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MASTER

TRANSPORT PROPERTIES
OF URANIUM DIOXIDE

by

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and L. Leibowitz

ARGONNE NATIONAL LABORATORY, ARGONNE, ILLINOIS

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Chemical Engineering Division

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PREFACE

Transport Properties of Uranium Dioxide

In order to provide reliable and consistent data on the thermophysical properties of reactor materials for reactor safety studies, we have prepared this revision of the transport properties of the uranium dioxide portion of the fuel property section of the report "Properties for LMFBR Safety Analysis." Since the original report was issued in 1976, measurements of thermal diffusivity¹ and emissivity^{2,3} have been made. In addition to incorporating this new data, new equations have been derived to fit the thermal diffusivity and thermal conductivity data. This analysis is consistent with the analysis of enthalpy and heat capacity. A new form of equation for the emissivity is also given. The present report comprises the transport part of the UO₂ portion of section A of the planned complete revision of "Properties for LMFBR Safety Analysis."

As much as possible, we have attempted to have each section independent of the others. Although this has entailed considerable repetition, we believe this will be helpful to users of this handbook. A user not needing great detail regarding the basis for the calculations will be able to read only the section of interest. Tables giving estimated standard deviations (1σ) have been included. These have been given as percents and it should be understood that a value of 100% means a standard deviation of a factor of two. We have also included a set of tables of closely spaced values. Comments from users of this material regarding errors, format, and utility would be appreciated.

J. K. Fink

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SECTION A: FUEL

1. UO₂ PROPERTIES

1.2 TRANSPORT - Saturated

- 1.2.1 Thermal Conductivity
- 1.2.2 Thermal Diffusivity
- 1.2.3 Emissivity
- 1.2.4 Viscosity
- 1.2.5 Electrical Conductivity

APPENDIX A: TABULATED TRANSPORT PROPERTIES IN SI UNITS

APPENDIX B: TABULATED TRANSPORT PROPERTIES IN CGS UNITS

SUMMARY OF TRANSPORT PROPERTIES

Property	Temperature, K					
	1000	2000	3120 (m.p.)	4000	5000	6000
Thermal Conductivity, $k, \text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$	3.74	2.19	3.44 (s) 11 (l)	-	-	-
Thermal Diffusivity $\kappa, \text{m}^2\cdot\text{s}^{-1}$	1.12×10^{-6}	0.581×10^{-6}	0.576×10^{-6} (s) 2.6×10^{-6} (l)	-	-	-
Emissivity at $\lambda = 0.63\mu\text{m}, \epsilon$	0.87	0.87	0.84	0.91	(0.98)	(0.99)
Viscosity, $\eta, \text{mPa}\cdot\text{s}$	-	-	4.34 (l)	(3.14)	(2.49)	(2.13)

(s) indicates solid
(l) indicates liquid

Values in parentheses were obtained by extrapolation beyond the range of available data.

Thermal Conductivity

<u>T, K</u>	<u>k, W·m⁻¹·K⁻¹</u>
298.15	(8.27)*
300	8.24
400	7.13
500	6.26
600	5.55
700	4.98
800	4.50
900	4.09
1000	3.74
1100	3.44
1200	3.18
1300	2.95
1400	2.76
1500	2.58
1600	2.44
1700	2.33
1800	2.25
1900	2.20
2000	2.19
2100	2.23
2200	2.31
2300	2.45
2400	2.65
2500	2.92
2600	3.26
2700	3.54
2800	3.51
2900	3.49
3000	3.47
3100	(3.44)
3120	(3.44)

*Parentheses indicate extrapolation beyond the range of experimental data.

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The thermal conductivity of UO₂.

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Thermal Conductivity

Temperature Range
T, K

k, W·m⁻¹·K⁻¹

Error
σ, %

300 ≤ T ≤ 2670

$$\frac{1}{6.8337 \times 10^{-2} + 1.6693 \times 10^{-4} T + 3.1886 \times 10^{-8} T^2 + 1.2783 \times 10^{-1} T e^{(-1.1608 \times 10^4 / kT)}}$$

6

2670 ≤ T ≤ 3120

$$4.1486 - 2.2673 \times 10^{-4} T$$

6

T > 3120 (liquid)

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20

3120 ≤ T ≤ 6000

20 - 100

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Thermal Conductivity

In the following section we review both thermal conductivity and thermal diffusivity; related by

$$k = \kappa C_p \rho \quad (1)$$

where k = thermal conductivity,

κ = thermal diffusivity,

C_p = heat capacity,

and ρ = density.

Two of the most recent reviews are those of Washington¹ and of Brandt and Neuer². Following Weilbacher³, Brandt and Neuer recommend an equation for thermal conductivity of the form:

$$k = \frac{1}{A + BT} + CT e^{D/kT} + E e^{F/kT} \quad (2)$$

where k is the Boltzmann constant.

The first term in Eq. (2) is attributed to the contribution from phonons, the second term is due to electrons and the third term is a conduction decrease due to dislocations. This third term was first introduced by Weilbacher who found such a term essential to fit his high temperature data.

Since both thermal conductivity and diffusivity are available for UO_2 , we first calculate conductivity from measured diffusivities using our recommended heat capacity⁴ and the density of Slagle⁵ based on data by Christensen.⁶

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For $T \leq 2670$ K

$$C_p = \frac{C_1 \theta^2 e^{\theta/T}}{T^2 (e^{\theta/T} - 1)^2} + 2C_2 T + C_3 k e^{-E_a/kT} \left(1 + \frac{(T-298.15)E_a}{kT^2} \right) \quad (3)$$

where $C_1 = 78.212 \text{ J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$, $C_2 = 3.8616 \times 10^{-3} \text{ J} \cdot \text{mol}^{-1} \cdot \text{K}^{-2}$, $C_3 = 3.3993 \times 10^8 \text{ J} \cdot \text{mol}^{-1} \cdot \text{eV}^{-1}$, $\theta = 516.11 \text{ K}$, $E_a = 1.8815 \text{ eV}$,

$k = 8.6144 \times 10^{-5} \text{ eV} \cdot \text{K}^{-1}$ is the Boltzman constant and C_p is in $\text{J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$ and T is in kelvins.

For $2670 \leq T \leq 3120$ K

$$C_p = 167.0 \text{ J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1} \quad (4)$$

The density for the range $298 < 3120$ K is given by^{4,5}

$$\rho = \rho_0 (1.0056 - 1.6324 \times 10^{-5} T - 8.3281 \times 10^{-9} T^2 + 2.0176 \times 10^{-13} T^3) \quad (5)$$

where $\rho_0 = 10970 \text{ kg/m}^3$ is the density at 273 K ⁷,

and ρ is in kg/m^3 and T is in kelvins.

Since our heat capacities differ significantly from those used in previous evaluations of thermal conductivity, we have recalculated thermal diffusivities and converted to the 1968 temperature scale. Our heat capacities, while including the suggestion of Rand⁸ of a phase change at 2670 K , do not show a jump discontinuity.

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We have included in our fit to the thermal conductivity and thermal diffusivity data of Godfrey et al.⁹, Stora¹⁰, Weilbacher³, and the round-robin data given by Conway¹¹, and Bates¹². We have used a nonlinear least square method described by Bevington¹³ to fit the complete set of 553 points over the entire temperature range. Many different forms of equations were tried and it was concluded that when all data are fit together there is no experimental basis for the third term in Eq. (2). In addition inclusion of only a phonon term and an electronic term is consistent with the theoretical treatment of the enthalpy and heat capacity data given previously.⁴

While the minimum standard deviation is obtained by using a three term single equation to fit all the combined data (thermal conductivity data and thermal diffusivity data expressed as thermal conductivity) from 300 through 3023 K, this is not a satisfactory fit to the high temperature thermal diffusivity data. Calculation of thermal diffusivity from the fit of thermal conductivity and comparison with experimental thermal diffusivity data showed the need of a linear thermal conductivity equation above the transition temperature 2670 K. Consequently, the thermal conductivity was fit with a single equation to 2670 K and with a linear equation above 2670 K. To prevent any discontinuities in the calculated thermal diffusivity, the thermal conductivity equation below 2670 K was constrained to agree with the linear fit at 2670 K. This treatment of using a linear equation above 2670 K is consistent with that used for enthalpy and heat capacity. The final equations, given below, include

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a T^2 dependence in the phonon term as suggested by Cabannes¹⁴ and Pomeranchuk¹⁵. We have found that inclusion of this term significantly improves the fit in the region from 1300 to 2100 K.

For $298 \leq T \leq 2670$ K

$$k = \frac{1}{A + BT + CT^2} + DT e^{-E/kT} \quad (6)$$

where $A = 6.8337 \times 10^{-2} \text{ m} \cdot \text{K} \cdot \text{W}^{-1}$,

$B = 1.6693 \times 10^{-4} \text{ m} \cdot \text{W}^{-1}$,

$C = 3.1886 \times 10^{-8} \text{ m} \cdot \text{W}^{-1} \cdot \text{K}^{-1}$,

$D = 1.2783 \times 10^{-1} \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-2}$,

$E = 1.1608 \text{ eV}$,

$k = 8.6144 \times 10^{-5} \text{ eV} \cdot \text{K}^{-1}$ is the Boltzmann constant; T is in kelvins
and k is in $\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$.

For $2670 \leq T \leq 3120$ K

$$k = 4.1486 - 2.2673 \times 10^{-4} T \quad (7)$$

where k is in $\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ and T is in kelvins.

Comparison of our final equations with those given by Weilbacher and by Brandt and Neuer shows that ours fits the overall data somewhat better. The standard deviation of the overall fit using Eq. (6-7) is 6.2%. The standard deviations of the data from Weilbacher's equations are 7.8% and 7.3%. For the fit of Brandt and Neuer, σ is 7.3%.

The thermal conductivity of UO_2 decreases with increasing porosity; a modified Loeb equation^{16,17} can be used to correct for this porosity effect:

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$$k = k_0 (1 - \alpha P) \quad (8)$$

where P is the pore volume fraction and α is an empirical constant equal¹⁸ to about 2.5 ± 1.5 . Weilbacher³ has proposed that a Loeb-type correction be applied to the phonon contribution while a simple volumetric correction, $(1 - P)$, be used with the remaining terms. The effects of variation in O/M ratio in solid UO_2 are not defined well enough at this time to warrant use of equations different from Eqs. (6-7).

There are no reported measurements for the thermal conductivity of liquid UO_2 ; however, Kim *et al.*,¹⁹ have measured its thermal diffusivity. Combining their value of $2.6 \times 10^{-6} \text{ m}^2/\text{s}$ for the thermal diffusivity with density and heat capacity data for liquid UO_2 leads to a value of $11 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ for the thermal conductivity of molten UO_2 in the liquid region near the melting point; the temperature variation of the liquid conductivity cannot be estimated at this time.

For solid UO_2 , the standard deviation (σ) of the data from Eqs. (6-7) is 6.2%. Because of lack of data for the thermal conductivity for liquid UO_2 , only an estimate may be made on the reliability of the $11 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ value obtained from the thermal diffusivity measurements of Kim *et al.*¹⁹ The experimenters suggest the standard deviation (σ) of 20% be used at 3120 K. Between 3120 and 6000 K, the error in the use of the value $11 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ is estimated as increasing from 20% at 3120 to 100% at 6000 K.

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Thermal Diffusivity

<u>T, K</u>	<u>$\kappa \times 10^7, \text{m}^2 \cdot \text{s}^{-1}$</u>
298.15	(32.0)*
300	31.8
400	24.7
500	20.5
600	17.6
700	15.4
800	13.7
900	12.3
1000	11.2
1100	10.2
1200	9.31
1300	8.58
1400	7.95
1500	7.41
1600	6.94
1700	6.55
1800	6.24
1900	5.99
2000	5.81
2100	5.69
2200	5.62
2300	5.61
2400	5.63
2500	5.68
2600	5.74
2700	5.76
2800	5.76
2900	5.76
3000	5.76
3100	(5.76)
3120	(5.76)

* Parentheses indicate extrapolation beyond the range of experimental data.

