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TRANSPORT PROPERTIES OF SELECTED ELEMENTS AND COMPOUNDS IN THE GASEOUS STATE

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By
P. E. Liley

CINDAS-TPRC Report 29

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Purdue Industrial Research Park
2595 Yeager Road
West Lafayette, Indiana 47906

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FOREWORD

This report combines and supersedes two previous reports (TPRC Reports 20 and 22) issued as interim and final reports to an AFOSR grant for studies on substances of potential use in the gas laser area. The merging of the two previous reports for convenience has necessitated some rearrangement of the text. In addition, a number of typographical errors have been corrected.

The Thermophysical Properties Research Center (TPRC) was founded on 1 January 1957. Due to the enlargement of the scope of its research operations after seventeen years, TPRC and the other affiliated Centers were restructured effective 1 July 1974 to have an umbrella organization, known as the Center for Information and Numerical Data Analysis and Synthesis (CINDAS), to comprise all the Centers.

The present report, which is Number 29 in the original TPRC Report series, is therefore designated CINDAS-TPRC Report 29.

ABSTRACT

Tables of viscosity, thermal conductivity, and diffusion coefficient have been prepared for one hundred seven binary mixtures and for nine pure substances, the latter being helium, atomic and molecular hydrogen, atomic and molecular deuterium, atomic and molecular fluorine, hydrogen fluoride, and deuterium fluoride. Most of the binary mixtures are combinations of these substances. The temperature range was from 100 to 3000 K. For the pure substances, the most recent recommendations were used and for the mixtures, the Lennard-Jones 6-12 potential was used for viscosity and diffusion, and a linear mixing rule was employed for thermal conductivity. The precision of the tabulated values is reviewed. The present state-of-the-art in predicting these properties is briefly surveyed. It is concluded that significant discrepancies can still exist between theoretical and experimental quantities.

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I. INTRODUCTION

This report, an amalgamation of two earlier reports [1,2] *, presents calculated values of the viscosity, thermal conductivity, and Fickian diffusion coefficient for gases and gas mixtures of interest to laser technology. The theoretical background is first briefly reviewed in order to acquaint the reader with the basis used in assembling our tables and to give him an idea of the assumptions made in the work. This background will also enable him to apply our tables in any calculations which he may desire to make. The methods which were used to prepare the input to our calculations are then reviewed and are followed by the tabulated values.

II. THEORETICAL AND EMPIRICAL METHODS

The three transport properties, viscosity (μ), thermal conductivity (k), and diffusion coefficient (D) can be defined from the equations

$$dp = -\mu A \frac{d\bar{v}}{dx} dt$$

$$dq = -kA \frac{dT}{dx} dt$$

$$dm = -DA \frac{dc}{dx} dt$$

which relate the fluxes of momentum, heat and mass to the respective gradients of velocity, temperature, and concentration.

The Chapman-Enskog theory represents a solution of the Boltzmann integro-differential equation in which equations for the transport properties result. In CGS [57] units,

$$10^7 \mu = \frac{266.93 \sqrt{MT}}{\sigma^2 \Omega_{22} (kT/\epsilon)} \quad (\text{gm cm}^{-1} \text{ sec}^{-1}) \quad (1)$$

$$10^7 k = \frac{1989.1}{\sigma^2} \sqrt{\frac{T}{M}} \cdot \frac{1}{\Omega_{22} (kT/\epsilon)} \quad (\text{cal cm}^{-1} \text{ sec}^{-1} \text{ K}^{-1}) \quad (2)$$

$$10^5 D = \frac{262.8}{P \sigma^3} \sqrt{\frac{T^3}{M}} \frac{1}{\Omega_{11} (kT/\epsilon)} \quad (\text{cm}^2 \text{ sec}^{-1}) \quad (3)$$

are the three first approximation equations, where T is the absolute temperature and the omegas are "collision integrals". Other quantities include M for molecular weight and P for pressure. Higher approximations involve additional multiplicative factors

* Numbers in square brackets designate references listed in Section V.

in the above equations. As will be noted below, to the accuracy possible in the present work, these higher approximations will be ignored.

Various limitations exist in the above equations due to assumptions made in their derivation. These include (1) only two body collisions occur, (2) that "classical" rather than quantum statistics apply, (3) that all gradients are small, (4) that the theory will be applied to systems where the dimensions are much greater than those between particles comprising the systems, and (5) that the intermolecular force field is spherically symmetrical. These restrictions, in practice, mean that the theory is usually valid for reasonably dilute gases at normal to high temperatures. The "reasonable" dilution implies that our equation of state can be written as $PV = RT + B_T P$, while "normal to high" implies that the temperatures are neither so low nor so high that quantum or dissociation effects occur, respectively. The most severe restriction is that the intermolecular force field be symmetrical. While, at first thought, this should restrict our attention to the monatomic gases, it is found that diatomic and (some) polyatomic gases can also be represented in this way. The main modifications which result with polyatomic gases are (1) that dipole moments exist (these lead to corrections due to polarity), and (2) that internal degrees of freedom contribute to the thermal conductivity. These lead to Eucken type corrections due to internal degrees of freedom. (Both corrections are troublesome and will be discussed below.) The basic result theoretically is thus contained in the statement that if the law of forces between the molecules in a dilute gas is known, the collision integrals (the Ω_{11} and Ω_{22} of equations 1-3) can, at least in principle, be calculated and thus their variation with reduced temperature, $T^* = kT/\epsilon$ (where ϵ is the well-depth in the intermolecular potential function), can be found. Some considerable attention was paid in the early stages of this work to reviewing the ability and adequacy of present day treatments to evaluate the intermolecular force field function and thus the collision integral (omega) functions. Two standard works exist on this subject - the 1964 "Molecular Theory of Gases and Liquids," reprinted with Notes Added in 1964 [3] and the third edition in 1970 of "The Mathematical Theory of Non-Uniform Gases" [4]. As might be inferred from the titles, the second citation is more mathematical. It also contains a slightly less detailed account of the comparison of theory and experiment.

Due to the fact that the 1964 updating in the 'Notes Added' of [3] is only barely adequate - a fact noted elsewhere [5] - the review of theoretical methods made here extended to a somewhat earlier date. Essentially, 1954 can be considered as representative.

The position in 1954 was that the Lennard-Jones 6-12 intermolecular potential function had found wide application in calculations of equilibrium and transport properties.

The indices 6 and 12 refer to the (negative) exponents of the intermolecular separation r which have a physical significance in representing attractive and repulsive forces between molecules respectively. At that time, reasonably good agreement was thought to exist between many of the experimental and theoretical predictions.

Since that time, many further studies have been made. In 1963 it was noted [6] that errors existed in the collision integrals of [3] and a retabulation was made. Further recalculations have also been made (see, e.g. [7]) and a later recommendation [8] used the values of [6] at reduced temperatures ($T^* = kT/\epsilon$, where ϵ is the well-depth in the potential and k is the Boltzmann constant) up to 4.5 and those of [7] at higher temperatures. In the present work, our earlier values of collision integrals [6] were used for reduced temperatures below 10 and those of [7] above this value. No significant difference exists between the present and [8] choices. The present one was made solely for ease of interpolation.

Other molecular models have been used since the publication of the original [3] review. An extensive investigation of these was made by Klein and associates [9-11]. Whichever model is used, the result is that the representation of both second virial coefficient and viscosity data over a relatively wide temperature range is equally good for many fluids. The range for transport properties is about $2 \leq T^* \leq 5$ where the ϵ/k in the T^* refers to the value determined using the 6-12 parameter. The adjective "about" refers to the fact that available viscosity data are imprecise - a statement that will be amplified during the discussion of the tabular values below.

The temperature range of interest to the present program involves reduced temperatures (on the Lennard-Jones 6-12 scale) of 0.4 to 70, depending on substance. Particularly for the light gases and mixtures, reduced temperatures above 5 occur. In this region the energies of intermolecular collisions may be large enough that the attractive forces play a relatively weak role. This is confirmed by an examination of the tables of Klein [7] for the Lennard-Jones m -6 potential, where, in addition to the value of $m = 12$ previously discussed, Klein tabulates collision integrals Ω_{11} and Ω_{22} (and other functions) for $m = 9, 15, 18, 21, 30, 50$, and 75. If one plots the collision integral Ω_{22} as a function of T^* on logarithmic paper, one can conclude that the representation $\Omega_{22} = a(T^*)^n$ is a quite accurate approximation for reduced temperatures above about 15. Furthermore, one can conclude that a definite relationship exists between the n and m . Finally, that the rigid sphere repulsion force model is approached as m increases. These results check with the assumption [3,4] that $\mu = AT^5$ if the repulsive potential only exists.

The m-6 model was then refined by Hanley and Klein [12,13] to the m-6-8 model, where the 8 refers to the dispersion forces. (For a description of these, see, e.g. page 29 of [3].) The initial expectation was that the coefficients A_6 and A_8 in the equation

$$E(r) = A_6 r^{-6} + A_8 r^{-8} + B_m r^{-m} \quad (4)$$

in this m-6-8 potential should be reconcilable with theoretical estimates. However, the results [13] of comparing theory with experiment have proved disappointing. The following extracts from [13] may prove informative.

- 1 (page 1747): Any spherical potential can never properly depict the interaction between two polyatomic molecules - as the molecules collide a number of orientation-dependent force laws are followed - one for each relative orientation.
- 2 (page 1747): Collisions between polyatomic molecules can be inelastic. The effect of the molecular internal degrees of freedom has then to be considered.
- 3: In addition, the discussion on pages 1750 and 1751 shows that the coefficients A_6 and A_8 deduced from theory and experiment agree poorly. On page 1751 it is stated that "adding more parameters to our potential for additional flexibility would not necessarily reduce the disagreement with theory even when additional parameter are added to the most uncertain part of the potential, the repulsive branch."

Difficulties also exist for fluids for which several transport properties have supposedly been accurately measured. Hanley, McCarty, and Intemann [14] were unable to reconcile extremely carefully calculated and measured thermal conductivities and viscosities for hydrogen. This was also noted for inert gases by Kestin [15]. Both workers favored the viscosity data, supposing an (uncertain) error to exist in the thermal conductivities. However, both workers relied on the basic accuracy of the Chapman-Enskog theory. Another difficulty was noted by Dahler [16] who said that there was a remote possibility of failure due to this theory. A stronger viewpoint is taken by Brush [17] who decided that the interatomic force concept was inadequate. This is a conclusion backed by at least plausible arguments which he makes - one of which is identical to the first cited remarks of [13] above.

All of these results are disturbing to a short term program to calculate transport properties. In addition to the above the writer consulted [18-22] and many other less detailed reviews in which further studies of interatomic and intermolecular potentials result. Another viewpoint can be taken which is scientifically more pessimistic but which

can yield results of somewhat predictable accuracy. That is, choose a potential for which the collision integrals and related functions are reasonably accurate and available. Furthermore, use reasonably accurate parameters in the sense of Klein [9]. This should secure at least reasonable results in the reduced temperature range $2 \leq T^* \leq 5$ and possibly for $2 \leq T^* \leq 10$. While the accuracy at higher temperatures may be marginal the hope is to adjust the fit by varying the repulsive index.

In this work, following the survey which led to the conclusions above, the Lennard-Jones 6-12 potential was selected for generation of the tabular values. While some m-6 fittings for simple gases have been made, the availability of data could not in the time available lead to accurate values of m for mixtures. The values of the collision integrals - and the fittings - for the m-6-8 potential have not yet been published^a. However, some predictions of the third virial coefficient using it were in disappointingly poor agreement with experiment [24].

One can conclude that no intermolecular potential is capable of representing the data for all properties to within the experimental error. This is due to orientation effects and inelasticity in collisions coupled with the inability to perform the mathematical calculations to sufficient accuracy and the fact that high energy collision and spectroscopic data may yield still different intermolecular potential values. This conclusion is in part supported by a subsequent analysis [54, 55] of the ability of the m-6-8 potential to simultaneously fit viscosity and second virial coefficient data for non-polar polyatomic gases. It was found that additional terms were necessary to represent the virial coefficient behavior. This implied that a more comprehensive potential should then likewise be used to calculate the viscosity (and, of course, other properties). This is an enormous complication, both from the fundamental difficulty of calculating functions for comprehensive potentials and from the more practical viewpoint of fitting such potentials to the experimental data. While it is stated [55] that "work is in progress to modify the m-6-8 potential to include non-spherical effects" one reads on the same page that "one assumes that the molecules collide with a fixed relative orientation and collision integrals are calculated for each orientation independently. The final values of the collision integrals are then determined by a statistical averaging over all these possible orientations". Here is the important fact that the calculations to date assume a fixed relative orientation. This, coupled with the averaging requirement will, in the opinion of the writer, introduce sufficient uncertainty so as to negate possible improvements by modifying the potential. Indeed, it appears probable that this stage has already been reached from

^a The report "Tables of Collision Integrals and Second Virial Coefficients for the (m, 6, 8) Intermolecular Potential Function" by Klein, Hanley, Smith, and Holland has since (June 1974) been published as NSRDS-NBS-47, 157 pp., 1974.

a fundamental viewpoint by the failure of the potential to correctly model the dispersion coefficients, as already mentioned in the discussion of Eq. (4). An extensive review [22] of some aspects of intermolecular forces does nothing to dispel the conclusion that realistic potentials are not yet available for molecules of complex structure. As remarked by Svehla [23], unless a consistent potential is selected, values of combinations (such as the Prandtl Number) of properties may vary irregularly from substance to substance. This is even more important in preparing tables for mixtures for which the composition varies. Hence, in the present work, the Lennard-Jones 6-12 potential was selected as the general basis for generating the tabular values rather than a more sophisticated model.

III. EQUATIONS FOR CALCULATING TRANSPORT PROPERTIES OF PURE GASES AND GAS MIXTURES

1. GENERAL DISCUSSION

As noted above, Eqs. (1-3) represent first approximation equations for the variation of these properties with temperature for pure gases. In order to use them, the collision diameter, σ , must be known. In addition, the well depth ϵ/k is needed so that the collision integral Ω_{11} or Ω_{22} can be determined for the particular reduced temperature T^* of kT/ϵ of interest.

The result of detailed calculations has been to reproduce tables of Ω_{11} and/or Ω_{22} as a function of T^* . An early example appears in [3]. Later tables were intercompared in [6] and again in [7]. The reader is referred to [6] for the extensive (3,320 values) tables of Ω_{11} and Ω_{22} used in this work for reduced temperatures below 10. Table 117 contains original and interpolated values of [7] for Ω_{11} , Ω_{22} , and A , all as functions of kT/ϵ for the Lennard-Jones 6-12 potential. (The A function is described in the section on viscosity of mixtures.) While various attempts have been made to represent the variation of these functions with reduced temperature analytically, most of these have suffered from the difficulty that the tables of [3] were used as inputs to the analyses. As noted elsewhere [6-8], the [3] tables do contain relatively large errors. Thus, the analyses need repeating using more accurate input. While two recent studies have appeared [8,25] which use the [7] tables as input, it was not considered feasible to program these in time for the present report. The more recent fits [8,25] also are limited to the (12,6) potential. It is considered desirable to derive a convenient representation for the (m,6) or, even better, for the (m-6-8) model. To allow for the polar-nonpolar interactions, possibly a (3-m-6-8) function should be devised.

2. VISCOSITY

Lacking such input at the present time, the omega tables of [6] and [7] were used numerically, in the ranges as described above, with Eqs. (1-3)*, to generate the present tables. The parameters σ and ϵ/k were taken from the work of Svehla [23]. This is the main previous effort to present a unified body of thermal conductivity and viscosity data based on a common potential and, furthermore, which selects molecular parameters which are reasonably self-consistent. By this is meant the fact that the estimation methods for compounds result in parameters which yield reasonable agreement with experimental data for compounds. The adjective reasonable is used to note that better agreement for specific properties and substances has been obtained by using different potentials. Presently lacking anywhere in the literature is a complete across-the-board reanalysis, except possibly for the inert gases [e.g. 15]. The comparisons for thermal conductivity in [26-28] do reveal that the Svehla values may be in error by possibly up to twice the accepted limits for some substances. For other materials, a very reasonable fit occurs in general.

For interpolation purposes, linear interpolation of the present tables is considered perfectly acceptable. If an empirical representation is needed, it is suggested that the Ω functions of Eqs. (1-3) be replaced by

$$\Omega = a + b/T + c/T^2 + d/T^3 \quad (5)$$

As will be evident from [28-30], use of Eq. (5) to represent viscosity and thermal conductivity results in negligible errors over large temperature ranges, even using $d = 0$ in many cases.

For mixtures, the equations are considerably more complex. For gaseous viscosity the mixture viscosity, μ_M , is given by

$$\mu_M = \frac{1 + Z}{X + Y} \quad (6)$$

where

$$\begin{aligned} X &= \frac{x_1^2}{\mu_{11}} + \frac{2x_1 x_2}{\mu_{12}} + \frac{x_2^2}{\mu_{22}} \\ Y &= \frac{3A_{12}}{5} \left\{ \frac{x_1^2}{\mu_{11}} \frac{M_1}{M_2} + \frac{2x_1 x_2}{\mu_{12}} \frac{(M_1 + M_2)^2}{4M_1 M_2} + \frac{x_2^2}{\mu_{22}} \frac{M_2}{M_1} \right\} \\ Z &= \frac{3A_{12}}{5} \left\{ x_1^2 \frac{M_1}{M_2} + 2x_1 x_2 \left[\frac{(M_1 + M_2)^2}{4M_1 M_2} \left(\frac{\mu_{12}}{\mu_1} + \frac{\mu_{12}}{\mu_2} \right) - 1 \right] + x_2^2 \frac{M_2}{M_1} \right\} \end{aligned}$$

* See [57].

In these equations M_1 , M_2 , x_1 , and x_2 are the molecular weights and mole fractions of components 1 and 2 and the μ_{11} , μ_{12} , and μ_{22} represent the viscosities of component 1, a hypothetical gas 12 and component 2. The gas 12 is assumed to obey the same potential as gases 1 and 2 but to have a molecular weight of $2M_1 M_2 / (M_1 + M_2)$, a collision diameter of $(\sigma_1 + \sigma_2)/2$ and a well depth ϵ/k of $(\epsilon_1/k) (\epsilon_2/k)$. A_{12} is a collision integral function [3], tabulated simply as A in Table 117.

In the various tables, the three columns under viscosity are values of μ_{11} , μ_{12} , and μ_{22} for the different temperatures listed. As shown by Table 117, A varies from 1.1105 at a reduced temperature of 10 to 1.1323 at $T^* = 100$, or 1.1214 ± 0.0109 over this temperature range. To a better precision, the approximation

$$A = 1.09340 + 0.020 \log T^* \quad (7)$$

will represent the [7] A values for $15 \leq T^* \leq 100$ to an average error of 2×10^{-4} and a maximum error of 1×10^{-3} in A . This approximation may be found useful in programming Eq. (6).

For multicomponent mixtures and for higher approximations, the careful comparisons of theory and experiment by Brokaw, et al. [31,32] may be found useful. The lack of accurate experimental data for most of the mixtures considered here was one reason why the higher approximation equations were not considered further in the present work.

3. THERMAL CONDUCTIVITY

Equation (2) above for thermal conductivity is only found to be applicable to the calculation of thermal conductivity for monatomic species, where no contributions of internal degrees of freedom to the thermal conductivities occur. The classical paper on the subject since [3] is that of Mason and Monchick [33] where polyatomic and polar gases were considered. In addition, Chapter 13 of [4] provides an excellent review, as do publications by Brokaw [34] and by Touloukian, Liley, and Saxena [27]. The equations involved are complex and the reader is referred to the cited sources for details. The conclusion one can draw from a study of these works is that even an extremely thorough and painstaking analysis can result in thermal conductivity values and/or the related Eucken factors that disagree significantly with experiment. The publications by Hanley, et al. [14] and Kestin [15] may also be cited here. Further evidence of disagreement may be found in [33,35]. For many substances, simple equations representing the thermal conductivity as linear and quadratic functions of temperature have been found adequate [28-30,36,37] as has also the representation of Eq. (2) where the omega function

approximation of Eq. (5) is used [28-30]. The conclusion to be drawn from this is that the relative magnitude of the internal contributions to the total energy decreases to about a constant value at high temperatures. While it cannot be neglected, the approximation of Svehla [23] can be seen from the comparisons in [28-30] to yield reasonably accurate results at high temperatures, though not at low temperatures. Hence, in this work, values based essentially on experimental data were used for the elements and simple compounds and were taken from [26-29]. For other compounds the values of [23] were used, or analogous estimation methods.

The computer print-out was, in fact, programmed so that many of the tables of viscosity and diffusion coefficient appearing in this report are edited copies of the computer sheets. The thermal conductivity values were based on experimental data, correlated with theory if possible as described in [29], or were generated by applying corrections for internal degrees of freedom to the calculated translational effect. In the latter case, some substances showed a significant divergence between the theoretical and the experimental values. In such cases, the calculated values were reduced to bring them into general accord with the experimental data. In our programming we adopted the fittings of Neufeld, Janzen, and Aziz [25] to generate the 6-12 collision integrals. It should be noted that their representation is only valid for reduced temperatures from 0.3 to 100 and not from 0.1 to 0.3 or from 100 to 400. Some problems were encountered before this fact was realized. While the lower end gives no practical difficulty, substances with low characteristic well depths, ϵ/k , can yield reduced temperatures over 100. A suitable blocking procedure was thus written into the program to prevent the computer extrapolating the calculation into regions where the reduced temperature exceeded one hundred. For the few cases where this occurred, tables were numerically generated using the approximations

$$\begin{aligned}\Omega_{11} &= 1.10670 (T^*)^{-0.1675} \\ \Omega_{22} &= 0.07183 (T^*)^{-0.1623}\end{aligned}\tag{4}$$

which have been found to yield collision integrals accurate to 1/4 percent for reduced temperatures over 25. In fact, the use of the Lennard-Jones potential at such high reduced temperatures is physically unrealistic due to the predominance of the repulsive part of the potential for which an exponential dependence on intermolecular separation is preferable to a power one, although, as mentioned earlier, neither representation is exact.

For mixtures, the equations are even more complicated and the analysis of [27] centered on approximations for the functions equivalent to the A_{12} of Eq. (6). A careful

study was made of the thermal conductivity - composition curves of [27] but no simple trends were evident. A cogent comment was made by Lehmann [38] and cited by Bretsznajder [39] that simple linear additivity is as reasonable as more sophisticated calculations for binary mixtures for which the molecular weight of the pure components do not differ by more than a factor of 4. Examination of the graphs of [27] reveal that - in a surprisingly large number of cases - the variation with composition is essentially linear, even for some mixtures where exceptions might be expected to occur. A more accurate calculation would involve knowledge of relaxation times, some of which are now available under an AFOSR contract [40]. In any future work on these substances, or those of lower priority, it is considered highly desirable to attempt to establish at least a function correlation of Eucken factor with molecular weight and/or chemical structure.

The thermal conductivity columns in the tables thus present values for the pure component and for the equimolar mixture. In any future work it is only anticipated that the equimolar values may show significant changes.

4. DIFFUSION COEFFICIENT

For diffusion coefficient values, Eq. (3) may be used for the self-diffusion coefficient and for interdiffusion, the equation is similar to (3) except that the σ and the ϵ now refer to a hypothetical gas 12, just as for viscosity. No attempt was made to introduce a variable coefficient into Eq. (3), as suggested by Wilke and Lee [41].

The three diffusion coefficient columns, tabulated for atmospheric pressure, list self-diffusivity for the pure components and the interdiffusion for the binary pair.

IV. REVIEW OF INFORMATION AVAILABLE ON TRANSPORT PROPERTIES FOR SUBSTANCES OF INTEREST AND OF METHODS USED TO PREPARE TABLES OF RECOMMENDED VALUES

1. DEUTERIUM

The Lennard-Jones potential and parameters of Svehla [23] were used to calculate the viscosity and diffusion coefficient values. The thermal conductivity values to 400 K [29, 33] were extrapolated using a log-log plot.

2. HELIUM

Until recently, up-to-date information on the properties of helium has been nonexistent. Within the last few years the position has changed for the better.

For the viscosity, the tables of Maitland and Smith [42], Watson [43], and Petersen [44] are in very good agreement. In somewhat less good agreement are the Tsederberg, et al. tables [45] while Angerhofer and Hanley [46] present tables for relatively low temperatures. The values presented here are essentially a mean of the [42-44] sets for temperatures to 2000 K. Values at higher temperatures were derived from an analysis of the lower temperature values which showed that $\mu \approx aT^n$ where $n \approx 0.702$. The tabular values were actually derived by assuming n to be a weakly varying linear function of temperature. The agreement between our tabulated values and any of the source values listed above is well within five percent. The absolute accuracy may, in fact, be a little better than this figure.

Thermal conductivity values to 2500 K have been tabulated by the author elsewhere [28,29]. The present tables are merely a reproduction of these with a finite difference extrapolation to 3000 K. From 100 to 700 K the accuracy should be two percent, from 700 to 1500 K five percent, and above 1500 K ten percent.

Values of the diffusion coefficient were obtained using the equation suggested in the Mason and Marrero [47] compilation for $^3\text{He}-^4\text{He}$ diffusion. Values tabulated in Landolt-Bornstein [48] for helium agree to within about ± 10 percent.

3. ATOMIC HYDROGEN

To ensure better consistency in the mixture tables, the tables of viscosity and thermal conductivity of atomic hydrogen tabulated by Svehla [23] were used even though some disagreement with the later Hanley, et al. [14] values occurred. The disagreement amounts to less than six percent in viscosity and eight percent in thermal conductivity. The diffusion coefficients, obtained from the work of Mata [52] were extrapolated above 2000 K assuming a logarithmic dependence on temperature. Possibly a ten percent uncertainty is reliable.

4. HYDROGEN

Three sets of tables for viscosity, by Maitland and Smith [42], Watson [43], and Hanley, McCarty, and Intemann [14] show insignificant differences between 100 and 2000 K. These were extrapolated to 3000 K to parallel the lower earlier tables of Bambanek [48] and Svehla [23]. An error of a few percent below 1000 K increasing to 5-10 percent at 3000 K appears possible.

The thermal conductivity values recommended in [28,29] to 1000 K were extrapolated to 3000 K to merge with the earlier values of [23]. The uncertainty should be a few

percent below 500 K, this increasing to possibly ten percent at the highest temperatures tabulated.

A plot of the self diffusion coefficient values tabulated by D'Ans-Lax [49] and in Landolt-Bornstein [50] revealed an almost linear variation of $\log D$ with $\log T$. The tabulated values, obtained from this graph (extrapolated where necessary), should be accurate to five percent below 500 K, the uncertainty increasing to ten to fifteen percent at 3000 K.

5. OTHER PURE SUBSTANCES

While the properties of helium, hydrogen, and deuterium discussed above were generated by the various methods there described, for other pure substances such as argon, fluorine, and nitrogen the parameters of Svehla [23] were used with the Lennard-Jones 6-12 potential first to generate the tabular values in order to achieve the maximum consistency in the tables for the mixtures. Parameters for substances not considered by Svehla were estimated using procedures identical or similar to those that he used. A collection of the parameters obtained in this way appears in Table 118.

No table of intermolecular parameters for all the gas pairs considered here is given as many of the tables* were generated from a computer program in which the mixture parameters were internally generated from the pure component values. The usual [3,56] methods for generating the parameters for mixtures were followed.

6. MIXTURES

For all mixtures, the viscosities tabulated under the mixed heading are the viscosities of a hypothetical mixed gas, as described in the text following Eq. (6) where the parameters used in the potential are obtained using the appropriate combination rules with the pure substance parameters of Table 118. The thermal conductivities tabulated under the mixed heading are for an equimolar mixture and assume a linear dependence on composition while the diffusion coefficients are for a hypothetical mixed gas.

Experimental data are lacking for many of the systems of mixtures. The error in our tables can be assumed, in general, to be about twenty percent greater than the larger of the two uncertainties for the pure component viscosities or diffusion coefficients. For thermal conductivities for systems for which the pure component molecular weights differ by less than a factor of four this should also apply. For thermal conductivity of systems of more disparate molecular weights, greater error may occur.

* Minor differences exist in a few cases between values of properties for the same substance tabulated in [1] and [2] and thus also in the different tables reproduced here.

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57. While Eqs. (1-3), copied from [3], apply to centimeter-gram-second (CGS) units, it should be noted that the tabular values are quoted in SI units. The reader is reminded that appropriate conversion factors are needed to convert from CGS to SI units. Extensive factor tables for viscosity and thermal conductivity may be found in volumes 11 and 3 of the TPRC Data Series.

