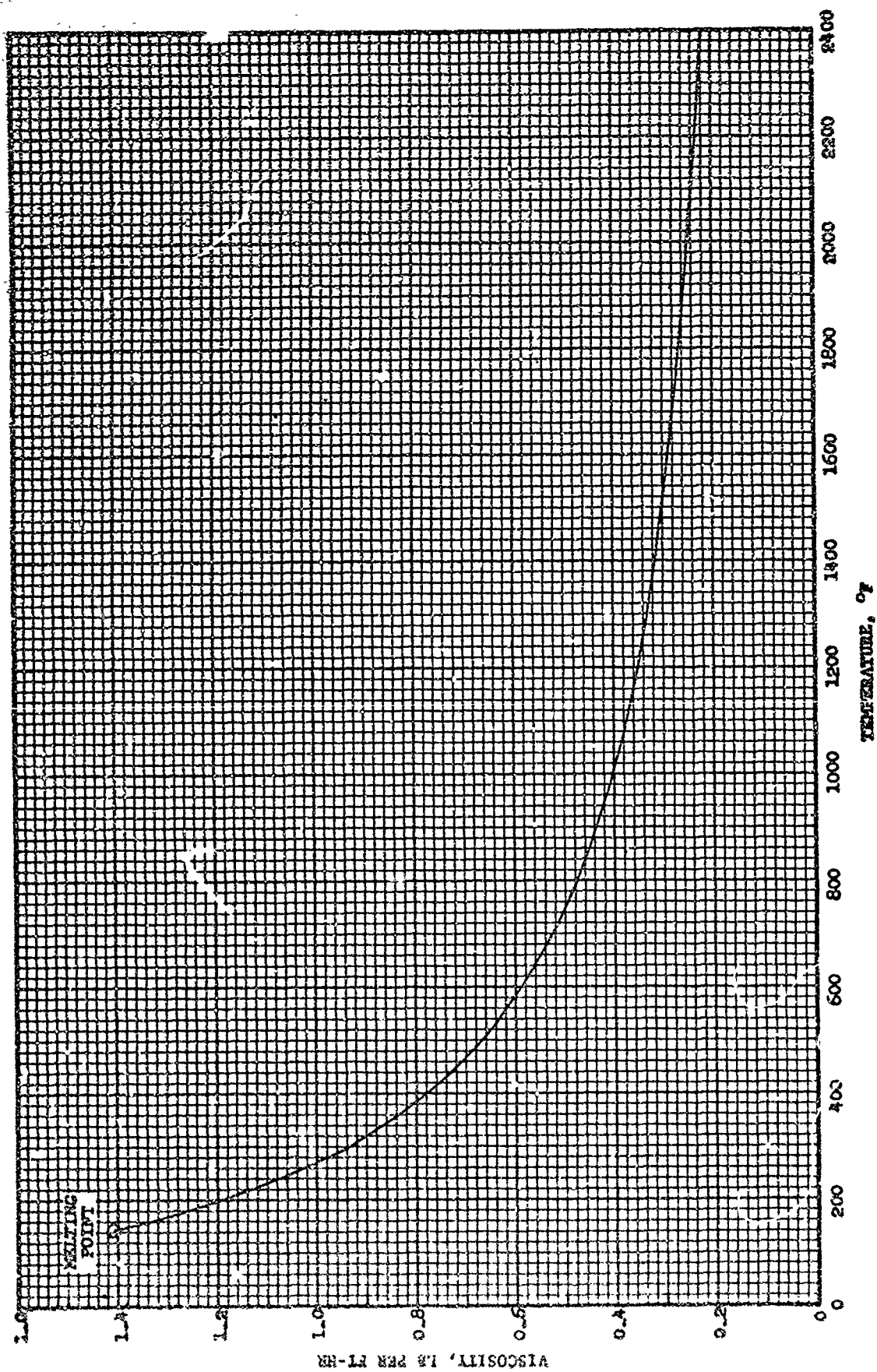


FIGURE 5. VISCOSITY OF LIQUID POTASSIUM

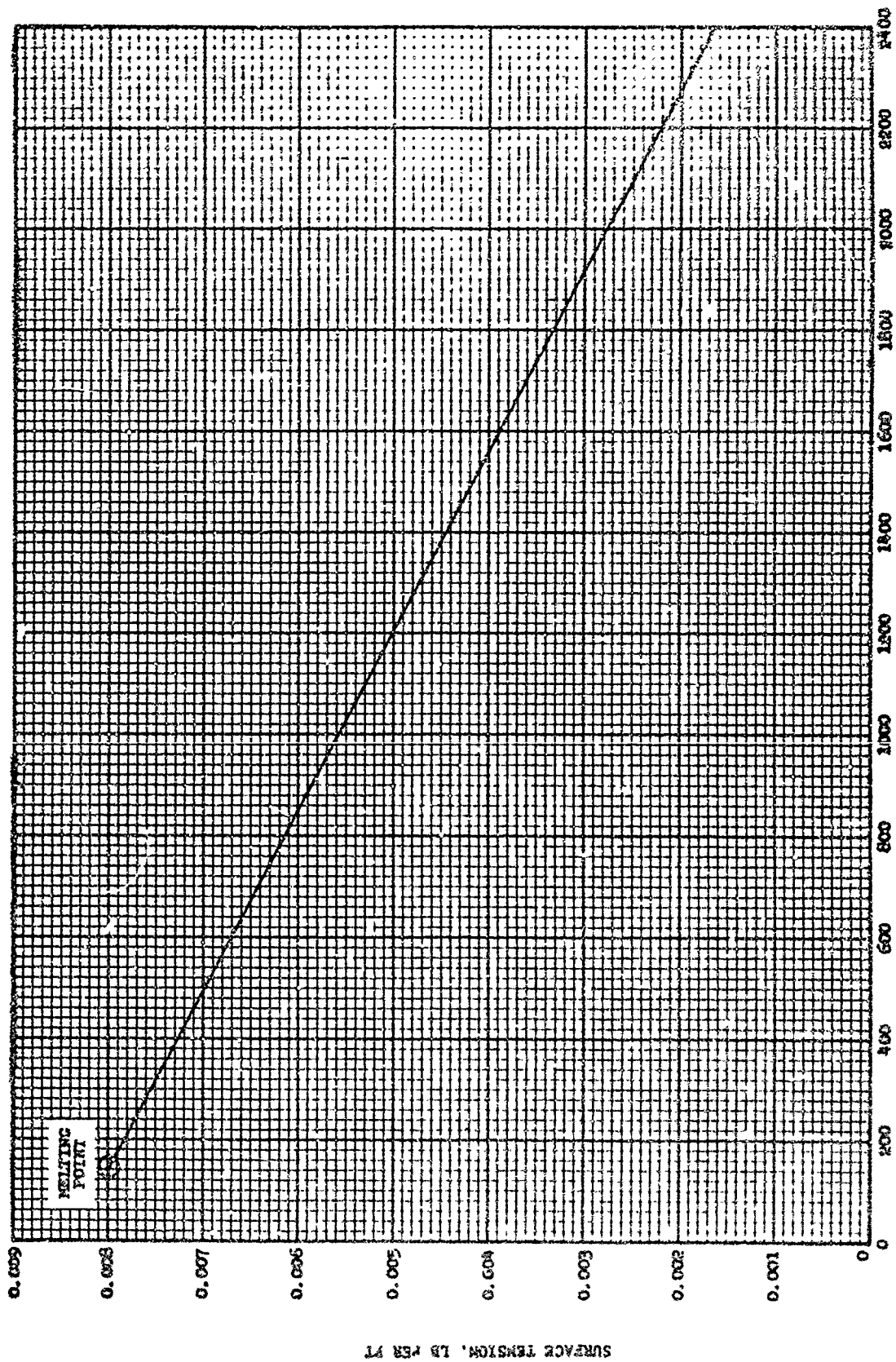


FIGURE 6. SURFACE TENSION OF LIQUID POTASSIUM

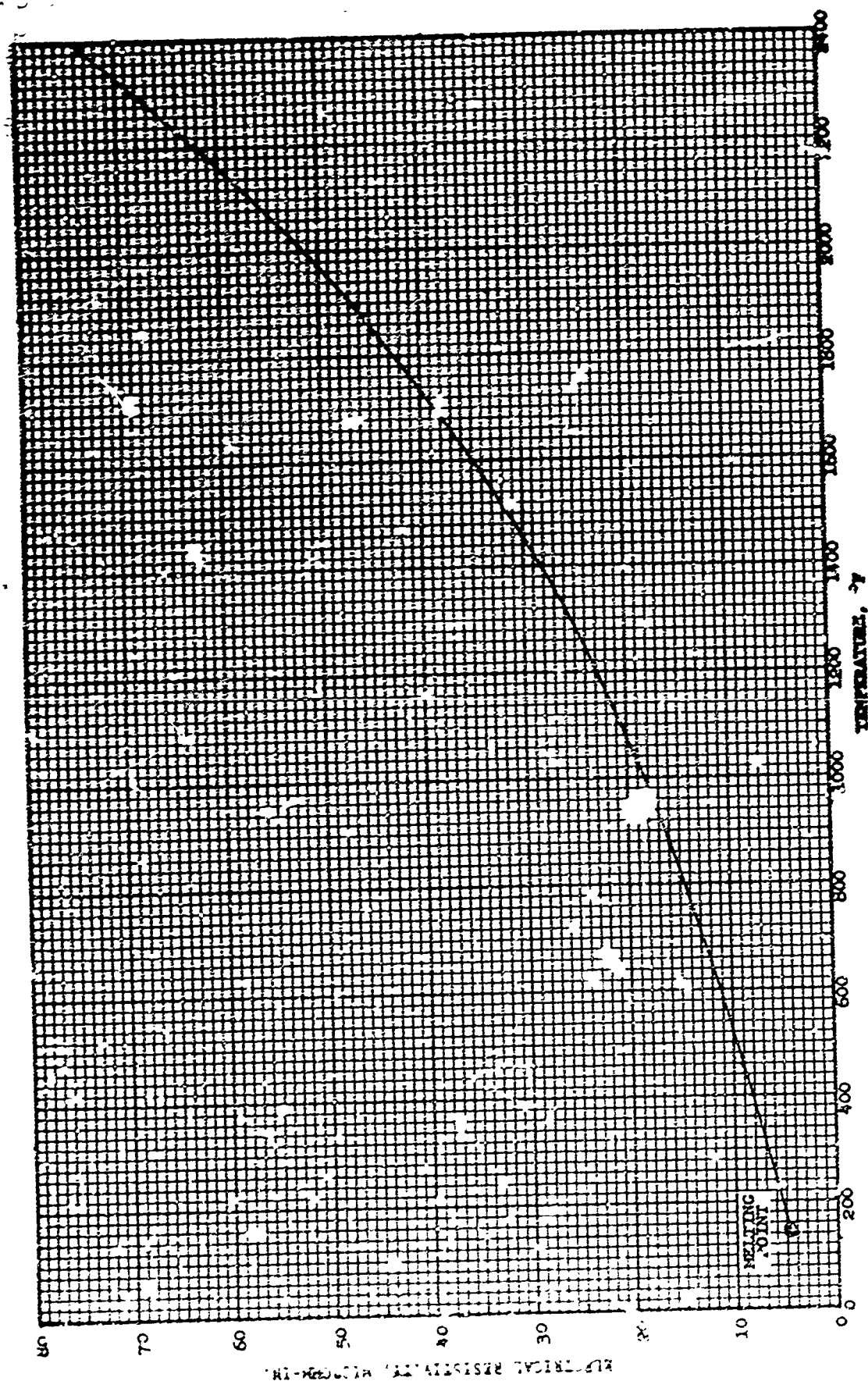


FIGURE 7. ELECTRICAL RESISTIVITY OF LIQUID POTASSIUM

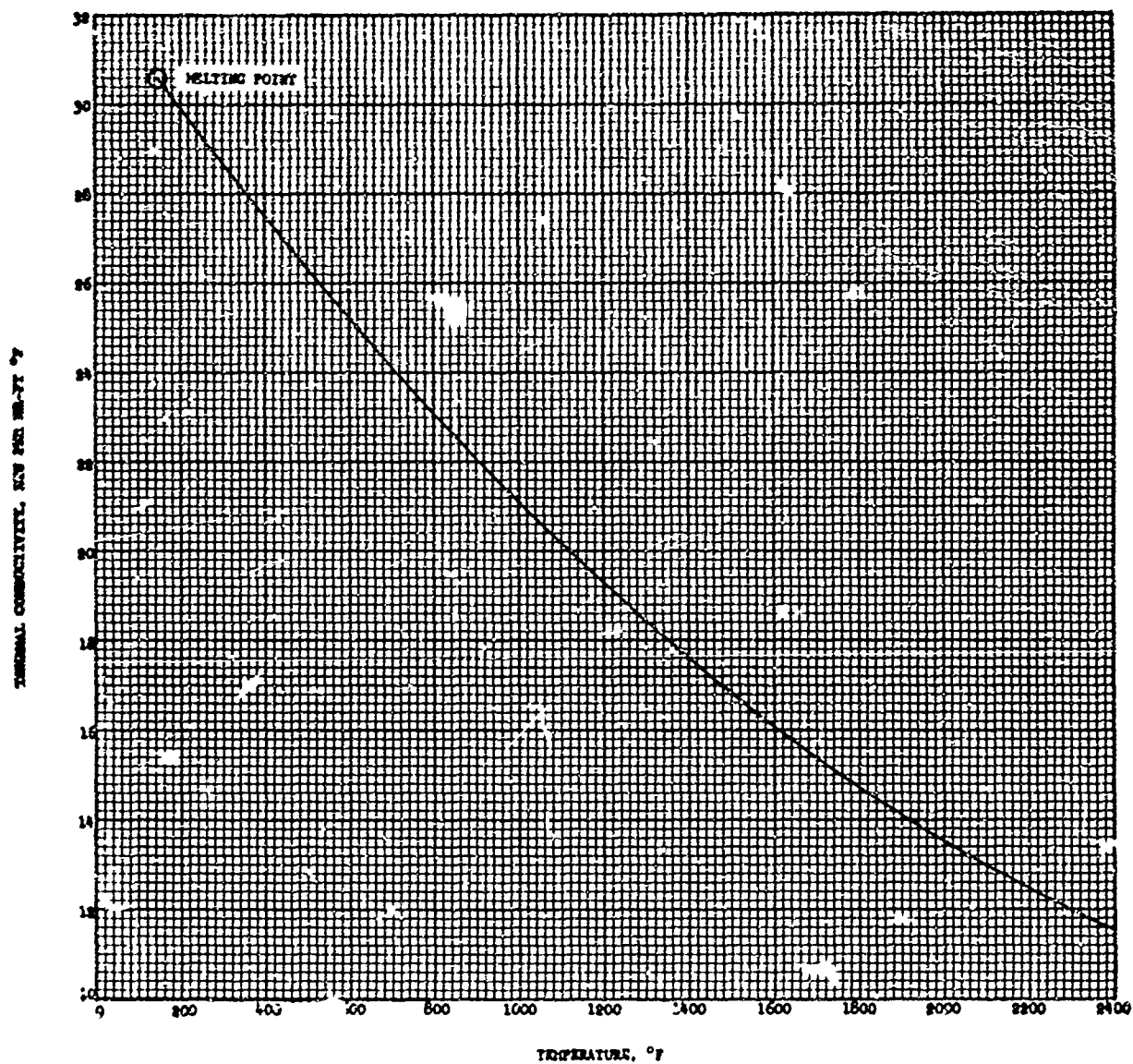


FIGURE 8. THERMAL CONDUCTIVITY OF LIQUID POTASSIUM

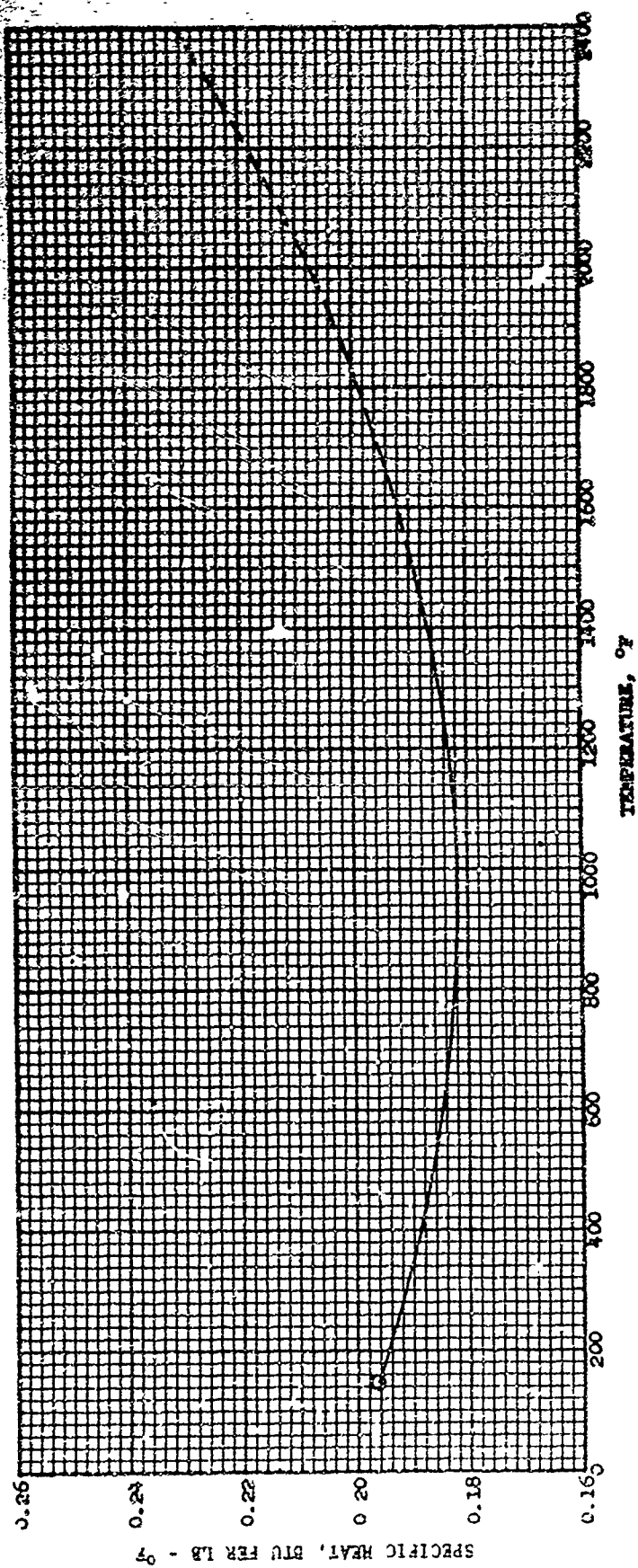


FIGURE 9. SPECIFIC HEAT OF LIQUID POTASSIUM

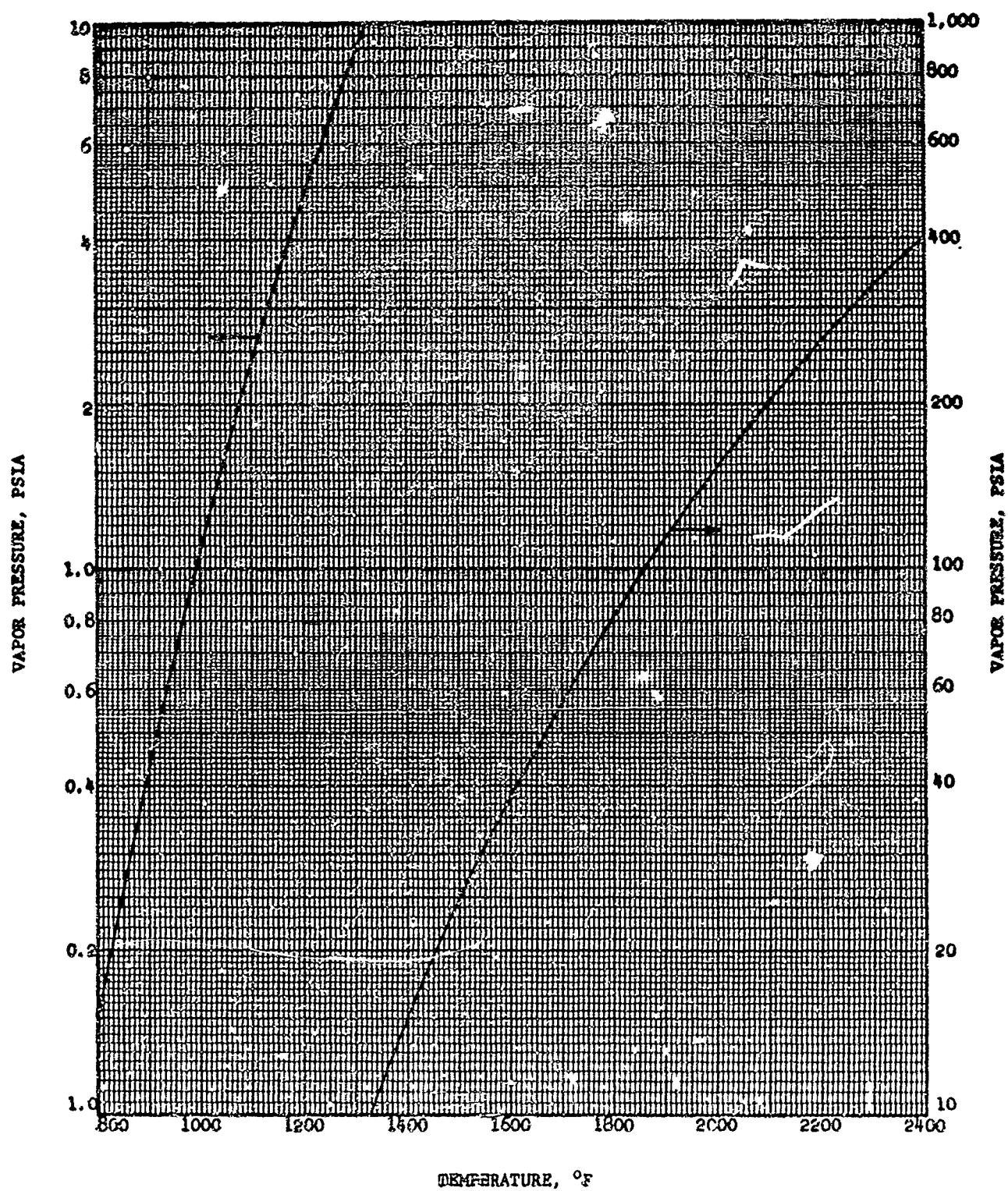


FIGURE 10. POTASSIUM VAPOR PRESSURE

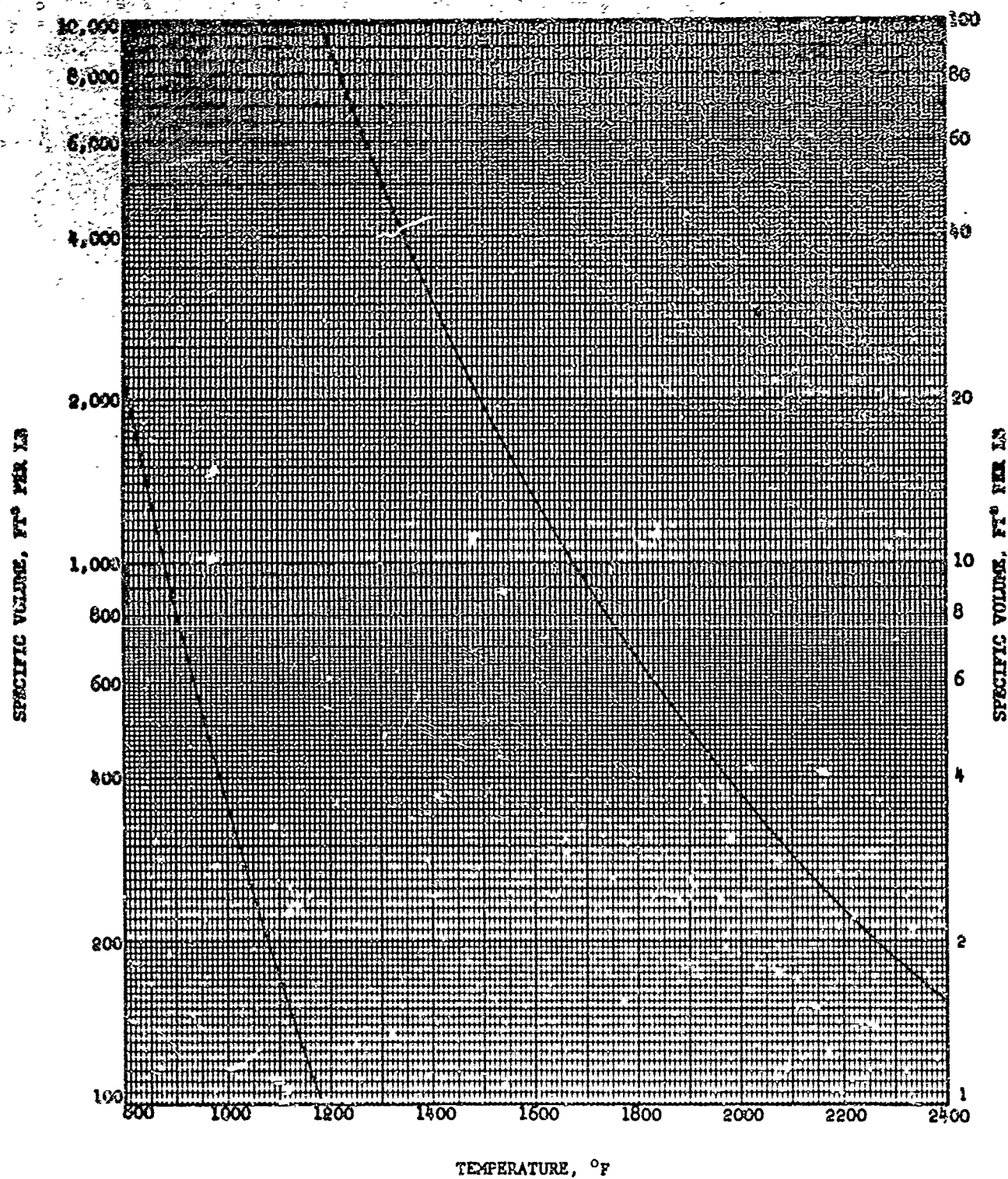


FIGURE 11 POTASSIUM SATURATED VAPOR SPECIFIC VOLUME

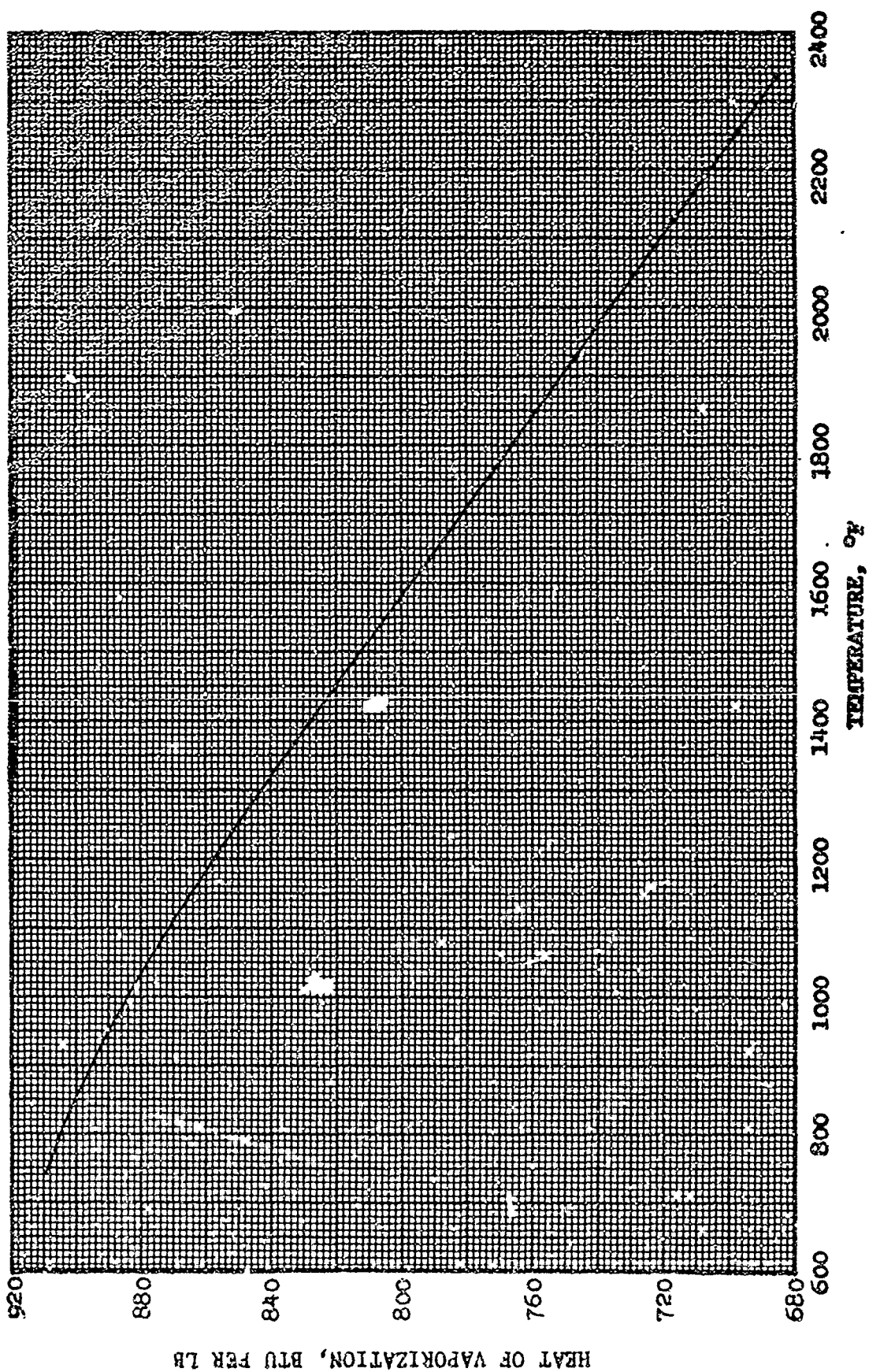


FIGURE 12. POTASSIUM HEAT OF VAPORIZATION

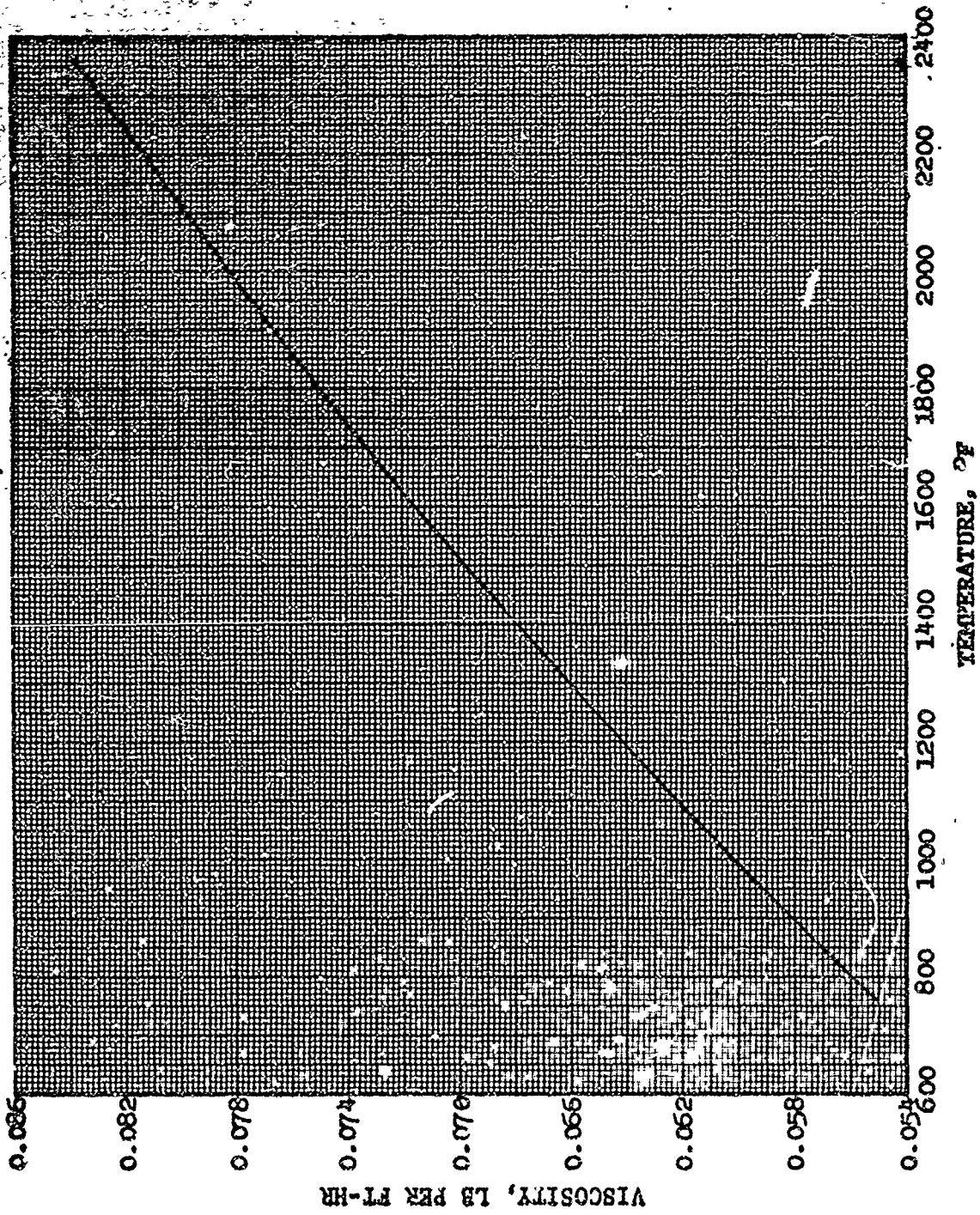


FIGURE 13. VISCOSITY OF SATURATED POTASSIUM VAPOR

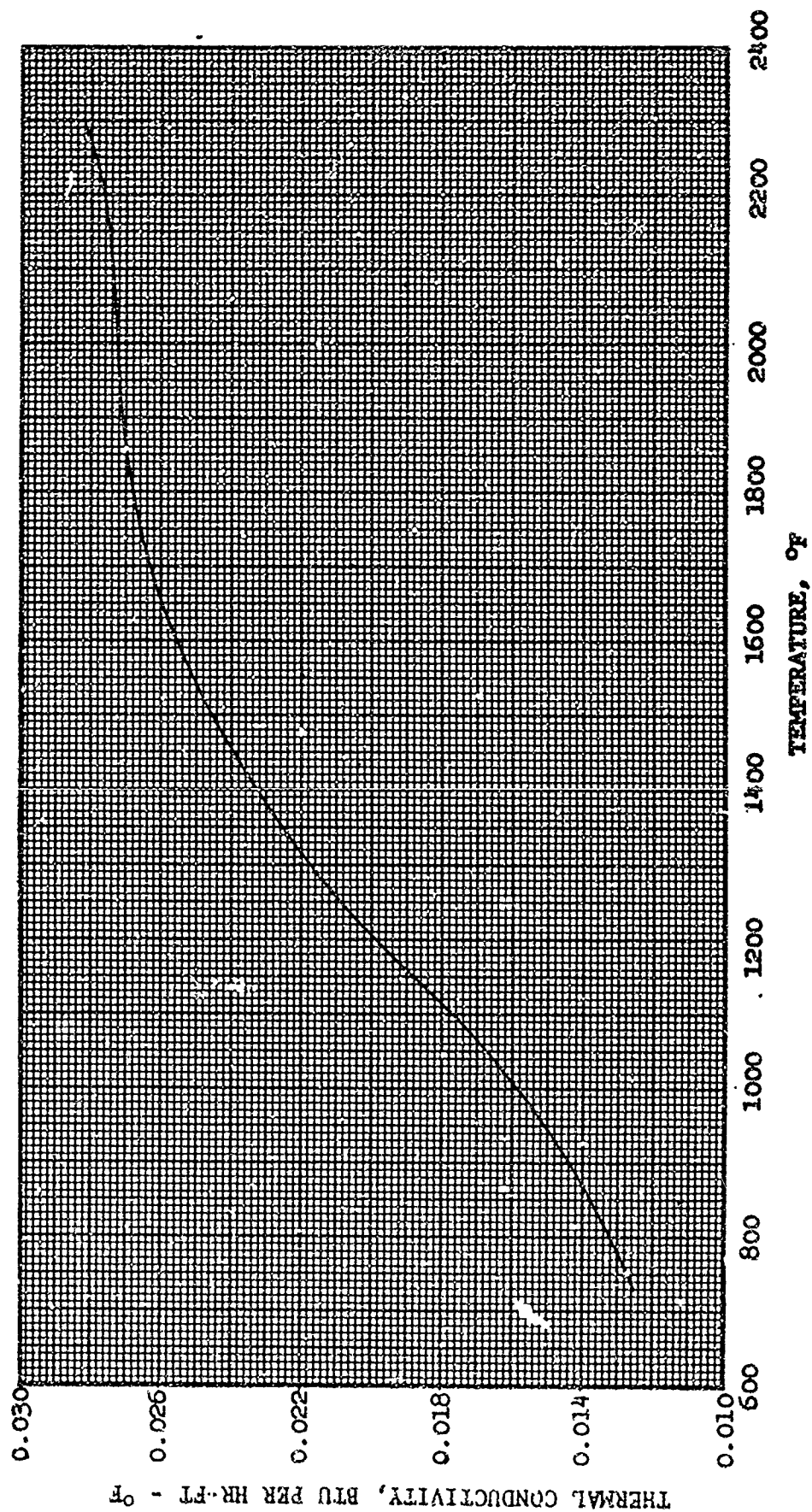


FIGURE 14. THERMAL CONDUCTIVITY OF SATURATED POTASSIUM VAPOR

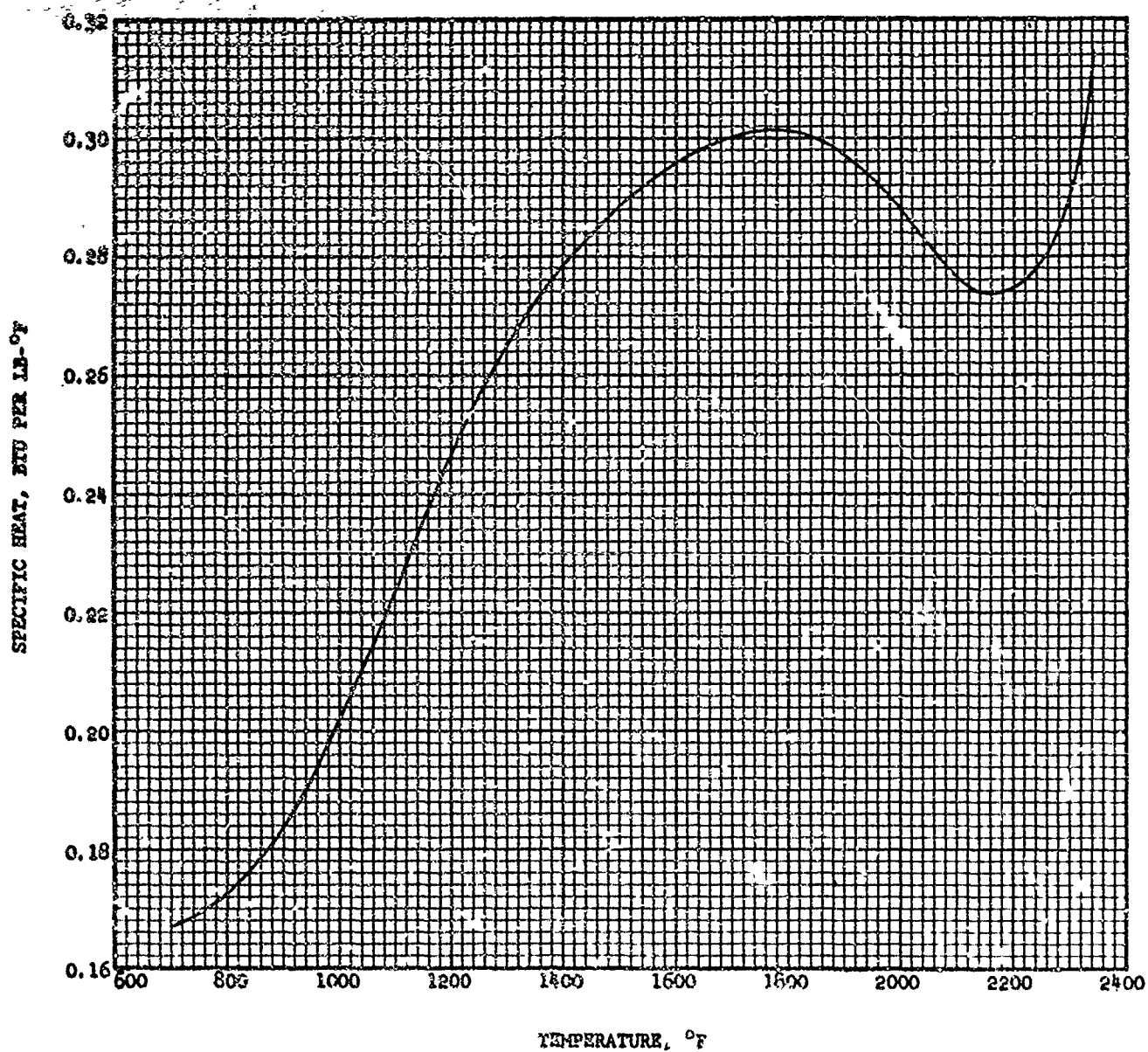


FIGURE 15. SPECIFIC HEAT OF SATURATED POTASSIUM VAPOR

APPENDIX I

SATURATION PROPERTIES OF POTASSIUM

FORTRAN PROGRAM 697-1

SATURATION PROPERTIES OF POTASSIUM

PAGE 1

T (°F)	PSAT (PSIA)	VF (CU FT/LB)	VB (CU FT/LB)	VF (BTU/LB)	VB (BTU/LB)	HF (BTU/LB)	HG (BTU/LB)	SF (BTU/LB)	SF8 (BTU/LB)	SG (BTU/LB)
1200	0.0758	0.02130	4304.0755	236.833591	909.3713238	1146.20	1146.20	0.5871112	0.7578094	1.3449
1220	0.0970	0.02137	3414.9281	240.3763424	907.0842469	1148.26	1148.26	0.5900398	0.7441674	1.3342
1240	0.1232	0.02145	2730.5200	243.9500797	906.3147976	1150.26	1150.26	0.5929449	0.7308990	1.3230
1260	0.1592	0.02153	2199.4210	247.5499144	904.6624107	1152.21	1152.21	0.5958244	0.7179860	1.3118
1280	0.1941	0.02160	1784.0775	251.1719827	902.9275419	1154.10	1154.10	0.5986761	0.7054121	1.3001
1300	0.2411	0.02168	1456.8600	254.8124249	901.115648	1155.92	1155.92	0.6014978	0.6931627	1.2947
1320	0.2974	0.02176	1197.2517	258.4676651	899.2466487	1157.68	1157.68	0.6042876	0.6812227	1.2855
1340	0.3646	0.02184	989.8969	262.1341226	897.2455775	1159.38	1159.38	0.6070440	0.6695863	1.2766
1360	0.4442	0.02192	823.2135	265.8093231	895.2015972	1161.01	1161.01	0.6097659	0.6582303	1.2680
