



Purpose

The type of media being controlled by the solenoid valve will have a direct effect on its ability to function properly. The purpose of this guide is to briefly introduce some materials commonly used when selecting a solenoid valve for specific applications. The guide includes Descriptions, Key Uses, Features and Limitations. The Chemical Compatibility Table (pages 84 - 91) lists 31 commonly used materials and rates their performance when exposed to various media.

Because the development of new and improved alloys, thermoplastics and elastomeric compounds are a continuing process. We offer this information as a basic material selection guide only.

Delrin (Acetal)

Standard Color: White

Description: Acetals are polymers of formaldehyde which technically are called polyoxymethylenes. Acetals are widely used engineering thermoplastics with high load-bearing characteristics and low coefficient of friction.

Key Uses: Industrial/mechanical products, appliances and plumbing. Based on excellent performance of Acetal copolymers in water at temperatures up to 212° F, they are widely used to mold faucet underbodies, shower heads, housings for pumps and filters, valves and fittings.

Maximum Working Temperature: +212° F

Features: Acetals are available in several specific grades. Easy-flow acetals which can be used in very thin-walled injection moldings, lubricated for low coefficient of friction and glass reinforced for strength and dimensional stability to name a few.

Limitations: Acetals are attacked by ultraviolet radiation, becoming brittle with long term exposure to sun light. UV-stabilization can provide significant improvements.

Nylon

Standard Color: Neutral, Black

Description: Nylons, or polyamides, are melt processable thermoplastics that contain an amide group as a recurring part of the chain. The first and largest volume of the engineering thermoplastics, they offer a combination of properties including high strength even at elevated temperatures, ductility, wear and abrasion resistance and good chemical resistance.

Key Uses: Nylons are used in virtually every industry and market. Transportation represents the largest single market for unreinforced and glass-reinforced nylons ranging from electrical connectors and wire jackets to engine fans and brake and power steering reservoirs.

Maximum Working Temperature: +266° F

Features: The mechanical properties of nylons are strength, stiffness and toughness and the combination thereof. Fiber reinforcement increases stiffness, strength and heat resistance. Excellent chemical resistance to hydrocarbon fuels, lubricants and various organic solvents is a distinguishing feature of nylons compared to other engineering plastics.

Limitations: Nylons are attacked by strong acids, oxidizing agents and concentrated solutions of certain salts. Absorbed moisture acts as a plasticizer and causes slight dimensional changes that must be considered in design.

PVC

Standard Color: Gray

Description: PVC is a vinyl-based resin and is produced by an oxyhydrochlorination process. It is the most versatile of all plastics because of its ability to be used to manufacture products ranging from heavy-walled pressure pipe to thin, crystal clear food packaging. PVC is easily machinable and can be injection molded.

Key Uses: Traditional uses for PVC compounds are hot- and cold-water distribution piping and industrial liquid handling pipe, fittings, valves and the like.

Maximum Working Temperature: +219° F

Features: The chemical resistance of PVC has prompted its use in industrial liquid handling, especially for high temperature liquids in paper and pulp operations, and acids and bases in plating and electrochemical operations.

Limitations: PVC is highly flammable and subject to rigorous protective measures because of health hazards.



Chemical Compatibility Selection Guide- Material Selection

Stainless Steel

Description: Stainless steels are high-alloy steels and have superior corrosion resistance to the carbon and conventional low-alloy steels because they contain relatively large amounts of chromium. In the broadest sense, the standard stainless steels can be divided into three groups based on their structures: austenitic (300 Series), ferritic (400 Series), and martensitic.

Key Uses: Applications for 300 series stainless steels include highly corrosive environments. Spartan utilizes 300 stainless steel in production of valve bodies where control of corrosive media and compatibility is an issue.

Applications for 400 series stainless steels include magnetic solenoid plungers and stops.

Features: 300 series stainless steels are austenitic and are non-magnetic in the annealed condition. They combine outstanding corrosion and heat resistance with good mechanical properties over a broad temperature range.

400 series stainless steels are ferritic grades and are always magnetic and contain chromium but no nickel. They combine corrosion and heat resistance with moderate mechanical properties.

Limitations: The ferritic grades are generally restricted to a narrower range of corrosion conditions than the austenitic grades.

Cast Bronze and Brass

Description: Bronze and brass are high copper alloys which are highly malleable, and are of the first to be found and utilized. These alloys are widely used because of their excellent electrical and thermal conductivities, outstanding resistance to corrosion, ease of fabrication, and a broad range of obtainable strengths and special properties.

Key Uses: Safety tools, molds for plastic parts, cams, bushings, bearings, valves, pump parts and gears.