VI. TABLES OF RECOMMENDED VALUES

TABLE 1. TRANSPORT PROPERTIES OF HELIUM

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$) He	Thermal Cond. ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$) He	Diffusion Coeff. ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$) He	Temp. (K)
100	99	73	0.29	100
200	155	115	0.92	200
300	199	152	1.84	300
400	244	187	3.01	400
500	284	220	4.41	500
600	322	252	6.04	600
700	359	281	7.88	700
800	394	308	9.92	800
900	429	332	12.2	900
1000	461	357	14.6	1000
1100	494	380	17.2	1100
1200	525	403	20.1	1200
1300	556	425	23.0	1300
1400	586	447	26.3	1400
1500	614	468	29.6	1500
1600	643	488	33.2	1600
1700	671	508	36.9	1700
1800	698	528	40.8	1800
1900	725	547	44.9	1900
2000	752	566	49.1	2000
2100	778	585	53.5	2100
2200	804	603	58.1	2200
2300	830	622	62.8	2300
2400	855	640	67.7	2400
2500	880	657	72.8	2500
2600	905	674	78.0	2600
2700	929	691	83.4	2700
2800	953	708	88.9	2800
2900	977	724	94.6	2900
3000	1001	740	101	3000

TABLE 2. TRANSPORT PROPERTIES OF HELIUM - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	He-He	He-H ₂	H ₂ -H ₂	He-He	He-H ₂	H ₂ -H ₂	He-He	He-H ₂	H ₂ -H ₂	
100	99	63	42	73	77	80	0.29	0.24	0.22	100
200	155	100	68	115	133	151	0.92	0.77	0.72	200
300	199	131	90	152	170	188	1.84	1.55	1.70	300
400	244	158	109	187	205	222	3.01	2.54	3.20	400
500	284	182	127	220	239	257	4.41	3.73	4.95	500
600	322	205	143	252	272	291	6.04	5.11	7.30	600
700	359	227	160	281	303	325	7.88	6.68	10.0	700
800	394	247	175	308	334	360	9.92	8.42	13.4	800
900	429	266	190	332	363	394	12.2	10.3	17.1	900
1000	461	285	205	357	393	428	14.6	12.4	21	1000
1100	494	303	219	380	420	460	17.2	14.7	26	1100
1200	525	321	232	403	448	493	20.1	17.1	32	1200
1300	556	338	246	425	476	526	23.0	19.6	37	1300
1400	586	355	259	447	503	559	26.3	22.4	44	1400
1500	614	371	272	468	530	592	29.6	25.2	50	1500
1600	643	387	284	488	556	624	33.2	28.3	58	1600
1700	671	402	296	508	583	657	36.9	31.4	66	1700
1800	698	418	308	528	609	689	40.8	34.8	75	1800
1900	725	433	319	547	634	720	44.9	38.2	85	1900
2000	752	447	331	566	659	752	49.1	41.9	95	2000
2100	778	462	341	585	684	783	53.5	45.6	105	2100
2200	804	476	351	603	708	813	58.1	49.5	115	2200
2300	830	490	361	622	733	843	62.8	53.6	126	2300
2400	855	504	371	640	757	873	67.7	57.8	138	2400
2500	880	518	380	657	780	903	72.8	62.1	151	2500
2600	905	531	390	674	803	932	78.0	66.6	165	2600
2700	929	544	400	691	826	960	83.4	71.2	179	2700
2800	953	557	409	708	848	987	88.9	75.9	195	2800
2900	977	570	418	724	869	1014	94.6	80.8	212	2900
3000	1001	583	427	740	891	1042	101	85.9	227	3000

TABLE 3. TRANSPORT PROPERTIES OF HYDROGEN-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	
100	65	35	38	9	38	68	0.03	0.10	0.20	100
200	128	65	66	18	73	128	0.10	0.37	0.71	200
300	179	89	89	26	104	182	0.21	0.76	1.43	300
400	223	109	108	33	127	221	0.34	1.25	2.33	400
500	262	127	125	39	148	257	0.50	1.83	3.39	500
600	297	143	141	44	167	291	0.69	2.49	4.59	600
700	330	159	156	49	187	325	0.89	3.22	5.93	700
800	361	173	170	54	207	360	1.12	4.03	7.41	800
900	390	187	184	59	226	394	1.37	4.90	9.00	900
1000	418	200	197	63	245	428	1.63	5.84	10.72	1000
1100	445	213	209	67	263	460	1.91	6.84	12.56	1100
1200	471	225	221	71	282	493	2.21	7.90	14.50	1200
1300	496	237	233	75	300	526	2.52	9.02	16.56	1300
1400	521	249	244	80	319	559	2.85	10.19	18.72	1400
1500	544	260	256	84	338	592	3.20	11.43	20.99	1500
1600	568	272	267	89	356	624	3.56	12.72	23.36	1600
1700	591	282	277	95	376	657	3.94	14.06	25.82	1700
1800	613	293	288	101	395	689	4.33	15.46	28.39	1800
1900	635	304	298	108	414	720	4.73	16.91	31.05	1900
2000	656	314	308	115	433	752	5.15	18.41	33.80	2000
2100	677	324	318	121	452	783	5.59	19.95	36.64	2100
2200	698	334	328	126	469	813	6.03	21.55	39.58	2200
2300	718	343	337	131	487	843	6.50	23.20	42.60	2300
2400	738	353	347	136	504	873	6.97	24.89	45.71	2400
2500	758	363	356	141	522	903	7.46	26.63	48.91	2500
2600	778	372	365	146	539	932	7.96	28.42	52.19	2600
2700	797	381	374	151	555	960	8.47	30.26	55.56	2700
2800	816	390	383	155	571	987	9.00	32.13	59.00	2800
2900	835	399	392	160	587	1014	9.54	34.06	62.54	2900
3000	853	408	400	165	603	1042	10.09	36.02	66.15	3000

TABLE 4. TRANSPORT PROPERTIES OF HYDROGEN-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-A}$	A-A	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-A}$	A-A	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-A}$	A-A	
100	38	37	83	68	37	7	0.20	0.10	0.02	100
200	66	70	166	128	70	12	0.71	0.39	0.09	200
300	89	96	237	182	99	17	1.43	0.80	0.19	300
400	108	118	298	221	121	22	2.33	1.33	0.32	400
500	125	138	352	257	141	26	3.39	1.94	0.47	500
600	141	156	401	291	160	30	4.59	2.64	0.65	600
700	156	173	447	325	179	34	5.93	3.43	0.85	700
800	170	188	490	360	198	37	7.41	4.29	1.06	800
900	184	203	531	394	217	40	9.00	5.22	1.30	900
1000	197	218	569	428	235	43	10.72	6.22	1.55	1000
1100	209	232	607	460	252	45	12.56	7.28	1.82	1100
1200	221	245	642	493	270	48	14.50	8.41	2.11	1200
1300	233	258	677	526	288	51	16.56	9.61	2.41	1300
1400	244	271	710	559	306	54	18.72	10.87	2.72	1400
1500	256	284	743	592	324	56	20.99	12.18	3.05	1500
1600	267	296	775	624	341	59	23.36	13.56	3.40	1600
1700	277	307	806	657	359	62	25.82	14.99	3.76	1700
1800	288	319	837	689	376	64	28.39	16.48	4.14	1800
1900	298	330	866	720	393	67	31.05	18.02	4.52	1900
2000	308	342	896	752	410	69	33.80	19.62	4.93	2000
2100	318	353	925	783	427	72	36.64	21.27	5.34	2100
2200	328	363	953	813	443	74	39.58	22.97	5.77	2200
2300	337	374	981	843	460	77	42.60	24.73	6.21	2300
2400	347	384	1008	873	476	79	45.71	26.53	6.66	2400
2500	356	395	1035	903	492	82	48.91	28.39	7.13	2500
2600	365	405	1062	932	508	84	52.19	30.29	7.61	2600
2700	374	415	1088	960	523	86	55.56	32.25	8.10	2700
2800	383	425	1114	987	538	89	59.00	34.25	8.60	2800
2900	392	434	1140	1014	552	91	62.54	36.30	9.12	2900
3000	400	444	1165	1042	568	94	66.15	38.40	9.64	3000

TABLE 5. TRANSPORT PROPERTIES OF HYDROGEN

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$) H_2	Thermal Cond. ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$) H_2	Diffusion Coeff. ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$) H_2	Temp. (K)
100	42	80	0.22	100
200	68	151	0.72	200
300	90	188	1.70	300
400	109	222	3.20	400
500	127	257	4.95	500
600	143	291	7.30	600
700	160	325	10.0	700
800	175	360	13.4	800
900	190	394	17.1	900
1000	205	428	21	1000
1100	219	460	26	1100
1200	232	493	32	1200
1300	246	526	37	1300
1400	259	559	44	1400
1500	272	592	50	1500
1600	284	624	58	1600
1700	296	657	66	1700
1800	308	689	75	1800
1900	319	720	85	1900
2000	331	752	95	2000
2100	341	783	105	2100
2200	351	813	115	2200
2300	361	843	126	2300
2400	371	873	138	2400
2500	380	903	151	2500
2600	390	932	165	2600
2700	400	960	179	2700
2800	409	987	195	2800
2900	418	1014	212	2900
3000	427	1042	227	3000

TABLE 6. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^4$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	H-H	H-He	He-He	H-H	H-He	He-He	H-H	H-He	He-He	
100	34	51	99	106	90	73	0.31	0.41	0.29	100
200	57	84	155	176	146	115	1.02	1.37	0.92	200
300	75	110	199	232	192	152	2.05	2.77	1.94	300
400	90	132	244	279	233	187	3.37	4.56	3.01	400
500	104	153	284	322	271	220	4.96	6.71	4.41	500
600	118	172	322	363	308	252	6.79	9.21	6.04	600
700	130	190	359	402	342	281	8.86	12.0	7.88	700
800	142	207	394	438	373	308	11.2	15.2	9.92	800
900	153	224	429	473	403	332	13.7	18.6	12.2	900
1000	164	240	461	507	432	357	16.4	22.4	14.6	1000
1100	174	255	494	539	460	380	19.9	26.4	17.2	1100
1200	184	270	525	570	487	403	23.1	30.6	20.1	1200
1300	194	284	556	600	513	425	26.5	35.1	23.0	1300
1400	204	298	586	630	539	447	30.3	39.9	26.3	1400
1500	213	312	614	658	563	468	33.3	45.0	29.6	1500
1600	222	325	643	686	587	488	38.0	50.3	33.2	1600
1700	231	338	671	714	611	508	42.4	56.0	36.9	1700
1800	239	352	698	740	634	528	47.2	61.7	40.8	1800
1900	248	364	725	766	657	547	51.8	67.8	44.9	1900
2000	256	376	752	792	679	566	56.6	74.1	49.1	2000
2100	264	389	778	818	702	585	61	80.6	53.5	2100
2200	272	400	804	843	723	603	67	87.4	58.1	2200
2300	280	412	830	867	745	622	72	94.4	62.8	2300
2400	288	424	855	891	766	640	78	102	67.7	2400
2500	296	435	880	915	786	657	84	110	72.8	2500
2600	303	446	905	938	806	674	90	117	78.0	2600
2700	311	457	929	962	827	691	96	125	83.4	2700
2800	318	469	953	984	846	708	103	133	88.9	2800
2900	326	480	977	1007	866	724	110	141	94.6	2900
3000	333	490	1001	1029	885	740	117	150	101	3000

TABLE 7. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}$	
100	65	29	34	57	0.03	0.16	100
200	128	52	57	96	0.10	0.57	200
300	179	70	75	128	0.21	1.16	300
400	223	85	91	155	0.34	1.89	400
500	262	99	105	180	0.50	2.75	500
600	297	112	118	203	0.69	3.74	600
700	330	124	130	224	0.89	4.83	700
800	361	135	142	245	1.12	6.03	800
900	390	146	153	264	1.37	7.34	900
1000	418	156	164	283	1.63	8.74	1000
1100	445	166	175	301	1.91	10.23	1100
1200	471	175	185	319	2.21	11.82	1200
1300	496	185	194	336	2.52	13.49	1300
1400	521	194	204	353	2.85	15.25	1400
1500	544	203	213	369	3.20	17.10	1500
1600	568	211	222	386	3.56	19.03	1600
1700	591	220	231	402	3.94	21.04	1700
1800	613	228	240	419	4.33	23.13	1800
1900	635	236	249	435	4.73	25.29	1900
2000	656	244	257	452	5.15	27.54	2000
2100	677	252	265	468	5.59	29.85	2100
2200	698	260	273	482	6.03	32.24	2200
2300	718	267	281	497	6.50	34.71	2300
2400	738	275	289	512	6.97	37.24	2400
2500	758	282	297	526	7.46	39.85	2500
2600	778	289	305	540	7.96	42.52	2600
2700	797	297	312	555	8.47	45.26	2700
2800	816	304	320	568	9.00	48.07	2800
2900	835	311	327	581	9.54	50.95	2900
3000	853	318	334	595	10.09	53.89	3000

TABLE 8. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	A-A	A-H	H-H	A-A	A-H	H-H	A-A	A-H	H-H	
100	83	31	34	7	56	106	0.02	0.17	0.37	100
200	166	56	57	12	93	175	0.09	0.61	1.22	200
300	237	76	75	17	123	230	0.19	1.24	2.42	300
400	298	92	91	22	150	278	0.32	2.02	3.90	400
500	352	107	105	26	173	321	0.47	2.95	5.66	500
600	401	121	118	30	196	362	0.65	4.00	7.65	600
700	447	134	130	34	217	400	0.85	5.18	9.88	700
800	490	146	142	37	236	436	1.06	6.47	12.32	800
900	531	158	153	40	255	470	1.30	7.87	14.98	900
1000	569	169	164	43	273	504	1.55	9.37	17.83	1000
1100	607	180	175	45	290	536	1.82	10.98	20.88	1100
1200	642	190	185	48	307	567	2.11	12.68	24.12	1200
1300	677	201	194	51	324	597	2.41	14.48	27.53	1300
1400	710	210	204	54	340	626	2.72	16.37	31.13	1400
1500	743	220	213	56	355	655	3.05	18.35	34.90	1500
1600	775	229	222	59	371	683	3.40	20.42	38.84	1600
1700	806	239	231	62	386	710	3.76	22.58	42.94	1700
1800	837	248	240	64	400	737	4.14	24.82	47.20	1800
1900	866	256	249	67	415	763	4.52	27.14	51.62	1900
2000	896	265	257	69	429	789	4.93	29.55	56.20	2000
2100	925	274	265	72	443	814	5.34	32.04	60.93	2100
2200	953	282	273	74	456	839	5.77	34.60	65.81	2200
2300	981	290	281	77	470	863	6.21	37.24	70.83	2300
2400	1008	298	289	79	483	888	6.66	39.96	76.01	2400
2500	1035	306	297	82	496	911	7.13	42.76	81.32	2500
2600	1062	314	305	84	509	935	7.61	45.63	86.78	2600
2700	1088	322	312	86	522	958	8.10	48.57	92.38	2700
2800	1114	330	320	89	535	981	8.60	51.59	98.11	2800
2900	1140	337	327	91	547	1003	9.12	54.67	103.98	2900
3000	1165	345	334	94	560	1026	9.64	57.83	109.99	3000

TABLE 9. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN - MOLECULAR HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	H-H	H-H ₂	H ₂ -H ₂	H-H	H-H ₂	H ₂ -H ₂	H-H	H-H ₂	H ₂ -H ₂	
100	34	35	42	106	65	80	0.31	0.32	0.22	100
200	57	59	68	176	141	151	1.02	1.88	0.72	200
300	75	78	90	232	182	188	2.05	2.16	1.70	300
400	90	96	109	279	219	221	3.37	3.54	3.20	400
500	104	111	127	322	256	257	4.96	5.21	4.95	500
600	118	126	143	363	293	291	6.79	7.14	7.30	600
700	130	142	160	402	330	325	8.86	9.32	10.0	700
800	142	152	175	438	368	360	11.2	11.7	13.4	800
900	153	174	190	473	404	394	13.7	14.4	17.1	900
1000	164	190	205	507	441	428	16.4	17.3	21	1000
1100	174	206	219	539	476	460	19.9	20.4	26	1100
1200	184	221	232	570	513	493	23.1	23.7	32	1200
1300	194	236	246	600	539	526	26.5	27.2	37	1300
1400	204	251	259	630	583	559	30.3	30.9	44	1400
1500	213	266	272	658	617	592	33.3	34.8	50	1500
1600	222	280	284	686	650	624	38.0	38.9	58	1600
1700	231	294	296	714	674	657	42.4	43.2	66	1700
1800	239	309	308	740	718	689	47.2	47.7	75	1800
1900	248	323	319	766	750	720	51.8	52.3	85	1900
2000	256	338	331	792	784	752	56.6	57.2	95	2000
2100	264	352	341	818	818	783	61	62.2	105	2100
2200	272	367	351	843	850	813	67	67.4	115	2200
2300	280	381	361	867	883	843	72	72.8	126	2300
2400	288	395	371	891	917	873	78	78.4	138	2400
2500	296	408	380	915	949	963	84	84.1	151	2500
2600	303	423	390	938	981	932	90	90.0	165	2600
2700	311	436	400	962	1016	960	96	96.1	179	2700
2800	318	451	409	984	1050	1017	103	102	195	2800
2900	325	465	418	1007	1080	1044	110	109	212	2900
3000	333	479	427	1029	1111	1072	117	115	227	3000

TABLE 10. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$) H	Thermal Cond. ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$) H	Diffusion Coeff. ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$) H	Temp. (K)
100	34	106	0.31	100
200	57	176	1.02	200
300	75	232	2.05	300
400	90	279	3.37	400
500	104	322	4.96	500
600	118	363	6.79	600
700	130	402	8.86	700
800	142	438	11.2	800
900	153	473	13.7	900
1000	164	507	16.4	1000
1100	174	539	19.9	1100
1200	184	570	23.1	1200
1300	194	600	26.5	1300
1400	204	630	30.3	1400
1500	213	658	33.3	1500
1600	222	686	38.0	1600
1700	231	714	42.4	1700
1800	239	740	47.2	1800
1900	248	766	51.8	1900
2000	256	792	56.6	2000
2100	264	818	61	2100
2200	272	843	67	2200
2300	280	867	72	2300
2400	288	891	78	2400
2500	296	915	84	2500
2600	303	938	90	2600
2700	311	962	96	2700
2800	318	984	103	2800
2900	325	1007	110	2900
3000	333	1029	117	3000

TABLE II. TRANSPORT PROPERTIES OF DEUTERIUM - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-He}$	He-He	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-He}$	He-He	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-He}$	He-He	
100	58	77	99	58	66	73	0.16	0.21	0.29	100
200	95	122	155	101	108	115	0.52	0.67	0.92	200
300	126	159	199	141	147	152	1.05	1.33	1.84	300
400	153	192	244	176	182	187	1.66	2.09	3.01	400
500	175	222	284	210	215	220	2.11	3.05	4.41	500
600	197	247	322	243	248	252	3.26	4.11	6.04	600
700	218	275	359	274	278	281	4.20	5.32	7.88	700
800	237	299	394	305	307	308	5.26	6.58	9.92	800
900	256	323	429	336	334	332	6.37	8.03	12.2	900
1000	273	341	461	365	361	357	7.59	9.58	14.6	1000
1100	291	364	494	393	387	380	8.88	11.2	17.2	1100
1200	308	390	525	421	412	403	10.3	13.0	20.1	1200
1300	324	412	556	449	437	425	11.7	14.8	23.0	1300
1400	340	432	586	476	462	447	13.2	16.8	26.3	1400
1500	355	451	614	502	485	468	14.8	18.8	29.6	1500
1600	370	470	643	528	508	488	16.5	20.9	33.2	1600
1700	385	489	671	554	531	508	18.3	23.1	36.9	1700
1800	400	508	698	579	554	528	20.1	25.4	40.8	1800
1900	414	526	725	605	576	547	21.9	27.8	44.9	1900
2000	428	544	752	630	598	566	23.9	30.2	49.1	2000
2100	442	562	778	654	620	585	25.9	32.9	53.5	2100
2200	456	579	804	678	641	603	28.0	35.6	58.1	2200
2300	469	596	830	702	662	622	30.1	38.4	62.8	2300
2400	482	613	855	726	683	640	32.3	41.3	67.7	2400
2500	495	629	880	750	704	657	34.6	44.2	72.8	2500
2600	508	645	905	774	724	674	36.8	47.2	78.0	2600
2700	521	661	929	797	744	691	39.2	50.3	83.4	2700
2800	533	678	953	821	765	708	41.8	53.5	88.9	2800
2900	546	693	977	844	784	724	44.2	56.7	94.6	2900
3000	558	709	1001	868	804	740	47.0	60.0	101	3000

TABLE 12. TRANSPORT PROPERTIES OF DEUTERIUM-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)				Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)				Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)				Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}_2$	$\text{N}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}_2$	$\text{N}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}_2$	$\text{N}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	
100	65	52	58	58	9	33	58	58	0.03	0.08	0.08	0.16	100
200	128	92	96	96	18	59	101	101	0.10	0.28	0.28	0.52	200
300	175	123	126	126	26	83	141	141	0.21	0.57	0.57	1.03	300
400	223	150	152	152	33	104	176	176	0.34	0.93	0.93	1.66	400
500	262	174	175	175	39	124	210	210	0.50	1.35	1.35	2.40	500
600	297	196	197	197	44	143	243	243	0.69	1.94	1.94	3.25	600
700	330	217	218	218	49	161	274	274	0.89	2.37	2.37	4.20	700
800	361	236	238	238	54	179	305	305	1.12	2.96	2.96	5.24	800
900	390	255	256	256	59	197	336	336	1.37	3.60	3.60	6.37	900
1000	418	273	275	275	63	214	365	365	1.63	4.29	4.29	7.58	1000
1100	445	291	292	292	67	230	393	393	1.91	5.02	5.02	8.88	1100
1200	471	308	309	309	71	246	421	421	2.21	5.80	5.80	10.25	1200
1300	496	324	325	325	75	262	449	449	2.52	6.63	6.63	11.71	1300
1400	521	340	341	341	80	278	476	476	2.85	7.49	7.49	13.24	1400
1500	544	355	357	357	84	293	502	502	3.20	8.40	8.40	14.84	1500
1600	568	371	372	372	89	308	528	528	3.56	9.35	9.35	16.51	1600
1700	591	385	387	387	95	324	554	554	3.94	10.33	10.33	18.26	1700
1800	613	400	402	402	101	340	579	579	4.33	11.36	11.36	20.07	1800
1900	635	414	416	416	108	356	605	605	4.73	12.42	12.42	21.95	1900
2000	656	428	430	430	115	372	630	630	5.15	13.53	13.53	23.90	2000
2100	677	442	444	444	121	387	654	654	5.59	14.66	14.66	25.91	2100
2200	698	455	457	457	126	402	678	678	6.03	15.84	15.84	27.98	2200
2300	718	469	471	471	131	416	702	702	6.50	17.05	17.05	30.12	2300
2400	738	482	484	484	136	431	726	726	6.97	18.29	18.29	32.32	2400
2500	758	495	497	497	141	445	750	750	7.46	19.57	19.57	34.58	2500
2600	778	507	510	510	146	460	774	774	7.96	20.89	20.89	36.90	2600
2700	797	520	522	522	151	474	797	797	8.47	22.23	22.23	39.28	2700
2800	816	532	535	535	155	488	821	821	9.00	23.61	23.61	41.72	2800
2900	835	545	547	547	160	502	844	844	9.54	25.03	25.03	44.21	2900
3000	853	557	559	559	165	516	868	868	10.09	26.47	26.47	46.77	3000

TABLE 13. TRANSPORT PROPERTIES OF DEUTERIUM-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-A}$	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-A}$	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-A}$	
100	58	55	58	32	0.16	0.08	100
200	96	99	101	56	0.52	0.29	200
300	126	134	141	79	1.03	0.60	300
400	152	164	176	99	1.66	0.98	400
500	175	190	210	108	2.40	1.42	500
600	197	215	243	136	3.25	1.93	600
700	218	238	274	154	4.20	2.50	700
800	238	259	305	171	5.24	3.12	800
900	256	280	336	188	6.37	3.80	900
1000	275	300	365	204	7.58	4.52	1000
1100	292	319	393	219	8.88	5.30	1100
1200	309	337	421	234	10.25	6.12	1200
1300	325	355	449	250	11.71	6.99	1300
1400	341	373	476	265	13.24	7.90	1400
1500	357	390	502	279	14.84	8.86	1500
1600	372	406	528	293	16.51	9.86	1600
1700	387	423	554	308	18.26	10.90	1700
1800	402	438	579	321	20.07	11.98	1800
1900	416	454	605	336	21.95	13.10	1900
2000	430	469	630	349	23.90	14.26	2000
2100	444	485	654	363	25.91	15.46	2100
2200	457	499	678	376	27.98	16.70	2200
2300	471	514	702	389	30.12	17.98	2300
2400	484	528	726	402	32.32	19.29	2400
2500	497	542	750	416	34.58	20.64	2500
2600	510	556	774	429	36.90	22.03	2600
2700	522	570	797	441	39.28	23.45	2700
2800	535	584	821	455	41.72	24.90	2800
2900	547	597	844	467	44.21	26.39	2900
3000	559	610	868	481	46.77	27.92	3000

TABLE 14. TRANSPORT PROPERTIES OF DEUTERIUM - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	
100	58	46	42	58	69	80	0.16	0.18	0.22	100
200	95	78	68	101	126	151	0.52	0.63	0.72	200
300	126	103	90	141	165	188	1.05	1.27	1.70	300
400	153	124	109	176	199	222	1.66	2.02	3.20	400
500	175	144	127	210	234	257	2.11	2.94	4.95	500
600	197	162	143	243	267	291	3.26	3.98	7.30	600
700	218	179	160	274	300	325	4.20	5.14	10.0	700
800	237	195	175	305	333	360	5.26	6.42	13.4	800
900	256	211	190	336	365	394	6.37	7.80	17.1	900
1000	273	225	205	365	397	428	7.59	9.28	21	1000
1100	291	240	219	393	427	460	8.88	10.9	26	1100
1200	308	254	232	421	457	493	10.3	12.8	32	1200
1300	324	267	246	449	488	526	11.7	14.4	37	1300
1400	340	280	259	476	518	559	13.2	16.2	44	1400
1500	355	294	272	502	547	592	14.8	18.2	50	1500
1600	370	306	284	528	576	624	16.5	20.2	58	1600
1700	385	318	296	554	606	657	18.3	22.3	66	1700
1800	400	330	308	579	634	689	20.1	24.5	75	1800
1900	414	342	319	605	663	720	21.9	26.8	85	1900
2000	428	353	331	630	691	752	23.9	29.2	95	2000
2100	442	365	341	654	719	783	25.9	31.4	105	2100
2200	456	376	351	678	746	813	28.0	34.0	115	2200
2300	469	387	361	702	773	843	30.1	36.6	126	2300
2400	482	398	371	726	800	873	32.3	39.2	138	2400
2500	495	408	380	750	827	903	34.6	42.0	151	2500
2600	508	419	390	774	853	932	36.8	44.7	165	2600
2700	521	429	400	797	879	960	39.2	47.5	179	2700
2800	533	440	409	821	919	1017	41.8	50.4	195	2800
2900	546	450	418	844	944	1044	44.2	53.4	212	2900
3000	558	460	427	868	970	1072	47.0	56.5	227	3000

TABLE 15. TRANSPORT PROPERTIES OF DEUTERIUM - ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻⁷)			Thermal Conductivity (Wm ⁻¹ K ⁻¹ · 10 ⁻³)			Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)			Temp. (K)
	D ₂ -D ₂	D ₂ -H	H-H	D ₂ -D ₂	D ₂ -H	H-H	D ₂ -D ₂	D ₂ -H	H-H	
100	58	40	34	58	78	98	0.16	0.27	0.31	100
200	95	66	57	101	139	176	0.52	0.89	1.02	200
300	126	86	75	149	191	232	1.05	1.79	2.05	300
400	153	104	90	176	228	279	1.66	2.83	3.37	400
500	175	120	104	210	226	322	2.11	4.10	4.96	500
600	197	135	118	243	303	363	3.26	5.55	6.79	600
700	218	150	130	274	338	402	4.20	7.18	8.86	700
800	237	163	142	305	372	438	5.26	8.97	11.2	800
900	256	176	153	336	405	473	6.37	10.9	13.7	900
1000	273	189	164	365	436	507	7.59	12.9	16.4	1000
1100	291	201	174	393	466	539	8.88	15.2	19.8	1100
1200	308	213	184	421	496	570	10.3	17.5	23.1	1200
1300	324	223	194	449	525	600	11.7	20.0	26.5	1300
1400	340	235	204	476	553	630	13.2	22.6	30.0	1400
1500	355	245	213	502	580	658	14.8	25.4	33.3	1500
1600	370	256	222	528	607	686	16.5	28.1	38.0	1600
1700	385	267	231	554	634	714	18.3	31.1	42.4	1700
1800	400	276	239	579	660	740	20.1	34.2	47.2	1800
1900	414	286	248	605	686	767	21.9	37.3	51.8	1900
2000	428	296	256	630	711	792	23.9	40.5	56.6	2000
2100	442	306	264	654	736	818	25.9	43.7	61	2100
2200	456	315	272	678	761	843	28.0	47.2	67	2200
2300	469	324	280	702	785	867	30.1	50.7	72	2300
2400	482	333	288	726	809	891	32.3	54.3	78	2400
2500	495	342	296	750	833	915	34.6	58.0	84	2500
2600	508	351	303	774	857	939	36.8	61.9	90	2600
2700	521	360	311	797	880	962	39.2	65.6	96	2700
2800	533	369	318	821	903	984	41.8	69.9	103	2800
2900	546	377	326	844	926	1007	44.2	74.1	110	2900
3000	558	386	333	868	949	1029	47.0	78.4	117	3000

TABLE 16. TRANSPORT PROPERTIES OF DEUTERIUM

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$) D_2	Thermal Cond. ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$) D_2	Diffusion Coeff. ($\text{m}^2 \text{s}^{-1} \cdot 10^{-6}$) D_2	Temp. (K)
100	58	58	0.16	100
200	95	101	0.52	200
300	126	141	1.05	300
400	153	176	1.66	400
500	175	210	2.11	500
600	197	243	3.26	600
700	218	274	4.20	700
800	237	305	5.26	800
900	256	336	6.37	900
1000	273	365	7.59	1000
1100	291	393	8.88	1100
1200	308	421	10.3	1200
1300	324	449	11.7	1300
1400	340	476	13.2	1400
1500	355	502	14.8	1500
1600	370	528	16.5	1600
1700	385	554	18.3	1700
1800	400	579	20.1	1800
1900	414	605	21.9	1900
2000	428	630	23.9	2000
2100	442	654	25.9	2100
2200	456	678	28.0	2200
2300	469	702	30.1	2300
2400	482	726	32.3	2400
2500	495	750	34.6	2500
2600	508	774	36.8	2600
2700	521	797	39.2	2700
2800	533	821	41.8	2800
2900	546	844	44.2	2900
3000	558	868	47.0	3000

TABLE 17. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	D-D	D-He	D-He	He-He	D-D	D-He	He-He
100	50	70	79	76	0.27	0.28	0.29
200	83	111	130	123	0.90	0.91	0.92
300	109	144	170	161	1.82	1.82	1.84
400	131	174	204	196	2.89	2.87	3.01
500	152	201	237	229	4.18	4.17	4.41
600	171	224	267	260	5.59	5.62	6.04
700	189	250	295	288	7.30	7.26	7.88
800	206	272	321	315	9.09	9.06	9.92
900	223	294	347	340	11.1	11.0	12.2
1000	238	314	371	364	13.2	13.1	14.6
1100	253	334	395	388	15.4	15.2	17.2
1200	268	354	418	411	17.8	17.6	20.1
1300	282	373	440	433	20.3	20.0	23.0
1400	296	391	461	454	23.0	22.9	26.3
1500	310	410	482	475	25.7	25.5	29.6
1600	323	427	503	496	28.9	28.5	33.2
1700	336	444	523	516	31.4	31.3	36.9
1800	349	461	543	536	34.4	34.7	40.8
1900	361	478	563	555	37.5	37.7	44.9
2000	373	494	582	574	40.8	41.2	49.1
2100	385	510	601	593	44.1	44.3	53.5
2200	397	526	619	611	46.3	48.0	58.1
2300	409	541	637	630	51.3	51.8	62.8
2400	420	556	655	648	55.1	55.6	67.7
2500	431	571	673	665	59.1	59.5	72.8
2600	442	586	690	682	62.9	63.5	78.0
2700	453	601	707	699	66.9	67.6	83.4
2800	464	615	724	716	70.9	71.8	88.9
2900	475	630	741	733	74.9	76.1	94.6
3000	486	644	757	749	78.9	80.6	101

TABLE 18. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}$	D-D	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}$	D-D	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}$	D-D	
100	65	41	50	9	44	79	0.03	0.12	0.27	100
200	128	73	83	18	74	130	0.10	0.42	0.90	200
300	179	98	109	26	98	170	0.21	0.85	1.79	300
400	223	120	132	33	119	205	0.34	1.39	2.88	400
500	262	139	152	39	138	237	0.50	2.03	4.18	500
600	297	157	171	44	155	267	0.69	2.75	5.65	600
700	330	173	189	49	172	295	0.89	3.56	7.29	700
800	361	189	206	54	188	322	1.12	4.44	9.10	800
900	390	204	223	59	203	347	1.37	5.40	11.06	900
1000	418	218	238	63	217	372	1.63	6.43	13.17	1000
1100	445	232	254	67	231	395	1.91	7.53	15.42	1100
1200	471	246	268	71	244	418	2.21	8.70	17.81	1200
1300	496	259	283	75	257	440	2.52	9.93	20.33	1300
1400	521	272	296	80	271	462	2.85	11.23	22.98	1400
1500	544	284	310	84	283	483	3.20	12.59	25.77	1500
1600	568	296	323	89	296	504	3.56	14.01	28.68	1600
1700	591	308	336	95	309	524	3.94	15.49	31.71	1700
1800	613	320	349	101	322	544	4.33	17.03	34.85	1800
1900	635	331	361	108	335	563	4.73	18.62	38.12	1900
2000	656	342	373	115	348	582	5.15	20.27	41.50	2000
2100	677	353	385	121	361	601	5.59	21.98	44.99	2100
2200	698	364	397	126	372	619	6.03	23.74	48.59	2200
2300	718	375	409	131	384	637	6.50	25.55	52.30	2300
2400	738	385	420	136	395	655	6.97	27.42	56.12	2400
2500	758	395	431	141	407	673	7.46	29.34	60.05	2500
2600	778	406	443	146	418	690	7.96	31.31	64.08	2600
2700	797	416	453	151	429	707	8.47	33.32	68.21	2700
2800	816	426	464	155	439	724	9.00	35.39	72.45	2800
2900	835	435	475	160	450	741	9.54	37.51	76.78	2900
3000	853	445	486	165	461	757	10.09	39.68	81.22	3000

TABLE 19. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	A-A	A-D	D-D	A-A	A-D	D-D	A-A	A-D	D-D	
100	83	44	50	7	43	79	0.02	0.12	0.27	100
200	166	79	83	12	71	130	0.09	0.45	0.90	200
300	237	107	109	17	93	170	0.19	0.91	1.79	300
400	298	130	132	22	113	205	0.32	1.48	2.88	400
500	352	152	152	26	131	237	0.47	2.16	4.18	500
600	401	171	171	30	148	267	0.65	2.94	5.65	600
700	447	189	189	34	164	295	0.85	3.80	7.29	700
800	490	206	206	37	179	322	1.06	4.74	9.10	800
900	531	223	223	40	193	347	1.30	5.77	11.06	900
1000	569	238	238	43	207	372	1.55	6.87	13.17	1000
1100	607	254	254	45	220	395	1.82	8.05	15.42	1100
1200	642	268	268	48	233	418	2.11	9.30	17.81	1200
1300	677	283	283	51	245	440	2.41	10.61	20.33	1300
1400	710	296	296	54	258	462	2.72	12.00	22.99	1400
1500	743	310	310	56	269	483	3.05	13.45	25.77	1500
1600	775	323	323	59	281	504	3.40	14.97	28.68	1600
1700	806	336	336	62	294	524	3.76	16.55	31.71	1700
1800	837	349	349	64	304	544	4.14	18.19	34.85	1800
1900	866	361	361	67	315	563	4.52	19.90	38.12	1900
2000	896	373	373	69	325	582	4.93	21.66	41.50	2000
2100	925	385	385	72	336	601	5.34	23.49	44.99	2100
2200	953	397	397	74	346	619	5.77	25.37	48.59	2200
2300	981	409	409	77	357	637	6.21	27.30	52.30	2300
2400	1008	420	420	79	367	655	6.66	29.30	56.12	2400
2500	1035	431	431	82	377	673	7.13	31.35	60.05	2500
2600	1062	443	443	84	387	690	7.61	33.45	64.08	2600
2700	1088	454	453	86	396	707	8.10	35.61	68.21	2700
2800	1114	464	464	89	406	724	8.60	37.82	72.45	2800
2900	1140	475	475	91	416	741	9.12	40.08	76.78	2900
3000	1165	486	486	94	425	757	9.64	42.40	81.22	3000

