

# Material Compatibility Chart

Gas	Primary Hazards					Metals					Plastics				Elastomers			Special Characteristics
	Asphyxiant	Toxic	Flammable	Corrosive	Oxidizer	Aluminum	Brass	Copper	Monel	Stainless Steel	Kel-F	Teflon	Tefzel	Kynar	Viton	Buna-N	Neoprene	
ACETYLENE						S	S	U	S	S	S	S	S	S	S	S	S	Extremely hazardous at pressures exceeding 15 psig. Brass with less than 65% copper content, suitable. Causes stress cracking of copper or copper alloys.
AIR						S	S	S	S	S	S	S	S	S	S	S	S	
AMMONIA						S	U	U	S	S	S	S	S	U	U	S	S	
ARGON						S	S	S	S	S	S	S	S	S	S	S	S	
*ARSINE						-	S	S	S	S	S	S	S	S	S	S	S	Highly toxic
BORON TRICHLORIDE						U	D	D	S	S	S	S	S	-	-	-	-	
BORON TRIFLUORIDE						-	D	D	S	S	S	S	S	-	-	-	-	
BORON-11 TRIFLUORIDE						-	D	D	S	S	S	S	S	-	-	-	-	
*BROMINE TRIFLUORIDE						D	D	D	S	S	D	D	S	U	U	U	U	Extremely reactive. Surface passivation required on all metals.
1,3-BUTADIENE						S	S	S	S	S	S	S	S	S	S	S	S	
n-BUTANE						S	S	S	S	S	S	S	S	S	S	S	S	
1-BUTENE						S	S	S	S	S	S	S	S	S	S	S	S	
cis-2-BUTENE						S	S	S	S	S	S	S	S	S	S	S	S	
trans-2-BUTENE						S	S	S	S	S	S	S	S	S	S	S	S	
CARBON DIOXIDE						S	S	S	S	S	S	S	S	S	S	D	D	
CARBON MONOXIDE						S	S	S	S	S	S	S	S	S	S	S	S	
CHLORINE						U	U	U	S	S	S	S	S	S	S	U	U	Highly toxic
*CHLORINE TRIFLUORIDE						U	-	-	S	S	D	D	S	U	U	U	U	Extremely reactive. Surface passivation required on all metals.
DEUTERIUM						S	S	S	S	S	S	S	S	S	S	S	S	
DICHLOROSILANE						U	-	-	S	S	S	S	S	S	-	-	-	
DI-, MONO-, AND TRIMETHYLAMINES						U	U	U	S	S	S	S	S	S	U	U	-	
DISILANE						S	S	S	S	S	S	S	S	S	S	S	S	
ETHANE						S	S	S	S	S	S	S	S	S	S	S	S	
ETHYL CHLORIDE						S	S	S	S	S	S	S	S	S	S	S	S	
ETHYLENE						S	S	S	S	S	S	S	S	S	S	S	S	
*FLUORINE						D	D	D	S	S	D	D	D	D	U	U	U	Extremely reactive. Surface passivation required on all metals.
HALOCARBON-14						S	S	S	S	S	S	S	S	S	S	S	S	
HALOCARBON-23						S	S	S	S	S	S	S	S	S	S	S	S	
HALOCARBON-116						S	S	S	S	S	S	S	S	S	S	S	S	
HELIUM						S	S	S	S	S	S	S	S	S	S	S	S	
HYDROGEN						S	S	S	S	S	S	S	S	S	S	S	S	
HYDROGEN BROMIDE						U	U	U	S	S	S	S	S	S	S	U	U	
HYDROGEN CHLORIDE						U	U	U	S	S	S	S	S	S	S	U	U	
*HYDROGEN FLUORIDE						U	U	U	S	S	S	S	S	S	U	U	U	
*HYDROGEN SULFIDE						S	S	-	S	S	S	S	S	S	U	S	S	
ISOBUTANE						S	S	S	S	S	S	S	S	S	S	S	S	
ISOBUTYLENE						S	S	S	S	S	S	S	S	S	S	S	S	
KRYPTON						S	S	S	S	S	S	S	S	S	S	S	S	
METHANE						S	S	S	S	S	S	S	S	S	S	S	S	
METHYL CHLORIDE						U	S	S	S	S	S	S	S	S	S	U	U	Flammable; may react with aluminum to form pyrophoric compound.
