

MATERIALS COMPATIBILITY



The compatibility data shown on the following pages has been compiled to assist in evaluating the appropriate materials to use in handling various gases. Prepared for use with the dry (anhydrous) gases at normal operating temperature of 70° (21° C), information may vary if different operating conditions exist.

Directions:

Locate the gas you are using in the first column.

Compare the materials of construction for the equipment you intend to use with the materials of construction shown in the Compatibility Chart. Then use the Key to Materials Compatibility to determine the compatibility.

COMPATIBILITY GUIDE

COMMON NAME

CHEMICAL FORMULA

		MATERIALS OF CONSTRUCTION										
		METALS					PLASTICS			ELASTOMERS		
		Brass	Stainless Steel	Aluminum	Zinc	Copper	PCTFE	Teflon®	Viton®	Buna-N	Neoprene	Polyurethane
Acetylene	C ₂ H ₂	R1	•	I	U	U	•	•	R2	R2	R2	R2
Air	-	•	•	•	•	•	•	•	•	•	•	•
Allene	C ₃ H ₄	•	•	•	I	U	•	•	•	•	•	I
Ammonia	NH ₃	U	•	•	U	U	•	•	U	•	•	U
Argon	Ar	•	•	•	•	•	•	•	•	•	•	•
Arsine	AsH ₃	•	•	R4	I	•	•	•	•	•	•	U
Boron Trichloride	BCl ₃	U	•	U	I	•	•	I	I	I	I	I
Boron Trifluoride	BF ₃	•	•	•	I	•	•	I	I	I	I	I
1,3-Butadiene	C ₄ H ₆	•	•	•	•	•	•	•	U	•	•	U
Butane	C ₄ H ₁₀	•	•	•	•	•	•	•	•	•	•	•
1-Butene	C ₄ H ₈	•	•	•	•	•	•	•	•	•	•	•
cis-2-Butene	C ₄ H ₈	•	•	•	•	•	•	•	•	•	•	•
trans-2-Butene	C ₄ H ₈	•	•	•	•	•	•	•	•	•	•	•
Carbon Dioxide	CO ₂	•	•	•	•	•	•	•	•	•	•	U
Carbon Monoxide	CO	•	•	•	•	•	•	I	•	•	•	•
Carbonyl Sulfide	COS	•	•	•	I	•	•	•	I	I	I	I
Chlorine	Cl ₂	U	•	U	U	U	•	•	•	U	U	U
Deuterium	D ₂	•	•	•	•	•	•	•	•	•	•	•
Diborane	B ₂ H ₆	•	•	U	I	•	•	I	I	I	I	I
Dichlorosilane	H ₂ SiCl ₂	I	•	I	I	I	•	I	I	I	I	I
Dimethyl Ether	C ₂ H ₆ O	•	•	•	•	•	•	•	•	•	•	I
Ethane	C ₂ H ₆	•	•	•	•	•	•	•	•	•	•	•
Ethyl Acetylene	C ₄ H ₆	I	•	•	I	U	•	•	I	•	I	I
Ethyl Chloride	C ₂ H ₅ Cl	•	•	U	I	•	•	•	•	•	•	U
Ethylene	C ₂ H ₄	•	•	•	•	•	•	•	•	•	•	I
Ethylene Oxide*	C ₂ H ₄ O	R3	•	R4	I	U	•	•	U	U	U	U
Ethylene Oxide/Carbon Dioxide Mixtures*		R3	•	I	I	U	•	•	U	U	U	U
Ethylene Oxide/Halocarbon Mixtures*		R3	•	I	I	U	•	•	U	U	U	U
Ethylene Oxide/HCF-124		R3	•	I	I	U	•	•	U	U	U	U
Halocarbon 11	CCl ₃ F	•	•	R4	I	•	•	•	•	•	U	U
Halocarbon 12	CCl ₂ F ₂	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 13	CClF ₃	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 13B1	CBF ₃	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 14	CF ₄	•	•	R4	I	•	•	•	•	•	•	•

LEGEND

- Satisfactory for use with the intended gas
- U Unsatisfactory for use with the intended gas
- I Insufficient data available to determine compatibility with the intended gas
- R1 Satisfactory with brass having a low copper content
- R2 Satisfactory with acetylene, however, cylinder gas is dissolved in a solvent (generally acetone) which may be incompatible with these elastomers
- R3 Satisfactory with brass, except where acetylene or acetylides are present
- R4 Generally unsatisfactory, except where specific use conditions have proven acceptable
- R5 Satisfactory below 3000 PSIG (206.9 bar) where gas velocities do not exceed 30 ft./sec.
- R6 Compatibility depends on condition of use



Compatibility Guide Cont.



