

AD-A129 060

TRANSPORT PROPERTIES OF SELECTED ELEMENTS AND COMPOUNDS 1/1
IN THE GASEOUS ST..(U) THERMOPHYSICAL AND ELECTRONIC
PROPERTIES INFORMATION ANALYSIS.. P E LILEY DEC 73

UNCLASSIFIED

CINDAS-TPRC-22 AFOSR-TR-74-1165

F/G 5/2

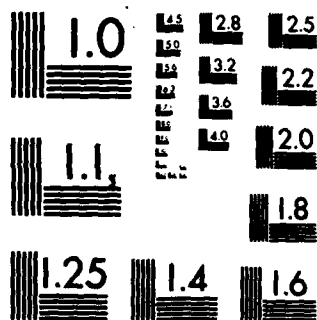
NL

END

DATE

FILED

DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TPRC
74430

THERMOPHYSICAL PROPERTIES RESEARCH CENTER

AFOSR-TR-74-1165

74430

P. E. Liley

TRANSPORT PROPERTIES OF SELECTED ELEMENTS
AND COMPOUNDS IN THE GASEOUS STATE
(Part 2)

By
P. E. Liley

TPRC Report 22

DTIC
ELECTE
JUN 8 1983
S A D

Prepared for
Air Force Office of Scientific Research

THERMOPHYSICAL PROPERTIES RESEARCH CENTER

Purdue University
2595 Yeager Road
West Lafayette, Indiana 47906

This document has been approved
for public release and sale; its
distribution is unlimited.

December 1973

83 06 07 105

AD A129060

DTIC FILE COPY

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. <i>AD-A129060</i>	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) TRANSPORT PROPERTIES OF SELECTED ELEMENTS AND COMPOUNDS IN THE GASEOUS STATE (Part 2)		5. TYPE OF REPORT & PERIOD COVERED State-of-the-Art Report
7. AUTHOR(s) P. E. Liley		6. PERFORMING ORG. REPORT NUMBER TPRC Report 22
9. PERFORMING ORGANIZATION NAME AND ADDRESS Thermophysical and Electronic Properties Information Analysis Center, CINDAS/Purdue Univ. 2595 Yeager Rd., W. Lafayette, IN 47906		8. CONTRACT OR GRANT NUMBER(s) AFOSR-72-2396
11. CONTROLLING OFFICE NAME AND ADDRESS Defense Technical Information Center, Defense Logistics Agency, Attn: DTIC-AI, Cameron Station Alexandria, VA 22314		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 9750-01
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE December 1973
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A
16. DISTRIBUTION STATEMENT (of this Report) Distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES CINDAS/TEPIAC Publication; (DTIC Source Code 413571); Microfiche copies available from DTIC		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) *Viscosity--*Thermal Conductivity--*Diffusion Coefficient--Gases--Liquids--Binary Mixtures-- Thermophysical Properties--Data Values		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Tables of viscosity, thermal conductivity, and diffusion coefficient have been prepared for sixty-nine binary mixtures. The temperature range was from 100 to 3000 K. For the substances comprising the binary mixtures recent recommendations were used, some of these being taken from our earlier report (Part 1). 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. It is concluded that significant discrepancies can still exist between theoretical and experimental quantities.		

DD FORM 1473

1 JAN 73

EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

ABSTRACT

Tables of viscosity, thermal conductivity and diffusion coefficient have been prepared for sixty-nine binary mixtures. The temperature range was from 100 to 3000 K. For the substances comprising the binary mixtures recent recommendations were used, some of these being taken from our earlier report (Part 1). 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. It is concluded that significant discrepancies can still exist between theoretical and experimental quantities.

Available For	
Microfilm	☒
Microfiche	☐
Machine Readable	☐
Distribution	
Availability Codes	
Dist	Avail and/or Special
A	

Dist
Avail and/or
Special

Dist
Avail and/or
Special

TABLE OF CONTENTS

	Page
ABSTRACT	iii
LIST OF TABLES	v
INTRODUCTION	1
THEORETICAL AND EMPIRICAL METHODS	1
SELECTION OF LENNARD-JONES 6-12 PARAMETERS	3
CALCULATION OF TRANSPORT PROPERTIES OF PURE GASES AND OF GAS MIXTURES	4
SUMMARY AND RECOMMENDATIONS	4
REFERENCES	5
TABLES OF RECOMMENDED VALUES	7
APPENDIX	76

LIST OF TABLES

	Page
1. Transport Properties of Hydrogen-Nitrogen Mixtures	7
2. Transport Properties of Hydrogen-Argon Mixtures	8
3. Transport Properties of Atomic Hydrogen-Nitrogen Mixtures	9
4. Transport Properties of Atomic Hydrogen-Argon Mixtures	10
5. Transport Properties of Deuterium-Nitrogen Mixtures	11
6. Transport Properties of Deuterium-Argon Mixtures	12
7. Transport Properties of Atomic Deuterium-Nitrogen Mixtures	13
8. Transport Properties of Atomic Deuterium-Argon Mixtures	14
9. Transport Properties of Ammonia-Nitrogen Mixtures	15
10. Transport Properties of Ammonia-Argon Mixtures	16
11. Transport Properties of Nitrogen Trideuteride-Helium Mixtures	17
12. Transport Properties of Nitrogen Trideuteride-Nitrogen Mixtures	18
13. Transport Properties of Nitrogen Trideuteride-Argon Mixtures	19
14. Transport Properties of Nitrogen Tetrahydride-Helium Mixtures	20
15. Transport Properties of Nitrogen Tetrahydride-Nitrogen Mixtures	21
16. Transport Properties of Nitrogen Tetrahydride-Argon Mixtures	22
17. Transport Properties of Nitrogen Tetradeuteride-Helium Mixtures	23
18. Transport Properties of Nitrogen Tetradeuteride-Nitrogen Mixtures	24
19. Transport Properties of Nitrogen Tetradeuteride-Argon Mixtures	25
20. Transport Properties of Fluorine-Nitrogen Mixtures	26
21. Transport Properties of Fluorine-Argon Mixtures	27
22. Transport Properties of Fluorine-Ammonia Mixtures	28
23. Transport Properties of Fluorine-Nitrogen Trideuteride Mixtures	29
24. Transport Properties of Fluorine-Nitrogen Tetrahydride Mixtures	30
25. Transport Properties of Fluorine-Nitrogen Tetradeuteride Mixtures	31
26. Transport Properties of Atomic Fluorine-Nitrogen Mixtures	32
27. Transport Properties of Atomic Fluorine-Argon Mixtures	33
28. Transport Properties of Atomic Fluorine-Ammonia Mixtures	34
29. Transport Properties of Atomic Fluorine-Nitrogen Trideuteride Mixtures	35
30. Transport Properties of Atomic Fluorine-Nitrogen Tetrahydride Mixtures	36

31. Transport Properties of Atomic Fluorine-Nitrogen Tetradeuteride Mixtures	37
32. Transport Properties of Nitrogen Trifluoride-Nitrogen Mixtures	38
33. Transport Properties of Nitrogen Trifluoride-Argon Mixtures	39
34. Transport Properties of Nitrogen Trifluoride-Hydrogen Mixtures	40
35. Transport Properties of Nitrogen Trifluoride-Atomic Hydrogen Mixtures	41
36. Transport Properties of Nitrogen Trifluoride-Deuterium Mixtures	42
37. Transport Properties of Nitrogen Trifluoride-Atomic Deuterium Mixtures	43
38. Transport Properties of Nitrogen Tetrafluoride-Helium Mixtures	44
39. Transport Properties of Nitrogen Tetrafluoride-Nitrogen Mixtures	45
40. Transport Properties of Nitrogen Tetrafluoride-Argon Mixtures	46
41. Transport Properties of Nitrogen Tetrafluoride-Hydrogen Mixtures	47
42. Transport Properties of Nitrogen Tetrafluoride-Atomic Hydrogen Mixtures	48
43. Transport Properties of Nitrogen Tetrafluoride-Deuterium Mixtures	49
44. Transport Properties of Nitrogen Tetrafluoride-Atomic Deuterium Mixtures	50
45. Transport Properties of Chlorine Pentafluoride-Helium Mixtures	51
46. Transport Properties of Chlorine Pentafluoride-Nitrogen Mixtures	52
47. Transport Properties of Chlorine Pentafluoride-Argon Mixtures	53
48. Transport Properties of Chlorine Pentafluoride-Hydrogen Mixtures	54
49. Transport Properties of Chlorine Pentafluoride-Atomic Hydrogen Mixtures	55
50. Transport Properties of Chlorine Pentafluoride-Deuterium Mixtures	56
51. Transport Properties of Chlorine Pentafluoride-Atomic Deuterium Mixtures	57
52. Transport Properties of Hydrogen Fluoride-Nitrogen Mixtures	58
53. Transport Properties of Hydrogen Fluoride-Argon Mixtures	59
54. Transport Properties of Deuterium Fluoride-Nitrogen Mixtures	60
55. Transport Properties of Deuterium Fluoride-Argon Mixtures	61
56. Transport Properties of Hydrogen Chloride-Helium Mixtures	62
57. Transport Properties of Hydrogen Chloride-Nitrogen Mixtures	63
58. Transport Properties of Hydrogen Chloride-Argon Mixtures	64

59. Transport Properties of Hydrogen Chloride-Hydrogen Mixtures . . .	65
60. Transport Properties of Hydrogen Chloride-Atomic Hydrogen Mixtures	66
61. Transport Properties of Hydrogen Chloride-Fluorine Mixtures . . .	67
62. Transport Properties of Hydrogen Chloride-Atomic Fluorine Mixtures	68
63. Transport Properties of Deuterium Chloride-Helium Mixtures . . .	69
64. Transport Properties of Deuterium Chloride-Nitrogen Mixtures . . .	70
65. Transport Properties of Deuterium Chloride-Argon Mixtures . . .	71
66. Transport Properties of Deuterium Chloride-Deuterium Mixtures . .	72
67. Transport Properties of Deuterium Chloride-Atomic Deuterium Mixtures	73
68. Transport Properties of Deuterium Chloride-Fluorine Mixtures . . .	74
69. Transport Properties of Deuterium Chloride-Atomic Fluorine Mixtures	75

Introduction

Because of continuing current interest, the properties of gases and gas mixtures of interest in chemical laser applications were studied. This final technical report constitutes the *second* in this series and supplements those substances and mixtures reported earlier [1]*. The present report also recommends further work.

Theoretical and Empirical Methods

In the earlier report the approach was taken that the Lennard-Jones 6-12 potential was used to calculate the viscosity and diffusion coefficients. For user convenience a brief summary of that material is reproduced here. For gaseous viscosity the mixture viscosity, μ_M , is given by

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

where

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

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 M_{12} of $2M_1 M_2 / (M_1 + M_2)$, a collision diameter σ_{12} of $(\sigma_1 + \sigma_2) / 2$ and a well depth ϵ_{12}/k of $\sqrt{(\epsilon_1/k)(\epsilon_2/k)}$. A_{12} is a collision integral function, tabulated simply as A in [1]. The μ_{ij} are given by

$$10^7 \mu_{ij} = 266.93 \sqrt{M_{ij} T} \left\{ \sigma^2 \Omega_{22} (kT/\epsilon_{ij}) \right\}, \quad \begin{cases} i = 1, 2 \\ j = 1, 2 \end{cases} \frac{\text{gm}}{\text{cm sec}} \quad (2)$$

where the Ω_{22} is a collision integral, described and also partially tabulated in [1]. The quantities tabulated in our tables are μ_{11} , μ_{12} , and μ_{22} so that equation (1) should then be used to calculate μ_M .

* Numbers in square brackets refer to the reference list.

For diffusion the equation

$$10^5 D_{ij} = \frac{262.8}{P \sigma_{ij}^2} \sqrt{\frac{T^3}{M_{ij}}} \frac{1}{\Omega_{ij} (kT/\epsilon_{ij})} \frac{\text{cm}^2}{\text{sec}} \quad (3)$$

can be used and the quantities tabulated are D_{11} , D_{12} , and D_{21} , for $P = 1$ atm.