Features: There are almost 400 commercial copper and copper-alloy compositions available from mills as wrought products (rod, plate, sheet, strip, tube, pipe, extrusions, foil, forgings and wire) and from foundries as castings.

Limitations: Bronze and brass are restricted to a narrow range of corrosion conditions as the copper tends to oxidize and sometimes dissolve in some damp and harsh chemical environments.

Aluminum

Description: Pure aluminum is a silver-white metal characterized by a slightly bluish cast. It has a specific gravity of 2.70, resists the corrosive effects of many chemicals and has a malleability approaching that of gold. When alloyed with other metals, numerous properties are obtained which make these alloys useful over a wide range of applications.

Key Uses: The automotive industry is the prime user of aluminum alloys for wheels and wheel covers and other light weight and decorative trim. It is also used in the pneumatic industry to produce light weight valve bodies and components.

Features: When aluminum surfaces are exposed to the atmosphere, a thin invisible oxide forms immediately which protects the metal from further oxidation. This self-protecting characteristic gives aluminum its high resistance to corrosion.

Limitations: Although the metal can safely be used in the presence of certain mild alkalies with the aid of inhibitors, in general, direct contact with alkalies should be avoided. Direct contact with certain other metals should be avoided in the presence of electrolyte; otherwise galvanic corrosion of aluminum may take place in the vicinity of the contact area. The use of a bituminous paint coating or insulating tape is recommended.

Buna N

Standard Color: Black

Description: Buna is the most widely used elastomer. It combines excellent resistance to petroleum-based oils and fuels, silicone greases, hydraulic fluids, water and alcohols, with a combination of working properties such as low compression set, high tensile strength, and abrasion resistance.

Key Uses: Oil resistant applications of all types. Low temperature military uses. Fuel systems. Can be compounded for FDA applications.

Temperature Range: -40° F to +250° F (Dry Heat Only)

Features: Increasing acrylonitrile content gives Buna its better resistance to petroleum-based oils and hydrocarbon fuels, enhancing resistance to the degrading effects of heat, at a cost of reduced low temperature performance.

Limitations: Precautions should be taken to avoid exposure of Buna to such highly polar solvents as acetone, MEK, chlorinated hydrocarbons and nitro hydrocarbons, which are known to cause rapid deterioration.



Aflas®

Standard Color: Black

Description: A copolymer of tetrafluoroethylene and propylene, Aflas exhibits excellent chemical resistance properties.

Key Uses: Seals for oil field, industrial and chemical applications.

Temperature Range: +60° F to +400° F (Dry Heat Only)

Features: Aflas features good resistance to petroleum fluids; steam; a number of acids and alkalies; amines (anti-freeze); phosphate esters and brake fluids. It has generated considerable interest as a seal material for oil field, industrial and chemical applications.

Limitations: Compression set of 52% after 30 days at 400° F may be considered too high for some sealing applications.

Chemraz®

Standard Color: Black

Description: A perfluoroelastomer possessing exceptional resistance to degradation by aggressive fluids and/or gases.

Key Uses: Severe chemical exposure and high temperatures. Seals for chemical processing & transportation.

Temperature Range: -35° F to +500° F (Dry Heat Only)

Features: Chemraz parts combine the high temperature toughness of a fluorocarbon elastomer, with the chemical inertness of Teflon®. As a group, parts resist attack by nearly ALL chemical reagents and provide long term service in virtually ALL chemical and petrochemical process streams.

Limitations: Chemraz parts can be made to significantly swell upon exposure to some fluorinated solvents; fully halogenated freons; and uranium hexafluoride.

EPDM (Ethylene-Propylene)

Standard Color: Black

Description: A copolymer of ethylene and propylene. Ethylene propylene has gained acceptance for its excellent ozone and chemical resistance.

Key Uses: Outdoor weather resistant uses. Hydraulic and automotive brake systems. Water appliances.

Temperature Range: -60° F to +300° F (Dry Heat Only)

Features: EPDM features good resistance to polar solvents such as MEK and acetone. It is also highly recommended for effective resistance to steam (to 400° F); hot water; silicone oils and greases; dilute acids and alkalies; alcohol and automotive brake fluids.

Limitations: With the exception of resistance to polar solvents, EPDM is not recommended for its overall solvent resistance.

Fluorocarbon (Viton)

Standard Color: Black

Description: Combining high temperature resistance with outstanding chemical resistance, Fluorocarbon-based compounds are the ideal seal material.

Key Uses: High temperature/low compression set applications. Wide chemical exposure situations.

