

Reference Data

Physical & Thermodynamic Properties of Common Gases

Properties of Common Gases at Normal Temperatures

Substance	Density ¹ (Lbs/Ft ³)	Specific Ht. at Constant Press ² (Btu/lb/°F)	Thermal Conductivity (Btu/in/hr/ft ² /°F)	Melting Point (°F)	Latent Heat Fusion ² (Btu/lb ²)	Boiling Point (°F)	Latent Heat Vaporization (Btu/lb)
Acetylene	0.068	0.3832	0.129	-114.34	—	-118.48	—
Air	0.0748	0.2400	0.18	—	—	—	92
Ammonia	0.048	0.5202	0.154	-103	194.4	-28.3	589
Argon	0.1033	0.1233	0.113	-308.56	12.1	-302.26	67.9
Butane-iso	0.16	—	0.0948	-229	—	13.64	157.3
Butane-n	0.15	—	0.0876	-211	—	33.08	164.7
Carbon Dioxide	0.1144	0.2025	0.12	-109.3	81.5	Sublimates	245
Carbon Monoxide	0.0725	0.2425	0.18	-340.6	14.4	-312.7	90.7
Chlorine	0.1853	0.1125	0.058	-150.88	44.4	-30.46	145.8
Chlorodifluoromethane (F-22)	0.289	0.1510	—	-256	—	-41.36	—
Chloroform	—	0.1440	0.0972	—	—	143.1	—
Cyanogen	0.14	0.4095	—	-18.22	—	-6.106	—
Dichlorodifluoromethane (F-12)	0.329	0.1410	0.058	-252	—	-21.62	—
Ethane	0.084	0.3861	0.13	-277.6	—	-126.94	464.4
Ethyl Chloride	0.179	0.2750	0.0610	-217.7	—	53.96	166.5
Ethylene	0.078	0.3990	0.1230	-272.92	—	-154.84	—
Fluorine	0.1059	0.1820	0.1760	-369.4	—	-304.6	72.9
Helium	0.0103	1.2500	0.9880	-457.6	—	-452.092	10.7
Hydrogen	0.0056	3.4090	1.16	-434.45	25.2	-423.755	192
Hydrogen Bromide	0.2275	0.0820	—	-124.06	13.8	-91.66	87.7
Hydrogen Chloride	0.1023	0.1940	0.0910	-168.34	24.1	-117.58	190.6
Hydrogen Fluoride	0.0535	—	—	-134.14	—	-34.06	0.3
Hydrogen Iodide	0.355	0.0600	—	-60.34	10.2	-32.26	61
Hydrogen Sulfide	0.096	0.2451	0.091	-122.8	—	-79.6	237.4
Methane	0.0446	0.5929	0.214	-296.5	26.2	-258.52	248.4
Methyl Chloride	0.142	0.2400	0.0648	-154.48	—	-10.714	184.1
Methyl Ether	0.131	—	—	-216.4	—	-12.82	—
Methyl Fluoride	0.096	—	—	—	—	-108.4	—
Neon	0.056	—	0.322	-415.61	5.1	-410.62	—
Nitric Oxide	0.0777	0.2320	0.1656	-268.6	33.1	-243.4	—
Nitrogen	0.073	0.2438	0.186	-345.75	11	-320.44	86
Nitrous Oxide	0.123	0.2126	0.1056	-152.32	—	-129.64	—
Oxygen	0.083	0.2175	0.18	-361.12	6	-297.4	91.8
Phosphine	0.095	—	—	-208.3	—	-125.32	—
Propane	0.126	—	0.097	-309.82	—	-48.1	—
Silicone Tetrafluoride	0.292	—	—	—	—	-90.4	—
Sulfur Dioxide	0.166	0.1544	0.07	-104.8	—	14	170.6
Water Vapor	0.0372	0.4820	0.1700	32	143.6	212	972
Xenon	0.365	—	—	-220	6.71	-164.38	43.9

1. Weight in lbs/ft³ at approximately 70°F and atmospheric pressure.
2. Where temperature is not given, 68°F (20°C) is understood.
3. All properties are at a pressure equivalent to 760 mm of mercury, unless otherwise indicated.

Properties of Common Gases at Cryogenic Temperatures

Properties / Gases	N ₂	O ₂	He	H ₂	CH ₄	NH ₃	A	Ne
Density @ 32°F Atm lb/ft ³	0.0781	0.0892	0.01114	0.00561	0.0448	0.0481	0.1113	0.0562
Boiling Point @ 1 Atm - °F	-320.4	-297.4	-452	-423	-258.7	-28.03	-302.4	-410.6
Melting Point @ 1 Atm - °F	-345.8	-361.1	-458 (26 Atm)	-434.6	-299.2	-107.9	-308.7	-415.7
Vapor Density @ BP - lbs/ft ³	0.288	0.296	0.999	0.083	0.1124	0.0556	0.368	0.593
Liquid Density @ BP - lbs/ft ³	50.19	71.29	7.803	4.37	26.47	42.58	86.77	74.91
Vapor Pressure Solid @ MP in mm.	96.4	2.0	< .02	54	70.0	45.2	516	323
Heat of Vapor @ BP - Btu/lb	85.7	91.6	< .03	194.4	248.4	588.6	70.0	37.4
Heat of Fusion @ MP - Btu/lb	11.0	5.9	< 1.8	25.2	26.1	151.2	12.1	7.2
Cp @ 50°F @ 1 Atm - Btu/lb°F	0.248	0.218	1.25 (-292°F)	3.39	0.528	0.523	0.125	0.25 (Approx)
Cp/Cv @ 59 - 68°F @ 1 Atm	1.40	1.40	1.65 (292°F)	1.41	1.31	1.31	1.67	1.64
Critical Temperature - °F	-232.8	-181.1	-450.2	-399.8	-116.5	270.3	-188.5	-379.7
Critical Pressure @ 1 Atm	33.5	50.1	2.26	12.8	45.8	111.5	48.0	26.8