For thermal conductivity a more empirical approach was adopted. Values for the pure components were taken from earlier works [2,3] where possible. These values basically are curve-fits for the lower temperatures (i.e., below about 1000 K) faired into power function fits to the data (if any existed) above 1000 K or from a similar analysis of high temperature viscosity data. Values for the mixtures are merely the average (i.e., equimolar) values for the pure components, based on the premise that the thermal conductivity of a mixture is a linear function of its composition.

The summary of theoretical work in our earlier report led to the conclusion 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 the more recent analysis [6,7] 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 behaviour. 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 [6] 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 fundamental viewpoint by the failure of

the potential to correctly model the dispersion coefficients, as was already mentioned in the discussion of equation (4) of our earlier report [1]. An extensive review [8] of some aspects of intermolecular forces does nothing to dispel the conclusion that realistic potentials are not yet available for molecules of complex structure. Hence, in the present work our previous use of the Lennard-Jones 6-12 potential is continued, especially as no extensive investigations of the ability of other potentials to represent the transport properties of gaseous mixtures appear to have been made.

Selection of Lennard-Jones 6-12 Parameters

The parameters for substances which have previously received attention in the literature were taken, where possible, from the tables of Svehla [10] for reasons detailed in our earlier report. Parameters for other substances were estimated using procedures either identical or similar to those of Svehla. The following table reproduces values of parameters for pure component substances not tabulated in our previous report.

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	760.00	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	0.16559
DCl	208.00	2.980	0.16340
H	37.00	2.701	0.99210
D ₂	35.21	2.952	0.50000

No analogous table to that of our previous report for all the gas pairs considered here is given in this report as the tables of the present report were generated from a computer program in which the mixture parameters were internally generated from the pure component values.

Calculation of Transport Properties of Pure Gases and of Gas Mixtures

The computer print-out was, in fact, programmed so that 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 [3], 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. A comment is made on this in the Recommendations section. In our programming we adopted the fittings of Neufeld, Janzen, and Aziz [11] 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

$$\begin{aligned}\Omega_{11} &= 1.10670 (T^*)^{-0.1575} \\ \Omega_{22} &= 0.07183 (T^*)^{-0.1523}\end{aligned}\tag{4}$$

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.

Summary and Recommendations

In the eighteen months duration of this project the first six months saw the preparation of tables of the thermal conductivity, viscosity, and Fickian diffusion coefficient for 38 binary mixtures and 9 pure substances which were distributed through AFOSR [1]. The present report gives tables for an additional 69 binary mixtures. Both sets of tables refer to the dilute gas state and present tables at 100 K increments from 100 K to 3000 K. The division of work between the two sets of tables followed AFOSR assessment of relative priority of the different mixtures and pure gases.

As a result of the work, some facts and conclusions can be stated. These can be summarized as

1. No tables have yet been generated for pressures above the atmospheric pressure (= dilute gas) state. While a detailed analysis would require a prolonged effort, an approximate study could be made using empirical tools of moderate accuracy. Some of the problems here are connected with the accuracy with which AFOSR/AFWL/others might require the effect of pressure to be known.
2. Of the three properties with which we have been concerned, thermal conductivity is the most uncertain. While estimates of the intermolecular potential affect all three properties, for thermal conductivity above the effect of the internal degrees of freedom can outweigh the translational energy contribution. It is proposed to pursue the problem of estimating the internal effect by generalized correlations firstly and then by rigorous theory if time allows.
3. Only one intermolecular potential function has been used to any extent to calculate mixture properties. Attention should be expanded to other potentials.
4. A useful further approach would be to use the Prandtl number as a means of obtaining thermal conductivities based on critically evaluated viscosity and specific heat values available from TPRC or other reliable sources.

References

1. Liley, P. E., "Transport Properties of Selected Elements and Compounds in the Gaseous State," TPRC Report 20, 75 pp., 1972. [AD757 528]
2. Touloukian, Y. S., Liley, P. E., and Saxena, S. C., "Thermophysical Properties of Matter. 3. Thermal Conductivity of Nonmetallic Liquids and Gases," Plenum Press, N. Y., 531 pp., 1970.
3. Ho, C. Y., Powell, R. W., and Liley, P. E., "Thermal Conductivity of the Elements," J. Phys. Chem. Ref. Data, 1, 279-421, 1972; (supplementary volume), 985 pp., 1974.
4. Hirschfelder, J. O., Curtiss, C. F., and Bird, R. B., "Molecular Theory of Gases and Liquids," Wiley, N. Y., 1964.
5. We have made no attempt to use some mixing rules which are more recent than those of [4]. Analysis of such later works yields no general conclusions as to their suitability.
6. Hanley, H. J. M. and Klein, M., "On the Utility of the m-6-8 Potential Function," N.B.S. TN 628, 77 pp., 1972.

7. Ely, J.F. and Hanley, H.J.M., "Analysis of the Viscosity and Second Virial Coefficients of Non-polar Polyatomic Gases Using the m-6-8 Potential," *Mol. Phys.*, 24, 683-7, 1972.
8. Certain, P.R. and Bruch, L.W., "Intermolecular Forces," Chapter 4 of "Theoretical Chemistry" (W.B. Brown, ed.), MTP Int. Rev. Sci., Phys. Chem. Series 1, Butterworths, 114-65, 1972. (For a preprint citation see reference 20 of item 1.)
9. Brokaw, R.S., "Approximate Formulas for Viscosity and Thermal Conductivity of Gas Mixtures," NASA TN D 2502, 17 pp., 1964; Brokaw, R.W., Svehla, R.A., and Baker, C.E., "Transport Properties of Dilute Gas Mixtures," NASA TN D 2580, 15 pp., 1965.
10. Svehla, R.A., "Estimated Viscosities and Thermal Conductivities of Gases at High Temperatures," NASA-TR-R-132, 120 pp., 1962.
11. Neufeld, P.D., Janzen, A.R., and Aziz, R.A., "Empirical Equations to Calculate 16 of the Transport Collision Integrals for the Lennard-Jones (12-6) Potential," *J. Chem. Phys.*, 57, 1100-2, 1972.

TABLE 1. TRANSPORT PROPERTIES OF HYDROGEN-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}_2$	$\text{H}_2\text{-H}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}_2$	
100	65	35	38	9	38	0.03	0.10	100
200	128	65	66	18	73	0.10	0.37	200
300	179	89	89	26	104	0.21	0.76	300
400	223	109	108	33	127	0.34	1.25	400
500	262	127	125	39	148	0.50	1.83	500
600	297	143	141	44	167	0.69	2.49	600
700	330	159	156	49	187	0.89	3.22	700
800	361	173	170	54	207	1.12	4.03	800
900	390	187	184	59	226	1.37	4.90	900
1000	418	200	197	63	245	1.63	5.84	1000
1100	445	213	209	67	263	1.91	6.84	1100
1200	471	225	221	71	282	2.21	7.90	1200
1300	496	237	233	75	300	2.52	9.02	1300
1400	521	249	244	80	319	2.85	10.19	1400
1500	544	260	256	84	338	3.20	11.43	1500
1600	568	272	267	89	356	3.56	12.72	1600
1700	591	282	277	95	376	3.94	14.06	1700
1800	613	293	288	101	395	4.33	15.46	1800
1900	635	304	298	108	414	4.73	16.91	1900
2000	656	314	308	115	433	5.15	18.41	2000
2100	677	324	318	121	452	5.59	19.95	2100
2200	698	334	328	126	469	6.03	21.55	2200
2300	718	343	337	131	487	6.50	23.20	2300
2400	738	353	347	136	504	6.97	24.89	2400
2500	758	363	356	141	522	7.46	26.63	2500
2600	778	372	365	146	539	7.96	28.42	2600
2700	797	381	374	151	555	8.47	30.26	2700
2800	816	390	383	155	571	9.00	32.13	2800
2900	835	399	392	160	587	9.54	34.06	2900
3000	853	408	400	165	603	10.09	36.02	3000

TABLE 2. TRANSPORT PROPERTIES OF HYDROGEN-ARGON 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)
	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-A}$	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-A}$	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-A}$	
100	38	37	68	37	0.20	0.10	100
200	66	70	128	70	0.71	0.39	200
300	89	96	182	99	1.43	0.80	300
400	108	118	221	121	2.33	1.33	400
500	125	138	257	141	3.39	1.94	500
600	141	156	291	160	4.59	2.64	600
700	156	173	325	179	5.93	3.43	700
800	170	188	360	198	7.41	4.29	800
900	184	203	394	217	9.00	5.22	900
1000	197	218	428	235	10.72	6.22	1000
1100	209	232	460	252	12.56	7.28	1100
1200	221	245	493	270	14.50	8.41	1200
1300	233	258	526	288	16.56	9.61	1300
1400	244	271	559	306	18.72	10.87	1400
1500	256	284	592	324	20.99	12.18	1500
1600	267	296	624	341	23.36	13.56	1600
1700	277	307	657	359	25.82	14.99	1700
1800	288	319	689	376	28.39	16.48	1800
1900	298	330	720	393	31.05	18.02	1900
2000	308	342	752	410	33.80	19.62	2000
2100	318	353	783	427	36.64	21.27	2100
2200	328	363	813	443	39.58	22.97	2200
2300	337	374	843	460	42.60	24.73	2300
2400	347	384	873	476	45.71	26.53	2400
2500	356	395	903	492	48.91	28.39	2500
2600	365	405	932	508	52.19	30.29	2600
2700	374	415	960	523	55.56	32.25	2700
2800	383	425	987	538	59.00	34.25	2800
2900	392	434	1014	552	62.54	36.30	2900
3000	400	444	1042	568	66.15	38.40	3000

TABLE 3. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-H}$	
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 4. TRANSPORT PROPERTIES OF ATOMIC HYDROGEN-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)			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 5. TRANSPORT PROPERTIES OF DEUTERIUM-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)			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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}_2$	$\text{D}_2\text{-D}_2$	
100	65	52	58	9	33	58	0.03	0.08	0.16	100
200	128	92	96	18	59	101	0.10	0.28	0.52	200
300	179	123	126	26	83	141	0.21	0.57	1.03	300
400	223	150	152	33	104	176	0.34	0.93	1.66	400
500	262	174	175	39	124	210	0.50	1.35	2.40	500
600	297	196	197	44	143	243	0.69	1.84	3.25	600
700	330	217	218	49	161	274	0.89	2.37	4.20	700
800	361	236	238	54	179	305	1.12	2.96	5.24	800
900	390	255	256	59	197	336	1.37	3.60	6.37	900
1000	418	273	275	63	214	365	1.63	4.29	7.58	1000
1100	445	291	292	67	230	393	1.91	5.02	8.88	1100
1200	471	308	309	71	246	421	2.21	5.80	10.25	1200
1300	496	324	325	75	262	449	2.52	6.63	11.71	1300
1400	521	340	341	80	278	476	2.85	7.49	13.24	1400
1500	544	355	357	84	293	502	3.20	8.40	14.84	1500
1600	568	371	372	89	308	528	3.56	9.35	16.51	1600
1700	591	385	387	95	324	554	3.94	10.33	18.26	1700
1800	613	400	402	101	340	579	4.33	11.36	20.07	1800
1900	635	414	416	108	356	605	4.73	12.42	21.95	1900
2000	656	428	430	115	372	630	5.15	13.53	23.90	2000
2100	677	442	444	121	387	654	5.59	14.66	25.91	2100
2200	698	455	457	126	402	678	6.03	15.84	27.98	2200
2300	718	469	471	131	416	702	6.50	17.05	30.12	2300
2400	738	482	484	136	431	726	6.97	18.29	32.32	2400
2500	758	495	497	141	445	750	7.46	19.57	34.58	2500
2600	778	507	510	146	460	774	7.96	20.89	36.90	2600
2700	797	520	522	151	474	797	8.47	22.23	39.28	2700
2800	816	532	535	155	488	821	9.00	23.61	41.72	2800
2900	835	545	547	160	502	844	9.54	25.03	44.21	2900
3000	853	557	559	165	516	868	10.09	26.47	46.77	3000

