

GAS 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. It is extremely important that all gas control equipment be compatible with the gas being passed through it. The use of a device that is not compatible with the service gas may damage the unit and cause a leak that could result in property damage or personal injury. To reduce potentially dangerous situations, always check for compatibility of materials before using any gases in your gas control equipment.

Since combinations of gases are virtually unlimited, mixtures (except for Ethylene Oxide/Halocarbon and Ethylene Oxide/CO₂ sterilizing gas mixtures) are not listed in the Compatibility Chart. Before using a gas mixture or any gas not listed in the chart, we strongly urge you to contact your nearest Advanced Representative for information and assistance.

DIRECTIONS

To use this chart, proceed as follows:

1. Locate the gas you are using in the first column.
2. 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 compatibility.

KEY TO MATERIALS COMPATIBILITY

- S:** 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.
- C1 thru C8:** Conditionally acceptable for use with the intended gas as follows:
- C1:** Satisfactory with brass having a low (65–70% maximum) copper content. Brass with higher copper content is unacceptable.
 - C2:** Satisfactory with acetylene; however, cylinder acetylene is packaged dissolved in a solvent (generally acetone) which may be incompatible with these elastomers.
 - C3:** Compatibility varies depending on specific Kalrez® compound used. Consult E.I. DuPont for information on specific applications.
 - C4:** Satisfactory with brass, except where acetylene or acetylides are present.
 - C5:** Generally unsatisfactory, except where specific use conditions have proven acceptable.
 - C6:** Satisfactory below 1000 psig.
 - C7:** Satisfactory below 1000 psig where gas velocities do not exceed 30 ft./sec.
 - C8:** Material compatibility depends on condition of use.

* This chart has been prepared for use with dry (anhydrous) gases at normal operating temperature of 70°F. Information may vary if different operating conditions exist. Systems and equipment used in oxidizer gas service (e.g., Oxygen or Nitrous Oxide) must be cleaned for oxidizer service.

IMPORTANT

This information is for experienced operators who know the general principles and the safety precautions to be observed in handling specialty gases and associated equipment. If you are not certain you fully understand these safety precautions, we urge you to obtain and read the applicable Material Safety Data Sheet (MSDS) and Equipment Instruction Booklet.

The information contained in the Compatibility Chart has been compiled by Advanced from what it believes are authoritative sources and it is offered solely as a convenience to its customers. While Advanced believes that this information is accurate and factual as of the date of this publication, this information is intended to be used only as a guide in providing general information with respect to the products mentioned; and, therefore, it is not to be taken as a warranty or representation for which Advanced assumes legal responsibility.

Since the user's product formulation, specific use application, and conditions of use are all outside Advanced's control, Advanced makes no warranty or representation regarding the result which may be obtained by the user. It shall be the responsibility of the user to determine the suitability of the user's gas control equipment for use with the products mentioned.

