

CHEMICAL RESISTANCE GUIDE

Fluid Compatibility

The chart on the following pages indicates the suitability of various elastomers and metals for use with fluid to be conveyed. It is intended as a guide to chemical compatibility with inner tube materials and assembly lubricant applied internally. The specific recommendations are based upon field experience, the advice of various polymer or fluid suppliers, and specific laboratory experiments.

It must be stressed, that this information is offered as a guide and it is intended as a guide only and is not a guarantee. Final selection of the proper hose style, seal, or material of metal components is further dependent on many factors including pressure, fluid and ambient temperature, concentration, duration of exposure and special requirements or variations which may not be known by ALFAGOMMA.

Testing under actual conditions is the best way to assure chemical compatibility for critical applications.

There may be instances where the outer cover could be adversely affected by substances which would not chemically affect the inner tube. Conversely, some substances which adversely affect the inner tube of the hose may not have a deteriorating effect on the outer cover. Where an external compatibility problem may occur or for fluid not listed, contact Kuriyama of America's ALFAGOMMA Hydraulic Hose Specialist.

Legal and other regulations applicable to the following applications must be followed with particular care:

- a) Special precautions are necessary in gaseous applications, high pressure inert gases, due to the potential volume of gaseous fluid in the system, unless the cover is perforated (pin pricked)
- b) Hose styles with rubber or thermoplastic covers are not suitable for gases above 250 PSI (1.7 Mpa). The pressure must not be released quickly and the hose must be chained or restrained to prevent personal injury in the event of damage or failure.
- c) Hose applications for furls or for liquefied petroleum gas, butane or propane must take into account legal and insurance regulations.
- d) Special hoses are supplied for refrigerants 12,22,R134 and some other refrigerants.

- e) The fluid manufacturer's recommended maximum operating temperature should be scrupulously observed by the user for any specific brand-name fluid. These recommended temperatures can vary widely between name brands of different fluid compositions even though they fall into the same generic "family" of fluids. Exceeding the manufacturer's recommended maximum operating temperature can result in fluid breakdown, producing by-products that are harmful to elastomeric products, as well as other materials in the system. If a manufacturer's recommended maximum temperature for his specific fluid is lower than that for the hose rating, it should take precedence over the hose rating for service usage. Ambient temperatures in excess of those recommended, in conjunction with maximum fluid temperatures, can materially shorten the service life of the hose.

Use the chart as follows:

1. Locate the medium to be carried. Chemicals are listed alphabetically.
2. Determine the suitability of the hose and fitting material, using the Resistance Rating Scale.
3. Check the hose specifications in this catalog. For further details on the products shown in this catalog, and their applications, consult your Kuriyama of America ALFAGOMMA Sales Specialist.

Resistance Rating Scale:

E	=	Excellent
G	=	Good
X	=	Not recommended
-	=	Testing Recommended
Blank	=	No Data

Note : All data is based on 68°F (20°C) unless otherwise noted.

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; – = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Absorption Oil	G	E	G	–	G	–	–	–	–	–	–	E
Acetaldehyde	X	X	X	–	X	E	G	E	E	E	E	E
Acetamide	E	G	–	–	–	X	–	–	–	–	–	–
Acetate Solvent Crude												
Acetate Solvent Pure												
Acetic Acid, 100%	X	X	–	–	–	–	X	X	X	G	G	X
Acetic Acid, 100% (Hot) Vapors	G	G	–	–	–	–	X	X	X	G	G	X
Acetic Acid, 100% Boiling	X	X	–	–	–	X	X	X	X	G	–	X
Acetic Acid, 25%	G	X	G	E	G	–	X	X	G	G	G	X
Acetic Acid, 30%	G	X	–	E	–	–	G	X	G	E	G	X
Acetic Acid, 5-20%	G	X	G	E	G	X	E	X	G	G	G	X
Acetic Acid, 50%	G	X	G	E	–	–	G	X	G	G	G	X
Acetic Acid, 50% Boiling	X	X	–	–	–	–	X	X	X	G	–	–
Acetic Acid, 80%	X	X	–	–	–	–	X	X	G	G	G	X
Acetic Acid, 80% Boiling	X	X	–	–	–	–	X	X	X	G	X	X
Acetic Acid, Air Free	–	–	–	–	–	–	–	X	X	X	–	X
Acetic Acid, Anhydride	X	X	X	E	G	–	X	X	G	G	G	X
Acetic Acid, Areated	–	–	–	–	–	–	–	X	X	X	–	X
Acetic Acid, Crude	X	X	–	–	–	–	E	X	G	E	G	X
Acetic Acid, Glacial	X	X	X	E	X	X	X	X	G	G	G	–
Acetil Bromide												
Acetil Chloride												
Acetil Chromide												
Acetone (Dimethylketone)	X	X	X	E	X	X	E	E	E	E	E	E
Acetonitrile (Methyl Cyanide)	G	X	G	E	G	–	–	–	–	–	–	–
Acetophenone												
Acetylene	G	G	E	E	–	–	E	E	E	E	E	G
Acrylic Esters												
Acrylonitrile (Vinyl Cyanide)	X	X	X	E	X	–	–	E	E	E	G	E
Adipic Acid												
Aero Lubriplate	E	E	–	–	–	–	–	E	E	E	E	–
Aero Safe 2300	X	X	–	–	–	X	–	E	E	E	E	E
Aeroshell 17A Grease	G	E	–	–	–	X	–	E	E	E	E	–
Aeroshell 750	X	G	–	–	–	X	–	E	E	E	E	–
Aeroshell 7A Grease	G	E	–	–	–	X	–	E	E	E	E	–
Aeroshell type 1A,1AC, 4	G	E	–	–	–	E	–	–	–	–	–	–
Air 150°F	E	E	E	E	E	E	E	E	E	E	E	E
Air 180°F	G	G	G	E	G	G	E	E	E	E	E	E
Air 200°	X	X	X	E	X	G	G	E	E	E	E	E
Air Ambient	E	E	E	E	E	E	E	E	E	E	E	E
Aircraft Hydraulic Oil AA	–	E	–	–	–	–	–	E	E	E	E	E

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Alcohol	E	E	–	–	–	–	–	E	E	E	E	E
Alcohol, Amyl	G	G	–	–	–	–	E	–	G	E	G	–
Alcohol, Benzyl	X	X	–	E	G	G	–	E	E	E	–	–
Alcohol, Butyl	G	X	G	–	G	E	E	E	E	E	E	E
Alcohol, Denatured	E	E	–	–	E	–	E	E	E	E	E	E
Alcohol, Diacetone	–	X	–	–	G	–	–	E	E	E	E	E
Alcohol, Ethyl (Ethanol)	E	E	E	E	E	G	E	E	E	E	E	G
Alcohol, Furfural	G	X	X	E	G	–	–	G	E	E	E	E
Alcohol, Hexyl (Hexanol)	G	E	–	–	X	–	–	E	E	E	E	G
Alcohol, Isobutyl	G	G	–	–	E	–	E	E	E	E	E	G
Alcohol, Isopropyl (Isopropanol)	G	G	G	–	G	G	E	E	E	E	E	G
Alcohol, Methyl (100%) (Methanol)1	E	E	E	E	E	–	E	E	E	E	E	G
Alcohol, Methyl (6%)	E	E	E	–	E	–	E	E	E	E	E	G
Alcohol, Octyl	G	G	–	–	–	–	E	E	E	E	E	–
Alcohol, Propyl	E	E	–	–	–	–	X	G	E	E	E	E
Alkazene	X	X	X	–	X	X	–	E	E	–	–	–
Alkyd Resins												
Aluminum Chloride	E	E	E	E	E	G	X	X	G	G	X	X
Aluminum Fluoride, 20%+A21	E	E	E	E	E	G	X	X	G	G	G	X
Aluminum Hydroxide	E	E	E	E	E	–	E	–	E	E	–	E
Aluminum Hydroxide, Saturated	E	E	–	–	–	–	E	–	E	E	–	–
Aluminum Nitrate	E	E	E	E	E	G	–	X	E	E	G	–
Aluminum Sulfate	E	E	E	E	E	X	E	X	X	G	X	X
Alums (Ammonium or Potassium)	E	E	E	E	E	–	–	X	G	G	X	X
Ammonia Gas Cold												
Ammonia Liquid (Anhydrous)												
Ammonia, Aqueous	E	G	E	–	E	–	E	–	E	E	–	X
Ammonium Acetate												
Ammonium Carbonate												
Ammonium Chloride, 1%	X	G	E	E	E	E	E	X	G	G	X	X
Ammonium Chloride, 10% Boiling	X	X	–	–	–	–	X	X	G	G	X	X
Ammonium Chloride, 28% Boiling	X	X	–	–	–	–	X	X	G	G	X	X
Ammonium Chloride, 50% Boiling	X	X	–	–	–	–	X	G	E	E	–	X
Ammonium Hydroxide	G	G	G	E	E	X	E	G	E	E	–	X
Ammonium Hydroxide , 3 Molar	E	X	–	–	–	G	–	X	G	G	X	X

Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Ammonium Hydroxide Concentrated 1	E	X	-	E	-	X	E	X	G	G	X	X
Ammonium Metaphosphate	G	G	G	-	G	-	-	E	E	E	X	-
Ammonium Nitrate, Fertilizer	E	G	E	E	E	E	X	E	E	E	G	X
Ammonium Nitrite	E	E	-	-	-	-	E	G	E	E	X	-
Ammonium Persulfate	X	X	X	E	-	X	X	X	G	G	X	X
Ammonium Persulfate 10%	E	X	-	-	-	X	X	X	G	G	X	X
Ammonium Persulfate 5%	E	X	-	-	-	-	X	G	G	X	X	X
Ammonium Phosphate (Mono,Di,Tri,Basic)	E	E	E	E	E	E	G	X	G	G	X	-
Ammonium Sulfate	E	G	E	E	E	E	X	X	X	G	X	X
Ammonium Sulfide												
Ammonium Thiocyanate	E	E	-	E	E	-	-	E	E	E	-	-
Amyl Chloride	X	-	X	G	X	-	G	-	E	E	-	-
Amyl Chloronaphthalene	X	X	X	-	X	-	-	-	E	E	-	-
Amyl Naphthalene	X	X	X	-	X	-	-	-	E	E	-	-
Amyl Phenol	-	-	-	-	-	-	-	-	E	E	-	-
Amyl Acetate	X	X	X	G	X	G	E	X	E	E	X	G
Amyl Alcohol												
Amyl Borate	G	G	G	-	-	-	-	-	-	-	-	-
AN-0-3 Grade M	E	E	-	-	-	-	-	-	-	-	-	-
AN-0-366	E	E	-	-	-	-	-	-	-	-	-	-
AN-0-6	E	E	-	-	-	-	-	-	-	-	-	-
AN-VV-0-366B Hydraulic Fluid	E	-	-	-	-	-	G	-	-	-	-	-
Anderol, L-774 (Diester)	X	G	-	-	-	-	X	-	-	-	-	-
Anderol, L-826 (Diester)	X	G	-	-	-	-	X	-	-	-	-	-
Anderol, L-829 (Diester)	X	G	-	-	-	-	X	-	-	-	-	-
ANG-25 (Diester Base,TG749)	X	G	-	-	-	-	X	E	E	E	E	-
ANG-25 (Glyceral Ester)	G	G	-	-	-	-	G	-	-	-	-	-
Aniline	X	X	X	G	X	X	G	G	E	E	X	X
Aniline Dyes												
Animal Fat												
Animal Gelatin	E	E	-	E	-	-	-	-	E	E	-	-
Animal Oil (Lard Oil)	G	E	-	E	-	-	-	-	E	E	E	E
Antifreeze, Alcohol Base	G	G	G	G	G	-	-	E	E	E	E	-
Antifreeze, Glycol Base	G	E	E	E	E	-	E	E	E	E	E	E
Antimony Chloride, 50%	-	E	-	-	-	-	X	X	X	X	-	-
Aqua Regia (Concentrated)	X	X	X	G	X	X	X	X	X	X	X	-
Arco ATF Dexron	-	E	-	-	-	-	-	-	-	-	-	-

