

THERMAL CONDUCTIVITY OF GASES

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The following table gives the thermal conductivity of some common gases as a function of temperature. Unless otherwise noted, the thermal conductivity values refer to a pressure of 100 kPa (1 bar) or to the saturation vapor pressure if that is less than 100 kPa. The notation $P=0$ indicates that the low-pressure limiting value is given. The difference between the thermal conductivity at 100 kPa and the limiting value is generally less than 1 %. Uncertainties for gases in this table are generally less than 3 %; uncertainty information on specific fluids can be found in the references. Thermal conductivity is given in units of $\text{mW m}^{-1} \text{K}^{-1}$. Substances are listed in the modified Hill order.

		Thermal conductivity in $\text{mW m}^{-1} \text{K}^{-1}$						
		100 K	200 K	300 K	400 K	500 K	600 K	Ref.
	Air	9.5	18.5	26.4	33.5	39.9	46.0	1
Ar	Argon ($P=0$)	6.3	12.4	17.7	22.4	26.5	30.3	2,3*
BF ₃	Boron trifluoride			19.0	24.6			4
ClH	Hydrogen chloride		9.8	15.0	19.8	24.2	28.3	5
F ₆ S	Sulfur hexafluoride			13.1	20.6	27.6	34.1	6
H ₂	Normal hydrogen ($P=0$)	68.2	132.8	186.6	230.9	270.9	309.1	7
H ₂ O	Water ($P=0$)			18.6	26.4	35.8	46.3	8
D ₂ O	Deuterium oxide ($P=0$)			17.9	26.0	35.6	46.7	9
H ₂ S	Hydrogen sulfide ($P=0$)		9.0	14.2	20.2	26.8	33.8	10
H ₃ N	Ammonia			25.4	37.5	52.0	68.6	11
He	Helium ($P=0$)	74.7	118.3	155.7	189.6	221.4	251.6	12
Kr	Krypton ($P=0$)	3.3	6.4	9.5	12.2	14.7	17.0	13
NO	Nitric oxide		17.8	25.9	33.1	39.6	46.2	4
N ₂	Nitrogen ($P=0$)	9.2	18.3	25.9	32.6	38.9	45.1	14
N ₂ O	Nitrous oxide ($P=0$)		9.7	17.1	25.3	33.6	41.8	15
Ne	Neon ($P=0$)	22.3	37.4	49.4	59.9	69.5	78.5	16
O ₂	Oxygen	9.1	18.2	26.5	34.0	41.0	47.7	1
O ₂ S	Sulfur dioxide			9.6	14.3	20.0	25.6	4
Xe	Xenon ($P=0$)	2.0	3.7	5.5	7.2	8.8	10.3	3*,17
CCl ₂ F ₂	Dichlorodifluoromethane			9.9	15.0	20.1	25.2	18
CF ₄	Tetrafluoromethane ($P=0$)			16.0	24.1	32.2	39.9	19
CO	Carbon monoxide ($P=0$)			25.0	31.7	37.9	43.2	20
CO ₂	Carbon dioxide		9.7	16.8	24.7	32.9	41.0	21
CHCl ₃	Trichloromethane			7.5	11.1	15.1		4
CH ₄	Methane ($P=0$)	10.4	21.8	34.4	50.0	68.4	88.6	22
CH ₄ O	Methanol				25.6	38.2	52.7	23
C ₂ Cl ₂ F ₄	1,2-Dichlorotetrafluoroethane			10.8	15.8	20.6	25.1	5
C ₂ Cl ₃ F ₃	1,1,2-Trichlorotrifluoroethane			9.0	13.6	18.3		18
C ₂ H ₂	Acetylene			21.4	33.3	45.4	56.8	4

* More accurate data covering a restricted temperature range.

C ₂ H ₄	Ethylene		10.5	21.1	36.4	55.1	75.8	24
C ₂ H ₄ O	Ethylene oxide (<i>P</i> =0)		6.0	12.2	22.2	34.8	48.5	25
C ₂ H ₆	Ethane (<i>P</i> =0)	4.8	11.2	21.5	35.7	52.3	70.1	26
C ₂ H ₆ O	Ethanol			14.4	25.8	38.4	53.2	4
C ₃ H ₂ ClF ₃	<i>trans</i> -1-Chloro-3,3,3-trifluoropropene (R1233zd(E))			10.8	18.4	25.9	33.1	27
C ₃ H ₃ F ₅	Pentafluoropropane			12.8	21.9	31.0	40.1	28
C ₃ H ₆ O	Acetone			11.5	20.2	30.6	42.7	4
C ₃ H ₈	Propane (<i>P</i> =0)	8.9	18.0	30.9	46.0	62.1	29	
C ₄ F ₈	Perfluorocyclobutane			12.1	19.1	26.3	33.5	5
C ₄ H ₁₀	<i>n</i> -Butane			16.7	28.3	43.0	60.9	30
C ₄ H ₁₀	Isobutane			17.1	28.9	43.2	60.2	31
C ₄ H ₁₀ O	Diethyl ether			15.1	25.0	37.1		4
C ₅ H ₁₀	Cyclopentane				22.4	35.6	50.4	32
C ₅ H ₁₂	<i>n</i> -Pentane				26.0	39.9	55.5	32
C ₆ H ₁₄	<i>n</i> -Hexane				23.5	35.5	48.8	33

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