TABLE 6. TRANSPORT PROPERTIES OF DEUTERIUM-ARGON 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)
	D_2 - D_2	D_2 -A	D_2 - D_2	D_2 -A	D_2 - D_2	A-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 7. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-D}$	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	22.99	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 8. TRANSPORT PROPERTIES OF ATOMIC DEUTERIUM-ARGON 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)
	A-A	A-D	A-A	A-D	A-A	A-D	
100	83	44	7	43	0.02	0.12	100
200	166	79	12	71	0.09	0.45	200
300	237	107	17	93	0.19	0.91	300
400	298	130	22	113	0.32	1.48	400
500	352	152	26	131	0.47	2.16	500
600	401	171	30	148	0.65	2.94	600
700	447	189	34	164	0.85	3.80	700
800	490	206	37	179	1.06	4.74	800
900	531	223	40	193	1.30	5.77	900
1000	569	238	43	207	1.55	6.87	1000
1100	607	254	45	220	1.82	8.05	1100
1200	642	268	48	233	2.11	9.30	1200
1300	677	283	51	245	2.41	10.61	1300
1400	710	296	54	258	2.72	12.00	1400
1500	743	310	56	269	3.05	13.45	1500
1600	775	323	59	281	3.40	14.97	1600
1700	806	336	62	294	3.76	16.55	1700
1800	837	349	64	304	4.14	18.19	1800
1900	866	361	67	315	4.52	19.90	1900
2000	896	373	69	325	4.93	21.66	2000
2100	925	385	72	336	5.34	23.49	2100
2200	953	397	74	346	5.77	25.37	2200
2300	981	409	77	357	6.21	27.30	2300
2400	1008	420	79	367	6.66	29.30	2400
2500	1035	431	82	377	7.13	31.35	2500
2600	1062	443	84	387	7.61	33.45	2600
2700	1088	454	86	396	8.10	35.61	2700
2800	1114	464	89	406	8.60	37.82	2800
2900	1140	475	91	416	9.12	40.08	2900
3000	1165	486	94	425	9.64	42.40	3000

TABLE 9. TRANSPORT PROPERTIES OF AMMONIA-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NH}_3$	$\text{NH}_3\text{-NH}_3$	
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	4.49	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	446	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 10. TRANSPORT PROPERTIES OF AMMONIA-ARGON 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)
	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	A-A	
100	83	51	39	7	5	0.02	0.02	100
200	166	102	70	12	15	0.09	0.09	200
300	237	154	103	17	25	0.19	0.21	300
400	298	204	138	22	36	0.32	0.37	400
500	352	249	174	26	51	0.47	0.56	500
600	401	291	209	30	66	0.65	0.79	600
700	447	331	244	34	81	0.85	1.04	700
800	490	367	276	37	98	1.06	1.32	800
900	531	401	308	40	115	1.30	1.63	900
1000	569	434	338	43	136	1.55	1.96	1000
1100	607	465	367	45	156	1.82	2.31	1100
1200	642	495	395	48	176	2.11	2.69	1200
1300	677	524	423	51	197	2.41	3.08	1300
1400	710	552	449	54	219	2.72	3.50	1400
1500	743	579	474	56	242	3.05	3.93	1500
1600	775	605	498	59	265	3.40	4.39	1600
1700	806	630	522	62	289	3.76	4.86	1700
1800	837	655	545	64	313	4.14	5.36	1800
1900	866	679	567	67	338	4.52	5.87	1900
2000	896	702	589	69	364	4.93	6.40	2000
2100	925	726	611	72	391	5.34	6.95	2100
2200	953	748	631	74	418	5.77	7.51	2200
2300	981	770	652	77	446	6.21	8.09	2300
2400	1008	792	672	79	472	6.66	8.69	2400
2500	1035	814	692	82	502	7.13	9.30	2500
2600	1062	835	711	84	532	7.61	9.93	2600
2700	1088	856	730	86	561	8.10	10.58	2700
2800	1114	876	749	89	591	8.60	11.24	2800
2900	1140	897	767	91	620	9.12	11.91	2900
3000	1165	917	786	94	650	9.64	12.61	3000

TABLE 11. TRANSPORT PROPERTIES OF NITROGEN TRIDEUTERIDE-HELIUM 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)
	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-HE}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-HE}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-HE}$	
100	-	99	-	73	-	0.29	100
200	96	130	17	115	0.10	0.42	200
300	145	174	28	152	0.24	0.85	300
400	194	212	40	187	0.42	1.38	400
500	240	246	54	220	0.65	2.01	500
600	283	277	68	252	0.92	2.72	600
700	324	306	83	281	1.22	3.52	700
800	361	334	98	308	1.56	4.39	800
900	397	360	114	332	1.92	5.34	900
1000	431	386	130	357	2.32	6.36	1000
1100	463	410	145	380	2.74	7.45	1100
1200	494	434	161	403	3.19	8.60	1200
1300	524	457	178	425	3.67	9.82	1300
1400	552	480	195	447	4.17	11.10	1400
1500	580	502	213	468	4.70	12.45	1500
1600	607	523	232	488	5.25	13.85	1600
1700	633	544	252	508	5.82	15.31	1700
1800	659	564	272	528	6.41	16.83	1800
1900	684	585	294	547	7.03	18.41	1900
2000	708	604	318	566	7.67	20.04	2000
2100	732	624	343	585	8.33	21.73	2100
2200	755	643	369	603	9.01	23.47	2200
2300	778	661	395	622	9.72	25.26	2300
2400	800	680	422	640	10.44	27.11	2400
2500	822	698	449	657	11.18	29.00	2500
2600	844	716	477	674	11.94	30.95	2600
2700	865	734	506	691	12.72	32.94	2700
2800	886	751	535	708	13.52	34.99	2800
2900	906	769	565	724	14.34	37.08	2900
3000	927	786	595	740	15.17	39.22	3000

TABLE 12. TRANSPORT PROPERTIES OF NITROGEN TRIDEUTERIDE-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ND}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ND}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ND}_3$	
100	65	-	9	-	0.03	-	100
200	128	111	18	17	0.10	0.10	200
300	179	164	26	27	0.21	0.23	300
400	223	211	33	36	0.34	0.39	400
500	262	254	39	46	0.50	0.59	500
600	297	293	44	56	0.69	0.81	600
700	330	328	49	66	0.89	1.06	700
800	361	362	54	76	1.12	1.34	800
900	390	393	59	86	1.37	1.64	900
1000	418	423	63	96	1.63	1.96	1000
1100	445	452	67	106	1.91	2.31	1100
1200	471	479	71	115	2.21	2.67	1200
1300	496	506	75	126	2.52	3.06	1300
1400	521	531	80	137	2.85	3.47	1400
1500	544	556	84	148	3.20	3.89	1500
1600	568	581	89	160	3.56	4.34	1600
1700	591	604	95	173	3.94	4.80	1700
1800	613	627	101	186	4.33	5.28	1800
1900	635	650	108	201	4.73	5.78	1900
2000	656	672	115	216	5.15	6.30	2000
2100	677	694	121	232	5.59	6.83	2100
2200	698	715	126	247	6.03	7.38	2200
2300	718	736	131	263	6.50	7.95	2300
2400	738	756	136	279	6.97	8.53	2400
2500	758	777	141	295	7.46	9.13	2500
2600	778	797	146	311	7.96	9.74	2600
2700	797	817	151	328	8.47	10.37	2700
2800	816	836	155	345	9.00	11.01	2800
2900	835	855	160	362	9.54	11.67	2900
3000	853	874	165	380	10.09	12.35	3000

TABLE 13. TRANSPORT PROPERTIES OF NITROGEN TRIDEUTERIDE-ARGON 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)
	ND ₃ -ND ₃		ND ₃ -A		ND ₃ -ND ₃		ND ₃ -A		ND ₃ -ND ₃		ND ₃ -A		
	-	96	-	123	-	17	-	14	-	0.10	-	0.02	
100					83		7						100
200	145	194	240	288	352	401	30	12	0.10	0.10	0.09	0.09	200
300	194	240	288	352	401	447	34	17	0.24	0.22	0.19	0.19	300
400	240	288	352	401	447	490	37	22	0.42	0.39	0.32	0.32	400
500	283	324	361	397	431	531	40	26	0.65	0.58	0.47	0.47	500
600	324	361	397	431	485	569	43		0.92	0.81	0.65	0.65	600
700	361	397	431	485	518	607	45		1.22	1.06	0.85	0.85	700
800	397	431	485	518	550	642	48		1.56	1.34	1.06	1.06	800
900	431	485	518	550	581	677	51		1.92	1.64	1.30	1.30	900
1000	463	494	524	552	580	710	54		2.32	1.96	1.55	1.55	1000
1100	494	524	552	580	607	743	56		2.74	2.31	1.82	1.82	1100
1200	524	552	580	607	642	775	59		3.19	2.68	2.11	2.11	1200
1300	552	580	607	639	677	775	62		3.67	3.07	2.41	2.41	1300
1400	580	607	639	677	710	806	64		4.17	3.48	2.72	2.72	1400
1500	607	639	677	710	743	837	67		4.70	3.91	3.05	3.05	1500
1600	633	659	684	708	775	866	69		5.25	4.36	3.40	3.40	1600
1700	659	684	708	732	806	896	72		5.82	4.82	3.76	3.76	1700
1800	684	708	732	755	837	925	74		6.41	5.31	4.14	4.14	1800
1900	708	732	755	778	866	953	77		7.03	5.81	4.52	4.52	1900
2000	732	755	778	800	896	1008	79		7.67	6.33	4.93	4.93	2000
2100	755	778	800	822	925	1035	82		8.33	6.87	5.34	5.34	2100
2200	778	800	822	846	953	1062	84		9.01	7.42	5.71	5.71	2200
2300	800	822	846	870	981	1088	86		9.72	7.99	6.21	6.21	2300
2400	822	846	870	894	1008	1114	89		10.44	8.58	6.66	6.66	2400
2500	844	865	886	906	1035	1140	91		11.18	9.18	7.13	7.13	2500
2600	865	886	906	927	1062	1165	94		11.94	9.80	7.61	7.61	2600
2700	886	906	927	944	1088	1188	96		12.72	10.43	8.10	8.10	2700
2800	906	927	944	962	1114	1214	89		13.52	11.08	8.60	8.60	2800
2900	927	944	962	984	1140	1240	91		14.34	11.75	9.12	9.12	2900
3000	944	962	984	1006	1165	1265	94		15.17	12.42	9.64	9.64	3000

TABLE 14. TRANSPORT PROPERTIES OF NITROGEN TETRAHYDRIDE-HELIUM 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)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-HE}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-HE}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-HE}$	
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	448	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	364	501	6.05	22.63	2400
2500	771	623	379	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 15. TRANSPORT PROPERTIES OF NITROGEN TETRAHYDRIDE-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)
	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{H}_4\text{-N}_2$	$\text{N}_2\text{-N}_2$	
100	43	49	14	11	0.01	0.02	0.03	100
200	76	98	30	24	0.05	0.07	0.10	200
300	111	148	44	35	0.11	0.16	0.21	300
400	149	195	59	46	0.20	0.28	0.34	400
500	187	239	74	57	0.32	0.43	0.50	500
600	225	278	88	66	0.46	0.60	0.69	600
700	263	315	102	76	0.62	0.79	0.89	700
800	300	349	116	85	0.81	1.01	1.12	800
900	336	382	131	95	1.02	1.24	1.37	900
1000	370	413	144	103	1.24	1.49	1.63	1000
1100	403	442	160	113	1.49	1.75	1.91	1100
1200	434	470	176	123	1.75	2.04	2.21	1200
1300	465	497	192	133	2.03	2.34	2.52	1300
1400	495	523	209	144	2.33	2.65	2.85	1400
1500	523	549	224	154	2.64	2.98	3.20	1500
1600	551	573	240	164	2.96	3.33	3.56	1600
1700	578	597	256	175	3.30	3.69	3.94	1700
1800	604	621	272	186	3.65	4.06	4.33	1800
1900	630	644	287	197	4.02	4.45	4.73	1900
2000	654	666	302	208	4.40	4.85	5.15	2000
2100	679	688	317	219	4.79	5.26	5.59	2100
2200	703	709	332	229	5.20	5.69	6.03	2200
2300	726	730	348	239	5.62	6.13	6.50	2300
2400	749	751	362	249	6.05	6.58	6.97	2400
2500	771	771	378	259	6.49	7.04	7.46	2500
2600	793	791	392	269	6.94	7.52	7.96	2600
2700	815	811	407	279	7.41	8.01	8.47	2700
2800	836	830	421	287	7.89	8.51	9.00	2800
2900	857	849	436	298	8.38	9.02	9.54	2900
3000	877	868	450	307	8.88	9.54	10.09	3000

