

Thermal conductivity of liquids: Aliphatic hydrocarbons

Part 2. Alkenes, dienes and trienes

Endorsed by
The Institution of Chemical Engineers
The Institution of Mechanical Engineers

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THERMAL CONDUCTIVITY OF LIQUIDS: ALIPHATIC HYDROCARBONS PART 2. ALKENES, DIENES AND TRIENES

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Data Sheets for each of the liquids are given in the following order:

Formula	Name	Alternative Name(s)	
C₂ and C₃ ALKENES			
1. C ₂ H ₄	Ethene	Ethylene	9
2. C ₃ H ₆	Propene	Propylene	10
BUTENES			
3. H ₂ C=CHCH ₂ CH ₃	But-1-ene	1-Butene Butene-1 1-Butylene α-Butylene	11
4. <i>cis</i> -(CH ₃)HC=CH(CH ₃)	<i>cis</i> -But-2-ene	<i>cis</i> -2-Butene <i>cis</i> -2-Butylene	12
5. <i>trans</i> -(CH ₃)HC=CH(CH ₃)	<i>trans</i> -But-2-ene	<i>trans</i> -2-Butene <i>trans</i> -2-Butylene	13
6. H ₂ C=C(CH ₃) ₂	2-Methylpropene	Isobutene Isobutylene	14

Formula	Name	Alternative Name(s)	
PENTENES			
7. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_2\text{CH}_3$	Pent-1-ene	1-Pentene Pentene-1 α -Amylene	15
8. $\text{cis}-(\text{CH}_3)\text{HC}=\text{CHCH}_2\text{CH}_3$	<i>cis</i> -Pent-2-ene	<i>cis</i> -2-Pentene <i>cis</i> - β -Amylene	16
9. $\text{trans}-(\text{CH}_3)\text{HC}=\text{CHCH}_2\text{CH}_3$	<i>trans</i> -Pent-2-ene	<i>trans</i> -2-Pentene <i>trans</i> - β -Amylene	17
10. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$	2-Methylbut-1-ene	2-Methyl-1-butene γ -Amylene	18
11. $\text{H}_2\text{C}=\text{CHCH}(\text{CH}_3)_2$	3-Methylbut-1-ene	3-Methyl-1-butene α -Isoamylene	19
12. $(\text{CH}_3)_2\text{C}=\text{CHCH}_3$	2-Methylbut-2-ene	2-Methyl-2-butene β -Isoamylene	20
HEXENES			
13. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_3\text{CH}_3$	Hex-1-ene	1-Hexene Hexene-1 α -Hexylene	21
14. $\text{cis}-(\text{CH}_3)\text{HC}=\text{CH}[\text{CH}_2]_2\text{CH}_3$	<i>cis</i> -Hex-2-ene	<i>cis</i> -2-Hexene	23
15. $\text{trans}-(\text{CH}_3)\text{HC}=\text{CH}[\text{CH}_2]_2\text{CH}_3$	<i>trans</i> -Hex-2-ene	<i>trans</i> -2-Hexene	24
16. $\text{cis}-(\text{CH}_3\text{CH}_2)\text{HC}=\text{CH}(\text{CH}_2\text{CH}_3)$	<i>cis</i> -Hex-3-ene	<i>cis</i> -3-Hexene	25
17. $\text{trans}-(\text{CH}_3\text{CH}_2)\text{HC}=\text{CH}(\text{CH}_2\text{CH}_3)$	<i>trans</i> -Hex-3-ene	<i>trans</i> -3-Hexene	26
18. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)[\text{CH}_2]_2\text{CH}_3$	2-Methylpent-1-ene	2-Methyl-1-pentene	27
19. $\text{H}_2\text{C}=\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}_3$	3-Methylpent-1-ene	3-Methyl-1-pentene	28
20. $\text{H}_2\text{C}=\text{CHCH}_2\text{CH}(\text{CH}_3)_2$	4-Methylpent-1-ene	4-Methyl-1-pentene	29
21. $(\text{CH}_3)_2\text{C}=\text{CHCH}_2\text{CH}_3$	2-Methylpent-2-ene	2-Methyl-2-pentene	30
22. $\text{cis}-(\text{CH}_3)\text{HC}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$	3-Methyl- <i>cis</i> -pent-2-ene	3-Methyl- <i>cis</i> -2-pentene	31
23. $\text{trans}-(\text{CH}_3)\text{HC}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$	3-Methyl- <i>trans</i> -pent-2-ene	3-Methyl- <i>trans</i> -2-pentene	32
24. $\text{cis}-(\text{CH}_3)\text{HC}=\text{CHCH}(\text{CH}_3)_2$	4-Methyl- <i>cis</i> -pent-2-ene	4-Methyl- <i>cis</i> -2-pentene	33
25. $\text{trans}-(\text{CH}_3)\text{HC}=\text{CHCH}(\text{CH}_3)_2$	4-Methyl- <i>trans</i> -pent-2-ene	4-Methyl- <i>trans</i> -2-pentene	34
26. $\text{H}_2\text{C}=\text{C}(\text{CH}_2\text{CH}_3)_2$	2-Ethylbut-1-ene	2-Ethyl-1-butene	35
27. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$	2,3-Dimethylbut-1-ene	2,3-Dimethyl-1-butene	36
28. $\text{H}_2\text{C}=\text{CHC}(\text{CH}_3)_3$	3,3-Dimethylbut-1-ene	3,3-Dimethyl-1-butene	37
29. $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_3)_2$	2,3-Dimethylbut-2-ene	2,3-Dimethyl-2-butene Tetramethylethylene	38