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Arco C2, 100	-	E	-	-	-	-	-	-	-	-	-	-
Argon Gas												
Aromatic Fuel 30%, Mil	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic Fuel 50%	X	G	-	-	-	-	-	-	-	-	-	-
Aromatic Hydrocarbons	X	X	-	-	X	G	-	G	E	G	G	G
Arsenic Salt												
Askarel, Transformer Oil	X	X	X	-	X	-	-	E	E	E	-	E
Asphalt, Cut Back	X	G	G	-	X	E	E	E	E	E	G	G
Asphalt, Topping	E	X	-	-	-	-	-	E	E	E	-	-
Asphalt, Under 180°F	G	G	G	X	X	E	-	E	E	E	-	G
ASTM Oil No. 1	E	E	E	E	G	E	E	E	E	E	E	E
ASTM Oil No. 2	G	E	-	G	-	E	E	E	E	E	E	E
ASTM Oil No. 3	X	E	X	X	X	-	E	E	E	E	E	E
ASTM Oil No. 4	X	G	-	-	-	-	-	E	E	E	E	-
ASTM Reference Fuel A	G	E	E	E	E	-	E	E	E	E	E	E
ASTM Reference Fuel B	G	E	G	G	X	-	-	E	E	E	E	E
ASTM Reference Fuel C	X	G	X	G	X	-	-	E	E	E	-	E
ATL-857	X	G	-	-	-	-	-	-	-	-	-	-
Atlantic Dominion F	G	E	-	-	-	-	-	-	-	-	-	-
Aurex 903R (Mobil)	G	E	-	-	-	-	-	-	-	-	-	-
Automatic Brake Fluid	G	X	-	-	-	-	-	E	E	E	E	-
Automatic Transmission Fluid	G	E	-	E	-	-	-	E	E	E	E	-
Aviation Gasoline, Mil	-	G	-	-	-	-	-	E	E	E	E	-
Baltic Types 100, 150, 200, 300, 500	-	E	-	-	-	-	-	-	-	-	-	-
Banvel Concentrated (Ag Spray)	-	-	-	-	-	-	-	E	-	-	E	-
Bardol B	X	X	X	-	X	-	-	E	E	E	-	-
Barium Chloride	X	E	E	E	E	E	E	X	G	G	X	E
Barium Chloride, 5%	X	E	-	-	-	-	X	G	E	E	X	G
Barium Chloride, Aqueous Solution (Hot)	X	E	-	-	-	-	X	G	G	G	X	-
Barium Concentrate	E	E	E	E	E	-	E	G	E	E	X	-
Barium Hydroxide	E	E	E	E	E	X	E	X	E	E	X	X
Barium Sulfate	E	E	-	E	G	-	E	G	E	E	G	G
Barium Sulfide	G	E	E	E	E	-	G	X	E	E	X	-
BariumSulfate, Aqueous Solution (Hot)	X	-	-	-	-	-	X	G	E	E	G	X
Baygon												-
Bayol 35	-	E	-	-	-	-	-	-	-	-	-	-
Bayol D	-	E	-	-	-	-	-	-	-	-	-	X
Beer												-
Beet Sugar Liquors	X	E	E	E	E	X	-	G	G	G	G	E

Chemical Resistance



Rating Scale:

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Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Bellows 80-20 Hydraulic Oil	-	E	-	-	-	G	-	-	-	-	-	E
Benzaldehyde	X	X	X	G	X	E	E	E	E	E	E	E
Benzene, Benzol	X	X	X	X	X	G	E	E	E	E	E	-
Benzine, Petroleum Ether	X	G	X	E	-	G	-	E	E	E	E	X
Benzine, Petroleum Naphtha												E
Benzoic Acid												G
Benzyl Alcohol												X
Black Point 77	-	E	-	-	-	-	-	-	-	-	-	X
Black Sulfate Liquor	G	G	G	G	G	-	E	G	E	E	X	-
Blast Furnace Gas	X	X	X	-	X	X	-	E	E	E	G	E
Borax, Sodium Borate	X	G	G	E	E	E	X	G	E	E	X	E
Bordeaux Mixture	G	G	G	-	-	E	E	X	-	E	E	-
Boric Acid	E	E	E	-	E	E	X	X	G	G	E	-
Boron Fuels, HEF	X	X	-	-	-	-	-	-	-	-	-	-
Brake Fluid, Petroleum Base	G	E	G	E	X	-	-	E	E	E	-	-
Brake Fluid, Synthetic Base	X	X	X	E	X	-	-	E	E	E	E	-
Bray GG-130	X	G	-	-	-	-	-	-	-	-	-	-
Brayco 719-r (VV-H-910)	G	X	-	-	-	-	-	-	-	-	-	E
Brayco 885 (MIL-L-6085A)	X	G	-	-	-	-	-	-	-	-	-	-
Brayco 910	G	G	-	-	-	-	-	-	-	-	-	E
Brine												E
Brom-113	X	G	-	-	-	-	-	-	-	-	-	-
Brom-114	G	G	-	-	-	-	-	-	-	-	-	X
Bromine												X
Bunker Oil	X	G	G	-	X	G	-	E	E	E	E	X
Butane	X	X	X	-	X	X	X	X	-	-	-	E
Butanone, MEK												-
Butyl Acetate	X	X	X	G	X	-	-	G	E	E	E	X
Butyl Acetate												G
Butyl Alcohol, Butanol												X
Butyl Cellosolve												X
Butyl Stearate												X
Butylene												X
Butyraldehyde												X
Cadmium Salts												
Calcium Acetate	X	X	X	E	X	-	-	G	G	G	X	E
Calcium Arsenate	-	-	-	-	-	E	E	-	-	-	-	E
Calcium Bisulfate	E	E	G	E	E	-	-	-	G	E	-	E
Calcium Bisulfide	E	E	G	E	E	E	-	-	G	G	X	-
Calcium Bisulfite	E	E	E	E	E	-	E	X	E	E	E	G

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Calcium Carbonate	E	E	E	E	E	E	E	G	E	E	X	X
Calcium Chlorate	E	E	E	-	E	-	-	G	G	E	E	E
Calcium Chloride	E	E	E	E	E	E	E	X	G	G	X	E
Calcium Hydroxide	E	G	G	E	E	X	-	X	X	E	-	X
Calcium Hydroxide, 10% Boiling	-	G	-	-	-	-	X	G	E	E	X	E
Calcium Hydroxide, 20% Boiling	-	-	-	-	-	-	X	-	E	E	X	-
Calcium Hydroxide, 50% Boiling	-	-	-	-	-	-	X	-	X	G	X	G
Calcium Hypochlorite, 5% (Under 100°F)	X	G	X	E	G	-	X	X	X	G	X	E
Calcium Hypochlorite, 15% (Under 100°F)	X	-	X	E	G	-	X	-	X	G	X	X
Calcium Nitrate	E	E	E	E	E	-	E	X	G	G	X	X
Calcium Salts												
Calcium Silicate	-	G	-	E	G	-	-	E	E	E	E	X
Calcium Sulfate	E	E	E	E	E	-	-	G	E	E	G	-
Calcium Sulfide	E	G	-	E	-	-	G	G	E	E	G	X
Caliche Liquors												
Cane Sugar Liquors	E	E	G	E	E	E	-	E	E	E	E	#
Carbitol												
Carbolic Acid Phenol												
Carbolic Acid, Phenol	X	X	X	E	X	X	X	X	E	E	G	X
Carbon Bisulfide												
Carbon Dioxide, Dry	G	E	E	E	E	E	-	E	E	E	E	E
Carbon Dioxide, Wet	G	E	E	E	E	-	-	E	E	E	E	E
Carbon Disulfide	X	X	-	G	X	G	E	G	E	E	G	-
Carbon Monoxide, (under 150°F) (Hot)	G	G	G	E	E	-	G	E	E	E	E	-
Carbon Tetrachloride, 5-10%	-	-	-	-	-	-	-	X	-	-	-	X
Carbon Tetrachloride, Pure	X	X	X	G	X	X	X	X	X	G	G	-
Carbonic Acid	E	E	E	E	E	X	-	X	E	E	G	-
Castor Oil	G	G	G	E	G	G	E	G	E	E	E	G
Caustic Soda, 20%	G	X	X	E	E	X	G	G	E	E	X	E
Caustic Soda, 50%	G	X	X	E	E	X	G	G	E	E	X	E
Cellosolve Acetate, Under 100°F	X	X	X	G	X	-	-	G	G	G	E	E
Cellosolve Butyl, Under 100°F	X	X	X	-	X	-	-	G	G	G	G	E
Cellosolve Union Carbide, Under 100°F	X	X	-	-	-	-	-	G	G	G	G	-
Cellugard, Cellugard 200	E	E	-	-	-	-	-	-	X	X	-	X

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Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Cellulube 1000, 220A, ST220, A60	X	X	X	-	X	-	-	E	E	E	E	X
Cellulube 90, 150, 220,300, 551	X	X	X	-	X	-	-	E	E	E	E	X
Cellutherm 2505A	X	G	-	-	-	-	-	-	-	-	-	X
Chevron FR-10,13, 20, 8												
China wood Oil (Tung)												
Chlor Acetone												
Chlordane	X	X	X	-	X	-	E	-	-	-	X	X
Chlorinated Paraffine												
Chlorinated Solvents												
Chlorine Gas, Under 212°F	-	X	-	-	-	-	-	X	X	-	-	-
Chlorine Trifluoride	X	X	-	-	-	-	E	E	E	E	-	-
Chlorine Water, 25% Chlorine	X	X	X	-	G	G	X	-	X	X	-	E
Chloroacetic Acid (Under 100°F)	X	X	X	-	G	-	X	X	X	X	X	E
Chlorobenzene	X	X	X	X	X	-	X	G	G	G	X	E
Chlorobromo Methane	X	X	X	-	X	-	-	G	G	G	X	G
Chloroform	X	X	X	X	X	-	X	G	E	E	X	X
Chlorosulphonic Acid												
Chlorotoluene	X	X	X	X	X	X	-	G	G	G	X	X
Chlorox, Bleach	G	G	-	E	G	-	E	X	G	E	X	X
Chrome Plating Solution												
Chromic Acid, 5%	X	X	-	-	-	-	X	X	G	E	X	X
Chromic Acid, 10%	X	X	X	E	G	X	X	X	X	G	X	X
Chromic Acid, 25%	X	X	X	E	G	X	X	X	X	G	X	X
Chromic Acid, 50%	X	X	X	E	G	X	X	X	X	X	X	X
Chromic Acid, 100%	-	-	-	-	-	X	-	X	X	X	X	X
Chromium Potassium Sulfate												
Cider												
Circo Light Process Oil	E	E	-	-	-	-	-	E	E	E	E	-
Citgo FR Fluids	-	X	-	-	-	G	-	-	-	-	-	-
Citgo FR15, 20,25												
Citgo Glycol FR-20XD	-	E	-	-	-	G	-	E	E	E	E	E
Citgo Pacemaker FR												
Citgo Pacemaker Glicol												
Citgo Sentry, (Under100°F)	G	G	E	-	X	G	-	E	E	E	-	E
Citgo Tractor Hydraulic Fluid	-	E	-	-	-	G	-	E	E	E	-	E
Citric Acid, 5%	-	G	-	-	-	-	E	X	E	E	E	X