Temperature Range: -20° F to +400° F (Dry Heat Only)

Features: Fluorocarbons are highly resistant to swelling in gasoline and gasoline/alcohol blends, as well as resistant to the degrading effects of U.V. light and ozone.

Limitations: Fluorocarbons are not recommended for exposure to ketones. They are also not recommended for situations requiring good low temperature flexibility.

Neoprene

Standard Color: Black

Description: Neoprene is a homopolymer of chloroprene and is one of the earliest of the synthetic materials to be developed as an oil-resistant substitute for Natural Rubber.

Key Uses: Recommended for exposure to weathering. Preferred sealing material for refrigeration industry. FDA approved for food and beverage industry use.

Temperature Range: -45° F to +250° F (Dry Heat Only)

Features: Neoprene has a good resistance to ozone, sunlight and oxygen aging; relatively low compression set; good resilience; and reasonable production cost.

Limitations: Neoprene is generally attacked by strong oxidizing acids, esters, ketones, chlorinated, aromatic and nitro hydrocarbons.



Chemical Compatibility Table

Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data	Plastics					Metals					Elastomers				
	Epoxy	Polypropylene	Polyethylene	PVC	Cyclocac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze
Acetaldehyde	A	A	C	D	D	A	A	A	A	A	A	A	A	A	A
Acetamide	A	A	A	D	D	D	A	B	A	A	A	A	A	A	A
Acetate Solvent	A	D	A	D	D	D	A	A	A	A	A	A	A	A	A
Acetic Acid, Glacial	B	A	A	D	D	C	B	A	A	A	A	A	A	A	A
Acetic Acid 20%	A	A	A	A	D	C	A	A	A	A	A	A	A	A	A
Acetic Acid 80%	C	A	A	D	D	D	C	A	A	A	A	C	D	A	A
Acetic Acid	C	A	A	D	D	D	C	A	A	A	A	C	D	A	A
Acetic Anhydride	C	B	A	D	D	D	C	A	A	A	A	C	D	A	A
Acetone	A	A	B	D	D	A	A	A	A	A	A	A	D	A	A
Acetyl Bromide	D	A	B	D	D	A	A	A	A	A	A	A	D	A	A
Acetyl Chloride (dry)	A	A	D	C	D	A	D	D	A	A	A	A	A	A	A
Acetylene	A	A	A	A	D	A	A	A	A	A	A	A	A	A	A
Acrylonitrile	A	A	A	A	D	A	A	A	A	A	A	A	A	A	A
Alcohols: Amyl	A	A	B	A	D	A	A	A	A	A	A	A	A	A	A
Benzyl	D	B	A	D	D	A	A	A	A	A	A	A	A	A	A
Butyl	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A
Diacetone	A	B	A	B	C	A	A	A	A	A	A	A	A	A	A
Ethyl	A	A	B	B	C	A	A	A	A	A	A	A	A	A	A
Hexyl	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Isobutyl	A	A	A	A	B	C	A	A	A	A	A	A	A	A	A
Isopropyl	A	A	A	A	D	A	B	A	A	A	A	A	A	A	A
Methyl	B	A	A	A	A	A	A	C	A	A	A	A	A	A	A