Formula	Name	Alternative Name(s)	
HEPTENES			
30. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_4\text{CH}_3$	Hept-1-ene	1-Heptene Heptene-1 α -Heptylene	39
31. <i>cis</i> -(CH_3) $\text{HC}=\text{CH}[\text{CH}_2]_3\text{CH}_3$	<i>cis</i> -Hept-2-ene	<i>cis</i> -2-Heptene	41
32. <i>trans</i> -(CH_3) $\text{HC}=\text{CH}[\text{CH}_2]_3\text{CH}_3$	<i>trans</i> -Hept-2-ene	<i>trans</i> -2-Heptene	42
33. <i>cis</i> -(CH_3CH_2) $\text{HC}=\text{CH}[\text{CH}_2]_2\text{CH}_3$	<i>cis</i> -Hept-3-ene	<i>cis</i> -3-Heptene	43
34. <i>trans</i> -(CH_3CH_2) $\text{HC}=\text{CH}[\text{CH}_2]_2\text{CH}_3$	<i>trans</i> -Hept-3-ene	<i>trans</i> -3-Heptene	44
35. <i>cis</i> -(CH_3)(CH_3CH_2) $\text{C}=\text{CH}(\text{CH}_2\text{CH}_3)$	3-Methyl- <i>cis</i> -hex-3-ene	3-Methyl- <i>cis</i> -3-hexene	45
36. <i>trans</i> -(CH_3)(CH_3CH_2) $\text{C}=\text{CH}(\text{CH}_2\text{CH}_3)$	3-Methyl- <i>trans</i> -hex-3-ene	3-Methyl- <i>trans</i> -3-hexene	46
37. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)_2$	2,4-Dimethylpent-1-ene	2,4-Dimethyl-1-pentene	47
38. $\text{H}_2\text{C}=\text{CHCH}_2\text{C}(\text{CH}_3)_3$	4,4-Dimethylpent-1-ene	4,4-Dimethyl-1-pentene	48
39. $(\text{CH}_3)_2\text{C}=\text{CHCH}(\text{CH}_3)_2$	2,4-Dimethylpent-2-ene	2,4-Dimethyl-2-pentene	49
40. <i>cis</i> -(CH_3) $\text{HC}=\text{CHC}(\text{CH}_3)_3$	4,4-Dimethyl- <i>cis</i> -pent-2-ene	4,4-Dimethyl- <i>cis</i> -2-pentene	50
41. <i>trans</i> -(CH_3) $\text{HC}=\text{CHC}(\text{CH}_3)_3$	4,4-Dimethyl- <i>trans</i> -pent-2-ene	4,4-Dimethyl- <i>trans</i> -2-pentene	51
42. $\text{H}_2\text{C}=\text{C}(\text{CH}_2\text{CH}_3)\text{CH}(\text{CH}_3)_2$	3-Methyl-2-ethylbut-1-ene	3-Methyl-2-ethyl-1-butene	52
43. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{C}(\text{CH}_3)_3$	2,3,3-Trimethylbut-1-ene	2,3,3-Trimethyl-1-butene	53
OCTENES			
44. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_5\text{CH}_3$	Oct-1-ene	1-Octene Octene-1 α -Octylene	54
45. <i>cis</i> -(CH_3) $\text{HC}=\text{CH}[\text{CH}_2]_4\text{CH}_3$	<i>cis</i> -Oct-2-ene	<i>cis</i> -2-Octene	56
46. <i>trans</i> -(CH_3) $\text{HC}=\text{CH}[\text{CH}_2]_4\text{CH}_3$	<i>trans</i> -Oct-2-ene	<i>trans</i> -2-Octene	57
47. $(\text{CH}_3)(\text{CH}_3\text{CH}_2)\text{C}=\text{CH}[\text{CH}_2]_2\text{CH}_3$	3-Methylhept-3-ene	3-Methyl-3-heptene	58
48. $\text{H}_2\text{C}=\text{C}(\text{CH}_2\text{CH}_3)[\text{CH}_2]_3\text{CH}_3$	2-Ethylhex-1-ene	2-Ethyl-1-hexene	59
49. <i>cis</i> -((CH_3) $_3\text{C}$) $\text{HC}=\text{CHCH}_2\text{CH}_3$	2,2-Dimethyl- <i>cis</i> -hex-3-ene	2,2-Dimethyl- <i>cis</i> -3-hexene	60
50. <i>trans</i> -((CH_3) $_3\text{C}$) $\text{HC}=\text{CHCH}_2\text{CH}_3$	2,2-Dimethyl- <i>trans</i> -hex-3-ene	2,2-Dimethyl- <i>trans</i> -3-hexene	61
51. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}(\text{CH}_2\text{CH}_3)_2$	2-Methyl-3-ethylpent-1-ene	2-Methyl-3-ethyl-1-pentene	62
52. $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2\text{C}(\text{CH}_3)_3$	2,4,4-Trimethylpent-1-ene	2,4,4-Trimethyl-1-pentene	63
53. $(\text{CH}_3)_2\text{C}=\text{CHC}(\text{CH}_3)_3$	2,4,4-Trimethylpent-2-ene	2,4,4-Trimethyl-2-pentene	64

Formula	Name	Alternative Name(s)	
C₉ to C₁₂ ALKENES			
54. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_6\text{CH}_3$	Non-1-ene	1-Nonene Nonene-1 α -Nonylene	65
55. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_7\text{CH}_3$	Dec-1-ene	1-Decene Decene-1 α -Decylene	66
56. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_8\text{CH}_3$	Undec-1-ene	1-Undecene Undecene-1 α -Undecylene	67
57. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_9\text{CH}_3$	Dodec-1-ene	1-Dodecene Dodecene-1 α -Dodecylene	68
C₁₃ to C₁₆ ALKENES			
58. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_{10}\text{CH}_3$	Tridec-1-ene	1-Tridecene Tridecene-1 α -Tridecylene	69
59. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_{11}\text{CH}_3$	Tetradec-1-ene	1-Tetradecene Tetradecene-1 α -Tetradecylene	70
60. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_{12}\text{CH}_3$	Pentadec-1-ene	1-Pentadecene Pentadecene-1 α -Pentadecylene	71
61. $\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_{13}\text{CH}_3$	Hexadec-1-ene	1-Hexadecene Hexadecene-1 α -Hexadecylene	72
C₃ and C₄ ALKADIENES			
62. $\text{H}_2\text{C}=\text{C}=\text{CH}_2$	Propadiene	Allene	73
63. $\text{H}_2\text{C}=\text{C}=\text{CHCH}_3$	Buta-1,2-diene	1,2-Butadiene	74
64. $(\text{H}_2\text{C}=\text{CH})\text{HC}=\text{CH}_2$	Buta-1,3-diene	1,3-Butadiene Bivinyll Vinylethylene	75
PENTADIENES			
65. $\text{H}_2\text{C}=\text{C}=\text{CHCH}_2\text{CH}_3$	Penta-1,2-diene	1,2-Pentadiene	76
66. <i>cis</i> -($\text{H}_2\text{C}=\text{CH})\text{HC}=\text{CHCH}_3$	Penta-1, <i>cis</i> -3-diene	1, <i>cis</i> -3-Pentadiene <i>cis</i> -Piperylene	77
67. <i>trans</i> -($\text{H}_2\text{C}=\text{CH})\text{HC}=\text{CHCH}_3$	Penta-1, <i>trans</i> -3-diene	1, <i>trans</i> -3-Pentadiene <i>trans</i> -Piperylene	78
68. $((\text{H}_2\text{C}=\text{CH})\text{CH}_2)\text{HC}=\text{CH}_2$	Penta-1,4-diene	1,4-Pentadiene	79
69. $(\text{CH}_3)\text{HC}=\text{C}=\text{CH}(\text{CH}_3)$	Penta-2,3-diene	2,3-Pentadiene	80