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Citric Acid, 5% @ 150°F	-	G	-	-	-	-	X	X	E	E	G	X
Citric Acid, 15%	E	G	-	-	-	-	E	X	E	E	-	X
Citric Acid, 15% Boiling	E	G	-	-	-	-	X	X	G	E	X	X
Citric Acid, Concentrated Boiling	E	X	E	-	E	G	X	X	X	G	X	X
Coal Gas	E	X	-	E	-	E	-	-	-	-	-	-
Coal Tars	X	G	X	G	G	-	-	E	E	E	E	E
Coke Oven Gas (Under 100°F)	X	G	X	-	G	-	-	E	E	E	G	-
Copper Arsenate, Cupric Arsenate	-	-	-	-	G	-	-	E	E	E	-	-
Copper Chloride, 1%	E	E	-	-	-	-	X	-	G	G	-	-
Copper Chloride, 5%	E	E	-	-	-	-	X	-	X	G	-	-
Copper Chloride, Cupric Chloride	G	G	G	G	G	E	G	X	X	E	-	X
Copper Cyanide, Cupric Cyanide	G	G	G	-	G	-	X	E	E	E	-	X
Copper Nitrate, 1% & 5%	E	E	-	-	-	-	E	X	E	E	X	X
Copper Nitrate, Cupric Nitrate	E	E	E	E	E	-	-	X	E	E	-	X
Copper Sulfate, 10%	E	E	-	-	-	-	-	X	G	G	X	-
Copper Sulfate, 50%	E	E	-	-	-	-	-	-	G	G	-	-
Copper Sulfate, Cupric Sulfate	E	E	E	E	E	E	E	X	E	E	X	X
Corn Oil	X	G	G	G	X	X	-	E	E	E	E	E
Cosmolubric												
Cottonseed Oil	G	G	E	G	G	X	G	E	E	E	E	E
Creasol, Cresylic Acid (Under 100°F)	X	X	X	E	X	-	X	G	E	E	G	-
Creosol												
Creosote, Wood or Coal Tar (Under 100°F)	X	G	X	-	X	X	X	G	E	E	E	X
Crude Petroleum Oil	X	X	G	G	G	G	-	E	E	E	E	E
Cutting Oil	G	E	G	E	X	-	-	E	E	E	-	E
Cutting Oil, Sulfur Base	X	E	-	-	-	-	-	E	E	E	E	-
Cutting Oil, Water Soluble	X	E	-	-	-	-	-	E	E	E	E	-
Cyclohexane	X	G	-	E	X	E	E	G	G	G	G	-
Cyclohexanol												
Cyclohexanone	X	X	X	G	X	E	E	G	G	G	G	-
Cymene	X	X	X	G	X	-	-	E	E	E	E	E
Dasco FR 300												
Dasco FR150, FR200, FR200B, FR310	-	E	-	-	-	-	E	-	-	-	-	-
Dasco IFR	-	E	-	-	-	-	E	E	-	-	E	E
DDT Preparation												

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Decalin	X	G	-	G	X	-	E	-	-	-	-	E
Dectol R&O Oil	X	E	-	-	-	G	-	-	-	-	-	-
Deionized Water												
Detergent / Water Solution												
Developing Fluids, Photo	G	-	-	E	G	-	-	-	E	E	-	-
Developing Solutions, Hypos	G	-	-	E	G	-	-	-	E	E	-	-
Dextron AFT												
Diacetone	X	X	X	E	X	-	E	E	E	E	E	E
Diammonium Phosphate												
Dibenzyl Ether												
Dibutyl Ether												
Dibutyl Phthalate (Under 120°F)	X	X	X	G	X	G	.	E	E	E	E	E
Dichlorobenzene	X	X	X	X	X	X	.	E	E	E	X	E
Dichloroethylene												
Dieldrin												
Diesel Oil, Fuel ASTM #2	G	E	G	G	X	E	E	E	E	E	E	E
Diester Lubricant MIL-I-7809	X	G	-	-	-	-	-	E	E	E	E	-
Diester Synthetic Lubricants	X	G	-	-	-	-	-	E	E	E	E	-
Diethanolamine, 20%												
Diethyl Ether												
Diethyl Sebacate												
Diethylamine (Under 120°F)	G	G	-	G	X	-	E	E	E	E	E	E
Diethylene Glycol	E	E	E	E	E	E	E	E	E	E	E	E
Diisobutyl Ketone	X	X	X	G	X	-	E	E	E	E	E	E
Diisobutylene	X	G	-	E	X	-	-	G	E	E	G	E
Diisopropyl Ketone	X	X	X	G	X	-	E	E	E	E	E	E
Dimethyl Benzol												
Dimethyl Aniline	X	X	X	G	X	-	-	-	-	-	-	E
Dimethyl Formamide (Under 120°F)	X	X	X	-	-	-	-	E	E	E	E	-
Dimethyl Phthalate	X	X	X	E	X	-	-	-	G	-	E	-
Diocetyl Phthalate (DOP)	X	X	X	G	X	-	-	E	E	E	E	E
Diocetyl Sebacate	X	X	X	X	X	-	-	E	E	E	E	-
Diocetylphospjate												
Dipentene	X	X	-	G	-	-	-	E	E	E	E	E
Dirco Oils	-	E	-	-	-	-	-	E	E	E	E	E
Dispersing Oil #10	X	X	-	-	-	-	-	E	E	E	E	-
Dow Corning C200, DC510, DC550, DC560	-	E	-	-	-	-	-	E	E	E	E	E

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Dow HD 50-4												
Dow Therm 209												
Dowtherm A	X	X	X	G	X	X	-	E	E	E	E	E
Dowtherm E	X	X	-	G	-	-	-	E	E	E	E	E
DP47, 200 Flow-DOW	-	E	-	-	-	-	-	E	E	E	E	E
Duro AW-16, 31												
Duro FR-HD	-	E	-	-	-	X	E	-	-	-	-	-
Duro Oils	-	E	-	-	-	-	-	E	E	E	E	E
Elco 28-EP, Lubricant	X	E	-	-	-	-	-	E	E	E	E	-
Enamels	-	-	-	-	-	-	-	E	-	-	-	-
Energol HL 68	-	E	-	-	-	-	-	E	E	E	E	E
Energol HLPC 68	-	E	-	-	-	-	-	E	E	E	E	E
EP Hydraulic Oils, Chevron	-	E	-	-	-	-	-	E	E	E	E	E
Epichlorohydrin (Under 120°F)	X	X	-	-	-	-	-	E	G	E	E	-
Esam-6 Fluid	G	-	-	-	-	-	-	-	-	-	-	-
Ethanoic Acid												
Ethanol	E	E	-	E	-	X	E	-	-	-	-	-
Ethanolamine, Aminoethanol	G	G	-	E	X	X	E	E	E	E	E	E
Ethers (Under 120°F)	X	G	X	E	G	G	E	E	E	E	E	E
Ethyl Acetate	X	X	X	G	X	G	E	E	E	E	G	G
Ethyl Acetoacetate	X	X	X	E	X	X	-	E	E	E	E	E
Ethyl Acrylate	X	X	X	G	X	X	-	E	E	E	E	-
Ethyl Alcohol												
Ethyl Amine, Monoethylamine	X	X	X	E	X	X	-	G	E	E	G	E
Ethyl Benzene	X	X	X	G	X	E	-	E	E	E	E	E
Ethyl Bromide, Di	X	X	X	G	X	-	-	E	E	E	E	E
Ethyl Butyrate	X	X	X	-	-	-	-	-	E	E	E	-
Ethyl Cellulose	-	-	-	E	-	-	-	E	E	E	-	E
Ethyl Chloride	X	X	X	-	X	X	-	G	E	E	E	G
Ethyl Chloride, Dry	E	X	-	-	-	X	E	E	E	E	E	-
Ethyl Chloride, Wet	G	X	-	-	-	-	E	-	E	E	E	E
Ethyl Mercaptan	X	X	X	-	X	X	-	G	G	G	G	-
Ethyl Oxalate	X	X	-	E	-	E	-	-	-	-	-	-
Ethyl Pentachlorobenzene	-	X	-	X	-	E	-	-	-	-	-	-
Ethyl Silicate	E	E	E	E	-	E	-	E	E	E	G	E
Ethylene Chlorohydrin, (Under 100°F)	X	X	X	-	-	X	X	E	E	G	X	-
Ethylene Diamine (Under 100°F)	G	G	G	E	X	X	-	E	E	E	X	E
Ethylene Dichloride	X	X	-	G	-	E	E	-	E	E	X	-

Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; – = Testing recommended; Blank = No Data

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Ethylene Glycol	E	E	E	E	E	E	E	G	E	E	E	E
Ethylene Glycol, Ethyl Ether												
Ethylene Oxide												
Exxon Univolt 60, N61												
Factovis 52	–	E	–	–	–	–	–	E	E	E	E	E
Fatty Acids	G	G	G	G	X	E	E	X	G	E	E	–
Ferric Chloride	–	–	–	E	G	–	–	X	X	X	X	X
Ferric Chloride, 1%	E	E	–	–	–	–	E	X	G	G	X	X
Ferric Chloride, 1% boiling	–	G	–	–	–	–	E	X	X	X	X	X
Ferric Chloride, 5% Still	G	E	–	–	–	–	E	X	X	X	X	X
Ferric Chloride, 5% Agitated or Aerated	G	G	–	–	–	–	E	X	X	X	X	X
Ferric Chloride, 10%	G	E	–	–	–	–	E	X	X	X	X	X
Ferric Sulfate	G	G	G	E	G	–	E	X	G	G	X	X
Ferrous Chloride	E	E	–	E	G	–	E	X	X	G	X	X
Ferrous Nitrate	G	G	G	–	G	–	–	–	E	E	–	–
Ferrous Sulfate, Copper Gas	G	G	G	E	G	–	–	X	E	E	E	G
Ferrous Sulfate, Saturated	E	–	–	–	–	–	E	–	G	G	X	–
Ferrous Salt Solutions												
Ferrous Sulfate, 10%	E	E	–	–	–	–	E	X	G	G	X	–
Fire Resistant Hydraulic Fluid, Texaco	–	E	–	–	–	–	–	E	E	E	E	E
Fire Safe, 1090E, 1150, 1220, 1300E, 155												
Fire Safe, 225, 211												
Firtec 290, MF	–	–	–	–	–	–	–	–	–	–	–	–
Fixing Solution, Photo	G	–	–	–	G	–	–	–	E	E	–	–
Flactid Acid												
Fluoboric Acid	E	E	–	E	–	–	–	E	–	E	X	–
Fluoboric Acid, 65%	G	–	–	E	G	X	–	–	E	E	–	–
Fluorine												
Fluosilic Acid	G	E	–	–	–	–	–	X	X	X	X	E
Fluosilic Acid, 50%	G	X	X	E	G	X	X	–	–	–	E	–
Formaldehyde	E	X	–	E	–	–	G	E	E	E	E	X
Formaldehyde, 37%	G	G	–	E	G	G	–	–	E	E	E	E
Formaldehyde, Hot	–	–	–	–	–	–	E	X	G	E	G	E
Formic Acid (Under 120°F)	E	X	E	E	G	X	G	X	G	E	E	G
Formic Acid, Dilute Hot	E	X	–	–	–	–	X	X	G	E	G	X
Freon 12, 22, 113, 114, 502	Use Freon Hose Only											