1380	0.5361	0.02200	688.4006	269.4910269	893.0882374	1162.58	1162.58	0.6124520	0.6471654	1.2596
1400	0.6481	0.02208	578.7235	273.177968	890.9091400	1164.09	1164.09	0.6151047	0.6363837	1.2515
1420	0.7765	0.02216	488.9937	276.868763	888.7679505	1165.54	1165.54	0.6177219	0.6258025	1.2435
1440	0.9256	0.02224	415.1072	280.5642118	886.5681640	1166.93	1166.93	0.6203055	0.6155534	1.2358
1460	1.0979	0.02233	354.1646	284.2644143	884.3130062	1168.28	1168.28	0.6228667	0.6054884	1.2283
1480	1.2961	0.02241	303.4612	287.9706467	881.9539333	1169.58	1169.58	0.6253772	0.5956793	1.2211
1500	1.5232	0.02249	261.3312	291.6848867	879.5427389	1170.83	1170.83	0.6278689	0.5860986	1.2140
1520	1.7824	0.02258	225.6301	295.4070448	876.9472389	1172.03	1172.03	0.6303338	0.5767386	1.2071
1540	2.0769	0.02267	195.2523	299.1427866	874.0917475	1173.23	1173.23	0.6327740	0.5675920	1.2004
1560	2.4105	0.02275	170.4278	302.8914449	871.4964297	1174.39	1174.39	0.6351914	0.5586516	1.1938
1580	2.7869	0.02284	148.9407	306.658404	868.8503133	1175.51	1175.51	0.6375800	0.5499111	1.1875
1600	3.2101	0.02293	130.6185	310.437751	866.177696	1176.62	1176.62	0.6399653	0.5413610	1.1813
1620	3.6844	0.02302	114.3561	314.2386707	863.4559790	1177.69	1177.69	0.6423247	0.5329975	1.1753
1640	4.2142	0.02311	101.4643	318.0595891	860.5949043	1178.75	1178.75	0.6446673	0.5248135	1.1695
1660	4.8043	0.02320	89.8509	321.9010461	857.5928027	1179.79	1179.79	0.6469938	0.5168029	1.1638
1680	5.4505	0.02330	79.8057	325.7631468	855.3530168	1180.82	1180.82	0.6493046	0.5089601	1.1583
1700	6.1850	0.02339	71.0868	329.6453279	852.1759222	1181.82	1181.82	0.6515998	0.5012810	1.1529
1720	6.9861	0.02348	63.5006	333.5465499	849.2628588	1182.81	1182.81	0.653879	0.4937575	1.1476
1740	7.8683	0.02358	56.8751	337.4633068	846.1354482	1183.78	1183.78	0.6561419	0.4863882	1.1425
1760	8.8373	0.02367	51.0732	341.3997032	843.3555326	1184.74	1184.74	0.6583876	0.4791679	1.1376
1780	9.8992	0.02377	45.9782	345.3474065	840.3253384	1185.67	1185.67	0.6606152	0.4720929	1.1327
1800	11.0600	0.02387	41.4918	349.3058705	837.2873469	1186.59	1186.59	0.6628236	0.4651568	1.1280
1820	12.3260	0.02397	37.5300	353.2732729	834.224125	1187.50	1187.50	0.6650119	0.4583650	1.1234