Formula	Name	Alternative Name(s)	
70. $\text{H}_2\text{C}=\text{C}=\text{C}(\text{CH}_3)_2$	3-Methylbuta-1,2-diene	3-Methyl-1,2-butadiene	81
71. $(\text{H}_2\text{C}=\text{C}(\text{CH}_3))\text{HC}=\text{CH}_2$	2-Methylbuta-1,3-diene	2-Methyl-1,3-butadiene Isoprene	82

HEXADIENES and HEXATRIENES

72. $\text{trans}-(\text{H}_2\text{C}=\text{CH})\text{HC}=\text{CHCH}_2\text{CH}_3$	Hexa-1, <i>trans</i> -3-diene	1, <i>trans</i> -3-Hexadiene	83
73. $\text{trans}-(\text{H}_2\text{C}=\text{CHCH}_2)\text{HC}=\text{CHCH}_3$	Hexa-1, <i>trans</i> -4-diene	1, <i>trans</i> -4-Hexadiene	84
74. $(\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_2)\text{HC}=\text{CH}_2$	Hexa-1,5-diene	1,5-Hexadiene	85
75. $\text{trans-trans}-((\text{CH}_3)\text{HC}=\text{CH})\text{HC}=\text{CH}(\text{CH}_3)$	Hexa- <i>trans</i> -2, <i>trans</i> -4-diene	<i>trans</i> -2, <i>trans</i> -4-Hexadiene	86
76. $(\text{H}_2\text{C}=\text{C}(\text{CH}_3))(\text{CH}_3)\text{C}=\text{CH}_2$	2,3-Dimethylbuta-1,3-diene	2,3-Dimethyl-1,3-butadiene	87
77. $\text{cis}-((\text{H}_2\text{C}=\text{CH})\text{HC}=\text{CH})\text{HC}=\text{CH}_2$	Hexa-1, <i>cis</i> -3,5-triene	1, <i>cis</i> -3,5-Hexatriene	88

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THERMAL CONDUCTIVITY OF LIQUIDS: ALIPHATIC HYDROCARBONS

Part 2. Alkenes, dienes and trienes

1. INTRODUCTION

This Item presents values of thermal conductivity at saturation pressure, in tabular form, for straight and branched chain liquid alkenes, dienes and trienes.

The data on which these recommended values of thermal conductivity are based are the most reliable available and the temperature range covered is from the melting temperature to approximately 0.9 of the critical temperature. Quantities are expressed in SI units and conversion factors to other units are provided in Section 3.

Section 4 describes the procedure used to obtain the values of thermal conductivity presented and indicates the effect of pressure. Section 5 gives an explanation of the Tables and indicates the uncertainties in the values presented in them.

References to sources of supplementary information are given in Section 6. The data sources for each particular compound are listed on the appropriate data sheet.

2. NOTATION AND UNITS

The SI unit of thermal conductivity is the watt per metre kelvin (W/m K). A convenient submultiple SI unit for the range of thermal conductivity in this Item is the milliwatt per metre kelvin (mW/m K); hence that is the unit adopted here.

A	constant for each liquid in Equation (4.2)	mW/m K
A'	constant for each liquid in Equation (4.1)	mW/m K
B, C, D	non-dimensional constants for each liquid in Equation (4.2)	–
p	pressure	N/m ² (Pa)
T	kelvin temperature	K
t	Celsius temperature, $T - 273.15$	°C
λ	thermal conductivity	mW/m K

Subscripts

c	denotes value at the critical point
p	denotes value at pressure p
r	denotes reduced quantity, <i>e.g.</i> $T_r = T/T_c$.

3. CONVERSION FACTORS

$$\begin{aligned}
 1 \text{ mW/m K} &= 0.8598 \times 10^{-3} \text{ kcal/m h } ^\circ\text{C}^* \\
 &= 2.3885 \times 10^{-6} \text{ cal/cm s } ^\circ\text{C}^* \\
 &= 0.5778 \times 10^{-3} \text{ Chu/ft h } ^\circ\text{C}^* \\
 &= 0.5778 \times 10^{-3} \text{ Btu/ft h } ^\circ\text{F}^* \\
 &= 6.9335 \times 10^{-3} \text{ Btu in/ft}^2 \text{ h } ^\circ\text{F}^*
 \end{aligned}$$

$$\begin{aligned}
 10^5 \text{ N/m}^2 &= 1 \text{ bar} \\
 &= 14.5038 \text{ lbf/in}^2 \\
 &= 1.0197 \text{ kgf/cm}^2 \\
 &= 0.9869 \text{ atm} \\
 &= 750.062 \text{ mmHg.}
 \end{aligned}$$

* The values used for the calorie and British Thermal Unit are International Table values.

4. THERMAL CONDUCTIVITY

4.1 Thermal Conductivity at Saturation Pressure

In Reference 2 Riedel showed that the experimental data for the thermal conductivity of normal (that is unassociated) liquids along the saturation line could be represented by the equation:

$$\lambda = A'[1 + (20/3)(1 - T_r)^{2/3}]. \quad (4.1)$$

The range of applicability of Equation (4.1) is limited for most compounds. For the liquids considered in this Item a good representation of the data* between the melting temperature and $T_r = 0.9$ is obtained from the equation:

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]. \quad (4.2)$$

Measurements of thermal conductivity have been made for relatively few liquids at $T_r > 0.9$ and so, because of the uncertain variation of thermal conductivity in the critical region, data are presented only for temperatures up to $T_r = 0.9$. The equation extrapolates in a physically realistic manner to within a few kelvin of the critical point.