METHYL FLUORIDE						S	S	S	S	S	S	S	S	S	-	-	-	
NEON						S	S	S	S	S	S	S	S	S	S	S	S	
NITROGEN						S	S	S	S	S	S	S	S	S	S	S	S	
NITROGEN DIOXIDE						S	U	U	U	S	S	S	-	-	U	U	U	
NITROGEN TRIFLUORIDE						-	S	S	S	S	S	S	S	S	S	-	-	
NITROUS OXIDE						S	S	S	S	S	S	S	S	S	S	S	S	Liquid may leach plasticizer out of certain plastics.
OCTAFLUOROCYCLOBUTANE						S	S	S	S	S	S	S	S	S	S	S	S	
OCTAFLUOROPROPANE						S	S	S	S	S	S	S	S	-	-	S	S	
*OXYGEN						U	S	S	S	D	S	S	S	S	D	U	U	
*PHOSPHINE						S	-	-	S	S	S	S	S	-	-	-	-	Highly toxic. High concentrations are pyrophoric.
PROPANE						S	S	S	S	S	S	S	S	S	S	S	S	
PROPYLENE						S	S	S	S	S	S	S	S	S	S	S	S	
*SILANE						S	S	S	S	S	S	S	S	S	S	S	S	Pyrophoric.
SILICON TETRACHLORIDE						U	U	U	S	S	S	S	S	S	U	U	U	
SILICON TETRAFLUORIDE						U	U	U	S	S	S	S	S	S	U	U	U	
SULFUR DIOXIDE						S	U	S	S	S	S	S	S	S	S	U	U	
SULFUR HEXAFLUORIDE						S	S	S	S	S	S	S	S	S	S	S	S	
SULFUR TETRAFLUORIDE						U	U	U	S	S	S	S	S	S	U	U	U	
TUNGSTEN HEXAFLUORIDE						U	U	U	S	S	S	S	S	S	U	U	U	
XENON						S	S	S	S	S	S	S	S	S	S	S	S	

The data in this table are presented as a guide only. Please call our Technical Information Center for assistance with your specific application.  
 Key: S = Satisfactory for use with the intended gas (dry anhydrous) at a normal operating temperature of 70°F. U = Unsatisfactory for use with the intended gas.  
 (-) = Insufficient data available to determine the compatibility with the intended gas. D = Suitability depends on condition of use.  
 \*THE USER SHOULD BECOME THOROUGHLY FAMILIAR WITH THE SPECIFIC PROPERTIES OF THIS GAS. MATERIAL COMPATIBILITY DEPENDS ON CONDITION OF USE.