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Fuel Oil	G	E	E	E	X	G	E	G	G	G	E	G
Fumaric Acid	G	X	–	–	–	X	–	E	E	E	–	–
Furan, Furfuran	X	X	X	E	–	–	–	E	E	E	E	E
Furfural												
Furfural Alcohol, Ant Oil	G	X	X	E	G	–	E	G	E	E	E	E
Fusel Oil, Grain Oil	X	X	–	–	–	–	–	–	–	–	–	–
Fyran Resin	X	X	–	–	–	–	–	–	E	–	–	–
Fyre Safe W/O												
Fyrquard 150, 200	–	E	–	–	–	–	–	E	E	E	E	E
Fyrquel 1000, 15R&O, 220R&O, 550R&O	X	X	–	–	–	–	–	E	–	–	E	–
Fyrquel A60, 90, 100, 150, 220, 300, 500	X	X	–	–	–	–	–	E	–	–	E	–
Gallic Acid	X	X	X	E	–	X	G	X	E	E	X	–
Gas Oil												
Gas, Natural	–	–	–	X	–	–	–	E	E	E	–	G
Gasohol	G	*	*	–	X	–	–	G	E	E	E	E
Gasoline Unleaded, Under 50% Aromatics	X	*	X	–	X	X	–	G	E	E	E	E
Gasoline, Aviation	X	–	G	–	–	–	–	E	E	E	E	E
Gasoline, Meter	X	*	–	–	–	–	X	E	E	E	E	X
Gasoline, Premium	G	*	*	–	X	X	–	G	E	E	E	E
Gasoline, Sour	X	X	–	–	–	–	–	G	E	E	X	–
Gasoline, Standard	E	*	*	G	X	X	–	G	E	E	E	E
Gelatin	E	E	–	–	–	–	E	E	E	E	E	X
Glauber's Salt	G	X	–	–	–	–	–	E	E	E	–	–
Glucose	E	E	E	–	E	E	E	E	E	E	E	E
Glue (Under 120°F)	G	G	G	–	E	E	G	G	E	E	G	X
Glycerine, Glycol	E	E	E	E	E	E	E	G	E	E	E	G
Glycol FR Fluids	–	E	–	–	–	–	–	E	E	E	E	E
Glystantine												
Grease, Ester Base	–	–	–	–	–	–	E	E	E	E	E	E
Grease, Petroleum Base	G	E	G	–	G	E	E	E	E	E	E	E
Grease, Silicone Base	–	–	–	–	–	–	E	E	E	E	E	E
Green Sulfate Liquor, Under 120°F	G	G	E	G	–	–	–	E	E	E	–	–
Gulf FR Fluid G-200	–	E	–	–	–	X	–	E	E	E	E	E
Gulf FR Fluid P37, P40, P43, P45, P47	–	X	–	–	–	X	–	–	–	–	–	–
Gycols (Under 120°F)	E	E	E	E	E	E	E	G	E	E	E	E
H 515 (NATO)												
Halon												
Halowax Oil	X	X	X	–	X	–	–	–	–	–	–	–
Helium												

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; – = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Hephtachlor, In Petroleum	–	G	X	–	–	–	–	–	–	–	–	–
Heptane (Under 100°F)	G	E	G	E	X	E	E	E	E	E	E	E
N-Hexaldehyde	G	X	G	–	–	–	–	E	E	E	E	E
Hexane (Under 120°F)	G	E	G	G	E	E	E	E	E	E	E	E
Hexene	G	G	–	E	–	–	–	E	E	–	E	–
HF 20												
High Viscosity Lubricant, H2	G	E	–	–	–	–	–	–	–	–	–	–
High Viscosity Lubricant, U4	G	E	–	–	–	–	–	–	–	–	–	–
Hilo MS #1	X	X	–	–	–	–	–	–	–	–	–	–
Houghto-Safe 1010, 1055, (Phos, Ester)	X	X	X	E	X	–	–	E	E	E	E	E
Houghto-Safe 1115, 1120,1130 (Phos, Ester)	X	X	X	E	X	–	–	E	E	E	E	E
Houghto-Safe 271,416, 520,616 (Water/Glycol)	G	E	E	–	–	G	–	E	E	E	E	E
Houghto-Safe 5046, 5046W (Water/Oil Emulsion)	G	E	–	–	–	–	–	E	E	E	E	E
Houghto-Safe 620,625, 640,525 (Water/Glycol)	E	E	E	–	–	G	–	E	E	E	E	E
Hul-E-Mul												
Hy-Chock Oil	–	G	–	–	–	–	–	E	E	E	–	–
Hydrafluid 760, Texaco & Houghton	–	E	–	–	–	–	–	E	E	E	E	–
Hydrafluid AZR&O, A, B, AA, C	–	E	–	–	–	–	–	E	E	E	–	–
Hydrasol A	–	E	–	–	–	–	–	E	E	E	–	–
Hydraulic Fluid HF-18, HF-20	–	E	–	–	–	G	E	E	E	E	E	E
Hydraulic Fluid HF-31	–	–	–	–	–	–	–	E	E	E	E	E
Hydraulic Fluid, Phosphate Ester Base	X	X	X	E	–	X	E	E	E	E	–	–
Hydraulic Fluid, Std Petroleum Oils	G	E	G	E	G	G	E	E	E	E	E	E
Hydraulic Fluid, Water Glycol Base	E	E	E	–	–	E	E	E	E	E	E	E
Hydraulic Oils, Petroleum	G	E	–	–	–	–	–	E	E	E	E	E
Hydraulic Oils, Synthetic	–	X	–	–	–	–	–	E	E	E	E	E
Hydraulic Safety Fluid 200&300 Texaco	–	E	–	–	–	E	–	E	E	E	E	E
Hydrazine	X	X	X	–	X	–	–	X	E	E	E	–
Hydro-Drive Oil	–	E	–	–	–	G	–	–	–	–	–	–
Hydro-Drive Oil Houghton	–	E	–	–	–	G	–	–	–	–	–	–
Hydrobromic Acid	X	X	–	–	–	–	–	X	X	X	X	X
Hydrobromic Acid, 37%	X	X	X	E	G	X	X	X	X	X	X	X

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Hydrochloric Acid	G	X	–	–	–	–	X	X	X	X	X	X
Hydrochloric Acid ,15%	X	X	X	E	G	X	X	X	X	X	X	X
Hydrochloric Acid Concentrated	X	X	–	–	–	–	X	X	X	X	X	X
Hydrochloric Acid, 3 Molar	G	X	–	–	–	–	X	–	–	–	–	X
Hydrochloric Acid, 37%	X	–	X	E	G	X	X	X	X	X	X	X
Hydrocyanic Acid, 20% Under 100°F	X	X	X	–	G	X	E	X	E	E	E	X
Hydrocyanic Acid, 98%	–	–	–	–	–	–	–	–	–	–	–	–
Hydrofluoric Acid, 10%	X	X	X	E	E	X	X	X	X	X	X	X
Hydrofluoric Acid, 20% (Under 120°F)	X	X	X	E	G	X	X	X	X	X	X	X
Hydrofluoric Acid, 48% (Under 120°F)	X	X	X	E	G	X	X	X	X	X	X	X
Hydrofluoric Acid, 70%	–	X	X	–	G	X	X	X	X	X	X	X
Hydrofluoric Acid, Anhydrous	–	X	–	–	–	–	–	–	–	–	–	–
Hydrofluoric Acid, Concentrated	X	X	X	E	G	X	X	X	X	X	X	X
Hydrofluorosilic Acid												
Hydrogen	E	E	–	E	–	–	–	X	X	X	E	–
Hydrogen Chloride Gas	–	–	–	E	–	–	–	–	E	E	–	–
Hydrogen Cyanide Gas	–	–	–	–	–	–	–	–	–	–	E	–
Hydrogen Fluoride (Under 100°F)	–	X	–	–	–	–	–	G	G	E	–	–
Hydrogen Perhydrol												
Hydrogen Peroxide, 10%	X	E	X	E	G	X	X	X	G	E	E	X
Hydrogen Peroxide, 30%	X	G	X	E	G	X	X	X	G	E	E	X
Hydrogen Peroxide, 70%	X	X	X	E	–	X	X	X	G	E	E	X
Hydrogen Peroxide, 90%	X	X	–	–	–	–	–	X	G	E	–	X
Hydrogen Peroxide, Dilute	E	G	–	–	–	–	E	E	–	E	–	X
Hydrogen Sulfide, Aqueous Solution	G	X	–	–	–	–	–	X	–	–	X	–
Hydrogen Sulfide, Dry, Cold	E	E	–	–	–	–	E	–	–	–	G	X
Hydrogen Sulfide, Dry, Hot	G	X	–	–	–	–	E	E	X	G	G	X
Hydrogen Sulfide, Gas	–	–	–	–	–	–	–	–	–	–	–	–
Hydrogen Sulfide, Wet, Cold	E	X	–	–	–	–	E	G	G	G	G	X
Hydrogen Sulfide, Wet, Hot	G	X	–	–	–	–	E	G	G	E	–	X
Hydrogluosilic Acid												
Hydrolube, Water Glycol	G	E	–	–	–	X	–	X	–	E	–	–

Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; – = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Hydrolubric Oil, Houghton	-	G	-	-	-	G	E	-	-	-	-	-
Hydroquinone	X	-	-	-	X	-	-	E	E	G	-	-
Hydroxy Quinoline												
Hykil N°6 (33%), Water (67%)	-	G	-	-	-	-	E	-	-	-	-	-
Hypochlorous Acid, (Under 120°F)	X	X	X	-	G	-	E	G	G	G	X	-
Hypoid Grease (Parapoid 10-C)	-	E	-	-	-	-	-	-	-	-	-	-
Imol, Imol S150, S220, S300, S500	-	E	-	-	-	G	E	E	E	E	E	-
Industron 53	-	E	-	-	-	-	-	-	-	-	-	-
Ink (Printers)	E	E	-	-	-	-	E	G	G	E	-	G
Ink Oil	-	G	-	-	-	-	E	E	E	-	E	-
Insulating Oil (Transformer)	G	E	G	-	X	-	-	E	E	E	-	E
Iodine (Under 100°F)	X	X	-	E	G	X	E	G	G	G	X	-
Iodine Pentafluoride	X	X	-	-	-	-	-	X	G	G	X	-
Iodine, in Alcohol	G	-	-	-	-	X	-	-	-	-	X	-
Irus Fluid 902	-	E	-	-	-	-	E	E	E	E	E	E
Irus Fluid 905	-	E	-	-	-	-	E	E	E	E	E	E
Isobutane	X	X	-	-	-	X	X	X	E	E	G	E
Isocyanates												
Isooctane	E	E	G	G	E	G	-	E	E	E	G	E
Isooctyl Thioglucolate	-	-	-	-	-	-	-	-	-	-	-	-
Isopropyl Acetate	X	X	X	-	X	G	E	G	G	E	X	E
Isopropyl Alcohol (Isopropanol)	G	G	G	E	G	G	E	E	E	E	E	G
Isopropyl Ether												
Isopropylamine												
Jet Fuel JP-3 (Under 100°F)	G	E	G	-	X	G	E	G	E	E	G	E
Jet Fuel JP-4 (Under 100°F)	X	E	G	-	X	-	E	G	E	E	G	E
Jet Fuel JP-5	X	E	X	-	X	-	E	G	E	E	G	E
Jet Fuel JP-6	X	E	X	-	X	-	E	G	E	E	G	E
Jet Fuel JP-x	G	E	X	-	X	-	E	G	E	E	G	E
Kerosene	X	E	G	E	X	-	E	E	E	E	E	E
Ketchup	E	E	-	-	-	-	E	-	E	E	-	-
Ketones	X	X	X	-	X	X	E	E	E	E	G	E
Keystone #87Hx-Grease+A334	X	E	-	-	-	-	E	E	E	E	-	-
Lacquer Solvents	X	X	X	-	X	G	E	X	G	E	E	E
Lacquers	X	X	X	-	X	-	E	X	X	E	E	E
Lactic Acid	E	X	X	-	E	X	-	X	G	E	X	G