The critical temperatures for these compounds have either been taken from ESDU 85008, 85016, 86001 (References 8, 9 and 10) or estimated from correlations of ESDU values with chemical structure. In this Item, the critical temperatures should be regarded as correlating parameters only and should not be taken as a source of accurate values.

The derived values of A , B , C and D given in Table 7.1 are a correlated set of values giving the best fit to the experimental data, not only as individual compounds but also as members of their chemical series. This method of correlating data for a series of compounds has been described in References 5 and 6. For all the alkenes, dienes and trienes in this Item, it was found that C and D are directly related to $B^\dagger$, as was observed for other non-hydrogen-bonded compounds such as the alkanes. Correlated values of the constants A , B , C and D were used to estimate constants for liquids for which no experimental data exist. Using these

* Experimental data at temperatures below the normal boiling temperature, t_b , are often at 1 atm pressure. As indicated in Section 4.2 the difference between values of λ at 1 atm pressure and at saturation pressure below t_b is not significant.

† $C = 1 - 3B$ and $D = 3B$. The values of B , C and D are presented to two decimal places in Table 7.1 and on the data sheets.

values with the values of T_c given in Table 7.1, values of λ in mW/m K have been calculated for each compound from Equation (4.2) and are presented in the data sheets.

4.2 Effect of Pressure

At temperatures up to the normal boiling point, the effect of pressure from the saturation pressure to $50 \times 10^5 \text{ N/m}^2$ (up to 50 atm) is to increase the thermal conductivity by approximately 1 per cent and, for most practical purposes, values at saturation pressure may be taken as equal to those at atmospheric pressure.

Reference 1 gives measurements of thermal conductivity for a number of liquids up to $12\,000 \times 10^5 \text{ N/m}^2$ ($\approx 12\,000 \text{ atm}$) at 30 °C and 75 °C. A generalised correlation of these results is given in Reference 3, but a knowledge of the critical pressure of the substance is required for its use.

For pressures up to $500 \times 10^5 \text{ N/m}^2$ ($\approx 500 \text{ atm}$) between the melting temperature and the normal boiling point a very approximate relationship:

$$\lambda_p/\lambda \approx 1 + 0.2p \times 10^{-8}, \quad (4.3)$$

may be used where λ_p is the thermal conductivity at pressure p and λ is the thermal conductivity at a pressure of 10^5 N/m^2 ($\approx 1 \text{ atm}$), both at the same temperature.

5. EXPLANATION OF TABLES

The constants of Equation (4.2) are given in Table 7.1 and on the data sheets. Values of the thermal conductivity are given in the data sheets at 10 kelvin intervals in K and °C, from within 10 kelvin of the melting temperature, or an appropriate starting temperature where the melting temperature is unknown, to a temperature corresponding with $T_r \approx 0.9$.

The sources are given in the data sheets and extrapolated values are indicated in parentheses.

For uniformity and ease of interpolation the data are presented and can be read to more significant digits than is warranted by their estimated accuracy.

The experimental data from the most reliable individual sources have a repeatability of about ± 1 per cent although differences in technique used by different workers (and possibly also in the purity of samples) can increase the uncertainty in the absolute values to about ± 2 per cent. However, such reliable data are not available for all the compounds considered, nor over the whole temperature range covered. Although it is considered that the correlation procedures adopted keep the errors in the values presented to a minimum, the user should in general allow for an uncertainty of ± 5 per cent unless the value in the data sheet is truncated to a whole number. Where whole numbers are given the uncertainty increases to ± 10 per cent.

Some fluids have poor thermal stability coupled with a high critical temperature. Values have been tabulated for all fluids up to $T_r \approx 0.9$ but many of these fluids will decompose at elevated temperatures. As most compounds will decompose rapidly at temperatures above about 300 °C, uncertainties of greater than ± 10 per cent may occur for temperatures $\geq 573 \text{ K}$.

6. REFERENCES

The references given are recommended sources of information supplementary to that in this Item.

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7. TABLES

TABLE 7.1 Constants for Equation (4.2)

Compound		T_c	A	B	C	D	Range of Applicability	
		K	mW/m K				°C	
1.	Ethene	282.35	60.32	5.00	-14.00	15.00	-170	to -10
2.	Propene	365.57	52.87	4.20	-11.60	12.60	-190	to 60
3.	But-1-ene	419.95	49.70	3.68	-10.05	11.05	-190	to 110
4.	<i>cis</i> -But-2-ene	435.58	53.45	3.68	-10.05	11.05	-140	to 130
5.	<i>trans</i> -But-2-ene	428.63	53.45	3.68	-10.05	11.05	-110	to 120
6.	2-Methylpropene	417.9	46.00	3.68	-10.05	11.05	-140	to 110
7.	Pent-1-ene	464.78	46.87	3.44	-9.32	10.32	-170	to 150
8.	<i>cis</i> -Pent-2-ene	475.15	50.33	3.44	-9.32	10.32	-150	to 160
9.	<i>trans</i> -Pent-2-ene	474.15	50.33	3.44	-9.32	10.32	-140	to 160
10.	2-Methylbut-1-ene	470.15	43.41	3.44	-9.32	10.32	-140	to 160
11.	3-Methylbut-1-ene	453.15	43.41	3.44	-9.32	10.32	-170	to 140
12.	2-Methylbut-2-ene	481.15	46.49	3.44	-9.32	10.32	-140	to 170
13.	Hex-1-ene	504.03	45.81	3.21	-8.63	9.63	-140	to 190
14.	<i>cis</i> -Hex-2-ene	511.15	48.18	3.21	-8.63	9.63	-140	to 200
15.	<i>trans</i> -Hex-2-ene	510.15	48.18	3.21	-8.63	9.63	-130	to 190
16.	<i>cis</i> -Hex-3-ene	508.15	48.58	3.21	-8.63	9.63	-130	to 190
17.	<i>trans</i> -Hex-3-ene	509.15	48.58	3.21	-8.63	9.63	-110	to 190
18.	2-Methylpent-1-ene	505.15	42.26	3.21	-8.63	9.63	-140	to 190
19.	3-Methylpent-1-ene	495.15	42.26	3.21	-8.63	9.63	-150	to 180
20.	4-Methylpent-1-ene	492.15	42.26	3.21	-8.63	9.63	-160	to 180
21.	2-Methylpent-2-ene	513.15	45.42	3.21	-8.63	9.63	-140	to 200
22.	3-Methyl- <i>cis</i> -pent-2-ene	515.15	44.63	3.21	-8.63	9.63	-140	to 200
23.	3-Methyl- <i>trans</i> -pent-2-ene	519.15	44.63	3.21	-8.63	9.63	-140	to 200
24.	4-Methyl- <i>cis</i> -pent-2-ene	496.15	44.63	3.21	-8.63	9.63	-140	to 180
25.	4-Methyl- <i>trans</i> -pent-2-ene	500.15	44.63	3.21	-8.63	9.63	-140	to 190
26.	2-Ethylbut-1-ene	511.15	42.65	3.21	-8.63	9.63	-130	to 200
27.	2,3-Dimethylbut-1-ene	501.15	40.68	3.21	-8.63	9.63	-160	to 190
28.	3,3-Dimethylbut-1-ene	480.15	39.10	3.21	-8.63	9.63	-120	to 170
29.	2,3-Dimethylbut-2-ene	527.15	45.02	3.21	-8.63	9.63	-80	to 210