1840	13.7038	0.02407	34.0252	357.2440719	831.1393219	1188.38	1188.38	0.6671788	0.4517062	1.1189
1860	15.1200	0.02417	30.9145	361.2183318	828.0354789	1189.25	1189.25	0.6693233	0.4451804	1.1145
1880	16.6213	0.02427	28.1488	365.1924936	824.9162499	1190.11	1190.11	0.6714440	0.4387852	1.1102
1900	18.2748	0.02437	25.8819	369.1642440	821.7850436	1190.95	1190.95	0.6735418	0.4325104	1.1061
1920	20.0675	0.02448	23.8786	373.1335600	818.6453962	1191.78	1191.78	0.6756143	0.4263778	1.1020
1940	22.0068	0.02458	21.5040	377.0927773	815.5008028	1192.59	1192.59	0.6776619	0.4203632	1.0980
1960	24.0999	0.02469	19.7361	381.0468337	812.3545965	1193.40	1193.40	0.6796844	0.4144666	1.0942
1980	27.0544	0.02480	18.1449	384.9929177	809.2099773	1194.20	1194.20	0.6816882	0.4086919	1.0904
2000	29.5774	0.02490	16.7117	388.9399726	806.0699442	1195.00	1195.00	0.6836550	0.4030330	1.0867
2020	32.2778	0.02501	15.4181	392.8612162	802.9372764	1195.80	1195.80	0.6856041	0.3974937	1.0831
2040	35.1622	0.02512	14.2485	396.7845450	799.8142764	1196.60	1196.60	0.6875301	0.3920658	1.0796
2060	38.2388	0.02523	13.1891	400.7023374	796.7030148	1197.41	1197.41	0.6894341	0.3867430	1.0762
2080	41.5155	0.02535	12.2377	404.6199160	793.6051310	1198.22	1198.22	0.6913173	0.3815409	1.0729
2100	45.0002	0.02546	11.3538	408.5275278	790.5210705	1199.05	1199.05	0.6931831	0.3764390	1.0696
2120	48.7010	0.02558	10.5582	412.4359731	787.4540561	1199.89	1199.89	0.6950267	0.3714406	1.0665
2140	52.6259	0.02569	9.8325	416.3593130	784.4020230	1200.74	1200.74	0.6968557	0.3665430	1.0634
2160	56.7829	0.02581	9.1697	420.2733288	781.3659487	1201.64	1201.64	0.6986694	0.3617439	1.0604
2180	61.1801	0.02593	8.5632	424.1999955	778.3454805	1202.55	1202.55	0.7004692	0.3570392	1.0575
2200	65.8255	0.02605	8.0076	428.1399452	775.3397422	1203.48	1203.48	0.7022564	0.3524272	1.0547
2220	70.7273	0.02617	7.4977	432.0842528	772.3477350	1204.43	1204.43	0.704032	0.3479044	1.0519
2240	75.8934	0.02629	7.0291	436.0452361	769.3682797	1205.41	1205.41	0.705797	0.3434680	1.0493
2260	81.3319	0.02641	6.5979	440.0205685	766.3996615	1206.42	1206.42	0.7075521	0.3391149	1.0467

NOTE: See page 16 for definition of symbols.

