

Physical Properties of Gases

Pure Gases		Molecular Weight	Vapor Pressure psia 21°C	Specific Gravity air=1	Specific Volume		Boiling Point °C
Common Name	Chemical Formula				CF/lb	m ³ /kg	
Acetylene	C ₂ H ₂	26.038	43.2	0.91	14.7	0.91	-85
Air	-	28.96		1	13.33	0.82	-194.3
Allene	C ₃ H ₄	40.065	107	1.411	9.6	0.6	-34.4
Ammonia	NH ₃	17.031	128.8	0.597	22.6	1.4	-33.4
Argon	Ar	39.95		1.38	9.7	0.6	-185.9
Arsine	AsH ₃	77.95	1100**	2.695	5	0.31	-62
Boron Trichloride	BCl ₃	117.17	4.4	4.05	3.3	0.2	12.5
Boron 11 Trifluoride	BF ₃	67.81		2.37	5.6	0.16	-100.3
Boron Trifluoride	BF ₃	67.81		2.37	5.6	0.16	-100.4
Bromine Trifluoride	BrF ₃	136.9	19.1	4.727			-128
1,3 Butadiene	C ₄ H ₆	54.092	36.1	1.898	6.9	0.43	-4.4
n-Butane	C ₄ H ₁₀	58.124	31	2.076	6.4	0.4	-0.5
1-Butene	C ₄ H ₈	56.11	38.2	1.998	6.7	0.42	-6.3
cis-2-Butene	C ₄ H ₈	56.11	27.7	1.997	6.7	0.42	3.7
trans-2-Butene	C ₄ H ₈	56.11	29.7	1.997	6.7	0.42	0.9
Carbon Dioxide	CO ₂	44.01	853.4	1.521	8.76	0.55	-78.5††
Carbon Monoxide	CO	28.01		0.968	13.8	0.86	-191.1
Carbonyl Sulfide	COS	60.075	9412**	2.1	6.5	0.4	-50
Chlorine	Cl ₂	70.906	100.2	2.49	5.4	0.33	-34.1
Chlorine Trifluoride	ClF ₃	92.46	< 760**	3.14	4.2	0.262	11.8
Cyanogen	CNCN	52.036	69.6	1.806	7.4	0.46	-21.2
Cyanogen Chloride	CNCl	61.47	133.33†	1.98	6.3	0.393	13
Cyclopropane	C ₃ H ₆	42.08	75	1.45	9.2	0.574	-34
Deuterium	D ₂	4.032		0.139	95.9	5.95	-249.6
Diborane	B ₂ H ₆	27.67		0.95	13.98	0.88	-92.8
Dichlorosilane	SiH ₂ Cl ₂	101.01	1230**	3.48	3.83	0.24	8
Dimethylamine	(CH ₃) ₂ NH	45.08	1292**	1.55	8.5	0.53	7
Dimethyl Ether	(CH ₃) ₂ O	46.07	77	1.59	8.4	0.52	-24.8
2,2-Dimethylpropane	C ₅ H ₁₂	72.15	1100**	2.622	5.3	0.331	9.5
Disilane	Si ₂ H ₆	62.22	46				-14.15
Ethane	C ₂ H ₆	30.07	558.7	1.047	12.8	0.79	-88.7
Ethyl Acetylene	C ₄ H ₆	54.09	8.5	1.966	7.2	0.45	8.1
Ethyl Chloride	C ₂ H ₅ Cl	64.52	1000**	2.22	6	0.37	12.3
Ethylene	C ₂ H ₄	28.054		0.974	13.8	0.86	-103.8
Fluorine	F ₂	37.997		1.696	10.2	0.64	-187
Germane	GeF ₄	76.62	638	3.43	5.05	0.315	-88.4
Halocarbon 11	CCl ₃ F	137.7	796**	5.04	2.993	0.186	23.8
Halocarbon 12	CCl ₂ F ₂	120.91	84.9	4.2	3.1	0.19	-29.8
Halocarbon 13	CClF ₃	104.46	473.4	3.8	3.5	0.22	-81.4
Halocarbon 13 B ₁	CBrF ₃	178.91	206	5.3	2.6	0.16	-58
Halocarbon 14	CF ₄	88.01		3.038	4.4	0.27	-128
Halocarbon 21	CHCl ₂ F	102.92	1195**	3.82	3.5	0.22	8.9
Halocarbon 22	CHClF ₂	86.47	137.7	3.08	4.4	0.27	-40.7
Halocarbon 23	CHF ₃	70.01	635.3	2.43	5.5	0.34	-82.1
Halocarbon 113	CCl ₂ F-ClF ₂	187.38	5.4	2.39			47.7
Halocarbon 114	C ₂ Cl ₂ F ₄	170.93	26.1	5.93	2.3	0.14	3.6
Halocarbon 115	C ₂ ClF ₆	154.45	117.7	5.569	2.4	0.15	-39
Halocarbon 116	C ₂ F ₆	138.01	398.9	4.773	2.8	0.17	-78.2
Halocarbon 142B	CH ₃ CClF ₂	100.5	42.1	3.63	3.6	0.22	-9.6
Halocarbon 152A	C ₂ H ₄ F ₂	66.05	87	2.36	5.85	0.365	-25