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Lactic Acid 10% Boiling	X	X	-	-	-	-	-	X	G	E	X	X
Lactic Acid 5%	G	E	-	-	-	-	E	X	G	E	E	X
Lactic Acid 5% Boiling	X	X	-	-	-	-	-	X	G	E	G	X
Lactol	G	G	G	-	-	-	-	E	E	E	E	E
Lasso (Ag Spray)	-	-	-	-	-	-	E	-	E	E	-	-
Latex	E	E	-	-	-	-	E	E	E	E	E	E
Lead Acetate	X	X	-	E	X	-	-	G	G	G	X	E
Lead Arsenate	G	G	-	-	G	E	-	E	E	E	-	-
Lead Nitrate	G	G	-	-	-	-	-	E	G	G	-	-
Lead Sulfate	E	E	-	E	E	E	-	E	E	E	-	-
Lead Sulphamate	G	G	-	-	G	-	-	-	-	-	-	-
Lead Tetramethyl	X	G	X	-	X	E	-	-	-	-	-	-
Lead, Tetraethyl (Under 100°F)	X	G	X	-	X	-	-	-	-	-	-	-
Lecithin	G	X	-	-	-	-	-	E	E	-	-	-
Ligroin (Petroleum Ether, Under 120°F)	X	E	-	-	X	-	-	G	E	E	X	-
Lime (Chlorinated Free Chlorine 20%)	-	E	-	E	-	E	-	-	-	G	-	-
Lime Bleach (Under 100°F)	X	G	X	-	X	-	-	X	G	E	-	-
Lime Sulphur	E	X	-	-	-	-	E	G	E	E	X	X
Lime Sulphur (Under 135°F)	E	X	X	-	G	-	E	G	E	E	X	X
Lindane (Ag Spray)	-	-	-	-	-	-	E	-	E	E	-	-
Lindol HF												
Lindol, Hydraulic Fluid	X	X	-	-	-	-	-	E	E	E	E	-
Linoleic Acid	X	G	X	-	-	-	-	X	G	E	E	-
Linseed Oil	X	E	-	-	-	-	E	E	E	E	G	G
Linseed Oil (Boiled)	G	G	E	E	E	E	-	G	E	E	E	G
LPG												
Lubricating Oil (Diester Under 135°F)	X	G	X	-	-	X	E	E	E	E	E	E
Lubricating Oil (Petroleum Base)	G	E	G	E	G	G	E	E	E	E	E	E
Lubricating Oil (SAE 10, 20, 30, 40, 50)	G	G	-	-	-	-	E	E	E	E	E	-
Machine Oil (Under 135°F)	E	E	G	-	G	G	-	E	E	E	E	E
Magnesium Carbonate	E	E	E	-	E	E	-	G	G	G	E	-
Magnesium Chloride	E	E	E	E	E	E	E	X	G	E	X	G
Magnesium Hydroxide	G	G	G	E	E	X	-	E	E	E	X	X
Magnesium Nitrate	G	G	G	-	E	-	-	G	G	G	X	E
Magnesium Sulfate	G	G	G	E	E	E	E	G	G	G	G	G
Malation (Ag Spray Dilute)	-	G	-	-	-	-	E	E	E	E	-	E

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Maleic Acid	G	X	-	-	-	-	E	-	E	E	G	G
Manganese Salts	-	E	E	-	E	-	-	-	-	-	-	-
Maximul (Penzoil Hydraulic Fluid)	G	E	G	-	-	-	-	E	-	-	-	-
Mercuric Chloride	E	G	G	E	E	G	X	X	G	G	X	X
Mercuric Cyanide	E	G	G	-	E	-	-	G	G	G	X	-
Mercurous Nitrate (Under 120°F)	E	G	G	-	E	-	-	E	E	E	X	-
Mercury	E	G	G	E	E	G	E	E	E	E	X	X
Mesityl Oxide	X	X	X	G	X	X	-	E	E	E	E	E
Methane	G	E	-	-	-	-	-	E	E	-	-	-
Methanol												
Methoxychlor (Insecticide)	-	-	-	-	-	-	X	E	E	E	-	-
Methyl Acetate	X	X	X	E	X	-	-	E	E	E	E	E
Methyl Acrylate	X	X	X	-	X	-	-	E	E	E	E	E
Methyl Alcohol, Methanol												
Methyl Amine (25% Aqueous Solution)	G	X	-	-	-	-	-	E	E	E	E	-
Methyl Amine (60%)	G	G	-	-	-	-	G	E	E	E	E	G
Methyl Amine (99%)	X	X	-	-	-	-	-	E	E	E	E	X
Methyl Amyl Carbinol	-	-	-	E	-	-	-	E	E	E	-	-
Methyl Bromide	X	X	X	-	X	X	X	E	E	E	X	E
Methyl Butyl Ketone (MBK)	X	X	X	G	X	-	-	E	E	E	E	E
Methyl Cellulosolve (Under 100°F)	G	X	-	E	X	-	-	G	G	G	G	E
Methyl Chloride	X	X	X	X	X	-	E	G	E	E	X	E
Methyl Ethyl Ketone (MEK)	X	X	X	G	X	X	E	E	E	E	G	E
Methyl Formate	G	X	X	-	X	-	-	G	E	E	E	E
Methyl Isobutyl Ketone (MIBK, 100°F)	X	X	X	G	X	X	G	G	G	G	G	E
Methyl Isopropyl Ketone	X	X	X	G	X	X	-	G	E	E	E	E
Methyl Methacrylate	X	X	X	G	G	-	-	G	G	G	-	-
Methyl Methyl Ketone												
Methyl Salicylate	G	G	G	-	-	-	-	E	E	E	E	E
Methyl Sulfate (Dinethyl, Under 100°F)	X	X	X	-	X	E	-	-	-	-	-	-
Methylene Chloride	X	X	X	X	X	-	G	G	G	G	X	E
Methylene Dichloride	X	X	X	-	-	-	E	E	E	E	X	E
Methylhalides												
MIL-F-7083												
MIL-H-83282												
MIL-H 5606												
MIL-L-2104 & 2104B												
MIL-L-7808												

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
MIL-O-6083												
Mine Guard FR												
Mineral Oil (Under 120°F)	E	E	E	E	E	E	-	E	E	E	G	E
Mineral Spirit	-	E	G	-	X	-	-	E	E	E	G	E
MLO-7277 Hydr.	X	X	-	-	-	-	-	E	E	E	E	-
MLO-7557	E	X	-	-	-	-	-	E	E	E	E	-
MLO-8515	E	G	-	-	-	-	-	E	E	E	E	-
MLO.8220 Hydr.	E	G	-	-	-	-	-	E	E	E	E	-
Mobil DTE												
Mobil HFA												
Mobil Rarus 824, 826, 827												
Mobil SHC 600 Series												
Mobil SHC 800 Series												
Mobil Vectra Oil												
Mobile Hydraulic Oils	-	E	-	-	-	G	-	E	E	E	E	-
Mobile Therm 603	-	E	-	-	-	-	-	E	E	E	E	E
Mobilfluid 423												
Mobilmet S122	-	E	-	-	-	G	-	-	-	-	-	-
Mobilrama 525												
Molasses (Under 120°F)	G	G	G	-	E	E	-	G	E	E	G	X
Monochlorobenzene	X	X	X	X	X	X	X	E	E	E	X	E
Monoethanolamine	X	G	-	E	X	-	-	E	E	E	G	E
Morpholine (Pure Additive)												
Motor Oils (Under 135°F)	G	E	G	E	G	G	E	E	E	E	E	E
Mould Oil	-	-	-	-	-	-	-	E	E	E	-	-
Muriatic Acid	X	X	X	E	G	X	X	X	X	X	X	X
Mustard	E	G	E	-	E	-	-	X	E	E	G	-
N-Octane	X	G	-	E	X	-	-	E	E	E	-	E
NaK												
Naphtenic Acid												
Naphtha (Low Aromatic Content)	X	G	X	E	X	-	E	G	E	E	E	E
Naphthalene	X	X	X	-	X	-	-	E	E	E	-	E
Naphthalene (Tar Camphor)	X	X	X	E	X	-	E	E	E	E	E	E
Natural Gas												
Neon Gas												
Nickel Acetate	G	G	-	-	-	-	-	E	G	G	E	E
Nickel Chloride	G	G	G	E	G	-	E	X	G	G	X	X
Nickel Nitrate	G	G	G	E	G	-	E	G	G	G	X	-
Nickel Plating Solution	-	G	-	-	G	X	-	-	E	E	-	-
Nickel Salts	G	-	E	-	-	-	-	-	-	-	-	-
Nickel Sulfate												
Nicotine Salts	-	-	-	-	-	-	E	-	E	X	G	-

Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Nitric Acid	X	X	-	-	-	-	-	X	E	E	-	X
Nitric Acid & Hydrochloric Acid	-	X	-	-	-	-	-	X	X	X	X	-
Nitric Acid, 20%	X	X	X	E	G	X	X	X	G	G	X	X
Nitric Acid, 3 M	X	X	-	-	-	-	-	X	E	E	-	X
Nitric Acid, 5% to 10%	X	X	X	E	G	X	X	X	G	G	E	X
Nitric Acid, 50% (Boiling)	X	X	X	X	X	X	X	X	G	G	X	X
Nitric Acid, 65% (Boiling)	X	X	X	X	X	X	X	X	G	G	X	X
Nitric Acid, Concentrated (Boiling)	X	X	-	-	-	-	X	X	G	G	X	X
Nitric Acid, Inhibited RED fuming (IRFNA)	X	X	-	-	-	-	-	X	E	E	E	X
Nitric Acid, Red Fuming (RNFA)	X	X	X	-	X	X	X	X	G	G	G	X
Nitrobenzene (Under 100°F)	X	X	X	G	X	X	-	G	G	G	G	E
Nitroethane	X	X	X	E	G	-	-	E	E	E	E	E
Nitrogen	E	E	G	E	E	E	E	E	E	E	E	E
Nitrogen Fertilizer Solution												
Nitrogen Oxide up to 50% (Under 100°F)	E	E	G	E	E	-	E	E	E	E	-	X
Nitromethane	X	X	X	-	-	-	-	E	E	E	E	E
Nitropropane	X	X	X	-	-	-	-	E	E	E	E	E
Nitrous Oxide (Gas)												
Nuto H												
Nyvac 20 (WG), 30 (WG)	-	E	-	-	-	-	-	E	E	E	E	E
Nyvac FR Fluid	-	E	-	-	-	-	-	E	E	E	E	E
Nyvac FR200 Fluid	-	E	-	-	-	-	-	E	E	E	E	E
O-148 (NATO)												
Octyl Alcohol												
Oil (SAE, Under 100°F)	E	E	E	E	G	E	E	E	E	E	E	E
Oil Synthetic Blends												
Oils Crude	X	G	-	-	-	-	-	E	E	-	-	-
Oleic Acid (Under 120°F)	G	G	G	E	G	E	E	G	G	E	E	G
Oleum 25%												
Oleum Spirits												
Olive Oil	X	G	G	G	X	-	-	G	E	E	E	G
Orthodichlorobenzene												
OS 45 Type III (OS45)	E	G	-	-	-	-	-	-	-	-	-	-
OS 45 Type IV (OS45-1)	E	G	-	-	-	-	-	-	-	-	-	-
OS 70	E	G	-	-	-	-	-	-	-	-	-	-
Oxalic Acid (5%, Hot and Cold)	G	G	-	-	-	-	G	X	G	E	E	X
Oxalic Acid	X	X	X	E	G	X	X	X	G	E	G	X