# Physical Properties

Product	Formula	Molecular Weight (lb/lb mol)	Critical Properties			Boiling Point at 1 atm (°F)	Heat of Vaporization at BP (Btu/lb)	Melting Point (°F)	Saturated Properties at 70°F			Gas Properties at 70°F and 1 atm			
			Critical Temp. (°F)	Critical Pressure (psia)	Critical Density (lb/ft <sup>3</sup> )				Vapor Pressure (psia)	Heat of Vaporization (Btu/lb)	Liquid Density (lb/ft <sup>3</sup> )	Gas Density (lb/ft <sup>3</sup> )	Specific Volume (ft <sup>3</sup> /lb)	Specific Gravity (Air=1.0)	Specific Heat, Cp (Btu/lb mol • °F)
Acetylene	C <sub>2</sub> H <sub>2</sub>	26.04	96.0	906.0	14.39	-119.6	352.5	-113.4	586.3	126.2	23.61	0.068	14.77	0.899	10.53
Air	—	28.96	—	—	—	-317.8	87.8	—	—	—	—	0.081	12.35	1.000	6.96
Ammonia	NH <sub>3</sub>	17.03	270.1	1636.0	14.67	-28.3	590.3	-107.9	129.0	510.0	38.55	0.044	22.49	0.588	8.69
Argon	Ar	39.95	-188.4	705.8	33.17	-302.5	69.4	-308.8	—	—	—	0.103	9.68	1.379	4.98
Arsine	AsH <sub>3</sub>	77.95	221.8	957.3	37.44	-79.9	92.1	-178.5	217.9	70.2	92.59	0.204	4.91	2.691	9.23
Boron Trichloride	BCl <sub>3</sub>	117.17	353.8	561.3	16.80	55.1	87.8	-160.6	19.7	85.9	81.40	0.314	3.18	4.045	15.55
Boron Trifluoride	BF <sub>3</sub>	67.80	10.0	723.0	36.90	-147.5	109.3	-199.7	—	—	—	0.176	5.68	2.341	12.08
Bromine Trifluoride	BrF <sub>3</sub>	136.90	9.9	723.0	—	258.2	134.1	48.0	0.1	134.1	175.61	0.0024*	415.08	4.727	15.81
1,3-Butadiene	C <sub>4</sub> H <sub>6</sub>	54.09	305.6	626.9	15.3	23.7	179.9	-164.1	36.5	169.8	38.67	0.143	6.98	1.868	20.45
Butane	C <sub>4</sub> H <sub>10</sub>	58.12	305.9	549.9	14.20	31.0	165.9	-217.0	31.3	157.1	36.05	0.155	6.45	2.007	23.87
iso-Butane	C <sub>4</sub> H <sub>10</sub>	58.12	275.0	539.5	13.8	11.2	157.6	-255.3	45.2	143.7	34.49	0.155	6.47	2.007	23.52
1-Butene	C <sub>4</sub> H <sub>8</sub>	56.11	295.5	569.3	14.6	21.1	172.1	-301.6	38.5	159.9	36.97	0.149	6.70	1.937	20.87
cis-2-Butene	C <sub>4</sub> H <sub>8</sub>	56.11	320.0	610.2	15.0	53.1	175.0	-217.6	20.3	170.9	29.02	0.151	6.61	1.937	19.50
trans-2-Butene	C <sub>4</sub> H <sub>8</sub>	56.11	311.0	591.8	14.7	47.3	172.6	-157.5	22.6	167.3	28.46	0.151	6.62	1.937	21.80
Carbon Dioxide	CO <sub>2</sub>	44.01	87.9	1071.0	29.20	-126.5	246.3	-69.9	852.8	63.2	47.64	0.114	8.74	1.519	8.93
Carbon Monoxide	CO	28.01	-220.4	507.0	18.79	-312.7	92.1	-337.1	—	—	—	0.072	13.80	0.967	6.97
Chlorine	Cl <sub>2</sub>	70.91	291.2	1118.4	35.79	-28.8	123.7	-149.8	99.6	109.0	85.54	0.186	5.39	2.448	8.24