TABLE 16. TRANSPORT PROPERTIES OF NITROGEN TETRAHYDRIDE-ARGON 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)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-A}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-A}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-A}$	
100	43	83	14	10	0.01	0.02	100
200	76	166	30	21	0.05	0.07	200
300	111	237	44	30	0.11	0.15	300
400	149	298	59	40	0.20	0.27	400
500	187	352	74	50	0.32	0.41	500
600	225	401	88	59	0.46	0.58	600
700	263	447	102	68	0.62	0.77	700
800	300	490	116	76	0.81	0.98	800
900	336	531	131	85	1.02	1.20	900
1000	370	569	144	93	1.24	1.45	1000
1100	403	607	160	102	1.49	1.71	1100
1200	434	642	176	112	1.75	1.99	1200
1300	465	677	192	122	2.03	2.28	1300
1400	495	710	209	131	2.33	2.59	1400
1500	523	743	224	140	2.64	2.92	1500
1600	551	775	240	149	2.96	3.26	1600
1700	578	806	256	159	3.30	3.61	1700
1800	604	837	272	168	3.65	3.98	1800
1900	630	866	287	177	4.02	4.36	1900
2000	654	896	302	185	4.40	4.75	2000
2100	679	925	317	194	4.79	5.16	2100
2200	703	953	332	203	5.20	5.58	2200
2300	726	981	348	212	5.62	6.01	2300
2400	749	1008	362	220	6.05	6.45	2400
2500	771	1035	378	230	6.49	6.91	2500
2600	793	1062	392	238	6.94	7.38	2600
2700	815	1088	407	246	7.41	7.86	2700
2800	836	1114	421	255	7.89	8.35	2800
2900	857	1140	436	263	8.38	8.86	2900
3000	877	1165	450	272	8.88	9.37	3000

TABLE 17. TRANSPORT PROPERTIES OF NITROGEN TETRADEUTERIDE-HELIUM 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)
	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-HE}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-HE}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-HE}$	
100	46	63	15	73	0.01	0.09	100
200	87	112	32	115	0.05	0.33	200
300	131	150	47	152	0.12	0.68	300
400	176	183	63	187	0.21	1.10	400
500	219	213	80	220	0.33	1.61	500
600	261	240	95	252	0.47	2.18	600
700	300	265	110	281	0.63	2.82	700
800	337	289	125	308	0.81	3.52	800
900	372	312	141	332	1.00	4.28	900
1000	405	334	155	357	1.21	5.10	1000
1100	437	355	172	380	1.44	5.97	1100
1200	467	376	189	403	1.68	6.89	1200
1300	496	396	207	425	1.93	7.87	1300
1400	524	416	225	447	2.20	8.90	1400
1500	551	435	241	468	2.48	9.98	1500
1600	578	453	258	488	2.77	11.10	1600
1700	603	471	276	508	3.07	12.28	1700
1800	628	489	293	528	3.39	13.49	1800
1900	653	506	308	547	3.72	14.76	1900
2000	677	524	324	566	4.06	16.07	2000
2100	700	540	341	585	4.41	17.42	2100
2200	723	557	357	603	4.78	18.81	2200
2300	745	573	374	622	5.15	20.25	2300
2400	767	589	390	640	5.54	21.73	2400
2500	788	605	406	657	5.94	23.25	2500
2600	809	621	422	674	6.34	24.81	2600
2700	830	636	438	691	6.76	26.41	2700
2800	850	651	454	708	7.19	28.05	2800
2900	870	666	469	724	7.62	29.73	2900
3000	890	681	484	740	8.07	31.45	3000

TABLE 18. TRANSPORT PROPERTIES OF NITROGEN TETRADEUTERIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻⁵)		Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)		Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)		Temp. (K)
	N ₂ D ₄ -N ₂ D ₄	N ₂ D ₄ -N ₂	N ₂ D ₄ -N ₂ D ₄	N ₂ D ₄ -N ₂	N ₂ D ₄ -N ₂ D ₄	N ₂ -N ₂	
100	46	53	15	12	0.01	0.02	100
200	87	107	32	25	0.05	0.07	200
300	131	159	47	36	0.12	0.16	300
400	176	206	63	48	0.21	0.28	400
500	219	249	80	59	0.33	0.43	500
600	261	288	95	69	0.47	0.59	600
700	300	324	110	79	0.63	0.77	700
800	337	357	125	89	0.81	0.98	800
900	372	389	141	100	1.00	1.20	900
1000	405	419	155	109	1.21	1.44	1000
1100	437	448	172	119	1.44	1.69	1100
1200	467	475	189	130	1.68	1.96	1200
1300	496	502	207	141	1.93	2.24	1300
1400	524	527	225	152	2.20	2.54	1400
1500	551	552	241	162	2.48	2.86	1500
1600	578	576	258	173	2.77	3.19	1600
1700	603	600	276	185	3.07	3.53	1700
1800	628	623	293	197	3.39	3.88	1800
1900	653	645	308	208	3.72	4.25	1900
2000	677	667	324	219	4.06	4.63	2000
2100	700	689	341	231	4.41	5.02	2100
2200	723	710	357	241	4.78	5.42	2200
2300	745	731	374	252	5.15	5.84	2300
2400	767	752	390	263	5.54	6.27	2400
2500	788	772	406	273	5.94	6.71	2500
2600	809	792	422	284	6.34	7.16	2600
2700	830	811	438	294	6.76	7.63	2700
2800	850	831	454	304	7.19	8.10	2800
2900	870	850	469	314	7.62	8.58	2900
3000	890	869	484	324	8.07	9.08	3000

TABLE 19. TRANSPORT PROPERTIES OF NITROGEN TETRADEUTERIDE-ARGON 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)
	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-A}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-A}$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-A}$	
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 20. TRANSPORT PROPERTIES OF FLUORINE-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}_2$	$\text{F}_2\text{-F}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}_2$	$\text{F}_2\text{-F}_2$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-F}_2$	$\text{F}_2\text{-F}_2$	
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 21. TRANSPORT PROPERTIES OF FLUORINE-ARGON 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)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-A}$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-A}$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-A}$	
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

TABLE 22. TRANSPORT PROPERTIES OF FLUORINE-AMMONIA MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-5}$)		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)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-NH}_3$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-NH}_3$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-NH}_3$	
100	86	52	10	8	0.02	0.02	100
200	168	104	19	17	0.10	0.10	200
300	236	157	28	27	0.20	0.22	300
400	293	206	37	37	0.33	0.38	400
500	344	251	45	48	0.49	0.58	500
600	391	292	52	59	0.67	0.80	600
700	434	330	59	70	0.87	1.06	700
800	475	366	65	81	1.09	1.34	800
900	513	399	71	93	1.33	1.65	900
1000	550	431	77	106	1.58	1.98	1000
1100	586	461	82	119	1.85	2.33	1100
1200	620	491	88	132	2.14	2.70	1200
1300	653	519	93	145	2.45	3.10	1300
1400	685	546	97	158	2.77	3.52	1400
1500	716	572	102	172	3.10	3.95	1500
1600	747	597	107	186	3.45	4.41	1600
1700	777	622	112	200	3.82	4.89	1700
1800	806	646	116	215	4.20	5.38	1800
1900	835	670	121	229	4.59	5.89	1900
2000	863	693	125	245	5.00	6.42	2000
2100	891	716	130	261	5.42	6.97	2100
2200	918	738	134	276	5.86	7.53	2200
2300	945	760	138	292	6.30	8.11	2300
2400	972	781	143	308	6.76	8.71	2400
2500	998	802	147	325	7.24	9.32	2500
2600	1023	823	151	341	7.72	9.95	2600
2700	1049	843	155	358	8.22	10.60	2700
2800	1074	864	159	375	8.73	11.26	2800
2900	1098	884	163	391	9.25	11.94	2900
3000	1123	903	167	409	9.79	12.63	3000

TABLE 23. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN TRIDEUTERIDE 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)
	$\text{ND}_3\text{-ND}_3$	$\text{F}_2\text{-ND}_3$	$\text{ND}_3\text{-ND}_3$	$\text{F}_2\text{-ND}_3$	$\text{ND}_3\text{-ND}_3$	$\text{F}_2\text{-F}_2$	
100	-	-	-	-	-	-	100
200	96	126	17	18	0.10	0.10	200
300	145	186	28	28	0.23	0.20	300
400	194	240	40	38	0.42	0.33	400
500	240	288	54	49	0.65	0.49	500
600	283	331	68	60	0.92	0.67	600
700	324	372	83	71	1.22	0.87	700
800	361	410	98	81	1.56	1.09	800
900	397	445	114	92	1.92	1.33	900
1000	431	479	130	103	2.32	1.58	1000
1100	463	512	145	113	2.74	1.85	1100
1200	494	543	161	124	3.19	2.14	1200
1300	524	573	178	135	3.67	2.45	1300
1400	552	602	195	146	4.17	2.77	1400
1500	580	630	213	157	4.70	3.10	1500
1600	607	657	232	169	5.25	3.45	1600
1700	633	684	252	182	5.82	3.82	1700
1800	659	710	272	194	6.41	4.20	1800
1900	684	736	294	207	7.03	4.59	1900
2000	708	761	318	221	7.67	5.00	2000
2100	732	785	343	236	8.33	5.42	2100
2200	755	810	369	251	9.01	5.86	2200
2300	778	833	395	266	9.72	6.30	2300
2400	800	857	422	282	10.44	6.76	2400
2500	822	880	449	298	11.18	7.24	2500
2600	844	902	477	314	11.94	7.72	2600
2700	865	925	506	330	12.72	8.22	2700
2800	886	947	535	347	13.52	8.73	2800
2900	906	969	565	364	14.34	9.25	2900
3000	927	990	595	381	15.17	9.79	3000

TABLE 24. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN TETRAHYDRIDE MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)		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 25. TRANSPORT PROPERTIES OF FLUORINE-NITROGEN TETRADEUTERIDE 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)
	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	$\text{F}_2\text{-F}_2$	$\text{F}_2\text{-N}_2\text{D}_4$	$\text{N}_2\text{D}_4\text{-N}_2\text{D}_4$	
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

Temp. (K)	Viscosity (Nsm ⁻² · 10 ⁻⁵)				Thermal Conductivity (W m ⁻¹ K ⁻¹ · 10 ⁻³)				Diffusion Coefficient (m ² s ⁻¹ · 10 ⁻⁴)				Temp. (K)
	N ₂ -N ₂		N ₂ -F		F-F		N ₂ -N ₂		N ₂ -F		F-F		
	N ₂ -N ₂	N ₂ -F	N ₂ -F	F-F	N ₂ -N ₂	N ₂ -F	F-F	N ₂ -N ₂	N ₂ -F	F-F			
100	65	70	78		9	11	13	0.03	0.03	0.04		100	
200	128	137	152		18	22	27	0.10	0.13	0.17		200	
300	179	192	213		26	32	38	0.21	0.27	0.36		300	
400	223	239	265		33	40	47	0.34	0.45	0.60		400	
500	262	280	311		39	46	54	0.50	0.67	0.88		500	
600	297	318	354		44	52	61	0.69	0.91	1.21		600	
700	330	354	393		49	58	67	0.89	1.19	1.57		700	
800	361	387	430		54	63	73	1.12	1.49	1.97		800	
900	390	418	464		59	69	79	1.37	1.81	2.40		900	
1000	418	448	498		63	73	84	1.63	2.16	2.86		1000	
1100	445	477	530		67	78	89	1.91	2.53	3.35		1100	
1200	471	505	561		71	82	94	2.21	2.93	3.88		1200	
1300	496	532	591		76	87	99	2.52	3.34	4.43		1300	
1400	521	558	620		80	91	103	2.85	3.78	5.01		1400	
1500	544	584	648		84	96	108	3.20	4.24	5.61		1500	
1600	568	609	676		89	100	112	3.56	4.72	6.25		1600	
1700	591	633	703		95	106	117	3.94	5.22	6.91		1700	
1800	613	657	729		101	111	121	4.33	5.74	7.60		1800	
1900	635	680	756		108	117	126	4.73	6.28	8.31		1900	
2000	656	703	781		115	122	130	5.15	6.83	9.05		2000	
2100	677	726	806		121	127	134	5.59	7.41	9.81		2100	
2200	698	748	831		126	132	138	6.03	8.00	10.59		2200	
2300	718	770	855		131	136	142	6.50	8.61	11.40		2300	
2400	738	791	879		136	141	146	6.97	9.24	12.23		2400	
2500	758	813	903		141	145	150	7.46	9.89	13.09		2500	
2600	778	834	926		146	149	153	7.96	10.55	13.97		2600	
2700	797	854	949		151	154	157	8.47	11.23	14.87		2700	
2800	816	874	971		155	158	161	9.00	11.93	15.79		2800	
2900	835	895	994		160	162	165	9.54	12.65	16.74		2900	
3000	853	914	1016		165	166	168	10.09	13.38	17.70		3000	