COMPATIBILITY CHART

Common Name	Chemical Formula	MATERIALS OF CONSTRUCTION																	
		Metals							Plastics						Elastomers				
		Brass	303 Stainless Steel	316 Stainless Steel	Aluminum	Zinc	Copper	Monel	PCTFE	Teflon	Tefzel	Kynar	PVC	Polycarbonate	Kalrez	Viton	Buna-N	Neoprene	Polyurethane
Acetylene	C ₂ H ₂	C1	S	S	I	U	U	S	S	S	S	I	I	S	C2	C2	C2	C2	
Air	—	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Allene	C ₃ H ₄	S	S	S	S	I	U	S	S	S	S	I	I	S	S	S	S	I	
Ammonia	NH ₃	U	S	S	S	U	U	S	S	S	U	S	U	C3	U	S	S	U	
Argon	Ar	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Arsine	AsH ₃	S	S	S	C5	I	S	S	S	S	S	S	I	S	S	S	S	U	
Boron Trichloride	BCl ₃	U	S	S	I	I	S	S	S	S	I	S	I	C3	I	I	I	I	
Boron Trifluoride	BF ₃	S	S	S	S	I	S	S	S	S	I	S	I	C3	I	I	I	I	
1,3-Butadiene	C ₄ H ₆	S	S	S	S	S	S	S	S	S	S	S	U	S	S	U	S	U	
Butane	C ₄ H ₁₀	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	
1-Butene	C ₄ H ₈	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	
Cis-2-Butene	C ₄ H ₈	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	
Trans-2-Butene	C ₄ H ₈	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	
Carbon Dioxide	CO ₂	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Carbon Monoxide	CO	S	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	
Carbonyl Sulfide	COS	S	S	S	S	I	S	S	S	S	S	S	I	I	S	I	I	I	
Chlorine	Cl ₂	U	S	S	U	U	U	S	S	S	S	U	U	S	S	U	U	U	
Deuterium	D ₂	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S	S	
Diborane	B ₂ H ₆	S	S	S	S	I	S	S	S	S	I	I	I	S	I	I	I	I	
Dichlorosilane	H ₂ SiCl ₂	I	S	S	I	I	I	S	S	S	S	I	I	S	I	I	I	I	
Dimethyl Ether	C ₂ H ₆ O	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	I	
Ethane	C ₂ H ₆	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S	S	
Ethyl Acetylene	C ₄ H ₆	I	S	S	S	I	U	S	S	S	I	S	I	S	S	I	S	I	
Ethyl Chloride	C ₂ H ₅ Cl	S	S	S	U	I	S	S	S	S	S	U	U	S	S	S	S	U	
Ethylene	C ₂ H ₄	S	S	S	S	S	S	S	S	S	S	I	I	S	S	S	S	I	
Ethylene Oxide**	C ₂ H ₄ O	C4	S	S	C5	I	U	I	S	S	I	I	U	U	C3	U	U	U	

** Satisfactory for use with EPR (Ethylene Propylene Rubber) and EPDM.

COMPATIBILITY CHART (continued)

Common Name		MATERIALS OF CONSTRUCTION																	
		Metals							Plastics					Elastomers					
		Brass	303 Stainless Steel	316 Stainless Steel	Aluminum	Zinc	Copper	Monel	PCTFE	Teflon	Tefzel	Kynar	PVC	Polycarbonate	Kalrez	Viton	Buna-N	Neoprene	Polyurethane
Ethylene Oxide/Carbon Dioxide Mixtures**	C4	S	S	I	I	U	I	S	S	I	I	U	U	C3	U	U	U	U	
Ethylene Oxide/Halocarbon Mixtures**	C4	S	S	I	I	U	I	S	S	I	I	U	U	C3	U	U	U	U	
Ethylene Oxide/HCFC-124	C4	S	S	I	I	U	I	S	S	I	I	U	U	C3	U	U	U	U	
Halocarbon 11	CCl ₃ F	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	U	U	
Halocarbon 12	CCl ₂ F ₂	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 13	CClF ₃	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 13B1	CBF ₃	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 14	CF ₄	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 21	CHCl ₂ F	S	S	S	C5	I	S	S	S	S	S	U	U	C3	U	U	S	S	
Halocarbon 22	CHClF ₂	S	S	S	C5	I	S	S	S	S	S	U	U	C3	U	U	S	U	
Halocarbon 23	CHF ₃	S	S	S	C5	I	S	S	S	S	S	U	U	C3	I	I	I	S	
Halocarbon 113	CCl ₂ FCClF ₂	S	S	S	C5	U	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 114	C ₂ Cl ₂ F ₄	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 115	C ₂ ClF ₅	S	S	S	C5	I	S	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 116	C ₂ F ₆	S	S	S	C5	I	S	S	S	S	S	U	U	C3	I	I	I	S	
Halocarbon 142B	C ₂ H ₃ ClF ₂	S	S	S	C5	I	S	S	S	S	S	U	U	C3	U	S	S	S	
Halocarbon 152A	C ₂ H ₄ F ₂	S	S	S	C5	I	S	S	S	S	S	U	U	C3	U	S	S	S	
Halocarbon C-318	C ₄ F ₈	S	S	S	C5	I	I	S	S	S	S	U	U	C3	S	S	S	S	
Halocarbon 502	CHClF ₂ /CClF ₂ -CF ₃	I	S	S	C5	I	I	S	S	I	S	U	U	C3	S	S	S	S	
Halocarbon 1132A	C ₂ H ₂ F ₂	S	S	S	C5	I	S	S	I	S	S	U	U	C3	I	I	I	S	
Helium	He	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Hydrogen	H ₂	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Hydrogen Chloride	HCl	U	S	S	I	U	U	S	S	S	S	S	U	S	S	U	U	U	
Hydrogen Sulfide	H ₂ S	U	S	S	S	I	I	S	S	S	S	S	S	S	U	S	S	S	
Isobutane	C ₄ H ₁₀	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	
Isobutylene	C ₄ H ₈	S	S	S	S	I	S	S	S	S	S	S	I	S	S	S	S	I	