Chlorine Trifluoride	ClF <sub>3</sub>	92.45	345.2	837.6	37.5	53.1	115.7	-105.3	21.5	125.5	113.60	0.244	4.09	3.192	15.66
Deuterium	D <sub>2</sub>	4.03	-390.8	241.5	4.2	-417.0	130.9	-426.0	—	—	—	0.010	96.00	0.139	6.95
Diborane	B <sub>2</sub> H <sub>6</sub>	27.67	62.1	580.8	10.4	-134.8	230.3	-264.8	—	—	—	0.072	13.86	0.955	13.79
Dichlorosilane	SiH <sub>2</sub> Cl <sub>2</sub>	101.01	348.8	678.2	28.9	46.7	—	-187.6	23.3	—	75.19	0.269	3.72	3.487	14.74
Dimethylamine	[(CH <sub>3</sub> ) <sub>2</sub> NH]	45.09	328.3	769.4	—	44.0	—	-133.9	26.1	—	40.90	0.119	8.37	1.557	16.57
Disilane	Si <sub>2</sub> H <sub>6</sub>	62.22	303.5	746.9	21.1	6.7	147.8	-206.7	47.6	—	49.90	0.166	6.01	2.148	19.54
Ethane	C <sub>2</sub> H <sub>6</sub>	30.07	90.4	707.9	12.70	-127.5	210.1	-297.9	559.6	85.0	20.98	0.078	12.76	1.038	12.67
Ethyl Chloride	C <sub>2</sub> H <sub>5</sub> Cl	64.52	369.0	754.2	20.1	54.0	165.0	-213.5	20.3	161.8	55.78	0.172	5.82	2.227	15.41
Ethylene	C <sub>2</sub> H <sub>4</sub>	28.05	49.1	736.0	14.17	-154.8	207.5	-272.5	—	—	—	0.073	13.71	0.969	10.28
Fluorine	F <sub>2</sub>	38.00	-199.9	754.6	35.81	-306.8	74.8	-363.4	—	—	—	0.098	10.18	1.312	7.49
Halocarbon-23	CHF <sub>3</sub>	70.01	78.7	701.4	32.2	-115.9	104.0	-247.3	626.0	31.5	49.02	0.182	5.48	2.417	12.29
Halocarbon-116	C <sub>2</sub> F <sub>6</sub>	138.01	67.5	432.2	38.0	-108.7	50.4	-149.3	429.9*	—	44.13*	0.361	2.77	4.765	25.27
Helium	He	4.00	-450.3	33.0	4.33	-452.0	8.8	—	—	—	—	0.010	96.67	0.138	4.97
Hydrogen	H <sub>2</sub>	2.02	-400.0	190.8	1.88	-423.2	195.3	-434.5	—	—	—	0.005	191.95	0.070	6.87
Hydrogen Bromide	HBr	80.92	194.0	1240.4	45.8	-88.0	93.2	-124.4	311.4	70.3	113.09	0.211	4.74	2.794	7.07
Hydrogen Chloride	HCl	36.46	124.5	1199.2	26.22	-120.8	190.6	-173.6	629.1	108.5	51.28	0.095	10.55	1.259	7.29
Hydrogen Fluoride	HF	20.01	370.4	972.5	18.2	-108.7	159.6	-118.4	14.13*	158.3	61.39*	0.177*	5.65*	4.765	—
Hydrogen Sulfide	H <sub>2</sub> S	34.08	212.8	1306.5	21.77	-74.9	235.9	-122.0	263.6	180.8	48.52	0.089	11.26	1.176	8.29
Krypton	Kr	83.80	-82.8	798.0	57.4	-244.1	46.35	-251.3	—	—	—	0.217	4.61	2.893	4.99
Methane	CH <sub>4</sub>	16.04	-116.2	673.0	10.10	-258.7	219.5	-296.5	—	—	—	0.042	24.06	0.554	8.53
Methyl Chloride	CH <sub>3</sub> Cl	50.49	290.8	964.0	22.04	-11.2	184.1	-143.9	73.4	163.7	57.52	0.207	4.83	1.740	10.44
Methyl Fluoride	CH <sub>3</sub> F	34.03	112.3	852.2	—	-109.0	—	-223.2	506.3	—	36.19	0.089	11.23	1.170	9.00