TABLE 20. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{N sec}^{-2} \cdot 10^{-7}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-5}$)			Diffusion Coefficient ($\text{m}^2 \text{ s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	D-D	D-H ₂	H ₂ -H ₂	D-D	D-H ₂	H ₂ -H ₂	D-D	D-H ₂	H ₂ -H ₂	
100	50	44	42	79	80	80	0.27	0.24	0.22	100
200	83	75	68	130	141	151	0.90	0.80	0.72	200
300	109	99	90	170	179	188	1.82	1.60	1.70	300
400	131	119	109	204	213	222	2.89	2.60	3.20	400
500	152	138	127	237	247	257	4.18	3.76	4.95	500
600	171	155	143	267	279	291	5.59	5.09	7.30	600
700	189	172	160	295	310	325	7.30	6.58	10.0	700
800	206	188	175	321	341	360	9.09	8.22	13.4	800
900	223	202	190	347	371	394	11.1	9.99	17.1	900
1000	238	216	205	371	400	428	13.2	11.9	21	1000
1100	253	230	219	395	428	460	15.4	13.9	26	1100
1200	268	243	232	418	455	493	17.8	16.1	32	1200
1300	282	257	246	440	482	526	20.3	18.3	37	1300
1400	296	269	259	461	510	559	23.0	20.7	44	1400
1500	310	281	272	482	537	592	25.7	23.3	50	1500
1600	323	293	284	503	564	624	28.9	25.9	58	1600
1700	336	305	296	523	590	657	31.4	28.6	66	1700
1800	349	316	308	543	616	689	34.4	31.4	75	1800
1900	361	327	319	563	642	720	37.5	34.4	85	1900
2000	373	339	331	582	667	752	40.8	37.5	95	2000
2100	385	350	341	601	692	783	44.1	40.6	105	2100
2200	397	360	351	619	716	813	46.3	43.8	115	2200
2300	409	371	361	637	740	843	51.3	47.0	126	2300
2400	420	381	371	655	764	873	55.1	50.4	138	2400
2500	431	391	380	673	788	903	59.1	53.9	151	2500
2600	442	402	390	690	811	932	62.9	59.6	165	2600
2700	453	412	400	707	834	960	66.9	61.4	179	2700
2800	464	422	409	724	871	1017	70.9	65.1	195	2800
2900	475	431	418	741	893	1044	74.9	69.1	212	2900
3000	486	441	427	757	915	1072	78.9	72.9	227	3000

TABLE 22. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM - DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	D-D	D-D ₂	D-D	D-D ₂	D-D	D-D ₂	
100	51	52	79	69	0.27	0.21	100
200	83	86	130	116	0.90	0.70	200
300	109	113	170	156	1.67	1.42	300
400	131	137	204	190	2.89	2.26	400
500	152	158	237	224	4.18	3.26	500
600	171	178	267	255	5.59	4.41	600
700	189	197	295	285	7.30	5.69	700
800	206	214	321	313	9.09	7.09	800
900	223	231	347	342	11.1	8.63	900
1000	238	248	371	368	13.2	10.3	1000
1100	253	263	395	394	15.4	12.0	1100
1200	268	279	418	420	17.8	13.9	1200
1300	282	293	440	445	20.3	15.9	1300
1400	296	307	461	469	23.0	17.9	1400
1500	310	321	482	492	25.7	20.0	1500
1600	323	336	503	516	28.9	22.3	1600
1700	336	349	523	539	31.4	24.7	1700
1800	349	362	543	561	34.4	27.2	1800
1900	361	375	563	584	37.5	29.7	1900
2000	373	388	582	606	40.8	32.3	2000
2100	385	401	601	628	44.1	35.0	2100
2200	397	413	619	649	46.3	38.0	2200
2300	409	425	637	670	51.3	41.0	2300
2400	420	437	655	690	55.1	44.0	2400
2500	431	449	673	712	59.1	47.0	2500
2600	443	460	690	732	62.9	50.0	2600
2700	454	472	707	752	66.9	53.1	2700
2800	465	483	724	773	70.9	56.5	2800
2900	476	494	741	793	74.9	59.9	2900
3000	486	505	757	813	78.9	63.4	3000

TABLE 23. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$) D	Thermal Cond. ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-5}$) D	Diffusion Coeff. ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$) D	Temp. (K)
100	50	79	0.27	100
200	83	130	0.96	200
300	109	170	1.82	300
400	131	204	2.89	400
500	152	237	4.18	500
600	171	267	5.59	600
700	189	295	7.30	700
800	206	321	9.09	800
900	223	347	11.1	900
1000	238	371	13.2	1000
1100	253	395	15.4	1100
1200	268	418	17.8	1200
1300	282	440	20.3	1300
1400	296	461	23.0	1400
1500	310	482	25.7	1500
1600	323	503	28.9	1600
1700	336	523	31.4	1700
1800	349	543	34.4	1800
1900	361	563	37.5	1900
2000	373	582	40.8	2000
2100	385	601	44.1	2100
2200	397	619	46.3	2200
2300	410	637	51.3	2300
2400	420	655	55.1	2400
2500	432	673	59.1	2500
2600	443	690	62.9	2600
2700	454	707	66.9	2700
2800	465	724	70.9	2800
2900	475	740	74.9	2900
3000	486	757	78.9	3000

TABLE 24. TRANSPORT PROPERTIES OF AMMONIA - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{NH}_3\text{-NH}_3$	$\text{NH}_3\text{-He}$	$\text{NH}_3\text{-NH}_3$	$\text{NH}_3\text{-He}$	$\text{NH}_3\text{-NH}_3$	$\text{NH}_3\text{-He}$	
100	52	64	5	39	0.02	0.10	100
200	71	118	15	65	0.09	0.39	200
300	104	160	25	89	0.20	0.81	300
400	139	195	36	112	0.36	1.31	400
500	174	227	51	136	0.56	1.91	500
600	209	257	66	159	0.80	2.40	600
700	244	284	81	181	1.08	3.11	700
800	277	310	98	203	1.40	4.19	800
900	309	335	115	224	1.76	5.09	900
1000	339	359	136	247	2.14	6.07	1000
1100	368	381	156	268	2.56	7.11	1100
1200	396	404	176	290	3.00	8.20	1200
1300	424	426	197	311	3.46	9.38	1300
1400	450	446	219	333	3.97	10.6	1400
1500	475	466	242	355	4.49	11.9	1500
1600	500	487	265	377	5.04	13.2	1600
1700	524	506	289	399	5.61	14.6	1700
1800	547	525	313	421	6.20	16.1	1800
1900	570	544	338	443	6.82	17.6	1900
2000	592	563	364	465	7.46	19.2	2000
2100	613	581	391	488	8.12	20.8	2100
2200	634	599	418	511	8.80	22.4	2200
2300	655	616	446	534	9.50	24.1	2300
2400	675	634	472	556	10.2	25.9	2400
2500	695	651	502	580	10.8	27.7	2500
2600	715	667	532	603	11.7	29.6	2600
2700	734	684	561	626	12.5	31.4	2700
2800	753	701	591	649	13.3	33.3	2800
2900	771	717	620	672	14.2	35.2	2900
3000	789	733	650	695	15.0	37.1	3000

TABLE 25. TRANSPORT PROPERTIES OF AMMONIA-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	
100	65	56	52	9	7	5	0.03	0.02	0.02	100
200	128	93	70	18	16	15	0.10	0.10	0.09	200
300	179	140	103	26	25	25	0.21	0.21	0.20	300
400	223	183	138	33	35	36	0.34	0.37	0.35	400
500	262	223	174	39	45	51	0.50	0.57	0.56	500
600	297	259	209	44	55	66	0.69	0.79	0.80	600
700	330	293	244	49	65	81	0.89	1.04	1.08	700
800	361	325	276	54	76	98	1.12	1.32	1.40	800
900	390	354	308	59	87	115	1.37	1.62	1.75	900
1000	418	383	338	63	99	136	1.63	1.95	2.14	1000
1100	445	410	367	67	111	156	1.91	2.30	2.56	1100
1200	471	436	395	71	123	176	2.21	2.67	3.00	1200
1300	496	461	423	75	136	197	2.52	3.06	3.47	1300
1400	521	485	449	80	149	219	2.85	3.47	3.97	1400
1500	544	508	474	84	163	242	3.20	3.90	4.43	1500
1600	568	531	498	89	177	265	3.56	4.35	5.04	1600
1700	591	553	522	95	192	289	3.94	4.82	5.61	1700
1800	613	574	545	101	207	313	4.33	5.30	6.20	1800
1900	635	595	567	108	223	338	4.73	5.81	6.82	1900
2000	656	615	589	115	239	364	5.15	6.33	7.46	2000
2100	677	636	611	121	256	391	5.59	6.87	8.12	2100
2200	698	655	631	126	272	418	6.03	7.43	8.80	2200
2300	718	675	652	131	288	445	6.50	8.00	9.50	2300
2400	738	694	672	136	304	472	6.97	8.59	10.22	2400
2500	758	712	692	141	322	502	7.46	9.19	10.97	2500
2600	778	731	711	146	339	532	7.96	9.81	11.73	2600
2700	797	749	730	151	356	561	8.47	10.45	12.51	2700
2800	816	767	749	156	373	591	9.00	11.10	13.32	2800
2900	835	785	767	160	390	620	9.54	11.77	14.14	2900
3000	853	802	786	165	407	650	10.09	12.45	14.98	3000

TABLE 26. TRANSPORT PROPERTIES OF AMMONIA-ARGON MIXTURES

Temp. (K)	Viscosity (Nsec ⁻² · 10 ⁻⁷)			Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)			Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)		Temp. (K)
	A-A	A-NH ₃	NH ₃ -NH ₃	A-A	A-NH ₃	NH ₃ -NH ₃	A-A	A-NH ₃ , NH ₃ -NH ₃	
100	83	51	39	7	6	5	0.02	0.02	100
200	166	102	70	12	13	15	0.09	0.09	200
300	237	154	103	17	21	25	0.19	0.21	300
400	298	204	138	22	29	36	0.32	0.37	400
500	352	249	174	26	38	51	0.47	0.56	500
600	401	291	209	30	48	66	0.65	0.79	600
700	447	331	244	34	57	81	0.85	1.04	700
800	490	367	276	37	67	98	1.06	1.32	800
900	531	401	308	40	78	115	1.30	1.63	900
1000	569	434	338	43	89	136	1.55	1.96	1000
1100	607	465	367	45	100	156	1.82	2.31	1100
1200	642	495	395	48	112	176	2.11	2.69	1200
1300	677	524	423	51	124	197	2.41	3.08	1300
1400	710	552	449	54	136	219	2.72	3.50	1400
1500	743	579	474	56	149	242	3.05	3.93	1500
1600	775	605	498	59	162	265	3.40	4.39	1600
1700	806	630	522	62	175	289	3.76	4.86	1700
1800	837	655	545	64	188	313	4.14	5.36	1800
1900	866	679	567	67	202	338	4.52	5.87	1900
2000	896	702	589	69	216	364	4.93	6.40	2000
2100	925	726	611	72	231	391	5.34	6.95	2100
2200	953	748	631	74	246	418	5.77	7.51	2200
2300	981	770	652	77	261	446	6.21	8.09	2300
2400	1008	792	672	79	275	472	6.66	8.69	2400
2500	1035	814	692	82	292	502	7.13	9.30	2500
2600	1062	835	711	84	308	532	7.61	9.93	2600
2700	1088	856	730	86	323	561	8.10	10.58	2700
2800	1114	876	749	89	340	591	8.60	11.24	2800
2900	1140	897	767	91	355	620	9.12	11.91	2900
3000	1165	917	786	94	372	650	9.64	12.61	3000

TABLE 27. TRANSPORT PROPERTIES OF NITROGEN TRIDEUTERIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-HE}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-HE}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-HE}$	
100	-	-	-	73	-	0.29	100
200	96	130	17	66	0.10	0.42	200
300	145	174	28	90	0.24	0.85	300
400	194	212	40	113	0.42	1.38	400
500	240	246	54	137	0.65	2.01	500
600	283	277	68	160	0.92	2.72	600
700	324	306	83	182	1.22	3.52	700
800	361	334	98	203	1.56	4.39	800
900	397	360	114	223	1.92	5.34	900
1000	431	386	130	243	2.32	6.36	1000
1100	463	410	145	262	2.74	7.45	1100
1200	494	434	161	282	3.19	8.60	1200
1300	524	457	178	301	3.67	9.82	1300
1400	552	480	195	321	4.17	11.10	1400
1500	580	502	213	340	4.70	12.45	1500
1600	607	523	232	360	5.25	13.85	1600
1700	633	544	252	380	5.82	15.31	1700
1800	659	564	272	400	6.41	16.83	1800
1900	684	585	294	420	7.03	18.41	1900
2000	708	604	318	442	7.67	20.04	2000
2100	732	624	343	464	8.33	21.73	2100
2200	755	643	369	486	9.01	23.47	2200
2300	778	661	395	508	9.72	25.26	2300
2400	800	680	422	531	10.44	27.11	2400
2500	822	698	449	553	11.18	29.00	2500
2600	844	716	477	575	11.94	30.95	2600
2700	865	734	506	598	12.72	32.94	2700
2800	886	751	535	621	13.52	34.99	2800
2900	906	769	565	644	14.34	37.03	2900
3000	927	786	595	668	15.17	39.22	3000

TABLE 28. TRANSPORT PROPERTIES OF NITROGEN TRIDEUTERIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{N cm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ND}_3$	$\text{N}_2\text{-ND}_3$	$\text{ND}_3\text{-ND}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ND}_3$	
100	65	-	-	9	0.03	-	100
200	128	111	96	18	0.10	0.10	200
300	179	164	145	26	0.21	0.23	300
400	223	211	194	33	0.34	0.39	400
500	262	254	240	39	0.50	0.59	500
600	297	293	283	44	0.69	0.81	600
700	330	328	324	49	0.89	1.06	700
800	361	362	361	54	1.12	1.34	800
900	390	393	397	59	1.37	1.64	900
1000	418	423	431	63	1.63	1.96	1000
1100	445	452	463	67	1.91	2.31	1100
1200	471	479	494	71	2.21	2.67	1200
1300	496	506	524	75	2.52	3.06	1300
1400	521	531	552	80	2.85	3.47	1400
1500	544	556	590	84	3.20	3.89	1500
1600	568	581	607	89	3.56	4.34	1600
1700	591	604	633	95	3.94	4.80	1700
1800	613	627	659	101	4.33	5.28	1800
1900	635	650	684	108	4.73	5.78	1900
2000	656	672	708	115	5.15	6.30	2000
2100	677	694	732	121	5.59	6.83	2100
2200	698	715	755	126	6.03	7.38	2200
2300	718	736	778	131	6.50	7.95	2300
2400	738	756	800	136	6.97	8.53	2400
2500	758	777	822	141	7.46	9.13	2500
2600	778	797	844	146	7.96	9.74	2600
2700	797	817	865	151	8.47	10.37	2700
2800	816	836	886	155	9.00	11.01	2800
2900	835	855	906	160	9.54	11.67	2900
3000	853	874	927	165	10.09	12.35	3000

TABLE 29. TRANSPORT PROPERTIES OF NITROGEN TRIDEUTERIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-A}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-A}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-A}$	
100	-	83	-	7	-	0.02	100
200	96	166	17	14	0.10	0.10	200
300	145	237	28	22	0.24	0.19	300
400	194	298	40	31	0.42	0.32	400
500	240	352	54	40	0.65	0.47	500
600	283	401	68	49	0.92	0.65	600
700	324	447	83	59	1.22	0.85	700
800	361	490	98	68	1.56	1.06	800
900	397	531	114	77	1.92	1.30	900
1000	431	569	130	86	2.32	1.55	1000
1100	463	607	145	95	2.74	2.31	1100
1200	494	642	161	104	3.19	2.68	1200
1300	524	677	178	114	3.67	3.07	1300
1400	552	710	195	124	4.17	3.48	1400
1500	580	743	213	134	4.70	3.91	1500
1600	607	775	232	145	5.25	4.36	1600
1700	633	806	252	157	5.82	4.82	1700
1800	659	837	272	168	6.41	5.31	1800
1900	684	866	294	180	7.03	5.81	1900
2000	708	896	318	193	7.67	6.33	2000
2100	732	925	343	207	8.33	6.87	2100
2200	755	953	369	221	9.01	7.42	2200
2300	778	981	395	236	9.72	7.99	2300
2400	800	1008	422	251	10.44	8.58	2400
2500	822	1035	449	265	11.18	9.18	2500
2600	844	1062	477	281	11.94	9.80	2600
2700	865	1088	506	296	12.72	10.43	2700
2800	886	1114	535	312	13.52	11.08	2800
2900	906	1140	565	328	14.34	11.75	2900
3000	927	1165	595	345	15.17	12.42	3000

TABLE 30. TRANSPORT PROPERTIES OF NITROGEN TETRAHYDRIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-HE}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-HE}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-HE}$	
100	43	61	14	43	0.01	0.09	100
200	76	112	30	72	0.05	0.34	200
300	111	153	44	98	0.11	0.69	300
400	149	187	59	123	0.20	1.14	400
500	187	218	74	147	0.32	1.66	500
600	225	247	88	170	0.46	2.26	600
700	263	273	102	191	0.62	2.93	700
800	300	298	116	211	0.81	3.66	800
900	336	322	131	231	1.02	4.45	900
1000	370	344	144	250	1.24	5.31	1000
1100	403	366	160	270	1.49	6.21	1100
1200	434	388	176	288	1.75	7.18	1200
1300	465	408	192	308	2.03	8.20	1300
1400	495	428	209	327	2.33	9.27	1400
1500	523	446	224	347	2.64	10.39	1500
1600	551	467	240	364	2.96	11.56	1600
1700	578	486	256	382	3.30	12.78	1700
1800	604	504	272	400	3.65	14.05	1800
1900	630	522	287	417	4.02	15.37	1900
2000	654	540	302	434	4.40	16.73	2000
2100	679	557	317	454	4.79	18.14	2100
2200	703	574	332	467	5.20	19.59	2200
2300	726	591	348	485	5.62	21.09	2300
2400	749	607	362	501	6.05	22.63	2400
2500	771	623	378	517	6.49	24.21	2500
2600	793	640	392	533	6.94	25.84	2600
2700	815	655	407	549	7.41	27.50	2700
2800	836	671	421	564	7.89	29.21	2800
2900	857	686	436	580	8.38	30.96	2900
3000	877	702	450	595	8.88	32.75	3000

TABLE 31. TRANSPORT PROPERTIES OF NITROGEN TETRAHYDRIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Ncm}^{-2} \cdot 10^{-4}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	
100	43	49	65	14	11	9	0.01	0.02	0.03	100
200	76	98	128	30	24	18	0.05	0.07	0.10	200
300	111	148	179	44	35	26	0.11	0.16	0.21	300
400	149	195	223	59	46	33	0.20	0.28	0.34	400
500	187	239	262	74	57	39	0.32	0.43	0.50	500
600	225	278	297	88	66	44	0.46	0.60	0.69	600
700	263	315	330	102	76	49	0.62	0.79	0.89	700
800	300	349	361	116	85	54	0.81	1.01	1.12	800
900	336	382	390	131	95	59	1.02	1.24	1.37	900
1000	370	413	418	144	103	63	1.24	1.49	1.63	1000
1100	403	442	445	160	113	67	1.49	1.75	1.91	1100
1200	434	470	471	176	123	71	1.75	2.04	2.21	1200
1300	465	497	496	192	133	75	2.03	2.34	2.52	1300
1400	495	523	521	209	144	80	2.33	2.65	2.85	1400
1500	523	549	544	224	154	84	2.64	2.98	3.20	1500
1600	551	573	568	240	164	89	2.96	3.33	3.56	1600
1700	578	597	591	256	175	95	3.30	3.69	3.94	1700
1800	604	621	613	272	186	101	3.65	4.06	4.33	1800
1900	630	644	635	287	197	108	4.02	4.45	4.73	1900
2000	654	666	656	302	208	115	4.40	4.85	5.15	2000
2100	679	688	677	317	219	121	4.79	5.26	5.59	2100
2200	703	709	698	332	229	126	5.20	5.69	6.03	2200
2300	726	730	718	348	239	131	5.62	6.13	6.50	2300
2400	749	751	738	362	249	136	6.05	6.58	6.97	2400
2500	771	771	758	378	259	141	6.49	7.04	7.46	2500
2600	793	791	778	392	269	146	6.94	7.52	7.96	2600
2700	815	811	797	407	279	151	7.41	8.01	8.47	2700
2800	836	830	816	421	287	156	7.89	8.51	9.00	2800
2900	857	849	835	436	298	160	8.38	9.02	9.54	2900
3000	877	868	853	450	307	165	8.88	9.54	10.09	3000

TABLE 32. TRANSPORT PROPERTIES OF NITROGEN TETRAHYDRIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-A}$	A-A	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-A}$	A-A	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-A}$	A-A	
100	43	56	83	14	10	7	0.01	0.02	0.02	100
200	76	110	166	30	21	12	0.05	0.07	0.09	200
300	111	167	237	44	30	17	0.11	0.15	0.19	300
400	149	222	298	59	40	22	0.20	0.27	0.32	400
500	187	273	352	74	50	26	0.32	0.41	0.47	500
600	225	320	401	88	59	30	0.46	0.58	0.65	600
700	263	363	447	102	68	34	0.62	0.77	0.85	700
800	300	404	490	116	76	37	0.81	0.98	1.06	800
900	336	442	531	131	85	40	1.02	1.20	1.30	900
1000	370	478	569	144	93	43	1.24	1.45	1.55	1000
1100	403	513	607	160	102	45	1.49	1.71	1.82	1100
1200	434	547	642	176	112	48	1.75	1.99	2.11	1200
1300	465	579	677	192	122	51	2.03	2.28	2.41	1300
1400	495	610	710	209	131	54	2.33	2.59	2.72	1400
1500	523	640	743	224	140	56	2.64	2.92	3.05	1500
1600	551	669	775	240	149	59	2.96	3.26	3.40	1600
1700	578	697	806	256	159	62	3.30	3.61	3.76	1700
1800	604	724	837	272	168	64	3.65	3.98	4.14	1800
1900	630	751	866	287	177	67	4.02	4.36	4.52	1900
2000	654	778	896	302	185	69	4.40	4.75	4.93	2000
2100	679	803	925	317	194	72	4.79	5.16	5.34	2100
2200	703	828	953	332	203	74	5.20	5.58	5.77	2200
2300	726	853	981	348	212	77	5.62	6.01	6.21	2300
2400	749	877	1008	362	220	79	6.05	6.45	6.66	2400
2500	771	901	1035	378	230	82	6.49	6.91	7.13	2500
2600	793	925	1062	392	238	84	6.94	7.38	7.61	2600
2700	815	948	1088	407	246	86	7.41	7.86	8.10	2700
2800	836	971	1114	421	255	89	7.89	8.35	8.60	2800
2900	857	993	1140	436	263	91	8.38	8.86	9.12	2900
3000	877	1015	1165	450	272	94	8.88	9.37	9.64	3000

TABLE 33. TRANSPORT PROPERTIES OF NITROGEN TETRADEUTERIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-HE}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-HE}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-HE}$	
100	46	63	15	44	0.01	0.09	100
200	87	112	32	73	0.05	0.33	200
300	131	150	47	99	0.12	0.68	300
400	176	183	63	125	0.21	1.10	400
500	219	213	80	150	0.33	1.61	500
600	261	240	95	173	0.47	2.18	600
700	300	265	110	195	0.63	2.82	700
800	337	289	125	216	0.81	3.52	800
900	372	312	141	236	1.00	4.28	900
1000	405	334	155	256	1.21	5.10	1000
1100	437	355	172	276	1.44	5.97	1100
1200	467	376	189	296	1.68	6.89	1200
1300	496	396	207	316	1.93	7.87	1300
1400	524	416	225	336	2.20	8.90	1400
1500	551	435	241	354	2.48	9.98	1500
1600	578	453	258	373	2.77	11.10	1600
1700	603	471	276	392	3.07	12.28	1700
1800	628	489	293	410	3.39	13.49	1800
1900	653	506	308	427	3.72	14.76	1900
2000	677	524	324	445	4.06	16.07	2000
2100	700	540	341	463	4.41	17.42	2100
2200	723	557	357	480	4.78	18.81	2200
2300	745	573	374	498	5.15	20.25	2300
2400	767	589	390	515	5.54	21.73	2400
2500	788	605	406	531	5.94	23.25	2500
2600	809	621	422	548	6.34	24.81	2600
2700	830	636	438	564	6.76	26.41	2700
2800	850	651	454	581	7.19	28.05	2800
2900	870	666	469	596	7.62	29.73	2900
3000	890	681	484	612	8.07	31.45	3000

TABLE 34. TRANSPORT PROPERTIES OF NITROGEN TETRADEUTERIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2$	$\text{N}_2\text{-N}_2$	
100	46	53	15	12	0.01	0.02	0.03	100
200	87	107	32	25	0.05	0.07	0.10	200
300	131	159	47	36	0.12	0.16	0.21	300
400	176	206	63	48	0.21	0.28	0.34	400
500	219	249	80	59	0.33	0.43	0.50	500
600	261	288	95	69	0.47	0.59	0.69	600
700	300	324	110	79	0.63	0.77	0.89	700
800	337	357	125	89	0.81	0.98	1.12	800
900	372	389	141	100	1.00	1.20	1.37	900
1000	405	419	155	109	1.21	1.44	1.63	1000
1100	437	448	172	119	1.44	1.69	1.91	1100
1200	467	475	189	130	1.68	1.96	2.21	1200
1300	496	502	207	141	1.93	2.24	2.52	1300
1400	524	527	225	152	2.20	2.54	2.85	1400
1500	551	552	241	162	2.48	2.86	3.20	1500
1600	578	576	258	173	2.77	3.19	3.56	1600
1700	603	600	276	185	3.07	3.53	3.94	1700
1800	628	623	293	197	3.39	3.88	4.33	1800
1900	653	645	308	208	3.72	4.25	4.73	1900
2000	677	667	324	219	4.06	4.63	5.15	2000
2100	700	689	341	231	4.41	5.02	5.59	2100
2200	723	710	357	241	4.78	5.42	6.03	2200
2300	745	731	374	252	5.15	5.84	6.50	2300
2400	767	752	390	263	5.54	6.27	6.97	2400
2500	788	772	406	273	5.94	6.71	7.46	2500
2600	809	792	422	284	6.34	7.16	7.96	2600
2700	830	811	438	294	6.76	7.63	8.47	2700
2800	850	831	454	304	7.19	8.10	9.00	2800
2900	870	850	469	314	7.62	8.58	9.54	2900
3000	890	869	484	324	8.07	9.08	10.09	3000

TABLE 35. TRANSPORT PROPERTIES OF NITROGEN TETRADEUTERIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-A}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-A}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-A}$	
100	46	83	15	11	0.01	0.02	100
200	87	166	32	22	0.05	0.07	200
300	131	237	47	32	0.12	0.16	300
400	176	298	63	42	0.21	0.27	400
500	219	352	80	52	0.33	0.41	500
600	261	401	95	62	0.47	0.57	600
700	300	447	110	72	0.63	0.75	700
800	337	490	125	81	0.81	0.94	800
900	372	531	141	90	1.00	1.16	900
1000	405	569	155	99	1.21	1.39	1000
1100	437	607	172	108	1.44	1.64	1100
1200	467	642	189	118	1.68	1.90	1200
1300	496	677	207	129	1.93	2.18	1300
1400	524	710	225	139	2.20	2.47	1400
1500	551	743	241	148	2.48	2.78	1500
1600	578	775	258	158	2.77	3.10	1600
1700	603	806	276	168	3.07	3.43	1700
1800	628	837	293	178	3.39	3.78	1800
1900	653	866	308	187	3.72	4.13	1900
2000	677	896	324	196	4.06	4.51	2000
2100	700	925	341	206	4.41	4.89	2100
2200	723	953	357	215	4.78	5.28	2200
2300	745	981	374	226	5.15	5.69	2300
2400	767	1008	390	235	5.54	6.11	2400
2500	788	1035	406	244	5.94	6.54	2500
2600	809	1062	422	253	6.34	6.98	2600
2700	830	1088	438	263	6.76	7.43	2700
2800	850	1114	454	274	7.19	7.89	2800
2900	870	1140	469	285	7.62	8.37	2900
3000	890	1165	484	296	8.07	8.85	3000

TABLE 36. TRANSPORT PROPERTIES OF FLUORINE - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{N cm}^{-2} \cdot 10^{-5}$)				Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)				Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	F ₂ -F ₂	F ₂ -He	He-He	He-He	F ₂ -F ₂	F ₂ -He	He-He	He-He	F ₂ -F ₂	F ₂ -He	He-He	
100	87	79	99	99	10	42	73	73	0.02	0.12	0.29	100
200	169	130	155	155	19	67	115	115	0.10	0.39	0.92	200
300	236	170	199	199	28	90	152	152	0.20	0.77	1.84	300
400	294	205	244	244	37	112	187	187	0.33	1.24	3.01	400
500	346	237	284	284	45	133	220	220	0.49	1.80	4.41	500
600	393	266	322	322	52	152	252	252	0.67	2.43	6.04	600
700	436	294	359	359	59	170	281	281	0.87	3.14	7.88	700
800	478	321	394	394	65	187	308	308	1.09	3.94	9.92	800
900	517	346	429	429	71	202	332	332	1.32	4.75	12.2	900
1000	554	371	461	461	77	217	357	357	1.58	5.66	14.6	1000
1100	590	395	494	494	82	231	380	380	1.85	6.64	17.2	1100
1200	624	417	525	525	88	246	403	403	2.14	7.65	20.1	1200
1300	657	439	556	556	93	259	425	425	2.45	8.74	23.0	1300
1400	688	461	586	586	97	272	447	447	2.78	9.95	26.3	1400
1500	720	482	614	614	102	285	468	468	3.11	11.1	29.6	1500
1600	750	502	643	643	107	298	488	488	3.46	12.4	33.2	1600
1700	781	523	671	671	112	310	508	508	3.82	13.7	36.9	1700
1800	811	543	698	698	116	322	528	528	4.20	15.0	40.8	1800
1900	840	562	725	725	121	334	547	547	4.58	16.4	44.9	1900
2000	869	582	752	752	125	345	566	566	4.99	17.8	49.1	2000
2100	897	600	778	778	130	358	585	585	5.41	19.3	53.5	2100
2200	925	619	804	804	134	369	603	603	5.83	20.9	58.1	2200
2300	952	637	830	830	138	380	622	622	6.26	22.5	62.8	2300
2400	979	655	855	855	143	392	640	640	6.70	24.1	67.7	2400
2500	1005	673	880	880	147	402	657	657	7.20	25.8	72.8	2500
2600	1031	690	905	905	151	413	674	674	7.71	27.5	78.0	2600
2700	1056	707	929	929	155	423	691	691	8.23	29.3	83.4	2700
2800	1082	724	953	953	159	434	708	708	8.76	31.1	88.9	2800
2900	1106	741	977	977	163	444	724	724	9.30	33.0	94.6	2900
3000	1131	758	1001	1001	167	454	740	740	9.85	35.0	101	3000