TABLE 27. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-ARGON 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)
	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	263	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 28. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-AMMONIA MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-5}$)		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-NH ₃ NH ₃ -NH ₃	F-F	F-NH ₃ NH ₃ -NH ₃	F-F	F-NH ₃ NH ₃ -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 29. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN TRIDEUTERIDE 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)
	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-F}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-F}$	$\text{ND}_3\text{-ND}_3$	$\text{ND}_3\text{-F}$	
100	-	-	-	13	-	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

TABLE 30. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN TETRAHYDRIDE 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)
	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}$	$\text{N}_2\text{H}_4\text{-N}_2\text{H}_4$	$\text{N}_2\text{H}_4\text{-F}$	F-F	
100	43	53	14	13	0.01	0.02	0.04	100
200	76	106	30	28	0.05	0.10	0.17	200
300	111	160	44	41	0.11	0.22	0.36	300
400	149	211	59	52	0.20	0.38	0.60	400
500	187	257	74	64	0.32	0.58	0.88	500
600	225	300	88	74	0.46	0.81	1.21	600
700	263	339	102	84	0.62	1.07	1.57	700
800	300	376	116	94	0.81	1.36	1.97	800
900	336	411	131	105	1.02	1.67	2.40	900
1000	370	444	144	114	1.24	2.01	2.86	1000
1100	403	476	160	124	1.49	2.37	3.35	1100
1200	434	506	176	135	1.75	2.75	3.88	1200
1300	465	535	192	145	2.03	3.15	4.43	1300
1400	495	564	209	156	2.33	3.58	5.01	1400
1500	523	591	224	166	2.64	4.02	5.61	1500
1600	551	617	240	176	2.96	4.49	6.25	1600
1700	578	643	256	186	3.30	4.97	6.91	1700
1800	604	668	272	196	3.65	5.48	7.60	1800
1900	630	693	287	206	4.02	6.00	8.31	1900
2000	654	717	302	216	4.40	6.54	9.05	2000
2100	679	740	317	225	4.79	7.10	9.81	2100
2200	703	763	332	235	5.20	7.67	10.59	2200
2300	726	786	348	245	5.62	8.27	11.40	2300
2400	749	808	362	254	6.05	8.88	12.23	2400
2500	771	830	378	264	6.49	9.50	13.09	2500
2600	793	851	392	272	6.94	10.14	13.97	2600
2700	815	873	407	282	7.41	10.80	14.87	2700
2800	836	893	421	291	7.89	11.48	15.79	2800
2900	857	914	436	300	8.38	12.17	16.74	2900
3000	877	934	450	309	8.88	12.87	17.70	3000

TABLE 31. TRANSPORT PROPERTIES OF ATOMIC FLUORINE-NITROGEN TETRADEUTERIDE 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)
	F-F	F-N ₂ D ₄ N ₂ D ₄ -N ₂ D ₄	F-F	F-N ₂ D ₄ N ₂ D ₄ -N ₂ D ₄	F-F	F-N ₂ D ₄ N ₂ D ₄ -N ₂ D ₄	
100	78	54	13	14	0.04	0.02	100
200	152	110	27	29	0.17	0.10	200
300	213	164	38	42	0.36	0.21	300
400	265	214	47	55	0.60	0.37	400
500	311	259	54	67	0.88	0.56	500
600	354	300	61	78	1.21	0.78	600
700	393	338	67	88	1.57	1.03	700
800	430	374	73	99	1.97	1.30	800
900	464	408	79	110	2.40	1.59	900
1000	498	440	84	120	2.86	1.91	1000
1100	530	470	89	130	3.35	2.25	1100
1200	561	499	94	141	3.88	2.61	1200
1300	591	527	99	153	4.43	2.99	1300
1400	620	555	103	164	5.01	3.39	1400
1500	648	581	108	174	5.61	3.80	1500
1600	676	607	112	185	6.25	4.24	1600
1700	703	631	117	196	6.91	4.70	1700
1800	729	656	121	207	7.60	5.17	1800
1900	756	680	126	217	8.31	5.66	1900
2000	781	703	130	227	9.05	6.17	2000
2100	806	726	134	237	9.81	6.69	2100
2200	831	748	138	247	10.59	7.23	2200
2300	855	770	142	258	11.40	7.79	2300
2400	879	792	146	268	12.23	8.36	2400
2500	903	813	150	278	13.09	8.95	2500
2600	926	834	153	287	13.97	9.55	2600
2700	949	855	157	297	14.87	10.17	2700
2800	971	875	161	307	15.79	10.80	2800
2900	994	895	165	317	16.74	11.45	2900
3000	1016	915	168	326	17.70	12.11	3000

TABLE 32. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NF}_3$	$\text{N}_2\text{-NF}_3$	$\text{NF}_3\text{-NF}_3$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-NF}_3$	
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	6.67	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 33. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-ARGON 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)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-A}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-A}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-A}$	
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 34. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-HYDROGEN 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)
	NF_3	NF_3	NF_3	H_2	NF_3	NF_3	NF_3	H_2	NF_3	NF_3	NF_3	H_2	
100	61	27	38	36	4	36	68	0.01	0.07	0.20	100		
200	124	52	66	69	10	69	128	0.04	0.28	0.71	200		
300	181	72	89	100	19	100	182	0.08	0.59	1.43	300		
400	232	89	108	124	28	124	221	0.14	0.98	2.33	400		
500	277	104	125	146	36	146	257	0.21	1.44	3.39	500		
600	318	118	141	167	44	167	291	0.29	1.96	4.59	600		
700	356	131	156	188	51	188	325	0.38	2.55	5.93	700		
800	391	143	170	208	57	208	360	0.48	3.19	7.41	800		
900	425	155	184	229	64	229	394	0.58	3.88	9.00	900		
1000	456	166	197	248	69	248	428	0.70	4.63	10.72	1000		
1100	487	177	209	267	74	267	460	0.82	5.42	12.56	1100		
1200	516	187	221	286	80	286	493	0.95	6.27	14.50	1200		
1300	544	197	233	305	84	305	526	1.08	7.16	16.56	1300		
1400	572	207	244	324	89	324	559	1.23	8.09	18.72	1400		
1500	598	216	256	343	94	343	592	1.38	9.08	20.99	1500		
1600	624	225	267	361	98	361	624	1.54	10.10	23.36	1600		
1700	649	234	277	379	102	379	657	1.70	11.17	25.82	1700		
1800	674	243	288	397	106	397	689	1.87	12.28	28.39	1800		
1900	698	252	298	415	110	415	720	2.05	13.43	31.05	1900		
2000	722	260	308	433	114	433	752	2.23	14.62	33.80	2000		
2100	745	269	318	450	118	450	783	2.42	15.85	36.64	2100		
2200	768	277	328	467	122	467	813	2.61	17.12	39.58	2200		
2300	790	285	337	484	125	484	843	2.81	18.42	42.60	2300		
2400	813	293	347	501	129	501	873	3.01	19.77	45.71	2400		
2500	834	301	356	518	133	518	903	3.23	21.15	48.91	2500		
2600	856	308	365	534	136	534	932	3.44	22.57	52.19	2600		
2700	877	316	374	550	140	550	960	3.67	24.03	55.56	2700		
2800	898	324	383	565	143	565	987	3.89	25.52	59.00	2800		
2900	919	331	392	580	147	580	1014	4.13	27.05	62.54	2900		
3000	939	338	400	596	150	596	1042	4.36	28.61	66.15	3000		

TABLE 35. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-ATOMIC HYDROGEN 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)
	NF ₃ -NF ₃	NF ₃ -H	H-H	NF ₃ -NF ₃	NF ₃ -H	H-H	NF ₃ -NF ₃	NF ₃ -H	H-H	
100	61	23	34	4	55	106	0.01	0.12	0.37	100
200	124	42	57	10	93	176	0.04	0.45	1.22	200
300	181	57	75	19	125	232	0.08	0.91	2.42	300
400	232	69	91	28	153	279	0.14	1.50	3.90	400
500	277	81	105	36	179	322	0.21	2.19	5.66	500
600	318	91	118	44	203	363	0.29	2.98	7.65	600
700	356	101	130	51	226	402	0.38	3.85	9.88	700
800	391	110	142	57	247	438	0.48	4.82	12.32	800
900	425	119	153	64	268	473	0.58	5.86	14.98	900
1000	456	128	164	69	288	507	0.70	6.98	17.83	1000
1100	487	136	175	74	306	539	0.82	8.18	20.88	1100
1200	516	144	185	80	325	570	0.95	9.45	24.12	1200
1300	544	151	194	84	342	600	1.08	10.79	27.53	1300
1400	572	159	204	89	359	630	1.23	12.19	31.13	1400
1500	598	166	213	94	376	658	1.38	13.67	34.90	1500
1600	624	173	222	98	392	686	1.54	15.21	38.84	1600
1700	649	180	231	102	408	714	1.70	16.82	42.94	1700
1800	674	187	240	106	423	740	1.87	18.49	47.20	1800
1900	698	193	249	110	438	766	2.05	20.22	51.62	1900
2000	722	200	257	114	453	792	2.23	22.01	56.20	2000
2100	745	206	265	118	468	818	2.42	23.87	60.93	2100
2200	768	213	273	122	482	843	2.61	25.78	65.81	2200
2300	790	219	281	125	496	867	2.81	27.75	70.83	2300
2400	813	225	289	129	510	891	3.01	29.77	76.01	2400
2500	834	231	297	133	524	915	3.23	31.86	81.32	2500
2600	856	237	305	136	537	938	3.44	33.99	86.78	2600
2700	877	243	312	140	551	962	3.67	36.19	92.38	2700
2800	898	248	320	143	563	984	3.89	38.43	98.11	2800
2900	919	254	327	147	577	1007	4.13	40.73	103.98	2900
3000	939	260	334	150	590	1029	4.36	43.09	109.99	3000

TABLE 36. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-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)
	NF_3 - NF_3	NF_3 - D_2	D_2 - D_2	NF_3 - NF_3	NF_3 - D_2	D_2 - D_2	NF_3 - NF_3	NF_3 - D_2	D_2 - D_2	
100	61	41	58	4	31	58	0.01	0.06	0.16	100
200	124	76	96	10	55	101	0.04	0.22	0.52	200
300	181	103	126	19	80	141	0.08	0.44	1.03	300
400	232	126	152	28	102	176	0.14	0.72	1.66	400
500	277	147	175	36	123	210	0.21	1.05	2.40	500
600	318	166	197	44	143	243	0.29	1.43	3.25	600
700	356	184	218	51	162	274	0.38	1.85	4.20	700
800	391	200	238	57	181	305	0.48	2.31	5.24	800
900	425	216	256	64	200	336	0.58	2.82	6.37	900
1000	456	232	275	69	217	365	0.70	3.35	7.58	1000
1100	487	246	292	74	233	393	0.82	3.93	8.88	1100
1200	516	261	309	80	250	421	0.95	4.54	10.25	1200
1300	544	275	325	84	266	449	1.08	5.18	11.71	1300
1400	572	288	341	89	282	476	1.23	5.86	13.24	1400
1500	598	301	357	94	298	502	1.38	6.57	14.84	1500
1600	624	314	372	98	313	528	1.54	7.31	16.51	1600
1700	649	327	387	102	328	554	1.70	8.08	18.26	1700
1800	674	339	402	106	342	579	1.87	8.88	20.07	1800
1900	698	351	416	110	357	605	2.05	9.72	21.95	1900
2000	722	363	430	114	372	630	2.23	10.58	23.90	2000
2100	745	375	444	118	386	654	2.42	11.47	25.91	2100
2200	768	386	457	122	400	678	2.61	12.39	27.98	2200
2300	790	397	471	125	413	702	2.81	13.33	30.12	2300
2400	813	408	484	129	427	726	3.01	14.31	32.32	2400
2500	834	419	497	133	441	750	3.23	15.31	34.58	2500
2600	856	430	510	136	455	774	3.44	16.33	36.90	2600
2700	877	441	522	140	468	797	3.67	17.39	39.28	2700
2800	898	451	535	143	482	821	3.89	18.47	41.72	2800
2900	919	462	547	147	495	844	4.13	19.57	44.21	2900
3000	939	472	559	150	509	868	4.36	20.70	46.77	3000