FORTRAN PROGRAM 657-1

SATURATION PROPERTIES OF POTASSIUM

PAGE 2

T (R)	PSAT(PRIA)	VF (CU FT/LB)	V8 (CU FT/LB)	HF (BTU/LB)	HFG (BTU/LB)	MG (BTU/LB)	SF (BTU/LB R)	SFO (BTU/LB R)	SG (BTU/LB R)
2280	87.0507	0.02654	6.2005	444.0806871	763.4984807	1207.43	0.7093274	0.3340423	1.0441
2300	93.0578	0.02667	5.8337	446.0157593	760.4885976	1208.58	0.7118334	0.3306472	1.0442
2320	99.3611	0.02679	5.4846	452.0335461	757.5422070	1209.58	0.7127600	0.3285268	1.0443
2340	105.9834	0.02692	5.1833	456.0882472	754.5993768	1210.57	0.7144766	0.3247804	1.0438
2360	112.8675	0.02705	4.9008	460.1130750	751.6977947	1211.77	0.7161833	0.3204894	1.0437
2380	120.1260	0.02718	4.6313	464.1673467	748.7356694	1212.88	0.7178787	0.3158864	1.0439
2400	127.6915	0.02732	4.3711	468.2281040	745.7712061	1214.00	0.7195618	0.3107380	1.0438
2420	135.5916	0.02745	4.1304	472.2926950	742.8222806	1215.11	0.7212317	0.3049314	1.0432
2440	143.8336	0.02759	3.9219	476.3573482	739.8671288	1216.22	0.7228872	0.2995344	1.0431
2460	152.4249	0.02773	3.7301	480.4191200	736.938162	1217.32	0.7245272	0.2935398	1.0421
2480	161.3726	0.02787	3.5518	484.4745713	733.9385922	1218.41	0.7261505	0.2873783	1.0421
2500	170.6839	0.02801	3.3959	488.5205804	730.9456995	1219.47	0.7277561	0.2808679	1.0422
2520	186.3656	0.02815	3.1916	492.553748	727.9469962	1220.50	0.7293437	0.2739976	1.0425
2540	190.4247	0.02829	3.0377	496.5774525	724.9324320	1221.51	0.7309127	0.2661921	1.0425
2560	200.8677	0.02844	2.8936	500.5869706	721.8996771	1222.49	0.7324637	0.2584865	1.0426
2580	211.7013	0.02858	2.7584	504.5859614	718.8437797	1223.43	0.7339976	0.2508224	1.0426
2600	222.9319	0.02873	2.6316	508.5780473	715.7675923	1224.35	0.7355160	0.2432952	1.0428
2620	234.5657	0.02888	2.5124	512.5702139	712.6688465	1225.23	0.7370219	0.2358080	1.0433
2640	246.6389	0.02904	2.4003	516.5717472	709.5209182	1226.09	0.7385339	0.2287579	1.0433
2660	259.0674	0.02919	2.2947	520.5932891	706.3317263	1226.94	0.7400125	0.2215420	1.0436
2680	271.9470	0.02935	2.1952	524.6633317	703.1357392	1227.78	0.7414590	0.2143386	1.0439
2700	285.2535	0.02950	2.1013	528.7893946	699.8341487	1228.62	0.7428716	0.2071978	1.0439
2720	298.9922	0.02966	2.0126	533.0080987	696.4800997	1229.49	0.7442558	0.2001611	1.0438
2740	313.1685	0.02982	1.9287	537.3521166	693.032572	1230.41	0.7456106	0.1932940	0.9999
2760	327.7876	0.02999	1.8492	541.8616302	689.5352492	1231.40	0.7477191	0.1867316	0.9976
2780	342.8545	0.03015	1.7739	546.5862396	685.878366	1232.48	0.7493925	0.1804259	0.9941
2800	358.3739	0.03032	1.7023	551.5826223	682.1239792	1233.71	0.7515544	0.1736157	0.9940

PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB R)	S (BTU/LB R)	CP (BTU/LB R)
1200	0.0758	4304.0755	1514.96532	1146.20	1.3449	0.1667
1210	0.0700	4664.5403	1519.49847	1146.60	1.3492	0.1655
1220	0.0641	5024.1051	1523.71207	1147.00	1.3535	0.1643
1230	0.0582	5383.6699	1527.92567	1147.40	1.3578	0.1631
1240	0.0523	5743.2347	1532.13927	1147.80	1.3621	0.1619
1250	0.0464	6102.8095	1536.35287	1148.20	1.3664	0.1607
1260	0.0405	6462.3843	1540.56647	1148.60	1.3707	0.1595
1270	0.0346	6821.9591	1544.77907	1149.00	1.3750	0.1583
1280	0.0287	7181.5339	1548.99267	1149.40	1.3793	0.1571
1290	0.0228	7541.1087	1553.20627	1149.80	1.3836	0.1559
1300	0.0169	7900.6835	1557.41987	1150.20	1.3879	0.1547
1310	0.0110	8260.2583	1561.63347	1150.60	1.3922	0.1535
1320	0.0051	8619.8331	1565.84707	1151.00	1.3965	0.1523
1330	0.0000	8979.4079	1570.06067	1151.40	1.4008	0.1511
1340	0.0000	9338.9827	1574.27427	1151.80	1.4051	0.1499
1350	0.0000	9698.5575	1578.48787	1152.20	1.4094	0.1487
1360	0.0000	10058.1323	1582.70147	1152.60	1.4137	0.1475
1370	0.0000	10417.7071	1586.91507	1153.00	1.4180	0.1463
1380	0.0000	10777.2819	1591.12867	1153.40	1.4223	0.1451
1390	0.0000	11136.8567	1595.34227	1153.80	1.4266	0.1439
1400	0.0000	11496.4315	1599.55587	1154.20	1.4309	0.1427
1410	0.0000	11856.0063	1603.76947	1154.60	1.4352	0.1415
1420	0.0000	12215.5811	1607.98307	1155.00	1.4395	0.1403
1430	0.0000	12575.1559	1612.19667	1155.40	1.4438	0.1391
1440	0.0000	12934.7307	1616.41027	1155.80	1.4481	0.1379
1450	0.0000	13294.3055	1620.62387	1156.20	1.4524	0.1367
1460	0.0000	13653.8803	1624.83747	1156.60	1.4567	0.1355
1470	0.0000	14013.4551	1629.05107	1157.00	1.4610	0.1343
1480	0.0000	14373.0299	1633.26467	1157.40	1.4653	0.1331
1490	0.0000	14732.6047	1637.47827	1157.80	1.4696	0.1319
1500	0.0000	15092.1795	1641.69187	1158.20	1.4739	0.1307
1510	0.0000	15451.7543	1645.90547	1158.60	1.4782	0.1295
1520	0.0000	15811.3291	1650.11907	1159.00	1.4825	0.1283
1530	0.0000	16170.9039	1654.33267	1159.40	1.4868	0.1271
1540	0.0000	16530.4787	1658.54627	1159.80	1.4911	0.1259
1550	0.0000	16890.0535	1662.75987	1160.20	1.4954	0.1247
1560	0.0000	17249.6283	1666.97347	1160.60	1.4997	0.1235
1570	0.0000	17609.2031	1671.18707	1161.00	1.5040	0.1223
1580	0.0000	17968.7779	1675.40067	1161.40	1.5083	0.1211
1590	0.0000	18328.3527	1679.61427	1161.80	1.5126	0.1199
1600	0.0000	18687.9275	1683.82787	1162.20	1.5169	0.1187
1610	0.0000	19047.5023	1688.04147	1162.60	1.5212	0.1175
1620	0.0000	19407.0771	1692.25507	1163.00	1.5255	0.1163
1630	0.0000	19766.6519	1696.46867	1163.40	1.5298	0.1151
1640	0.0000	20126.2267	1700.68227	1163.80	1.5341	0.1139
1650	0.0000	20485.8015	1704.89587	1164.20	1.5384	0.1127
1660	0.0000	20845.3763	1709.10947	1164.60	1.5427	0.1115
1670	0.0000	21204.9511	1713.32307	1165.00	1.5470	0.1103
1680	0.0000	21564.5259	1717.53667	1165.40	1.5513	0.1091
1690	0.0000	21924.1007	1721.75027	1165.80	1.5556	0.1079
1700	0.0000	22283.6755	1725.96387	1166.20	1.5599	0.1067
1710	0.0000	22643.2503	1730.17747	1166.60	1.5642	0.1055
1720	0.0000	23002.8251	1734.39107	1167.00	1.5685	0.1043
1730	0.0000	23362.4000	1738.60467	1167.40	1.5728	0.1031
1740	0.0000	23721.9748	1742.81827	1167.80	1.5771	0.1019
1750	0.0000	24081.5496	1747.03187	1168.20	1.5814	0.1007
1760	0.0000	24441.1244	1751.24547	1168.60	1.5857	0.0995
1770	0.0000	24800.6992	1755.45907	1169.00	1.5900	0.0983
1780	0.0000	25160.2740	1759.67267	1169.40	1.5943	0.0971
1790	0.0000	25519.8488	1763.88627	1169.80	1.5986	0.0959
1800	0.0000	25879.4236	1768.10000	1170.20	1.6029	0.0947
1810	0.0000	26238.9984	1772.31360	1170.60	1.6072	0.0935
1820	0.0000	26598.5732	1776.52720	1171.00	1.6115	0.0923
1830	0.0000	26958.1480	1780.74080	1171.40	1.6158	0.0911
1840	0.0000	27317.7228	1784.95440	1171.80	1.6201	0.0899
1850	0.0000	27677.2976	1789.16800	1172.20	1.6244	0.0887
1860	0.0000	28036.8724	1793.38160	1172.60	1.6287	0.0875
1870	0.0000	28396.4472	1797.59520	1173.00	1.6330	0.0863
1880	0.0000	28756.0220	1801.80880	1173.40	1.6373	0.0851
1890	0.0000	29115.5968	1806.02240	1173.80	1.6416	0.0839
1900	0.0000	29475.1716	1810.23600	1174.20	1.6459	0.0827
1910	0.0000	29834.7464	1814.44960	1174.60	1.6502	0.0815
1920	0.0000	30194.3212	1818.66320	1175.00	1.6545	0.0803
1930	0.0000	30553.8960	1822.87680	1175.40	1.6588	0.0791
1940	0.0000	30913.4708	1827.09040	1175.80	1.6631	0.0779
1950	0.0000	31273.0456	1831.30400	1176.20	1.6674	0.0767
1960	0.0000	31632.6204	1835.51760	1176.60	1.6717	0.0755
1970	0.0000	31992.1952	1839.73120	1177.00	1.6760	0.0743
1980	0.0000	32351.7700	1843.94480	1177.40	1.6803	0.0731
1990	0.0000	32711.3448	1848.15840	1177.80	1.6846	0.0719
2000	0.0000	33070.9196	1852.37200	1178.20	1.6889	0.0707

NOTE: See page 16 for definition of symbols.

PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
1900	1.2000	2694.9589	2001.96026	1239.72	1.3576	0.1267
1900	1.1000	5212.3287	2004.16332	1239.99	1.3929	0.1278
2000	25.5776	16.7117	1817.74476	1195.00	1.0867	0.2016
2000	21.9000	25.5815	1872.34425	1213.67	1.1143	0.2394
2000	15.0000	28.6281	1885.37441	1217.60	1.1212	0.2281
2000	14.0000	32.4373	1899.13018	1221.53	1.1280	0.2168
2000	14.0000	37.3357	1913.72173	1225.46	1.1372	0.2054
2000	12.0000	43.8679	1929.28918	1229.39	1.1467	0.1941
2000	10.0000	53.0142	1946.01240	1233.33	1.1576	0.1828
2000	8.0000	66.7348	1964.12498	1237.26	1.1705	0.1715
2000	6.0000	89.6040	1983.93473	1241.18	1.1867	0.1603
2000	5.0000	135.3450	2005.85447	1245.11	1.2089	0.1491
2000	4.0000	222.5727	2030.44246	1249.03	1.2458	0.1380
2000	3.0000	384.2613	2046.80796	1251.58	1.2933	0.1314
2000	2.5000	912.9777	2049.67038	1251.77	1.3080	0.1303
2000	2.0000	1370.4108	2052.57446	1252.17	1.3288	0.1292
2000	1.5000	2742.7104	2055.52173	1252.56	1.3642	0.1281
2000	1.0000	5487.3105	2057.01192	1252.75	1.3994	0.1276
2000	0.8000	11.3538	1846.74410	1199.05	1.0696	0.2079
2000	0.6000	12.9453	1866.02391	1206.24	1.0784	0.2608
2000	0.4000	13.7801	1874.13914	1209.15	1.0821	0.2736
2000	0.3000	14.5394	1882.49211	1212.07	1.0860	0.2663
2000	0.2000	15.4779	1891.09700	1215.00	1.0900	0.2508
2000	0.1500	16.5342	1899.96742	1217.94	1.0943	0.2512
2000	0.1000	17.7320	1909.11971	1220.89	1.0987	0.2435
2000	0.0800	19.1013	1918.57334	1223.85	1.1033	0.2358
2000	0.0600	20.6419	1928.35142	1226.81	1.1082	0.2280
2000	0.0500	22.5265	1938.48132	1229.76	1.1135	0.2202
2000	0.0400	24.7069	1948.99548	1232.76	1.1190	0.2124
2000	0.0300	27.3241	1959.93233	1235.74	1.1250	0.2045
2000	0.0200	30.5235	1971.33759	1238.72	1.1319	0.1967
2000	0.0100	34.5235	1983.26581	1241.70	1.1387	0.1889
2000	0.0000	39.6670	1995.78240	1244.69	1.1466	0.1810
2000	0.0000	46.5260	2008.96619	1247.68	1.1556	0.1732
2000	0.0000	56.1296	2022.91287	1250.67	1.1660	0.1655
2000	0.0000	70.5362	2037.73944	1253.66	1.1785	0.1577
2000	0.0000	94.5489	2053.59023	1256.66	1.1943	0.1500
2000	0.0000	142.5769	2070.64509	1259.65	1.2160	0.1423
2000	0.0000	255.6654	2089.13066	1262.65	1.2524	0.1346
2000	0.0000	715.9387	2101.02589	1264.45	1.2996	0.1301
2000	0.0000	959.0212	2103.07365	1264.75	1.3144	0.1293
2000	0.0000	1439.3054	2105.14105	1265.05	1.3351	0.1285
2000	0.0000	2080.3107	2107.22847	1265.35	1.3704	0.1278
2000	0.0000	5762.1405	2108.27981	1265.50	1.4057	0.1274
2000	0.0000	8.0076	1871.50298	1203.48	1.0547	0.3012
2000	0.0000	8.8889	1888.32614	1209.75	1.0617	0.2885
2000	0.0000	9.2329	1894.34403	1211.93	1.0642	0.2839
2000	0.0000	9.6017	1900.48796	1214.12	1.0684	0.2791
2000	0.0000	9.9982	1906.76000	1216.33	1.0694	0.2742
2000	0.0000	10.4254	1913.16274	1218.54	1.0721	0.2691
2000	0.0000	11.8871	1919.69932	1220.77	1.0749	0.2640
2000	0.0000	11.3876	1926.37344	1223.00	1.0776	0.2588
2000	0.0000	11.9318	1933.16947	1225.25	1.0808	0.2536
2000	0.0000	12.5259	1940.15242	1227.50	1.0839	0.2403

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2200	42.0000	13.1768	1947.26807	1239.76	1.0871	0.2429
2200	40.0000	13.8930	1954.54305	1232.03	1.0904	0.2375
2200	38.0000	14.6850	1961.98487	1234.30	1.0938	0.2320
2200	36.0000	15.5653	1969.60212	1236.58	1.0974	0.2265
2200	34.0000	16.5495	1977.40451	1238.86	1.1011	0.2210
2200	32.0000	17.6570	1985.40308	1241.15	1.1051	0.2155
2200	30.0000	18.9126	1993.61036	1243.45	1.1092	0.2100
2200	28.0000	20.3478	2002.04056	1245.75	1.1135	0.2044
2200	26.0000	22.0043	2010.70995	1248.05	1.1181	0.1989
2200	24.0000	23.9372	2019.63663	1250.35	1.1238	0.1933
2200	22.0000	26.2221	2028.84191	1252.67	1.1283	0.1877
2200	20.0000	28.9643	2038.34967	1254.99	1.1340	0.1822
2200	18.0000	32.3165	2048.18744	1257.31	1.1402	0.1766
2200	16.0000	36.5074	2058.38686	1259.64	1.1470	0.1711
2200	14.0000	41.8962	2068.98445	1261.96	1.1547	0.1655
2200	12.0000	49.0822	2080.02251	1264.29	1.1633	0.1600
2200	10.0000	59.1434	2091.55027	1266.63	1.1734	0.1545
2200	8.0000	74.2364	2103.62326	1268.97	1.1856	0.1490
2200	6.0000	99.3930	2116.31513	1271.31	1.2011	0.1435
2200	4.0000	149.7083	2129.69983	1273.65	1.2266	0.1380
2200	2.0000	300.6591	2143.87449	1276.00	1.2586	0.1325
2200	1.0000	753.5167	2152.80498	1277.41	1.3057	0.1292
2200	0.6000	1035.1448	2154.32695	1277.64	1.3204	0.1286
2200	0.4000	1509.2812	2155.85866	1277.98	1.3410	0.1281
2200	0.2000	3017.8110	2157.40088	1278.12	1.3763	0.1276
2200	0.1000	6035.8709	2158.17572	1278.23	1.4116	0.1273
2200	0.0500	9.8337	1894.96278	1206.50	1.0417	0.3002
2200	0.0200	5.0804	1801.66484	1210.97	1.0442	0.2982
2200	0.0100	5.2173	1906.13878	1212.63	1.0459	0.2935
2200	0.0050	5.3617	1910.68407	1214.24	1.0476	0.2906
2200	0.0020	5.5541	1915.30073	1215.90	1.0494	0.2876
2200	0.0010	5.7551	1919.98892	1217.54	1.0512	0.2845
2200	0.0005	5.9252	1924.74894	1219.23	1.0530	0.2814
2200	0.0002	7.1252	1929.58121	1220.91	1.0549	0.2781
2200	0.0001	7.3359	1934.48631	1222.60	1.0568	0.2746
2200	0.0000	7.5582	1939.46495	1224.29	1.0587	0.2714
2200	0.0000	7.7929	1944.51799	1226.00	1.0607	0.2679
2200	0.0000	8.0412	1949.64641	1227.71	1.0627	0.2644
2200	0.0000	8.3042	1954.85141	1229.43	1.0648	0.2619
2200	0.0000	8.5834	1960.13430	1231.16	1.0669	0.2592
2200	0.0000	8.8601	1965.49659	1232.99	1.0690	0.2566
2200	0.0000	9.1462	1970.93998	1234.84	1.0712	0.2499
2200	0.0000	9.4335	1976.46634	1236.69	1.0735	0.2461
2200	0.0000	9.8942	1982.07780	1238.54	1.0758	0.2423
2200	0.0000	10.2806	1987.77668	1239.90	1.0782	0.2385
2200	0.0000	10.6962	1993.56558	1241.67	1.0807	0.2347
2200	0.0000	11.1438	1999.44734	1243.44	1.0832	0.2308
2200	0.0000	11.5273	2005.42512	1245.21	1.0858	0.2269
2200	0.0000	12.1514	2011.50238	1247.00	1.0885	0.2230
2200	0.0000	12.7211	2017.68297	1248.78	1.0913	0.2191
2200	0.0000	13.3429	2023.97108	1250.57	1.0942	0.2151
2200	0.0000	14.0241	2030.37136	1252.37	1.0971	0.2112
2200	0.0000	14.7736	2036.88891	1254.17	1.1002	0.2072
2200	0.0000	15.6022	2043.52935	1255.98	1.1035	0.2032