TABLE 37. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}_2$	$\text{F}_2\text{-F}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}_2$	$\text{F}_2\text{-F}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}_2$	$\text{F}_2\text{-F}_2$	
100	65	75	86	73	41	10	0.03	0.03	0.02	100
200	128	145	168	142	81	19	0.10	0.10	0.10	200
300	179	204	236	199	113	28	0.21	0.20	0.20	300
400	223	254	293	248	142	37	0.34	0.34	0.33	400
500	262	298	344	291	168	45	0.50	0.50	0.49	500
600	297	339	391	331	191	52	0.69	0.68	0.67	600
700	330	376	434	367	213	59	0.89	0.80	0.87	700
800	361	411	475	402	233	65	1.12	1.11	1.09	800
900	390	444	513	434	252	71	1.37	1.35	1.33	900
1000	418	476	550	465	271	77	1.63	1.61	1.58	1000
1100	445	507	586	495	288	82	1.91	1.89	1.85	1100
1200	471	537	620	524	306	88	2.21	2.19	2.14	1200
1300	496	565	653	552	322	93	2.52	2.50	2.45	1300
1400	521	593	685	579	338	97	2.85	2.82	2.77	1400
1500	544	620	716	606	354	102	3.20	3.17	3.10	1500
1600	568	647	747	632	369	107	3.56	3.52	3.45	1600
1700	591	673	777	657	384	112	3.94	3.90	3.82	1700
1800	613	698	806	682	399	116	4.33	4.28	4.20	1800
1900	635	723	835	706	413	121	4.73	4.69	4.59	1900
2000	656	748	863	730	427	125	5.15	5.10	5.00	2000
2100	677	772	891	754	442	130	5.59	5.53	5.42	2100
2200	698	795	918	777	455	134	6.03	5.97	5.86	2200
2300	718	818	945	799	468	138	6.50	6.43	6.30	2300
2400	738	841	972	822	482	143	6.97	6.90	6.76	2400
2500	758	864	998	844	495	147	7.46	7.38	7.24	2500
2600	778	886	1023	866	508	151	7.96	7.88	7.72	2600
2700	797	908	1049	887	521	155	8.47	8.39	8.22	2700
2800	816	930	1074	908	533	159	9.00	8.91	8.73	2800
2900	835	951	1098	929	546	163	9.54	9.44	9.25	2900
3000	853	972	1123	950	558	167	10.09	9.98	9.79	3000

TABLE 38. TRANSPORT PROPERTIES OF FLUORINE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	F_2-F_2	F_2-A	F_2-F_2	F_2-A	F_2-F_2	F_2-A	
100	86	84	10	8	0.02	0.02	100
200	168	167	19	15	0.10	0.09	200
300	236	236	28	22	0.20	0.20	300
400	293	296	37	29	0.33	0.33	400
500	344	348	45	35	0.49	0.48	500
600	391	396	52	41	0.67	0.66	600
700	434	441	59	46	0.87	0.86	700
800	475	483	65	51	1.09	1.08	800
900	513	522	71	55	1.33	1.31	900
1000	550	560	77	60	1.58	1.57	1000
1100	586	596	82	64	1.85	1.84	1100
1200	620	631	88	68	2.14	2.12	1200
1300	653	665	93	72	2.45	2.43	1300
1400	685	697	97	75	2.77	2.75	1400
1500	716	729	102	79	3.10	3.08	1500
1600	747	761	107	83	3.45	3.43	1600
1700	777	791	112	87	3.82	3.79	1700
1800	806	821	116	90	4.20	4.17	1800
1900	835	850	121	94	4.59	4.56	1900
2000	863	879	125	97	5.00	4.96	2000
2100	891	907	130	101	5.42	5.38	2100
2200	918	935	134	104	5.86	5.81	2200
2300	945	963	138	107	6.30	6.26	2300
2400	972	989	143	111	6.76	6.71	2400
2500	998	1016	147	114	7.24	7.18	2500
2600	1023	1042	151	117	7.72	7.66	2600
2700	1049	1068	155	120	8.22	8.16	2700
2800	1074	1093	159	124	8.73	8.67	2800
2900	1098	1118	163	127	9.25	9.18	2900
3000	1123	1143	167	130	9.79	9.71	3000

TABLES 39. TRANSPORT PROPERTIES OF FLUORINE - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Ncm}^{-2} \cdot 10^{-4}$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	
100	87	38	42	10	45	80	0.02	0.11	0.22	100
200	169	70	68	19	85	151	0.10	0.40	0.72	200
300	236	96	90	28	108	188	0.20	0.82	1.70	300
400	294	117	109	37	130	222	0.33	1.33	3.20	400
500	346	137	127	45	151	257	0.49	1.94	4.95	500
600	393	155	143	52	172	291	0.67	2.64	7.30	600
700	436	171	160	59	192	325	0.87	3.41	10.0	700
800	478	187	175	65	213	360	1.09	4.27	13.4	800
900	517	202	190	71	233	394	1.32	5.19	17.1	900
1000	554	216	205	77	253	428	1.58	6.21	21	1000
1100	590	230	219	82	271	460	1.85	7.26	26	1100
1200	624	243	232	88	291	493	2.14	8.37	32	1200
1300	657	255	246	93	310	526	2.45	9.54	37	1300
1400	688	269	259	97	328	559	2.78	10.8	44	1400
1500	720	281	272	102	347	592	3.11	12.1	50	1500
1600	750	293	284	107	366	624	3.46	13.5	58	1600
1700	781	305	296	112	385	657	3.82	14.9	66	1700
1800	811	316	308	116	403	689	4.20	16.4	75	1800
1900	840	327	319	121	421	720	4.58	17.9	85	1900
2000	869	339	331	125	439	752	4.99	19.5	95	2000
2100	897	349	341	130	466	783	5.41	21.2	105	2100
2200	925	360	351	134	474	813	5.83	22.9	115	2200
2300	952	370	361	138	491	843	6.26	24.6	126	2300
2400	979	380	371	143	508	873	6.70	26.4	138	2400
2500	1005	390	380	147	525	903	7.20	28.1	151	2500
2600	1031	400	390	151	542	932	7.71	29.8	165	2600
2700	1056	410	400	155	558	960	8.23	31.6	179	2700
2800	1082	420	409	159	573	987	8.76	33.4	195	2800
2900	1106	430	418	163	589	1014	9.30	35.2	212	2900
3000	1131	440	427	167	605	1042	9.85	37.0	227	3000

TABLE 40. TRANSPORT PROPERTIES OF FLUORINE - ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \cdot \text{s}^{-1} \cdot 10^{-6}$)			Temp. (K)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-H}$	H-H	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-H}$	H-H	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-H}$	H-H	
100	87	31	34	10	58	106	0.02	0.17	0.31	100
200	169	56	57	19	98	176	0.10	0.61	1.02	200
300	236	75	75	28	130	232	0.20	1.26	2.05	300
400	294	91	90	37	158	279	0.33	2.02	3.37	400
500	345	106	104	45	184	322	0.49	2.94	4.96	500
600	393	120	118	52	208	363	0.67	3.99	6.79	600
700	436	132	130	59	231	402	0.87	5.15	8.86	700
800	478	144	142	65	252	436	1.09	6.46	11.2	800
900	517	155	153	71	272	473	1.32	7.83	13.7	900
1000	554	166	164	77	292	507	1.58	9.33	16.4	1000
1100	590	177	174	82	311	539	1.85	10.9	19.9	1100
1200	624	188	184	88	329	570	2.14	12.6	23.1	1200
1300	657	198	194	93	347	600	2.45	14.4	26.5	1300
1400	688	207	204	97	364	630	2.78	16.3	30.3	1400
1500	720	216	213	102	380	658	3.11	18.3	33.3	1500
1600	750	226	222	107	397	686	3.46	20.3	38.0	1600
1700	781	235	231	112	413	714	3.82	22.5	42.4	1700
1800	811	244	239	116	428	740	4.20	24.7	47.2	1800
1900	840	253	248	121	444	766	4.58	27.0	51.8	1900
2000	869	261	256	125	459	792	4.99	29.4	56.6	2000
2100	897	269	264	130	474	818	5.41	31.9	61	2100
2200	925	278	272	134	489	843	5.83	34.4	67	2200
2300	952	286	280	138	503	867	6.26	37.0	72	2300
2400	979	294	288	143	517	891	6.70	39.8	78	2400
2500	1005	302	296	147	531	915	7.20	42.6	84	2500
2600	1031	309	303	151	545	938	7.71	45.4	90	2600
2700	1056	317	311	155	559	962	8.23	48.3	96	2700
2800	1082	325	318	159	572	984	8.76	51.2	103	2800
2900	1106	332	325	163	585	1007	9.30	54.3	110	2900
3000	1131	340	333	167	598	1029	9.85	57.5	117	3000

TABLE 41. TRANSPORT PROPERTIES OF FLUORINE - DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	
100	87	56	58	10	58	106	0.02	0.08	0.16	100
200	169	100	95	19	98	176	0.10	0.30	0.52	200
300	236	134	126	28	130	232	0.20	0.61	1.05	300
400	294	163	153	37	158	279	0.33	0.98	1.66	400
500	346	189	175	45	184	322	0.49	1.93	2.11	500
600	393	213	197	52	208	363	0.67	1.93	3.26	600
700	436	236	218	59	231	402	0.87	2.49	4.20	700
800	478	257	237	65	252	438	1.09	3.12	5.26	800
900	517	278	256	71	272	473	1.32	3.79	6.37	900
1000	554	297	273	77	292	507	1.58	4.51	7.59	1000
1100	590	316	291	82	311	539	1.85	5.29	8.88	1100
1200	624	334	308	88	329	570	2.14	6.10	10.3	1200
1300	657	352	324	93	347	600	2.45	6.96	11.7	1300
1400	688	369	340	97	364	630	2.78	7.89	13.2	1400
1500	720	387	355	102	380	658	3.11	8.85	14.8	1500
1600	750	403	370	107	397	686	3.46	9.84	16.5	1600
1700	781	419	385	112	413	714	3.82	10.9	18.3	1700
1800	811	434	400	116	428	740	4.20	11.9	20.1	1800
1900	840	450	414	121	444	766	4.58	13.0	21.9	1900
2000	869	464	428	125	459	792	4.99	14.2	23.9	2000
2100	897	480	442	130	474	818	5.41	15.4	25.9	2100
2200	925	494	456	134	489	843	5.83	16.6	28.0	2200
2300	952	509	469	138	503	867	6.26	17.9	30.1	2300
2400	979	523	482	143	517	891	6.70	19.2	32.3	2400
2500	1005	538	495	147	531	915	7.20	20.5	34.6	2500
2600	1031	551	508	151	545	938	7.71	21.9	36.8	2600
2700	1056	565	521	155	559	962	8.23	23.3	39.2	2700
2800	1082	579	533	159	572	984	8.76	24.7	41.8	2800
2900	1106	592	546	163	585	1007	9.30	27.6	44.2	2900
3000	1131	605	558	167	598	1029	9.85	30.5	47.0	3000

TABLE 42. TRANSPORT PROPERTIES OF FLUORINE - ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-D}$	D-D	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-D}$	D-D	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-D}$	D-D	
100	87	45	50	10	45	79	0.02	0.13	0.39	100
200	169	79	83	19	75	130	0.10	0.44	1.31	200
300	236	106	109	28	99	170	0.20	0.93	2.63	300
400	294	129	131	37	121	204	0.33	1.48	4.19	400
500	346	150	152	45	141	237	0.49	2.15	6.06	500
600	393	169	171	52	160	267	0.67	2.92	8.19	600
700	436	188	189	59	177	295	0.87	3.78	10.6	700
800	478	205	206	65	193	321	1.09	4.72	13.2	800
900	517	220	223	71	209	347	1.32	5.74	16.0	900
1000	554	236	238	77	224	371	1.58	6.82	19.0	1000
1100	590	256	253	82	239	395	1.85	7.98	22.3	1100
1200	624	267	268	88	253	418	2.14	9.23	25.8	1200
1300	657	280	282	93	267	440	2.45	10.6	29.4	1300
1400	688	294	296	97	279	461	2.78	11.9	33.2	1400
1500	720	307	310	102	292	482	3.11	13.4	37.2	1500
1600	750	320	323	107	305	503	3.46	14.9	41.3	1600
1700	781	333	336	112	318	523	3.82	16.4	45.5	1700
1800	811	345	349	116	330	543	4.20	17.9	49.8	1800
1900	840	358	361	121	342	563	4.58	19.6	54.3	1900
2000	869	370	373	125	354	582	4.99	21.5	59.0	2000
2100	897	382	385	130	365	601	5.41	23.5	63.9	2100
2200	925	394	397	134	377	619	5.83	25.5	67.0	2200
2300	952	406	409	138	388	637	6.26	27.4	74.3	2300
2400	979	417	420	143	399	655	6.70	29.4	79.8	2400
2500	1005	428	431	147	410	673	7.20	31.4	85.5	2500
2600	1031	439	442	151	421	690	7.71	33.3	91.1	2600
2700	1056	450	453	155	431	707	8.23	35.3	96.8	2700
2800	1082	461	464	159	442	724	8.76	37.3	103	2800
2900	1106	472	475	163	452	741	9.30	39.2	108	2900
3000	1131	483	486	167	462	757	9.85	41.2	114	3000

TABLE 43. TRANSPORT PROPERTIES OF FLUORINE-AMMONIA MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-4}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	
100	86	52	52	10	8	5	0.02	0.02	0.02	100
200	168	104	70	19	17	15	0.10	0.10	0.09	200
300	236	157	103	28	27	25	0.20	0.22	0.20	300
400	293	206	138	37	37	36	0.33	0.38	0.35	400
500	344	251	174	45	48	51	0.49	0.58	0.56	500
600	391	292	209	52	59	66	0.67	0.80	0.80	600
700	434	330	244	59	70	81	0.87	1.06	1.08	700
800	475	366	276	65	81	98	1.09	1.34	1.40	800
900	513	399	308	71	93	115	1.33	1.65	1.75	900
1000	550	431	338	77	106	136	1.58	1.98	2.14	1000
1100	586	461	367	82	119	156	1.85	2.33	2.56	1100
1200	620	491	395	88	132	176	2.14	2.70	3.00	1200
1300	653	519	423	93	145	197	2.45	3.10	3.47	1300
1400	685	546	449	97	158	219	2.77	3.52	3.97	1400
1500	716	572	474	102	172	242	3.10	3.95	4.49	1500
1600	747	597	498	107	186	265	3.45	4.41	5.04	1600
1700	777	622	522	112	200	289	3.82	4.89	5.61	1700
1800	806	646	545	116	215	313	4.20	5.38	6.20	1800
1900	835	670	567	121	229	338	4.59	5.89	6.82	1900
2000	863	693	589	125	245	364	5.00	6.42	7.46	2000
2100	891	716	611	130	261	391	5.42	6.97	8.12	2100
2200	918	738	631	134	276	418	5.86	7.53	8.80	2200
2300	945	760	652	138	292	446	6.30	8.11	9.50	2300
2400	972	781	672	143	308	472	6.76	8.71	10.22	2400
2500	998	802	692	147	325	502	7.24	9.32	10.97	2500
2600	1023	823	711	151	341	532	7.72	9.95	11.73	2600
2700	1049	843	730	155	358	561	8.22	10.60	12.51	2700
2800	1074	864	749	159	375	591	8.73	11.26	13.32	2800
2900	1098	884	767	163	391	620	9.25	11.94	14.14	2900
3000	1123	903	786	167	409	650	9.79	12.63	14.98	3000

TABLE 44. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN TRIDEUTERIDE MIXTURES

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻¹)		Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)		Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)		Temp. (K)
	ND ₃ -ND ₃	F ₂ -ND ₃	ND ₃ -ND ₃	F ₂ -F ₂	ND ₃ -ND ₃	F ₂ -F ₂	
100	-	-	-	86	-	0.02	100
200	96	126	17	168	0.10	0.10	200
300	145	186	28	236	0.24	0.23	300
400	194	240	40	293	0.42	0.39	400
500	240	288	54	344	0.65	0.59	500
600	283	331	68	391	0.92	0.82	600
700	324	372	83	434	1.22	1.07	700
800	361	410	98	475	1.56	1.35	800
900	397	445	114	513	1.92	1.65	900
1000	431	479	130	550	2.32	1.98	1000
1100	463	512	145	586	2.74	2.33	1100
1200	494	543	161	620	3.19	2.70	1200
1300	524	573	178	653	3.67	3.09	1300
1400	552	602	195	685	4.17	3.50	1400
1500	580	630	213	716	4.70	3.93	1500
1600	607	657	232	747	5.25	4.38	1600
1700	633	684	252	777	5.82	4.84	1700
1800	659	710	272	806	6.41	5.33	1800
1900	684	736	294	835	7.03	5.83	1900
2000	708	761	318	863	7.67	6.35	2000
2100	732	785	343	891	8.33	6.89	2100
2200	755	810	369	918	9.01	7.44	2200
2300	778	833	395	945	9.72	8.01	2300
2400	800	857	422	972	10.44	8.60	2400
2500	822	880	449	998	11.18	9.20	2500
2600	844	902	477	1023	11.94	9.82	2600
2700	865	925	506	1049	12.72	10.46	2700
2800	886	947	535	1074	13.52	11.11	2800
2900	906	969	565	1098	14.34	11.77	2900
3000	927	990	595	1123	15.17	12.45	3000

TABLE 45. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN TETRAHYDRIDE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}_2$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}_2$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}_2$	$\text{F}_2\text{-F}_2$	
100	43	57	14	12	0.01	0.02	0.02	100
200	76	113	30	25	0.05	0.07	0.10	200
300	111	171	44	36	0.11	0.16	0.20	300
400	149	225	59	48	0.20	0.28	0.33	400
500	187	274	74	59	0.32	0.42	0.49	500
600	225	320	88	70	0.46	0.59	0.67	600
700	263	362	102	80	0.62	0.79	0.87	700
800	300	402	116	90	0.81	1.00	1.09	800
900	336	439	131	101	1.02	1.22	1.33	900
1000	370	474	144	111	1.24	1.47	1.58	1000
1100	403	508	160	121	1.49	1.73	1.85	1100
1200	434	540	176	132	1.75	2.01	2.14	1200
1300	465	572	192	142	2.03	2.31	2.45	1300
1400	495	602	209	153	2.33	2.62	2.77	1400
1500	523	631	224	163	2.64	2.95	3.10	1500
1600	551	659	240	173	2.96	3.29	3.45	1600
1700	578	687	256	184	3.30	3.64	3.82	1700
1800	604	713	272	194	3.65	4.01	4.20	1800
1900	630	740	287	204	4.02	4.40	4.59	1900
2000	654	765	302	213	4.40	4.79	5.00	2000
2100	679	790	317	223	4.79	5.20	5.42	2100
2200	703	815	332	233	5.20	5.62	5.86	2200
2300	726	839	348	243	5.62	6.06	6.30	2300
2400	749	863	362	252	6.05	6.50	6.76	2400
2500	771	886	378	262	6.49	6.96	7.24	2500
2600	793	909	392	271	6.94	7.43	7.72	2600
2700	815	932	407	281	7.41	7.91	8.22	2700
2800	836	954	421	290	7.89	8.41	8.73	2800
2900	857	976	436	299	8.38	8.91	9.25	2900
3000	877	998	450	308	8.88	9.43	9.79	3000

TABLE 46. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN TETRADEUTERIDE MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	
100	86	59	44	10	12	15	0.02	0.02	0.01	100
200	168	119	81	19	25	32	0.10	0.07	0.05	200
300	236	178	121	28	37	47	0.20	0.16	0.11	300
400	293	232	163	37	50	63	0.33	0.27	0.20	400
500	344	281	205	45	62	80	0.49	0.41	0.31	500
600	391	325	245	52	73	95	0.67	0.57	0.44	600
700	434	366	283	59	84	110	0.87	0.75	0.59	700
800	475	405	320	65	95	125	1.09	0.94	0.77	800
900	513	441	354	71	106	141	1.33	1.16	0.95	900
1000	550	476	387	77	116	155	1.58	1.39	1.16	1000
1100	586	509	419	82	127	172	1.85	1.64	1.38	1100
1200	620	540	449	88	138	189	2.14	1.90	1.61	1200
1300	653	571	478	93	150	207	2.45	2.17	1.86	1300
1400	685	600	506	97	161	225	2.77	2.47	2.12	1400
1500	716	629	533	102	171	241	3.10	2.77	2.39	1500
1600	747	657	560	107	182	258	3.45	3.09	2.68	1600
1700	777	684	585	112	194	276	3.82	3.42	2.98	1700
1800	806	710	610	116	204	293	4.20	3.76	3.29	1800
1900	835	736	634	121	214	308	4.59	4.12	3.61	1900
2000	863	761	658	125	224	324	5.00	4.49	3.94	2000
2100	891	785	681	130	235	341	5.42	4.87	4.29	2100
2200	918	810	703	134	245	357	5.86	5.27	4.64	2200
2300	945	834	726	138	256	374	6.30	5.67	5.01	2300
2400	972	857	747	143	266	390	6.76	6.09	5.39	2400
2500	998	880	769	147	276	406	7.24	6.52	5.78	2500
2600	1023	903	790	151	286	422	7.72	6.95	6.17	2600
2700	1049	925	810	155	296	438	8.22	7.40	6.58	2700
2800	1074	947	830	159	306	454	8.73	7.87	7.00	2800
2900	1098	969	850	163	316	469	9.25	8.34	7.43	2900
3000	1123	991	870	167	325	484	9.79	8.82	7.87	3000

TABLE 47. TRANSPORT PROPERTIES OF FLUORINE

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$) F_2	Thermal Cond. ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$) F_2	Diffusion Coeff. ($\text{m}^2\text{s}^{-1} \cdot 10^{-4}$) F_2	Temp. (K)
100	87	10	0.02	100
200	169	19	0.10	200
300	236	28	0.20	300
400	295	37	0.33	400
500	346	45	0.49	500
600	393	52	0.67	600
700	437	59	0.87	700
800	478	65	1.09	800
900	517	71	1.32	900
1000	554	77	1.58	1000
1100	590	82	1.85	1100
1200	624	88	2.14	1200
1300	657	93	2.45	1300
1400	688	97	2.78	1400
1500	720	102	3.11	1500
1600	750	107	3.46	1600
1700	781	112	3.82	1700
1800	811	116	4.20	1800
1900	840	121	4.58	1900
2000	869	125	4.99	2000
2100	897	130	5.41	2100
2200	925	134	5.83	2200
2300	952	138	6.26	2300
2400	979	143	6.70	2400
2500	1005	147	7.20	2500
2600	1031	151	7.71	2600
2700	1056	155	8.23	2700
2800	1082	159	8.76	2800
2900	1106	163	9.30	2900
3000	1131	167	9.85	3000

TABLE 48. TRANSPORT PROPERTIES OF ATOMIC FLUORINE - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Mcm}^{-2} \cdot 10^{-8}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	F-F	F-He	He-He	F-F	F-He	He-He	F-F	F-He	He-He	
100	78	85	99	13	43	73	0.05	0.14	0.29	100
200	152	139	155	27	71	115	0.17	0.46	0.92	200
300	214	182	199	38	95	152	0.36	0.92	1.84	300
400	266	220	244	47	117	187	0.60	1.50	3.01	400
500	313	254	284	54	137	220	0.88	2.15	4.41	500
600	355	295	322	61	157	252	1.21	2.91	6.04	600
700	395	316	359	67	174	281	1.57	3.77	7.88	700
800	432	344	394	73	191	308	1.96	4.69	9.92	800
900	468	371	429	79	206	332	2.39	5.70	12.2	900
1000	501	397	461	84	221	357	2.85	6.79	14.6	1000
1100	533	423	494	89	235	380	3.35	7.95	17.2	1100
1200	564	448	525	94	249	403	3.88	9.18	20.1	1200
1300	594	472	556	99	262	425	4.43	10.5	23.0	1300
1400	623	495	586	103	275	447	5.03	11.8	26.3	1400
1500	651	517	614	108	288	468	5.63	13.3	29.6	1500
1600	679	539	643	112	300	488	6.25	14.8	33.2	1600
1700	706	561	671	117	313	508	6.91	16.4	36.9	1700
1800	734	583	698	121	325	528	7.59	18.0	40.8	1800
1900	760	603	725	126	337	547	8.29	19.7	44.9	1900
2000	786	623	752	130	348	566	9.02	21.4	49.1	2000
2100	812	643	778	134	360	585	9.78	23.2	53.5	2100
2200	837	663	804	138	371	603	10.6	25.0	58.1	2200
2300	861	683	830	142	382	622	11.4	27.1	62.8	2300
2400	885	702	855	146	393	640	12.2	29.2	67.7	2400
2500	909	721	880	150	404	657	13.1	31.3	72.8	2500
2600	933	739	905	153	414	674	14.0	33.4	78.0	2600
2700	956	758	929	157	424	691	14.9	35.5	83.4	2700
2800	978	776	953	161	435	708	15.8	37.6	88.9	2800
2900	1001	794	977	165	445	724	16.9	39.7	94.6	2900
3000	1023	812	1001	168	454	740	18.0	41.8	101	3000

TABLE 49. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{N cm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}$	
100	65	70	9	11	0.03	0.04	100
200	128	137	18	22	0.10	0.17	200
300	179	192	26	32	0.21	0.36	300
400	223	239	33	40	0.34	0.60	400
500	262	280	39	46	0.50	0.88	500
600	297	318	44	52	0.69	1.21	600
700	330	354	49	58	0.89	1.57	700
800	361	387	54	63	1.12	1.97	800
900	390	418	59	69	1.37	2.40	900
1000	418	448	63	73	1.63	2.86	1000
1100	445	477	67	78	1.91	3.35	1100
1200	471	505	71	82	2.21	3.88	1200
1300	496	532	76	87	2.52	4.43	1300
1400	521	558	80	91	2.85	5.01	1400
1500	544	584	84	96	3.20	5.61	1500
1600	568	609	89	100	3.56	6.25	1600
1700	591	633	95	106	3.94	6.91	1700
1800	613	657	101	111	4.33	7.60	1800
1900	635	680	108	117	4.73	8.31	1900
2000	656	703	115	122	5.15	9.05	2000
2100	677	726	121	127	5.59	9.81	2100
2200	698	748	126	132	6.03	10.59	2200
2300	718	770	131	136	6.50	11.40	2300
2400	738	791	136	141	6.97	12.23	2400
2500	758	813	141	145	7.46	13.09	2500
2600	778	834	146	149	7.96	13.97	2600
2700	797	854	151	154	8.47	14.87	2700
2800	816	874	155	158	9.00	15.79	2800
2900	835	895	160	162	9.54	16.74	2900
3000	853	914	165	166	10.09	17.70	3000

TABLE 50. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-ARGON MIXTURES

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻⁴)			Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)			Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)			Temp. (K)
	A-A	A-F	F-F	A-A	A-F	F-F	A-A	A-F	F-F	
100	83	77	78	7	10	13	0.02	0.03	0.04	100
200	166	153	152	12	19	27	0.09	0.13	0.17	200
300	237	217	213	17	27	38	0.19	0.27	0.36	300
400	298	271	265	22	34	47	0.32	0.45	0.60	400
500	352	319	311	26	40	54	0.47	0.67	0.88	500
600	401	364	354	30	45	61	0.65	0.92	1.21	600
700	447	404	393	34	50	67	0.85	1.19	1.57	700
800	490	443	430	37	55	73	1.06	1.49	1.97	800
900	531	479	464	40	59	79	1.30	1.82	2.40	900
1000	569	513	498	43	63	84	1.55	2.17	2.86	1000
1100	607	547	530	45	67	89	1.82	2.55	3.35	1100
1200	642	579	561	48	71	94	2.11	2.95	3.88	1200
1300	677	610	591	51	75	99	2.41	3.37	4.43	1300
1400	710	640	620	54	78	103	2.72	3.81	5.01	1400
1500	743	669	648	56	82	108	3.05	4.27	5.61	1500
1600	775	698	767	59	85	112	3.40	4.76	6.25	1600
1700	806	726	703	62	89	117	3.76	5.26	6.91	1700
1800	837	753	729	64	92	121	4.14	5.78	7.60	1800
1900	866	780	756	67	96	126	4.52	6.32	8.31	1900
2000	896	807	781	69	99	130	4.93	6.89	9.05	2000
2100	925	832	806	72	103	134	5.34	7.47	9.81	2100
2200	953	858	831	74	106	138	5.77	8.06	10.59	2200
2300	981	883	855	77	109	142	6.21	8.68	11.40	2300
2400	1008	908	879	79	112	146	6.66	9.31	12.23	2400
2500	1035	932	903	82	116	150	7.13	9.97	13.09	2500
2600	1062	956	926	84	118	153	7.61	10.63	13.97	2600
2700	1088	980	949	86	121	157	8.10	11.32	14.87	2700
2800	1114	1003	971	89	125	161	8.60	12.02	15.79	2800
2900	1140	1026	994	91	128	165	9.12	12.74	16.74	2900
3000	1165	1049	1016	94	131	168	9.64	13.48	17.70	3000

TABLE 5L. TRANSPORT PROPERTIES OF ATOMIC FLUORINE - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	F-F	F-H ₂	H ₂ -H ₂	F-F	F-H ₂	H ₂ -H ₂	F-F	F-H ₂	H ₂ -H ₂	
100	78	42	42	13	47	80	0.05	0.13	0.22	100
200	152	78	68	27	89	151	0.17	0.46	0.72	200
300	214	106	90	38	113	188	0.36	0.96	1.70	300
400	266	130	109	47	135	222	0.60	1.55	3.20	400
500	313	152	127	54	156	257	0.88	2.26	4.95	500
600	355	172	143	61	176	291	1.21	3.08	7.30	600
700	395	190	160	67	196	325	1.57	3.98	10.0	700
800	432	208	175	73	217	360	1.96	4.98	13.4	800
900	468	224	190	79	237	394	2.39	6.06	17.1	900
1000	501	242	205	84	256	428	2.85	7.20	21	1000
1100	533	256	219	89	275	460	3.35	8.47	26	1100
1200	564	270	232	94	294	493	3.88	9.76	32	1200
1300	594	284	246	99	313	526	4.43	11.1	37	1300
1400	623	298	259	103	331	559	5.03	12.6	44	1400
1500	651	312	272	108	350	592	5.63	14.2	50	1500
1600	679	325	284	112	368	624	6.25	15.8	58	1600
1700	706	339	296	117	387	657	6.91	17.4	66	1700
1800	734	351	308	121	405	689	7.59	19.2	75	1800
1900	760	364	319	126	423	720	8.29	21.0	85	1900
2000	786	376	331	130	441	752	9.02	22.8	95	2000
2100	812	389	341	134	459	783	9.78	24.7	105	2100
2200	837	401	351	138	476	813	10.6	26.7	115	2200
2300	861	412	361	142	493	843	11.4	28.8	126	2300
2400	885	424	371	146	510	873	12.2	30.9	138	2400
2500	909	435	380	150	527	903	13.1	32.9	151	2500
2600	933	447	390	153	543	932	14.0	35.0	165	2600
2700	956	458	400	157	559	960	14.9	37.2	179	2700
2800	978	469	409	161	574	987	15.8	39.4	195	2800
2900	1001	480	418	165	590	1014	16.9	41.7	212	2900
3000	1023	490	427	168	605	1042	18.0	44.0	227	3000

TABLE 52. TRANSPORT PROPERTIES OF ATOMIC FLUORINE - ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)		Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	F-F	F-H	F-F	F-H	F-F	F-H	
100	79	35	13	60	0.05	0.20	100
200	152	63	27	102	0.17	0.71	200
300	214	84	38	135	0.36	1.46	300
400	266	103	47	163	0.60	2.34	400
500	313	119	54	188	0.88	3.40	500
600	355	135	61	212	1.21	4.61	600
700	395	149	67	235	1.57	5.97	700
800	432	163	73	256	1.96	7.47	800
900	468	175	79	276	2.39	9.03	900
1000	501	188	84	296	2.85	10.8	1000
1100	533	200	89	314	3.25	12.6	1100
1200	564	212	94	332	3.88	14.6	1200
1300	594	223	99	350	4.43	16.7	1300
1400	623	235	103	367	5.03	18.8	1400
1500	651	244	108	383	5.63	21.0	1500
1600	679	255	112	399	6.25	23.3	1600
1700	706	264	117	416	6.91	25.8	1700
1800	734	274	121	431	7.59	28.5	1800
1900	760	284	126	446	8.29	31.2	1900
2000	786	294	130	461	9.02	34.0	2000
2100	812	303	134	476	9.78	36.9	2100
2200	837	313	138	491	10.6	39.8	2200
2300	861	322	142	505	11.4	42.8	2300
2400	885	331	146	519	12.2	46.0	2400
2500	909	340	150	533	13.1	48.2	2500
2600	933	349	153	545	14.0	52.5	2600
2700	956	357	157	560	14.9	55.8	2700
2800	978	366	161	573	15.8	59.3	2800
2900	1001	375	165	586	16.9	62.9	2900
3000	1023	383	168	599	18.0	66.4	3000