TABLE 37. TRANSPORT PROPERTIES OF NITROGEN TRIFLUORIDE-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)
	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}$	$\text{NF}_3\text{-NF}_3$	$\text{NF}_3\text{-D}$	
100	61	32	4	41	0.01	0.09	100
200	124	59	10	70	0.04	0.33	200
300	181	80	19	94	0.08	0.67	300
400	232	98	28	116	0.14	1.09	400
500	277	114	36	136	0.21	1.60	500
600	318	129	44	155	0.29	2.17	600
700	356	143	51	173	0.38	2.81	700
800	391	156	57	189	0.48	3.51	800
900	425	168	64	205	0.58	4.27	900
1000	456	180	69	220	0.70	5.08	1000
1100	487	192	74	234	0.82	5.95	1100
1200	516	203	80	249	0.95	6.88	1200
1300	544	214	84	262	1.08	7.85	1300
1400	572	224	89	275	1.23	8.88	1400
1500	598	235	94	288	1.38	9.96	1500
1600	624	245	98	300	1.54	11.08	1600
1700	649	254	102	312	1.70	12.25	1700
1800	674	264	106	324	1.87	13.46	1800
1900	698	273	110	336	2.05	14.73	1900
2000	722	283	114	348	2.23	16.03	2000
2100	745	292	118	359	2.42	17.38	2100
2200	768	301	122	370	2.61	18.77	2200
2300	790	309	125	381	2.81	20.21	2300
2400	813	318	129	392	3.01	21.68	2400
2500	834	326	133	403	3.23	23.20	2500
2600	856	335	136	413	3.44	24.76	2600
2700	877	343	140	423	3.67	26.35	2700
2800	898	351	143	433	3.89	27.99	2800
2900	919	359	147	443	4.13	29.66	2900
3000	939	367	150	453	4.36	31.38	3000

TABLE 38. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-HELIUM MIXTURES

Temp. (K)	Viscosity ($\text{N}\cdot\text{m}^{-2} \cdot 10^{-5}$)			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)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-HE}$	HE-HE	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-HE}$	HE-HE	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-HE}$	HE-HE	
100	73	61	99	3	38	73	0.01	0.09	0.29	100
200	146	105	156	7	61	115	0.03	0.29	0.92	200
300	220	139	202	18	85	152	0.07	0.59	1.84	300
400	287	168	244	31	109	187	0.12	0.95	3.01	400
500	349	195	284	43	131	220	0.18	1.38	4.41	500
600	405	219	322	55	153	252	0.25	1.87	6.04	600
700	457	242	359	68	174	281	0.33	2.42	7.88	700
800	506	264	394	81	194	308	0.42	3.02	9.92	800
900	551	285	429	94	213	332	0.51	3.67	12.20	900
1000	595	305	461	107	232	357	0.62	4.36	14.60	1000
1100	637	325	494	117	248	380	0.73	5.11	17.20	1100
1200	677	344	525	126	264	403	0.84	5.90	20.10	1200
1300	715	362	556	134	279	425	0.97	6.74	23.00	1300
1400	752	380	586	142	294	447	1.10	7.62	26.30	1400
1500	788	397	614	150	309	468	1.23	8.54	29.60	1500
1600	823	414	643	157	322	488	1.38	9.50	33.20	1600
1700	857	431	671	163	335	508	1.52	10.51	36.90	1700
1800	890	447	698	170	349	528	1.68	11.55	40.80	1800
1900	922	463	725	177	362	547	1.84	12.63	44.90	1900
2000	954	479	752	183	374	566	2.00	13.75	49.10	2000
2100	985	494	778	189	387	585	2.17	14.91	53.50	2100
2200	1016	509	804	196	399	603	2.35	16.11	58.10	2200
2300	1046	524	830	202	412	622	2.53	17.34	62.80	2300
2400	1075	538	855	208	424	640	2.71	18.60	67.70	2400
2500	1104	553	880	214	435	657	2.90	19.90	72.80	2500
2600	1133	567	905	220	447	674	3.10	21.24	78.00	2600
2700	1161	581	929	226	458	691	3.30	22.61	83.40	2700
2800	1189	595	953	232	470	708	3.51	24.01	88.90	2800
2900	1216	609	977	238	481	724	3.72	25.45	94.60	2900
3000	1243	622	1001	244	492	740	3.93	26.92	101.00	3000

TABLE 39. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm} \cdot 2 \cdot 10^{-5}$)		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)
	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	$\text{N}_2\text{F}_4\text{-N}_2$	
100	73	62	3	6	0.01	0.02	100
200	146	125	7	12	0.03	0.06	200
300	220	182	18	22	0.07	0.13	300
400	287	232	31	32	0.12	0.23	400
500	349	276	43	41	0.18	0.34	500
600	405	316	55	49	0.25	0.46	600
700	457	354	68	58	0.33	0.61	700
800	506	388	81	67	0.42	0.76	800
900	551	421	94	76	0.51	0.93	900
1000	595	453	107	85	0.62	1.11	1000
1100	637	483	117	92	0.73	1.31	1100
1200	677	512	126	98	0.84	1.51	1200
1300	715	539	134	104	0.97	1.73	1300
1400	752	566	142	111	1.10	1.96	1400
1500	788	593	150	117	1.23	2.20	1500
1600	823	618	157	123	1.38	2.45	1600
1700	857	643	163	129	1.52	2.71	1700
1800	890	667	170	135	1.68	2.98	1800
1900	922	691	177	142	1.84	3.26	1900
2000	954	715	183	149	2.00	3.55	2000
2100	985	738	189	155	2.17	3.85	2100
2200	1016	760	196	161	2.35	4.16	2200
2300	1046	783	202	165	2.53	4.48	2300
2400	1075	805	208	172	2.71	4.80	2400
2500	1104	826	214	177	2.90	5.14	2500
2600	1133	847	220	183	3.10	5.49	2600
2700	1161	868	226	188	3.30	5.84	2700
2800	1189	889	232	193	3.51	6.20	2800
2900	1216	910	238	199	3.72	6.57	2900
3000	1243	930	244	204	3.93	6.95	3000

TABLE 40. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-ARGON 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)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-A}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-A}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-A}$	
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	1053	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 41. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-HYDROGEN 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)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}_2$	$\text{H}_2\text{-H}_2$	
100	73	27	3	35	0.01	0.07	0.20	100
200	146	53	7	67	0.03	0.29	0.71	200
300	220	75	18	100	0.07	0.61	1.43	300
400	287	93	31	126	0.12	1.02	2.33	400
500	349	110	43	150	0.18	1.50	3.39	500
600	405	125	55	173	0.25	2.05	4.59	600
700	457	139	68	196	0.33	2.66	5.93	700
800	506	152	81	220	0.42	3.34	7.41	800
900	551	164	94	244	0.51	4.07	9.00	900
1000	595	176	107	267	0.62	4.86	10.72	1000
1100	637	188	117	288	0.73	5.70	12.56	1100
1200	677	199	126	309	0.84	6.59	14.50	1200
1300	715	209	134	330	0.97	7.53	16.56	1300
1400	752	219	142	350	1.10	8.51	18.72	1400
1500	788	230	150	371	1.23	9.55	20.99	1500
1600	823	239	157	390	1.38	10.63	23.36	1600
1700	857	249	163	410	1.52	11.75	25.82	1700
1800	890	258	170	429	1.68	12.92	28.39	1800
1900	922	268	177	448	1.84	14.13	31.05	1900
2000	954	277	183	467	2.00	15.38	33.80	2000
2100	985	286	189	486	2.17	16.68	36.64	2100
2200	1016	294	196	504	2.35	18.01	39.58	2200
2300	1046	303	202	522	2.53	19.39	42.60	2300
2400	1075	311	208	540	2.71	20.80	45.71	2400
2500	1104	320	214	558	2.90	22.26	48.91	2500
2600	1133	328	220	576	3.10	23.75	52.19	2600
2700	1161	336	226	593	3.30	25.29	55.56	2700
2800	1189	344	232	609	3.51	26.86	59.00	2800
2900	1216	352	238	626	3.72	28.46	62.54	2900
3000	1243	360	244	643	3.93	30.11	66.15	3000

TABLE 42. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-ATOMIC HYDROGEN 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)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-H}$	
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 43. TRANSPORT PROPERTIES OF NITROGEN TETRAFLUORIDE-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)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}_2$	$\text{D}_2\text{-D}_2$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}_2$	$\text{D}_2\text{-D}_2$	
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 44. 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)
	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}$	$\text{N}_2\text{F}_4\text{-N}_2\text{F}_4$	$\text{N}_2\text{F}_4\text{-D}$	
100	73	32	3	41	0.01	0.09	100
200	146	61	7	68	0.03	0.34	200
300	220	84	18	94	0.07	0.69	300
400	287	104	31	117	0.12	1.14	400
500	349	121	43	140	0.18	1.67	500
600	405	137	55	161	0.25	2.28	600
700	457	152	68	181	0.33	2.95	700
800	506	166	81	201	0.42	3.69	800
900	551	179	94	220	0.51	4.49	900
1000	595	192	107	239	0.62	5.36	1000
1100	637	204	117	256	0.73	6.28	1100
1200	677	216	126	272	0.84	7.25	1200
1300	715	228	134	287	0.97	8.28	1300
1400	752	239	142	301	1.10	9.36	1400
1500	788	250	150	316	1.23	10.50	1500
1600	823	260	157	330	1.38	11.68	1600
1700	857	271	163	343	1.52	12.92	1700
1800	890	281	170	356	1.68	14.20	1800
1900	922	291	177	370	1.84	15.53	1900
2000	954	301	183	382	2.00	16.90	2000
2100	985	311	189	395	2.17	18.33	2100
2200	1016	320	196	407	2.35	19.80	2200
2300	1046	329	202	419	2.53	21.31	2300
2400	1075	339	208	431	2.71	22.86	2400
2500	1104	348	214	443	2.90	24.46	2500
2600	1133	357	220	455	3.10	26.10	2600
2700	1161	366	226	466	3.30	27.79	2700
2800	1189	374	232	478	3.51	29.51	2800
2900	1216	383	238	489	3.72	31.28	2900
3000	1243	391	244	500	3.93	33.09	3000