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Oxalic Acid (10% Boiling)	X	X	-	-	-	-	-	X	X	X	X	X
Oxalic Acid (10%)	G	G	-	-	-	-	G	X	G	E	E	X
Oxygen (200°-400°F)	X	X	-	-	-	-	-	-	-	-	-	-
Oxygen Cold	E	G	-	E	-	-	E	G	E	E	E	E
Oxygen Gaseous	-	-	-	-	-	-	-	-	-	-	E	-
Ozone (Dry)	G	X	G	E	G	E	G	E	E	E	E	E
Ozone (Wet)	-	X	-	-	-	-	-	X	G	E	G	-
Pacemaker Types 150T, 300T, 500T (Citgo)	-	E	-	-	-	-	-	-	-	-	-	-
Paint	X	-	-	-	X	X	G	-	E	E	E	E
Paint Solvents (Oil Base)	X	X	-	-	X	X	G	-	E	E	E	E
Paint Thinner, Duco	G	E	-	-	-	-	E	G	G	E	G	X
Paints (Oil Base)	-	E	-	-	E	-	E	-	-	-	-	-
Palm Oil	G	E	G	-	G	-	-	E	E	E	E	E
Palmitic Acid	G	G	G	E	X	E	E	G	G	E	E	X
Paradichlorobenzene												
Paraffin (Petroleum)	G	E	G	E	X	-	E	G	E	E	E	E
Paraformaldehyde	G	G	G	-	G	G	-	E	E	E	E	-
Peanut Oil (Under 100°F)	G	E	G	-	-	-	-	E	E	E	E	E
Pentane												
Pentasol	G	G	G	-	G	-	-	E	E	E	E	E
Perchloric Acid	X	X	-	-	G	X	X	X	G	E	X	-
Perchloroethylene (Tetrachloroethylene)	X	X	X	G	X	-	G	E	E	E	X	X
Petroleum Oil (Above 250°F)	X	X	-	-	-	-	-	-	-	-	-	-
Petroleum Oil (Crude)	G	E	-	-	-	-	-	-	-	-	-	-
Petroleum Oil (Under 250°F)	G	E	-	-	-	-	-	-	-	-	-	-
Petroleum Oils (Refined)	G	E	G	-	G	G	E	E	E	E	E	E
Petroleum Oils (Sour)	G	G	-	-	X	G	-	G	E	E	E	X
Petroleum Oils (Under 100°F)	G	E	G	-	G	G	-	E	E	E	E	E
Phenol (70/30 Water)	X	X	-	-	-	-	-	-	E	E	E	-
Phenol (85/15 Water)	X	X	-	-	-	-	-	-	E	E	E	-
Phenol (Carbolic Acid)	X	X	X	E	X	X	X	G	E	E	E	X
Phenylamine												
Phorone (Diisopropylidene Acetone)	X	X	-	-	X	X	-	E	E	E	-	E
Phosphate Esters (3 Molar)	X	X	-	G	G	X	G	-	-	-	-	-
Phosphate Esters (Concentrated)	X	X	-	X	X	X	G	-	-	-	-	-
Phosphate Esters (Dilute)	X	X	-	E	E	X	G	-	-	-	-	-

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Phosphoric Acid	G	G	-	-	-	-	-	-	G	-	-	-
Phosphoric Acid (1%)	G	-	-	-	-	-	-	E	E	-	X	-
Phosphoric Acid (10% Hot)	G	X	-	-	-	-	X	-	E	X	X	-
Phosphoric Acid (10%)	G	X	-	-	-	-	X	-	E	X	X	-
Phosphoric Acid (3 Molar)	X	X	-	-	-	-	-	-	-	-	-	-
Phosphoric Acid (5%)	G	X	-	-	-	-	-	E	E	-	X	-
Phosphoric Acid (50% Hot)	G	X	-	-	-	-	X	X	G	X	X	-
Phosphoric Acid (50%)	G	G	G	E	E	X	X	X	G	E	X	G
Phosphoric Acid (85% Hot)	G	X	-	-	-	-	X	X	X	X	X	-
Phosphoric Acid (85%)	G	X	-	E	E	X	X	X	G	X	X	-
Phosphoric Acid (Aerated)	-	-	-	-	-	-	X	-	G	-	-	-
Phosphoric Acid (Concentrated)	X	X	-	-	-	-	-	-	-	-	-	-
Phosphoric Acid Air Free	-	-	-	-	-	-	X	-	-	X	-	-
Phosphorous Trichlor												
Photographic Developers	E	E	-	-	-	-	X	E	E	-	-	-
Photographic, Emulsions	-	-	-	-	-	-	-	-	-	-	-	-
Photographic, Fixing Solutions	G	-	-	G	-	-	-	E	E	-	-	-
Phthalic Acid	-	-	-	-	-	-	G	G	E	G	-	-
Picric Acid (Water Solution 100°F)	G	G	G	-	G	G	X	X	E	E	X	X
Picric Acid Molten												
Pine Oil	X	G	-	G	X	-	E	E	E	E	E	-
Pinene	X	G	-	G	-	-	-	E	E	E	E	E
Piperazine Hydrochloride Solution (34%)	-	G	-	-	-	-	-	-	-	-	-	-
Pitch	G	E	-	-	G	G	E	-	-	-	-	-
Plating Solutions (Chrome)	X	X	-	-	X	X	-	X	X	-	-	-
Plating Solutions (Other)	-	E	-	-	-	-	-	-	-	-	-	-
Polyester Resin	-	-	-	-	-	-	G	-	-	-	-	-
Polyol Ester												
Polyurethane Foam (Under 125°F)	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Acetate	G	G	-	E	G	X	-	G	E	E	X	-
Potassium Bicarbonate	E	E	-	-	E	-	E	E	G	G	E	-
Potassium Bisulfite	-	E	-	-	-	-	E	-	-	-	-	-
Potassium Bromate	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Bromide	E	E	-	-	E	G	E	X	X	G	X	-
Potassium Carbonate (Potash)	E	E	E	E	E	G	E	G	E	E	X	X
Potassium Chlorate	E	E	-	-	G	E	G	G	G	G	-	-

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Potassium Chloride (1% to 5%)	E	E	-	E	-	G	E	E	G	G	X	X
Potassium Chloride (Boiling)	-	-	-	-	-	-	-	-	G	G	-	X
Potassium Cyanide	E	E	-	E	-	-	E	G	G	G	X	X
Potassium Dichromate	E	E	-	E	-	-	G	E	G	G	G	-
Potassium Ferrocyanide	-	-	-	-	-	-	-	G	E	E	G	-
Potassium Fluoride	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Hydroxide	G	G	-	-	-	-	-	E	E	E	-	-
Potassium Hydroxide (27%Boiling)	-	-	-	-	-	-	-	G	G	E	X	X
Potassium Hydroxide (30% Caustic Potash)	-	-	-	E	-	-	-	-	-	-	-	-
Potassium Hydroxide (5%)	E	E	-	-	-	-	E	G	G	G	X	X
Potassium Hydroxide (50% Boiling)	-	-	-	-	-	-	-	G	G	G	X	X
Potassium Hydroxide (70% Hot)	-	-	-	-	-	-	-	X	-	-	X	X
Potassium Hydroxide (70%)	-	E	-	-	-	-	-	-	-	-	X	X
Potassium Iodide	E	E	-	-	E	-	E	E	G	G	-	-
Potassium Nitrate	E	E	-	E	-	E	E	E	E	G	G	G
Potassium Nitrate (1% to 5%)	E	E	-	-	-	-	-	E	E	E	E	G
Potassium Permanganate	E	G	-	-	-	-	G	E	G	G	G	-
Potassium Permanganate (5%)	E	E	-	-	-	-	E	E	E	E	E	-
Potassium Persulfate	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Phosphate	E	-	-	-	E	-	-	X	G	G	X	-
Potassium Sulfate	E	E	-	E	-	E	E	E	G	G	E	-
Potassium Sulfate 1% & 5%	E	E	-	-	-	-	E	E	E	E	E	X
Potassium Sulfide	E	E	-	-	-	-	-	G	G	G	-	-
Potassium Sulfite	E	E	-	E	-	-	-	E	E	E	E	-
Potassium Thiosulfate	E	-	-	-	E	-	-	-	-	-	-	-
Primatol A, S, P (Ag Spray)	-	-	-	-	-	-	-	-	-	-	-	-
PRL-High Temp Hydraulic Oil	G	E	-	-	-	-	-	E	E	E	E	-
Propane Gas	X	X	-	-	-	X	X	X	E	E	E	-
Propionic Acid	X	X	-	-	-	-	-	E	-	G	G	-
Propyl Acetate	X	X	-	G	-	-	-	E	-	-	-	-
Propylene (Liquid or Gas, Ambient)	X	X	-	E	-	-	G	E	E	E	E	-
Propylene Dichloride	-	-	-	-	-	-	-	E	G	E	X	-
Propylene Glycol	E	E	-	E	E	E	G	E	G	G	E	-
Propylene Oxide	X	X	-	-	-	-	-	G	E	E	G	-

Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; – = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Purina Insecticide	X	X	–	–	–	–	G	E	E	E	E	G
Puropale RX Oils	–	E	–	–	–	G	E	E	E	E	E	E
Pydraulic	X	X	–	–	–	–	–	–	–	–	–	–
Pydraulic 10E, 29E-LT, 30E, 60, 65E, 115E	X	X	–	G	–	–	–	E	E	E	E	E
Pydraulic 135	–	X	–	G	–	–	G	E	E	E	–	–
Pydraulic 150	X	X	X	G	X	G	G	E	E	E	E	E
Pydraulic 280	X	X	X	G	X	G	G	E	E	E	–	–
Pydraulic 312	X	X	X	G	–	G	E	E	E	E	–	–
Pydraulic 50E	–	–	–	G	–	G	E	E	E	E	–	–
Pydraulic 540	X	X	X	G	X	X	X	E	E	E	–	–
Pydraulic 625	X	X	X	G	X	G	G	E	E	E	–	–
Pydraulic A-200	X	X	X	G	X	X	G	E	E	E	–	–
Pydraulic F-9	X	X	X	G	X	G	E	E	E	E	–	–
Pyranol, Transformer Oil	G	E	–	–	–	–	–	E	E	E	E	–
Pyridine	X	X	–	–	X	E	–	E	E	E	E	E
Pyrogard 160, 230, 630	–	–	–	–	–	–	–	E	E	E	–	–
Pyrogard 51, 53, 55	–	X	–	–	–	–	–	E	E	E	–	–
Pyrogard C, D	–	E	–	–	–	G	E	E	E	E	E	E
Pyrolube	E	X	–	–	–	–	–	–	–	–	–	–
Quench Oil	G	G	–	–	–	–	–	E	E	E	–	–
Quintolubric 700												
Quintolubric 822	X	E	–	–	–	–	–	E	E	E	E	E
Quintolubric 957, 958												
Ramrod (Ag Spray)	–	–	–	–	–	–	E	E	E	E	E	E
Rando Oils	–	E	–	–	–	G	E	E	E	E	E	E
Rape Seed Oil	G	X	–	–	X	–	G	E	E	E	E	E
Red Line 100 Oil	G	E	–	–	–	–	–	–	–	–	–	–
Red Oil (Comm. Oleic Acid, MIL-H-5606)	G	G	G	E	G	–	E	G	G	E	E	G
Refined Wax (Petroleum)	G	E	G	–	–	G	E	E	E	E	–	E
Refrigerant Freon 12, 22, 113, 114, 502	Use Freon Hose Only											
Refrigerant HFC 134A	Use Freon Hose Only											
Regal Oils R&O	–	E	–	–	–	G	E	–	–	–	–	–
Resorcinol												
Richfield Weed Killer	X	G	–	–	X	–	–	–	–	–	–	–
Round Up	G	G	–	–	–	–	E	G	E	E	E	E
Rubilene Oils	–	E	–	–	–	G	E	–	–	–	–	–
SAE N° 10 Oil												
Safco-Safe T10, T20												
Safetytex 215	–	X	–	–	–	–	–	–	–	–	–	–
Salicylic Acid	E	X	–	–	–	–	E	E	E	E	G	–

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Salt Water (See Water)	G	G	G	–	G	E	E	G	E	E	X	G
Santo Safe 300	X	X	–	–	–	–	–	E	E	E	E	–
Santosafe W-G15, W-G20, W-G30	–	E	–	–	–	G	E	E	E	E	E	E
SCC 7204 (Stauffer)	–	–	–	–	–	–	–	–	–	–	–	–
Sevin	–	–	–	–	–	–	E	–	–	–	–	–
Sewage	G	G	G	E	G	–	E	X	E	E	G	G
Shell IRUS 902												
Shell IRUS 905												
Shell Pella-A												
Shell Tellus												
Shellac	G	E	–	–	–	–	E	E	E	E	E	–
Shellac (Bleached)	G	E	–	–	–	–	E	E	E	E	E	G
Shellac (Orange)	G	E	–	–	–	–	E	E	E	E	E	G
Silicate Ester												
Silicone Greases	G	G	G	–	G	–	E	E	E	E	E	E
Silicone Oils	G	G	G	–	G	–	E	E	E	E	E	E
Silver Cyanide	E	–	–	–	–	–	–	E	E	E	X	–
Silver Nitrate	E	E	E	E	E	–	E	G	E	E	E	G
Skelly, Solvent B, C, E	X	E	–	–	–	–	–	–	–	–	–	–
Skydrol 500A & 7000	X	X	X	G	X	–	E	E	E	E	E	–
Soap oil	X	X	–	–	X	–	–	E	E	E	–	–
Soap Solutions	G	E	G	E	E	E	E	E	E	E	E	E
Soda Ash (Sodium Carbonate)	E	E	E	E	E	E	E	E	E	E	X	G
Soda Water	–	–	–	–	–	E	E	–	–	–	–	–
Sodium Dichromate	G	E	–	E	G	E	E	–	–	–	–	–
Sodium Hypochlorite	E	X	–	–	–	–	–	X	X	X	X	–
Sodium Hypochlorite 20%	X	X	X	E	E	X	E	X	X	G	X	X
Sodium Hypochlorite 5%	–	X	X	E	E	X	E	X	X	G	X	X
Sodium Hyposulfate	X	–	–	–	–	–	–	X	E	E	X	–
Sodium Metaphosphate	G	G	G	E	G	–	E	X	E	E	E	X
Sodium Nitrate	X	X	–	E	G	E	E	E	G	G	G	G
Sodium Perborate	X	X	–	–	X	–	G	X	E	E	E	X
Sodium Peroxide (Sodium Dioxide)	E	G	E	G	E	–	X	X	E	E	E	X
Sodium Phosphate	X	E	–	E	–	E	E	G	E	E	X	X
Sodium Phosphate (Dibasic)	G	E	–	–	–	–	–	–	–	–	–	–
Sodium Phosphate (Mono)	E	E	–	–	–	–	–	–	–	–	–	–
Sodium Phosphate (Tribasic)	G	E	–	–	–	–	–	G	G	G	–	–
Sodium Silicate	E	E	–	E	E	G	E	G	G	G	X	X

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Sodium Silicate (Hot)	E	E	-	-	-	-	-	G	G	G	X	X
Sodium Sulfate	E	E	-	E	E	E	E	G	E	E	-	G
Sodium Sulfide	E	E	-	E	E	E	E	X	X	G	X	X
Sodium Sulfide Saturated	E	E	-	-	-	-	E	G	G	E	X	X
Sodium Sulfite	G	G	G	E	G	E	G	E	E	E	-	X
Sodium Sulfite 10% @ 150°F	E	E	-	-	-	-	-	G	G	G	G	-
Sodium Sulfite 5%	E	E	-	-	-	-	-	E	E	E	E	-
Sodium Thiosulfate (hpo, Antichlor)	E	E	E	E	E	E	E	X	E	E	G	X
Sodium Tripolyphosphate (STPP)	-	-	-	-	-	-	-	-	E	E	X	X
Sodium Acetate	X	X	X	E	X	G	E	E	E	E	E	E
Sodium Benzoate	-	-	-	-	-	E	-	-	-	-	-	-
Sodium Bicarbonate	E	E	E	E	E	E	E	G	E	E	G	G
Sodium Bisulfate (Niter Cake)	E	E	E	E	E	E	E	X	G	E	X	X
Sodium Bisulfite	E	E	E	E	E	E	E	G	E	E	G	-
Sodium Borate	E	E	E	E	E	E	E	E	E	E	-	-
Sodium Carbonate	E	E	E	E	E	E	E	G	G	G	X	G
Sodium Chlorate	G	E	-	-	E	E	E	G	G	G	X	-
Sodium Chloride	E	E	E	E	E	E	E	G	G	E	X	X
Sodium Chloride - 2%	E	E	-	-	-	-	E	G	G	E	X	X
Sodium Chloride - 5%	E	E	-	-	-	-	E	-	G	E	X	X
Sodium Chloride - 5% @ 150°F	E	E	-	-	-	-	E	-	G	E	-	X
Sodium Chloride Saturated	E	E	-	-	-	-	E	-	E	E	X	-
Sodium Chloride Saturated (Boiling)	-	-	-	-	-	-	-	-	G	E	X	-
Sodium Chloride Slurry	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Cyanide	E	E	E	E	E	E	E	G	E	E	X	X
Sodium Ferricyanide	-	-	-	-	-	-	-	G	G	G	-	-
Sodium Ferrocyanide	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Fluoride	-	E	-	-	-	-	-	G	G	G	-	-
Sodium Fluoride (5%)	-	E	-	-	-	-	-	E	G	G	G	-
Sodium Fluoride (70%)	-	-	-	-	-	-	-	-	-	G	-	-
Sodium Hydrosulfide	E	X	-	-	-	-	-	-	-	-	-	-
Sodium Hydrosulfite	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Hydroxide	G	G	-	-	-	-	-	G	-	-	-	X
Sodium Hydroxide (10%)	-	-	-	E	-	-	-	-	-	-	-	-
Sodium Hydroxide (20% Cold)	E	G	-	-	-	-	-	E	E	E	X	X
Sodium Hydroxide (20% Hot)	E	X	-	-	-	-	-	G	E	E	X	X

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Sodium Hydroxide (3M)	G	G	-	-	-	-	-	-	-	-	-	X
Sodium Hydroxide (40%)	E	G	G	E	E	-	G	G	E	E	X	X
Sodium Hydroxide (50% Cold)	G	X	X	E	E	-	G	G	G	G	X	X
Sodium Hydroxide (50% Hot)	-	-	-	E	G	-	X	X	G	G	X	X
Sodium Hydroxide (60%)	G	X	X	E	G	-	X	X	G	G	X	X
Sodium Hydroxide (70% Cold)	E	G	-	-	-	-	-	-	-	G	X	X
Sodium Hydroxide (70% Hot)	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Hydroxide (80% Hot)	E	X	-	-	-	-	-	X	X	X	X	X
Sole												
Solnus Oils	-	E	-	-	-	G	E	E	E	E	E	E
Solvac 1535 G	-	-	-	G	-	-	E	-	-	-	-	-
Sour Crude Oil	-	-	-	-	-	-	-	-	-	-	-	-
Soybean Oil	G	G	G	-	G	-	E	E	E	E	E	-
Spent Acid	-	-	-	-	G	-	-	-	E	E	-	-
SR-10 Fuel	X	G	-	-	-	-	-	-	-	-	-	-
SR-6 Fuel	X	E	-	-	-	-	-	-	-	-	-	-
SRF Fluid B (Shell)	-	X	-	-	-	-	-	-	-	-	-	-
SRF Fluid C (Shell)	-	X	-	-	-	-	-	-	-	-	-	-
Stannic Chloride	X	G	G	E	X	-	X	X	X	X	X	X
Stannic Chloride, 50%	X	E	-	-	-	-	-	X	X	X	X	-
Stannous Chloride (Under 150°F)	E	E	-	E	E	-	X	-	X	G	X	-
Stannous Chloride, 15%	E	E	-	-	-	-	-	X	X	-	X	-
Stanoil No. 15, 18, 25, 31, 35, 51	-	E	-	-	-	G	E	E	E	E	E	E
Starch	G	G	-	-	E	E	E	X	E	E	E	-
Staysol FR	-	E	-	-	-	G	E	E	E	E	E	E
Steam-Water up to 250°F												
Stearic Acid	G	G	G	E	G	E	E	X	G	E	X	X
Stearin	-	-	-	-	-	E	G	-	-	-	-	-
Stoddard Solvent	G	G	X	E	-	X	E	G	E	E	E	E
Styrene (Monomer)	-	X	-	G	-	-	G	G	X	G	X	G
Styrene (Vinyl Benzene)	X	X	-	-	-	-	E	E	E	E	E	E
Sucrose Solutions	E	E	E	-	E	-	-	E	E	E	-	-
Sulfamic Acid (10% Under 170°F)	-	-	-	E	G	-	-	-	-	-	-	-
Sulfate Black Liquor	E	E	-	-	-	-	E	G	G	G	X	-
Sulfate Green Liquor	E	E	-	-	-	-	E	G	G	G	X	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur (Molten)	X	X	-	-	-	-	-	-	-	-	-	-

Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; - = Testing recommended; Blank = No Data