TABLE 7.1 Constants for Equation (4.2) (Continued)

Compound		T_c	A	B	C	D	Range of Applicability
		K	mW/m K				°C
30.	Hept-1-ene	537.3	46.18	3.00	-7.99	8.99	-120 to 220
31.	<i>cis</i> -Hept-2-ene	544.15	49.42	3.00	-7.99	8.99	-110 to 220
32.	<i>trans</i> -Hept-2-ene	543.15	49.42	3.00	-7.99	8.99	-110 to 220
33.	<i>cis</i> -Hept-3-ene	540.15	49.42	3.00	-7.99	8.99	-130 to 220
34.	<i>trans</i> -Hept-3-ene	540.15	49.42	3.00	-7.99	8.99	-140 to 220
35.	3-Methyl- <i>cis</i> -hex-3-ene	544.15	46.18	3.00	-7.99	8.99	-130 to 220
36.	3-Methyl- <i>trans</i> -hex-3-ene	542.15	46.18	3.00	-7.99	8.99	-130 to 220
37.	2,4-Dimethylpent-1-ene	526.15	40.10	3.00	-7.99	8.99	-130 to 210
38.	4,4-Dimethylpent-1-ene	515.15	38.89	3.00	-7.99	8.99	-140 to 200
39.	2,4-Dimethylpent-2-ene	526.15	43.34	3.00	-7.99	8.99	-130 to 210
40.	4,4-Dimethyl- <i>cis</i> -pent-2-ene	527.15	41.30	3.00	-7.99	8.99	-140 to 210
41.	4,4-Dimethyl- <i>trans</i> -pent-2-ene	521.15	41.30	3.00	-7.99	8.99	-120 to 200
42.	3-Methyl-2-ethylbut-1-ene	537.15	38.48	3.00	-7.99	8.99	-120 to 220
43.	2,3,3-Trimethylbut-1-ene	531.15	37.67	3.00	-7.99	8.99	-110 to 210
44.	Oct-1-ene	566.65	46.64	2.79	-7.38	8.38	-100 to 240
45.	<i>cis</i> -Oct-2-ene	573.15	49.97	2.79	-7.38	8.38	-100 to 250
46.	<i>trans</i> -Oct-2-ene	571.15	49.97	2.79	-7.38	8.38	-90 to 250
47.	3-Methylhept-3-ene	572.15	46.23	2.79	-7.38	8.38	-90 to 250
48.	2-Ethylhex-1-ene	569.15	42.89	2.79	-7.38	8.38	-90 to 250
49.	2,2-Dimethyl- <i>cis</i> -hex-3-ene	548.15	42.00	2.79	-7.38	8.38	-140 to 230
50.	2,2-Dimethyl- <i>trans</i> -hex-3-ene	546.15	42.00	2.79	-7.38	8.38	-130 to 230
51.	2-Methyl-3-ethylpent-1-ene	561.15	41.20	2.79	-7.38	8.38	-110 to 240
52.	2,4,4-Trimethylpent-1-ene	550.15	39.15	2.79	-7.38	8.38	-90 to 230
53.	2,4,4-Trimethylpent-2-ene	555.15	41.65	2.79	-7.38	8.38	-110 to 230
54.	Non-1-ene	592.15	46.86	2.61	-6.83	7.83	-80 to 270
55.	Dec-1-ene	616.15	47.90	2.44	-6.31	7.31	-70 to 290
56.	Undec-1-ene	638.15	49.43	2.28	-5.84	6.84	-50 to 310
57.	Dodec-1-ene	657.15	50.82	2.14	-5.41	6.41	-40 to 330

TABLE 7.1 Constants for Equation (4.2) (Continued)