TABLE 53. TRANSPORT PROPERTIES OF ATOMIC FLUORINE - DEUTERIUM MIXTURES

Temp (K)	Viscosity ($\text{N m}^{-2} \cdot 10^{-3}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp (K)
	F-F	F-D ₂	F-F	F-D ₂	F-F	F-D ₂	
100	78	56	13	36	0.05	0.10	100
200	152	103	27	64	0.17	0.35	200
300	214	139	38	90	0.36	0.71	300
400	266	170	47	112	0.60	1.16	400
500	313	198	54	132	0.88	1.69	500
600	355	224	61	152	1.21	2.29	600
700	395	248	67	171	1.57	2.96	700
800	432	271	73	189	1.96	3.70	800
900	468	293	79	208	2.39	4.50	900
1000	501	313	84	226	2.85	5.36	1000
1100	533	334	89	241	3.35	6.28	1100
1200	564	351	94	258	3.88	7.25	1200
1300	594	371	99	274	4.43	8.27	1300
1400	623	389	103	290	5.03	9.25	1400
1500	651	407	108	305	5.63	10.4	1500
1600	679	423	112	320	6.25	11.7	1600
1700	706	442	117	336	6.91	12.9	1700
1800	734	458	121	350	7.59	14.2	1800
1900	760	475	126	366	8.29	15.5	1900
2000	786	490	130	380	9.02	16.9	2000
2100	812	506	134	394	9.78	18.3	2100
2200	837	521	138	408	10.6	19.8	2200
2300	861	537	142	422	11.4	21.3	2300
2400	885	552	146	436	12.2	22.8	2400
2500	909	567	150	450	13.1	24.4	2500
2600	933	581	153	464	14.0	26.1	2600
2700	956	596	157	477	14.9	27.9	2700
2800	978	610	161	491	15.8	29.3	2800
2900	1001	624	165	505	16.9	31.0	2900
3000	1023	638	168	518	18.0	36.0	3000

TABLE 54. TRANSPORT PROPERTIES OF ATOMIC FLUORINE - ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{N cm}^{-2} \cdot 10^{-5}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	F-F	F-D	D-D	F-F	F-D	D-D	F-F	F-D	D-D	
100	78	36	50	13	46	79	0.05	0.15	0.39	100
200	152	64	83	27	79	130	0.17	0.53	1.31	200
300	214	86	109	38	104	170	0.36	1.08	2.63	300
400	266	104	131	47	126	204	0.60	1.73	4.19	400
500	313	121	152	54	146	237	0.88	2.52	6.06	500
600	355	137	171	61	164	267	1.21	3.42	8.19	600
700	395	152	189	67	181	295	1.57	4.47	10.6	700
800	432	165	206	73	197	321	1.96	5.53	13.2	800
900	468	179	223	79	213	347	2.39	6.73	16.0	900
1000	501	191	238	84	228	371	2.85	8.23	19.0	1000
1100	533	203	253	89	242	395	3.35	9.38	22.3	1100
1200	564	215	268	94	256	418	3.88	10.8	25.8	1200
1300	594	226	282	99	270	440	4.43	12.4	29.4	1300
1400	623	237	296	103	282	461	5.03	14.0	33.2	1400
1500	651	248	310	108	295	482	5.63	15.6	37.2	1500
1600	679	259	323	112	307	503	6.25	17.2	41.3	1600
1700	706	269	336	117	320	523	6.91	19.8	45.5	1700
1800	734	279	349	121	332	543	7.59	21.4	49.8	1800
1900	760	289	361	126	345	563	8.39	23.2	54.3	1900
2000	786	299	373	130	356	582	9.02	25.2	59.0	2000
2100	812	309	385	134	368	601	9.78	27.3	63.9	2100
2200	837	318	397	138	379	619	10.6	29.6	67.0	2200
2300	861	327	409	142	390	637	11.4	32.0	74.3	2300
2400	885	337	420	146	401	655	12.2	34.4	79.8	2400
2500	909	346	431	150	412	673	13.1	36.8	85.5	2500
2600	933	354	442	153	422	690	14.0	39.0	91.1	2600
2700	956	363	453	157	432	707	14.9	41.5	96.8	2700
2800	978	372	464	161	443	724	15.8	44.0	103	2800
2900	1001	381	475	165	453	741	16.9	46.6	108	2900
3000	1023	389	486	168	463	757	18.0	49.2	114	3000

TABLE 55. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-AMMONIA MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp (K)
	F-F	F-NH ₃	F-F	F-NH ₃	F-F	F-NH ₃	NH ₃ -NH ₃	
100	78	52	13	9	0.04	0.03	0.02	100
200	152	104	25	20	0.17	0.13	0.09	200
300	213	156	35	30	0.36	0.28	0.20	300
400	265	205	43	40	0.60	0.49	0.35	400
500	311	250	51	51	0.88	0.75	0.56	500
600	354	290	58	60	1.21	1.04	0.80	600
700	393	328	64	73	1.57	1.38	1.08	700
800	430	363	71	84	1.97	1.74	1.40	800
900	464	397	76	96	2.40	2.14	1.75	900
1000	498	428	82	109	2.86	2.57	2.14	1000
1100	530	458	87	122	3.35	3.03	2.56	1100
1200	561	487	92	134	3.88	3.52	3.00	1200
1300	591	515	97	147	4.43	4.03	3.47	1300
1400	620	542	102	160	5.01	4.58	3.97	1400
1500	648	568	106	174	5.61	5.15	4.49	1500
1600	676	594	111	188	6.25	5.74	5.04	1600
1700	703	618	115	202	6.91	6.36	5.61	1700
1800	729	642	120	217	7.60	7.00	6.20	1800
1900	756	666	124	231	8.31	7.67	6.82	1900
2000	781	689	128	246	9.05	8.36	7.46	2000
2100	806	711	132	262	9.81	9.07	8.12	2100
2200	831	733	136	277	10.59	9.80	8.80	2200
2300	855	755	140	293	11.40	10.56	9.50	2300
2400	879	776	144	308	12.23	11.33	10.22	2400
2500	903	797	148	325	13.09	12.13	10.97	2500
2600	926	818	152	342	13.97	12.95	11.73	2600
2700	949	838	156	359	14.87	13.79	12.51	2700
2800	971	858	159	375	15.79	14.65	13.32	2800
2900	994	878	163	391	16.74	15.53	14.14	2900
3000	1016	897	167	408	17.70	16.43	14.98	3000

TABLE 56. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN TRIDEUTERIDE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-F}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-F}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-F}$	
100	-	-	-	-	-	0.04	100
200	96	123	17	22	0.10	0.14	200
300	145	182	28	33	0.24	0.30	300
400	194	235	40	43	0.42	0.52	400
500	240	282	54	54	0.65	0.78	500
600	283	325	68	64	0.92	1.08	600
700	324	365	83	75	1.22	1.41	700
800	361	402	98	85	1.56	1.78	800
900	397	437	114	96	1.92	2.18	900
1000	431	470	130	107	2.32	2.61	1000
1100	463	502	145	117	2.74	3.07	1100
1200	494	532	161	127	3.19	3.55	1200
1300	524	562	178	138	3.67	4.07	1300
1400	552	590	195	149	4.17	4.61	1400
1500	580	618	213	160	4.70	5.18	1500
1600	607	645	232	172	5.25	5.77	1600
1700	633	671	252	184	5.82	6.38	1700
1800	659	696	272	196	6.41	7.02	1800
1900	684	721	294	210	7.03	7.69	1900
2000	708	746	318	224	7.67	8.37	2000
2100	732	770	343	238	8.33	9.08	2100
2200	755	794	369	253	9.01	9.81	2200
2300	778	817	395	268	9.72	10.57	2300
2400	800	840	422	284	10.44	11.34	2400
2500	822	862	449	299	11.18	12.13	2500
2600	844	885	477	315	11.94	12.95	2600
2700	865	907	506	331	12.72	13.79	2700
2800	886	928	535	347	13.52	14.64	2800
2900	906	950	565	365	14.34	15.52	2900
3000	927	971	595	386	15.17	16.42	3000
						17.70	

TABLE 57. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN TETRAHYDRIDE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}$	
100	43	53	14	13	0.01	0.02	100
200	76	196	30	28	0.05	0.10	200
300	111	160	44	41	0.11	0.22	300
400	149	211	59	52	0.20	0.38	400
500	187	257	74	64	0.32	0.58	500
600	225	300	88	74	0.46	0.81	600
700	263	339	102	84	0.62	1.07	700
800	300	376	116	94	0.81	1.36	800
900	336	411	131	105	1.02	1.67	900
1000	370	444	144	114	1.24	2.01	1000
1100	403	476	160	124	1.49	2.37	1100
1200	434	506	176	135	1.75	2.75	1200
1300	465	535	192	145	2.03	3.15	1300
1400	495	564	209	156	2.33	3.58	1400
1500	523	591	224	166	2.64	4.02	1500
1600	551	617	240	176	2.96	4.49	1600
1700	578	643	256	186	3.30	4.97	1700
1800	604	668	272	196	3.65	5.48	1800
1900	630	693	287	206	4.02	6.00	1900
2000	654	717	302	216	4.40	6.54	2000
2100	679	740	317	225	4.79	7.10	2100
2200	703	763	332	235	5.20	7.67	2200
2300	726	786	348	245	5.62	8.27	2300
2400	749	808	362	254	6.05	8.88	2400
2500	771	830	378	264	6.49	9.50	2500
2600	793	851	392	272	6.94	10.14	2600
2700	815	873	407	282	7.41	10.80	2700
2800	836	893	421	291	7.89	11.48	2800
2900	857	914	436	300	8.38	12.17	2900
3000	877	934	450	309	8.88	12.87	3000

TABLE 58. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN TETRADEUTERIDE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)				Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	F-F	F-N ₂ D ₄	N ₂ D ₄ -N ₂ D ₄		F-F	F-N ₂ D ₄	F-F	F-N ₂ D ₄	N ₂ D ₄ -N ₂ D ₄	
100	78	54	44		13	14	0.04	0.02	0.61	100
200	152	110	81		27	29	0.17	0.10	0.05	200
300	213	164	121		38	42	0.36	0.21	0.11	300
400	265	214	163		47	55	0.60	0.37	0.20	400
500	311	259	205		54	67	0.88	0.56	0.31	500
600	354	300	245		61	78	1.21	0.78	0.44	600
700	393	338	283		67	88	1.57	1.03	0.59	700
800	430	374	320		73	99	1.97	1.30	0.77	800
900	464	408	354		79	110	2.40	1.59	0.95	900
1000	498	440	387		84	120	2.86	1.91	1.16	1000
1100	530	470	419		89	130	3.35	2.25	1.38	1100
1200	561	499	449		94	141	3.88	2.61	1.61	1200
1300	591	527	478		99	153	4.43	2.99	1.86	1300
1400	620	555	506		103	164	5.01	3.39	2.12	1400
1500	648	581	533		108	174	5.61	3.80	2.39	1500
1600	676	607	560		112	185	6.25	4.24	2.68	1600
1700	703	631	585		117	196	6.91	4.70	2.98	1700
1800	729	656	610		121	207	7.60	5.17	3.29	1800
1900	756	680	634		126	217	8.31	5.66	3.61	1900
2000	781	703	658		130	227	9.05	6.17	3.94	2000
2100	806	726	681		134	237	9.81	6.69	4.29	2100
2200	831	748	703		138	247	10.59	7.23	4.64	2200
2300	855	770	726		142	258	11.40	7.79	5.01	2300
2400	879	792	747		146	268	12.23	8.36	5.39	2400
2500	903	813	769		150	278	13.09	8.95	5.78	2500
2600	926	834	790		153	287	13.97	9.55	6.17	2600
2700	949	855	810		157	297	14.87	10.17	6.58	2700
2800	971	875	830		161	307	15.79	10.80	7.00	2800
2900	994	895	850		165	317	16.74	11.45	7.43	2900
3000	1016	915	870		168	326	17.70	12.11	7.87	3000

TABLE 59. TRANSPORT PROPERTIES OF ATOMIC FLUORINE - FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W}\cdot\text{m}^{-1} \cdot \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \cdot \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	F-F	F-F ₂	F ₂ -F ₂	F-F	F-F ₂	F ₂ -F ₂	F-F	F-F ₂	F ₂ -F ₂	
100	78	79	87	13	12	10	0.05	0.03	0.02	100
200	152	155	169	27	23	19	0.17	0.13	0.10	200
300	214	217	236	38	33	28	0.36	0.28	0.20	300
400	266	270	294	47	42	37	0.60	0.46	0.33	400
500	313	317	346	54	50	45	0.88	0.68	0.49	500
600	355	359	393	61	57	52	1.21	0.92	0.67	600
700	395	399	437	67	63	59	1.57	1.20	0.87	700
800	432	436	478	73	68	65	1.96	1.50	1.09	800
900	468	472	517	79	74	71	2.39	1.83	1.32	900
1000	501	506	554	84	81	77	2.85	2.18	1.58	1000
1100	533	539	590	89	86	82	3.35	2.56	1.85	1100
1200	564	568	624	94	91	88	3.88	2.96	2.14	1200
1300	594	601	657	99	94	93	4.43	3.38	2.45	1300
1400	623	631	688	103	106	97	5.03	3.82	2.78	1400
1500	651	659	720	108	105	102	5.63	4.28	3.11	1500
1600	679	687	750	112	110	107	6.25	4.77	3.46	1600
1700	706	716	781	117	115	112	6.91	5.27	3.82	1700
1800	734	742	811	121	119	116	7.59	5.80	4.20	1800
1900	760	766	840	126	124	121	8.29	6.34	4.58	1900
2000	786	793	869	130	128	125	9.02	6.90	4.99	2000
2100	812	819	897	134	132	130	9.78	7.48	5.41	2100
2200	837	845	925	138	136	134	10.6	8.08	5.83	2200
2300	861	871	952	142	140	138	11.4	8.68	6.26	2300
2400	885	894	979	146	145	143	12.2	9.33	6.70	2400
2500	909	918	1005	150	149	147	13.1	9.99	7.20	2500
2600	933	940	1031	153	152	151	14.0	10.5	7.71	2600
2700	956	964	1056	157	156	155	14.9	11.4	8.23	2700
2800	978	987	1082	161	160	159	15.8	12.3	8.76	2800
2900	1001	1008	1106	165	164	163	16.9	13.4	9.30	2900
3000	1023	1031	1131	168	168	167	18.0	14.9	9.85	3000

TABLE 60. TRANSPORT PROPERTIES OF ATOMIC FLUORINE

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$) F	Thermal Cond. ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$) F	Diffusion Coeff. ($\text{m}^2\text{s}^{-1} \cdot 10^4$) F	Temp. (K)
100	78	13	0.05	100
200	152	27	0.17	200
300	214	38	0.36	300
400	266	47	0.60	400
500	313	54	0.88	500
600	355	61	1.21	600
700	395	67	1.57	700
800	432	73	1.96	800
900	468	79	2.39	900
1000	501	84	2.85	1000
1100	533	89	3.35	1100
1200	564	94	3.88	1200
1300	594	99	4.43	1300
1400	623	103	5.03	1400
1500	651	108	5.63	1500
1600	679	112	6.25	1600
1700	706	117	6.91	1700
1800	734	121	7.59	1800
1900	760	126	8.29	1900
2000	786	130	9.02	2000
2100	812	134	9.78	2100
2200	837	138	10.6	2200
2300	861	142	11.4	2300
2400	885	146	12.2	2400
2500	909	150	13.1	2500
2600	933	153	14.0	2600
2700	956	157	14.9	2700
2800	978	161	15.8	2800
2900	1001	165	16.9	2900
3000	1023	168	18.0	3000

TABLE 61. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficients ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	NF ₃ -NF ₃	NF ₃ -He	He-He	NF ₃ -NF ₃	NF ₃ -He	He-He	NF ₃ -NF ₃	NF ₃ -He	He-He	
100	62	58	99	4	39	73	0.01	0.08	0.29	100
200	124	97	155	10	63	115	0.04	0.28	0.92	200
300	182	128	199	19	86	152	0.08	0.56	1.84	300
400	232	155	244	28	108	187	0.13	0.89	3.01	400
500	278	179	284	36	128	220	0.20	1.29	4.41	500
600	319	202	322	44	148	252	0.28	1.75	6.04	600
700	357	222	359	51	166	281	0.38	2.26	7.88	700
800	393	243	394	57	183	308	0.48	2.82	9.92	800
900	427	262	429	64	198	332	0.58	3.43	12.2	900
1000	459	281	461	69	213	357	0.69	4.08	14.6	1000
1100	490	298	494	74	227	380	0.81	4.78	17.2	1100
1200	519	315	525	80	242	403	0.94	5.52	20.1	1200
1300	548	332	556	84	255	425	1.07	6.30	23.0	1300
1400	576	349	586	89	268	447	1.22	7.12	26.3	1400
1500	602	364	614	94	281	468	1.37	7.98	29.6	1500
1600	628	380	643	98	293	488	1.53	8.84	33.2	1600
1700	654	396	671	102	305	508	1.69	9.82	36.9	1700
1800	678	410	698	106	317	528	1.86	10.8	40.8	1800
1900	702	425	725	110	329	547	2.03	11.8	44.9	1900
2000	726	439	752	114	340	566	2.21	12.9	49.1	2000
2100	749	453	778	118	352	585	2.40	13.9	53.5	2100
2200	772	467	804	122	363	603	2.59	15.0	58.1	2200
2300	794	481	830	125	374	622	2.78	16.1	62.8	2300
2400	816	494	855	129	385	640	3.00	17.4	67.7	2400
2500	838	508	880	133	395	657	3.21	18.6	72.9	2500
2600	860	521	905	136	405	674	3.42	19.8	78.0	2600
2700	882	533	929	140	415	691	3.64	21.1	83.4	2700
2800	903	547	953	143	426	708	3.87	22.4	88.9	2800
2900	924	559	977	147	436	724	4.10	24.8	94.6	2900
3000	945	571	1001	150	445	740	4.44	27.2	101	3000

TABLE 62. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NF}_3$	$\text{N}_2\text{-NF}_3$	$\text{NF}_3\text{-NF}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NF}_3$	
100	65	59	9	6	0.03	0.02	100
200	128	119	18	14	0.10	0.06	200
300	179	171	26	22	0.21	0.14	300
400	223	215	33	30	0.34	0.23	400
500	262	255	39	37	0.50	0.34	500
600	297	291	44	44	0.69	0.47	600
700	330	324	49	50	0.89	0.61	700
800	361	355	54	56	1.12	0.77	800
900	390	385	59	61	1.37	0.94	900
1000	418	413	63	66	1.63	1.12	1000
1100	445	440	67	70	1.91	1.31	1100
1200	471	466	71	75	2.21	1.52	1200
1300	496	491	75	79	2.52	1.73	1300
1400	521	515	80	84	2.85	1.96	1400
1500	544	539	84	89	3.20	2.20	1500
1600	568	562	89	94	3.56	2.45	1600
1700	591	584	95	98	3.94	2.71	1700
1800	613	607	101	103	4.33	2.98	1800
1900	635	628	108	109	4.73	3.26	1900
2000	656	649	115	114	5.15	3.55	2000
2100	677	670	121	119	5.59	3.85	2100
2200	698	691	126	124	6.03	4.16	2200
2300	718	711	131	128	6.50	4.48	2300
2400	738	731	136	132	6.97	4.80	2400
2500	758	751	141	137	7.46	5.14	2500
2600	778	770	146	141	7.96	5.48	2600
2700	797	789	151	145	8.47	5.84	2700
2800	816	808	155	149	9.00	6.20	2800
2900	835	826	160	153	9.54	6.57	2900
3000	853	845	165	157	10.09	6.95	3000

TABLE 63. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-A}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-A}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-A}$	
100	61	69	4	5	0.01	0.01	100
200	124	139	10	11	0.04	0.06	200
300	181	200	19	18	0.08	0.13	300
400	232	254	28	25	0.14	0.21	400
500	277	302	36	31	0.21	0.32	500
600	318	346	44	37	0.29	0.44	600
700	356	386	51	42	0.38	0.57	700
800	391	424	57	47	0.48	0.72	800
900	425	459	64	52	0.58	0.88	900
1000	456	493	69	56	0.70	1.05	1000
1100	487	525	74	59	0.82	1.23	1100
1200	516	557	80	64	0.95	1.42	1200
1300	544	587	84	67	1.08	1.63	1300
1400	572	616	89	71	1.23	1.84	1400
1500	598	644	94	75	1.38	2.07	1500
1600	624	672	98	78	1.54	2.30	1600
1700	649	699	102	82	1.70	2.55	1700
1800	674	726	106	85	1.87	2.80	1800
1900	698	752	110	88	2.05	3.06	1900
2000	722	777	114	91	2.23	3.33	2000
2100	745	802	118	95	2.42	3.62	2100
2200	768	827	122	98	2.61	3.91	2200
2300	790	851	125	101	2.81	4.20	2300
2400	813	875	129	104	3.01	4.51	2400
2500	834	898	133	107	3.23	4.83	2500
2600	856	921	136	110	3.44	5.15	2600
2700	877	944	140	113	3.67	5.48	2700
2800	898	967	143	116	3.89	5.83	2800
2900	919	989	147	119	4.13	6.17	2900
3000	939	1011	150	122	4.36	6.53	3000

TABLE 64. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-1} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-H}_2$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-H}_2$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-H}_2$	$\text{H}_2\text{-H}_2$	
100	61	27	4	36	0.01	0.07	0.20	100
200	124	52	10	69	0.04	0.28	0.71	200
300	181	72	19	100	0.08	0.59	1.43	300
400	232	85	28	124	0.14	0.98	2.33	400
500	277	104	36	146	0.21	1.44	3.39	500
600	318	118	44	167	0.29	1.96	4.59	600
700	356	131	51	188	0.38	2.55	5.93	700
800	391	143	57	208	0.48	3.19	7.41	800
900	425	155	64	229	0.58	3.88	9.00	900
1000	456	166	69	248	0.70	4.63	10.72	1000
1100	487	177	74	267	0.82	5.42	12.56	1100
1200	516	187	80	286	0.95	6.27	14.59	1200
1300	544	197	84	305	1.08	7.16	16.56	1300
1400	572	207	89	324	1.23	8.09	18.72	1400
1500	598	216	94	343	1.38	9.08	20.99	1500
1600	624	225	98	361	1.54	10.10	23.36	1600
1700	649	234	102	379	1.70	11.17	25.82	1700
1800	674	243	106	397	1.87	12.28	28.39	1800
1900	698	252	110	415	2.05	13.43	31.05	1900
2000	722	260	114	433	2.23	14.62	33.80	2000
2100	745	269	118	450	2.42	15.85	36.64	2100
2200	768	277	122	467	2.61	17.12	39.58	2200
2300	790	285	125	484	2.81	18.42	42.60	2300
2400	813	293	129	501	3.01	19.77	45.71	2400
2500	834	301	133	518	3.23	21.15	48.91	2500
2600	856	308	136	534	3.44	22.57	52.19	2600
2700	877	316	140	550	3.67	24.03	55.56	2700
2800	896	324	143	565	3.89	25.52	59.00	2800
2900	919	331	147	580	4.13	27.05	62.54	2900
3000	939	338	150	596	4.36	28.61	66.15	3000

TABLE 65. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-H}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-H}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-H}$	
100	61	23	34	55	0.01	0.12	100
200	124	42	57	93	0.04	0.45	200
300	181	57	75	125	0.08	0.91	300
400	232	69	91	153	0.14	1.50	400
500	277	81	105	179	0.21	2.19	500
600	318	91	118	203	0.29	2.98	600
700	356	101	130	226	0.38	3.85	700
800	391	110	142	247	0.48	4.82	800
900	425	119	153	268	0.58	5.86	900
1000	456	128	164	288	0.70	6.98	1000
1100	487	136	175	306	0.82	8.18	1100
1200	516	144	185	325	0.95	9.45	1200
1300	544	151	194	342	1.08	10.79	1300
1400	572	159	204	359	1.23	12.19	1400
1500	598	166	213	376	1.38	13.67	1500
1600	624	173	222	392	1.54	15.21	1600
1700	649	180	231	408	1.70	16.82	1700
1800	674	187	240	423	1.87	18.49	1800
1900	698	193	249	438	2.05	20.22	1900
2000	722	200	257	453	2.23	22.01	2000
2100	745	206	265	468	2.42	23.87	2100
2200	768	213	273	482	2.61	25.78	2200
2300	790	219	281	496	2.81	27.75	2300
2400	813	225	289	510	3.01	29.77	2400
2500	834	231	297	524	3.23	31.86	2500
2600	856	237	305	537	3.44	33.99	2600
2700	877	243	312	551	3.67	36.19	2700
2800	898	248	320	563	3.89	38.43	2800
2900	919	254	327	577	4.13	40.73	2900
3000	939	260	334	590	4.36	43.09	3000

TABLE 66. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}_2$	$\text{NF}_3\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}_2$	$\text{D}_2\text{-D}_2$	
100	61	41	58	58	0.01	0.06	0.16	100
200	124	76	96	101	0.04	0.22	0.52	200
300	181	103	126	141	0.08	0.44	1.03	300
400	232	126	152	176	0.14	0.72	1.66	400
500	277	147	175	210	0.21	1.05	2.40	500
600	318	166	197	243	0.29	1.43	3.25	600
700	356	184	218	274	0.38	1.85	4.20	700
800	391	200	238	305	0.48	2.31	5.24	800
900	425	216	256	336	0.58	2.82	6.37	900
1000	456	232	275	365	0.70	3.35	7.58	1000
1100	487	246	292	393	0.82	3.93	8.88	1100
1200	516	261	309	421	0.95	4.54	10.25	1200
1300	544	275	325	449	1.08	5.18	11.71	1300
1400	572	288	341	476	1.23	5.86	13.24	1400
1500	598	301	357	502	1.38	6.57	14.84	1500
1600	624	314	372	528	1.54	7.31	16.51	1600
1700	649	327	387	554	1.70	8.08	18.26	1700
1800	674	339	402	579	1.87	8.89	20.07	1800
1900	698	351	416	605	2.05	9.72	21.95	1900
2000	722	363	430	630	2.23	10.58	23.90	2000
2100	745	375	444	654	2.42	11.47	25.91	2100
2200	768	386	457	678	2.61	12.39	27.98	2200
2300	790	397	471	702	2.81	13.33	30.12	2300
2400	813	408	484	726	3.01	14.31	32.32	2400
2500	834	419	497	750	3.23	15.31	34.58	2500
2600	856	430	510	774	3.44	16.33	36.90	2600
2700	877	441	522	797	3.67	17.39	39.28	2700
2800	898	451	535	821	3.89	18.47	41.72	2800
2900	919	462	547	844	4.13	19.57	44.21	2900
3000	939	472	559	868	4.36	20.70	46.77	3000

TABLE 67. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		D-D	Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}$		$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}$	
100	61	32	50	4	41	0.01	0.09	100
200	124	59	83	10	70	0.04	0.33	200
300	181	80	109	19	94	0.08	0.67	300
400	232	98	132	28	116	0.14	1.09	400
500	277	114	152	36	136	0.21	1.60	500
600	318	129	171	44	155	0.29	2.17	600
700	356	143	189	51	173	0.38	2.81	700
800	391	156	206	57	189	0.48	3.51	800
900	425	168	223	64	205	0.58	4.27	900
1000	456	180	238	69	220	0.70	5.08	1000
1100	487	192	254	74	234	0.82	5.95	1100
1200	516	203	268	80	249	0.95	6.88	1200
1300	544	214	283	84	262	1.08	7.85	1300
1400	572	224	296	89	275	1.23	8.88	1400
1500	598	235	310	94	288	1.38	9.96	1500
1600	624	245	323	98	300	1.54	11.08	1600
1700	649	254	336	102	312	1.70	12.25	1700
1800	674	264	349	106	324	1.87	13.46	1800
1900	698	273	361	110	336	2.05	14.73	1900
2000	722	283	373	114	348	2.23	16.03	2000
2100	745	292	385	118	359	2.42	17.38	2100
2200	768	301	397	122	370	2.61	18.77	2200
2300	790	309	409	125	381	2.81	20.21	2300
2400	813	318	420	129	392	3.01	21.68	2400
2500	834	326	431	133	403	3.23	23.20	2500
2600	856	335	443	136	413	3.44	24.76	2600
2700	877	343	453	140	423	3.67	26.35	2700
2800	898	351	464	143	433	3.89	27.99	2800
2900	919	359	475	147	443	4.13	29.66	2900
3000	939	367	486	150	453	4.36	31.38	3000

TABLE 68. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-HE}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-HE}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-HE}$	
100	73	61	3	38	0.01	0.09	100
200	146	105	7	61	0.03	0.29	200
300	220	139	18	85	0.07	0.59	300
400	287	168	31	109	0.12	0.95	400
500	349	195	43	131	0.18	1.38	500
600	405	219	55	153	0.25	1.87	600
700	457	242	68	174	0.33	2.42	700
800	506	264	81	194	0.42	3.02	800
900	551	285	94	213	0.51	3.67	900
1000	595	305	107	232	0.62	4.36	1000
1100	637	325	117	248	0.73	5.11	1100
1200	677	344	126	264	0.84	5.90	1200
1300	715	362	134	279	0.97	6.74	1300
1400	752	380	142	294	1.10	7.62	1400
1500	788	397	150	309	1.23	8.54	1500
1600	823	414	157	322	1.38	9.50	1600
1700	857	431	163	335	1.52	10.51	1700
1800	890	447	170	349	1.68	11.55	1800
1900	922	463	177	362	1.84	12.63	1900
2000	954	479	183	374	2.00	13.75	2000
2100	985	494	189	387	2.17	14.91	2100
2200	1016	509	196	399	2.35	16.11	2200
2300	1046	524	202	412	2.53	17.34	2300
2400	1075	538	208	424	2.71	18.60	2400
2500	1104	553	214	435	2.90	19.90	2500
2600	1133	567	220	447	3.10	21.24	2600
2700	1161	581	226	458	3.30	22.61	2700
2800	1189	595	232	470	3.51	24.01	2800
2900	1216	609	238	481	3.72	25.45	2900
3000	1243	622	244	492	3.93	26.92	3000

TABLE 69. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	
100	73	62	65	3	6	9	0.01	0.02	0.03	100
200	146	125	128	7	12	18	0.03	0.06	0.10	200
300	220	182	179	18	22	26	0.07	0.13	0.21	300
400	287	232	223	31	32	33	0.12	0.23	0.34	400
500	349	276	262	43	41	39	0.18	0.34	0.50	500
600	405	316	297	55	49	44	0.25	0.46	0.69	600
700	457	354	330	68	58	49	0.33	0.61	0.89	700
800	506	388	361	81	67	54	0.42	0.76	1.12	800
900	551	421	390	94	76	59	0.51	0.93	1.37	900
1000	595	453	418	107	85	63	0.62	1.11	1.63	1000
1100	637	483	445	117	92	67	0.73	1.31	1.91	1100
1200	677	512	471	126	98	71	0.84	1.51	2.21	1200
1300	715	539	496	134	104	75	0.97	1.73	2.52	1300
1400	752	566	521	142	111	80	1.10	1.96	2.85	1400
1500	788	593	544	150	117	84	1.23	2.20	3.20	1500
1600	823	618	568	157	123	89	1.38	2.45	3.56	1600
1700	857	643	591	163	129	95	1.52	2.71	3.94	1700
1800	890	667	613	170	135	101	1.68	2.98	4.33	1800
1900	922	691	635	177	142	108	1.84	3.26	4.73	1900
2000	954	715	656	183	149	115	2.00	3.55	5.15	2000
2100	985	738	677	189	155	121	2.17	3.85	5.59	2100
2200	1016	760	698	196	161	126	2.35	4.16	6.03	2200
2300	1046	783	718	202	165	131	2.53	4.48	6.50	2300
2400	1075	805	738	208	172	136	2.71	4.80	6.97	2400
2500	1104	826	758	214	177	141	2.90	5.14	7.46	2500
2600	1133	847	778	220	183	146	3.10	5.49	7.96	2600
2700	1161	868	797	226	188	151	3.30	5.84	8.47	2700
2800	1189	889	816	232	193	155	3.51	6.20	9.00	2800
2900	1216	910	835	238	199	160	3.72	6.57	9.54	2900
3000	1243	930	853	244	204	165	3.93	6.95	10.09	3000

TABLE 70. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-A}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-A}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-A}$	
100	73	72	3	5	0.01	0.01	100
200	146	147	7	9	0.03	0.06	200
300	220	216	18	17	0.07	0.12	300
400	287	277	31	26	0.12	0.21	400
500	349	332	43	34	0.18	0.31	500
600	405	381	55	42	0.25	0.43	600
700	457	427	68	51	0.33	0.56	700
800	506	470	81	59	0.42	0.70	800
900	551	511	94	67	0.51	0.86	900
1000	595	549	107	75	0.62	1.03	1000
1100	637	586	117	81	0.73	1.21	1100
1200	677	621	126	87	0.84	1.40	1200
1300	715	655	134	92	0.97	1.60	1300
1400	752	688	142	98	1.10	1.82	1400
1500	788	720	150	103	1.23	2.04	1500
1600	823	751	157	108	1.38	2.27	1600
1700	857	782	163	112	1.52	2.52	1700
1800	890	812	170	117	1.68	2.77	1800
1900	922	841	177	122	1.84	3.03	1900
2000	954	869	183	126	2.00	3.30	2000
2100	985	897	189	130	2.17	3.58	2100
2200	1016	925	196	135	2.35	3.86	2200
2300	1046	952	202	139	2.53	4.16	2300
2400	1075	979	208	143	2.71	4.46	2400
2500	1104	1005	214	148	2.90	4.78	2500
2600	1133	1031	220	152	3.10	5.10	2600
2700	1161	1056	226	156	3.30	5.43	2700
2800	1189	1082	232	160	3.51	5.76	2800
2900	1216	1107	238	164	3.72	6.11	2900
3000	1243	1131	294	169	3.93	6.46	3000