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K

The thermal diffusivity of UO_2 .

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K

Thermal DiffusivityTemperature Range
T, K $\kappa, \text{m}^2 \cdot \text{s}^{-1}$ Error
 $\sigma, \%$ $300 \leq T \leq 3120$ $\frac{k}{C_p \rho}$

7

 $T > 3120 \text{ (liquid)}$ 2.6×10^{-6}

20

 $3120 \leq T \leq 6000$

20 - 100

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K

Thermal Diffusivity

We have fit the thermal diffusivity data of Weilbacher¹, Bates², Conway and Feith³ along with the thermal conductivity data of Stora⁴, Godfrey⁵ and Conway and Feith³. The data of Goldsmith and Douglas⁶ were not included in the fit since they are for different porosities and O/M ratios. The values of thermal diffusivity of solid UO₂ (100% theoretical density) tabulated in this section were calculated from the thermal conductivity k , using the relation

$$\kappa = k(C_p \rho) \quad (1)$$

where ρ is the density, C_p is the heat capacity and k is the thermal conductivity. The density was calculated using^{7,8}

$$\rho = \rho_0 (1.0056 - 1.6324 \times 10^{-5} T - 8.3281 \times 10^{-9} T^2 + 2.0176 \times 10^{-13} T^3) \quad (2)$$

where $\rho_0 = 10970 \text{ kg/m}^3$ is the density at 273 K⁹, ρ is in kg/m³, and T is in kelvins. The heat capacity at constant pressure has been calculated using the equations:⁸

for $T \leq 2670 \text{ K}$

$$C_p = \frac{C_1 \theta^2 e^{\theta/T}}{T^2 (e^{\theta/T} - 1)^2} + 2C_2 T + C_3 k e^{-E_a/kT} \left(1 + \frac{(T-298.15)E_a}{kT^2} \right) \quad (3)$$

where $C_1 = 78.212 \text{ J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$,

$C_2 = 3.8616 \times 10^{-3} \text{ J} \cdot \text{mol}^{-1} \cdot \text{K}^{-2}$,

$C_3 = 3.3993 \times 10^8 \text{ J} \cdot \text{mol}^{-1} \cdot \text{eV}$,

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$$\theta = 516.11 \text{ K},$$

$$E_a = 1.8815 \text{ eV},$$

$$k = 8.6144 \times 10^{-5} \text{ eV} \cdot \text{K}^{-1} \text{ is the Boltzmann constant;}$$

$$\text{for } 2670 \leq T \leq 3120 \text{ K}$$

$$C_p = 167.0.$$

(4)

In Eqs. (3-4), heat capacity is in $\text{J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$. Temperature is in kelvins in Eq. (3). The thermal conductivity, k , was calculated from:

$$\text{for } T \leq 2670 \text{ K}$$

$$k = \frac{1}{A + BT + CT^2} + DT e^{-E/kT} \quad (5)$$

$$\text{where } A = 6.8337 \times 10^{-2} \text{ m} \cdot \text{K} \cdot \text{W}^{-1},$$

$$B = 1.6693 \times 10^{-4} \text{ m} \cdot \text{W}^{-1},$$

$$C = 3.1886 \times 10^{-8} \text{ m} \cdot \text{W}^{-1} \cdot \text{K}^{-1},$$

$$D = 1.2783 \times 10^{-1} \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-2},$$

$$E = 1.1608 \text{ eV},$$

$$k = 8.6144 \times 10^{-5} \text{ eV} \cdot \text{K}^{-1} \text{ is the Boltzmann constant;}$$

$$\text{for } 2670 \leq T \leq 3120 \text{ K}$$

$$k = 4.1486 - 2.2673 \times 10^{-4} T. \quad (6)$$

In Eqs. (5-6), k is in $\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ and T is in kelvins. Eqs. (5-6) are based on a nonlinear least-squares fit (see Bevington¹⁰) to the experimental data¹⁻⁵ from 300 to 2670 K and a linear least-squares fit from 2670 to 3000 K. The fit using these two equations has a standard deviation of 6.2%. The first term of Eq. (6) represents the contribution due to

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phonons and the second term represents the electron contribution. The T^2 dependence in the phonon term was suggested by Cabannes¹¹ and by Pomeranchuk¹². It significantly improves the fit. Eq. (5) was constrained to agree with the linear equation at the transition temperature 2670 K to prevent any discontinuity in the calculated thermal diffusivity. The inclusion of a phonon and electronic term and the use of a linear equation above the transition temperature is consistent with the method used to evaluate the enthalpy and heat capacity data of UO_2 .⁸

Thermal diffusivity values calculated via Eqs. (1-6) fit the thermal diffusivity data to 6.6%.

For consistency, the recommended thermal diffusivity values are those calculated from the combined fit to thermal conductivity and thermal diffusivity via Eqs. (1-6). However these values may be approximated by the equations given below.

For $T < 2670$ K

$$\kappa = \frac{1}{A + BT + CT^2} + D e^{-E/kT} \quad (7)$$

where $A = 9.2996 \times 10^4 \text{ s} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$,

$B = 7.0462 \times 10^2 \text{ s} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$,

$C = 1.0017 \times 10^{-1} \text{ s} \cdot \text{m}^{-2} \cdot \text{K}^{-2}$,

$D = 1.3299 \times 10^{-5} \text{ m}^2 \cdot \text{s}^{-1}$,

$E = 0.95661 \text{ eV}$

$k = 8.6144 \times 10^{-5} \text{ eV} \cdot \text{K}^{-1}$ is the Boltzmann constant,

and κ is in m^2/s and T is in kelvins.

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κ

For $2670 < T \leq 3120$ K

$$\kappa = 6.0129 \times 10^{-7} - 8.0752 \times 10^{-12} T \quad (8)$$

where T is in kelvins and κ is in m^2/s .

These equations reproduce the recommended thermal diffusivity values with a standard deviation of 1.4%. They fit the thermal diffusivity data to 6.3%.

To correct the thermal diffusivity of porous specimens to theoretical density, the following equations are recommended:

$$\kappa = \kappa_0 (1 - \alpha P), \quad P \leq 0.1, \quad (9)$$

$$\kappa = \kappa_0 (1 - P)/(1 + 2P), \quad P \geq 0.1, \quad (10)$$

where κ_0 = thermal diffusivity of 100% dense UO_2 ,

P = fraction porosity,

and $\alpha = 2.5 \pm 1.5$ (see Ref. 13.)

Thermal diffusivity has been found to decrease with increasing oxygen content⁶ (i.e., O/M > 2.00) and with burnup. At temperatures above 1200 K, however, these effects can be considered negligible at the present time.

The value of thermal diffusivity recently measured¹⁴ for molten UO_2 near the melting point is $2.6 \times 10^{-6} \text{ m}^2/\text{s}$. The source of this high value has been ascribed to internal radiation^{14,15} and to electronic effects¹⁶, and is the subject of continuing investigation. Recent emissivity experiments and preliminary calculations of the absorption coefficient of liquid UO_2 by Bober¹⁷ indicate that the contribution of radiative heat transfer in liquid UO_2 cannot be responsible for this large increase of the thermal diffusivity upon melting.

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For solid UO_2 , the standard deviation (σ) of the data from the recommended values is 6.6%. For molten UO_2 , the only experimental measurements are near the melting point. The experimenters¹⁴ suggest a standard deviation (σ) of 20% be used for this value at the melting point until further data is available. Above 3120 K, the error in the use of $2.6 \times 10^{-6} \text{ m}^2/\text{s}$ for the thermal diffusivity of liquid UO_2 is estimated as increasing from 20% around 3120 K to 100% near 6000 K.

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 ϵ EmissivitySintered Stoichiometric UO₂ Pellets

<u>T, K</u>	<u>$\epsilon(\lambda = 0.63 \mu\text{m})$</u>
500	0.87
1000	0.87
2000	0.87
3000	0.87
3119	0.87

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 ϵ EmissivityPremelted Stoichiometric UO₂

<u>T, K</u>	<u>$\epsilon(\lambda = 0.63 \mu\text{m})$</u>
298.15	0.82
500	0.82
1000	0.83
1500	0.83
2000	0.83
2500	0.83
3000	0.84
3120(s)	0.84

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 ϵ EmissivityLiquid Stoichiometric UO₂

<u>T, K</u>	<u>$\epsilon(\lambda = 0.63 \text{ } \mu\text{m})$</u>
3120	0.84
3500	0.87
4000	0.91
4500	(0.95)*
5000	(0.98)
5500	(0.99)
6000	(0.996)

*Parenthesis indicates extrapolation beyond range of experimental data.

Recommended thermal emissivity values for UO_2 compared with reported experimental data.
(This figure contributed by R. Gibby⁹)

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Comparison of recommended equation for emissivity liquid UO₂ with Bober-Karow-Muller equation in the range of experimental data.

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 ϵ Emissivity

Temperature Range T, K	$\epsilon(0.63 \mu\text{m})$	Error $\sigma, \%$
1000-3120 (sintered)	0.87	3
1000-3120 (premelted)	$0.836 + 4.321 \times 10^{-6} (T-3120)$	3
3120-4200 (liquid)		3
4200-6000	$1.0 - 0.16096 e^{[-3.7897 \times 10^{-4} (T-3120) - 3.2718 \times 10^{-7} (T-3120)^2]}$	+3, -10

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Emissivity

The recent work of Bober, Karow, and Müller^{1,2} on solid and molten UO_2 provide spectral emissivity data over the range of 1000 to 4200 K. Since these are the most recent and reliable data and cover the widest temperature range, they are the recommended data source and the source of the values given in this temperature range in the accompanying table. Below 2000 K, data are in reasonable agreement with the earlier work of Cabannes, et al.,³ and Held and Wilder⁴, but disagree with the early data of Claudson⁵. The Claudson data give a decrease in emissivity with temperature from 0.85 to 0.37 in the temperature interval 1000 to 2200 K. Other investigators³ suggest that this decreasing function of Claudson is due to the presence of errors in the measurement techniques.

Above 2000 K, the data at $\lambda = 0.63 \mu\text{m}$ of Bober, Karow, and Müller exhibit a relatively flat temperature dependence unlike data at $\lambda = 0.65 \mu\text{m}$ of Held and Wilder⁴ which show a decrease in spectral emissivity with an increase in temperature. Bober, Karow, and Müller² found that while the temperature dependence is similar, the emissivity at $\lambda = 0.63 \mu\text{m}$ of sintered UO_2 is slightly higher than that of premelted UO_2 . They obtained¹ an emissivity of 0.87 at $\lambda = 0.63 \mu\text{m}$ for sintered UO_2 and recommend the equation given below to represent the data on the emissivity at $\lambda = 0.63 \mu\text{m}$ of premelted UO_2 .

$$\epsilon(\lambda = 0.63 \mu\text{m}) = 0.836 + 4.321 \times 10^{-6} (T - 3120) \quad (1)$$

where T is in kelvins.

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This representation of their data indicates the slight increase with temperature that was observed. Their results are supported by spectral emissivity measurements of Babelot et al.,⁶ who obtained a value of 0.84 at $\lambda = 0.65 \mu\text{m}$ at the melting point.

With a slight discontinuity at the solid-liquid phase transition (3120 K), the emissivity of UO_2 at $\lambda = 0.63 \mu\text{m}$ increases from 0.84 at the melting point to 0.92 at 4100 K.