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Isopentane	C ₅ H ₁₂	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	
Krypton	Kr	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Methane	CH ₄	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S	S	
Methyl Chloride	CH ₃ Cl	S	S	S	U	U	S	S	S	S	S	I	I	S	S	U	U	U	
Methyl Mercaptan	CH ₃ SH	S	S	S	U	I	U	U	S	S	S	I	I	I	S	I	I	S	I
Neon	Ne	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Nitric Oxide	NO	U	S	S	S	I	S	S	S	S	S	I	S	I	S	I	I	S	I
Nitrogen	N ₂	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Nitrogen Dioxide	NO ₂	I	S	S	S	I	I	S	S	S	S	I	U	I	S	U	U	U	U
Nitrous Oxide	N ₂ O	S	C6	C6	C5	S	S	S	S	C5	S	S	S	I	C3	S	S	S	S
Oxygen	O ₂	S	C7	C7	C7	S	S	S	S	C5	S	S	S	S	C3	C8	C8	C8	S
Perfluoropropane	C ₃ F ₈	S	S	S	S	I	S	S	S	S	S	I	I	I	I	I	S	S	I
Phosphine	PH ₃	I	S	S	S	I	I	S	S	S	S	I	I	I	S	I	I	I	I
Phosphorous Pentafluoride	PF ₅	I	S	S	I	I	I	S	S	S	S	I	I	I	I	I	I	I	I
Propane	C ₃ H ₈	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Propylene	C ₃ H ₆	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	U	U	U
Propylene Oxide	C ₃ H ₆ O	I	S	S	I	I	I	I	S	S	S	I	U	S	C3	U	U	U	U
Refrigerant Gases	—	See Halocarbons																	
Silane	SiH ₄	S	S	S	S	I	S	S	S	S	S	S	S	I	S	S	S	S	S
Silicon Tetrachloride	SiCl ₄	I	S	S	U	I	I	S	S	S	I	I	U	I	C3	I	I	I	I
Silicon Tetrafluoride	SiF ₄	S	S	S	S	I	S	S	S	S	S	S	S	I	C3	S	S	S	S
Sulfur Dioxide	SO ₂	U	S	S	S	U	U	S	S	S	S	S	S	U	S	S	U	U	S
Sulfur Hexafluoride	SF ₆	S	S	S	S	I	S	S	S	S	S	S	S	I	C3	S	S	S	S
Trichlorosilane	HSiCl ₃	I	S	S	U	I	I	S	S	S	I	I	U	I	C3	I	I	I	I
Vinyl Methyl Ether	C ₃ H ₆ O	S	S	S	S	I	U	S	S	S	S	I	I	U	C3	I	I	I	I
Xenon	Xe	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S