TABLE 71. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}_2$	
100	73	27	3	35	0.01	0.07	100
200	146	53	7	67	0.03	0.29	200
300	220	75	18	100	0.07	0.61	300
400	287	93	31	126	0.12	1.02	400
500	349	110	43	150	0.18	1.50	500
600	405	125	55	173	0.25	2.05	600
700	457	139	68	196	0.33	2.66	700
800	506	152	81	220	0.42	3.34	800
900	551	164	94	244	0.51	4.07	900
1000	595	176	107	267	0.62	4.86	1000
1100	637	188	117	288	0.73	5.70	1100
1200	677	199	126	309	0.84	6.59	1200
1300	715	209	134	330	0.97	7.53	1300
1400	752	219	142	350	1.10	8.51	1400
1500	788	230	150	371	1.23	9.55	1500
1600	823	239	157	390	1.38	10.63	1600
1700	857	249	163	410	1.52	11.75	1700
1800	890	258	170	429	1.68	12.92	1800
1900	922	268	177	448	1.84	14.13	1900
2000	954	277	183	467	2.00	15.38	2000
2100	985	286	189	486	2.17	16.68	2100
2200	1016	294	196	504	2.35	18.01	2200
2300	1046	303	202	522	2.53	19.39	2300
2400	1075	311	208	540	2.71	20.80	2400
2500	1104	320	214	558	2.90	22.26	2500
2600	1133	328	220	576	3.10	23.75	2600
2700	1161	336	226	593	3.30	25.29	2700
2800	1189	344	232	609	3.51	26.86	2800
2900	1216	352	238	626	3.72	28.46	2900
3000	1243	360	244	643	3.93	30.11	3000

TABLE 72. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}$	
100	73	23	3	54	0.01	0.12	100
200	146	43	7	91	0.03	0.46	200
300	220	59	18	125	0.07	0.95	300
400	287	73	31	155	0.12	1.57	400
500	349	85	43	182	0.18	2.30	500
600	405	97	55	209	0.25	3.13	600
700	457	107	68	235	0.33	4.06	700
800	506	117	81	259	0.42	5.08	800
900	551	126	94	283	0.51	6.18	900
1000	595	135	107	307	0.62	7.37	1000
1100	637	144	117	328	0.73	8.63	1100
1200	677	152	126	348	0.84	9.97	1200
1300	715	161	134	367	0.97	11.39	1300
1400	752	169	142	386	1.10	12.88	1400
1500	788	176	150	404	1.23	14.44	1500
1600	823	184	157	421	1.38	16.07	1600
1700	857	191	163	438	1.52	17.76	1700
1800	890	198	170	455	1.68	19.53	1800
1900	922	205	177	471	1.84	21.36	1900
2000	954	212	183	487	2.00	23.25	2000
2100	985	219	189	503	2.17	25.21	2100
2200	1016	226	196	519	2.35	27.23	2200
2300	1046	232	202	534	2.53	29.31	2300
2400	1075	239	208	549	2.71	31.45	2400
2500	1104	245	214	564	2.90	33.65	2500
2600	1133	252	220	579	3.10	35.91	2600
2700	1161	258	226	594	3.30	38.22	2700
2800	1189	264	232	608	3.51	40.59	2800
2900	1216	270	238	622	3.72	43.02	2900
3000	1243	276	244	636	3.93	45.51	3000

TABLE 73. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}_2$	$\text{D}_2\text{-D}_2$	
100	73	42	58	3	30	58	0.01	0.06	0.16	100
200	146	79	96	7	54	101	0.03	0.22	0.52	200
300	220	108	126	18	79	141	0.07	0.45	1.03	300
400	287	133	152	31	103	176	0.12	0.75	1.66	400
500	349	156	175	43	126	210	0.18	1.09	2.40	500
600	405	176	197	55	149	243	0.25	1.49	3.25	600
700	457	195	218	68	171	274	0.33	1.93	4.20	700
800	506	213	238	81	193	305	0.42	2.42	5.24	800
900	551	230	256	94	215	336	0.51	2.94	6.37	900
1000	595	247	275	107	236	365	0.62	3.51	7.58	1000
1100	637	263	292	117	255	393	0.73	4.11	8.88	1100
1200	677	278	309	126	273	421	0.84	4.75	10.25	1200
1300	715	293	325	134	291	449	0.97	5.42	11.71	1300
1400	752	307	341	142	309	476	1.10	6.13	13.24	1400
1500	788	321	357	150	326	502	1.23	6.87	14.84	1500
1600	823	335	372	157	342	528	1.38	7.65	16.51	1600
1700	857	348	387	163	358	554	1.52	8.46	18.26	1700
1800	890	361	402	170	374	579	1.68	9.30	20.07	1800
1900	922	374	416	177	391	605	1.84	10.17	21.95	1900
2000	954	387	430	183	406	630	2.00	11.07	23.90	2000
2100	985	399	444	189	421	654	2.17	12.00	25.91	2100
2200	1016	412	457	196	437	678	2.35	12.96	27.98	2200
2300	1046	424	471	202	452	702	2.53	13.95	30.12	2300
2400	1075	435	484	208	467	726	2.71	14.97	32.32	2400
2500	1104	447	497	214	482	750	2.90	16.02	34.58	2500
2600	1133	459	510	220	497	774	3.10	17.09	36.90	2600
2700	1161	470	522	226	511	797	3.30	18.20	39.28	2700
2800	1189	481	535	232	526	821	3.51	19.33	41.72	2800
2900	1216	492	547	238	541	844	3.72	20.48	44.21	2900
3000	1243	503	559	244	556	868	3.93	21.66	46.77	3000

TABLE 74. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}$	D-D	
100	73	32	3	41	0.01	0.09	0.27	100
200	146	61	7	68	0.03	0.34	0.90	200
300	220	84	18	94	0.07	0.69	1.79	300
400	287	104	31	117	0.12	1.14	2.88	400
500	349	121	43	140	0.18	1.67	4.18	500
600	405	137	55	161	0.25	2.28	5.65	600
700	457	152	68	181	0.33	2.95	7.29	700
800	506	166	81	201	0.42	3.69	9.10	800
900	551	179	94	220	0.51	4.49	11.06	900
1000	595	192	107	239	0.62	5.36	13.17	1000
1100	637	204	117	256	0.73	6.28	15.42	1100
1200	677	216	126	272	0.84	7.25	17.81	1200
1300	715	228	134	287	0.97	8.28	20.33	1300
1400	752	239	142	301	1.10	9.36	22.99	1400
1500	788	250	150	316	1.23	10.50	25.77	1500
1600	823	260	157	330	1.38	11.68	28.68	1600
1700	857	271	163	343	1.52	12.92	31.71	1700
1800	890	281	170	356	1.68	14.20	34.85	1800
1900	922	291	177	370	1.84	15.53	38.12	1900
2000	954	301	183	382	2.00	16.90	41.50	2000
2100	985	311	189	395	2.17	18.33	44.99	2100
2200	1016	320	196	407	2.35	19.80	48.59	2200
2300	1046	329	202	419	2.53	21.31	52.30	2300
2400	1075	339	208	431	2.71	22.86	56.12	2400
2500	1104	348	214	443	2.90	24.46	60.05	2500
2600	1133	357	220	455	3.10	26.10	64.08	2600
2700	1161	366	226	466	3.30	27.79	68.21	2700
2800	1189	374	232	478	3.51	29.51	72.45	2800
2900	1216	383	238	489	3.72	31.28	76.78	2900
3000	1243	391	244	500	3.93	33.09	81.22	3000

TABLE 75. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	HE-HE	HE-CLF ₅	HE-HE	HE-CLF ₅	HE-HE	HE-CLF ₅	
100	99	41	73	40	0.29	0.06	100
200	156	73	115	64	0.92	0.20	200
300	202	98	152	85	1.84	0.41	300
400	244	119	187	106	3.01	0.67	400
500	284	139	220	126	4.41	0.97	500
600	322	156	252	145	6.04	1.32	600
700	359	173	281	162	7.88	1.71	700
800	394	189	308	179	9.92	2.13	800
900	429	204	332	194	12.20	2.59	900
1000	461	218	357	210	14.60	3.08	1000
1100	494	232	380	223	17.20	3.61	1100
1200	525	245	403	238	20.10	4.17	1200
1300	556	259	425	252	23.00	4.76	1300
1400	586	271	447	266	26.30	5.39	1400
1500	614	284	468	279	29.60	6.04	1500
1600	643	296	488	291	33.20	6.72	1600
1700	671	308	508	304	36.90	7.43	1700
1800	698	319	528	316	40.90	8.17	1800
1900	725	331	547	328	44.90	8.93	1900
2000	752	342	566	339	49.10	9.72	2000
2100	778	353	585	350	53.50	10.54	2100
2200	804	363	603	360	58.10	11.38	2200
2300	830	374	622	371	62.80	12.25	2300
2400	855	384	640	381	67.70	13.15	2400
2500	880	395	657	391	72.80	14.07	2500
2600	905	405	674	400	78.00	15.01	2600
2700	929	415	691	410	83.40	15.98	2700
2800	953	425	708	419	88.90	16.97	2800
2900	977	435	724	428	94.60	17.99	2900
3000	1001	444	740	437	101.00	19.03	3000

TABLE 76. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ClF}_5$	$\text{N}_2\text{-ClF}_5$	$\text{ClF}_5\text{-ClF}_5$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ClF}_5$	
100	65	42	40	7	0.03	0.01	100
200	128	84	74	13	0.10	0.04	200
300	179	126	111	19	0.21	0.09	300
400	223	165	150	25	0.34	0.15	400
500	262	199	188	32	0.50	0.23	500
600	297	231	225	41	0.69	0.32	600
700	330	260	260	44	0.89	0.42	700
800	361	287	292	54	1.12	0.54	800
900	390	313	324	58	1.37	0.66	900
1000	418	337	354	63	1.63	0.79	1000
1100	445	360	382	67	1.91	0.93	1100
1200	471	383	410	72	2.21	1.08	1200
1300	496	404	436	77	2.52	1.24	1300
1400	521	425	461	82	2.85	1.40	1400
1500	544	445	486	87	3.20	1.57	1500
1600	568	465	510	92	3.56	1.76	1600
1700	591	484	533	97	3.94	1.94	1700
1800	613	503	555	101	4.33	2.14	1800
1900	635	521	577	108	4.73	2.34	1900
2000	656	539	598	115	5.15	2.55	2000
2100	677	556	619	121	5.59	2.77	2100
2200	698	573	640	126	6.03	2.99	2200
2300	718	590	660	131	6.50	3.22	2300
2400	738	607	680	136	6.97	3.46	2400
2500	758	623	699	141	7.46	3.70	2500
2600	778	639	718	146	7.96	3.95	2600
2700	797	655	736	151	8.47	4.21	2700
2800	816	671	755	155	9.00	4.47	2800
2900	835	686	773	160	9.54	4.74	2900
3000	853	702	790	165	10.09	5.01	3000

TABLE 77. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-ARGON MIXTURES

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻¹)		Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)		Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)		Temp. (K)
	A-A	A-CLF ₅ CLF ₅ -CLF ₅	A-A	A-CLF ₅ CLF ₅ -CLF ₅	A-A	A-CLF ₅ CLF ₅ -CLF ₅	
100	83	49	7	7	0.02	0.01	100
200	166	99	12	12	0.09	0.04	200
300	237	149	17	18	0.19	0.08	300
400	298	195	22	23	0.32	0.14	400
500	352	237	26	29	0.47	0.21	500
600	401	276	30	34	0.65	0.29	600
700	447	312	34	39	0.85	0.38	700
800	490	345	37	43	1.06	0.49	800
900	531	377	40	48	1.30	0.60	900
1000	569	407	43	53	1.55	0.72	1000
1100	607	435	45	56	1.82	0.85	1100
1200	642	463	48	61	2.11	0.98	1200
1300	677	489	51	65	2.41	1.13	1300
1400	710	515	54	69	2.72	1.28	1400
1500	743	539	56	73	3.05	1.44	1500
1600	775	563	59	77	3.40	1.60	1600
1700	806	587	62	81	3.76	1.77	1700
1800	837	609	64	84	4.14	1.95	1800
1900	866	632	67	88	4.52	2.14	1900
2000	896	653	69	90	4.93	2.33	2000
2100	925	675	72	93	5.34	2.53	2100
2200	953	695	74	96	5.77	2.73	2200
2300	981	716	77	99	6.21	2.94	2300
2400	1008	736	79	101	6.66	3.16	2400
2500	1035	756	82	103	7.13	3.38	2500
2600	1062	776	84	105	7.61	3.61	2600
2700	1088	795	86	107	8.10	3.85	2700
2800	1114	814	89	110	8.60	4.08	2800
2900	1140	833	91	112	9.12	4.33	2900
3000	1165	851	94	114	9.64	4.58	3000

TABLE 78. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-ClF}_5$	$\text{ClF}_5\text{-ClF}_5$	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-ClF}_5$	$\text{ClF}_5\text{-ClF}_5$	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-ClF}_5$	$\text{ClF}_5\text{-ClF}_5$	
100	38	17	40	68	37	7	0.20	0.05	0.00	100
200	66	35	74	128	70	13	0.71	0.19	0.01	200
300	89	51	111	182	100	19	1.43	0.41	0.03	300
400	108	65	150	221	125	25	2.33	0.70	0.05	400
500	125	77	188	257	144	32	3.39	1.05	0.08	500
600	141	88	225	291	164	38	4.59	1.44	0.11	600
700	156	99	260	325	184	44	5.93	1.88	0.15	700
800	170	108	292	360	205	50	7.41	2.36	0.19	800
900	184	118	324	394	225	57	9.00	2.89	0.24	900
1000	197	126	354	428	245	63	10.72	3.45	0.29	1000
1100	209	135	382	460	263	67	12.56	4.05	0.35	1100
1200	221	143	410	493	283	74	14.50	4.69	0.41	1200
1300	233	150	436	526	302	79	16.56	5.37	0.47	1300
1400	244	158	461	559	322	85	18.72	6.08	0.53	1400
1500	256	165	486	592	341	90	20.99	6.82	0.60	1500
1600	267	172	510	624	359	95	23.36	7.59	0.68	1600
1700	277	179	533	657	378	100	25.82	8.40	0.75	1700
1800	288	186	555	689	397	105	28.39	9.24	0.83	1800
1900	298	193	577	720	414	109	31.05	10.11	0.91	1900
2000	308	199	598	752	432	112	33.80	11.01	0.99	2000
2100	318	206	619	783	449	115	36.64	11.94	1.08	2100
2200	328	212	640	813	465	118	39.58	12.89	1.17	2200
2300	337	218	660	843	482	121	42.60	13.88	1.26	2300
2400	347	224	680	873	498	123	45.71	14.90	1.36	2400
2500	356	230	699	903	514	125	48.91	15.94	1.46	2500
2600	365	236	718	932	529	127	52.19	17.01	1.56	2600
2700	374	242	736	960	544	129	55.56	18.11	1.66	2700
2800	383	248	755	987	559	131	59.00	19.23	1.76	2800
2900	392	254	773	1014	573	133	62.54	20.38	1.87	2900
3000	400	259	790	1042	588	135	66.15	21.56	1.98	3000

TABLE 79. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	H-H	H-CLF ₅ CLF ₅ -CLF ₅	H-H	H-CLF ₅ CLF ₅ -CLF ₅	H-H	H-CLF ₅ CLF ₅ -CLF ₅	
100	34	14	106	56	0.37	0.08	100
200	57	29	175	94	1.22	0.31	200
300	75	41	230	124	2.42	0.65	300
400	91	51	278	151	3.90	1.09	400
500	105	60	321	176	5.66	1.61	500
600	118	68	362	200	7.65	2.20	600
700	130	76	400	222	9.88	2.86	700
800	142	83	436	243	12.32	3.59	800
900	153	90	470	263	14.98	4.38	900
1000	164	97	504	283	17.83	5.23	1000
1100	175	103	536	301	20.88	6.14	1100
1200	185	109	567	320	24.12	7.10	1200
1300	194	115	597	338	27.53	8.11	1300
1400	204	121	626	355	31.13	9.17	1400
1500	213	126	655	372	34.90	10.29	1500
1600	222	132	683	389	38.84	11.45	1600
1700	231	137	710	405	42.94	12.66	1700
1800	240	142	737	421	47.20	13.92	1800
1900	249	147	763	436	51.62	15.23	1900
2000	257	152	789	450	56.20	16.58	2000
2100	265	157	814	464	60.93	17.98	2100
2200	273	162	839	478	65.81	19.42	2200
2300	281	167	863	492	70.83	20.90	2300
2400	289	171	888	505	76.01	22.43	2400
2500	297	176	911	518	81.32	24.00	2500
2600	305	180	935	531	86.78	25.61	2600
2700	312	185	958	543	92.38	27.26	2700
2800	320	189	981	556	98.11	28.95	2800
2900	327	194	1003	568	103.98	30.69	2900
3000	334	198	1026	580	109.99	32.46	3000

TABLE 80. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-DEUTERIUM MIXTURES

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻¹)		Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)		Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)		Temp. (K)
	D ₂ -D ₂	D ₂ -CLF ₅	D ₂ -D ₂	D ₂ -CLF ₅	D ₂ -D ₂	D ₂ -CLF ₅	
100	58	27	58	32	0.16	0.04	100
200	96	53	101	57	0.52	0.15	200
300	126	75	141	80	1.03	0.31	300
400	152	94	176	100	1.66	0.52	400
500	175	111	210	121	2.40	0.77	500
600	197	126	243	140	3.25	1.06	600
700	218	141	274	159	4.20	1.37	700
800	238	154	305	177	5.24	1.72	800
900	256	167	336	196	6.37	2.10	900
1000	275	179	365	214	7.58	2.51	1000
1100	292	190	393	230	8.88	2.94	1100
1200	309	201	421	247	10.25	3.40	1200
1300	325	212	449	264	11.71	3.89	1300
1400	341	223	476	280	13.24	4.40	1400
1500	357	233	502	296	14.84	4.93	1500
1600	372	243	528	311	16.51	5.49	1600
1700	387	253	554	327	18.26	6.07	1700
1800	402	262	579	342	20.07	6.68	1800
1900	416	272	605	357	21.95	7.30	1900
2000	430	281	630	371	23.90	7.95	2000
2100	444	290	654	384	25.91	8.62	2100
2200	457	299	678	398	27.98	9.31	2200
2300	471	307	702	411	30.12	10.12	2300
2400	484	316	726	424	32.32	10.75	2400
2500	497	324	750	438	34.58	11.51	2500
2600	510	333	774	450	36.90	12.28	2600
2700	522	341	797	463	39.28	13.07	2700
2800	535	349	821	476	41.72	13.88	2800
2900	547	357	844	488	44.21	14.71	2900
3000	559	365	868	501	46.77	15.56	3000

TABLE 81. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	$\text{CLF}_5\text{-CLF}_5$	$\text{CLF}_5\text{-D}$	$\text{CLF}_5\text{-CLF}_5$	$\text{CLF}_5\text{-D}$	$\text{CLF}_5\text{-CLF}_5$	$\text{CLF}_5\text{-D}$	
100	40	21	7	43	0.00	0.06	100
200	74	41	13	71	0.01	0.22	200
300	111	58	19	94	0.03	0.47	300
400	150	72	25	114	0.05	0.79	400
500	188	85	32	134	0.08	1.17	500
600	225	97	38	152	0.11	1.60	600
700	260	108	44	169	0.15	2.08	700
800	292	118	50	185	0.19	2.61	800
900	324	128	57	202	0.24	3.18	900
1000	354	137	63	217	0.29	3.79	1000
1100	382	146	67	231	0.35	4.45	1100
1200	410	155	74	246	0.41	5.15	1200
1300	436	163	79	259	0.47	5.88	1300
1400	461	171	85	273	0.53	6.65	1400
1500	486	179	90	286	0.60	7.46	1500
1600	510	186	95	299	0.68	8.31	1600
1700	533	194	100	311	0.75	9.19	1700
1800	555	201	105	324	0.83	10.10	1800
1900	577	208	109	336	0.91	11.05	1900
2000	598	216	112	347	0.99	12.03	2000
2100	619	222	115	358	1.08	13.04	2100
2200	640	229	118	368	1.17	14.08	2200
2300	660	236	121	379	1.26	15.16	2300
2400	680	243	123	389	1.36	16.27	2400
2500	699	249	125	399	1.46	17.41	2500
2600	718	255	127	408	1.56	18.57	2600
2700	736	262	129	418	1.66	19.77	2700
2800	755	268	131	427	1.76	21.00	2800
2900	773	274	133	436	1.87	22.26	2900
3000	790	280	135	446	1.98	23.54	3000

TABLE 82. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Ngm}^{-2} \cdot 10^{-9}$)		Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	HF-HF	He-He	HF-HF	He-He	HF-HF	He-He	
100	44	68	9	40	0.02	0.09	100
200	83	120	17	66	0.09	0.39	200
300	125	160	26	89	0.21	0.79	300
400	167	194	35	111	0.36	1.27	400
500	206	225	44	132	0.55	1.84	500
600	243	253	51	152	0.78	2.49	600
700	277	281	59	170	1.04	3.35	700
800	310	305	66	187	1.32	4.02	800
900	340	330	73	203	1.64	4.85	900
1000	369	353	80	219	1.97	5.82	1000
1100	397	375	87	234	2.35	6.82	1100
1200	423	398	94	249	2.73	7.89	1200
1300	449	419	101	263	3.12	9.00	1300
1400	473	439	108	278	3.52	10.2	1400
1500	496	459	115	292	3.96	11.4	1500
1600	520	479	122	305	4.44	12.7	1600
1700	542	499	129	319	4.94	14.0	1700
1800	564	517	135	332	5.47	15.4	1800
1900	585	535	141	344	5.90	16.9	1900
2000	606	553	147	357	6.45	18.4	2000
2100	627	571	154	370	7.00	19.9	2100
2200	647	588	160	382	7.60	21.5	2200
2300	666	606	166	394	8.25	23.1	2300
2400	686	623	172	406	8.90	24.8	2400
2500	705	640	177	417	9.60	26.6	2500
2600	723	656	183	429	10.3	28.4	2600
2700	741	672	189	440	11.0	30.3	2700
2800	760	689	194	451	11.7	32.0	2800
2900	777	705	200	462	12.5	33.9	2900
3000	795	720	205	473	13.2	35.9	3000

TABLE 83. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HF}$	HF-HF	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HF}$	HF-HF	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HF}$	HF-HF	
100	65	51	42	9	9	9	0.03	0.02	0.02	100
200	128	103	82	18	17	17	0.10	0.10	0.09	200
300	179	153	125	26	26	26	0.21	0.21	0.20	300
400	223	197	167	33	34	35	0.34	0.36	0.36	400
500	262	236	206	39	41	44	0.50	0.54	0.55	500
600	297	272	242	44	44	51	0.69	0.75	0.78	600
700	330	305	277	49	54	59	0.89	0.99	1.04	700
800	361	336	309	54	60	66	1.12	1.24	1.33	800
900	390	365	339	59	66	73	1.37	1.52	1.64	900
1000	418	393	368	63	72	80	1.63	1.82	1.98	1000
1100	445	420	395	67	77	87	1.91	2.14	2.34	1100
1200	471	445	421	71	82	94	2.21	2.48	2.72	1200
1300	496	470	446	75	88	101	2.52	2.84	3.13	1300
1400	521	494	471	80	94	108	2.85	3.22	3.56	1400
1500	544	517	494	84	99	115	3.20	3.62	4.00	1500
1600	568	539	517	89	105	122	3.56	4.03	4.47	1600
1700	591	561	540	95	112	129	3.94	4.46	4.96	1700
1800	613	583	561	101	118	135	4.33	4.91	5.47	1800
1900	635	604	582	108	124	141	4.73	5.37	5.99	1900
2000	656	624	603	115	131	147	5.15	5.85	6.54	2000
2100	677	644	623	121	137	154	5.59	6.35	7.10	2100
2200	698	664	643	126	143	160	6.03	6.86	7.68	2200
2300	718	684	662	131	148	166	6.50	7.38	8.28	2300
2400	738	703	681	136	154	172	6.97	7.92	8.89	2400
2500	758	722	700	141	159	177	7.46	8.48	9.52	2500
2600	778	740	718	146	163	183	7.96	9.05	10.17	2600
2700	797	759	736	151	170	189	8.47	9.63	10.84	2700
2800	816	777	754	155	174	194	9.00	10.23	11.52	2800
2900	835	795	772	160	180	200	9.54	10.84	12.21	2900
3000	853	812	789	165	185	205	10.09	11.47	12.92	3000

TABLE 84. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HF-HF	HF-A	A-A	HF-HF	HF-A	A-A	HF-HF	HF-A	A-A	
100	42	57	83	9	8	7	0.02	0.02	0.02	100
200	82	114	166	17	14	12	0.09	0.09	0.09	200
300	125	171	237	26	21	17	0.20	0.21	0.19	300
400	167	221	298	35	28	22	0.36	0.36	0.32	400
500	206	267	352	44	35	26	0.55	0.54	0.47	500
600	242	308	401	51	40	30	0.78	0.75	0.65	600
700	277	347	447	59	46	34	1.04	0.98	0.85	700
800	309	383	490	66	51	37	1.33	1.24	1.06	800
900	339	417	531	73	56	40	1.64	1.52	1.30	900
1000	368	449	569	80	61	43	1.98	1.82	1.55	1000
1100	395	480	607	87	66	45	2.34	2.14	1.82	1100
1200	421	509	642	94	71	48	2.72	2.48	2.11	1200
1300	446	538	677	101	76	51	3.13	2.84	2.41	1300
1400	471	565	710	108	81	54	3.56	3.22	2.72	1400
1500	494	592	743	115	86	56	4.00	3.62	3.05	1500
1600	517	618	775	122	91	59	4.47	4.04	3.40	1600
1700	540	643	806	129	95	62	4.96	4.47	3.76	1700
1800	561	668	837	135	99	64	5.47	4.92	4.14	1800
1900	582	692	866	141	104	67	5.99	5.38	4.52	1900
2000	603	715	896	147	108	69	6.54	5.86	4.93	2000
2100	623	738	925	154	113	72	7.10	6.36	5.34	2100
2200	643	761	953	160	117	74	7.68	6.87	5.77	2200
2300	662	784	981	166	121	77	8.28	7.40	6.21	2300
2400	681	806	1008	172	125	79	8.89	7.94	6.66	2400
2500	700	827	1035	177	129	82	9.52	8.50	7.13	2500
2600	718	849	1062	183	133	84	10.17	9.07	7.61	2600
2700	736	870	1088	189	137	86	10.84	9.66	8.10	2700
2800	754	890	1114	194	141	89	11.52	10.26	8.60	2800
2900	772	911	1140	200	145	91	12.21	10.88	9.12	2900
3000	789	931	1165	205	149	94	12.92	11.50	9.64	3000

TABLE 85. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)				Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)				Diffusion Coefficient ($\text{m}^2\text{s}^{-1} \cdot 10^{-4}$)				Temp. (K)
	HF-HF	HF-H ₂	H ₂ -H ₂	H ₂ -H ₂	HF-HF	HF-H ₂	H ₂ -H ₂	H ₂ -H ₂	HF-HF	HF-H ₂	H ₂ -H ₂	H ₂ -H ₂	
100	44	30	42	45	9	45	80	80	0.02	0.09	0.22	0.22	100
200	83	60	68	84	17	84	151	151	0.09	0.36	0.72	0.72	200
300	125	86	90	107	26	107	188	188	0.21	0.75	1.70	1.70	300
400	167	109	109	129	35	129	222	222	0.36	1.28	3.20	3.20	400
500	206	129	127	151	44	151	257	257	0.55	1.89	4.95	4.95	500
600	243	147	143	171	51	171	291	291	0.78	2.60	7.30	7.30	600
700	277	163	160	192	59	192	325	325	1.04	3.38	10.0	10.0	700
800	310	179	175	213	66	213	360	360	1.32	4.24	13.4	13.4	800
900	340	194	190	234	73	234	394	394	1.64	5.18	17.1	17.1	900
1000	369	208	205	254	80	254	428	428	1.97	6.18	21	21	1000
1100	397	222	219	274	87	274	460	460	2.35	7.25	26	26	1100
1200	423	235	232	294	94	294	493	493	2.73	8.39	32	32	1200
1300	449	247	246	313	101	313	526	526	3.12	9.59	37	37	1300
1400	473	260	259	334	108	334	559	559	3.56	10.9	44	44	1400
1500	496	272	272	354	115	354	592	592	3.96	12.2	50	50	1500
1600	520	284	284	373	122	373	624	624	4.44	13.6	58	58	1600
1700	542	296	296	393	129	393	657	657	4.94	15.0	66	66	1700
1800	564	309	308	412	135	412	689	689	5.47	16.5	75	75	1800
1900	585	319	319	431	141	431	720	720	5.90	18.0	85	85	1900
2000	606	329	331	450	147	450	752	752	6.45	19.7	95	95	2000
2100	627	339	341	469	154	469	783	783	7.00	21.3	105	105	2100
2200	647	349	351	487	160	487	813	813	7.60	23.0	115	115	2200
2300	666	359	361	505	166	505	843	843	8.25	24.8	126	126	2300
2400	686	369	371	526	172	526	873	873	8.90	26.6	138	138	2400
2500	705	379	380	540	177	540	903	903	9.60	28.5	151	151	2500
2600	723	388	390	558	183	558	932	932	10.3	30.4	165	165	2600
2700	744	398	400	575	189	575	960	960	11.0	32.3	179	179	2700
2800	760	407	409	591	194	591	987	987	11.7	34.3	195	195	2800
2900	777	417	418	607	200	607	1014	1014	12.5	36.3	212	212	2900
3000	795	426	427	624	205	624	1042	1042	13.2	38.3	227	227	3000

TABLE 86. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HF-HF	HF-H	H-H	HF-HF	HF-H	H-H	HF-HF	HF-H	H-H	
100	44	26	34	9	58	106	0.02	0.15	0.31	100
200	83	50	57	17	97	176	0.09	0.56	1.02	200
300	125	70	75	26	129	232	0.21	1.20	2.05	300
400	167	87	90	35	157	279	0.36	1.96	3.37	400
500	206	102	104	44	183	322	0.55	2.87	4.96	500
600	243	116	118	51	207	363	0.78	3.92	6.79	600
700	277	129	130	59	231	402	1.04	5.09	8.86	700
800	310	141	142	66	252	438	1.32	6.38	11.2	800
900	340	152	153	73	273	473	1.64	7.77	13.7	900
1000	369	163	164	80	294	507	1.97	9.27	16.4	1000
1100	397	173	174	87	313	539	2.35	10.9	19.9	1100
1200	423	184	184	94	332	570	2.73	12.6	23.1	1200
1300	449	194	194	101	351	600	3.12	14.4	26.5	1300
1400	473	203	204	108	369	630	3.52	16.2	30.3	1400
1500	496	212	213	115	387	658	3.96	18.2	33.3	1500
1600	520	222	222	122	404	686	4.44	20.3	38.0	1600
1700	542	231	231	129	422	714	4.94	22.4	42.4	1700
1800	564	239	239	135	438	740	5.47	24.6	47.2	1800
1900	585	247	248	141	454	766	5.90	27.0	51.8	1900
2000	606	256	256	147	470	792	6.45	29.4	56.6	2000
2100	627	264	264	154	486	818	7.00	31.9	61	2100
2200	647	272	272	160	502	843	7.60	34.4	67	2200
2300	666	280	280	166	517	867	8.25	37.0	72	2300
2400	686	288	288	172	532	891	8.90	39.7	78	2400
2500	705	296	296	177	546	915	9.60	42.5	84	2500
2600	723	303	303	183	561	938	10.3	45.3	90	2600
2700	741	311	311	189	576	962	11.0	48.1	96	2700
2800	760	318	318	194	589	984	11.7	51.2	103	2800
2900	777	325	325	200	604	1007	12.5	54.2	110	2900
3000	795	333	333	205	617	1029	13.2	57.2	117	3000