Compound		T_c	A	B	C	D	Range of Applicability
		K	mW/m K				°C
58.	Tridec-1-ene	675.15	52.19	2.01	-5.02	6.00	-20 to 340
59.	Tetradec-1-ene	692.15	53.20	1.89	-4.68	5.68	-10 to 360
60.	Pentadec-1-ene	707.15	54.47	1.79	-4.38	5.38	-10 to 370
61.	Hexadec-1-ene	722.15	55.21	1.71	-4.12	5.12	0 to 380
62.	Propadiene	392.15	58.16	4.20	-11.60	12.60	-140 to 90
63.	Buta-1,2-diene	452.15	52.33	3.68	-10.05	11.05	-140 to 140
64.	Buta-1,3-diene	425.17	52.33	3.68	-10.05	11.05	-110 to 120
65.	Penta-1,2-diene	491.15	48.80	3.44	-9.32	10.32	-140 to 180
66.	Penta-1, <i>cis</i> -3-diene	490.15	48.80	3.44	-9.32	10.32	-140 to 180
67.	Penta-1, <i>trans</i> -3-diene	487.15	48.80	3.44	-9.32	10.32	-90 to 170
68.	Penta-1,4-diene	462.15	48.50	3.44	-9.32	10.32	-150 to 150
69.	Penta-2,3-diene	497.15	48.50	3.44	-9.32	10.32	-130 to 180
70.	3-Methylbuta-1,2-diene	489.15	45.30	3.44	-9.32	10.32	-120 to 180
71.	2-Methylbuta-1,3-diene	479.15	45.30	3.44	-9.32	10.32	-150 to 170
72.	Hexa-1, <i>trans</i> -3-diene	520.15	47.40	3.21	-8.63	9.63	-140 to 200
73.	Hexa-1, <i>trans</i> -4-diene	510.15	47.40	3.21	-8.63	9.63	-140 to 190
74.	Hexa-1,5-diene	501.15	47.39	3.21	-8.63	9.63	-140 to 190
75.	Hexa- <i>trans</i> -2, <i>trans</i> -4-diene	536.15	47.51	3.21	-8.63	9.63	-140 to 220
76.	2,3-Dimethylbuta-1,3-diene	525.15	42.20	3.21	-8.63	9.63	-80 to 210
77.	Hexa-1, <i>cis</i> -3,5-triene	540.15	49.00	3.21	-8.63	9.63	-140 to 220

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C₂H₄ ETHENE (ETHYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 282.35$ K

$A = 60.32$, $B = 5.00$, $C = -14.00$, $D = 15.00$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
100	(274.)	190	163.2	-170	270.1	-80	159.9
110	260.8	200	152.8	-160	256.6	-70	149.7
120	247.4	210	143.0	-150	243.3	-60	140.1
130	234.4	220	133.9	-140	230.3	-50	131.2
140	221.6	230	125.	-130	217.6	-40	123.
150	209.1	240	118.	-120	205.3	-30	116.
160	197.0	250	111.	-110	193.3	-20	109.
170	185.3	260	106.	-100	181.7	-10	104.
180	174.0			-90	170.6		

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C_3H_6 PROPENE (PROPYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$$T_r = T/T_c, \quad T = \text{temperature (K)}$$

$$T_c = 365.57 \text{ K}$$

$$A = 52.87, \quad B = 4.20, \quad C = -11.60, \quad D = 12.60$$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
80	(258.)	210	156.4	-190	(255.)	-60	154.2
90	(249.)	220	149.6	-180	247.	-50	147.4
100	241.	230	142.9	-170	238.	-40	140.8
110	233.	240	136.4	-160	230.	-30	134.4
120	224.	250	130.1	-150	222.	-20	128.2
130	216.	260	124.1	-140	213.9	-10	122.2
140	208.5	270	118.3	-130	206.0	0	116.5
150	200.6	280	112.7	-120	198.2	10	111.0
160	192.9	290	107.5	-110	190.5	20	105.9
170	185.3	300	102.5	-100	183.0	30	101.0
180	177.9	310	98.0	-90	175.6	40	96.6
190	170.6	320	93.8	-80	168.3	50	92.6
200	163.4	330	90.	-70	161.2	60	89.

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H₂C=CHCH₂CH₃ BUT-1-ENE (1-BUTENE, BUTENE-1, 1-BUTYLENE, α-BUTYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 419.95$ K

$A = 49.70$, $B = 3.68$, $C = -10.05$, $D = 11.05$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
80	(231.)	240	(139.)	-190	(229.)	-30	(137.4)
90	(225.)	250	(134.0)	-180	(223.)	-20	(132.4)
100	(218.)	260	(129.0)	-170	(217.)	-10	(127.5)
110	(212.)	270	(124.2)	-160	(210.)	0	(122.7)
120	(206.)	280	(119.4)	-150	(204.)	10	(118.0)
130	(200.)	290	(114.8)	-140	(198.)	20	(113.4)
140	(194.)	300	(110.4)	-130	(193.)	30	(109.0)
150	(189.)	310	(106.1)	-120	(187.)	40	(104.7)
160	(183.)	320	(101.9)	-110	(181.)	50	(100.7)
170	(177.)	330	(98.)	-100	(175.)	60	(97.)
180	(171.)	340	(94.)	-90	(170.)	70	(93.)
190	(166.)	350	(91.)	-80	(164.)	80	(90.)
200	(160.)	360	(87.)	-70	(159.)	90	(86.)
210	(155.)	370	(84.)	-60	(153.)	100	(83.)
220	(149.)	380	(81.)	-50	(148.)	110	(81.)
230	(144.)			-40	(143.)		

cis-(CH₃)HC=CH(CH₃) *cis*-BUT-2-ENE (*cis*-2-BUTENE, *cis*-2-BUTYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 435.58$ K

$A = 53.45$, $B = 3.68$, $C = -10.05$, $D = 11.05$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
130	(218.)	270	(139.)	-140	(217.)	0	(137.)
140	(212.)	280	(134.)	-130	(210.)	10	(132.)
150	(206.)	290	(129.)	-120	(204.)	20	(127.)
160	(200.)	300	(124.)	-110	(198.)	30	(122.)
170	(194.)	310	(119.)	-100	(192.)	40	(118.)
180	(188.)	320	(115.)	-90	(186.)	50	(113.)
190	(182.)	330	(110.)	-80	(181.)	60	(109.)
200	(177.)	340	(106.)	-70	(175.)	70	(105.)
210	(171.)	350	(102.)	-60	(169.)	80	(101.)
220	(165.)	360	(99.)	-50	(163.)	90	(97.)
230	(160.)	370	(95.)	-40	(158.)	100	(94.)
240	(154.)	380	(92.)	-30	(153.)	110	(91.)
250	(149.)	390	(89.)	-20	(147.)	120	(88.)
260	(144.)	400	(86.)	-10	(142.)	130	(85.)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

 λ = thermal conductivity at saturation pressure (mW/m K)
$$T_r = T/T_c, \quad T = \text{temperature (K)}$$
$$T_c = 428.63 \text{ K}$$
$$A = 53.45, \quad B = 3.68, \quad C = -10.05, \quad D = 11.05$$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
160	(199.)	280	(131.)	-110	(197.)	10	(130.)
170	(192.)	290	(126.)	-100	(191.)	20	(125.)
180	(186.)	300	(122.)	-90	(185.)	30	(120.)
190	(181.)	310	(117.)	-80	(179.)	40	(116.)
200	(175.)	320	(112.)	-70	(173.)	50	(111.)
210	(169.)	330	(108.)	-60	(167.)	60	(107.)
220	(163.)	340	(104.)	-50	(161.)	70	(103.)
230	(158.)	350	(100.)	-40	(156.)	80	(99.)
240	(152.)	360	(96.)	-30	(150.)	90	(95.)
250	(147.)	370	(93.)	-20	(145.)	100	(92.)
260	(142.)	380	(90.)	-10	(140.)	110	(89.)
270	(136.)	390	(87.)	0	(135.)	120	(86.)