Octyl	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Propyl	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Chloride 20%	A	A	A	B	A	D	A	C	A	A	C	C	D	A	A
Aluminum Chloride	A	A	B	A	A	D	A	C	A	A	C	C	D	A	A
Aluminum Fluoride	B	A	A	A	A	D	A	C	A	A	C	C	D	A	A
Aluminum Hydroxide	B	A	A	A	A	D	A	C	A	A	C	C	D	A	A
Aluminum Potassium Sulfate 10%	A	A	A	A	A	D	A	C	A	A	C	C	D	A	A
Aluminum Potassium Sulfate 100%	A	A	A	A	A	D	A	C	A	A	C	C	D	A	A
Aluminum Sulfate	A	A	A	A	A	A	A	C	A	A	B	B	D	A	A
Alums	A	A	A	A	A	A	A	C	A	A	B	B	D	A	A
Amines	A	A	C	D	B	D	D	D	B	A	A	A	A	B	A
Ammonia 10%	A	A	C	B	A	A	A	D	A	A	A	A	A	C	A
Ammonia, anhydrous	A	A	C	B	A	A	A	D	A	A	A	A	A	C	A
Ammonia, liquid	A	A	C	A	B	A	B	D	A	A	A	B	B	C	A
Ammonia Nitrate	A	A	A	A	A	A	D	C	A	A	A	A	A	A	A
Ammonium Acetate	A	A	A	A	A	A	D	A	A	A	A	A	A	A	A
Ammonium Bifluoride	A	A	A	A	A	A	D	A	A	A	A	A	A	A	A
Ammonium Carbonate	A	A	A	B	A	A	D	A	A	A	B	C	B	A	A
Ammonium Casenite	A	A	A	A	A	D	A	C	A	A	A	D	C	B	A
Ammonium Chloride	A	A	A	A	A	D	A	C	A	A	A	A	A	A	A
Ammonium Hydroxide	A	A	A	A	A	D	A	C	A	A	A	A	A	A	A
Ammonium Nitrate	A	A	A	A	A	D	A	C	A	A	A	A	A	A	A
Ammonium Oxalate	A	A	A	A	A	D	A	C	A	A	A	A	A	A	A
Ammonium Persulfate	A	A	A	A	A	C	C	D	B	A	B	B	A	A	A
Ammonium Phosphate, Dibasic	A	A	A	A	A	A	C	B	B	A	A	B	B	A	A
Ammonium Phosphate, Monobasic	A	A	A	A	A	A	C	B	B	A	A	B	B	A	A
Ammonium Phosphate, Tribasic	A	A	A	C	A	A	B	B	B	A	A	B	B	A	A
Ammonium Sulfate	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A
Ammonium Thiosulfate	A	B	A	C	C	A	D	C	A	A	A	A	A	A	A
Amyl Acetate	D	B	B	D	D	A	C	A	A	A	A	A	A	A	A
Amyl Alcohol	D	B	B	D	D	A	C	A	A	A	A	A	A	A	A
Amyl Chloride	A	C	C	B	C	D	A	C	A	A	A	A	A	A	A
Aniline	C	C	D	D	D	D	A	C	A	A	A	A	A	A	A
Aniline Hydrochloride	A	D	A	D	B	A	D	D	D	A	D	D	D	A	A
Anti-Freeze	A	D	A	B	A	A	D	D	D	A	A	C	D	B	A
Antimony Trichloride	D	B	B	C	C	D	D	D	D	A	A	D	D	B	A
Aqua Regia (80%HCl, 20%HNO ₃)	D	B	B	C	C	D	D	D	D	A	A	D	D	B	A
Arachlor 1248	A	D	A	B	A	A	D	D	D	A	A	D	D	B	A
Aromatic Hydrocarbons	A	D	C	D	D	A	C	A	A	A	C	A	A	B	B
Arsenic Acid	A	A	B	A	A	A	C	A	A	A	A	A	A	B	B
Asphalt	A	B	A	A	A	A	C	A	A	A	A	A	A	B	B
Barium Carbonate	A	A	A	B	A	A	A	A	A	A	A	A	A	B	B
Barium Chloride	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B
Barium Cyanide	A	D	B	D	D	A	A	B	A	A	A	A	A	B	B
Barium Hydroxide	A	B	B	A	A	A	A	B	A	A	A	A	A	B	B
Barium Nitrate	A	A	B	B	A	A	A	B	A	A	A	A	A	B	B
Barium Sulfate	C	B	B	B	A	A	A	B	A	A	A	A	A	B	B
Barium Sulfide	C	B	B	B	A	A	A	B	A	A	A	A	A	B	B