Monomethylamine	CH <sub>3</sub> NH <sub>2</sub>	31.06	314.4	1082.0	—	20.4	184.1	-136.2	44.4	—	41.15	0.082	12.25	1.072	12.02
Neon	Ne	20.18	-379.8	384.9	30.15	-410.9	36.9	-415.5	—	—	—	0.052	19.18	0.697	4.97
Nitrogen	N <sub>2</sub>	28.01	-232.5	492.3	19.40	-320.4	85.6	-345.9	—	—	—	0.072	13.80	0.967	6.97
Nitrogen Trifluoride	NF <sub>3</sub>	71.00	-38.5	646.9	34.1	-200.2	70.1	-340.2	—	—	—	0.184	5.43	2.451	12.66
Nitrous Oxide	N <sub>2</sub> O	44.01	97.6	1053.3	28.61	-128.3	160.2	-131.6	751.3	71.7	48.21	0.114	8.74	1.520	9.17
Octafluorocyclobutane	C <sub>4</sub> F <sub>8</sub>	200.03	239.4	402.8	—	21.2	—	-40.9	39.9	—	94.65	0.535	1.87	6.906	37.29
Octafluoropropane	C <sub>3</sub> F <sub>8</sub>	188.02	161.4	386.1	39.20	-34.3	45.2	-233.8	114.1	34.0	84.66	0.498	2.01	6.491	35.40
Oxygen	O <sub>2</sub>	32.00	-181.8	729.1	26.80	-297.4	91.5	-361.9	—	—	—	0.083	12.08	1.105	7.03
Phosphine	PH <sub>3</sub>	34.00	124.9	947.9	18.8	-126.0	177.3	-208.8	493.2	—	35.50	0.088	11.30	1.174	8.93
Propane	C <sub>3</sub> H <sub>8</sub>	44.10	206.6	617.6	13.70	-43.7	183.0	-305.8	124.9	147.1	31.12	0.116	8.62	1.522	17.71
Propylene	C <sub>3</sub> H <sub>6</sub>	42.08	197.5	666.3	14.51	-53.8	188.3	-301.4	152.2	146.0	31.92	0.110	9.06	1.453	15.56
Silane	SiH <sub>4</sub>	32.12	25.8	702.5	15.1	-170.4	164.6	-301.0	—	—	—	0.083	11.98	1.109	10.24
Silicon Tetrachloride	SiCl <sub>4</sub>	169.90	453.0	521.1	32.5	136.6	70.5	-94.0	4.0	75.6	92.13	0.121*	8.25	5.866	21.63
Silicon Tetrafluoride	SiF <sub>4</sub>	104.08	6.5	539.3	42.66	-148.3	64.6	-124.2	—	—	—	0.271	3.69	3.593	17.50
Sulfur Dioxide	SO <sub>2</sub>	64.06	315.5	1142.0	32.78	13.8	167.5	-103.9	50.1	155.0	83.66	0.168	5.95	2.212	9.70
Sulfur Hexafluoride	SF <sub>6</sub>	146.05	114.0	545.2	46.04	-90.8	48.5	-58.9	310.2	28.2	86.25	0.382	2.62	5.042	22.91
Sulfur Tetrafluoride	SF <sub>4</sub>	108.05	114.0	545.2	—	-53.5	105.3	-184.9	152.7	—	82.68	0.284	3.53	3.731	18.65
Tetrafluoromethane	CF <sub>4</sub>	88.00	-50.2	543.6	39.06	-198.5	58.5	-298.5	—	—	—	0.228	4.38	3.038	14.43
Trimethylamine	[(CH <sub>3</sub> ) <sub>3</sub> N]	59.11	320.3	591.8	39.06	37.2	—	-178.8	28.0	—	39.61	0.157	6.35	2.041	22.03
Tungsten Hexafluoride	WF <sub>6</sub>	297.84	337.7	619.3	81.6	63.0	38.1	-35.6	17.1	37.7	212.58	0.795	1.26	10.283	28.79
Xenon	Xe	131.30	61.9	847.1	68.65	-162.6	41.4	-169.4	—	—	—	0.341	2.93	4.533	5.02

\*Value given is for saturated conditions; 70°F and 14.7 psia.