

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.

- 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

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
Boron Trifluoride	BF ₃	•	•	•	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
Dichlorosilane	H ₂ SiCl ₂	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
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/HCFC-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	•	•	•	•	•	•	•

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FORMULA

		MATERIALS OF CONSTRUCTION										
		METALS					PLASTICS		ELASTOMERS			
		Brass	Stainless Steel	Aluminum	Zinc	Copper	PCTFE	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	•	•	•	•	•	•	•	•	•	•	•
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	•	•	•	•	•	•	•	•	•	•	•

MOISTURE CONVERSION

Dew Point °C °F	Vapor Pressure (Water/Ice in Equilibrium) mm of Mercury	PPM on Volume Basis at 760 mm of Hg Pressure	Relative Humidity at 70 F%	PPM on Weight Basis in Air
-90 -130	0.00007	0.0921	0.00037	0.057
-88 -126	0.0001	0.132	0.00054	0.082
-86 -123	0.00014	0.184	0.00075	0.11
-84 -119	0.0002	0.263	0.00107	0.16
-82 -116	0.00029	0.382	0.00155	0.24
-80 -112	0.0004	0.562	0.00214	0.33
-78 -108	0.00056	0.737	0.003	0.46
-76 -105	0.00077	1.01	0.0041	0.63
-74 -101	0.00105	1.38	0.00559	0.86
-72 -98	0.00143	1.88	0.00762	1.17
-70 -94	0.00194	2.55	0.0104	1.58
-68 -90	0.00261	3.43	0.014	2.13
-66 -87	0.00349	4.59	0.0187	2.84
-64 -83	0.00464	6.11	0.0248	3.79
-62 -80	0.00614	8.08	0.0328	5.01
-60 -76	0.00808	10.6	0.043	6.59
-58 -72	0.0106	13.9	0.0565	8.63
-56 -69	0.0138	18.2	0.0735	11.3
-54 -65	0.0178	23.4	0.0948	14.5
-52 -62	0.023	30.3	0.123	18.8
-50 -58	0.0295	38.8	0.157	24.1
-48 -54	0.0378	49.7	0.202	30.9
-46 -51	0.0481	63.3	0.257	39.3
-44 -47	0.0609	80	0.325	49.7
-42 -44	0.0768	101	0.41	62.7
-40 -40	0.0966	127	0.516	78.9
-38 -36	0.1209	159	0.644	98.6
-36 -33	0.1507	198	0.804	122.9
-34 -29	0.1873	246	1	152
-32 -26	0.2318	305	1.24	189
-30 -22	0.2859	376	1.52	234
-28 -18	0.351	462	1.88	287
-26 -15	0.43	566	2.3	351
-24 -11	0.526	692	2.81	430
-22 -8	0.64	842	3.41	523
-20 -4	0.776	1020	4.13	633
-18 0	0.939	1240	5	770
-16 3	1.132	1490	6.03	925
-14 7	1.361	1790	7.25	1110
-12 10	1.632	2150	8.69	1335
-10 14	1.95	2570	10.4	1596
-8 18	2.326	3060	12.4	1900
-6 21	2.765	3640	14.7	2260
-4 25	3.28	4320	17.5	2680
-2 28	3.88	5100	20.7	3170
0 32	4.579	6020	24.4	3640
2 36	5.294	6970	28.2	4330
4 39	6.101	8030	32.5	4990
6 43	7.013	9230	37.4	5730
8 46	8.045	10590	42.9	6580
10 50	9.029	12120	49.1	7530
12 54	10.52	13840	56.1	8600
14 57	11.99	15780	63.9	9800
16 61	13.63	17930	72.6	11140
18 64	15.48	20370	82.5	12650
20 68	17.54	23080	93.5	14330

Warranty

This equipment is sold by The Harris Products Group under the warranties and policies set forth in the following paragraphs. The warranty is extended only with respect to the purchase of this equipment directly from The Harris Products Group or its authorized distributor network as new merchandise and is extended to the first buyer thereof other than for the purpose of resale.

The warranty period is one (1) year from the date of original delivery to the buyer with the following exception for equipment use in corrosive gas service. Equipment used in corrosive gas service will have a warranty of ninety (90) days from the date of original delivery. The equipment is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in the product manual and any associated labels, inserts or instructions provided that the equipment is properly operated under conditions of normal use and that recommended regular maintenance and service is performed in accordance with the instructions provided.

The warranty for such equipment shall not apply if the equipment has been altered by any third party. The Harris Products Group or its designated service facility shall only perform repairs to the equipment. If the equipment has been subject to abuse, misuse, negligence or accident the stated warranty will not apply.

The Harris Products Group sole obligation to the buyer and the buyer's sole remedy is limited to the repair or replacement of the equipment free of charge at The Harris Products Group's option. The authorized distributor from which it was purchased must report the request for return or repair to The Harris Products Group. The request must include the observed deficiency, the part number or assembly number, gas service used and the proof of purchase. The request for return or repair must occur no later than seven (7) days after the expiration of the warranty period (One year and seven days for non-corrosive equipment and ninety seven (97) days for equipment in corrosive gas service). Transportation charges are to be prepaid for the return of the equipment and upon examination the equipment is found defective due to no fault of the buyer the equipment will be replaced or repaired and returned to the original buyer at no charge. If the product is found to be defective due to negligence of the buyer or his customer the product will be repaired or replaced and returned to the original buyer only after authorization has been received to pay for any such repairs and all transportation charges.

The Harris Products Group shall not be liable for any damages including but not limited to incidental damages, consequential damages or other damages which may occur due to negligence, breach of warranty or otherwise.

There are no express or implied warranties that extend beyond the warranties set forth by The Harris Products Group.