Bober, Karow, and Müller fit their liquid UO_2 emissivity data in the temperature range 3120 to 4200 K with the quartic equation

$$\begin{aligned} \epsilon(\lambda = 0.63 \mu\text{m}) = & 0.843 + 1.4465 \times 10^{-5} \Delta T + 1.6497 \times 10^{-7} \Delta T^2 \\ & - 1.3136 \times 10^{-10} \Delta T^3 + 2.899 \times 10^{-14} \Delta T^4 \end{aligned} \quad (2)$$

where $\Delta T = T - T_m$

$T_m = 3120 \text{ K}$

and T is in kelvins.

While this equation may be used to represent the data in the temperature range 3120 to 4200 K, it should not be used to extrapolate beyond 4200 K since this quartic equation goes through an inflection point at 4831 K followed by an increasing slope so that it gives emissivity values of greater than unity for temperatures above 5668 K. Consequently the quartic equation should not be used above 4200 K, the end of the range of experimental data.

To provide an equation for extrapolation beyond the range of experimental data as well as for fitting the existing data, the equation

$$\epsilon(\lambda=0.63 \mu\text{m}) = 1 - 0.16096 e^{[-3.7897 \times 10^{-4} \Delta T - 3.2718 \times 10^{-7} (\Delta T)^2]} \quad (3)$$

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where $\Delta T = T - T_m$

$$T_m = 3120 \text{ K}$$

and T is in kelvins, is recommended.

This equation, suggested by C. L. Fink⁷, reproduces the values calculated via the Bober-Karow-Müller equation in the experimental range 3120 to 4200 K to within 0.14% and gives a reasonable form for emissivity at high temperatures.

No differences were found in the measured values of the emissivity of sintered and premolten UO_2 in the infrared region. Unlike the emissivity values at $\lambda = 0.63 \text{ } \mu\text{m}$, the values at $\lambda = 10.6 \text{ } \mu\text{m}$ show no discontinuity at the melting point and decrease sharply with increasing temperature. Measurements by Bober, Karow, and Müller² indicate the emissivity of UO_2 at $\lambda = 10.6 \text{ } \mu\text{m}$ decreases from 0.91 at 2200 K to 0.85 at the melting point (3120 K) and further decreases to 0.64 at 3670 K. This difference from results in the visible region is not currently understood.

Since results of Cabannes³ indicate that the spectral emissivity of solid sintered UO_2 is practically independent of wavelength in the range of 0.5 to 10 μm , the total normal emissivity of solid sintered UO_2 may be approximated by 0.87.

In a review of thermal radiative properties of UO_2 , Brandt and Neuer⁸ summarized the effects of various parameters on radiation properties as follows:

- The emittance of UO_2 is a volume-property and therefore not highly influenced by surface roughness.

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- The radiation properties are not essentially dependent on the U/O ratio.
- The radiative properties are not highly temperature dependent.
- The effects of impurities and contamination are not currently known. Thus emissivity could show significant dependence on these parameters particularly in the visible region at high temperatures.

The recommended spectral emissivity data of Bober, Karow, and Müller² agree within their estimated uncertainty both with the data of Held and Wilder⁴ and that of Cabannes et al.³ at temperatures below 2100 K. At the melting point, good agreement exists between the data of Bober and Karow¹ and that of Babelot et al.⁶ The estimated uncertainty (1σ) for the entire solid range and for the liquid in the temperature range (3120 to 4200 K) is $\pm 3\%$. Above 4200 K, the estimated uncertainty is $+3\%$ and -10% .

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 η Viscosity

<u>T, K</u>	<u>η, mPa·s (= cp)</u>
3120	4.34
3200	4.19
3300	4.01
3400	(3.84)*
3500	(3.70)
3600	(3.57)
3700	(3.44)
3800	(3.33)
3900	(3.23)
4000	(3.14)
4100	(3.05)
4200	(2.97)
4300	(2.89)
4400	(2.82)
4500	(2.76)
4600	(2.70)
4700	(2.64)
4800	(2.59)
4900	(2.54)
5000	(2.49)
5100	(2.44)
5200	(2.40)
5300	(2.36)
5400	(2.32)
5500	(2.29)
5600	(2.25)
5700	(2.22)
5800	(2.19)
5900	(2.16)
6000	(2.13)

*Parenthesis indicate extrapolation beyond the range of experimental data.

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 η

Temperature Range T, K	<u>Viscosity</u>	
	η , mPa·s	Error σ , %
3120-3400		25
3400-3500	0.988 exp (4620/T)	50
4500-6000		100 (factor of 2)

A 1.2.4.2

A Comparison of the Recommended Viscosity Function with Available Experimental Data
(This figure is due to R. Gibby⁵.)

The Viscosity of Liquid UO_2 .

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Viscosity*

Viscosity data for UO_2 are available from the experimental measurements of Woodley,¹ Tsai and Olander,² and Palinski³ which agree reasonably well. Tsai and Olander's viscosity values are slightly higher than Woodley's and because of the better precision of the data we have chosen to use the latter results. The Woodley equation is

$$\eta = 0.988 \exp (4620/T), \quad (1)$$

where η is in centipoise (mPa·s) and T is in kelvins.

Recently, Palinski³ obtained the value 4.6 cP for the kinematic viscosity of UO_2 at the melting point. This value agrees within 7% with 4.3 cP calculated via the Woodly equation.

The viscosity of UO_2 has also been measured by Nelson et al.,⁴ at 3028 and 3068 K which they believed was just above the melting point. Their viscosity values at these temperatures are a factor of 10 above those from Eq. (1) at 3120 K. Reviewing their experimental data has led us to hypothesize that the Nelson viscosity values were measured below the melting point of UO_2 . Consequently their values have not been included in this analysis.

The uncertainty in the available viscosity data can only be estimated because of the lack of any high temperature standards to calibrate the viscometers. In the temperature, range 3120–3400 K, the uncertainty, σ , is estimated as $\pm 25\%$ from data from two different studies and qualitative observations.

* Parts of this section were contributed by R. Gibby⁵, Hanford Engineering Development Laboratory, Richland, WA.