TABLE 45. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-HELIUM 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)
	HE-HE	HE-CLF ₅ CLF ₅ -CLF ₅	HE-HE	HE-CLF ₅ CLF ₅ -CLF ₅	HE-HE	HE-CLF ₅ CLF ₅ -CLF ₅	
100	99	41	40	7	0.29	0.06	100
200	156	73	64	13	0.92	0.20	200
300	202	98	85	19	1.84	0.41	300
400	244	119	106	25	3.01	0.67	400
500	284	139	126	32	4.41	0.97	500
600	322	156	145	38	6.04	1.32	600
700	359	173	162	44	7.88	1.71	700
800	394	189	179	50	9.92	2.13	800
900	429	204	194	57	12.20	2.59	900
1000	461	218	210	63	14.60	3.08	1000
1100	494	232	223	67	17.20	3.61	1100
1200	525	245	238	74	20.10	4.17	1200
1300	556	259	252	79	23.00	4.76	1300
1400	586	271	266	85	26.30	5.39	1400
1500	614	284	279	90	29.60	6.04	1500
1600	643	296	291	95	33.20	6.72	1600
1700	671	308	304	100	36.90	7.43	1700
1800	698	319	316	105	40.80	8.17	1800
1900	725	331	328	109	44.90	8.93	1900
2000	752	342	339	112	49.10	9.72	2000
2100	778	353	350	115	53.50	10.54	2100
2200	804	363	360	118	58.10	11.38	2200
2300	830	374	371	121	62.80	12.25	2300
2400	855	384	381	123	67.70	13.15	2400
2500	880	395	391	125	72.80	14.07	2500
2600	905	405	400	127	78.00	15.01	2600
2700	929	415	410	129	83.40	15.98	2700
2800	953	425	419	131	88.90	16.97	2800
2900	977	435	428	133	94.60	17.99	2900
3000	1001	444	437	135	101.00	19.03	3000

TABLE 46. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ClF}_5$	$\text{N}_2\text{-ClF}_5$	$\text{ClF}_5\text{-ClF}_5$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-ClF}_5$	
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	38	0.69	0.32	600
700	330	260	260	44	0.89	0.42	700
800	361	287	292	50	1.12	0.54	800
900	390	313	324	57	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	74	2.21	1.08	1200
1300	496	404	436	79	2.52	1.24	1300
1400	521	425	461	85	2.85	1.40	1400
1500	544	445	486	90	3.20	1.57	1500
1600	568	465	510	95	3.56	1.76	1600
1700	591	484	533	100	3.94	1.94	1700
1800	613	503	555	105	4.33	2.14	1800
1900	635	521	577	109	4.73	2.34	1900
2000	656	539	598	112	5.15	2.55	2000
2100	677	556	619	115	5.59	2.77	2100
2200	698	573	640	118	6.03	2.99	2200
2300	718	590	660	121	6.50	3.22	2300
2400	738	607	680	123	6.97	3.46	2400
2500	758	623	699	125	7.46	3.70	2500
2600	778	639	718	127	7.96	3.95	2600
2700	797	655	736	129	8.47	4.21	2700
2800	816	671	755	131	9.00	4.47	2800
2900	835	686	773	133	9.54	4.74	2900
3000	853	702	790	135	10.09	5.01	3000

TABLE 47. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-ARGON 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)
	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 48. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-HYDROGEN 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)
	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-ClF}_5$	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-ClF}_5$	$\text{H}_2\text{-H}_2$	$\text{H}_2\text{-ClF}_5$	
100	38	17	68	37	7	0.20	100
200	66	35	128	70	13	0.71	200
300	89	51	182	100	19	1.43	300
400	108	65	221	123	25	2.33	400
500	125	77	257	144	32	3.39	500
600	141	88	291	164	38	4.59	600
700	156	99	325	184	44	5.93	700
800	170	108	360	205	50	7.41	800
900	184	118	394	225	57	9.00	900
1000	197	126	428	245	63	10.72	1000
1100	209	135	460	263	67	12.56	1100
1200	221	143	493	283	74	14.50	1200
1300	233	150	526	302	79	16.56	1300
1400	244	158	559	322	85	18.72	1400
1500	256	165	592	341	90	20.99	1500
1600	267	172	624	359	95	23.36	1600
1700	277	179	657	378	100	25.82	1700
1800	288	186	689	397	105	28.39	1800
1900	298	193	720	414	109	31.05	1900
2000	308	199	752	432	112	33.80	2000
2100	318	206	783	449	115	36.64	2100
2200	328	212	813	465	118	39.58	2200
2300	337	218	843	482	121	42.60	2300
2400	347	224	873	498	123	45.71	2400
2500	356	230	903	514	125	48.91	2500
2600	365	236	932	529	127	52.19	2600
2700	374	242	960	544	129	55.56	2700
2800	383	248	987	559	131	59.00	2800
2900	392	254	1014	573	133	62.54	2900
3000	400	259	1042	588	135	66.15	3000

TABLE 49. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-ATOMIC HYDROGEN 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)
	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 50. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-DEUTERIUM MIXTURES

Temp. (K)	Viscosity, η ($\text{Nsm}^{-2} \cdot 10^{-5}$)		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)
	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-CLF}_5$	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-CLF}_5$	$\text{D}_2\text{-D}_2$	$\text{D}_2\text{-CLF}_5$	
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 51. TRANSPORT PROPERTIES OF CHLORINE PENTAFLUORIDE-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)
	$\text{CLF}_5\text{-CLF}_5$	$\text{CLF}_5\text{-D}$	$\text{CLF}_5\text{-CLF}_5$	$\text{CLF}_5\text{-D}$	$\text{CLF}_5\text{-CLF}_5$	$\text{CLF}_5\text{-D}$	
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 52. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)			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 53. TRANSPORT PROPERTIES OF HYDROGEN FLUORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)		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	HF-HF	HF-A	HF-HF	HF-A	
100	42	57	9	8	0.02	0.02	100
200	82	114	17	14	0.09	0.09	200
300	125	171	26	21	0.20	0.21	300
400	167	221	35	28	0.36	0.36	400
500	206	267	44	35	0.55	0.54	500
600	242	308	51	40	0.78	0.75	600
700	277	347	59	46	1.04	0.98	700
800	309	383	66	51	1.33	1.24	800
900	339	417	73	56	1.64	1.52	900
1000	368	449	80	61	1.98	1.82	1000
1100	395	480	87	66	2.34	2.14	1100
1200	421	509	94	71	2.72	2.48	1200
1300	446	538	101	76	3.13	2.84	1300
1400	471	565	108	81	3.56	3.22	1400
1500	494	592	115	86	4.00	3.62	1500
1600	517	618	122	91	4.47	4.04	1600
1700	540	643	129	95	4.96	4.47	1700
1800	561	668	135	99	5.47	4.92	1800
1900	582	692	141	104	5.99	5.38	1900
2000	603	715	147	108	6.54	5.86	2000
2100	623	738	154	113	7.10	6.36	2100
2200	643	761	160	117	7.68	6.87	2200
2300	662	784	166	121	8.28	7.40	2300
2400	681	806	172	125	8.89	7.94	2400
2500	700	827	177	129	9.52	8.50	2500
2600	718	849	183	133	10.17	9.07	2600
2700	736	870	189	137	10.84	9.66	2700
2800	754	890	194	141	11.52	10.26	2800
2900	772	911	200	145	12.21	10.88	2900
3000	789	931	205	149	12.92	11.50	3000

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

TABLE 55. TRANSPORT PROPERTIES OF DEUTERIUM FLUORIDE-ARGON 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)
	DF-DF	DF-A	A-A	DF-DF	DF-A	DF-DF	DF-A	
100	69	73	83	12	9	0.03	0.03	100
200	140	149	166	25	18	0.14	0.11	200
300	208	217	237	37	29	0.30	0.25	300
400	268	276	298	48	34	0.52	0.42	400
500	322	329	352	58	42	0.78	0.62	500
600	372	377	401	68	49	1.08	0.85	600
700	417	421	447	77	55	1.42	1.12	700
800	460	463	490	86	61	1.79	1.40	800
900	500	502	531	95	67	2.19	1.71	900
1000	538	540	569	105	74	2.62	2.05	1000
1100	575	575	607	114	79	3.08	2.41	1100
1200	610	610	642	122	85	3.57	2.79	1200
1300	644	643	677	130	90	4.09	3.19	1300
1400	676	675	710	138	96	4.64	3.61	1400
1500	708	706	743	146	101	5.21	4.05	1500
1600	739	737	775	154	106	5.80	4.52	1600
1700	769	767	806	161	111	6.42	5.00	1700
1800	798	796	837	168	116	7.07	5.49	1800
1900	827	824	866	175	121	7.74	6.01	1900
2000	855	852	896	182	125	8.43	6.55	2000
2100	883	880	925	189	130	9.14	7.10	2100
2200	910	907	953	196	135	9.88	7.67	2200
2300	937	933	981	203	140	10.63	8.25	2300
2400	963	959	1008	209	144	11.41	8.86	2400
2500	989	985	1035	216	149	12.21	9.48	2500
2600	1014	1010	1062	222	153	13.03	10.11	2600
2700	1040	1035	1088	229	157	13.88	10.77	2700
2800	1064	1060	1114	235	161	14.74	11.44	2800
2900	1089	1084	1140	241	166	15.62	12.12	2900
3000	1113	1108	1165	247	170	16.52	12.82	3000

TABLE 56. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-HELIUM 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)
	HCL-HCL	HE-HE	HCL-HCL	HE-HE	HCL-HCL	HE-HE	
100	-	99	-	73	-	0.29	100
200	96	156	9	115	0.06	0.35	200
300	146	202	14	83	0.13	0.70	300
400	196	244	19	103	0.23	1.14	400
500	243	282	24	122	0.36	1.65	500
600	286	317	28	140	0.51	2.24	600
700	327	350	32	156	0.68	2.89	700
800	365	382	36	172	0.86	3.61	800
900	402	412	40	186	1.07	4.39	900
1000	436	441	44	200	1.29	5.23	1000
1100	469	470	47	213	1.52	6.12	1100
1200	500	497	51	227	1.77	7.07	1200
1300	531	523	54	239	2.04	8.07	1300
1400	560	549	58	252	2.32	9.13	1400
1500	588	574	61	264	2.61	10.23	1500
1600	615	598	65	276	2.92	11.39	1600
1700	642	622	68	288	3.24	12.59	1700
1800	668	646	72	300	3.57	13.84	1800
1900	693	669	75	311	3.91	15.14	1900
2000	718	692	79	332	4.27	16.48	2000
2100	742	714	82	333	4.63	17.86	2100
2200	766	736	85	344	5.01	19.30	2200
2300	789	757	89	355	5.41	20.77	2300
2400	812	778	92	366	5.81	22.29	2400
2500	834	799	95	376	6.22	23.84	2500
2600	856	820	98	386	6.64	25.44	2600
2700	878	840	102	396	7.08	27.09	2700
2800	899	860	105	406	7.52	28.77	2800
2900	920	880	109	416	7.98	30.49	2900
3000	941	899	112	426	8.44	32.25	3000

TABLE 57. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HCL}$	$\text{N}_2\text{-HCL}$	HCL-HCL	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-HCL}$	
100	65	-	9	-	0.03	-	100
200	128	113	18	13	0.10	0.08	200
300	179	167	26	20	0.21	0.17	300
400	223	215	33	26	0.34	0.29	400
500	262	259	39	31	0.50	0.44	500
600	297	298	44	36	0.69	0.61	600
700	330	334	49	40	0.89	0.80	700
800	361	369	54	45	1.12	1.00	800
900	390	401	59	49	1.37	1.23	900
1000	418	431	63	53	1.63	1.47	1000
1100	445	461	67	57	1.91	1.73	1100
1200	471	489	71	61	2.21	2.01	1200
1300	496	516	75	64	2.52	2.30	1300
1400	521	542	80	69	2.85	2.60	1400
1500	544	567	84	72	3.20	2.92	1500
1600	568	592	89	76	3.56	3.26	1600
1700	591	616	95	81	3.94	3.61	1700
1800	613	640	101	86	4.33	3.97	1800
1900	635	663	108	91	4.73	4.34	1900
2000	656	685	115	97	5.15	4.73	2000
2100	677	707	121	101	5.59	5.13	2100
2200	698	729	126	105	6.03	5.54	2200
2300	718	750	131	110	6.50	5.97	2300
2400	738	772	136	114	6.97	6.41	2400
2500	758	792	141	118	7.46	6.86	2500
2600	778	813	146	122	7.96	7.32	2600
2700	797	833	151	126	8.47	7.79	2700
2800	816	853	155	130	9.00	8.27	2800
2900	835	872	160	134	9.54	8.77	2900
3000	853	892	165	138	10.09	9.28	3000