$\text{H}_2\text{C}=\text{C}(\text{CH}_3)_2$ 2-METHYLPROPENE (ISOBUTENE, ISOBUTYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 417.9$ K

$A = 46.00$, $B = 3.68$, $C = -10.05$, $D = 11.05$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
130	(185.)	260	118.8	-140	(183.)	-10	117.4
140	(180.)	270	114.3	-130	(178.)	0	112.9
150	(174.)	280	109.9	-120	(172.)	10	108.6
160	(169.)	290	105.7	-110	(167.)	20	104.4
170	(163.)	300	101.6	-100	(162.)	30	100.3
180	(158.)	310	97.6	-90	(156.)	40	96.4
190	(153.)	320	93.7	-80	151.	50	92.6
200	148.	330	90.1	-70	146.	60	89.0
210	143.	340	86.6	-60	141.	70	85.5
220	138.	350	83.3	-50	136.2	80	82.3
230	132.9	360	80.2	-40	131.4	90	79.3
240	128.1	370	77.4	-30	126.6	100	76.6
250	123.4	380	75.	-20	122.0	110	74.

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$\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_2\text{CH}_3$ PENT-1-ENE (1-PENTENE, PENTENE-1, α -AMYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 464.78$ K

$A = 46.87$, $B = 3.44$, $C = -9.32$, $D = 10.32$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
100	(204.)	270	125.6	-170	(202.)	0	124.3
110	(199.)	280	121.5	-160	(197.)	10	120.3
120	(194.)	290	117.6	-150	(192.)	20	116.3
130	(189.)	300	113.7	-140	(187.)	30	112.4
140	(184.)	310	(109.8)	-130	(182.)	40	(108.7)
150	(179.)	320	(106.1)	-120	(178.)	50	(105.0)
160	(174.)	330	(102.5)	-110	(173.)	60	(101.4)
170	(170.)	340	(98.9)	-100	(168.)	70	(97.9)
180	(165.)	350	(95.5)	-90	(164.)	80	(94.5)
190	(160.)	360	(92.2)	-80	(159.)	90	(91.2)
200	(156.)	370	(89.1)	-70	(154.)	100	(88.1)
210	(151.)	380	(86.)	-60	(150.0)	110	(85.)
220	(146.9)	390	(83.)	-50	(145.5)	120	(82.)
230	(142.5)	400	(80.)	-40	(141.2)	130	(80.)
240	(138.2)	410	(78.)	-30	(136.9)	140	(77.)
250	(133.9)	420	(76.)	-20	132.6	150	(75.)
260	129.7			-10	128.4		

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cis-(CH₃)HC=CHCH₂CH₃ *cis*-PENT-2-ENE (*cis*-2-PENTENE, *cis*-β-AMYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 475.15$ K

$A = 50.33$, $B = 3.44$, $C = -9.32$, $D = 10.32$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
120	(209.)	280	(133.)	-150	(208.)	10	(132.)
130	(204.)	290	(129.)	-140	(203.)	20	(128.)
140	(199.)	300	(125.)	-130	(198.)	30	(123.)
150	(194.)	310	(121.)	-120	(192.)	40	(119.)
160	(189.)	320	(117.)	-110	(188.)	50	(115.)
170	(184.)	330	(113.)	-100	(183.)	60	(112.)
180	(179.)	340	(109.)	-90	(178.)	70	(108.)
190	(174.)	350	(105.)	-80	(173.)	80	(104.)
200	(170.)	360	(102.)	-70	(168.)	90	(101.)
210	(165.)	370	(98.)	-60	(163.)	100	(97.)
220	(160.)	380	(95.)	-50	(159.)	110	(94.)
230	(155.)	390	(92.)	-40	(154.)	120	(91.)
240	(151.)	400	(89.)	-30	(149.)	130	(88.)
250	(146.)	410	(86.)	-20	(145.)	140	(85.)
260	(142.)	420	(83.)	-10	(140.)	150	(83.)
270	(137.)	430	(81.)	0	(136.)	160	(80.)

trans-(CH₃)HC=CHCH₂CH₃ *trans*-PENT-2-ENE (*trans*-2-PENTENE, *trans*-β-AMYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 474.15$ K

$A = 50.33$, $B = 3.44$, $C = -9.32$, $D = 10.32$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
130	(204.)	290	(129.)	-140	(202.)	20	(127.)
140	(199.)	300	(125.)	-130	(197.)	30	(123.)
150	(194.)	310	(120.)	-120	(192.)	40	(119.)
160	(189.)	320	(116.)	-110	(187.)	50	(115.)
170	(184.)	330	(113.)	-100	(182.)	60	(111.)
180	(179.)	340	(109.)	-90	(177.)	70	(108.)
190	(174.)	350	(105.)	-80	(173.)	80	(104.)
200	(169.)	360	(102.)	-70	(168.)	90	(100.)
210	(165.)	370	(98.)	-60	(163.)	100	(97.)
220	(160.)	380	(95.)	-50	(158.)	110	(94.)
230	(155.)	390	(92.)	-40	(154.)	120	(91.)
240	(151.)	400	(89.)	-30	(149.)	130	(88.)
250	(146.)	410	(86.)	-20	(145.)	140	(85.)
260	(142.)	420	(83.)	-10	(140.)	150	(82.)
270	(137.)	430	(81.)	0	(136.)	160	(80.)
280	(133.)			10	(132.)		