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TABULATED TRANSPORT PROPERTIES
IN SI UNITS

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
298	3.2034D-06	8.2685D+00	8.2381D-01
300	3.1817D-06	8.2450D+00	8.2381D-01
310	3.0857D-06	8.1202D+00	8.2386D-01
320	2.9970D-06	7.9987D+00	8.2390D-01
330	2.9149D-06	7.8805D+00	8.2394D-01
340	2.8384D-06	7.7652D+00	8.2399D-01
350	2.7669D-06	7.6530D+00	8.2403D-01
360	2.6999D-06	7.5435D+00	8.2407D-01
370	2.6368D-06	7.4368D+00	8.2412D-01
380	2.5774D-06	7.3327D+00	8.2416D-01
390	2.5212D-06	7.2312D+00	8.2420D-01
400	2.4679D-06	7.1321D+00	8.2425D-01
410	2.4173D-06	7.0354D+00	8.2429D-01
420	2.3691D-06	6.9410D+00	8.2433D-01
430	2.3231D-06	6.8487D+00	8.2438D-01
440	2.2791D-06	6.7586D+00	8.2442D-01
450	2.2371D-06	6.6706D+00	8.2446D-01
460	2.1967D-06	6.5845D+00	8.2451D-01
470	2.1580D-06	6.5004D+00	8.2455D-01
480	2.1208D-06	6.4181D+00	8.2459D-01
490	2.0850D-06	6.3376D+00	8.2464D-01
500	2.0505D-06	6.2589D+00	8.2468D-01
510	2.0172D-06	6.1818D+00	8.2472D-01
520	1.9850D-06	6.1064D+00	8.2477D-01
530	1.9539D-06	6.0326D+00	8.2481D-01
540	1.9238D-06	5.9603D+00	8.2485D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
550	1.8947D-06	5.8895D+00	8.2490D-01
560	1.8665D-06	5.8201D+00	8.2494D-01
570	1.8391D-06	5.7522D+00	8.2498D-01
580	1.8125D-06	5.6856D+00	8.2502D-01
590	1.7867D-06	5.6203D+00	8.2507D-01
600	1.7617D-06	5.5564D+00	8.2511D-01
610	1.7373D-06	5.4936D+00	8.2515D-01
620	1.7135D-06	5.4321D+00	8.2520D-01
630	1.6904D-06	5.3718D+00	8.2524D-01
640	1.6679D-06	5.3126D+00	8.2528D-01
650	1.6460D-06	5.2545D+00	8.2533D-01
660	1.6246D-06	5.1975D+00	8.2537D-01
670	1.6038D-06	5.1416D+00	8.2541D-01
680	1.5834D-06	5.0866D+00	8.2546D-01
690	1.5636D-06	5.0327D+00	8.2550D-01
700	1.5442D-06	4.9798D+00	8.2554D-01
710	1.5252D-06	4.9278D+00	8.2559D-01
720	1.5067D-06	4.8767D+00	8.2563D-01
730	1.4886D-06	4.8265D+00	8.2567D-01
740	1.4709D-06	4.7772D+00	8.2572D-01
750	1.4536D-06	4.7288D+00	8.2576D-01
760	1.4366D-06	4.6812D+00	8.2580D-01
770	1.4200D-06	4.6344D+00	8.2585D-01
780	1.4038D-06	4.5884D+00	8.2589D-01
790	1.3878D-06	4.5432D+00	8.2593D-01
800	1.3722D-06	4.4987D+00	8.2598D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
810	1.3570D-06	4.4549D+00	8.2602D-01
820	1.3420D-06	4.4119D+00	8.2606D-01
830	1.3273D-06	4.3696D+00	8.2610D-01
840	1.3129D-06	4.3279D+00	8.2615D-01
850	1.2988D-06	4.2870D+00	8.2619D-01
860	1.2849D-06	4.2467D+00	8.2623D-01
870	1.2713D-06	4.2070D+00	8.2628D-01
880	1.2580D-06	4.1679D+00	8.2632D-01
890	1.2449D-06	4.1295D+00	8.2636D-01
900	1.2320D-06	4.0917D+00	8.2641D-01
910	1.2194D-06	4.0544D+00	8.2645D-01
920	1.2069D-06	4.0177D+00	8.2649D-01
930	1.1948D-06	3.9816D+00	8.2654D-01
940	1.1828D-06	3.9460D+00	8.2658D-01
950	1.1710D-06	3.9110D+00	8.2662D-01
960	1.1594D-06	3.8764D+00	8.2667D-01
970	1.1481D-06	3.8424D+00	8.2671D-01
980	1.1369D-06	3.8089D+00	8.2675D-01
990	1.1259D-06	3.7759D+00	8.2680D-01
1000	1.1151D-06	3.7434D+00	8.2684D-01
1010	1.1044D-06	3.7113D+00	8.2688D-01
1020	1.0940D-06	3.6797D+00	8.2693D-01
1030	1.0837D-06	3.6485D+00	8.2697D-01
1040	1.0736D-06	3.6178D+00	8.2701D-01
1050	1.0636D-06	3.5876D+00	8.2706D-01
1060	1.0538D-06	3.5577D+00	8.2710D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
1070	1.0441D-06	3.5283D+00	8.2714D-01
1080	1.0346D-06	3.4993D+00	8.2719D-01
1090	1.0253D-06	3.4707D+00	8.2723D-01
1100	1.0161D-06	3.4425D+00	8.2727D-01
1110	1.0070D-06	3.4147D+00	8.2731D-01
1120	9.9806D-07	3.3873D+00	8.2736D-01
1130	9.8926D-07	3.3602D+00	8.2740D-01
1140	9.8060D-07	3.3336D+00	8.2744D-01
1150	9.7207D-07	3.3072D+00	8.2749D-01
1160	9.6367D-07	3.2813D+00	8.2753D-01
1170	9.5539D-07	3.2557D+00	8.2757D-01
1180	9.4723D-07	3.2305D+00	8.2762D-01
1190	9.3920D-07	3.2056D+00	8.2766D-01
1200	9.3128D-07	3.1810D+00	8.2770D-01
1210	9.2348D-07	3.1568D+00	8.2775D-01
1220	9.1579D-07	3.1329D+00	8.2779D-01
1230	9.0822D-07	3.1093D+00	8.2783D-01
1240	9.0075D-07	3.0860D+00	8.2788D-01
1250	8.9340D-07	3.0631D+00	8.2792D-01
1260	8.8615D-07	3.0405D+00	8.2796D-01
1270	8.7901D-07	3.0182D+00	8.2801D-01
1280	8.7157D-07	2.9962D+00	8.2805D-01
1290	8.6503D-07	2.9745D+00	8.2809D-01
1300	8.5820D-07	2.9531D+00	8.2814D-01
1310	8.5146D-07	2.9320D+00	8.2818D-01
1320	8.4482D-07	2.9111D+00	8.2822D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (cm^2/s)	CONDUCTIVITY (W/m-K)	EMISSIVITY
1330	8.3827D-07	2.8906D+00	8.2827D-01
1340	8.3182D-07	2.8704D+00	8.2831D-01
1350	8.2547D-07	2.8505D+00	8.2835D-01
1360	8.1920D-07	2.8308D+00	8.2840D-01
1370	8.1303D-07	2.8114D+00	8.2844D-01
1380	8.0695D-07	2.7924D+00	8.2848D-01
1390	8.0096D-07	2.7736D+00	8.2852D-01
1400	7.9506D-07	2.7550D+00	8.2857D-01
1410	7.8924D-07	2.7368D+00	8.2861D-01
1420	7.8351D-07	2.7188D+00	8.2865D-01
1430	7.7786D-07	2.7011D+00	8.2870D-01
1440	7.7230D-07	2.6837D+00	8.2874D-01
1450	7.6683D-07	2.6666D+00	8.2878D-01
1460	7.6143D-07	2.6497D+00	8.2883D-01
1470	7.5612D-07	2.6331D+00	8.2887D-01
1480	7.5089D-07	2.6168D+00	8.2891D-01
1490	7.4574D-07	2.6008D+00	8.2896D-01
1500	7.4067D-07	2.5850D+00	8.2900D-01
1510	7.3568D-07	2.5696D+00	8.2904D-01
1520	7.3077D-07	2.5544D+00	8.2909D-01
1530	7.2594D-07	2.5394D+00	8.2913D-01
1540	7.2118D-07	2.5248D+00	8.2917D-01
1550	7.1651D-07	2.5104D+00	8.2922D-01
1560	7.1191D-07	2.4963D+00	8.2926D-01
1570	7.0738D-07	2.4825D+00	8.2930D-01
1580	7.0293D-07	2.4690D+00	8.2935D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
1590	6.9856D-07	2.4557D+00	8.2939D-01
1600	6.9426D-07	2.4428D+00	8.2943D-01
1610	6.9004D-07	2.4301D+00	8.2948D-01
1620	6.8589D-07	2.4177D+00	8.2952D-01
1630	6.8162D-07	2.4056D+00	8.2956D-01
1640	6.7782D-07	2.3938D+00	8.2960D-01
1650	6.7389D-07	2.3823D+00	8.2965D-01
1660	6.7004D-07	2.3711D+00	8.2969D-01
1670	6.6625D-07	2.3602D+00	8.2973D-01
1680	6.6254D-07	2.3496D+00	8.2978D-01
1690	6.5891D-07	2.3393D+00	8.2982D-01
1700	6.5534D-07	2.3293D+00	8.2986D-01
1710	6.5185D-07	2.3197D+00	8.2991D-01
1720	6.4842D-07	2.3103D+00	8.2995D-01
1730	6.4507D-07	2.3013D+00	8.2999D-01
1740	6.4179D-07	2.2925D+00	8.3004D-01
1750	6.3858D-07	2.2842D+00	8.3008D-01
1760	6.3544D-07	2.2761D+00	8.3012D-01
1770	6.3238D-07	2.2683D+00	8.3017D-01
1780	6.2938D-07	2.2609D+00	8.3021D-01
1790	6.2645D-07	2.2539D+00	8.3025D-01
1800	6.2359D-07	2.2471D+00	8.3030D-01
1810	6.2080D-07	2.2408D+00	8.3034D-01
1820	6.1808D-07	2.2347D+00	8.3038D-01
1830	6.1542D-07	2.2290D+00	8.3043D-01
1840	6.1284D-07	2.2237D+00	8.3047D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
1850	6.1033D-07	2.2188D+00	8.3051D-01
1860	6.0788D-07	2.2142D+00	8.3056D-01
1870	6.0550D-07	2.2099D+00	8.3060D-01
1880	6.0319D-07	2.2061D+00	8.3064D-01
1890	6.0095D-07	2.2026D+00	8.3069D-01
1900	5.9877D-07	2.1995D+00	8.3073D-01
1910	5.9666D-07	2.1968D+00	8.3077D-01
1920	5.9462D-07	2.1945D+00	8.3081D-01