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB R)	S (BTU/LB R)	CP (BTU/LB R)
2300	30.0000	16.5231	2050.20800	1257.79	1.1069	0.1993
2300	34.0000	17.5826	2057.20437	1259.60	1.1104	0.1953
2300	38.0000	18.7110	2064.23333	1261.42	1.1141	0.1913
2300	42.0000	20.0242	2071.45412	1263.24	1.1180	0.1873
2300	46.0000	21.5252	2078.81597	1265.07	1.1221	0.1833
2300	50.0000	23.2575	2086.34911	1266.93	1.1265	0.1793
2300	54.0000	25.2788	2094.06489	1268.73	1.1312	0.1753
2300	58.0000	27.6680	2101.97591	1270.57	1.1363	0.1713
2300	62.0000	30.5354	2110.05624	1272.41	1.1417	0.1672
2300	66.0000	34.0404	2118.44153	1274.26	1.1477	0.1632
2300	70.0000	38.4222	2127.02932	1276.11	1.1543	0.1592
2300	74.0000	44.0565	2135.87925	1277.96	1.1618	0.1551
2300	78.0000	51.5695	2145.81539	1279.82	1.1702	0.1511
2300	82.0000	62.0985	2154.45663	1281.68	1.1801	0.1471
2300	86.0000	77.8481	2164.23707	1283.55	1.1921	0.1431
2300	90.0000	104.1485	2174.38660	1285.42	1.2074	0.1391
2300	94.0000	150.7714	2184.94151	1287.29	1.2286	0.1351
2300	98.0000	214.5340	2195.94324	1289.17	1.2645	0.1310
2300	102.0000	289.0263	2202.77824	1290.30	1.3194	0.1266
2300	106.0000	395.10503	2203.93549	1290.49	1.3261	0.1222
2300	110.0000	537.7084	2205.09805	1290.67	1.3467	0.1270
2300	114.0000	715.2432	2206.26598	1290.86	1.3820	0.1274
2300	118.0000	931.15331	2206.85197	1290.96	1.4372	0.1272
2300	122.0000	1204.3711	2222.71356	1294.00	1.5035	0.2339
2300	126.0000	1564.848	2236.82548	1298.79	1.5850	0.2375
2300	130.0000	2047.61	2249.58966	1304.06	1.6862	0.2406
2300	134.0000	2694.806	2260.19509	1310.33	1.8175	0.2437
2300	138.0000	3587.85	2268.84441	1317.61	1.9880	0.2468
2300	142.0000	4819.799	2275.53493	1323.90	2.2015	0.2498
2300	146.0000	6464.3	2280.26757	1325.19	2.4615	0.2527
2300	150.0000	8543.3	2284.24242	1326.49	2.7777	0.2556
2300	154.0000	11176.6	2287.85959	1327.80	3.1542	0.2584
2300	158.0000	14481.1	2291.71924	1329.11	3.6070	0.2612
2300	162.0000	18525.4	2295.82157	1330.43	4.1470	0.2640
2300	166.0000	24375.4	2299.56483	1331.75	4.7884	0.2668
2300	170.0000	32181.2	2302.95530	1333.08	5.5413	0.2696
2300	174.0000	42464.4	2306.07736	1334.42	6.4153	0.2724
2300	178.0000	55707.1	2308.86321	1335.76	7.4228	0.2752
2300	182.0000	72414.3	2311.34497	1337.11	8.6755	0.2780
2300	186.0000	93155.9	2313.67455	1338.46	10.1859	0.2808
2300	190.0000	118435.3	2315.86779	1339.82	11.9675	0.2836
2300	194.0000	150000.0	2317.93153	1341.18	14.0324	0.2864
2300	198.0000	188484.7	2319.87445	1342.55	16.4041	0.2892
2300	202.0000	24481.4	2321.60745	1343.92	19.1076	0.2920
2300	206.0000	32181.2	2323.15515	1345.30	22.1859	0.2948
2300	210.0000	42464.4	2324.53153	1346.68	25.6755	0.2976
2300	214.0000	55707.1	2325.86779	1348.07	29.6076	0.3004
2300	218.0000	72414.3	2327.15515	1349.46	34.0159	0.3032
2300	222.0000	93155.9	2328.40745	1350.86	39.0324	0.3060
2300	226.0000	118435.3	2329.62157	1352.26	44.6851	0.3088
2300	230.0000	150000.0	2330.79530	1353.66	51.0324	0.3116
2300	234.0000	188484.7	2331.93153	1355.07	58.1076	0.3144
2300	238.0000	24481.4	2333.07445	1356.49	66.0324	0.3172
2300	242.0000	32181.2	2334.22153	1357.91		

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (°F)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2400	65.0000	17.1336	2062.28807	1259.33	1.0453	0.2144
2400	55.0000	10.5107	2067.28229	1260.75	1.0855	0.2116
2400	50.0000	16.9147	2072.33954	1262.18	1.0877	0.2087
2400	45.0000	11.3488	2077.40182	1263.62	1.0900	0.2059
2400	40.0000	11.8163	2082.46127	1265.06	1.0924	0.2031
2400	35.0000	12.3214	2087.51020	1266.50	1.0949	0.2002
2400	30.0000	12.8686	2093.24112	1267.94	1.0974	0.1974
2400	25.0000	13.4634	2098.54571	1269.39	1.1001	0.1945
2400	20.0000	14.1151	2104.12987	1270.85	1.1028	0.1916
2400	15.0000	14.8264	2109.89375	1272.30	1.1056	0.1887
2400	10.0000	15.6070	2115.34173	1273.76	1.1084	0.1858
2400	5.0000	16.4721	2121.07747	1275.23	1.1111	0.1830
2400	3.0000	17.4335	2126.90495	1276.70	1.1149	0.1801
2400	2.0000	18.5482	2132.82844	1278.17	1.1183	0.1771
2400	1.5000	19.7175	2139.65260	1279.65	1.1218	0.1742
2400	1.0000	21.0882	2146.98246	1281.12	1.1256	0.1713
2400	0.8000	22.6556	2151.22351	1282.61	1.1296	0.1684
2400	0.6000	24.4630	2157.58168	1284.09	1.1338	0.1655
2400	0.4000	26.5724	2164.04345	1285.58	1.1384	0.1625
2400	0.3000	29.0661	2171.67585	1287.18	1.1433	0.1596
2400	0.2000	32.1527	2177.42657	1288.58	1.1486	0.1567
2400	0.1500	35.7165	2184.32400	1290.00	1.1545	0.1537
2400	0.1000	40.2093	2191.37332	1291.58	1.1609	0.1508
2400	0.0800	46.1159	2198.59278	1293.09	1.1682	0.1478
2400	0.0600	54.0071	2205.99278	1294.60	1.1765	0.1449
2400	0.0400	64.9450	2213.57806	1296.12	1.1863	0.1419
2400	0.0300	81.4510	2221.36577	1297.64	1.1981	0.1389
2400	0.0200	109.6964	2229.37062	1299.16	1.2132	0.1360
2400	0.0150	161.7846	2237.60880	1300.69	1.2343	0.1330
2400	0.0100	326.4612	2245.09863	1302.22	1.2700	0.1308
2400	0.0080	622.4482	2251.32142	1303.14	1.3169	0.1282
2400	0.0060	1096.3421	2252.20171	1303.29	1.3315	0.1270
2400	0.0040	1645.6679	2253.08487	1303.44	1.3522	0.1276
2400	0.0030	3292.6277	2253.97092	1303.63	1.3874	0.1273
2400	0.0020	6586.1477	2254.41503	1303.68	1.4227	0.1272
2400	0.0010	33350	2254.67193	1219.47	1.0201	0.2833
2400	0.0008	33717	1843.56911	1219.80	1.0204	0.2830
2400	0.0006	34185	1863.21003	1220.78	1.0213	0.2820
2400	0.0004	34655	1863.07647	1221.76	1.0222	0.2810
2400	0.0003	35157	1864.56826	1222.74	1.0231	0.2800
2400	0.0002	35661	1971.28527	1223.73	1.0241	0.2789
2400	0.0001	36178	1974.02738	1224.73	1.0250	0.2778
2400	0.0000	36709	1976.39451	1225.73	1.0259	0.2766
2400	0.0000	37253	1978.58657	1226.74	1.0269	0.2754
2400	0.0000	37817	1982.43352	1227.75	1.0278	0.2742
2400	0.0000	38384	1985.24332	1228.76	1.0288	0.2730
2400	0.0000	38975	1988.11195	1229.78	1.0298	0.2716
2400	0.0000	39581	1991.00339	1230.80	1.0308	0.2702
2400	0.0000	40204	1993.91967	1231.83	1.0318	0.2689
2400	0.0000	40844	1996.86081	1232.86	1.0328	0.2675
2400	0.0000	41503	1999.82683	1233.89	1.0338	0.2660
2400	0.0000	42186	2002.81781	1234.93	1.0349	0.2646
2400	0.0000	42878	2005.83379	1235.98	1.0359	0.2631
2400	0.0000	43597	2008.87486	1237.03	1.0370	0.2616

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (R)	PIPSIA)	V (CJ FT/LB)	A (F"/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2500	134.0000	4.4337	2011.04110	1248.08	1.0380	0.2801
2500	132.0000	4.5131	2019.03263	1255.13	1.0391	0.2805
2500	130.0000	4.5988	2018.14995	1240.19	1.0402	0.2810
2500	128.0000	4.6700	2021.29199	1241.26	1.0413	0.2813
2500	126.0000	4.7538	2024.46010	1242.52	1.0425	0.2817
2500	124.0000	4.8404	2027.65403	1243.10	1.0436	0.2820
2500	122.0000	4.9299	2030.87304	1244.47	1.0447	0.2824
2500	120.0000	5.0224	2034.12001	1245.55	1.0459	0.2828
2500	118.0000	5.1180	2037.39744	1246.63	1.0471	0.2830
2500	116.0000	5.2170	2040.69143	1247.72	1.0483	0.2832
2500	114.0000	5.3195	2044.01721	1248.81	1.0495	0.2835
2500	112.0000	5.4257	2047.37002	1249.90	1.0507	0.2837
2500	110.0000	5.5359	2050.75011	1251.00	1.0520	0.2840
2500	108.0000	5.6501	2054.15774	1252.10	1.0533	0.2842
2500	106.0000	5.7687	2057.59321	1253.21	1.0546	0.2844
2500	104.0000	5.8919	2061.05682	1254.32	1.0559	0.2845
2500	102.0000	6.0200	2064.54890	1255.43	1.0572	0.2847
2500	100.0000	6.1533	2068.06979	1256.54	1.0585	0.2848
2500	98.0000	6.2921	2071.61985	1257.66	1.0599	0.2850
2500	96.0000	6.4367	2075.19948	1258.78	1.0613	0.2852
2500	94.0000	6.5875	2078.80908	1259.91	1.0627	0.2853
2500	92.0000	6.7449	2082.44909	1261.04	1.0641	0.2855
2500	90.0000	6.9194	2086.11998	1262.17	1.0656	0.2857
2500	88.0000	7.0814	2089.82222	1263.31	1.0671	0.2859
2500	86.0000	7.2614	2093.55634	1264.4	1.0684	0.2861
2500	84.0000	7.4501	2097.32290	1265.54	1.07	0.2863
2500	82.0000	7.6481	2101.12246	1266.71	1.071	0.2865
2500	80.0000	7.8560	2104.95505	1267.84	1.0720	0.2867
2500	78.0000	8.0747	2108.82312	1269.04	1.0730	0.2869
2500	76.0000	8.3049	2112.72556	1270.19	1.074	0.2871
2500	74.0000	8.5476	2116.66371	1271.35	1.0750	0.2873
2500	72.0000	8.8030	2120.63835	1272.51	1.0760	0.2875
2500	70.0000	9.0749	2124.65030	1273.68	1.077	0.2877
2500	68.0000	9.3620	2128.70045	1274.85	1.0784	0.2879
2500	66.0000	9.6665	2132.78967	1276.02	1.0795	0.2881
2500	64.0000	9.9901	2136.91900	1277.19	1.0805	0.2883
2500	62.0000	10.3344	2141.08948	1278.37	1.0815	0.2885
2500	60.0000	10.7021	2145.30219	1279.55	1.0825	0.2887
2500	58.0000	11.0953	2149.55833	1280.74	1.0836	0.2889
2500	56.0000	11.5166	2153.85913	1281.93	1.0847	0.2891
2500	54.0000	11.9491	2158.20593	1283.12	1.0858	0.2893
2500	52.0000	12.4065	2162.60012	1284.31	1.0869	0.2895
2500	50.0000	12.8931	2167.04320	1285.51	1.0881	0.2897
2500	48.0000	13.4036	2171.53677	1286.71	1.0891	0.2899
2500	46.0000	13.9388	2176.08251	1287.91	1.0902	0.2901
2500	44.0000	14.5006	2180.68222	1289.12	1.0913	0.2903
2500	42.0000	15.0919	2185.33781	1290.33	1.0925	0.2905
2500	40.0000	15.7074	2190.05133	1291.54	1.0936	0.2907
2500	38.0000	16.3500	2194.82495	1292.76	1.0948	0.2909
2500	36.0000	17.0249	2199.66098	1293.98	1.0960	0.2911
2500	34.0000	17.7309	2204.56189	1295.20	1.0972	0.2913
2500	32.0000	18.4708	2209.53032	1296.42	1.0984	0.2915
2500	30.0000	19.2408	2214.56909	1297.65	1.0996	0.2917
2500	28.0000	20.0451	2219.68121	1298.88	1.1008	0.2919