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Sulfur Chloride	X	X	X	-	G	-	G	X	X	G	X	X
Sulfur Dioxide (Dry)	X	X	X	-	G	-	X	G	E	E	E	E
Sulfur Dioxide (Liquid)	G	X	-	-	G	-	-	-	-	-	-	-
Sulfur Dioxide (Moist)	G	X	-	-	G	-	E	-	G	E	E	X
Sulfur Hexafluoride (Gas)	E	G	-	-	G	-	X	-	-	-	-	-
Sulfur Trioxide (Dry)	X	X	X	X	X	-	E	G	G	G	G	X
Sulfuric Acid (10%)	E	G	G	E	E	-	X	-	X	X	G	X
Sulfuric Acid (30%)	E	-	-	E	E	-	X	X	X	G	X	X
Sulfuric Acid (50%)	G	X	X	E	E	-	X	X	X	G	X	X
Sulfuric Acid (75%)	X	X	X	-	G	-	X	X	X	G	X	X
Sulfuric Acid (93%)	X	X	X	-	X	-	X	G	X	G	X	X
Sulfuric Acid (98%)	X	X	X	X	X	-	X	G	X	G	X	X
Sulfuric Acid, 3 Molar	X	X	-	-	-	-	-	-	-	-	-	-
Sulfuric Acid, 85%	X	X	-	-	-	-	X	G	E	X	-	-
Sulfuric Acid, Aerated, No Velocity	-	-	-	-	-	-	-	G	G	G	X	-
Sulfuric Acid, Air Free, No Velocity	-	-	-	-	-	-	-	X	X	G	X	-
Sulfuric Acid, Concentrated	X	X	-	-	-	-	-	E	E	-	-	-
Sulfuric Acid, Fuming, Oleum	X	-	-	-	-	-	-	G	E	E	G	-
Sulfurous Acid	G	G	-	-	-	-	X	X	X	G	G	-
Sulfurous Acid (10%)	-	X	-	E	E	-	-	X	G	E	X	-
Sulfurous Acid (75%)	X	X	X	E	E	-	X	X	X	G	X	X
Sulphuric Acid 10%	-	G	-	-	-	-	X	X	G	E	X	X
Sulphuric Acid 5%	-	E	-	-	-	-	X	G	G	E	X	X
Sulphuric Acid 5% Boiling	X	-	-	-	-	-	X	X	X	-	X	X
Sulphuric Acid 50%	X	X	-	-	-	-	X	X	X	X	X	X
Sulphuric Acid, Concentrated	X	X	-	-	-	-	X	-	E	E	X	X
Sulphuric Acid, Concentrated @ 300%	X	X	-	-	-	-	X	X	X	X	X	X
Sulphuric Acid, Concentrated Boiling	X	X	-	-	-	-	X	X	X	X	X	X
Sulphuric Acid, Fuming	X	-	-	-	-	-	-	G	G	G	X	-
Sulphuric Acid 10% Boiling	X	X	-	-	-	-	X	X	X	-	X	X
Sulphurous Acid, saturated	X	X	-	-	-	-	G	-	E	E	X	X
Sun Minesafe, Sunsafe												
Sutan Plus, Herbicide	X	X	X	E	-	-	E	E	E	E	E	-
Synesstic												
Synthetic Oil (Citgo)	-	-	-	-	-	G	E	E	E	E	-	-
Syrup	G	E	G	-	-	-	E	-	E	E	E	-

Chemical Name	Hose							Fittings & Adapters				
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Tall Oil	G	G	G	-	X	-	-	G	X	G	X	-
Tallow	G	G	G	-	-	-	E	G	G	G	E	G
Tannic Acid (10%)	G	X	-	E	G	-	X	G	E	E	G	X
Tannin	E	E	-	-	-	-	E	-	-	-	-	-
Tar (Bituminous, Under 100°F)	G	G	G	X	-	-	-	E	E	E	E	G
Tar and Tar Oil	G	-	-	-	-	G	E	E	E	E	E	G
Tartaric Acid	G	G	G	E	E	-	E	X	G	G	G	X
Tellus Oils	-	E	-	-	-	G	E	E	E	E	E	E
Tenol Oils	-	E	-	-	-	G	E	E	E	E	-	-
Tepineol	X	G	-	E	G	-	G	E	E	E	E	-
Tergitol	-	-	-	-	-	-	-	G	E	E	-	G
Terresstic	-	E	-	-	-	-	E	E	E	E	-	-
Tertiary Butyl Alcohol												
Tetra Chloro Benzene												
Tetra Chloro Ethane												
Tetra Chloro Ethylene												
Tetra Chloro Methane												
Tetra Chloro Naphthalene												
Tetra Ethylene Glycol												
Tetraethyl Lead	G	G	-	-	-	-	G	-	-	-	-	-
Tetraethyl Lead Blench	X	G	-	-	-	-	-	-	-	-	-	-
Tetrahydrofuran (THF)	X	X	-	-	X	G	E	G	E	E	-	-
Tetralin	X	X	-	-	X	-	G	E	E	E	E	-
Texaco 760 Hydrafluid												
Texaco 766, 763 (200-300)												
Thiopen	X	X	-	-	-	-	-	-	-	-	-	-
Tim-Sol												
Titanium Tetrachloride	X	X	X	-	-	-	-	E	G	G	X	X
Toluene (Toluol)	X	X	X	X	X	-	E	E	E	E	E	E
Toluene Diisocyanate (Under 150°F)	X	-	-	-	-	-	-	E	E	E	-	-
Transformer Oil (Askarel Types)	X	X	X	E	X	-	-	E	E	E	E	-
Transformer Oil (Petroleum Type)	G	E	G	E	X	G	E	E	E	E	E	E
Transmission Fluid Type A	G	E	G	E	G	-	G	E	E	E	E	E
Tributyl Phosphate	X	X	X	G	X	-	-	E	-	-	X	-
Tributoxyethyl Phosphate	X	X	X	X	X	-	G	E	-	-	X	-
Tributyl Phosphate												
Trichloro Acetic Aci												
Trichloro Etane												
Trichloroethylene	X	X	X	G	X	-	G	X	G	E	X	E

Chemical Resistance



Rating Scale:

E = Excellent resistance; G = Good resistance; X = Not recommended; – = Testing recommended; Blank = No Data

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Trichloromonofluoroethane (Freon 113)	-	E	-	-	-	-	E	E	E	X	-	-
Trichloromonofluoroethane (Freon 17)	-	-	-	-	-	-	E	E	E	X	-	-
Tricresyl Phosphate	X	X	X	E	X	-	E	E	G	G	X	-
Triethanolamine (TEA)	G	G	-	E	G	-	E	E	E	E	E	E
Triphenyl Phosphate												
Tripolyphosphate (STPP)	X	E	-	-	-	-	-	G	E	X	-	-
Trisodium Phosphate												
Tung Oil	G	G	-	-	G	-	E	E	E	E	E	E
Turbine Oil	X	E	-	-	-	-	E	E	E	E	-	-
Turbine Oil #15 (MIL-L-7808A)	X	E	-	-	-	-	E	E	E	E	-	-
Turbo Oil #35	X	G	-	-	-	-	E	E	E	E	-	-
Turpentine	X	G	-	G	X	E	E	X	E	E	E	G
Tycol A Turbo 37, 50, 58, 60	-	E	-	-	-	G	E	E	E	E	-	-
Tycol Avalon 50, 57, 60	-	E	-	-	-	G	E	E	E	E	-	-
Type I Fuel (MIL-S-3136) ASTM Fuel A	G	E	-	-	-	-	E	E	E	E	-	-
Type II Fuel (MIL-S-3136)	X	G	-	-	-	-	E	E	E	E	-	-
Type III Fuel (MIL-S-3136) ASTM Fuel B	X	E	-	-	-	-	E	E	E	E	-	-
Ucon Hydrolube Types 150CP, 200CP	-	E	-	-	-	G	E	E	E	E	E	E
Ucon Hydrolube Types 275CP, 300CP, 550 CP	-	-	-	-	-	-	-	-	-	-	-	-
Ucon M1	-	E	-	-	-	G	E	E	E	E	E	E
Union ATF Dexron	-	E	-	-	-	G	E	E	E	E	E	E
Union ATF Type F	-	E	-	-	-	G	E	E	E	E	E	E
Union C-2 Fluid	-	E	-	-	-	G	E	E	E	E	E	E
Union C-P Oil	-	E	-	-	-	G	E	E	E	E	E	E
Union Hydraulic Oil AW	-	E	-	-	-	G	E	E	E	E	E	E
Union Hydraulic Tractor Fluid	-	E	-	-	-	G	E	E	E	E	E	E
Univis 40, Hydraulic Fluidon	G	E	-	-	-	-	E	E	E	E	-	-
Unleaded Gasoline												
Urea Solution	E	G	-	E	E	G	E	E	E	E	G	-
Urethane Formulats												
Uric Acid												
Varnish	X	X	X	X	X	-	E	G	E	E	E	G
Vaseline												

Chemical Name	Hose						Fittings & Adapters					
	Neoprene	Nitrile	Nitrile/PVC	CPE	Hypalon	Urethane	Nylon	Carbon Steel	Stainless Steel 304	Stainless Steel 316	Aluminum	Brass
Vegetable Oils	G	E	G	E	-	G	E	E	E	E	E	G
Vegetable Oils (Hot)	-	-	-	-	-	-	E	G	G	G	E	G
Versilube	E	E	-	-	-	-	E	E	E	E	-	-
Versilube F-50, F-44	G	G	G	-	G	G	E	E	E	E	E	E
Vinegard	G	X	X	G	X	-	E	X	G	E	X	X
Vinyl Acetate	X	X	X	E	X	-	-	G	E	G	E	G
Vinyl Chloride (Chloroethylene, Monomer)	X	X	X	X	X	-	-	G	E	E	G	X
Vital 4300, 5310												
Vitrea Oils	-	E	-	-	-	G	E	E	E	E	-	-
Volt Esso 35												
Water	E	E	E	E	E	E	E	3	E	E	E	E
Water, (Under 150°F)												
Water, (up to 200°F)												
Water Glycols												
Water in Oil Emulsion	-	-	-	-	-	G	E	-	-	-	-	-
Water, Acid Mine	G	X	-	-	-	-	E	X	G	G	X	X
Water, Brine	G	G	-	-	E	E	E	X	G	G	-	-
Water, Demineralized	-	-	-	-	-	-	-	-	-	-	-	-
Water, Distilled	G	E	-	-	E	E	E	X	E	E	E	E
Water, Fresh	E	E	-	-	-	-	E	X	E	E	E	X
Water, Potable (FDA Tube Only)	Use FDA Hose Only											
Water, Salt	G	E	-	-	-	-	E	X	G	G	X	X
Whiskey												
White & Bagley No. 2190 Cutting oil	G	E	-	-	-	-	-	-	-	-	-	-
White Oil												
White Pine Oil												
Wines	Use FDA Hose Only											
Wood Alcohol												
Wood Oil	G	E	-	E	G	E	E	E	E	E	E	-
Xenon												
Xylene, Xylol	X	E	-	X	-	G	G	G	G	E	E	E
Xylidine												
Zeric	-	E	-	-	-	G	G	-	-	-	-	-
Zinc Acetate	G	X	-	-	X	-	G	E	E	E	E	E
Zinc Carbonate												
Zinc Chloride Solutions	E	E	E	E	E	-	E	X	G	E	X	X
Zinc Chromate	-	-	-	E	E	-	-	-	E	E	-	-
Zinc Hydrate	-	-	-	-	-	G	-	-	-	-	-	-
Zinc Sulfate Solutions	G	G	G	E	G	-	G	X	G	E	X	X