1930	5.9264D-07	2.1926D+00	8.3086D-01
1940	5.9073D-07	2.1911D+00	8.3090D-01
1950	5.8888D-07	2.1900D+00	8.3094D-01
1960	5.8710D-07	2.1893D+00	8.3099D-01
1970	5.8539D-07	2.1891D+00	8.3103D-01
1980	5.8373D-07	2.1892D+00	8.3107D-01
1990	5.8215D-07	2.1898D+00	8.3112D-01
2000	5.8062D-07	2.1908D+00	8.3116D-01
2010	5.7916D-07	2.1923D+00	8.3120D-01
2020	5.7776D-07	2.1942D+00	8.3125D-01
2030	5.7642D-07	2.1965D+00	8.3129D-01
2040	5.7515D-07	2.1993D+00	8.3133D-01
2050	5.7393D-07	2.2026D+00	8.3138D-01
2060	5.7277D-07	2.2063D+00	8.3142D-01
2070	5.7168D-07	2.2105D+00	8.3146D-01
2080	5.7064D-07	2.2151D+00	8.3151D-01
2090	5.6966D-07	2.2203D+00	8.3155D-01
2100	5.6873D-07	2.2259D+00	8.3159D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
2110	5.6767D-07	2.2321D+00	8.3164D-01
2120	5.6706D-07	2.2387D+00	8.3168D-01
2130	5.6630D-07	2.2458D+00	8.3172D-01
2140	5.6560D-07	2.2535D+00	8.3177D-01
2150	5.6495D-07	2.2616D+00	8.3181D-01
2160	5.6435D-07	2.2703D+00	8.3185D-01
2170	5.6381D-07	2.2795D+00	8.3190D-01
2180	5.6331D-07	2.2892D+00	8.3194D-01
2190	5.6287D-07	2.2995D+00	8.3198D-01
2200	5.6247D-07	2.3103D+00	8.3202D-01
2210	5.6212D-07	2.3217D+00	8.3207D-01
2220	5.6182D-07	2.3336D+00	8.3211D-01
2230	5.6156D-07	2.3461D+00	8.3215D-01
2240	5.6135D-07	2.3592D+00	8.3220D-01
2250	5.6118D-07	2.3728D+00	8.3224D-01
2260	5.6106D-07	2.3870D+00	8.3228D-01
2270	5.6097D-07	2.4018D+00	8.3233D-01
2280	5.6093D-07	2.4172D+00	8.3237D-01
2290	5.6092D-07	2.4332D+00	8.3241D-01
2300	5.6095D-07	2.4498D+00	8.3246D-01
2310	5.6102D-07	2.4670D+00	8.3250D-01
2320	5.6112D-07	2.4848D+00	8.3254D-01
2330	5.6126D-07	2.5032D+00	8.3259D-01
2340	5.6143D-07	2.5223D+00	8.3263D-01
2350	5.6163D-07	2.5420D+00	8.3267D-01
2360	5.6186D-07	2.5624D+00	8.3272D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
2370	5.6213D-07	2.5834D+00	8.3276D-01
2380	5.6242D-07	2.6050D+00	8.3280D-01
2390	5.6274D-07	2.6273D+00	8.3285D-01
2400	5.6308D-07	2.6503D+00	8.3289D-01
2410	5.6345D-07	2.6739D+00	8.3293D-01
2420	5.6384D-07	2.6982D+00	8.3298D-01
2430	5.6425D-07	2.7232D+00	8.3302D-01
2440	5.6469D-07	2.7489D+00	8.3306D-01
2450	5.6515D-07	2.7753D+00	8.3310D-01
2460	5.6562D-07	2.8024D+00	8.3315D-01
2470	5.6611D-07	2.8301D+00	8.3319D-01
2480	5.6662D-07	2.8586D+00	8.3323D-01
2490	5.6715D-07	2.8879D+00	8.3328D-01
2500	5.6769D-07	2.9178D+00	8.3332D-01
2510	5.6824D-07	2.9485D+00	8.3336D-01
2520	5.6881D-07	2.9799D+00	8.3341D-01
2530	5.6939D-07	3.0120D+00	8.3345D-01
2540	5.6998D-07	3.0449D+00	8.3349D-01
2550	5.7058D-07	3.0786D+00	8.3354D-01
2560	5.7118D-07	3.1130D+00	8.3358D-01
2570	5.7180D-07	3.1482D+00	8.3362D-01
2580	5.7242D-07	3.1841D+00	8.3367D-01
2590	5.7305D-07	3.2209D+00	8.3371D-01
2600	5.7369D-07	3.2584D+00	8.3375D-01
2610	5.7433D-07	3.2967D+00	8.3380D-01
2620	5.7497D-07	3.3358D+00	8.3384D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M^2/S)	CONDUCTIVITY ($\text{W}/\text{M-K}$)	EMISSIVITY
2630	5.7562D-07	3.3757D+00	8.3388D-01
2640	5.7627D-07	3.4164D+00	8.3393D-01
2650	5.7692D-07	3.4579D+00	8.3397D-01
2660	5.7757D-07	3.5002D+00	8.3401D-01
2670	5.7822D-07	3.5433D+00	8.3406D-01
2680	5.7599D-07	3.5410D+00	8.3410D-01
2690	5.7598D-07	3.5387D+00	8.3414D-01
2700	5.7597D-07	3.5364D+00	8.3419D-01
2710	5.7597D-07	3.5342D+00	8.3423D-01
2720	5.7596D-07	3.5319D+00	8.3427D-01
2730	5.7596D-07	3.5296D+00	8.3431D-01
2740	5.7595D-07	3.5274D+00	8.3436D-01
2750	5.7595D-07	3.5251D+00	8.3440D-01
2760	5.7595D-07	3.5228D+00	8.3444D-01
2770	5.7594D-07	3.5206D+00	8.3449D-01
2780	5.7594D-07	3.5183D+00	8.3453D-01
2790	5.7594D-07	3.5160D+00	8.3457D-01
2800	5.7594D-07	3.5138D+00	8.3462D-01
2810	5.7595D-07	3.5115D+00	8.3466D-01
2820	5.7595D-07	3.5092D+00	8.3470D-01
2830	5.7595D-07	3.5070D+00	8.3475D-01
2840	5.7596D-07	3.5047D+00	8.3479D-01
2850	5.7596D-07	3.5024D+00	8.3483D-01
2860	5.7597D-07	3.5002D+00	8.3488D-01
2870	5.7597D-07	3.4979D+00	8.3492D-01
2880	5.7598D-07	3.4956D+00	8.3496D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (M**2/S)	CONDUCTIVITY (W/M-K)	EMISSIVITY
2890	5.7599D-07	3.4934D+00	8.3501D-01
2900	5.7600D-07	3.4911D+00	8.3505D-01
2910	5.7601D-07	3.4888D+00	8.3509D-01
2920	5.7602D-07	3.4865D+00	8.3514D-01
2930	5.7603D-07	3.4843D+00	8.3518D-01
2940	5.7605D-07	3.4820D+00	8.3522D-01
2950	5.7606D-07	3.4797D+00	8.3527D-01
2960	5.7608D-07	3.4775D+00	8.3531D-01
2970	5.7609D-07	3.4752D+00	8.3535D-01
2980	5.7611D-07	3.4729D+00	8.3540D-01
2990	5.7612D-07	3.4707D+00	8.3544D-01
3000	5.7614D-07	3.4684D+00	8.3548D-01
3010	5.7616D-07	3.4661D+00	8.3552D-01
3020	5.7618D-07	3.4639D+00	8.3557D-01
3030	5.7620D-07	3.4616D+00	8.3561D-01
3040	5.7622D-07	3.4593D+00	8.3565D-01
3050	5.7625D-07	3.4571D+00	8.3570D-01
3060	5.7627D-07	3.4548D+00	8.3574D-01
3070	5.7629D-07	3.4525D+00	8.3578D-01
3080	5.7632D-07	3.4503D+00	8.3583D-01
3090	5.7634D-07	3.4480D+00	8.3587D-01
3100	5.7637D-07	3.4457D+00	8.3591D-01
3110	5.7640D-07	3.4435D+00	8.3596D-01
3120	5.7643D-07	3.4412D+00	8.3600D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
3120	4.3436D+00	8.3904D-01
3130	4.3231D+00	8.3965D-01
3140	4.3028D+00	8.4028D-01
3150	4.2827D+00	8.4091D-01
3160	4.2629D+00	8.4154D-01
3170	4.2433D+00	8.4219D-01
3180	4.2239D+00	8.4284D-01
3190	4.2047D+00	8.4350D-01
3200	4.1857D+00	8.4417D-01
3210	4.1669D+00	8.4485D-01
3220	4.1483D+00	8.4553D-01
3230	4.1300D+00	8.4622D-01
3240	4.1118D+00	8.4692D-01
3250	4.0938D+00	8.4762D-01
3260	4.0760D+00	8.4833D-01
3270	4.0583D+00	8.4905D-01
3280	4.0409D+00	8.4977D-01
3290	4.0236D+00	8.5050D-01
3300	4.0065D+00	8.5124D-01
3310	3.9896D+00	8.5198D-01
3320	3.9729D+00	8.5273D-01
3330	3.9563D+00	8.5348D-01
3340	3.9399D+00	8.5424D-01
3350	3.9237D+00	8.5501D-01
3360	3.9076D+00	8.5578D-01
3370	3.8917D+00	8.5655D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
3380	3.876CD+00	8.5733D-01
3390	3.8604D+00	8.5812D-01
3400	3.8449D+00	8.5891D-01
3410	3.8296D+00	8.5971D-01
3420	3.8145D+00	8.6051D-01
3430	3.7995D+00	8.6131D-01
3440	3.7846D+00	8.6212D-01
3450	3.7699D+00	8.6293D-01
3460	3.7554D+00	8.6375D-01
3470	3.7409D+00	8.6457D-01
3480	3.7267D+00	8.6540D-01
3490	3.7125D+00	8.6623D-01
3500	3.6985D+00	8.6706D-01
3510	3.6846D+00	8.6790D-01
3520	3.6709D+00	8.6873D-01
3530	3.6572D+00	8.6958D-01
3540	3.6437D+00	8.7042D-01
3550	3.6304D+00	8.7127D-01
3560	3.6171D+00	8.7212D-01
3570	3.6040D+00	8.7298D-01
3580	3.5910D+00	8.7383D-01
3590	3.5781D+00	8.7469D-01
3600	3.5653D+00	8.7555D-01
3610	3.5527D+00	8.7642D-01
3620	3.5402D+00	8.7728D-01
3630	3.5277D+00	8.7815D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
3640	3.5154D+00	8.7902D-01
3650	3.5032D+00	8.7989D-01
3660	3.4911D+00	8.8076D-01
3670	3.4791D+00	8.8164D-01
3680	3.4673D+00	8.8251D-01
3690	3.4555D+00	8.8339D-01
3700	3.4438D+00	8.8427D-01
3710	3.4322D+00	8.8514D-01