COMMON NAME	CHEMICAL FORMULA	MATERIALS OF CONSTRUCTION										
		METALS					PLASTICS		ELASTOMERS			
		Brass	Stainless Steel	Aluminum	Zinc	Copper	PTFE	Teflon®	Viton	Buna-N	Neoprene	Polyurethane
Halocarbon 21	CHCl ₂ F	.	.	R4	|	.	.	.	U	U	.	.
Halocarbon 22	CHClF ₂	.	.	R4	|	.	.	.	U	U	.	U
Halocarbon 23	CHF ₃	.	.	R4	|	.	.	.	|	|	|	.
Halocarbon 113	CCl ₂ FCClF ₂	.	.	R4	U	.	.	.	.	.	.	.
Halocarbon 114	C ₂ Cl ₂ F ₄	.	.	R4	|	.	.	.	.	.	.	.
Halocarbon 115	C ₂ ClF ₅	.	.	R4	|	.	.	.	.	.	.	.
Halocarbon 116	C ₂ F ₆	.	.	R4	|	.	.	.	|	|	|	.
Halocarbon 142B	C ₂ H ₃ ClF ₂	.	.	R4	|	.	.	.	U	.	.	.
Halocarbon 152A	C ₂ H ₄ F ₂	.	.	R4	|	.	.	.	U	.	.	.
Halocarbon C-318	C ₂ F ₈	.	.	R4	|	|	.	.	.	.	.	.
Halocarbon 502	CHClF ₂ /CClF ₂ -CF ₃	|	.	R4	|	|	.	.	.	.	.	.
Halocarbon 1132A	C ₂ H ₂ F ₂	.	.	R4	|	.	|	.	|	|	|	.
Helium	He	.	.	.	.	.	.	.	.	.	.	.
Hydrogen	H ₂	.	.	.	.	.	.	.	.	.	.	.
Hydrogen Chloride	HCl	U	.	U	U	U	.	.	.	U	U	U
Hydrogen Sulfide	H ₂ S	U	.	.	|	|	.	.	U	.	.	.
Isobutane	C ₄ H ₁₀	.	.	.	.	.	.	.	.	.	.	.
Isobutylene	C ₄ H ₈	.	.	.	|	.	.	.	.	.	.	|
Isopentane	C ₅ H ₁₂	.	.	.	.	.	.	.	.	.	.	.
Krypton	Kr	.	.	.	.	.	.	.	.	.	.	.
Methane	CH ₄	.	.	.	.	.	.	.	.	.	.	.
Methyl Chloride	CH ₃ Cl	.	.	U	U	.	.	.	.	U	U	U
Methyl Mercaptan	CH ₃ SH	.	.	U	|	U	.	.	|	|	.	|
Neon	Ne	.	.	.	.	.	.	.	.	.	.	.
Nitric Oxide	NO	U	.	.	|	.	.	.	|	|	.	|
Nitrogen	N ₂	.	.	.	.	.	.	.	.	.	.	.
Nitrogen Dioxide	NO ₂	|	.	.	|	|	.	.	U	U	U	U
Nitrous Oxide	N ₂ O	.	.	.	.	.	.	.	.	.	.	.
Oxygen	O ₂	.	R5	R4	.	.	.	.	R6	R6	R6	.
Perfluoropropane	C ₃ F ₈	.	.	.	|	.	.	.	|	.	.	|
Phosphine	PH ₃	|	.	.	|	|	.	.	|	|	|	|
Phosphorous Pentafluoride	PF ₅	|	.	|	|	|	.	.	|	|	|	|
Propane	C ₃ H ₈	.	.	.	.	.	.	.	.	.	.	.
Propylene	C ₃ H ₆	.	.	.	.	.	.	.	.	U	U	U
Propylene Oxide	C ₃ H ₆ O	|	.	|	|	|	.	.	U	U	U	U
Refrigerant Gases	See Halocarbons											
Silane	SiH ₄	.	.	.	|	.	.	.	.	.	.	.
Silicon Tetrachloride	SiCl ₄	|	.	U	|	|	.	.	|	|	|	|
Silicon Tetrafluoride	SiF ₄	.	.	.	|	.	.	.	.	.	.	.
Sulfur Dioxide	SO ₂	U	.	.	U	U	.	.	.	U	U	.
Sulfur Hexafluoride	SF ₆	.	.	.	|	.	.	.	.	.	.	.
Trichlorosilane	HSiCl ₃	|	.	U	|	|	.	.	|	|	|	|
Vinyl Methyl Ether	C ₃ H ₆ O	.	.	.	|	U	.	.	|	|	|	|
Xenon	Xe	.	.	.	.	.	.	.	.	.	.	.