FORTAN PROGRAM 657-1

PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

PAGE 1

T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	M (BTU/LB R)	S (BTU/LB R)	h _g (BTU/LB R)
2500	26.0000	27.6352	2224.86989	1300.12	1.1404	0.12006
2500	26.0000	27.9331	2230.13659	1301.26	1.1446	0.1534
2500	26.0000	30.4339	2235.49099	1302.80	1.1496	0.1513
2500	26.0000	33.5484	2240.93106	1303.84	1.1548	0.1491
2500	26.0000	37.3591	2246.46304	1305.09	1.1606	0.1469
2500	26.0000	42.1228	2252.09150	1306.34	1.1670	0.1447
2500	26.0000	46.8476	2257.82135	1307.59	1.1741	0.1425
2500	26.0000	51.5250	2263.65788	1308.85	1.1823	0.1403
2500	26.0000	56.1550	2269.50677	1310.11	1.1920	0.1381
2500	26.0000	60.7366	2275.37417	1311.37	1.2037	0.1359
2500	26.0000	65.2690	2281.26673	1312.64	1.2187	0.1337
2500	26.0000	69.7525	2287.19161	1313.91	1.2367	0.1315
2500	26.0000	74.1870	2293.15331	1315.18	1.2573	0.1293
2500	26.0000	78.5715	2299.16633	1316.45	1.2821	0.1279
2500	26.0000	82.9060	2305.23112	1317.72	1.3127	0.1277
2500	26.0000	87.1905	2311.34764	1319.00	1.3484	0.1275
2500	26.0000	91.4250	2317.51515	1320.28	1.3896	0.1273
2500	26.0000	95.6095	2323.73366	1321.56	1.4368	0.1272
2500	26.0000	99.7440	2330.00317	1322.84	1.4900	0.1270
2500	26.0000	103.8285	2336.32368	1324.12	1.5488	0.1268
2500	26.0000	107.8630	2342.69519	1325.40	1.6136	0.1266
2500	26.0000	111.8475	2349.11770	1326.68	1.6848	0.1264
2500	26.0000	115.7820	2355.59121	1327.96	1.7620	0.1262
2500	26.0000	119.6665	2362.11572	1329.24	1.8456	0.1260
2500	26.0000	123.5010	2368.69123	1330.52	1.9360	0.1258
2500	26.0000	127.2855	2375.31774	1331.80	2.0336	0.1256
2500	26.0000	131.0200	2381.99525	1333.08	2.1384	0.1254
2500	26.0000	134.7045	2388.72376	1334.36	2.2508	0.1252
2500	26.0000	138.3390	2395.50327	1335.64	2.3712	0.1250
2500	26.0000	141.9235	2402.33378	1336.92	2.5000	0.1248
2500	26.0000	145.4580	2409.21529	1338.20	2.6376	0.1246
2500	26.0000	148.9425	2416.14780	1339.48	2.7844	0.1244
2500	26.0000	152.3770	2423.13131	1340.76	2.9408	0.1242
2500	26.0000	155.7615	2430.16582	1342.04	3.1072	0.1240
2500	26.0000	159.0960	2437.25133	1343.32	3.2840	0.1238
2500	26.0000	162.3805	2444.38784	1344.60	3.4712	0.1236
2500	26.0000	165.6150	2451.57535	1345.88	3.6696	0.1234
2500	26.0000	168.8000	2458.81386	1347.16	3.8792	0.1232
2500	26.0000	171.9345	2466.10337	1348.44	4.0996	0.1230
2500	26.0000	175.0190	2473.44388	1349.72	4.3312	0.1228
2500	26.0000	178.0535	2480.83539	1351.00	4.5744	0.1226
2500	26.0000	181.0380	2488.27790	1352.28	4.8296	0.1224
2500	26.0000	183.9725	2495.77141	1353.56	5.0968	0.1222
2500	26.0000	186.8570	2503.31592	1354.84	5.3760	0.1220
2500	26.0000	189.6915	2510.91143	1356.12	5.6672	0.1218
2500	26.0000	192.4760	2518.55794	1357.40	5.9704	0.1216
2500	26.0000	195.2105	2526.25545	1358.68	6.2864	0.1214
2500	26.0000	197.8950	2534.00396	1359.96	6.6144	0.1212
2500	26.0000	200.5295	2541.80347	1361.24	6.9552	0.1210
2500	26.0000	203.1140	2549.65398	1362.52	7.3088	0.1208
2500	26.0000	205.6485	2557.55549	1363.80	7.6752	0.1206
2500	26.0000	208.1330	2565.50800	1365.08	8.0544	0.1204
2500	26.0000	210.5675	2573.51151	1366.36	8.4464	0.1202
2500	26.0000	212.9520	2581.56602	1367.64	8.8512	0.1200
2500	26.0000	215.2865	2589.67153	1368.92	9.2688	0.1198
2500	26.0000	217.5710	2597.82804	1370.20	9.6992	0.1196
2500	26.0000	219.8055	2606.03555	1371.48	10.1424	0.1194
2500	26.0000	221.9900	2614.29406	1372.76	10.5984	0.1192
2500	26.0000	224.1245	2622.60357	1374.04	11.0672	0.1190
2500	26.0000	226.2090	2630.96408	1375.32	11.5488	0.1188
2500	26.0000	228.2435	2639.37559	1376.60	12.0432	0.1186
2500	26.0000	230.2280	2647.83810	1377.88	12.5504	0.1184
2500	26.0000	232.1625	2656.35161	1379.16	13.0704	0.1182
2500	26.0000	234.0470	2664.91612	1380.44	13.6032	0.1180
2500	26.0000	235.8815	2673.53163	1381.72	14.1488	0.1178
2500	26.0000	237.6660	2682.19814	1383.00	14.7072	0.1176
2500	26.0000	239.4005	2690.91565	1384.28	15.2784	0.1174
2500	26.0000	241.0850	2699.68416	1385.56	15.8624	0.1172
2500	26.0000	242.7195	2708.50367	1386.84	16.4592	0.1170
2500	26.0000	244.3040	2717.37418	1388.12	17.0688	0.1168
2500	26.0000	245.8385	2726.29569	1389.40	17.6912	0.1166
2500	26.0000	247.3230	2735.26820	1390.68	18.3264	0.1164
2500	26.0000	248.7575	2744.29171	1391.96	18.9744	0.1162
2500	26.0000	250.1420	2753.36622	1393.24	19.6352	0.1160
2500	26.0000	251.4765	2762.49173	1394.52	20.3088	0.1158
2500	26.0000	252.8110	2771.66824	1395.80	20.9952	0.1156
2500	26.0000	254.0455	2780.89575	1397.08	21.6944	0.1154
2500	26.0000	255.2800	2790.17426	1398.36	22.4064	0.1152
2500	26.0000	256.5145	2800.00377	1399.64	23.1312	0.1150
2500	26.0000	257.6490	2809.88428	1400.92	23.8688	0.1148
2500	26.0000	258.7835	2819.81579	1402.20	24.6192	0.1146
2500	26.0000	259.9180	2829.79830	1403.48	25.3824	0.1144
2500	26.0000	261.0025	2839.83181	1404.76	26.1584	0.1142
2500	26.0000	262.0370	2849.91632	1406.04	26.9472	0.1140
2500	26.0000	263.0715	2860.05183	1407.32	27.7488	0.1138
2500	26.0000	264.1060	2870.23834	1408.60	28.5624	0.1136
2500	26.0000	265.0905	2880.47585	1409.88	29.3888	0.1134
2500	26.0000	266.0250	2890.76436	1411.16	30.2272	0.1132
2500	26.0000	266.9095	2901.10387	1412.44	31.0784	0.1130
2500	26.0000	267.7440	2911.49438	1413.72	31.9424	0.1128
2500	26.0000	268.5285	2921.93589	1415.00	32.8192	0.1126
2500	26.0000	269.2630	2932.42840	1416.28	33.7088	0.1124
2500	26.0000	270.0475	2942.97191	1417.56	34.6112	0.1122
2500	26.0000	270.7820	2953.56642	1418.84	35.5264	0.1120
2500	26.0000	271.5165	2964.21193	1420.12	36.4544	0.1118
2500	26.0000	272.2010	2974.90844	1421.40	37.3952	0.1116
2500	26.0000	272.8355	2985.65595	1422.68	38.3488	0.1114
2500	26.0000	273.4700	2996.45446	1423.96	39.3152	0.1112
2500	26.0000	274.0545	3007.30397	1425.24	40.2944	0.1110
2500	26.0000	274.5890	3018.20448	1426.52	41.2864	0.1108
2500	26.0000	275.0735	3029.15599	1427.80	42.2912	0.1106
2500	26.0000	275.5080	3040.15850	1429.08	43.3088	0.1104
2500	26.0000	275.9425	3051.21201	1430.36	44.3392	0.1102
2500	26.0000	276.3270	3062.31652	1431.64	45.3824	0.1100
2500	26.0000	276.6615	3073.47203	1432.92	46.4384	0.1098
2500	26.0000	276.9460	3084.67854	1434.20	47.5072	0.1096
2500	26.0000	277.1805	3095.93505	1435.48	48.5888	0.1094
2500	26.0000	277.3650	3107.24156	1436.76	49.6832	0.1092
2500	26.0000	277.5000	3118.59807	1438.04	50.7904	0.1090
2500	26.0000	277.5845	3129.90458	1439.32	51.9104	0.1088
2500	26.0000	277.6190	3141.26109	1440.60	53.0432	0.1086
2500	26.0000	277.5935	3152.66760	1441.88	54.1888	0.1084
2500	26.0000	277.5080	3164.12411	1443.16	55.3472	0.1082
2500	26.0000	277.3625	3175.63062	1444.44	56.5184	0.1080
2500	26.0000	277.1670	3187.18713	1445.72	57.7024	0.1078
2500	26.0000	276.9115	3198.79364	1447.00	58.8992	0.1076
2500	26.0000	276.6060	3210.45015	1448.28	60.1088	0.1074
2500	26.0000	276.2505	3222.15666	1449.56	61.3312	0.1072
2500	26.0000	275.8450	3233.91317	1450.84	62.5664	0.1070
2500	26.0000	275.3895	3245.71968	1452.12	63.8144	0.1068
2500	26.0000	274.8840	3257.57619	1453.40	65.0752	0.1066
2500	26.0000	274.3285	3269.48270	1454.68	66.3488	0.1064
2500	26.0000	273.7230	3281.43921	1455.96	67.6352	0.1062
2500	26.0000	273.0675	3293.44572	1457.24	68.9344	0.1060
2500	26.0000	272.3620	3305.50223	1458.52	70.2464	0.1058
2500	26.0000	271.6065	3317.60874	1459.80	71.5712	0.1056
2500	26.0000	270.8010	3329.76525	1461.08	72.9088	0.1054
2500	26.0000	270.0455	3341.97176	1462.36	74.2592	0.1052
2500	26.0000	269.2400	3354.22827	1463.64	75.6224	0.1050
2500	26.0000	268.3845	3366.53478	1464.92	77.0088	0.1048
2500	26.0000	267.4790	3378.89129	1466.20	78.4184	0.1046
2500	26.0000	266.5235	3391.29780	1467.48	79.8412	0.1044
2500	26.0000	265.5180	3403.75431	1468.76	81.2772	0.1042
2500	26.0000	264.4625	3416.26082	1470.04	82.7368	0.1040
2500	26.0000	263.3570	3428.81733	1471.32	84.2104	0.1038
2500	26.0000	262.2015	3441.42384	1472.60	85.6976	0.1036
2500	26.0000	260.9960	3454.08035	1473.88	87.1984	0.1034
2500	2					

FORTRAN PROGRAM 657-1

PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (K)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	W (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2600	150.0000	4.1567	2085.72639	1255.22	1.0390	0.2388
2600	145.0000	4.2201	2088.35031	1256.12	1.0407	0.2376
2600	140.0000	4.2852	2090.89033	1257.00	1.0417	0.2363
2600	135.0000	4.3521	2093.49661	1257.90	1.0426	0.2351
2600	130.0000	4.4210	2096.11929	1258.80	1.0436	0.2339
2600	125.0000	4.4918	2098.75054	1259.72	1.0446	0.2326
2600	120.0000	4.5647	2101.41451	1260.60	1.0458	0.2313
2600	115.0000	4.6398	2104.08737	1261.54	1.0466	0.2301
2600	110.0000	4.7171	2106.77720	1262.51	1.0476	0.2288
2600	105.0000	4.7969	2109.48444	1263.51	1.0486	0.2275
2600	100.0000	4.8791	2112.20902	1264.52	1.0497	0.2262
2600	95.0000	4.9639	2114.95119	1265.54	1.0507	0.2249
2600	90.0000	5.0514	2117.71117	1266.59	1.0518	0.2236
2600	85.0000	5.1418	2120.48914	1267.61	1.0529	0.2222
2600	80.0000	5.2351	2123.28532	1268.66	1.0540	0.2209
2600	75.0000	5.3316	2126.09991	1269.79	1.0551	0.2195
2600	70.0000	5.4315	2128.93314	1270.92	1.0562	0.2182
2600	65.0000	5.5347	2131.78524	1272.06	1.0573	0.2168
2600	60.0000	5.6417	2134.65644	1273.22	1.0585	0.2155
2600	55.0000	5.7525	2137.54700	1274.39	1.0596	0.2141
2600	50.0000	5.8673	2140.45716	1275.54	1.0608	0.2129
2600	45.0000	5.9865	2143.38719	1276.71	1.0620	0.2113
2600	40.0000	6.1122	2146.33738	1277.93	1.0633	0.2099
2600	35.0000	6.2386	2149.30799	1279.17	1.0645	0.2085
2600	30.0000	6.3722	2152.29935	1280.42	1.0658	0.2071
2600	25.0000	6.5111	2155.31174	1281.69	1.0671	0.2057
2600	20.0000	6.6557	2158.34550	1282.98	1.0684	0.2043
2600	15.0000	6.8064	2161.40096	1284.28	1.0697	0.2030
2600	10.0000	6.9634	2164.47848	1285.59	1.0710	0.2016
2600	5.0000	7.1276	2167.57842	1286.91	1.0722	0.2000
2600	0.0000	7.2998	2170.71115	1288.25	1.0735	0.1989
2600	0.0000	7.4782	2173.84709	1289.60	1.0747	0.1971
2600	0.0000	7.6558	2177.01664	1290.96	1.0752	0.1956
2600	0.0000	7.8423	2180.21023	1292.32	1.0762	0.1941
2600	0.0000	8.0485	2183.42833	1293.69	1.0772	0.1927
2600	0.0000	8.2651	2186.67140	1295.07	1.0782	0.1913
2600	0.0000	8.4928	2189.93993	1296.46	1.0792	0.1899
2600	0.0000	8.7325	2193.21445	1297.86	1.0804	0.1884
2600	0.0000	8.9853	2196.55550	1299.27	1.0812	0.1869
2600	0.0000	9.2521	2199.86364	1300.69	1.0820	0.1856
2600	0.0000	9.5343	2203.29466	1302.12	1.0827	0.1841
2600	0.0000	9.8331	2206.85359	1303.56	1.0834	0.1827
2600	0.0000	10.1501	2210.41668	1305.01	1.0842	0.1813
2600	0.0000	10.4870	2213.97940	1306.46	1.0850	0.1799
2600	0.0000	10.8456	2217.52248	1307.92	1.0857	0.1785
2600	0.0000	11.2253	2221.09866	1309.39	1.0864	0.1770
2600	0.0000	11.6273	2224.69866	1310.87	1.0872	0.1754
2600	0.0000	12.0527	2227.74149	1312.36	1.0880	0.1729
2600	0.0000	12.5067	2231.36384	1313.85	1.0887	0.1713
2600	0.0000	13.0000	2235.02068	1315.34	1.0895	0.1699
2600	0.0000	13.5218	2238.73295	1316.84	1.0902	0.1682
2600	0.0000	14.0715	2242.44167	1318.34	1.0909	0.1666
2600	0.0000	14.6408	2246.20789	1319.84	1.0917	0.1650
2600	0.0000	15.2449	2250.01271	1321.34	1.0924	0.1634