3720	3.4208D+00	8.8602D-01
3730	3.4094D+00	8.8690D-01
3740	3.3981D+00	8.8778D-01
3750	3.3869D+00	8.8866D-01
3760	3.3759D+00	8.8955D-01
3770	3.3649D+00	8.9043D-01
3780	3.3540D+00	8.9131D-01
3790	3.3432D+00	8.9219D-01
3800	3.3325D+00	8.9307D-01
3810	3.3219D+00	8.9395D-01
3820	3.3113D+00	8.9483D-01
3830	3.3009D+00	8.9571D-01
3840	3.2905D+00	8.9659D-01
3850	3.2803D+00	8.9747D-01
3860	3.2701D+00	8.9835D-01
3870	3.2600D+00	8.9923D-01
3880	3.2500D+00	9.0010D-01
3890	3.2400D+00	9.0098D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
3900	3.2302D+00	9.0185D-01
3910	3.2204D+00	9.0272D-01
3920	3.2107D+00	9.0359D-01
3930	3.2011D+00	9.0446D-01
3940	3.1916D+00	9.0533D-01
3950	3.1821D+00	9.0620D-01
3960	3.1727D+00	9.0706D-01
3970	3.1634D+00	9.0792D-01
3980	3.1542D+00	9.0878D-01
3990	3.1450D+00	9.0964D-01
4000	3.1359D+00	9.1050D-01
4010	3.1269D+00	9.1135D-01
4020	3.1180D+00	9.1220D-01
4030	3.1091D+00	9.1305D-01
4040	3.1003D+00	9.1389D-01
4050	3.0915D+00	9.1474D-01
4060	3.0829D+00	9.1558D-01
4070	3.0743D+00	9.1642D-01
4080	3.0657D+00	9.1725D-01
4090	3.0572D+00	9.1808D-01
4100	3.0488D+00	9.1891D-01
4110	3.0405D+00	9.1974D-01
4120	3.0322D+00	9.2056D-01
4130	3.0240D+00	9.2138D-01
4140	3.0158D+00	9.2219D-01
4150	3.0077D+00	9.2301D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
4160	2.9997D+00	9.2382D-01
4170	2.9917D+00	9.2462D-01
4180	2.9838D+00	9.2542D-01
4190	2.9759D+00	9.2622D-01
4200	2.9681D+00	9.2702D-01
4210	2.9604D+00	9.2781D-01
4220	2.9527D+00	9.2859D-01
4230	2.9451D+00	9.2938D-01
4240	2.9375D+00	9.3015D-01
4250	2.9300D+00	9.3093D-01
4260	2.9225D+00	9.3170D-01
4270	2.9151D+00	9.3247D-01
4280	2.9077D+00	9.3323D-01
4290	2.9004D+00	9.3398D-01
4300	2.8932D+00	9.3474D-01
4310	2.8859D+00	9.3549D-01
4320	2.8788D+00	9.3623D-01
4330	2.8717D+00	9.3697D-01
4340	2.8646D+00	9.3771D-01
4350	2.8576D+00	9.3844D-01
4360	2.8507D+00	9.3917D-01
4370	2.8438D+00	9.3989D-01
4380	2.8369D+00	9.4060D-01
4390	2.8301D+00	9.4132D-01
4400	2.8234D+00	9.4202D-01
4410	2.8166D+00	9.4273D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
4420	2.8100D+00	9.4343D-01
4430	2.8034D+00	9.4412D-01
4440	2.7968D+00	9.4481D-01
4450	2.7902D+00	9.4549D-01
4460	2.7838D+00	9.4617D-01
4470	2.7773D+00	9.4684D-01
4480	2.7709D+00	9.4751D-01
4490	2.7646D+00	9.4817D-01
4500	2.7582D+00	9.4883D-01
4510	2.7520D+00	9.4949D-01
4520	2.7457D+00	9.5013D-01
4530	2.7396D+00	9.5078D-01
4540	2.7334D+00	9.5142D-01
4550	2.7273D+00	9.5205D-01
4560	2.7212D+00	9.5268D-01
4570	2.7152D+00	9.5330D-01
4580	2.7092D+00	9.5392D-01
4590	2.7033D+00	9.5453D-01
4600	2.6974D+00	9.5514D-01
4610	2.6915D+00	9.5574D-01
4620	2.6857D+00	9.5634D-01
4630	2.6799D+00	9.5693D-01
4640	2.6741D+00	9.5751D-01
4650	2.6684D+00	9.5809D-01
4660	2.6627D+00	9.5867D-01
4670	2.6571D+00	9.5924D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
4680	2.6515D+00	9.5981D-01
4690	2.6459D+00	9.6037D-01
4700	2.6403D+00	9.6092D-01
4710	2.6348D+00	9.6147D-01
4720	2.6294D+00	9.6201D-01
4730	2.6239D+00	9.6255D-01
4740	2.6185D+00	9.6309D-01
4750	2.6132D+00	9.6362D-01
4760	2.6078D+00	9.6414D-01
4770	2.6025D+00	9.6466D-01
4780	2.5973D+00	9.6517D-01
4790	2.5920D+00	9.6568D-01
4800	2.5868D+00	9.6618D-01
4810	2.5816D+00	9.6668D-01
4820	2.5765D+00	9.6717D-01
4830	2.5714D+00	9.6766D-01
4840	2.5663D+00	9.6814D-01
4850	2.5613D+00	9.6862D-01
4860	2.5563D+00	9.6909D-01
4870	2.5513D+00	9.6955D-01
4880	2.5463D+00	9.7002D-01
4890	2.5414D+00	9.7047D-01
4900	2.5365D+00	9.7092D-01
4910	2.5316D+00	9.7137D-01
4920	2.5268D+00	9.7181D-01
4930	2.5220D+00	9.7225D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
4940	2.5172D+00	9.7268D-01
4950	2.5125D+00	9.7310D-01
4960	2.5077D+00	9.7353D-01
4970	2.5030D+00	9.7394D-01
4980	2.4984D+00	9.7435D-01
4990	2.4937D+00	9.7476D-01
5000	2.4891D+00	9.7516D-01
5010	2.4845D+00	9.7556D-01
5020	2.4800D+00	9.7595D-01
5030	2.4754D+00	9.7634D-01
5040	2.4709D+00	9.7672D-01
5050	2.4664D+00	9.7710D-01
5060	2.4620D+00	9.7748D-01
5070	2.4576D+00	9.7785D-01
5080	2.4532D+00	9.7821D-01
5090	2.4488D+00	9.7857D-01
5100	2.4444D+00	9.7892D-01
5110	2.4401D+00	9.7928D-01
5120	2.4358D+00	9.7962D-01
5130	2.4315D+00	9.7996D-01
5140	2.4273D+00	9.8030D-01
5150	2.4230D+00	9.8063D-01
5160	2.4188D+00	9.8096D-01
5170	2.4146D+00	9.8129D-01
5180	2.4105D+00	9.8161D-01
5190	2.4063D+00	9.8192D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
5200	2.4022D+00	9.8223D-01
5210	2.3981D+00	9.8254D-01
5220	2.3940D+00	9.8284D-01
5230	2.3900D+00	9.8314D-01
5240	2.3860D+00	9.8344D-01
5250	2.3820D+00	9.8373D-01
5260	2.3780D+00	9.8401D-01
5270	2.3740D+00	9.8429D-01
5280	2.3701D+00	9.8457D-01
5290	2.3662D+00	9.8485D-01
5300	2.3623D+00	9.8512D-01
5310	2.3584D+00	9.8539D-01
5320	2.3545D+00	9.8565D-01
5330	2.3507D+00	9.8591D-01
5340	2.3469D+00	9.8616D-01
5350	2.3431D+00	9.8641D-01
5360	2.3393D+00	9.8666D-01
5370	2.3356D+00	9.8691D-01
5380	2.3319D+00	9.8715D-01
5390	2.3281D+00	9.8738D-01
5400	2.3244D+00	9.8762D-01
5410	2.3208D+00	9.8785D-01
5420	2.3171D+00	9.8807D-01
5430	2.3135D+00	9.8830D-01
5440	2.3099D+00	9.8852D-01
5450	2.3063D+00	9.8873D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
5460	2.3027D+00	9.8895D-01
5470	2.2991D+00	9.8915D-01
5480	2.2956D+00	9.8936D-01
5490	2.2921D+00	9.8956D-01
5500	2.2886D+00	9.8976D-01
5510	2.2851D+00	9.8996D-01
5520	2.2816D+00	9.9015D-01
5530	2.2782D+00	9.9034D-01
5540	2.2747D+00	9.9053D-01
5550	2.2713D+00	9.9072D-01
5560	2.2679D+00	9.9090D-01
5570	2.2645D+00	9.9108D-01
5580	2.2612D+00	9.9125D-01
5590	2.2578D+00	9.9142D-01
5600	2.2545D+00	9.9159D-01
5610	2.2512D+00	9.9176D-01
5620	2.2479D+00	9.9192D-01
5630	2.2446D+00	9.9209D-01
5640	2.2413D+00	9.9224D-01
5650	2.2381D+00	9.9240D-01
5660	2.2349D+00	9.9255D-01
5670	2.2317D+00	9.9270D-01
5680	2.2285D+00	9.9285D-01
5690	2.2253D+00	9.9300D-01
5700	2.2221D+00	9.9314D-01
5710	2.2190D+00	9.9328D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
5720	2.2158D+00	9.9342D-01
5730	2.2127D+00	9.9356D-01
5740	2.2096D+00	9.9369D-01
5750	2.2065D+00	9.9382D-01
5760	2.2034D+00	9.9395D-01
5770	2.2004D+00	9.9407D-01
5780	2.1973D+00	9.9420D-01
5790	2.1943D+00	9.9432D-01
5800	2.1913D+00	9.9444D-01
5810	2.1883D+00	9.9456D-01
5820	2.1853D+00	9.9467D-01
5830	2.1823D+00	9.9479D-01
5840	2.1793D+00	9.9490D-01
5850	2.1764D+00	9.9501D-01
5860	2.1735D+00	9.9511D-01
5870	2.1705D+00	9.9522D-01
5880	2.1676D+00	9.9532D-01
5890	2.1648D+00	9.9542D-01
5900	2.1619D+00	9.9552D-01
5910	2.1590D+00	9.9562D-01
5920	2.1562D+00	9.9572D-01
5930	2.1533D+00	9.9581D-01
5940	2.1505D+00	9.9590D-01
5950	2.1477D+00	9.9599D-01
5960	2.1449D+00	9.9608D-01
5970	2.1421D+00	9.9617D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (PA-S)	EMISSIVITY
5980	2.1394D+00	9.9625D-01
5990	2.1366D+00	9.9634D-01
6000	2.1338D+00	9.9642D-01