TABLE 87. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HF-HF	HF-D ₂	D ₂ -D ₂	HF-HF	HF-D ₂	D ₂ -D ₂	HF-HF	HF-D ₂	D ₂ -D ₂	
100	44	45	58	9	34	58	0.02	0.07	0.16	100
200	83	93	95	17	59	101	0.09	0.28	0.52	200
300	125	121	126	26	84	141	0.21	0.60	1.05	300
400	167	150	153	35	106	176	0.36	0.97	1.66	400
500	206	176	175	44	127	210	0.55	1.43	2.11	500
600	243	200	197	51	147	243	0.78	1.95	3.26	600
700	277	222	218	59	167	274	1.04	2.53	4.20	700
800	310	242	237	66	186	305	1.32	3.17	5.26	800
900	340	262	256	73	205	336	1.64	3.87	6.37	900
1000	369	281	273	80	223	365	1.97	4.60	7.59	1000
1100	397	299	291	87	240	393	2.35	5.39	8.88	1100
1200	423	317	308	94	258	421	2.73	6.24	10.3	1200
1300	449	334	324	101	275	449	3.12	7.13	11.7	1300
1400	473	350	340	108	292	476	3.52	8.06	13.2	1400
1500	497	366	355	115	309	502	3.96	9.10	14.8	1500
1600	520	381	370	122	325	528	4.44	10.1	16.5	1600
1700	542	396	385	129	342	554	4.94	11.2	18.3	1700
1800	564	411	400	135	357	579	5.47	12.2	20.1	1800
1900	585	425	414	141	373	605	5.90	13.4	21.9	1900
2000	606	440	428	147	389	630	6.45	14.6	23.9	2000
2100	627	454	442	154	404	654	7.00	15.8	25.9	2100
2200	647	468	456	160	419	678	7.60	17.1	28.0	2200
2300	666	482	469	166	434	702	8.25	18.4	30.1	2300
2400	686	496	482	172	449	726	8.90	19.7	32.3	2400
2500	705	510	495	177	464	750	9.60	21.0	34.6	2500
2600	723	523	508	183	479	774	10.3	22.4	36.8	2600
2700	741	536	521	189	493	797	11.0	23.8	39.2	2700
2800	760	549	533	194	508	821	11.7	25.2	41.8	2800
2900	777	562	546	200	522	844	12.5	27.7	44.2	2900
3000	795	575	558	205	537	868	13.2	30.2	47.0	3000

TABLE 88. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)				Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)				Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)				Temp. (K)
	HF-HF	HF-D	D-D	D-D	HF-HF	HF-D	D-D	D-D	HF-HF	HF-D	D-D	D-D	
100	44	36	50	50	9	44	79	79	0.02	0.10	0.39	0.39	100
200	83	71	83	83	17	74	130	130	0.09	0.42	1.31	1.31	200
300	125	99	109	109	26	98	170	170	0.21	0.89	2.63	2.63	300
400	167	122	131	131	35	120	204	204	0.36	1.45	4.19	4.19	400
500	206	144	152	152	44	141	237	237	0.55	2.13	6.06	6.06	500
600	243	163	171	171	51	159	267	267	0.78	2.91	8.19	8.19	600
700	277	181	189	189	57	176	295	295	1.04	2.77	10.6	10.6	700
800	310	197	206	206	66	194	321	321	1.32	4.73	13.2	13.2	800
900	340	213	223	223	73	210	347	347	1.64	5.76	16.0	16.0	900
1000	369	229	238	238	80	226	371	371	1.97	6.87	19.0	19.0	1000
1100	397	244	253	253	87	241	395	395	2.35	8.05	22.3	22.3	1100
1200	423	258	268	268	94	256	418	418	2.73	9.29	25.8	25.8	1200
1300	449	272	282	282	101	271	440	440	3.12	10.6	29.4	29.4	1300
1400	473	285	296	296	108	285	461	461	3.52	12.0	33.2	33.2	1400
1500	497	298	310	310	115	299	482	482	3.96	13.5	37.2	37.2	1500
1600	520	311	323	323	122	313	503	503	4.44	15.0	41.3	41.3	1600
1700	542	324	336	336	129	326	523	523	4.94	16.6	45.5	45.5	1700
1800	564	335	349	349	135	340	543	543	5.47	18.3	49.8	49.8	1800
1900	585	347	361	361	141	352	563	563	5.90	19.9	54.3	54.3	1900
2000	606	359	373	373	147	365	582	582	6.45	21.7	59.0	59.0	2000
2100	627	371	385	385	154	378	601	601	7.00	23.5	63.9	63.9	2100
2200	647	382	397	397	160	390	619	619	7.60	24.7	67.0	67.0	2200
2300	666	393	409	409	166	402	637	637	8.25	26.7	74.3	74.3	2300
2400	686	404	420	420	172	414	655	655	8.90	28.9	79.8	79.8	2400
2500	705	415	431	431	177	425	673	673	9.60	31.2	85.5	85.5	2500
2600	723	426	442	442	183	437	690	690	10.3	33.7	91.1	91.1	2600
2700	741	436	453	453	189	448	707	707	11.0	36.3	96.8	96.8	2700
2800	760	447	464	464	194	459	724	724	11.7	39.0	103	103	2800
2900	777	457	475	475	200	471	741	741	12.5	41.9	108	108	2900
3000	795	468	486	486	205	481	757	757	13.2	44.9	114	114	3000

TABLE 89. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{N cm}^{-2} \cdot 10^{-5}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HF-HF	HF-F ₂	F ₂ -F ₂	HF-HF	HF-F ₂	F ₂ -F ₂	HF-HF	HF-F ₂	F ₂ -F ₂	
100	44	57	58	9	10	10	0.02	0.02	0.02	100
200	83	117	95	17	18	19	0.09	0.10	0.10	200
300	125	173	126	26	27	28	0.21	0.21	0.20	300
400	167	205	153	35	36	37	0.36	0.36	0.33	400
500	206	267	175	44	45	45	0.55	0.55	0.49	500
600	243	306	197	51	52	52	0.78	0.76	0.67	600
700	277	345	218	59	59	59	1.04	0.96	0.87	700
800	310	379	237	66	66	65	1.32	1.25	1.09	800
900	340	413	256	73	72	71	1.64	1.53	1.32	900
1000	369	444	273	80	79	77	1.97	1.83	1.58	1000
1100	397	475	291	87	85	82	2.35	2.17	1.85	1100
1200	423	503	308	94	91	88	2.73	2.50	2.14	1200
1300	449	530	324	101	97	93	3.12	2.86	2.45	1300
1400	473	558	340	108	103	97	3.52	3.24	2.78	1400
1500	497	583	355	115	109	102	3.96	3.63	3.11	1500
1600	520	609	370	122	115	107	4.44	4.07	3.46	1600
1700	542	635	385	129	121	112	4.94	4.49	3.82	1700
1800	564	658	400	135	126	116	5.47	4.93	4.20	1800
1900	585	682	414	141	131	121	5.90	5.40	4.58	1900
2000	606	705	428	147	136	125	6.45	5.88	4.99	2000
2100	627	727	442	154	142	130	7.00	6.38	5.41	2100
2200	647	750	456	160	147	134	7.60	6.90	5.83	2200
2300	666	773	469	166	152	139	8.25	7.42	6.26	2300
2400	686	794	482	172	158	143	8.90	7.97	6.70	2400
2500	705	816	495	177	162	147	9.60	8.53	7.20	2500
2600	723	836	508	183	167	151	10.3	9.11	7.71	2600
2700	741	856	521	189	172	155	11.0	9.69	8.23	2700
2800	760	878	533	194	177	159	11.7	10.3	8.76	2800
2900	777	898	546	200	182	163	12.5	10.9	9.30	2900
3000	795	917	558	205	186	167	13.2	11.6	9.85	3000

TABLE 90. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE - ATOMIC FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HF-HF	HF-F	F-F	HF-HF	HF-F	F-F	HF-HF	HF-F	F-F	
100	44	48	78	9	11	13	0.02	0.03	0.05	100
200	83	97	152	17	22	27	0.09	0.13	0.17	200
300	125	143	214	26	32	38	0.21	0.29	0.36	300
400	167	185	266	35	41	47	0.36	0.48	0.60	400
500	206	222	313	44	49	54	0.55	0.72	0.88	500
600	243	255	355	51	56	61	0.78	0.99	1.21	600
700	277	286	395	59	63	67	1.04	1.26	1.57	700
800	310	314	432	66	70	73	1.32	1.64	1.96	800
900	340	342	468	73	76	79	1.64	2.01	2.39	900
1000	369	368	501	80	82	84	1.97	2.41	2.85	1000
1100	397	394	533	87	88	89	2.35	2.85	3.35	1100
1200	423	417	564	94	94	94	2.73	3.28	3.88	1200
1300	449	440	594	101	100	99	3.12	3.75	4.43	1300
1400	473	462	623	108	106	103	3.52	4.25	5.03	1400
1500	496	483	651	115	112	108	3.96	4.77	5.63	1500
1600	520	505	679	122	117	112	4.44	5.34	6.25	1600
1700	542	526	706	129	123	117	4.94	5.89	6.91	1700
1800	564	545	734	135	128	121	5.47	6.47	7.59	1800
1900	585	565	760	141	134	126	5.90	7.09	8.29	1900
2000	606	584	786	147	138	130	6.45	7.72	9.02	2000
2100	627	603	812	154	144	134	7.00	8.37	9.78	2100
2200	647	622	837	160	149	138	7.60	9.05	10.6	2200
2300	666	641	861	166	154	142	8.25	9.74	11.4	2300
2400	686	658	885	172	159	146	8.90	10.5	12.2	2400
2500	705	676	909	177	164	150	9.60	11.2	13.1	2500
2600	723	693	933	183	168	153	10.3	12.0	14.0	2600
2700	741	711	956	189	173	157	11.0	12.7	14.9	2700
2800	760	728	978	194	178	161	11.7	13.5	15.8	2800
2900	777	745	1001	200	183	165	12.5	14.3	16.9	2900
3000	795	762	1023	205	187	168	13.2	15.2	18.0	3000

TABLE 51. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$) HF	Thermal Cond. ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$) HF	Diffusion Coeff. ($\text{m}^2\text{s}^{-1} \cdot 10^{-4}$) HF	Temp. (K)
100	44	9	0.02	100
200	83	17	0.09	200
300	125	26	0.21	300
400	167	35	0.36	400
500	206	44	0.55	500
600	243	51	0.78	600
700	277	59	1.04	700
800	310	66	1.32	800
900	340	73	1.64	900
1000	369	80	1.97	1000
1100	397	87	2.35	1100
1200	423	94	2.73	1200
1300	449	101	3.12	1300
1400	473	108	3.52	1400
1500	496	115	3.96	1500
1600	520	122	4.44	1600
1700	542	129	4.94	1700
1800	564	135	5.47	1800
1900	585	141	5.90	1900
2000	606	147	6.45	2000
2100	627	154	7.00	2100
2200	647	160	7.60	2200
2300	666	166	8.25	2300
2400	686	172	8.90	2400
2500	705	177	9.60	2500
2600	723	183	10.3	2600
2700	741	189	11.0	2700
2800	760	194	11.7	2800
2900	777	200	12.5	2900
3000	795	205	13.2	3000

TABLE 92. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-3}$)		Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DF-DF	DF-He	DF-DF	DF-He	DF-DF	DF-He	
100	67	84	12	43	0.03	0.14	100
200	136	143	25	70	0.14	0.46	200
300	202	188	37	95	0.34	0.92	300
400	262	228	48	118	0.54	1.48	400
500	312	263	58	139	0.80	2.15	500
600	358	297	68	160	1.11	2.91	600
700	401	328	77	179	1.46	3.77	700
800	443	357	86	197	1.84	4.69	800
900	484	385	95	214	2.25	5.70	900
1000	525	412	105	231	2.70	6.69	1000
1100	560	440	114	247	3.17	7.95	1100
1200	594	465	122	263	3.68	9.18	1200
1300	627	490	130	278	4.21	10.5	1300
1400	659	514	138	293	4.77	11.8	1400
1500	689	538	146	307	5.35	13.3	1500
1600	720	561	154	321	5.96	14.8	1600
1700	749	584	161	335	6.60	16.3	1700
1800	778	606	168	348	7.26	18.0	1800
1900	806	626	175	361	7.95	19.6	1900
2000	834	648	182	374	8.67	21.4	2000
2100	860	669	189	387	9.41	23.2	2100
2200	887	689	196	400	10.2	25.1	2200
2300	913	709	203	413	10.9	27.0	2300
2400	939	729	209	425	11.7	28.9	2400
2500	964	749	216	437	12.6	31.0	2500
2600	989	768	222	448	13.4	33.0	2600
2700	1013	787	229	460	14.3	35.2	2700
2800	1038	806	235	472	15.2	37.3	2800
2900	1062	824	241	483	16.1	39.4	2900
3000	1085	842	247	494	17.0	41.5	3000
						101	

TABLE 93. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)				Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)				Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)				Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DF}$	DF-DF		$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DF}$	DF-DF		$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DF}$	DF-DF		
100	65	66	69		9	10	12		0.03	0.03	0.03		100
200	128	133	140		18	21	25		0.10	0.12	0.14		200
300	179	191	208		26	31	37		0.21	0.25	0.30		300
400	223	242	268		33	40	48		0.34	0.42	0.52		400
500	262	287	322		39	48	58		0.50	0.62	0.78		500
600	297	328	372		44	56	68		0.69	0.86	1.08		600
700	330	366	417		49	63	77		0.89	1.12	1.42		700
800	361	402	460		54	70	86		1.12	1.41	1.79		800
900	390	436	500		59	77	95		1.37	1.72	2.19		900
1000	418	468	538		63	84	105		1.63	2.05	2.62		1000
1100	445	498	575		67	90	114		1.91	2.41	3.08		1100
1200	471	528	610		71	96	122		2.21	2.79	3.57		1200
1300	496	556	644		75	102	130		2.52	3.19	4.09		1300
1400	521	584	676		80	109	138		2.85	3.61	4.64		1400
1500	544	611	708		84	115	146		3.20	4.05	5.21		1500
1600	568	637	739		89	121	154		3.56	4.51	5.80		1600
1700	591	663	769		95	128	161		3.94	4.98	6.42		1700
1800	613	688	798		101	134	168		4.33	5.48	7.07		1800
1900	635	713	827		108	141	175		4.73	5.99	7.74		1900
2000	656	737	855		115	148	182		5.15	6.53	8.43		2000
2100	677	760	883		121	155	189		5.59	7.08	9.14		2100
2200	698	784	910		126	161	196		6.03	7.65	9.88		2200
2300	718	807	937		131	167	203		6.50	8.23	10.63		2300
2400	738	829	963		136	172	209		6.97	8.83	11.41		2400
2500	758	852	989		141	178	216		7.46	9.45	12.21		2500
2600	778	873	1014		146	184	222		7.96	10.08	13.03		2600
2700	797	895	1040		151	190	229		8.47	10.73	13.88		2700
2800	816	916	1064		155	195	235		9.00	11.40	14.74		2800
2900	835	937	1089		160	200	241		9.54	12.08	15.62		2900
3000	853	958	1113		165	206	247		10.09	12.78	16.52		3000

TABLE 94. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DF-DF	DF-A	DF-DF	DF-A	DF-DF	DF-A	
100	69	73	12	9	0.03	0.03	100
200	140	149	25	18	0.14	0.11	200
300	208	217	37	29	0.30	0.25	300
400	268	276	48	34	0.52	0.42	400
500	322	329	58	42	0.78	0.62	500
600	372	377	68	49	1.08	0.85	600
700	417	421	77	55	1.42	1.12	700
800	460	463	86	61	1.79	1.40	800
900	500	502	95	67	2.19	1.71	900
1000	538	540	105	74	2.62	2.05	1000
1100	575	575	114	79	3.08	2.41	1100
1200	610	610	122	85	3.57	2.79	1200
1300	644	643	130	90	4.09	3.19	1300
1400	676	675	138	96	4.64	3.61	1400
1500	708	706	146	101	5.21	4.05	1500
1600	739	737	154	106	5.80	4.52	1600
1700	769	767	161	111	6.42	5.00	1700
1800	798	796	168	116	7.07	5.49	1800
1900	827	824	175	121	7.74	6.01	1900
2000	855	852	182	125	8.43	6.55	2000
2100	883	880	189	130	9.14	7.10	2100
2200	910	907	196	135	9.88	7.67	2200
2300	937	933	203	140	10.63	8.25	2300
2400	963	959	209	144	11.41	8.86	2400
2500	989	985	216	149	12.21	9.48	2500
2600	1014	1010	222	153	13.03	10.11	2600
2700	1040	1035	229	157	13.88	10.77	2700
2800	1064	1060	235	161	14.74	11.44	2800
2900	1089	1084	241	166	15.62	12.12	2900
3000	1113	1108	247	170	16.52	12.82	3000

TABLE 95. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficients ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	DF-DF	DF-H ₂	H ₂ -H ₂	DF-DF	DF-H ₂	H ₂ -H ₂	DF-DF	DF-H ₂	H ₂ -H ₂	
100	67	52	42	12	40	68	0.03	0.08	0.22	100
200	136	101	68	25	77	128	0.14	0.32	0.72	200
300	202	142	90	37	110	182	0.34	0.68	1.70	300
400	262	176	109	48	135	221	0.54	1.12	3.20	400
500	312	206	127	58	158	256	0.80	1.65	4.95	500
600	358	234	143	68	180	291	1.11	2.25	7.30	600
700	401	260	160	77	201	325	1.46	2.92	10.0	700
800	443	284	175	86	223	360	1.84	3.65	13.4	800
900	484	307	190	95	245	394	2.25	4.45	17.1	900
1000	525	329	205	105	267	428	2.70	5.31	21	1000
1100	560	350	219	114	287	460	3.17	6.23	26	1100
1200	594	371	232	122	308	493	3.68	7.26	32	1200
1300	627	391	246	130	328	526	4.21	8.22	37	1300
1400	659	416	259	138	349	559	4.77	9.30	44	1400
1500	689	429	272	146	369	592	5.35	10.4	50	1500
1600	720	447	284	154	389	624	5.96	11.6	58	1600
1700	749	466	296	161	409	657	6.60	12.8	66	1700
1800	778	483	308	168	429	689	7.26	14.1	75	1800
1900	806	500	319	175	448	720	7.95	15.5	85	1900
2000	834	517	331	182	467	752	8.67	16.8	95	2000
2100	860	523	341	189	486	783	9.41	18.3	105	2100
2200	887	549	351	196	505	813	10.2	19.7	115	2200
2300	913	565	361	203	523	843	10.9	21.2	126	2300
2400	939	581	371	209	541	873	11.7	22.7	138	2400
2500	964	596	380	216	560	903	12.6	24.3	151	2500
2600	989	612	396	222	577	932	13.4	26.0	165	2600
2700	1013	627	400	229	595	960	14.3	27.6	179	2700
2800	1038	642	409	235	611	987	15.2	29.3	195	2800
2900	1062	657	418	241	636	1014	16.1	31.0	212	2900
3000	1085	671	427	247	645	1042	17.0	32.8	227	3000

TABLE 96. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DF-DF	DF-H	DF-DF	DF-H	DF-DF	DF-H	
100	67	45	12	59	0.03	0.14	100
200	136	85	25	101	0.14	0.50	200
300	202	116	37	135	0.34	1.02	300
400	262	142	48	164	0.54	1.67	400
500	312	166	58	190	0.80	2.45	500
600	358	187	68	216	1.11	3.33	600
700	401	208	77	240	1.46	4.31	700
800	443	227	86	262	1.84	5.39	800
900	484	245	95	284	2.25	6.57	900
1000	525	263	105	306	2.70	7.82	1000
1100	560	279	114	327	3.17	9.17	1100
1200	594	295	122	346	3.68	10.6	1200
1300	627	312	130	365	4.21	12.1	1300
1400	659	327	138	384	4.77	13.7	1400
1500	689	342	146	402	5.35	15.3	1500
1600	720	356	154	420	5.96	17.0	1600
1700	749	371	161	438	6.60	18.9	1700
1800	778	384	168	454	7.26	20.7	1800
1900	806	398	175	471	7.95	22.7	1900
2000	834	411	182	487	8.67	24.7	2000
2100	860	424	189	504	9.41	26.8	2100
2200	887	438	196	520	10.2	29.0	2200
2300	913	451	203	535	10.9	31.2	2300
2400	939	463	209	550	11.7	33.4	2400
2500	964	475	216	566	12.6	35.7	2500
2600	989	487	222	580	13.4	38.1	2600
2700	1013	499	229	596	14.3	40.7	2700
2800	1032	511	235	610	15.2	43.1	2800
2900	1062	523	241	624	16.1	48.1	2900
3000	1085	535	247	638	17.0	53.1	3000

TABLE 97. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^7$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficients ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	DF-DF	DF-D ₂	D ₂ -D ₂	DF-DF	DF-D ₂	D ₂ -D ₂	DF-DF	DF-D ₂	D ₂ -D ₂	
100	67	57	58	12	35	58	0.03	0.09	0.16	100
200	136	108	95	25	63	101	0.14	0.34	0.52	200
300	202	144	126	57	89	141	0.34	0.70	1.05	300
400	262	177	153	48	112	176	0.54	1.14	1.66	400
500	312	206	175	58	134	210	0.80	1.67	2.11	500
600	358	233	197	68	156	243	1.11	2.27	3.26	600
700	401	258	218	77	176	274	1.46	2.94	4.25	700
800	443	282	237	86	196	305	1.84	3.68	5.26	800
900	484	305	256	95	216	336	2.25	4.47	6.37	900
1000	525	326	273	105	235	365	2.70	5.33	7.59	1000
1100	560	347	291	114	254	393	3.17	6.24	8.88	1100
1200	594	367	308	122	272	421	3.68	7.21	10.3	1200
1300	627	386	324	130	290	449	4.21	8.25	11.7	1300
1400	659	406	340	138	307	476	4.77	9.34	13.2	1400
1500	689	424	355	146	324	502	5.35	10.6	14.8	1500
1600	720	442	370	154	341	528	5.96	11.6	16.5	1600
1700	749	459	385	161	358	554	6.60	12.8	18.3	1700
1800	778	476	400	168	374	579	7.26	14.1	20.1	1800
1900	806	493	414	175	390	605	7.95	15.4	21.9	1900
2000	834	510	428	182	406	630	8.67	16.8	23.9	2000
2100	860	527	442	189	422	654	9.41	18.3	25.9	2100
2200	887	543	456	196	437	678	10.2	19.7	28.0	2200
2300	913	559	469	203	453	702	10.9	21.2	30.1	2300
2400	939	575	482	209	468	726	11.7	22.7	32.3	2400
2500	964	590	495	216	483	750	12.6	24.3	34.6	2500
2600	989	605	508	222	498	774	13.4	26.0	36.8	2600
2700	1013	620	521	229	513	797	14.3	27.7	39.2	2700
2800	1038	635	533	235	528	821	15.2	29.4	41.8	2800
2900	1062	650	546	241	543	844	16.1	31.2	44.2	2900
3000	1085	664	558	247	558	868	17.0	33.0	47.0	3000

TABLE 98. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - ATOMIC DEUTERIUM

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)		Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DF-DF	DF-D	DF-DF	DF-D	DF-DF	DF-D	
100	67	46	12	45	0.03	0.14	100
200	136	88	25	78	0.14	0.51	200
300	202	118	37	104	0.34	1.04	300
400	262	145	48	126	0.54	1.72	400
500	312	169	58	148	0.80	2.51	500
600	358	191	68	170	1.11	3.36	600
700	401	211	77	187	1.46	4.42	700
800	443	231	86	204	1.84	5.52	800
900	484	249	95	221	2.25	6.73	900
1000	525	267	105	238	2.70	8.00	1000
1100	560	284	114	255	3.17	9.39	1100
1200	594	301	122	276	3.68	10.8	1200
1300	627	316	130	285	4.21	12.4	1300
1400	659	332	138	300	4.77	14.0	1400
1500	689	347	146	314	5.35	15.7	1500
1600	720	362	154	329	5.96	17.5	1600
1700	749	376	161	342	6.60	19.4	1700
1800	778	390	168	356	7.26	21.3	1800
1900	806	404	175	369	7.95	23.3	1900
2000	834	418	182	382	8.67	25.3	2000
2100	860	432	189	395	9.41	27.4	2100
2200	887	445	196	408	10.2	29.6	2200
2300	913	458	203	420	10.9	31.8	2300
2400	939	470	209	432	11.7	34.2	2400
2500	964	483	216	445	12.6	36.7	2500
2600	989	496	222	456	13.4	39.0	2600
2700	1013	508	229	468	14.3	41.5	2700
2800	1038	519	235	480	15.2	44.1	2800
2900	1062	532	241	491	16.1	46.8	2900
3000	1085	543	247	502	17.0	49.5	3000

TABLE 99. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W}\cdot\text{m}^{-1} \cdot \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \cdot \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	DF-DF	DF-F ₂	F ₂ -F ₂	DF-DF	DF-F ₂	F ₂ -F ₂	DF-DF	DF-F ₂	F ₂ -F ₂	
100	67	74	87	12	11	10	0.03	0.03	0.02	100
200	136	148	169	25	22	19	0.14	0.12	0.10	200
300	202	214	236	37	33	28	0.34	0.26	0.20	300
400	262	271	294	49	43	37	0.54	0.46	0.33	400
500	312	321	346	58	52	45	0.80	0.66	0.49	500
600	358	367	393	68	60	52	1.11	0.88	0.67	600
700	401	409	437	77	68	59	1.46	1.15	0.87	700
800	443	449	478	86	76	65	1.84	1.44	1.09	800
900	484	484	517	95	83	71	2.25	1.76	1.32	900
1000	525	521	554	105	91	77	2.70	2.10	1.58	1000
1100	560	556	590	114	98	82	3.17	2.46	1.85	1100
1200	594	589	624	122	105	88	3.68	2.86	2.14	1200
1300	627	622	657	130	112	93	4.21	3.26	2.45	1300
1400	659	652	688	138	118	97	4.77	3.69	2.78	1400
1500	689	682	720	146	124	102	5.35	4.15	3.11	1500
1600	720	712	750	154	131	107	5.96	4.53	3.46	1600
1700	749	740	781	161	137	112	6.60	4.99	3.82	1700
1800	778	769	811	168	142	116	7.26	5.52	4.20	1800
1900	806	796	840	175	148	121	7.95	6.06	4.58	1900
2000	834	822	869	182	154	125	8.67	6.69	4.99	2000
2100	860	849	897	189	160	130	9.41	7.26	5.41	2100
2200	887	875	925	196	165	134	10.2	7.83	5.83	2200
2300	913	901	952	203	171	138	10.9	8.39	6.26	2300
2400	939	927	979	209	176	143	11.7	9.05	6.70	2400
2500	964	952	1005	216	182	147	12.6	9.80	7.20	2500
2600	989	977	1031	222	187	151	13.4	10.3	7.71	2600
2700	1013	1001	1056	229	192	155	14.3	11.0	8.23	2700
2800	1038	1024	1082	235	197	159	15.2	11.7	8.76	2800
2900	1062	1047	1106	241	202	163	16.1	12.5	9.30	2900
3000	1085	1070	1131	247	207	167	17.0	13.3	9.85	3000

TABLE 100. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - ATOMIC FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{Wm}^{-1}\text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2\text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	DF-DF	DF-F	F-F	DF-DF	DF-F	F-F	DF-DF	DF-F	F-F	
100	67	71	78	12	13	13	0.03	0.04	0.05	100
200	136	144	152	25	26	27	0.14	0.16	0.17	200
300	202	207	214	37	38	38	0.34	0.34	0.36	300
400	262	262	266	48	48	47	0.54	0.58	0.60	400
500	312	311	313	58	56	54	0.80	0.86	0.88	500
600	358	355	355	68	64	61	1.11	1.18	1.21	600
700	401	396	395	77	72	67	1.46	1.54	1.57	700
800	443	434	432	86	79	73	1.84	1.93	1.96	800
900	484	470	468	95	87	79	2.25	2.36	2.39	900
1000	525	505	501	105	94	84	2.70	2.81	2.85	1000
1100	560	538	533	114	102	89	3.17	3.30	3.35	1100
1200	594	570	564	122	108	94	3.68	3.82	3.88	1200
1300	627	601	594	130	115	99	4.21	4.37	4.43	1300
1400	659	631	623	138	121	103	4.77	4.95	5.03	1400
1500	689	660	651	146	127	108	5.35	5.55	5.63	1500
1600	720	690	679	154	133	112	5.96	6.20	6.25	1600
1700	749	717	706	161	139	117	6.60	6.85	6.91	1700
1800	778	743	734	168	145	121	7.26	7.52	7.59	1800
1900	806	768	760	175	151	126	7.95	8.21	8.29	1900
2000	834	795	786	182	156	130	8.67	8.91	9.02	2000
2100	860	820	812	189	162	134	9.41	9.70	9.78	2100
2200	887	847	837	196	167	138	10.2	10.5	10.6	2200
2300	913	872	861	203	173	142	10.9	11.3	11.4	2300
2400	939	896	885	209	178	146	11.7	12.1	12.2	2400
2500	964	920	909	216	183	150	12.6	13.0	13.1	2500
2600	989	943	933	222	188	153	13.4	13.9	14.0	2600
2700	1013	966	956	229	193	157	14.3	14.8	14.9	2700
2800	1038	989	978	235	198	161	15.2	15.7	15.8	2800
2900	1062	1012	1001	241	203	165	16.1	16.8	16.9	2900
3000	1085	1035	1023	247	208	168	17.0	17.9	18.0	3000

TABLE 101. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE - HYDROGEN FLUORIDE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)			Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	DF-DF	DF-HF	HF-HF	DF-DF	DF-HF	HF-HF	DF-DF	DF-HF	HF-HF	
100	67	53	44	12	11	9	0.03	0.03	0.02	100
200	136	106	83	25	21	17	0.14	0.11	0.09	200
300	202	159	125	37	31	26	0.34	0.26	0.21	300
400	262	209	167	48	42	35	0.54	0.44	0.36	400
500	312	255	206	58	51	44	0.80	0.67	0.55	500
600	358	297	243	68	59	51	1.11	0.94	0.78	600
700	401	336	277	77	68	59	1.46	1.24	1.04	700
800	443	373	310	86	76	66	1.84	1.57	1.32	800
900	484	407	340	95	84	73	2.25	1.93	1.64	900
1000	525	439	369	105	93	80	2.70	2.31	1.97	1000
1100	560	470	397	114	101	87	3.17	2.73	2.35	1100
1200	594	500	423	122	108	94	3.68	3.17	2.73	1200
1300	627	528	449	130	116	101	4.21	3.63	3.12	1300
1400	659	556	473	138	123	108	4.77	4.15	3.52	1400
1500	689	583	496	146	131	115	5.35	4.63	3.96	1500
1600	720	609	520	154	138	122	5.96	5.16	4.44	1600
1700	749	638	542	161	145	129	5.60	5.72	4.94	1700
1800	778	662	564	168	152	135	7.26	7.29	5.47	1800
1900	806	689	585	175	158	141	7.95	6.89	5.90	1900
2000	834	717	606	182	165	147	8.67	7.52	6.45	2000
2100	860	744	627	189	172	154	9.41	8.16	7.00	2100
2200	887	771	647	196	178	160	10.2	8.81	7.60	2200
2300	913	798	666	203	185	166	10.9	9.43	8.25	2300
2400	939	819	686	209	191	172	11.7	10.0	8.90	2400
2500	964	838	705	216	197	177	12.6	10.8	9.60	2500
2600	989	859	723	222	203	183	13.4	11.6	10.3	2600
2700	1013	880	741	229	209	189	14.3	12.4	11.0	2700
2800	1038	903	760	235	215	194	15.2	13.2	11.7	2800
2900	1062	924	777	241	222	200	16.1	14.0	12.5	2900
3000	1085	945	795	247	226	205	17.0	14.9	13.2	3000

TABLE 102. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)	Thermal Conductivity ($\text{Wm}^{-1} \text{K}^{-1} \cdot 10^{-3}$)	Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)	Temp. (K)
	DF	DF	DF	
100	67	12	0.03	100
200	136	25	0.14	200
300	202	37	0.34	300
400	262	48	0.54	400
500	312	58	0.80	500
600	358	68	1.11	600
700	401	77	1.46	700
800	443	86	1.84	800
900	484	95	2.25	900
1000	525	105	2.70	1000
1100	560	114	3.17	1100
1200	594	122	3.68	1200
1300	627	130	4.21	1300
1400	659	138	4.77	1400
1500	689	146	5.35	1500
1600	720	154	5.96	1600
1700	749	161	6.60	1700
1800	773	168	7.26	1800
1900	806	175	7.95	1900
2000	834	182	8.67	2000
2100	860	189	9.41	2100
2200	887	196	10.2	2200
2300	913	203	10.9	2300
2400	939	209	11.7	2400
2500	964	216	12.6	2500
2600	989	222	13.4	2600
2700	1013	229	14.3	2700
2800	1038	235	15.2	2800
2900	1062	241	16.1	2900
3000	1095	247	17.0	3000