** mmHg

† kPa

†† Sublimation point

Physical Properties of Gases continued

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Common Name	Chemical Formula				CF/lb	m ³ /kg	
Halocarbon C-318	C ₄ H ₈	200.03	25	7.33	1.9	0.12	-6
Halocarbon 1132A	C ₂ H ₂ F ₂	64.04		2.2	6	0.37	
Helium	He	4.003		0.138	96.7	6	-268.9
Hexafluoropropylene	C ₃ F ₆	150.03		1.583	2.58	0.156	-29
Hydrogen	H ₂	2.016		0.00696	192	11.9	-252.8
Hydrogen Bromide	HBr	80.92	22.77†	2.7	4.8	0.3	-67
Hydrogen Chloride	HCl	36.46	626.7	1.268	10.9	0.68	-84.9
Hydrogen Fluoride	HF	20.01	110**	1.27	17	1.05	19.4†
Hydrogen Selenide	H ₂ Se	80.976	139.6	2	4.8	0.3	41.2
Hydrogen Sulfide	H ₂ S	34.08	267.7	1.189	11.2	0.69	-59.7
Iodine Pentafluoride	IF ₅	221.9		3.189 (liq.)	1.7	0.11	
Isobutane	C ₄ H ₁₀	58.124	45.4	2	6.5	0.4	-11.7
Isobutylene	C ₄ H ₈	56.11	39	1.997	6.7	0.42	-6.9
Krypton	Kr	83.8		2.889	4.6	0.29	-153.3
Methane	CH ₄	16.043		0.55	23.7	1.47	-161.4
Methyl Acetylene	C ₃ H ₄	40.065	60	1.411	9.7	0.605	-23.2
Methyl Bromide	CH ₃ BR	94.94	2.4†	3.3	4.1	0.25	3.6
3-Methylbutene-1	C ₅ H ₁₀	70.135		2.549	5.5	0.343	
Methyl Chloride	CH ₃ Cl	50.49	3796**	1.74	7.6	0.47	-24.2
Methyl Fluoride	CH ₃ F	34.03	538	1.195	11.36	0.709	-78.4
Methyl Mercaptan	CH ₃ SH	48.11	1535**	1.66	7.5	0.47	6.8
Monoethylamine	C ₂ H ₅ NH ₂	45.08		1.56	7.9	0.49	
Monomethylamine	CH ₃ NH ₂	31.058	1.08	1.07	12.1	0.755	-6.3
Neon	Ne	20.183		0.696	19.2	1.19	-245.9
Nitric Oxide	NO	30.006		1.04	12.9	0.8	-151.7
Nitrogen	N ₂	28.1		0.967	13.8	0.86	-195.8
Nitrogen Dioxide*	NO ₂	46.005	14.7	1.58	4.7	0.29	21.2
Nitrogen Trifluoride	NF ₃	71		2.48	5.44	0.034	-129
Nitrogen Trioxide	N ₂ O ₃	76.01			5.1	0.31	
Nitrous Oxide	N ₂ O	44.013	774.7	1.53	8.7	0.54	-88.4
Oxygen	O ₂	32		1.105	12.1	0.755	-182.9
Perfluoropropane	C ₃ F ₈	188.02	116	6.683	2	0.12	-36.7
Phosgene	COCl ₂	98.92	10.17	3.4	3.9	0.24	7.55
Phosphine	PH ₃	34		1.184	11.4	0.71	-87.7
Propane	C ₃ H ₈	44.1	124.3	1.55	8.7	1.54	-42.1
Propylene	C ₃ H ₆	42.08	151.9	1.476	9.1	0.58	-47.7
Silane	SiH ₄	32.13		1.114	12.1	0.75	-112
Silicon Tetrafluoride	SiF ₄	104.08		3.7	3.7	0.23	-95.1
Sulfur Dioxide	SO ₂	64.063	49.1	2.262	5.9	0.37	-10.1
Sulfur Hexafluoride	SF ₆	146.054	320	5.114	2.5	0.16	-63.9††
Sulfur Tetrafluoride	SF ₄	108.06		3.53	3.7	0.23	-40.4
Tetrafluoroethylene	C ₂ F ₄	100.016	441.3	3.53	3.8	0.24	-78.4
Trimethylamine	(CH ₃) ₃ N	59.11	1.9†	2.087	6	0.37	3
Tungsten Hexafluoride	WF ₆	297.84		10.29	1.3	0.09	
Vinyl Chloride	C ₂ H ₃ Cl	62.5	2530**	2.15	6.2	0.387	-13.9
Xenon	Xe	131.3		4.553	2.9	0.18	-108.3

* Or nitrogen tetroxide (N₂O₄)

** mmHg

† atm

†† Sublimation point