TABULATED TRANSPORT PROPERTIES
IN CGS UNITS

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
298	3.2004D-06	8.2685D+00	8.2381D-01
300	3.1817D-02	8.2450D-02	8.2381D-01
310	3.0657D-02	8.1202D-02	8.2386D-01
320	2.9970D-02	7.9987D-02	8.2390D-01
330	2.9149D-02	7.8805D-02	8.2394D-01
340	2.8384D-02	7.7652D-02	8.2399D-01
350	2.7669D-02	7.6530D-02	8.2403D-01
360	2.6999D-02	7.5435D-02	8.2407D-01
370	2.6368D-02	7.4368D-02	8.2412D-01
380	2.5774D-02	7.3327D-02	8.2416D-01
390	2.5212D-02	7.2312D-02	8.2420D-01
400	2.4679D-02	7.1321D-02	8.2425D-01
410	2.4173D-02	7.0354D-02	8.2429D-01
420	2.3691D-02	6.9410D-02	8.2433D-01
430	2.3231D-02	6.8487D-02	8.2438D-01
440	2.2791D-02	6.7586D-02	8.2442D-01
450	2.2371D-02	6.6706D-02	8.2446D-01
460	2.1967D-02	6.5845D-02	8.2451D-01
470	2.1580D-02	6.5004D-02	8.2455D-01
480	2.1208D-02	6.4181D-02	8.2459D-01
490	2.0850D-02	6.3376D-02	8.2464D-01
500	2.0505D-02	6.2589D-02	8.2468D-01
510	2.0172D-02	6.1818D-02	8.2472D-01
520	1.9850D-02	6.1064D-02	8.2477D-01
530	1.9539D-02	6.0326D-02	8.2481D-01
540	1.9238D-02	5.9603D-02	8.2485D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
550	1.8947D-02	5.8895D-02	8.2490D-01
560	1.8665D-02	5.8201D-02	8.2494D-01
570	1.8391D-02	5.7522D-02	8.2498D-01
580	1.8125D-02	5.6856D-02	8.2502D-01
590	1.7867D-02	5.6203D-02	8.2507D-01
600	1.7617D-02	5.5564D-02	8.2511D-01
610	1.7373D-02	5.4936D-02	8.2515D-01
620	1.7135D-02	5.4321D-02	8.2520D-01
630	1.6904D-02	5.3718D-02	8.2524D-01
640	1.6679D-02	5.3126D-02	8.2528D-01
650	1.6460D-02	5.2545D-02	8.2533D-01
660	1.6246D-02	5.1975D-02	8.2537D-01
670	1.6038D-02	5.1416D-02	8.2541D-01
680	1.5834D-02	5.0866D-02	8.2546D-01
690	1.5636D-02	5.0327D-02	8.2550D-01
700	1.5442D-02	4.9798D-02	8.2554D-01
710	1.5252D-02	4.9278D-02	8.2559D-01
720	1.5067D-02	4.8767D-02	8.2563D-01
730	1.4886D-02	4.8265D-02	8.2567D-01
740	1.4709D-02	4.7772D-02	8.2572D-01
750	1.4536D-02	4.7288D-02	8.2576D-01
760	1.4366D-02	4.6812D-02	8.2580D-01
770	1.4200D-02	4.6344D-02	8.2585D-01
780	1.4038D-02	4.5884D-02	8.2589D-01
790	1.3878D-02	4.5432D-02	8.2593D-01
800	1.3722D-02	4.4987D-02	8.2598D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
810	1.3570D-02	4.4549D-02	8.2602D-01
820	1.3420D-02	4.4119D-02	8.2606D-01
830	1.3273D-02	4.3696D-02	8.2610D-01
840	1.3129D-02	4.3279D-02	8.2615D-01
850	1.2988D-02	4.2870D-02	8.2619D-01
860	1.2849D-02	4.2467D-02	8.2623D-01
870	1.2713D-02	4.2070D-02	8.2628D-01
880	1.2580D-02	4.1679D-02	8.2632D-01
890	1.2449D-02	4.1295D-02	8.2636D-01
900	1.2320D-02	4.0917D-02	8.2641D-01
910	1.2194D-02	4.0544D-02	8.2645D-01
920	1.2069D-02	4.0177D-02	8.2649D-01
930	1.1948D-02	3.9816D-02	8.2654D-01
940	1.1828D-02	3.9460D-02	8.2658D-01
950	1.1710D-02	3.9110D-02	8.2662D-01
960	1.1594D-02	3.8764D-02	8.2667D-01
970	1.1481D-02	3.8424D-02	8.2671D-01
980	1.1369D-02	3.8089D-02	8.2675D-01
990	1.1259D-02	3.7759D-02	8.2680D-01
1000	1.1151D-02	3.7434D-02	8.2684D-01
1010	1.1044D-02	3.7113D-02	8.2688D-01
1020	1.0940D-02	3.6797D-02	8.2693D-01
1030	1.0837D-02	3.6485D-02	8.2697D-01
1040	1.0736D-02	3.6178D-02	8.2701D-01
1050	1.0636D-02	3.5876D-02	8.2706D-01
1060	1.0538D-02	3.5577D-02	8.2710D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
1070	1.0441D-02	3.5283D-02	8.2714D-01
1080	1.0346D-02	3.4993D-02	8.2719D-01
1090	1.0253D-02	3.4707D-02	8.2723D-01
1100	1.0161D-02	3.4425D-02	8.2727D-01
1110	1.0070D-02	3.4147D-02	8.2731D-01
1120	9.9806D-03	3.3873D-02	8.2736D-01
1130	9.8926D-03	3.3602D-02	8.2740D-01
1140	9.8060D-03	3.3336D-02	8.2744D-01
1150	9.7207D-03	3.3072D-02	8.2749D-01
1160	9.6367D-03	3.2813D-02	8.2753D-01
1170	9.5539D-03	3.2557D-02	8.2757D-01
1180	9.4723D-03	3.2305D-02	8.2762D-01
1190	9.3920D-03	3.2056D-02	8.2766D-01
1200	9.3128D-03	3.1810D-02	8.2770D-01
1210	9.2348D-03	3.1568D-02	8.2775D-01
1220	9.1579D-03	3.1329D-02	8.2779D-01
1230	9.0822D-03	3.1093D-02	8.2783D-01
1240	9.0075D-03	3.0860D-02	8.2788D-01
1250	8.9340D-03	3.0631D-02	8.2792D-01
1260	8.8615D-03	3.0405D-02	8.2796D-01
1270	8.7901D-03	3.0182D-02	8.2801D-01
1280	8.7197D-03	2.9962D-02	8.2805D-01
1290	8.6503D-03	2.9745D-02	8.2809D-01
1300	8.5820D-03	2.9531D-02	8.2814D-01
1310	8.5146D-03	2.9320D-02	8.2818D-01
1320	8.4482D-03	2.9111D-02	8.2822D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
1330	8.3827D-03	2.8906D-02	8.2827D-01
1340	8.3182D-03	2.8704D-02	8.2831D-01
1350	8.2547D-03	2.8505D-02	8.2835D-01
1360	8.1920D-03	2.8308D-02	8.2840D-01
1370	8.1303D-03	2.8114D-02	8.2844D-01
1380	8.0695D-03	2.7924D-02	8.2848D-01
1390	8.0096D-03	2.7736D-02	8.2852D-01
1400	7.9506D-03	2.7550D-02	8.2857D-01
1410	7.8924D-03	2.7368D-02	8.2861D-01
1420	7.8351D-03	2.7188D-02	8.2865D-01
1430	7.7786D-03	2.7011D-02	8.2870D-01
1440	7.7230D-03	2.6837D-02	8.2874D-01
1450	7.6683D-03	2.6666D-02	8.2878D-01
1460	7.6143D-03	2.6497D-02	8.2883D-01
1470	7.5612D-03	2.6331D-02	8.2887D-01
1480	7.5089D-03	2.6168D-02	8.2891D-01
1490	7.4574D-03	2.6008D-02	8.2896D-01
1500	7.4067D-03	2.5850D-02	8.2900D-01
1510	7.3568D-03	2.5696D-02	8.2904D-01
1520	7.3077D-03	2.5544D-02	8.2909D-01
1530	7.2594D-03	2.5394D-02	8.2913D-01
1540	7.2118D-03	2.5248D-02	8.2917D-01
1550	7.1651D-03	2.5104D-02	8.2922D-01
1560	7.1191D-03	2.4963D-02	8.2926D-01
1570	7.0738D-03	2.4825D-02	8.2930D-01
1580	7.0293D-03	2.4690D-02	8.2935D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
1590	6.9856D-03	2.4557D-02	8.2939D-01
1600	6.9426D-03	2.4428D-02	8.2943D-01
1610	6.9004D-03	2.4301D-02	8.2948D-01
1620	6.8589D-03	2.4177D-02	8.2952D-01
1630	6.8182D-03	2.4056D-02	8.2956D-01
1640	6.7782D-03	2.3938D-02	8.2960D-01
1650	6.7389D-03	2.3823D-02	8.2965D-01
1660	6.7004D-03	2.3711D-02	8.2969D-01
1670	6.6625D-03	2.3602D-02	8.2973D-01
1680	6.6254D-03	2.3496D-02	8.2978D-01
1690	6.5891D-03	2.3393D-02	8.2982D-01
1700	6.5534D-03	2.3293D-02	8.2986D-01
1710	6.5185D-03	2.3197D-02	8.2991D-01
1720	6.4842D-03	2.3103D-02	8.2995D-01
1730	6.4507D-03	2.3013D-02	8.2999D-01
1740	6.4179D-03	2.2925D-02	8.3004D-01
1750	6.3858D-03	2.2842D-02	8.3008D-01
1760	6.3544D-03	2.2761D-02	8.3012D-01
1770	6.3236D-03	2.2683D-02	8.3017D-01
1780	6.2938D-03	2.2609D-02	8.3021D-01
1790	6.2645D-03	2.2539D-02	8.3025D-01
1800	6.2359D-03	2.2471D-02	8.3030D-01
1810	6.2080D-03	2.2408D-02	8.3034D-01
1820	6.1808D-03	2.2347D-02	8.3038D-01
1830	6.1542D-03	2.2290D-02	8.3043D-01
1840	6.1284D-03	2.2237D-02	8.3047D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
1850	6.1033D-03	2.2188D-02	8.3051D-01
1860	6.0788D-03	2.2142D-02	8.3056D-01
1870	6.0550D-03	2.2099D-02	8.3060D-01
1880	6.0319D-03	2.2061D-02	8.3064D-01
1890	6.0095D-03	2.2026D-02	8.3069D-01
1900	5.9877D-03	2.1995D-02	8.3073D-01
1910	5.9666D-03	2.1968D-02	8.3077D-01
1920	5.9462D-03	2.1945D-02	8.3081D-01
1930	5.9264D-03	2.1926D-02	8.3086D-01
1940	5.9073D-03	2.1911D-02	8.3090D-01
1950	5.8888D-03	2.1900D-02	8.3094D-01
1960	5.8710D-03	2.1893D-02	8.3099D-01
1970	5.8539D-03	2.1891D-02	8.3103D-01
1980	5.8373D-03	2.1892D-02	8.3107D-01
1990	5.8215D-03	2.1898D-02	8.3112D-01
2000	5.8062D-03	2.1908D-02	8.3116D-01
2010	5.7916D-03	2.1923D-02	8.3120D-01
2020	5.7776D-03	2.1942D-02	8.3125D-01
2030	5.7642D-03	2.1965D-02	8.3129D-01
2040	5.7515D-03	2.1993D-02	8.3133D-01
2050	5.7393D-03	2.2026D-02	8.3138D-01
2060	5.7277D-03	2.2063D-02	8.3142D-01
2070	5.7168D-03	2.2105D-02	8.3146D-01
2080	5.7064D-03	2.2151D-02	8.3151D-01
2090	5.6966D-03	2.2203D-02	8.3155D-01
2100	5.6873D-03	2.2259D-02	8.3159D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
2110	5.6787D-03	2.2321D-02	8.3164D-01
2120	5.6706D-03	2.2387D-02	8.3168D-01
2130	5.6630D-03	2.2458D-02	8.3172D-01
2140	5.6560D-03	2.2535D-02	8.3177D-01
2150	5.6495D-03	2.2616D-02	8.3181D-01
2160	5.6435D-03	2.2703D-02	8.3185D-01
2170	5.6381D-03	2.2795D-02	8.3190D-01
2180	5.6331D-03	2.2892D-02	8.3194D-01
2190	5.6287D-03	2.2995D-02	8.3198D-01
2200	5.6247D-03	2.3103D-02	8.3202D-01
2210	5.6212D-03	2.3217D-02	8.3207D-01
2220	5.6182D-03	2.3336D-02	8.3211D-01
2230	5.6156D-03	2.3461D-02	8.3215D-01
2240	5.6135D-03	2.3592D-02	8.3220D-01
2250	5.6118D-03	2.3728D-02	8.3224D-01
2260	5.6106D-03	2.3870D-02	8.3228D-01
2270	5.6097D-03	2.4018D-02	8.3233D-01
2280	5.6093D-03	2.4172D-02	8.3237D-01
2290	5.6092D-03	2.4332D-02	8.3241D-01
2300	5.6095D-03	2.4498D-02	8.3246D-01
2310	5.6102D-03	2.4670D-02	8.3250D-01
2320	5.6112D-03	2.4848D-02	8.3254D-01
2330	5.6126D-03	2.5032D-02	8.3259D-01
2340	5.6143D-03	2.5223D-02	8.3263D-01
2350	5.6163D-03	2.5420D-02	8.3267D-01
2360	5.6186D-03	2.5624D-02	8.3272D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
2370	5.6213D-03	2.5834D-02	8.3276D-01
2380	5.6242D-03	2.6050D-02	8.3280D-01
2390	5.6274D-03	2.6273D-02	8.3285D-01
2400	5.6308D-03	2.6503D-02	8.3289D-01
2410	5.6345D-03	2.6739D-02	8.3293D-01
2420	5.6384D-03	2.6982D-02	8.3298D-01
2430	5.6425D-03	2.7232D-02	8.3302D-01
2440	5.6469D-03	2.7489D-02	8.3306D-01
2450	5.6515D-03	2.7753D-02	8.3310D-01
2460	5.6562D-03	2.8024D-02	8.3315D-01
2470	5.6611D-03	2.8301D-02	8.3319D-01
2480	5.6662D-03	2.8586D-02	8.3323D-01
2490	5.6715D-03	2.8879D-02	8.3328D-01
2500	5.6769D-03	2.9178D-02	8.3332D-01
2510	5.6824D-03	2.9485D-02	8.3336D-01
2520	5.6881D-03	2.9799D-02	8.3341D-01
2530	5.6939D-03	3.0120D-02	8.3345D-01
2540	5.6998D-03	3.0449D-02	8.3349D-01
2550	5.7058D-03	3.0786D-02	8.3354D-01
2560	5.7118D-03	3.1130D-02	8.3358D-01
2570	5.7180D-03	3.1482D-02	8.3362D-01
2580	5.7242D-03	3.1841D-02	8.3367D-01
2590	5.7305D-03	3.2209D-02	8.3371D-01
2600	5.7369D-03	3.2584D-02	8.3375D-01
2610	5.7433D-03	3.2967D-02	8.3380D-01
2620	5.7497D-03	3.3358D-02	8.3384D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
2630	5.7562D-03	3.3757D-02	8.3388D-01
2640	5.7627D-03	3.4164D-02	8.3393D-01
2650	5.7692D-03	3.4579D-02	8.3397D-01
2660	5.7757D-03	3.5002D-02	8.3401D-01
2670	5.7822D-03	3.5433D-02	8.3406D-01
2680	5.7599D-03	3.5410D-02	8.3410D-01
2690	5.7598D-03	3.5387D-02	8.3414D-01
2700	5.7597D-03	3.5364D-02	8.3419D-01
2710	5.7597D-03	3.5342D-02	8.3423D-01
2720	5.7596D-03	3.5319D-02	8.3427D-01
2730	5.7596D-03	3.5296D-02	8.3431D-01
2740	5.7595D-03	3.5274D-02	8.3436D-01
2750	5.7595D-03	3.5251D-02	8.3440D-01
2760	5.7595D-03	3.5228D-02	8.3444D-01
2770	5.7594D-03	3.5206D-02	8.3449D-01
2780	5.7594D-03	3.5183D-02	8.3453D-01
2790	5.7594D-03	3.5160D-02	8.3457D-01
2800	5.7594D-03	3.5138D-02	8.3462D-01
2810	5.7595D-03	3.5115D-02	8.3466D-01
2820	5.7595D-03	3.5092D-02	8.3470D-01
2830	5.7595D-03	3.5070D-02	8.3475D-01
2840	5.7596D-03	3.5047D-02	8.3479D-01
2850	5.7596D-03	3.5024D-02	8.3483D-01
2860	5.7597D-03	3.5002D-02	8.3488D-01
2870	5.7597D-03	3.4979D-02	8.3492D-01
2880	5.7598D-03	3.4956D-02	8.3496D-01