TABLE 58. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-ARGON 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)
	HCL-HCL	HCL-A	HCL-HCL	HCL-A	HCL-HCL	HCL-A	
100	-	83	-	7	-	0.02	100
200	96	166	9	11	0.06	0.07	200
300	146	237	14	16	0.13	0.16	300
400	196	298	19	22	0.23	0.28	400
500	243	352	24	29	0.36	0.42	500
600	286	401	28	33	0.51	0.52	600
700	327	447	32	38	0.68	0.77	700
800	365	490	36	43	0.86	0.97	800
900	402	531	40	48	1.07	1.19	900
1000	436	569	44	53	1.29	1.43	1000
1100	469	607	47	57	1.52	1.68	1100
1200	500	642	51	62	1.77	1.95	1200
1300	531	677	54	66	2.04	2.23	1300
1400	560	710	58	71	2.32	2.53	1400
1500	588	743	61	75	2.61	2.84	1500
1600	615	775	65	80	2.92	3.17	1600
1700	642	806	68	84	3.24	3.51	1700
1800	668	837	72	88	3.57	3.86	1800
1900	693	866	75	92	3.91	4.23	1900
2000	718	896	79	95	4.27	4.61	2000
2100	742	925	82	98	4.63	5.00	2100
2200	766	953	85	101	5.01	5.40	2200
2300	789	981	89	105	5.41	5.82	2300
2400	812	1008	92	107	5.81	6.24	2400
2500	834	1035	95	110	6.22	6.68	2500
2600	856	1062	98	112	6.64	7.13	2600
2700	878	1088	102	115	7.08	7.59	2700
2800	899	1114	105	118	7.52	8.06	2800
2900	920	1140	109	121	7.98	8.55	2900
3000	941	1165	112	123	8.44	9.04	3000

TABLE 59. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-HYDROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm} \cdot 10^{-5}$)		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)
	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 60. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-ATOMIC HYDROGEN 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)
	HCL-HCL	HCL-H H-H	HCL-HCL	HCL-H H-H	HCL-HCL	HCL-H H-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 61. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-FLUORINE 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)
	HCL-HCL	F ₂ -F ₂	HCL-HCL	F ₂ -F ₂	HCL-HCL	F ₂ -F ₂	
100	-	86	-	10	-	0.02	100
200	96	130	9	14	0.06	0.08	200
300	146	193	14	21	0.13	0.17	300
400	196	248	19	28	0.23	0.29	400
500	243	298	24	34	0.36	0.43	500
600	286	344	28	40	0.51	0.60	600
700	327	386	32	45	0.68	0.78	700
800	365	425	36	50	0.86	0.99	800
900	402	462	40	55	1.07	1.21	900
1000	436	498	44	60	1.29	1.45	1000
1100	469	531	47	64	1.52	1.70	1100
1200	500	564	51	69	1.77	1.97	1200
1300	531	595	54	73	2.04	2.26	1300
1400	560	625	58	77	2.32	2.56	1400
1500	588	654	61	81	2.61	2.87	1500
1600	615	683	65	86	2.92	3.20	1600
1700	642	711	68	90	3.24	3.54	1700
1800	668	738	72	94	3.57	3.90	1800
1900	693	764	75	98	3.91	4.26	1900
2000	718	790	79	102	4.27	4.65	2000
2100	742	816	82	106	4.63	5.04	2100
2200	766	841	85	109	5.01	5.44	2200
2300	789	865	89	113	5.41	5.86	2300
2400	812	890	92	117	5.81	6.29	2400
2500	834	914	95	121	6.22	6.73	2500
2600	856	937	98	124	6.64	7.18	2600
2700	878	960	102	128	7.08	7.65	2700
2800	899	983	105	132	7.52	8.12	2800
2900	920	1006	109	136	7.98	8.61	2900
3000	941	1028	112	139	8.44	9.11	3000

TABLE 62. TRANSPORT PROPERTIES OF HYDROGEN CHLORIDE-ATOMIC FLUORINE 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)
	HCL-HCL	HCL-F	HCL-HCL	HCL-F	HCL-HCL	HCL-F	
100	-	-	-	13	-	0.04	100
200	96	120	9	18	0.06	0.10	200
300	146	178	14	26	0.13	0.23	300
400	196	229	19	33	0.23	0.40	400
500	243	276	24	39	0.36	0.59	500
600	286	318	28	44	0.51	0.82	600
700	327	356	32	49	0.68	1.08	700
800	365	393	36	54	0.86	1.36	800
900	402	427	40	59	1.07	1.66	900
1000	436	460	44	64	1.29	1.99	1000
1100	469	491	47	68	1.52	2.34	1100
1200	500	521	51	72	1.77	2.71	1200
1300	531	549	54	76	2.04	3.10	1300
1400	560	577	58	80	2.32	3.52	1400
1500	588	604	61	84	2.61	3.95	1500
1600	615	631	65	88	2.92	4.40	1600
1700	642	656	68	92	3.24	4.87	1700
1800	668	681	72	96	3.57	5.36	1800
1900	693	706	75	100	3.91	5.87	1900
2000	718	730	79	104	4.27	6.39	2000
2100	742	753	82	108	4.63	6.93	2100
2200	766	777	85	112	5.01	7.49	2200
2300	789	799	89	117	5.41	8.06	2300
2400	812	822	92	121	5.81	8.65	2400
2500	834	844	95	126	6.22	9.26	2500
2600	856	866	98	130	6.64	9.81	2600
2700	878	887	102	134	7.08	10.59	2700
2800	899	908	105	138	7.52	11.40	2800
2900	920	929	109	142	7.98	12.23	2900
3000	941	950	112	146	8.44	13.09	3000
				150			
				153			
				157			
				161			
				165			
				168			
				170			
				175			
				180			
				185			
				190			
				195			
				200			
				205			
				210			
				215			
				220			
				225			
				230			
				235			
				240			
				245			
				250			
				255			
				260			
				265			
				270			
				275			
				280			
				285			
				290			
				295			
				300			

TABLE 63. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-HELIUM 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-HE	DCL-DCL	DCL-HE	DCL-DCL	DCL-HE	
100	79	82	-	73	0.02	0.12	100
200	160	139	19	115	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	633	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 64. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-NITROGEN MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)		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)
	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DCL DCL-DCL}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DCL DCL-DCL}$	$\text{N}_2\text{-N}_2$	$\text{N}_2\text{-DCL DCL-DCL}$	
100	65	71	9	-	0.03	0.02	100
200	128	143	18	18	0.10	0.10	200
300	179	206	26	25	0.21	0.21	300
400	223	261	33	31	0.34	0.35	400
500	262	310	39	35	0.50	0.52	500
600	297	354	44	40	0.69	0.72	600
700	330	396	49	45	0.89	0.93	700
800	361	434	54	49	1.12	1.17	800
900	390	471	59	54	1.37	1.43	900
1000	418	505	63	58	1.63	1.71	1000
1100	445	539	67	62	1.91	2.01	1100
1200	471	571	71	67	2.21	2.33	1200
1300	496	601	75	71	2.52	2.66	1300
1400	521	631	80	75	2.85	3.01	1400
1500	544	661	84	79	3.20	3.38	1500
1600	568	689	89	84	3.56	3.76	1600
1700	591	717	95	89	3.94	4.16	1700
1800	613	744	101	94	4.33	4.58	1800
1900	635	770	108	99	4.73	5.01	1900
2000	656	797	115	105	5.15	5.45	2000
2100	677	822	121	110	5.59	5.91	2100
2200	698	847	126	114	6.03	6.39	2200
2300	718	872	131	118	6.50	6.87	2300
2400	738	897	136	122	6.97	7.38	2400
2500	758	921	141	126	7.46	7.89	2500
2600	778	944	146	130	7.96	8.42	2600
2700	797	968	151	135	8.47	8.97	2700
2800	816	991	155	138	9.00	9.52	2800
2900	835	1014	160	142	9.54	10.09	2900
3000	853	1036	165	146	10.09	10.68	3000

TABLE 65. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-ARGON MIXTURES

Temp. (K)	Viscosity ($\text{Nsm}^{-2} \cdot 10^{-6}$)		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	482	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 66. 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	-	-	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 67. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-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)
	DCL-DCL	DCL-D	DCL-DCL	DCL-D	DCL-DCL	DCL-D	
100	79	44	-	-	0.02	0.13	100
200	160	83	19	74	0.09	0.47	200
300	238	113	24	97	0.21	0.96	300
400	308	139	28	116	0.35	1.58	400
500	372	162	32	134	0.53	2.32	500
600	429	184	37	152	0.74	3.15	600
700	482	203	41	168	0.97	4.09	700
800	532	222	45	183	1.23	5.11	800
900	579	240	50	198	1.50	6.22	900
1000	623	257	54	212	1.80	7.41	1000
1100	666	273	58	226	2.12	8.68	1100
1200	707	289	63	240	2.45	10.02	1200
1300	746	304	67	253	2.81	11.44	1300
1400	784	319	71	266	3.19	12.94	1400
1500	821	334	75	278	3.58	14.51	1500
1600	857	348	79	291	3.99	16.14	1600
1700	892	362	83	303	4.41	17.85	1700
1800	926	376	87	315	4.86	19.62	1800
1900	960	389	91	327	5.32	21.46	1900
2000	992	402	95	336	5.79	23.36	2000
2100	1024	415	99	350	6.28	25.33	2100
2200	1056	428	102	360	6.79	27.36	2200
2300	1087	440	106	371	7.31	29.45	2300
2400	1118	453	109	382	7.85	31.60	2400
2500	1148	465	112	392	8.40	33.81	2500
2600	1177	477	115	402	8.96	36.08	2600
2700	1206	488	119	413	9.54	38.40	2700
2800	1235	500	121	422	10.13	40.79	2800
2900	1264	512	124	432	10.74	43.23	2900
3000	1292	523	126	441	11.36	45.73	3000

TABLE 68. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-FLUORINE 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-F ₂	DCL-DCL	DCL-F ₂	DCL-DCL	DCL-F ₂	
100	-	-	-	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 69. TRANSPORT PROPERTIES OF DEUTERIUM CHLORIDE-ATOMIC FLUORINE 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-F	DCL-DCL	DCL-F	DCL-DCL	DCL-F	
100	79	76	-	13	0.02	0.03	100
200	160	154	19	23	0.09	0.13	200
300	238	222	24	31	0.21	0.28	300
400	308	281	28	37	0.35	0.48	400
500	372	333	32	43	0.53	0.71	500
600	429	381	37	49	0.74	0.98	600
700	482	425	41	54	0.97	1.28	700
800	532	467	45	59	1.23	1.60	800
900	579	506	50	64	1.50	1.96	900
1000	623	543	54	69	1.80	2.34	1000
1100	666	579	58	73	2.12	2.75	1100
1200	707	613	63	78	2.45	3.18	1200
1300	746	647	67	83	2.81	3.64	1300
1400	784	679	71	87	3.19	4.12	1400
1500	821	710	75	91	3.58	4.62	1500
1600	857	741	79	95	3.99	5.14	1600
1700	892	770	83	100	4.41	5.69	1700
1800	926	800	87	104	4.86	6.26	1800
1900	960	828	91	108	5.32	6.84	1900
2000	992	856	95	112	5.79	7.45	2000
2100	1024	884	99	116	6.28	8.08	2100
2200	1056	911	102	120	6.79	8.73	2200
2300	1087	937	106	124	7.31	9.40	2300
2400	1118	964	109	127	7.85	10.08	2400
2500	1148	989	112	131	8.40	10.79	2500
2600	1177	1015	115	134	8.96	11.51	2600
2700	1206	1040	119	138	9.54	12.25	2700
2800	1235	1065	121	141	10.13	13.02	2800
2900	1264	1089	124	144	10.74	13.79	2900
3000	1292	1114	126	147	11.36	14.59	3000

APPENDIX

Errata to TPRC Report 20 [1]

on	change	to
page 1, Eq. 3	$10^6 D$	$10^5 D$
page 6, line 7	[16]	[22]
page 7, line 8 of text	[8]	[5]
page 9, lines 6, 8 of text	Table 2	Table 1
pages 18-64	$\text{Nsm}^{-2} \cdot 10^{-4}$	$\text{Nsm}^{-2} \cdot 10^{-5}$
pages 18-64	The diffusion coefficient tabulated is for $p = 1 \text{ atm.}$	

END

DATE
FILMED

6-83

DTIC