TABLE 103. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HCL-HCL	HCL-HE	HE-HE	HCL-HCL	HCL-HE	HE-HE	HCL-HCL	HCL-HE	HE-HE	
100	-	-	99	-	-	73	-	-	0.29	100
200	96	116	156	9	62	115	0.06	0.35	0.92	200
300	146	155	202	14	83	152	0.13	0.70	1.84	300
400	196	188	244	19	103	187	0.23	1.14	3.01	400
500	243	218	282	24	122	220	0.36	1.65	4.41	500
600	286	246	317	28	140	252	0.51	2.24	6.04	600
700	327	272	350	32	156	281	0.68	2.89	7.88	700
800	365	297	382	36	172	308	0.86	3.61	9.92	800
900	402	320	412	40	186	332	1.07	4.39	12.20	900
1000	436	343	441	44	200	357	1.29	5.23	14.60	1000
1100	469	365	470	47	213	380	1.52	6.12	17.20	1100
1200	500	386	497	51	227	403	1.77	7.07	20.10	1200
1300	531	407	523	54	239	425	2.04	8.07	23.00	1300
1400	560	426	549	58	252	447	2.32	9.13	26.30	1400
1500	588	446	574	61	264	468	2.61	10.23	29.60	1500
1600	615	465	598	65	276	488	2.92	11.39	33.20	1600
1700	642	484	622	68	288	508	3.24	12.59	36.90	1700
1800	668	502	646	72	300	528	3.57	13.84	40.80	1800
1900	693	520	669	75	311	547	3.91	15.14	44.90	1900
2000	718	537	692	79	332	566	4.27	16.48	49.10	2000
2100	742	555	714	82	333	585	4.63	17.86	53.50	2100
2200	766	571	736	85	344	603	5.01	19.30	58.10	2200
2300	789	588	757	89	355	622	5.41	20.77	62.80	2300
2400	812	605	778	92	366	640	5.81	22.29	67.70	2400
2500	834	621	799	95	376	657	6.22	23.84	72.80	2500
2600	856	637	820	98	386	674	6.64	25.44	78.00	2600
2700	878	653	840	102	396	691	7.08	27.09	83.40	2700
2800	899	668	860	105	406	708	7.52	28.77	88.90	2800
2900	920	683	880	109	416	724	7.98	30.49	94.60	2900
3000	941	699	899	112	426	740	8.44	32.25	101.00	3000

TABLE 104. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)			Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HCL}$	HCL-HCL	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HCL}$	HCL-HCL	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HCL}$	HCL-HCL	
100	65	-	-	9	-	-	0.03	-	-	100
200	128	113	96	18	13	9	0.10	0.08	0.06	200
300	179	167	146	26	20	14	0.21	0.17	0.13	300
400	223	215	196	33	26	19	0.34	0.29	0.23	400
500	262	259	243	39	31	24	0.50	0.44	0.36	500
600	297	298	286	44	36	28	0.69	0.61	0.51	600
700	330	334	327	49	40	32	0.89	0.80	0.68	700
800	361	369	365	54	45	36	1.12	1.00	0.86	800
900	390	401	402	59	49	40	1.37	1.23	1.07	900
1000	418	431	436	63	53	44	1.63	1.47	1.29	1000
1100	445	461	469	67	57	47	1.91	1.73	1.52	1100
1200	471	489	500	71	61	51	2.21	2.01	1.77	1200
1300	496	516	531	75	64	54	2.52	2.30	2.04	1300
1400	521	542	560	80	69	58	2.85	2.60	2.32	1400
1500	544	567	588	84	72	61	3.20	2.92	2.61	1500
1600	568	592	615	89	76	65	3.56	3.26	2.92	1600
1700	591	616	642	95	81	68	3.94	3.61	3.24	1700
1800	613	640	668	101	86	72	4.33	3.97	3.57	1800
1900	635	663	693	108	91	75	4.73	4.34	3.91	1900
2000	656	685	718	115	97	79	5.15	4.73	4.27	2000
2100	677	707	742	121	101	82	5.59	5.13	4.63	2100
2200	698	729	766	126	105	85	6.03	5.54	5.01	2200
2300	718	750	789	131	110	89	6.50	5.97	5.41	2300
2400	738	772	812	136	114	92	6.97	6.41	5.81	2400
2500	758	792	834	141	118	95	7.46	6.86	6.22	2500
2600	778	813	856	146	122	98	7.96	7.32	6.64	2600
2700	797	833	878	151	126	102	8.47	7.79	7.08	2700
2800	816	853	899	155	130	105	9.00	8.27	7.52	2800
2900	835	872	920	160	134	109	9.54	8.77	7.98	2900
3000	853	892	941	165	138	112	10.09	9.28	8.44	3000

TABLE 105. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Ncm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	HCL-HCL	HCL-A	HCL-HCL	HCL-A	HCL-HCL	HCL-A	
100	-	-	-	7	-	0.02	100
200	96	127	9	11	0.06	0.07	200
300	146	191	14	16	0.13	0.16	300
400	196	247	19	22	0.23	0.28	400
500	243	299	24	29	0.36	0.42	500
600	286	346	28	33	0.51	0.52	600
700	327	389	32	38	0.68	0.77	700
800	365	429	36	43	0.86	0.97	800
900	402	468	40	48	1.07	1.19	900
1000	436	504	44	53	1.29	1.43	1000
1100	469	539	47	57	1.52	1.68	1100
1200	500	572	51	62	1.77	1.95	1200
1300	531	604	54	66	2.04	2.23	1300
1400	560	635	58	71	2.32	2.53	1400
1500	588	665	61	75	2.61	2.84	1500
1600	615	694	65	80	2.92	3.17	1600
1700	642	723	68	84	3.24	3.51	1700
1800	668	750	72	88	3.57	3.86	1800
1900	693	778	75	92	3.91	4.23	1900
2000	718	804	79	95	4.27	4.61	2000
2100	742	830	82	98	4.63	5.00	2100
2200	766	856	85	101	5.01	5.40	2200
2300	789	881	89	105	5.41	5.82	2300
2400	812	906	92	107	5.81	6.24	2400
2500	834	930	95	110	6.22	6.68	2500
2600	856	954	98	112	6.64	7.13	2600
2700	878	978	102	115	7.08	7.59	2700
2800	899	1001	105	118	7.52	8.06	2800
2900	920	1024	109	121	7.98	8.55	2900
3000	941	1047	112	123	8.44	9.04	3000

TABLE 106. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	HCL-HCL	HCL-H ₂	HCL-HCL	HCL-H ₂	HCL-HCL	HCL-H ₂	
100	-	-	-	68	-	0.20	100
200	96	57	9	68	0.06	0.32	200
300	146	82	14	98	0.13	0.69	300
400	196	104	19	120	0.23	1.17	400
500	243	123	24	140	0.36	1.73	500
600	286	140	28	159	0.51	2.37	600
700	327	156	32	178	0.68	3.09	700
800	365	171	36	198	0.86	3.88	800
900	402	185	40	217	1.07	4.74	900
1000	436	199	44	236	1.29	5.66	1000
1100	469	212	47	253	1.52	6.65	1100
1200	500	224	51	272	1.77	7.69	1200
1300	531	237	54	290	2.04	8.79	1300
1400	560	248	58	308	2.32	9.95	1400
1500	588	260	61	326	2.61	11.16	1500
1600	615	271	65	344	2.92	12.42	1600
1700	642	282	68	362	3.24	13.74	1700
1800	668	292	72	380	3.57	15.11	1800
1900	693	303	75	397	3.91	16.53	1900
2000	718	313	79	415	4.27	18.00	2000
2100	742	323	82	432	4.63	19.51	2100
2200	766	333	85	449	5.01	21.08	2200
2300	789	343	89	466	5.41	22.69	2300
2400	812	352	92	482	5.81	24.35	2400
2500	834	362	95	499	6.22	26.05	2500
2600	856	371	98	515	6.64	27.80	2600
2700	878	380	102	531	7.08	29.59	2700
2800	899	389	105	546	7.52	31.43	2800
2900	920	398	109	561	7.98	33.31	2900
3000	941	407	112	577	8.44	35.23	3000

TABLE 107. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-ATOMIC HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	HCL-HCL	HCL-H	HCL-HCL	HCL-H	HCL-HCL	HCL-H	
100	-	34	-	106	-	0.37	100
200	96	47	9	92	0.06	0.52	200
300	146	66	14	123	0.13	1.08	300
400	196	83	19	149	0.23	1.80	400
500	243	97	24	173	0.36	2.65	500
600	286	110	28	195	0.51	3.62	600
700	327	122	32	217	0.68	4.70	700
800	365	134	36	237	0.86	5.89	800
900	402	145	40	256	1.07	7.17	900
1000	436	155	44	275	1.29	8.56	1000
1100	469	165	47	293	1.52	10.03	1100
1200	500	175	51	310	1.77	11.60	1200
1300	531	184	54	327	2.04	13.25	1300
1400	560	193	58	344	2.32	14.99	1400
1500	588	202	61	359	2.61	16.80	1500
1600	615	210	65	375	2.92	18.70	1600
1700	642	219	68	391	3.24	20.68	1700
1800	668	227	72	406	3.57	22.74	1800
1900	693	235	75	420	3.91	24.87	1900
2000	718	243	79	435	4.27	27.07	2000
2100	742	251	82	450	4.63	29.35	2100
2200	766	259	85	464	5.01	31.70	2200
2300	789	266	89	478	5.41	34.12	2300
2400	812	274	92	492	5.81	36.62	2400
2500	834	281	95	505	6.22	39.18	2500
2600	856	288	98	518	6.64	41.81	2600
2700	878	295	102	532	7.08	44.50	2700
2800	899	302	105	544	7.52	47.27	2800
2900	920	309	109	558	7.98	50.10	2900
3000	941	316	112	571	8.44	52.99	3000

TABLE 108. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)			Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)			Temp. (K)
	HCL-HCL	HCL-F ₂	F ₂ -F ₂	HCL-HCL	HCL-F ₂	HCL-HCL	HCL-F ₂	F ₂ -F ₂	
100	-	-	86	-	10	-	-	0.02	100
200	96	130	168	9	14	0.06	0.08	0.10	200
300	146	193	236	14	21	0.13	0.17	0.20	300
400	196	248	293	19	28	0.23	0.29	0.33	400
500	243	298	344	24	34	0.36	0.43	0.49	500
600	286	344	391	28	40	0.51	0.60	0.67	600
700	327	386	434	32	45	0.68	0.78	0.87	700
800	365	425	475	36	50	0.86	0.99	1.09	800
900	402	462	513	40	55	1.07	1.21	1.33	900
1000	436	498	550	44	60	1.29	1.45	1.58	1000
1100	469	531	586	47	64	1.52	1.70	1.85	1100
1200	500	564	620	51	69	1.77	1.97	2.14	1200
1300	531	595	653	54	73	2.04	2.26	2.45	1300
1400	560	625	685	58	77	2.32	2.56	2.77	1400
1500	588	654	716	61	81	2.61	2.87	3.10	1500
1600	615	683	747	65	86	2.92	3.20	3.45	1600
1700	642	711	777	68	90	3.24	3.54	3.82	1700
1800	668	738	806	72	94	3.57	3.90	4.20	1800
1900	693	764	835	75	98	3.91	4.26	4.59	1900
2000	718	790	863	79	102	4.27	4.65	5.00	2000
2100	742	816	891	82	106	4.63	5.04	5.42	2100
2200	766	841	918	85	109	5.01	5.44	5.86	2200
2300	789	865	945	89	113	5.41	5.86	6.30	2300
2400	812	890	972	92	117	5.81	6.29	6.76	2400
2500	834	914	998	95	121	6.22	6.73	7.24	2500
2600	856	937	1023	98	124	6.64	7.18	7.72	2600
2700	878	960	1049	102	128	7.08	7.65	8.22	2700
2800	899	983	1074	105	132	7.52	8.12	8.73	2800
2900	920	1006	1098	109	136	7.98	8.61	9.25	2900
3000	941	1028	1123	112	139	8.44	9.11	9.79	3000

TABLE 109. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-ATOMIC FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	HCL-HCL	HCL-F	HCL-HCL	HCL-F	HCL-HCL	HCL-F	
100	-	-	-	78	-	0.04	100
200	96	120	9	152	0.06	0.10	200
300	146	178	14	213	0.13	0.23	300
400	196	229	19	265	0.23	0.40	400
500	243	276	24	311	0.36	0.59	500
600	286	318	28	354	0.51	0.82	600
700	327	356	32	393	0.68	1.08	700
800	365	393	36	430	0.86	1.36	800
900	402	427	40	464	1.07	1.66	900
1000	436	460	44	498	1.29	1.99	1000
1100	469	491	47	530	1.52	2.34	1100
1200	500	521	51	561	1.77	2.71	1200
1300	531	549	54	591	2.04	3.10	1300
1400	560	577	58	620	2.32	3.52	1400
1500	588	604	61	648	2.61	3.95	1500
1600	615	631	65	676	2.92	4.40	1600
1700	642	656	68	703	3.24	4.87	1700
1800	668	681	72	729	3.57	5.36	1800
1900	693	706	75	756	3.91	5.87	1900
2000	718	730	79	781	4.27	6.39	2000
2100	742	753	82	806	4.63	6.93	2100
2200	766	777	85	831	5.01	7.49	2200
2300	789	799	89	855	5.41	8.06	2300
2400	812	822	92	879	5.81	8.65	2400
2500	834	844	95	903	6.22	9.26	2500
2600	856	866	98	926	6.64	9.88	2600
2700	878	887	102	949	7.08	10.52	2700
2800	899	908	105	971	7.52	11.18	2800
2900	920	929	109	994	7.98	11.85	2900
3000	941	950	112	1016	8.44	12.53	3000

TABLE 110. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DCL-DCL	DCL-HE	DCL-DCL	DCL-HE	DCL-DCL	DCL-HE	
100	79	82	-	-	0.02	0.12	100
200	160	139	19	67	0.09	0.42	200
300	238	184	24	88	0.21	0.83	300
400	308	223	28	107	0.35	1.35	400
500	372	258	32	126	0.53	1.95	500
600	429	290	37	144	0.74	2.64	600
700	482	321	41	161	0.97	3.41	700
800	532	350	45	176	1.23	4.26	800
900	579	378	50	191	1.50	5.17	900
1000	623	404	54	205	1.80	6.16	1000
1100	666	430	58	219	2.12	7.21	1100
1200	707	455	63	233	2.45	8.33	1200
1300	746	479	67	246	2.81	9.51	1300
1400	784	503	71	259	3.19	10.75	1400
1500	821	526	75	271	3.58	12.06	1500
1600	857	548	79	283	3.99	13.41	1600
1700	892	570	83	295	4.41	14.83	1700
1800	926	591	87	307	4.86	16.30	1800
1900	960	613	91	319	5.32	17.83	1900
2000	992	632	95	330	5.79	19.41	2000
2100	1024	654	99	342	6.28	21.05	2100
2200	1056	674	102	352	6.79	22.73	2200
2300	1087	693	106	364	7.31	24.47	2300
2400	1118	713	109	374	7.85	26.26	2400
2500	1148	732	112	384	8.40	28.09	2500
2600	1177	750	115	394	8.96	29.98	2600
2700	1206	769	119	405	9.54	31.91	2700
2800	1235	787	121	414	10.13	33.89	2800
2900	1264	805	124	424	10.74	35.92	2900
3000	1292	823	126	433	11.36	37.99	3000

TABLE 111. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)				Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)				Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)				Temp. (K)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DCL}$	DCL-DCL		$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DCL}$	DCL-DCL		$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DCL}$	DCL-DCL		
150	65	71	79	-	9	-	-	-	0.03	0.02	0.02	0.02	100
200	128	143	160	18	18	18	19	19	0.10	0.10	0.10	0.09	200
300	179	206	238	26	26	25	24	24	0.21	0.21	0.21	0.21	300
400	223	261	308	33	33	31	28	28	0.34	0.35	0.35	0.35	400
500	262	310	372	39	39	35	32	32	0.50	0.52	0.52	0.53	500
600	297	354	429	44	44	40	37	37	0.69	0.72	0.72	0.74	600
700	330	396	482	49	49	45	41	41	0.89	0.93	0.93	0.97	700
800	361	434	532	54	54	49	45	45	1.12	1.17	1.17	1.23	800
900	390	471	579	59	59	54	50	50	1.37	1.43	1.43	1.50	900
1000	418	505	623	63	63	58	54	54	1.63	1.71	1.71	1.80	1000
1100	445	539	666	67	67	62	58	58	1.91	2.01	2.01	2.12	1100
1200	471	571	707	71	71	67	63	63	2.21	2.33	2.33	2.45	1200
1300	496	601	746	75	75	71	67	67	2.52	2.66	2.66	2.81	1300
1400	521	631	784	80	80	75	71	71	2.85	3.01	3.01	3.19	1400
1500	544	661	821	84	84	79	75	75	3.20	3.38	3.38	3.58	1500
1600	568	689	857	89	89	84	79	79	3.56	3.76	3.76	3.99	1600
1700	591	717	892	95	95	89	83	83	3.94	4.16	4.16	4.41	1700
1800	613	744	926	101	101	94	87	87	4.33	4.58	4.58	4.86	1800
1900	635	770	960	108	108	99	91	91	4.73	5.01	5.01	5.32	1900
2000	656	797	992	115	115	105	95	95	5.15	5.45	5.45	5.79	2000
2100	677	822	1024	121	121	110	99	99	5.59	5.91	5.91	6.28	2100
2200	698	847	1056	126	126	114	102	102	6.03	6.39	6.39	6.79	2200
2300	718	872	1087	131	131	118	106	106	6.50	6.87	6.87	7.31	2300
2400	738	897	1118	136	136	122	109	109	6.97	7.38	7.38	7.85	2400
2500	758	921	1148	141	141	126	112	112	7.46	7.89	7.89	8.40	2500
2600	778	944	1177	146	146	130	115	115	7.96	8.42	8.42	8.96	2600
2700	797	968	1206	151	151	135	119	119	8.47	8.97	8.97	9.54	2700
2800	816	991	1235	155	155	138	121	121	9.00	9.52	9.52	10.13	2800
2900	835	1014	1264	160	160	142	124	124	9.54	10.09	10.09	10.74	2900
3000	853	1036	1292	165	165	146	126	126	10.09	10.68	10.68	11.36	3000

TABLE 112. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DCL-DCL	DCL-A	DCL-DCL	DCL-A	DCL-DCL	DCL-A	
100	79	80	-	-	0.02	0.02	100
200	160	163	19	15	0.09	0.09	200
300	238	238	24	21	0.21	0.20	300
400	308	304	28	25	0.35	0.34	400
500	372	362	32	29	0.53	0.50	500
600	429	415	37	33	0.74	0.69	600
700	492	464	41	37	0.97	0.91	700
800	532	510	45	41	1.23	1.14	800
900	579	554	50	45	1.50	1.40	900
1000	623	595	54	48	1.80	1.67	1000
1100	666	635	58	51	2.12	1.96	1100
1200	707	673	63	55	2.45	2.27	1200
1300	746	710	67	59	2.81	2.60	1300
1400	784	745	71	62	3.19	2.94	1400
1500	821	780	75	65	3.58	3.30	1500
1600	857	813	79	69	3.99	3.68	1600
1700	892	846	83	72	4.41	4.07	1700
1800	926	878	87	75	4.86	4.48	1800
1900	960	910	91	79	5.32	4.90	1900
2000	992	941	95	82	5.79	5.33	2000
2100	1024	971	99	85	6.28	5.78	2100
2200	1056	1001	102	88	6.79	6.25	2200
2300	1087	1030	106	91	7.31	6.72	2300
2400	1118	1059	109	94	7.85	7.22	2400
2500	1148	1087	112	97	8.40	7.72	2500
2600	1177	1115	115	100	8.96	8.24	2600
2700	1206	1143	119	102	9.54	8.77	2700
2800	1235	1170	121	104	10.13	9.32	2800
2900	1264	1197	124	107	10.74	9.87	2900
3000	1292	1224	126	110	11.36	10.45	3000

TABLE 113. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DCL-DCL	DCL-D ₂	DCL-DCL	DCL-D ₂	DCL-DCL	DCL-D ₂	
100	79	55	-	58	0.02	0.08	100
200	160	103	19	60	0.09	0.31	200
300	238	141	24	82	0.21	0.63	300
400	308	174	28	102	0.35	1.04	400
500	372	203	32	121	0.53	1.52	500
600	429	229	37	140	0.74	2.07	600
700	482	254	41	157	0.97	2.68	700
800	532	277	45	175	1.23	3.35	800
900	579	299	50	193	1.50	4.08	900
1000	623	320	54	209	1.80	4.86	1000
1100	666	341	58	225	2.12	5.69	1100
1200	707	361	63	242	2.45	6.58	1200
1300	746	380	67	258	2.81	7.51	1300
1400	784	399	71	273	3.19	8.49	1400
1500	821	417	75	288	3.58	9.52	1500
1600	857	435	79	303	3.99	10.59	1600
1700	892	452	83	318	4.41	11.71	1700
1800	926	469	87	333	4.86	12.87	1800
1900	960	486	91	348	5.32	14.08	1900
2000	992	502	95	362	5.79	15.33	2000
2100	1024	518	99	376	6.28	16.62	2100
2200	1056	534	102	390	6.79	17.95	2200
2300	1087	550	106	404	7.31	19.32	2300
2400	1118	565	109	417	7.85	20.73	2400
2500	1148	580	112	431	8.40	22.18	2500
2600	1177	595	115	444	8.96	23.67	2600
2700	1206	610	119	458	9.54	25.20	2700
2800	1235	625	121	471	10.13	26.76	2800
2900	1264	639	124	484	10.74	28.36	2900
3000	1292	653	126	497	11.36	30.00	3000

TABLE 114. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-ATOMIC DEUTERIUM MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-1}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DCL-DCL	DCL-D	DCL-DCL	DCL-D	DCL-DCL	DCL-D	
100	79	44	-	79	0.02	0.13	100
200	160	83	19	130	0.09	0.47	200
300	238	113	24	170	0.21	0.96	300
400	308	139	28	204	0.35	1.58	400
500	372	162	32	237	0.53	2.32	500
600	429	184	37	267	0.74	3.15	600
700	482	203	41	295	0.97	4.09	700
800	532	222	45	321	1.23	5.11	800
900	579	240	50	347	1.50	6.22	900
1000	623	257	54	371	1.80	7.41	1000
1100	666	273	58	395	2.12	8.68	1100
1200	707	289	63	418	2.45	10.02	1200
1300	746	304	67	440	2.81	11.44	1300
1400	784	319	71	461	3.19	12.94	1400
1500	821	334	75	482	3.58	14.51	1500
1600	857	348	79	503	3.99	16.14	1600
1700	892	362	83	523	4.41	17.85	1700
1800	926	376	87	543	4.86	19.62	1800
1900	960	389	91	563	5.32	21.46	1900
2000	992	402	95	582	5.79	23.36	2000
2100	1024	415	99	601	6.28	25.33	2100
2200	1056	428	102	619	6.79	27.36	2200
2300	1087	440	106	637	7.31	29.45	2300
2400	1118	453	109	655	7.85	31.60	2400
2500	1148	465	112	673	8.40	33.81	2500
2600	1177	477	115	690	8.96	36.08	2600
2700	1206	488	119	707	9.54	38.40	2700
2800	1235	500	121	724	10.13	40.79	2800
2900	1264	512	124	740	10.74	43.23	2900
3000	1292	523	126	757	11.36	45.73	3000

TABLE 115. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-7}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DCL-DCL	DCL-F ₂	DCL-DCL	DCL-F ₂	DCL-DCL	DCL-F ₂	
100	-	86	-	10	-	0.02	100
200	160	165	19	19	0.09	0.09	200
300	238	239	24	26	0.21	0.20	300
400	308	303	28	32	0.35	0.33	400
500	372	359	32	38	0.53	0.51	500
600	429	411	37	44	0.74	0.70	600
700	482	458	41	50	0.97	0.92	700
800	532	503	45	55	1.23	1.15	800
900	579	545	50	60	1.50	1.41	900
1000	623	586	54	65	1.80	1.69	1000
1100	666	624	58	70	2.12	1.98	1100
1200	707	661	63	75	2.45	2.29	1200
1300	746	697	67	80	2.81	2.62	1300
1400	784	731	71	84	3.19	2.96	1400
1500	821	765	75	88	3.58	3.33	1500
1600	857	798	79	93	3.99	3.70	1600
1700	892	830	83	97	4.41	4.10	1700
1800	926	862	87	101	4.86	4.51	1800
1900	960	892	91	106	5.32	4.93	1900
2000	992	923	95	110	5.79	5.37	2000
2100	1024	952	99	114	6.28	5.82	2100
2200	1056	982	102	118	6.79	6.29	2200
2300	1087	1010	106	122	7.31	6.77	2300
2400	1118	1039	109	126	7.85	7.26	2400
2500	1148	1066	112	129	8.40	7.77	2500
2600	1177	1094	115	133	8.96	8.29	2600
2700	1206	1121	119	137	9.54	8.83	2700
2800	1235	1148	121	140	10.13	9.37	2800
2900	1264	1174	124	143	10.74	9.94	2900
3000	1292	1200	126	146	11.36	10.51	3000

TABLE 116. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-ATOMIC FLUORINE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-4}$)		Thermal Conductivity ($\text{W m}^{-1} \text{K}^{-1} \cdot 10^{-3}$)		Diffusion Coefficient ($\text{m}^2 \text{s}^{-1} \cdot 10^{-4}$)		Temp. (K)
	DCL-DCL	DCL-F	DCL-DCL	DCL-F	DCL-DCL	DCL-F	
100	79	76	-	13	0.02	0.03	100
200	160	154	19	27	0.09	0.13	200
300	238	222	24	38	0.21	0.28	300
400	308	281	28	47	0.35	0.48	400
500	372	333	32	54	0.53	0.71	500
600	429	381	37	61	0.74	0.98	600
700	482	425	41	67	0.97	1.28	700
800	532	467	45	73	1.23	1.60	800
900	579	506	50	79	1.50	1.96	900
1000	623	543	54	84	1.80	2.34	1000
1100	666	579	58	89	2.12	2.75	1100
1200	707	613	63	94	2.45	3.18	1200
1300	746	647	67	99	2.81	3.64	1300
1400	784	679	71	103	3.19	4.12	1400
1500	821	710	75	108	3.58	4.62	1500
1600	857	741	79	112	3.99	5.14	1600
1700	892	770	83	117	4.41	5.69	1700
1800	926	800	87	121	4.86	6.26	1800
1900	960	828	91	126	5.32	6.84	1900
2000	992	856	95	130	5.79	7.45	2000
2100	1024	884	99	134	6.28	8.08	2100
2200	1056	911	102	138	6.79	8.73	2200
2300	1087	937	106	142	7.31	9.40	2300
2400	1118	964	109	146	7.85	10.08	2400
2500	1148	989	112	150	8.40	10.79	2500
2600	1177	1015	115	153	8.96	11.51	2600
2700	1206	1040	119	157	9.54	12.25	2700
2800	1235	1065	121	161	10.13	13.02	2800
2900	1264	1089	124	165	10.74	13.79	2900
3000	1292	1114	126	168	11.36	14.59	3000

TABLE 117. COLLISION INTEGRAL AND ANOTHER FUNCTION FOR THE
LENNARD-JONES 6-12 POTENTIAL FUNCTION

T*	Ω_{11}	Ω_{22}	A	T*	Ω_{11}	Ω_{22}	A
10	0.7422	0.8242	1.1105	55	0.5674	0.6405	1.1287
11	0.7306	0.8124	1.1119	56	0.5658	0.6387	1.1288
12	0.7202	0.8017	1.1131	57	0.5642	0.6370	1.1289
13	0.7109	0.7921	1.1142	58	0.5627	0.6353	1.1291
14	0.7025	0.7834	1.1152	59	0.5612	0.6337	1.1292
15	0.6948	0.7754	1.1161	60	0.5598	0.6322	1.1293
16	0.6877	0.7681	1.1169	61	0.5584	0.6306	1.1294
17	0.6811	0.7612	1.1176	62	0.5570	0.6290	1.1295
18	0.6750	0.7549	1.1183	63	0.5556	0.6275	1.1297
19	0.6693	0.7489	1.1190	64	0.5542	0.6260	1.1298
20	0.6640	0.7433	1.1195	65	0.5528	0.6246	1.1299
21	0.6598	0.7383	1.1201	66	0.5514	0.6232	1.1300
22	0.6542	0.7333	1.1206	67	0.5501	0.6218	1.1301
23	0.6496	0.7283	1.1211	68	0.5489	0.6205	1.1301
24	0.6453	0.7237	1.1215	69	0.5477	0.6191	1.1302
25	0.6413	0.7194	1.1219	70	0.5465	0.6177	1.1303
26	0.6374	0.7153	1.1223	71	0.5453	0.6164	1.1304
27	0.6336	0.7113	1.1227	72	0.5441	0.6151	1.1305
28	0.6301	0.7076	1.1231	73	0.5429	0.6139	1.1305
29	0.6267	0.7040	1.1234	74	0.5417	0.6126	1.1306
30	0.6234	0.7005	1.1237	75	0.5406	0.6113	1.1307
31	0.6203	0.6972	1.1240	76	0.5395	0.6101	1.1308
32	0.6172	0.6939	1.1244	77	0.5384	0.6089	1.1309
33	0.6143	0.6908	1.1247	78	0.5373	0.6077	1.1309
34	0.6114	0.6878	1.1249	79	0.5362	0.6065	1.1310
35	0.6086	0.6849	1.1252	80	0.5352	0.6053	1.1311
36	0.6060	0.6820	1.1254	81	0.5341	0.6042	1.1312
37	0.6035	0.6793	1.1257	82	0.5331	0.6031	1.1313
38	0.6010	0.6766	1.1259	83	0.5321	0.6020	1.1313
39	0.5986	0.6741	1.1261	84	0.5311	0.6009	1.1314
40	0.5962	0.6715	1.1263	85	0.5301	0.5998	1.1315
41	0.5940	0.6690	1.1265	86	0.5291	0.5988	1.1316
42	0.5919	0.6665	1.1267	87	0.5282	0.5977	1.1316
43	0.5897	0.6640	1.1268	88	0.5272	0.5961	1.1317
44	0.5876	0.6620	1.1270	89	0.5263	0.5956	1.1317
45	0.5854	0.6599	1.1272	90	0.5254	0.5946	1.1318
46	0.5835	0.6578	1.1274	91	0.5245	0.5936	1.1318
47	0.5816	0.6557	1.1276	92	0.5236	0.5926	1.1318
48	0.5797	0.6537	1.1277	93	0.5227	0.5917	1.1319
49	0.5778	0.6517	1.1279	94	0.5218	0.5907	1.1319
50	0.5759	0.6490	1.1281	95	0.5209	0.5897	1.1320
51	0.5741	0.6477	1.1282	96	0.5200	0.5888	1.1320
52	0.5723	0.6458	1.1283	97	0.5191	0.5879	1.1321
53	0.5706	0.6440	1.1285	98	0.5183	0.5869	1.1321
54	0.5690	0.6422	1.1286	99	0.5175	0.5860	1.1322
				100	0.5167	0.5851	1.1323

TABLE 118. LENNARD-JONES 6-12 PARAMETERS FOR PURE GASES

Gas	$\epsilon/K(^{\circ}K)$	σ (Å)	$1/\sqrt{M}$
He	10.22	2.551	0.49980
N ₂	113.50	3.566	0.18894
A	138.20	3.287	0.15822
H ₂	59.70	2.827	0.70430
D	35.20	2.664	0.70712
NH ₃	558.30	2.900	0.24232
ND ₃	337.00	2.900	0.22357
N ₂ H ₄	700.00	3.180	0.17665
N ₂ D ₄	462.00	3.380	0.16664
F ₂	112.60	3.357	0.16223
F	112.60	2.968	0.22942
NF ₃	175.00	4.154	0.11868
N ₂ F ₄	240.00	3.880	0.09805
ClF ₃	448.30	4.900	0.08770
HF	330.00	3.148	0.22357
DF	199.10	2.826	0.21223
HCl	344.70	3.339	0.10559
DCI	208.00	2.980	0.16340
H	37.00	2.701	0.99210
D ₂	35.21	2.952	0.50000