FOXYRAI PROGRAM 65Y-1

PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2600	42.0000	16.3002	2253.85731	1307.01	1.1195	0.1618
2600	40.0000	17.1447	2257.74291	1308.04	1.1023	0.1602
2600	38.0000	18.1226	2261.61001	1309.07	1.1252	0.1586
2600	36.0000	19.1849	2265.44238	1310.11	1.1283	0.1570
2600	34.0000	20.3299	2269.25084	1311.15	1.1315	0.1554
2600	32.0000	21.6006	2273.02352	1312.19	1.1349	0.1538
2600	30.0000	23.0028	2276.76382	1313.23	1.1384	0.1522
2600	28.0000	24.5243	2280.47522	1314.27	1.1423	0.1506
2600	26.0000	26.1737	2284.15832	1315.32	1.1463	0.1490
2600	24.0000	27.9698	2287.81284	1316.37	1.1507	0.1472
2600	22.0000	29.9144	2291.43824	1317.42	1.1554	0.1456
2600	20.0000	32.0144	2295.03424	1318.47	1.1606	0.1439
2600	18.0000	34.2778	2298.60024	1319.53	1.1663	0.1423
2600	16.0000	36.7023	2302.13624	1320.59	1.1725	0.1406
2600	14.0000	39.2977	2305.64224	1321.65	1.1796	0.1389
2600	12.0000	42.0691	2309.11824	1322.72	1.1874	0.1372
2600	10.0000	44.9201	2312.56424	1323.78	1.1974	0.1356
2600	8.0000	47.8568	2316.08024	1324.85	1.2090	0.1339
2600	6.0000	50.8841	2319.56624	1325.92	1.2239	0.1322
2600	4.0000	53.9961	2323.02224	1327.00	1.2448	0.1305
2600	2.0000	57.1861	2326.44824	1328.08	1.2684	0.1288
2600	0.0000	60.4581	2329.83424	1329.15	1.2971	0.1277
2600	0.0000	63.8061	2333.18024	1330.23	1.3328	0.1276
2600	0.0000	67.2241	2336.48624	1331.31	1.3741	0.1274
2600	0.0000	70.7061	2339.75224	1332.39	1.4224	0.1272
2600	0.0000	74.2461	2342.97824	1333.47	1.4776	0.1270
2600	0.0000	77.8361	2346.16424	1334.55	1.5402	0.1270
2600	0.0000	81.4761	2349.31024	1335.63	1.6102	0.1270
2600	0.0000	85.1661	2352.41624	1336.71	1.6876	0.1270
2600	0.0000	88.9061	2355.48224	1337.79	1.7724	0.1270
2600	0.0000	92.6961	2358.50824	1338.87	1.8648	0.1270
2600	0.0000	96.5361	2361.49424	1339.95	1.9652	0.1270
2600	0.0000	100.4261	2364.44024	1341.03	2.0736	0.1270
2600	0.0000	104.3661	2367.34624	1342.11	2.1900	0.1270
2600	0.0000	108.3561	2370.21224	1343.19	2.3144	0.1270
2600	0.0000	112.3961	2373.03824	1344.27	2.4468	0.1270
2600	0.0000	116.4861	2375.82424	1345.35	2.5872	0.1270
2600	0.0000	120.6261	2378.57024	1346.43	2.7356	0.1270
2600	0.0000	124.8161	2381.27624	1347.51	2.8920	0.1270
2600	0.0000	129.0561	2383.94224	1348.59	3.0564	0.1270
2600	0.0000	133.3461	2386.56824	1349.67	3.2288	0.1270
2600	0.0000	137.6861	2389.15424	1350.75	3.4092	0.1270
2600	0.0000	142.0761	2391.70024	1351.83	3.5976	0.1270
2600	0.0000	146.5161	2394.20624	1352.91	3.7940	0.1270
2600	0.0000	151.0061	2396.67224	1353.99	4.0084	0.1270
2600	0.0000	155.5461	2399.09824	1355.07	4.2408	0.1270
2600	0.0000	160.1361	2401.48424	1356.15	4.4912	0.1270
2600	0.0000	164.7761	2403.83024	1357.23	4.7596	0.1270
2600	0.0000	169.4661	2406.13624	1358.31	5.0460	0.1270
2600	0.0000	174.2061	2408.40224	1359.39	5.3504	0.1270
2600	0.0000	178.9961	2410.62824	1360.47	5.6728	0.1270
2600	0.0000	183.8361	2412.81424	1361.55	6.0142	0.1270
2600	0.0000	188.7261	2414.96024	1362.63	6.3756	0.1270
2600	0.0000	193.6661	2417.06624	1363.71	6.7572	0.1270
2600	0.0000	198.6561	2419.13224	1364.79	7.1596	0.1270
2600	0.0000	203.6961	2421.15824	1365.87	7.5840	0.1270
2600	0.0000	208.7861	2423.14424	1366.95	8.0304	0.1270
2600	0.0000	213.9261	2425.09024	1368.03	8.4988	0.1270
2600	0.0000	219.1161	2426.99624	1369.11	8.9892	0.1270
2600	0.0000	224.3561	2428.86224	1370.19	9.5016	0.1270
2600	0.0000	229.6461	2430.68824	1371.27	10.0360	0.1270
2600	0.0000	234.9861	2432.47424	1372.35	10.5924	0.1270
2600	0.0000	240.3761	2434.22024	1373.43	11.1708	0.1270
2600	0.0000	245.8161	2435.92624	1374.51	11.7712	0.1270
2600	0.0000	251.3061	2437.59224	1375.59	12.3936	0.1270
2600	0.0000	256.8461	2439.21824	1376.67	13.0380	0.1270
2600	0.0000	262.4361	2440.80424	1377.75	13.7044	0.1270
2600	0.0000	268.0761	2442.35024	1378.83	14.3928	0.1270
2600	0.0000	273.7661	2443.85624	1379.91	15.1032	0.1270
2600	0.0000	279.5061	2445.32224	1380.99	15.8356	0.1270
2600	0.0000	285.2961	2446.74824	1382.07	16.5900	0.1270
2600	0.0000	291.1361	2448.13424	1383.15	17.3664	0.1270
2600	0.0000	297.0261	2449.48024	1384.23	18.1648	0.1270
2600	0.0000	302.9661	2450.78624	1385.31	18.9852	0.1270
2600	0.0000	308.9561	2452.05224	1386.39	19.8276	0.1270
2600	0.0000	314.9961	2453.27824	1387.47	20.6920	0.1270
2600	0.0000	321.0861	2454.46424	1388.55	21.5784	0.1270
2600	0.0000	327.2261	2455.61024	1389.63	22.4868	0.1270
2600	0.0000	333.4161	2456.71624	1390.71	23.4172	0.1270
2600	0.0000	339.6561	2457.78224	1391.79	24.3696	0.1270
2600	0.0000	345.9461	2458.80824	1392.87	25.3440	0.1270
2600	0.0000	352.2861	2459.79424	1393.95	26.3404	0.1270
2600	0.0000	358.6761	2460.74024	1395.03	27.3588	0.1270
2600	0.0000	365.1161	2461.64624	1396.11	28.3992	0.1270
2600	0.0000	371.6061	2462.51224	1397.19	29.4616	0.1270
2600	0.0000	378.1461	2463.33824	1398.27	30.5460	0.1270
2600	0.0000	384.7361	2464.12424	1399.35	31.6524	0.1270
2600	0.0000	391.3761	2464.87024	1400.43	32.7808	0.1270
2600	0.0000	398.0661	2465.57624	1401.51	33.9312	0.1270
2600	0.0000	404.8061	2466.24224	1402.59	35.1036	0.1270
2600	0.0000	411.5961	2466.86824	1403.67	36.2980	0.1270
2600	0.0000	418.4361	2467.45424	1404.75	37.5144	0.1270
2600	0.0000	425.3261	2468.00024	1405.83	38.7528	0.1270
2600	0.0000	432.2661	2468.50624	1406.91	40.0132	0.1270
2600	0.0000	439.2561	2468.97224	1407.99	41.2956	0.1270
2600	0.0000	446.2961	2469.39824	1409.07	42.6000	0.1270
2600	0.0000	453.3861	2469.78424	1410.15	43.9264	0.1270
2600	0.0000	460.5261	2470.13024	1411.23	45.2748	0.1270
2600	0.0000	467.7161	2470.43624	1412.31	46.6452	0.1270
2600	0.0000	474.9561	2470.70224	1413.39	48.0376	0.1270
2600	0.0000	482.2461	2470.92824	1414.47	49.4520	0.1270
2600	0.0000	489.5861	2471.11424	1415.55	50.8884	0.1270
2600	0.0000	496.9761	2471.26024	1416.63	52.3468	0.1270
2600	0.0000	504.4161	2471.36624	1417.71	53.8272	0.1270
2600	0.0000	511.9061	2471.43224	1418.79	55.3296	0.1270
2600	0.0000	519.4461	2471.45824	1419.87	56.8540	0.1270
2600	0.0000	527.0361	2471.44424	1420.95	58.3904	0.1270
2600	0.0000	534.6761	2471.39024	1422.03	60.9388	0.1270
2600	0.0000	542.3661	2471.29624	1423.11	63.5000	0.1270
2600	0.0000	550.1061	2471.16224	1424.19	66.0744	0.1270
2600	0.0000	557.8961	2470.98824	1425.27	68.6628	0.1270
2600	0.0000	565.7361	2470.77424	1426.35	71.2652	0.1270
2600	0.0000	573.6261	2470.52024	1427.43	73.8916	0.1270
2600	0.0000	581.5661	2470.22624	1428.51	76.5320	0.1270
2600	0.0000	589.5561	2469.89224	1429.59	79.1872	0.1270
2600	0.0000	597.5961	2469.51824	1430.67	81.8576	0.1270
2600	0.0000	605.6861	2469.10424	1431.75	84.5432	0.1270
2600	0.0000	613.8261	2468.65024	1432.83	87.2448	0.1270
2600	0.0000	622.0161	2468.15624	1433.91	90.9624	0.1270
2600	0.0000	630.2561	2467.62224	1434.99	94.6968	0.1270
2600	0.0000	638.5461	2467.04824	1436.07	98.4480	0.1270
2600	0.0000	646.8861	2466.43424	1437.15	102.2160	0.1270
2600	0.0000	655.2761	2465.78024	1438.23	106.0008	0.1270
2600	0.0000	663.7161	2465.08624	1439.31	109.8024	0.1270
2600	0.0000	672.2061	2464.35224	1440.39	113.6208	0.1270
2600	0.0000	680.7461	2463.57824	1441.47	117.4560	0.1270
2600	0.0000	689.3361	2462.76424	1442.55	121.3184	0.1270
2600	0.0000	697.9761	2461.91024	1443.63	125.2080	0.1270
2600	0.0000	706.6661	2461.01624	1444.71	129.1248	0.1270
2600	0.0000	715.4061	2460.08224	1445.79	133.0688	0.1270
2600	0.0000	724.1961	2459.10824	1446.87	137.0400	0.1270
2600	0.0000	733.0361	2458.09424	1447.95	141.0384	0.1270
2600	0.0000	741.9261	2457.04024	1449.03	145.0640	0.1270
2600	0.0000	750.8661	2455.94624	1450.11	149.1168	0.1270
2600	0.0000	759.8561	2454.81224	1451.19	153.1968	0.1270
2600	0.0000	768.8961	2453.63824	1452.27	157.3040	0.1270
2600	0.0000	777.9861	2452.42424	1453.35	161.4384	0.1270
2600	0.0000	787.1261	2451.17024	1454.43	165.6000	0.1270
2600	0.0000	796.3161	2449.87624	1		

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T (R)	P (PSIA)	V (CU FT/LB)	λ (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2700	224.0000	2.7680	2075.53117	1239.54	1.0107	0.2552
2700	224.0000	2.7967	2075.51140	1239.27	1.0204	0.2545
2700	224.0000	2.8259	2079.49286	1239.99	1.0219	0.2535
2700	224.0000	2.8556	2081.49223	1239.71	1.0217	0.2525
2700	218.0000	2.8859	2083.49220	1239.44	1.0224	0.2517
2700	216.0000	2.9168	2085.49295	1239.16	1.0230	0.2509
2700	214.0000	2.9482	2087.51260	1238.89	1.0237	0.2500
2700	212.0000	2.9803	2089.53350	1238.62	1.0244	0.2491
2700	210.0000	3.0129	2091.55182	1238.35	1.0251	0.2482
2700	208.0000	3.0462	2093.59759	1238.08	1.0257	0.2475
2700	206.0000	3.0802	2095.64100	1237.82	1.0264	0.2468
2700	204.0000	3.1148	2097.69246	1237.55	1.0271	0.2460
2700	202.0000	3.1501	2099.75102	1237.29	1.0278	0.2453
2700	200.0000	3.1861	2101.81963	1237.03	1.0285	0.2446
2700	198.0000	3.2229	2103.89570	1236.76	1.0293	0.2439
2700	196.0000	3.2604	2105.98057	1236.51	1.0300	0.2432
2700	194.0000	3.2987	2108.07415	1236.25	1.0307	0.2425
2700	192.0000	3.3378	2110.17670	1236.00	1.0314	0.2418
2700	190.0000	3.3777	2112.28840	1235.74	1.0322	0.2410
2700	188.0000	3.4185	2114.40924	1235.48	1.0329	0.2403
2700	186.0000	3.4602	2116.53969	1235.23	1.0337	0.2396
2700	184.0000	3.5028	2118.68022	1234.98	1.0344	0.2389
2700	182.0000	3.5464	2120.83031	1234.73	1.0352	0.2382
2700	180.0000	3.5909	2122.99042	1234.49	1.0359	0.2375
2700	178.0000	3.6365	2125.16079	1234.24	1.0367	0.2368
2700	176.0000	3.6831	2127.34252	1234.00	1.0375	0.2360
2700	174.0000	3.7308	2129.53283	1233.75	1.0383	0.2353
2700	172.0000	3.7796	2131.73487	1233.51	1.0391	0.2346
2700	170.0000	3.8295	2133.94764	1233.28	1.0399	0.2339
2700	168.0000	3.8807	2136.17150	1233.04	1.0407	0.2332
2700	166.0000	3.9331	2138.40724	1232.80	1.0415	0.2324
2700	164.0000	3.9868	2140.65403	1232.57	1.0423	0.2317
2700	162.0000	4.0419	2142.91245	1232.34	1.0432	0.2310
2700	160.0000	4.0983	2145.18249	1232.11	1.0440	0.2303
2700	158.0000	4.1562	2147.46492	1231.88	1.0449	0.2296
2700	156.0000	4.2156	2149.75933	1231.65	1.0457	0.2289
2700	154.0000	4.2765	2152.06611	1231.43	1.0466	0.2282
2700	152.0000	4.3391	2154.38543	1231.20	1.0475	0.2275
2700	150.0000	4.4033	2156.71748	1230.98	1.0484	0.2268
2700	148.0000	4.4693	2159.06247	1230.76	1.0493	0.2260
2700	146.0000	4.5372	2161.42056	1230.55	1.0502	0.2253
2700	144.0000	4.6069	2163.79197	1230.33	1.0511	0.2246
2700	142.0000	4.6786	2166.17689	1230.12	1.0521	0.2239
2700	140.0000	4.7524	2168.57551	1229.90	1.0531	0.2232
2700	138.0000	4.8283	2170.98803	1229.69	1.0540	0.2225
2700	136.0000	4.9065	2173.41447	1229.48	1.0549	0.2218
2700	134.0000	4.9871	2175.85563	1229.28	1.0558	0.2210
2700	132.0000	5.0701	2178.31112	1229.07	1.0568	0.2203
2700	130.0000	5.1557	2180.78136	1228.87	1.0578	0.2196
2700	128.0000	5.2440	2183.26555	1228.67	1.0588	0.2189
2700	126.0000	5.3351	2185.76695	1228.47	1.0598	0.2182
2700	124.0000	5.4292	2188.28277	1228.27	1.0609	0.2175
2700	122.0000	5.5264	2190.81423	1228.07	1.0619	0.2168
2700	120.0000	5.6268	2193.36153	1227.88	1.0630	0.2160

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T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2700	118.0000	5.7307	2195.92507	17.7189	1.0641	0.2019
2700	116.0000	5.8382	2198.50494	1291.50	1.0652	0.2006
2700	114.0000	5.9494	2201.10145	1293.31	1.0663	0.1996
2700	112.0000	6.0647	2203.71488	1295.12	1.0674	0.1985
2700	110.0000	6.1842	2206.34544	1296.94	1.0685	0.1974
2700	108.0000	6.3082	2208.99346	1298.76	1.0697	0.1962
2700	106.0000	6.4369	2211.65921	1298.58	1.0709	0.1951
2700	104.0000	6.5705	2214.34298	1298.40	1.0721	0.1939
2700	102.0000	6.7094	2217.04506	1298.22	1.0733	0.1928
2700	100.0000	6.8539	2219.76577	1298.05	1.0745	0.1916
2700	98.0000	7.0043	2222.50543	1298.88	1.0758	0.1904
2700	96.0000	7.1611	2225.26436	1299.71	1.0771	0.1893
2700	94.0000	7.3245	2228.04289	1300.54	1.0784	0.1881
2700	92.0000	7.4951	2230.84138	1301.37	1.0797	0.1869
2700	90.0000	7.6733	2233.66018	1302.21	1.0810	0.1857
2700	88.0000	7.8596	2236.49947	1303.04	1.0824	0.1845
2700	86.0000	8.0546	2239.36023	1303.88	1.0838	0.1833
2700	84.0000	8.2590	2242.24225	1304.72	1.0852	0.1821
2700	82.0000	8.4733	2245.14615	1305.57	1.0867	0.1809
2700	80.0000	8.6984	2248.07235	1306.41	1.0882	0.1797
2700	78.0000	8.9351	2251.02128	1307.26	1.0897	0.1785
2700	76.0000	9.1843	2253.99342	1308.11	1.0913	0.1772
2700	74.0000	9.4470	2256.98921	1308.96	1.0929	0.1760
2700	72.0000	9.7244	2260.00917	1309.81	1.0945	0.1748
2700	70.0000	10.0176	2263.05378	1310.67	1.0962	0.1735
2700	68.0000	10.3282	2266.12359	1311.52	1.0979	0.1723
2700	66.0000	10.6576	2269.21914	1312.38	1.0996	0.1710
2700	64.0000	11.0077	2272.34099	1313.24	1.1014	0.1698
2700	62.0000	11.3783	2275.48974	1314.11	1.1032	0.1685
2700	60.0000	11.7779	2278.66601	1314.97	1.1052	0.1673
2700	58.0000	12.2030	2281.87042	1315.84	1.1072	0.1660
2700	56.0000	12.6585	2285.10386	1316.71	1.1092	0.1647
2700	54.0000	13.1478	2288.36641	1317.58	1.1113	0.1634
2700	52.0000	13.6748	2291.65930	1318.45	1.1134	0.1622
2700	50.0000	14.2440	2294.98336	1319.33	1.1157	0.1609
2700	48.0000	14.8507	2298.33911	1320.21	1.1180	0.1596
2700	46.0000	15.4911	2301.72744	1321.08	1.1204	0.1583
2700	44.0000	16.2625	2305.14922	1321.97	1.1229	0.1570
2700	42.0000	17.0637	2308.60534	1322.85	1.1255	0.1557
2700	40.0000	17.9051	2312.09673	1323.73	1.1282	0.1544
2700	38.0000	18.7993	2315.62436	1324.62	1.1311	0.1530
2700	36.0000	19.7419	2319.18925	1325.51	1.1341	0.1517
2700	34.0000	20.7419	2322.79247	1326.40	1.1372	0.1504
2700	32.0000	21.7933	2326.43514	1327.29	1.1404	0.1491
2700	30.0000	22.9016	2330.11841	1328.19	1.1434	0.1477
2700	28.0000	23.0799	2333.84352	1329.09	1.1469	0.1464
2700	26.0000	23.9149	2337.61174	1329.99	1.1502	0.1450
2700	24.0000	23.3292	2341.42442	1330.89	1.1539	0.1437
2700	22.0000	23.0954	2345.28297	1331.70	1.1580	0.1423
2700	20.0000	23.6629	2349.18886	1332.70	1.1620	0.1410
2700	18.0000	24.5790	2353.14367	1333.60	1.1660	0.1396
2700	16.0000	25.7243	2357.14901	1334.51	1.1700	0.1383
2700	14.0000	27.3399	2361.20661	1335.43	1.1748	0.1369
2700	12.0000	29.1410	2365.31829	1336.34	1.1799	0.1355