TRANSPORT PROPERTIES OF SOLID URANIUM DIOXIDE

T (K)	DIFFUSIVITY (CM**2/S)	CONDUCTIVITY (W/CM-K)	EMISSIVITY
2890	5.7599D-03	3.4934D-02	8.3501D-01
2900	5.7600D-03	3.4911D-02	8.3505D-01
2910	5.7601D-03	3.4888D-02	8.3509D-01
2920	5.7602D-03	3.4865D-02	8.3514D-01
2930	5.7603D-03	3.4843D-02	8.3518D-01
2940	5.7605D-03	3.4820D-02	8.3522D-01
2950	5.7606D-03	3.4797D-02	8.3527D-01
2960	5.7608D-03	3.4775D-02	8.3531D-01
2970	5.7609D-03	3.4752D-02	8.3535D-01
2980	5.7611D-03	3.4729D-02	8.3540D-01
2990	5.7612D-03	3.4707D-02	8.3544D-01
3000	5.7614D-03	3.4684D-02	8.3548D-01
3010	5.7616D-03	3.4661D-02	8.3552D-01
3020	5.7618D-03	3.4639D-02	8.3557D-01
3030	5.7620D-03	3.4616D-02	8.3561D-01
3040	5.7622D-03	3.4593D-02	8.3565D-01
3050	5.7625D-03	3.4571D-02	8.3570D-01
3060	5.7627D-03	3.4548D-02	8.3574D-01
3070	5.7629D-03	3.4525D-02	8.3578D-01
3080	5.7632D-03	3.4503D-02	8.3583D-01
3090	5.7634D-03	3.4480D-02	8.3587D-01
3100	5.7637D-03	3.4457D-02	8.3591D-01
3110	5.7640D-03	3.4435D-02	8.3596D-01
3120	5.7643D-03	3.4412D-02	8.3600D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
3120	4.3436D+03	8.3904D-01
3130	4.3231D+03	8.3965D-01
3140	4.3028D+03	8.4028D-01
3150	4.2827D+03	8.4091D-01
3160	4.2629D+03	8.4154D-01
3170	4.2433D+03	8.4219D-01
3180	4.2239D+03	8.4284D-01
3190	4.2047D+03	8.4350D-01
3200	4.1857D+03	8.4417D-01
3210	4.1669D+03	8.4485D-01
3220	4.1483D+03	8.4553D-01
3230	4.1300D+03	8.4622D-01
3240	4.1118D+03	8.4692D-01
3250	4.0938D+03	8.4762D-01
3260	4.0760D+03	8.4833D-01
3270	4.0583D+03	8.4905D-01
3280	4.0409D+03	8.4977D-01
3290	4.0236D+03	8.5050D-01
3300	4.0065D+03	8.5124D-01
3310	3.9896D+03	8.5198D-01
3320	3.9729D+03	8.5273D-01
3330	3.9563D+03	8.5348D-01
3340	3.9399D+03	8.5424D-01
3350	3.9237D+03	8.5501D-01
3360	3.9076D+03	8.5578D-01
3370	3.8917D+03	8.5655D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
3380	3.8760D+03	8.5733D-01
3390	3.8604D+03	8.5812D-01
3400	3.8449D+03	8.5891D-01
3410	3.8296D+03	8.5971D-01
3420	3.8145D+03	8.6051D-01
3430	3.7995D+03	8.6131D-01
3440	3.7846D+03	8.6212D-01
3450	3.7699D+03	8.6293D-01
3460	3.7554D+03	8.6375D-01
3470	3.7409D+03	8.6457D-01
3480	3.7267D+03	8.6540D-01
3490	3.7125D+03	8.6623D-01
3500	3.6985D+03	8.6706D-01
3510	3.6846D+03	8.6790D-01
3520	3.6709D+03	8.6873D-01
3530	3.6572D+03	8.6958D-01
3540	3.6437D+03	8.7042D-01
3550	3.6304D+03	8.7127D-01
3560	3.6171D+03	8.7212D-01
3570	3.6040D+03	8.7298D-01
3580	3.5910D+03	8.7383D-01
3590	3.5781D+03	8.7469D-01
3600	3.5653D+03	8.7555D-01
3610	3.5527D+03	8.7642D-01
3620	3.5402D+03	8.7728D-01
3630	3.5277D+03	8.7815D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
3640	3.5154D+03	8.7902D-01
3650	3.5032D+03	8.7989D-01
3660	3.4911D+03	8.8076D-01
3670	3.4791D+03	8.8164D-01
3680	3.4673D+03	8.8251D-01
3690	3.4555D+03	8.8339D-01
3700	3.4438D+03	8.8427D-01
3710	3.4322D+03	8.8514D-01
3720	3.4208D+03	8.8602D-01
3730	3.4094D+03	8.8690D-01
3740	3.3981D+03	8.8778D-01
3750	3.3869D+03	8.8866D-01
3760	3.3759D+03	8.8955D-01
3770	3.3649D+03	8.9043D-01
3780	3.3540D+03	8.9131D-01
3790	3.3432D+03	8.9219D-01
3800	3.3325D+03	8.9307D-01
3810	3.3219D+03	8.9395D-01
3820	3.3113D+03	8.9483D-01
3830	3.3009D+03	8.9571D-01
3840	3.2905D+03	8.9659D-01
3850	3.2803D+03	8.9747D-01
3860	3.2701D+03	8.9835D-01
3870	3.2600D+03	8.9923D-01
3880	3.2500D+03	9.0010D-01
3890	3.2400D+03	9.0098D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
3900	3.2302D+03	9.0185D-01
3910	3.2204D+03	9.0272D-01
3920	3.2107D+03	9.0359D-01
3930	3.2011D+03	9.0446D-01
3940	3.1916D+03	9.0533D-01
3950	3.1821D+03	9.0620D-01
3960	3.1727D+03	9.0706D-01
3970	3.1634D+03	9.0792D-01
3980	3.1542D+03	9.0878D-01
3990	3.1450D+03	9.0964D-01
4000	3.1359D+03	9.1050D-01
4010	3.1269D+03	9.1135D-01
4020	3.1180D+03	9.1220D-01
4030	3.1091D+03	9.1305D-01
4040	3.1003D+03	9.1389D-01
4050	3.0915D+03	9.1474D-01
4060	3.0829D+03	9.1558D-01
4070	3.0743D+03	9.1642D-01
4080	3.0657D+03	9.1725D-01
4090	3.0572D+03	9.1808D-01
4100	3.0488D+03	9.1891D-01
4110	3.0405D+03	9.1974D-01
4120	3.0322D+03	9.2056D-01
4130	3.0240D+03	9.2138D-01
4140	3.0158D+03	9.2219D-01
4150	3.0077D+03	9.2301D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
4160	2.9997D+03	9.2382D-01
4170	2.9917D+03	9.2462D-01
4180	2.9638D+03	9.2542D-01
4190	2.9759D+03	9.2622D-01
4200	2.9681D+03	9.2702D-01
4210	2.9604D+03	9.2781D-01
4220	2.9527D+03	9.2859D-01
4230	2.9451D+03	9.2938D-01
4240	2.9375D+03	9.3015D-01
4250	2.9300D+03	9.3093D-01
4260	2.9225D+03	9.3170D-01
4270	2.9151D+03	9.3247D-01
4280	2.9077D+03	9.3323D-01
4290	2.9004D+03	9.3398D-01
4300	2.8932D+03	9.3474D-01
4310	2.8859D+03	9.3549D-01
4320	2.8788D+03	9.3623D-01
4330	2.8717D+03	9.3697D-01
4340	2.8646D+03	9.3771D-01
4350	2.8576D+03	9.3844D-01
4360	2.8507D+03	9.3917D-01
4370	2.8438D+03	9.3989D-01
4380	2.8369D+03	9.4060D-01
4390	2.8301D+03	9.4132D-01
4400	2.8234D+03	9.4202D-01
4410	2.8166D+03	9.4273D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIONIVITY
4420	2.8100D+03	9.4343D-01
4430	2.8034D+03	9.4412D-01
4440	2.7968D+03	9.4481D-01
4450	2.7902D+03	9.4549D-01
4460	2.7838D+03	9.4617D-01
4470	2.7773D+03	9.4684D-01
4480	2.7709D+03	9.4751D-01
4490	2.7646D+03	9.4817D-01
4500	2.7582D+03	9.4883D-01
4510	2.7520D+03	9.4949D-01
4520	2.7457D+03	9.5013D-01
4530	2.7396D+03	9.5078D-01
4540	2.7334D+03	9.5142D-01
4550	2.7273D+03	9.5205D-01
4560	2.7212D+03	9.5268D-01
4570	2.7152D+03	9.5330D-01
4580	2.7092D+03	9.5392D-01
4590	2.7033D+03	9.5453D-01
4600	2.6974D+03	9.5514D-01
4610	2.6915D+03	9.5574D-01
4620	2.6857D+03	9.5634D-01
4630	2.6799D+03	9.5693D-01
4640	2.6741D+03	9.5751D-01
4650	2.6684D+03	9.5809D-01
4660	2.6627D+03	9.5867D-01
4670	2.6571D+03	9.5924D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
4680	2.6515D+03	9.5981D-01
4690	2.6459D+03	9.6037D-01
4700	2.6403D+03	9.6092D-01
4710	2.6348D+03	9.6147D-01
4720	2.6294D+03	9.6201D-01
4730	2.6239D+03	9.6255D-01
4740	2.6185D+03	9.6309D-01
4750	2.6132D+03	9.6362D-01
4760	2.6078D+03	9.6414D-01
4770	2.6025D+03	9.6466D-01
4780	2.5973D+03	9.6517D-01
4790	2.5920D+03	9.6568D-01
4800	2.5868D+03	9.6618D-01
4810	2.5816D+03	9.6668D-01
4820	2.5765D+03	9.6717D-01
4830	2.5714D+03	9.6766D-01
4840	2.5663D+03	9.6814D-01
4850	2.5613D+03	9.6862D-01
4860	2.5563D+03	9.6909D-01
4870	2.5513D+03	9.6955D-01
4880	2.5463D+03	9.7002D-01
4890	2.5414D+03	9.7047D-01
4900	2.5365D+03	9.7092D-01
4910	2.5316D+03	9.7137D-01
4920	2.5268D+03	9.7181D-01
4930	2.5220D+03	9.7225D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
4940	2.5172D+03	9.7268D-01
4950	2.5125D+03	9.7310D-01
4960	2.5077D+03	9.7353D-01
4970	2.5030D+03	9.7394D-01
4980	2.4984D+03	9.7435D-01
4990	2.4937D+03	9.7476D-01
5000	2.4891D+03	9.7516D-01
5010	2.4845D+03	9.7556D-01
5020	2.4800D+03	9.7595D-01
5030	2.4754D+03	9.7634D-01
5040	2.4709D+03	9.7672D-01
5050	2.4664D+03	9.7710D-01
5060	2.4620D+03	9.7748D-01
5070	2.4576D+03	9.7785D-01
5080	2.4532D+03	9.7821D-01
5090	2.4488D+03	9.7857D-01
5100	2.4444D+03	9.7892D-01
5110	2.4401D+03	9.7928D-01
5120	2.4356D+03	9.7962D-01
5130	2.4315D+03	9.7996D-01
5140	2.4273D+03	9.8030D-01
5150	2.4230D+03	9.8063D-01
5160	2.4188D+03	9.8096D-01
5170	2.4146D+03	9.8129D-01
5180	2.4105D+03	9.8161D-01
5190	2.4063D+03	9.8192D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
5200	2.4022D+03	9.8223D-01
5210	2.3981D+03	9.8254D-01
5220	2.3940D+03	9.8284D-01
5230	2.3900D+03	9.8314D-01
5240	2.3860D+03	9.8344D-01
5250	2.3820D+03	9.8373D-01
5260	2.3780D+03	9.8401D-01
5270	2.3740D+03	9.8429D-01
5280	2.3701D+03	9.8457D-01
5290	2.3662D+03	9.8485D-01
5300	2.3623D+03	9.8512D-01
5310	2.3584D+03	9.8539D-01
5320	2.3545D+03	9.8565D-01
5330	2.3507D+03	9.8591D-01
5340	2.3469D+03	9.8616D-01
5350	2.3431D+03	9.8641D-01
5360	2.3393D+03	9.8666D-01
5370	2.3356D+03	9.8691D-01
5380	2.3319D+03	9.8715D-01
5390	2.3281D+03	9.8738D-01
5400	2.3244D+03	9.8762D-01
5410	2.3208D+03	9.8785D-01
5420	2.3171D+03	9.8807D-01
5430	2.3135D+03	9.8830D-01
5440	2.3099D+03	9.8852D-01
5450	2.3063D+03	9.8873D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
5460	2.3027D+03	9.8895D-01
5470	2.2991D+03	9.8915D-01
5480	2.2956D+03	9.8936D-01
5490	2.2921D+03	9.8956D-01
5500	2.2886D+03	9.8976D-01
5510	2.2851D+03	9.8996D-01
5520	2.2816D+03	9.9015D-01
5530	2.2782D+03	9.9034D-01
5540	2.2747D+03	9.9053D-01
5550	2.2713D+03	9.9072D-01
5560	2.2679D+03	9.9090D-01
5570	2.2645D+03	9.9108D-01
5580	2.2612D+03	9.9125D-01
5590	2.2578D+03	9.9142D-01
5600	2.2545D+03	9.9159D-01
5610	2.2512D+03	9.9176D-01
5620	2.2479D+03	9.9192D-01
5630	2.2446D+03	9.9209D-01
5640	2.2413D+03	9.9224D-01
5650	2.2381D+03	9.9240D-01
5660	2.2349D+03	9.9255D-01
5670	2.2317D+03	9.9270D-01
5680	2.2285D+03	9.9285D-01
5690	2.2253D+03	9.9300D-01
5700	2.2221D+03	9.9314D-01
5710	2.2190D+03	9.9328D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
5720	2.2158D+03	9.9342D-01
5730	2.2127D+03	9.9356D-01
5740	2.2096D+03	9.9369D-01
5750	2.2065D+03	9.9382D-01
5760	2.2034D+03	9.9395D-01
5770	2.2004D+03	9.9407D-01
5780	2.1973D+03	9.9420D-01
5790	2.1943D+03	9.9432D-01
5800	2.1913D+03	9.9444D-01
5810	2.1883D+03	9.9456D-01
5820	2.1853D+03	9.9467D-01
5830	2.1823D+03	9.9479D-01
5840	2.1793D+03	9.9490D-01
5850	2.1764D+03	9.9501D-01
5860	2.1735D+03	9.9511D-01
5870	2.1705D+03	9.9522D-01
5880	2.1676D+03	9.9532D-01
5890	2.1648D+03	9.9542D-01
5900	2.1619D+03	9.9552D-01
5910	2.1590D+03	9.9562D-01
5920	2.1562D+03	9.9572D-01
5930	2.1533D+03	9.9581D-01
5940	2.1505D+03	9.9590D-01
5950	2.1477D+03	9.9599D-01
5960	2.1449D+03	9.9608D-01
5970	2.1421D+03	9.9617D-01

TRANSPORT PROPERTIES OF LIQUID URANIUM DIOXIDE

T (K)	VISCOSITY (CP)	EMISSIVITY
5980	2.1394D+03	9.9625D-01
5990	2.1366D+03	9.9634D-01
6000	2.1338D+03	9.9642D-01

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