$\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$ 2-METHYLBUT-1-ENE (2-METHYL-1-BUTENE, γ -AMYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 470.15 \text{ K}$

$A = 43.41$, $B = 3.44$, $C = -9.32$, $D = 10.32$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
130	(176.)	290	(110.)	-140	(174.)	20	(109.)
140	(171.)	300	(106.)	-130	(170.)	30	(105.)
150	(167.)	310	(103.)	-120	(165.)	40	(102.)
160	(162.)	320	(100.)	-110	(161.)	50	(98.)
170	(158.)	330	(96.)	-100	(157.)	60	(95.)
180	(154.)	340	(93.)	-90	(152.)	70	(92.)
190	(150.)	350	(90.)	-80	(148.)	80	(89.)
200	(145.)	360	(87.)	-70	(144.)	90	(86.)
210	(141.)	370	(84.)	-60	(140.)	100	(83.)
220	(137.)	380	(81.)	-50	(136.)	110	(80.)
230	(133.)	390	(78.)	-40	(132.)	120	(77.)
240	(129.)	400	(76.)	-30	(128.)	130	(75.)
250	(125.)	410	(73.)	-20	(124.)	140	(73.)
260	(121.)	420	(71.)	-10	(120.)	150	(70.)
270	(118.)	430	(69.)	0	(116.)	160	(68.)
280	(114.)			10	(113.)		

$\text{H}_2\text{C}=\text{CHCH}(\text{CH}_3)_2$ 3-METHYLBUT-1-ENE (3-METHYL-1-BUTENE, α -ISOAMYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 453.15 \text{ K}$

$A = 43.41$, $B = 3.44$, $C = -9.32$, $D = 10.32$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
100	(187.)	260	(118.)	-170	(186.)	-10	(116.)
110	(183.)	270	(114.)	-160	(181.)	0	(113.)
120	(178.)	280	(110.)	-150	(177.)	10	(109.)
130	(173.)	290	(106.)	-140	(172.)	20	(105.)
140	(169.)	300	(103.)	-130	(167.)	30	(101.)
150	(164.)	310	(99.)	-120	(163.)	40	(98.)
160	(160.)	320	(96.)	-110	(158.)	50	(94.)
170	(155.)	330	(92.)	-100	(154.)	60	(91.)
180	(151.)	340	(89.)	-90	(150.)	70	(88.)
190	(147.)	350	(86.)	-80	(145.)	80	(85.)
200	(142.)	360	(83.)	-70	(141.)	90	(82.)
210	(138.)	370	(80.)	-60	(137.)	100	(79.)
220	(134.)	380	(77.)	-50	(132.)	110	(76.)
230	(130.)	390	(75.)	-40	(128.)	120	(74.)
240	(126.)	400	(72.)	-30	(124.)	130	(71.)
250	(122.)	410	(70.)	-20	(120.)	140	(69.)

$(\text{CH}_3)_2\text{C}=\text{CHCH}_3$ 2-METHYLBUT-2-ENE (2-METHYL-2-BUTENE, β -ISOAMYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$T_r = T/T_c$, T = temperature (K)

$T_c = 481.15 \text{ K}$

$A = 46.49$, $B = 3.44$, $C = -9.32$, $D = 10.32$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
130	(189.)	290	120.5	-140	(188.)	20	119.3
140	(185.)	300	116.7	-130	(183.)	30	115.5
150	(180.)	310	(112.9)	-120	(179.)	40	(111.8)
160	(176.)	320	(109.3)	-110	(174.)	50	(108.1)
170	(171.)	330	(105.7)	-100	(170.)	60	(104.6)
180	(167.)	340	(102.2)	-90	(165.)	70	(101.1)
190	(162.)	350	(98.8)	-80	(161.)	80	(97.8)
200	(158.)	360	(95.5)	-70	(156.)	90	(94.5)
210	(153.)	370	(92.3)	-60	(152.0)	100	(91.3)
220	(149.0)	380	(89.)	-50	147.7	110	(88.)
230	144.8	390	(86.)	-40	143.5	120	(85.)
240	140.6	400	(84.)	-30	139.3	130	(83.)
250	136.5	410	(81.)	-20	135.2	140	(80.)
260	132.4	420	(78.)	-10	131.1	150	(78.)
270	128.4	430	(76.)	0	127.1	160	(75.)
280	124.4	440	(74.)	10	123.2	170	(73.)

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Unpublished data, Private communication to D.T. Jamieson.

$\text{H}_2\text{C}=\text{CH}[\text{CH}_2]_3\text{CH}_3$ HEX-1-ENE (1-HEXENE, HEXENE-1, α -HEXYLENE)

$$\lambda = A[1 + B(1 - T_r)^{1/3} + C(1 - T_r)^{2/3} + D(1 - T_r)]$$

where

λ = thermal conductivity at saturation pressure (mW/m K)

$$T_r = T/T_c, \quad T = \text{temperature (K)}$$

$$T_c = 504.03 \text{ K}$$

$$A = 45.81, \quad B = 3.21, \quad C = -8.63, \quad D = 9.63$$

T K	λ mW/m K	T K	λ mW/m K	t °C	λ mW/m K	t °C	λ mW/m K
130	(182.)	300	116.8	-140	181.0	30	115.7
140	178.1	310	113.4	-130	176.8	40	112.3
150	174.0	320	110.0	-120	172.7	50	109.0
160	169.9	330	106.7	-110	168.6	60	105.7
170	165.9	340	103.5	-100	164.6	70	102.5
180	161.8	350	100.3	-90	160.6	80	99.3
190	157.9	360	97.2	-80	156.6	90	96.3
200	153.9	370	94.2	-70	152.7	100	93.3
210	150.0	380	91.	-60	148.8	110	90.
220	146.1	390	88.	-50	144.9	120	88.
230	142.3	400	86.	-40	141.1	130	85.
240	138.5	410	83.	-30	137.4	140	82.
250	134.8	420	81.	-20	133.6	150	80.
260	131.1	430	78.	-10	130.0	160	77.
270	127.5	440	76.	0	126.3	170	75.
280	123.9	450	74.	10	122.7	180	73.
290	120.3	460	72.	20	119.2	190	71.

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