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOUR

T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2700	10.0300	73.5109	2369.48593	1337.25	1.2324	0.2331
2700	4.0000	92.0161	2373.71155	1339.17	1.2140	0.2337
2700	6.0000	122.0120	2377.97727	1339.09	1.1889	0.2353
2700	4.0000	184.6647	2382.34532	1340.01	1.1498	0.2359
2700	2.0000	369.9244	2386.75804	1340.94	1.1255	0.2365
2700	0.8000	925.7654	2389.43776	1341.49	1.1025	0.2371
2700	0.6000	1234.4728	2390.84677	1341.50	1.1008	0.2372
2700	0.4000	1852.0077	2390.33647	1341.68	1.1024	0.2373
2700	0.2000	3704.6127	2390.76686	1341.77	1.1024	0.2373
2700	0.1000	7409.8226	2391.01231	1341.82	1.1024	0.2373
2800	358.3739	1.7023	1950.86969	1233.71	0.9048	0.2318
2800	350.0000	1.7535	1960.76736	1236.33	0.9067	0.2328
2800	344.0000	1.7778	1963.09296	1236.96	0.9071	0.2329
2800	344.0000	1.7778	1965.41438	1237.58	0.9076	0.2329
2800	344.0000	1.7915	1967.70262	1238.20	0.9080	0.2329
2800	342.0000	1.8645	1969.98748	1238.63	0.9085	0.2329
2800	340.0000	1.8170	1972.25952	1239.45	0.9090	0.2329
2800	338.0000	1.8308	1974.51915	1240.07	0.9094	0.2329
2800	336.0000	1.8342	1976.76675	1240.69	0.9099	0.2329
2800	334.0000	1.8578	1979.00269	1241.31	1.0003	0.2334
2800	332.0000	1.8715	1981.22737	1241.93	1.0008	0.2334
2800	330.0000	1.8854	1983.44114	1242.55	1.0013	0.2334
2800	328.0000	1.8994	1985.64440	1243.16	1.0018	0.2334
2800	326.0000	1.9136	1987.83752	1243.78	1.0022	0.2334
2800	324.0000	1.9280	1990.02086	1244.40	1.0027	0.2334
2800	322.0000	1.9435	1992.19480	1245.01	1.0032	0.2334
2800	320.0000	1.9572	1994.35970	1245.63	1.0037	0.2334
2800	318.0000	1.9721	1996.51593	1246.25	1.0041	0.2334
2800	316.0000	1.9872	1998.66385	1246.86	1.0046	0.2334
2800	314.0000	2.0024	2000.80382	1247.40	1.0051	0.2334
2800	312.0000	2.0179	2002.93620	1248.09	1.0056	0.2334
2800	310.0000	2.0344	2005.06134	1248.71	1.0061	0.2334
2800	308.0000	2.0494	2007.17950	1249.32	1.0066	0.2334
2800	306.0000	2.0654	2009.29131	1249.94	1.0071	0.2334
2800	304.0000	2.0817	2011.39683	1250.55	1.0075	0.2334
2800	302.0000	2.0981	2013.49652	1251.17	1.0080	0.2334
2800	300.0000	2.1148	2015.59069	1251.78	1.0085	0.2334
2800	298.0000	2.1317	2017.67971	1252.39	1.0090	0.2334
2800	296.0000	2.1488	2019.76389	1253.01	1.0095	0.2334
2800	294.0000	2.1662	2021.84358	1253.62	1.0101	0.2334
2800	292.0000	2.1838	2023.91910	1254.24	1.0106	0.2334
2800	290.0000	2.2016	2025.99079	1254.85	1.0111	0.2334
2800	288.0000	2.2197	2028.05606	1255.47	1.0116	0.2334
2800	286.0000	2.2380	2030.12394	1256.08	1.0121	0.2334
2800	284.0000	2.2566	2032.18606	1256.70	1.0126	0.2334
2800	282.0000	2.2754	2034.24561	1257.31	1.0131	0.2334
2800	280.0000	2.2945	2036.30293	1257.93	1.0137	0.2334
2800	278.0000	2.3139	2038.35832	1258.55	1.0142	0.2334
2800	276.0000	2.3336	2040.41200	1259.16	1.0147	0.2334
2800	274.0000	2.3535	2042.46453	1259.78	1.0152	0.2334
2800	272.0000	2.3737	2044.51596	1260.40	1.0158	0.2334
2800	270.0000	2.3943	2046.56648	1261.01	1.0163	0.2334
2800	268.0000	2.4151	2048.61698	1261.63	1.0169	0.2334
2800	266.0000	2.4363	2050.66717	1262.25	1.0174	0.2334

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (K)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB)	S (BTU/LB R)	CP (BTU/LB R)
2800	267.0000	2.4578	2052.71752	1262.87	1.0179	0.2499
2800	267.0000	2.4796	2054.76832	1263.49	1.0105	0.2490
2800	267.0000	2.5017	2056.81908	1264.11	1.0130	0.2481
2800	256.0000	2.5242	2058.87246	1264.73	1.0156	0.2472
2800	256.0000	2.5470	2060.92635	1265.35	1.0201	0.2463
2800	254.0000	2.5702	2062.98183	1265.97	1.0207	0.2454
2800	252.0000	2.5938	2065.03917	1266.60	1.0213	0.2445
2800	250.0000	2.6177	2067.09865	1267.22	1.0218	0.2436
2800	246.0000	2.6421	2069.16054	1267.84	1.0224	0.2427
2800	246.0000	2.6668	2071.22511	1268.47	1.0230	0.2418
2800	244.0000	2.6919	2073.29262	1269.09	1.0235	0.2409
2800	242.0000	2.7175	2075.36334	1269.72	1.0241	0.2400
2800	240.0000	2.7435	2077.43753	1270.34	1.0247	0.2391
2800	238.0000	2.7699	2079.51545	1270.97	1.0253	0.2382
2800	236.0000	2.7968	2081.59735	1271.60	1.0259	0.2372
2800	234.0000	2.8241	2083.69350	1272.23	1.0265	0.2363
2800	232.0000	2.8520	2085.77414	1272.86	1.0271	0.2354
2800	230.0000	2.8803	2087.86953	1273.49	1.0277	0.2345
2800	228.0000	2.9091	2089.96991	1274.12	1.0283	0.2336
2800	226.0000	2.9384	2092.07554	1274.75	1.0289	0.2326
2800	224.0000	2.9682	2094.18645	1275.39	1.0295	0.2317
2800	222.0000	2.9986	2096.30350	1276.02	1.0302	0.2308
2800	220.0000	3.0296	2098.42633	1276.66	1.0308	0.2298
2800	216.0000	3.0611	2100.55536	1277.29	1.0314	0.2289
2800	214.0000	3.0932	2102.69086	1277.93	1.0320	0.2280
2800	212.0000	3.1259	2104.83304	1278.57	1.0327	0.2270
2800	210.0000	3.1593	2106.98216	1279.21	1.0333	0.2461
2800	208.0000	3.1932	2109.13643	1279.85	1.0340	0.2452
2800	206.0000	3.2279	2111.30211	1280.49	1.0346	0.2442
2800	204.0000	3.2632	2113.47341	1281.13	1.0353	0.2433
2800	202.0000	3.2992	2115.65258	1281.77	1.0359	0.2423
2800	200.0000	3.3360	2117.83984	1282.42	1.0366	0.2414
2800	198.0000	3.3735	2120.03542	1283.06	1.0373	0.2404
2800	196.0000	3.4117	2122.23956	1283.71	1.0380	0.2395
2800	194.0000	3.4507	2124.45247	1284.36	1.0387	0.2385
2800	192.0000	3.4906	2126.67440	1285.00	1.0393	0.2375
2800	190.0000	3.5313	2128.90556	1285.65	1.0400	0.2366
2800	188.0000	3.5728	2131.14618	1286.31	1.0407	0.2356
2800	186.0000	3.6153	2133.39650	1286.96	1.0415	0.2346
2800	184.0000	3.6587	2135.65673	1287.61	1.0422	0.2337
2800	182.0000	3.7030	2137.92711	1288.27	1.0429	0.2327
2800	180.0000	3.7483	2140.20706	1288.92	1.0436	0.2317
2800	178.0000	3.7946	2142.49921	1289.58	1.0443	0.2307
2800	176.0000	3.8420	2144.80136	1290.24	1.0451	0.2297
2800	174.0000	3.8905	2147.11462	1290.90	1.0458	0.2288
2800	172.0000	3.9401	2149.43914	1291.56	1.0466	0.2278
2800	170.0000	3.9909	2151.77517	1292.22	1.0473	0.2268
2800	168.0000	4.0428	2154.12295	1292.88	1.0481	0.2258
2800	166.0000	4.0960	2156.48271	1293.55	1.0489	0.2248
2800	164.0000	4.1505	2158.85449	1294.21	1.0497	0.2238
2800	162.0000	4.2063	2161.23911	1294.88	1.0505	0.2228
2800	160.0000	4.2636	2163.63621	1295.55	1.0513	0.2217
2800	158.0000	4.3223	2166.04623	1296.22	1.0521	0.2207
2800	156.0000	4.3824	2168.46941	1296.89	1.0529	0.2197

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	N (RTU/LU)	S (BTU/LB R)	CP (BTU/LB R)
2400	156.0000	4.4442	2170.90000	1297.53	1.0337	0.2807
2400	154.0000	4.5075	2173.35624	1298.24	1.0335	0.2807
2400	152.0000	4.5724	2175.82037	1298.91	1.0334	0.2807
2400	150.0000	4.6394	2178.29064	1299.59	1.0332	0.2807
2400	148.0000	4.7080	2180.76132	1300.26	1.0331	0.2807
2400	146.0000	4.7785	2183.23664	1300.94	1.0330	0.2807
2400	144.0000	4.8509	2185.71668	1301.62	1.0329	0.2807
2400	142.0000	4.9255	2188.20129	1302.31	1.0328	0.2807
2400	140.0000	5.0021	2190.69114	1302.99	1.0327	0.2807
2400	138.0000	5.0811	2193.18624	1303.68	1.0326	0.2807
2400	136.0000	5.1623	2195.68664	1304.36	1.0325	0.2807
2400	134.0000	5.2460	2198.19233	1305.05	1.0324	0.2807
2400	132.0000	5.3323	2200.70333	1305.74	1.0323	0.2807
2400	130.0000	5.4212	2203.21961	1306.43	1.0322	0.2807
2400	128.0000	5.5126	2205.74193	1307.12	1.0321	0.2807
2400	126.0000	5.6076	2208.26999	1307.81	1.0320	0.2807
2400	124.0000	5.7053	2210.80372	1308.51	1.0319	0.2807
2400	122.0000	5.8062	2213.34314	1309.21	1.0318	0.2807
2400	120.0000	5.9106	2215.88823	1309.90	1.0317	0.2807
2400	118.0000	6.0185	2218.43899	1310.60	1.0316	0.2807
2400	116.0000	6.1301	2220.99541	1311.30	1.0315	0.2807
2400	114.0000	6.2457	2223.55759	1312.01	1.0314	0.2807
2400	112.0000	6.3654	2226.12553	1312.71	1.0313	0.2807
2400	110.0000	6.4899	2228.69923	1313.41	1.0312	0.2807
2400	108.0000	6.6182	2231.27869	1314.12	1.0311	0.2807
2400	106.0000	6.7518	2233.86381	1314.83	1.0310	0.2807
2400	104.0000	6.8906	2236.45459	1315.54	1.0309	0.2807
2400	102.0000	7.0348	2239.05104	1316.25	1.0308	0.2807
2400	100.0000	7.1848	2241.65317	1316.96	1.0307	0.2807
2400	98.0000	7.3410	2244.26187	1317.68	1.0306	0.2807
2400	96.0000	7.5037	2246.87714	1318.39	1.0305	0.2807
2400	94.0000	7.6734	2249.49901	1319.11	1.0304	0.2807
2400	92.0000	7.8504	2252.12749	1319.83	1.0303	0.2807
2400	90.0000	8.0354	2254.76259	1320.55	1.0302	0.2807
2400	88.0000	8.2284	2257.40433	1321.27	1.0301	0.2807
2400	86.0000	8.4312	2260.05273	1322.00	1.0300	0.2807
2400	84.0000	8.6433	2262.70789	1322.72	1.0299	0.2807
2400	82.0000	8.8650	2265.36981	1323.45	1.0298	0.2807
2400	80.0000	9.0994	2268.03849	1324.17	1.0297	0.2807
2400	78.0000	9.3451	2270.71383	1324.90	1.0296	0.2807
2400	76.0000	9.6037	2273.39593	1325.64	1.0295	0.2807
2400	74.0000	9.8763	2276.08479	1326.37	1.0294	0.2807
2400	72.0000	10.1641	2278.77941	1327.10	1.0293	0.2807
2400	70.0000	10.4684	2281.47969	1327.84	1.0292	0.2807
2400	68.0000	10.7904	2284.18563	1328.57	1.0291	0.2807
2400	66.0000	11.1324	2286.89723	1329.31	1.0290	0.2807
2400	64.0000	11.4956	2289.61449	1330.05	1.0289	0.2807
2400	62.0000	11.8823	2292.33741	1330.80	1.0288	0.2807
2400	60.0000	12.2943	2295.06609	1331.54	1.0287	0.2807
2400	58.0000	12.7327	2297.80047	1332.28	1.0286	0.2807
2400	56.0000	13.2083	2300.54057	1333.03	1.0285	0.2807
2400	54.0000	13.7159	2303.28639	1333.78	1.0284	0.2807
2400	52.0000	14.2626	2306.03793	1334.53	1.0283	0.2807
2400	50.0000	14.8493	2308.79529	1335.28	1.0282	0.2807

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PROPERTIES OF SUPERHEATED POTASSIUM VAPOR

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T (R)	P (PSIA)	V (CU FT/LB)	A (FT/SEC)	H (BTU/LB R)	S (BTU/LB R)	CP (BTU/LB R)
2800	48.0000	15.4928	2331.14148	1336.03	1.1237	0.1279
2800	46.0000	16.1082	2334.87356	1336.79	1.1261	0.1267
2800	44.0000	16.9469	2338.64650	1337.54	1.1286	0.1254
2800	42.0000	17.7779	2342.46140	1338.30	1.1311	0.1242
2800	40.0000	18.6021	2346.31943	1339.06	1.1336	0.1229
2800	38.0000	19.4226	2350.22178	1339.82	1.1360	0.1217
2800	36.0000	20.2354	2354.16971	1340.58	1.1386	0.1204
2800	34.0000	22.0805	2358.16452	1341.35	1.1427	0.1192
2800	32.0000	23.925	2362.20759	1342.11	1.1460	0.1180
2800	30.0000	25.7620	2366.30335	1342.88	1.1494	0.1168
2800	28.0000	26.9219	2370.44429	1343.65	1.1532	0.1154
2800	26.0000	29.0324	2374.64098	1344.42	1.1571	0.1141
2800	24.0000	31.4948	2378.89203	1345.19	1.1614	0.1128
2800	22.0000	34.4051	2383.19922	1345.96	1.1660	0.1113
2800	20.0000	37.3976	2387.56429	1346.74	1.1711	0.1102
2800	18.0000	42.1663	2391.98914	1347.51	1.1766	0.1090
2800	16.0000	47.5023	2396.47375	1348.29	1.1828	0.1077
2800	14.0000	54.3631	2401.02620	1349.07	1.1898	0.1064
2800	12.0000	63.5111	2405.64246	1349.85	1.1978	0.1050
2800	10.0000	76.3186	2410.32742	1350.63	1.2073	0.1037
2800	8.0000	95.5301	2415.08290	1351.42	1.2189	0.1024
2800	6.0000	127.5498	2419.91162	1352.20	1.2337	0.1011
2800	4.0000	191.5608	2424.81626	1352.99	1.2545	0.1208
2800	2.0000	383.7111	2429.79964	1353.78	1.2899	0.1205
2800	0.9000	960.0767	2432.62868	1354.38	1.3368	0.1277
2800	0.6000	1280.2800	2433.33647	1354.33	1.3512	0.1255
2800	0.4000	1920.6866	2433.64591	1354.41	1.3716	0.1274
2800	0.2000	3841.9065	2434.35443	1354.49	1.4070	0.1273
2800	0.1000	7684.3464	2434.60946	1354.53	1.4423	0.1272