*Delrin, Hypalon, Teflon, Viton - Reg TM E. I. Du Pont de Nemours & Co.

*Chemraz - Reg TM Green, Tweed & Co., Inc.

*Ryton - Reg TM Phillips Petroleum Co.

*Cyclocac - Reg TM Borg-Warner Corp.

*Aflas - Reg TM Asahi Glass Co., Ltd. (This chart is available upon request)

Chemical Compatibility Table



Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data																																
	Epoxy	Polypropylene	Polyethylene	PVC	Cyclac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze	Cast iron	Aluminum	Hastelloy C	Carbon/ceramic	Cermagnet A	Viton*	Buna N	Neoprene	Nitrile	Natural rubber	Hypalon*	EPDM	Chemraz*	Silicone	Ceramic	Carbon/graphite	
Beer	A	A	A	A	B	A	A	B		A	A	A	A	B	A	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Beet Sugar Liquids	A	B	A	A	B	A	A	A		A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Benzaldehyde	A	A	A	A	D	A	A	C	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Benzene	A	C	C	C	C	A	A	C	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Benzene Sulfonic Acid	B	D	D	D	B	D	A	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Benzoic Acid	A	C	B	A		C	A	C	B	A	A	B	B	B	D	D	B	B	A	A	A	A	D	D	D	D	D	B	A	B	B	A
Benzol	A	A	C	B		A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	B	D	D	D	B	A	A	A	A
Bleaching Liquors	A	A	B	B		D	A	C	A	A	A	A	A	A	A	A	D	B	B	A	A	A	D	C	D	D	A	A	A	A	A	A
Borax (Sodium Borate)	A	B	A	A	B	A	A	A	A	A	A	A	A	B	D	A	B	B	A	A	A	A	D	C	D	D	A	A	A	A	A	A
Boric Acid	A	A	A	A	B	A	A	A	A	A	A	A	B	D	A	B	D	B	A	A	A	A	D	C	D	D	A	A	A	A	A	A
Brewery Slop	A	D	D	D	C	D	A	D	A	A	A	D	D	A	A	D	A	A	A	D	D	A	D	D	D	D	D	B	A	A	A	A
Bromine	D	D	D	D	C	D	A	D	A	A	A	D	D	A	A	D	A	A	A	D	D	A	D	D	D	D	D	B	A	A	A	A
Butadiene	A	C	C	C	B	A	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A	D	B	A	A	A	A
Butane	D	A	C	C	A	B	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A	D	B	A	A	A	A
Butanol (Butyl Alcohol)	D	A	C	C	A	B	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A	D	B	A	A	A	A
Butter	A	A	A	A	B	B	D	D	A	A	A	A	C	A	B	D	D	A	A	A	A	A	A	B	A	D	B	A	A	B	A	A
Buttermilk	A	A	A	A	B	B	D	D	A	A	A	A	C	A	B	D	D	A	A	A	A	A	A	B	A	D	B	A	A	B	A	A
Butylene	A	A	A	A	B	B	D	D	A	A	A	A	C	A	B	D	D	A	A	A	A	A	A	B	A	D	B	A	A	B	A	A
Butylacetate	B	C	C	C	D	B	D	D	A	A	A	A	B	B	A	D	A	A	A	A	A	A	A	B	A	D	B	A	A	B	A	A
Butyric Acid	C	C	C	D	B	D	D	D	A	A	A	A	B	B	A	D	A	A	A	A	A	A	B	A	D	D	B	A	A	B	A	A
Calcium Bisulfate	A	A	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	C	B	A	A	A	A	A	A	A	C	A	A	A	A	A
Calcium Bisulfide	A	A	A	A	B	A	A	A	A	A	A	B	B	B	A	C	D	C	B	A	A	A	A	A	A	A	C	A	A	A	A	A
Calcium Bisulfite	A	A	A	A	B	A	A	A	A	A	A	B	B	B	A	C	D	C	B	A	A	A	A	A	A	A	C	A	A	A	A	A
Calcium Carbonate	A	A	A	A	B	A	A	A	A	A	A	B	B	B	A	C	D	C	B	A	A	A	A	A	A	A	C	A	A	A	A	A
Calcium Chlorate	A	A	A	A	B	A	A	A	A	A	A	B	B	B	A	C	D	C	B	A	A	A	A	A	A	A	C	A	A	A	A	A
Calcium Chloride	A	A	A	A	B	A	D	A	A	A	A	B	C	C	D	D	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Hydroxide	A	A	A	A	B	A	D	A	A	A	A	B	C	C	D	D	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Hypochlorite	A	A	A	A	B	A	D	A	A	A	A	B	C	C	D	D	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Oxide	A	A	A	A	B	A	D	A	A	A	A	B	C	C	D	D	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Sulfate	A	A	A	A	B	A	D	A	A	A	A	B	C	C	D	D	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Calgon	A	A	A	A	B	A	D	A	A	A	A	B	C	C	D	D	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Cane Juice	A	C	B	B	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbolic Acid (see Phenol)	A	C	B	B	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Bisulfide	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Dioxide	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Dioxide (Dry)	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Dioxide (Wet)	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Disulfide	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Monoxide	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Tetrachloride	A	A	A	A	C	D	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbonated Water	A	B	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbonic Acid	A	B	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Catsup	A	B	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chloroacetic Acid	A	C	C	C	B	D	A	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorobromomethane	A	C	C	C	B	D	A	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chloric Acid	A	C	B	B	C	D	D	D	D	A	A	C	C	C	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorinated Glue	A	C	B	B	C	D	D	D	D	A	A	C	C	C	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorine, anhydrous liquid	A	C	B	B	C	D	D	D	D	A	A	C	C	C	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorine, dry	A	C	B	B	C	D	D	D	D	A	A	C	C	C	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorine Water	A	C	B	B	C	D	D	D	D	A	A	C	C	C	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chlorobenzene (Mono)	C	C	C	C	D	D	D	B	A	A	B	B	B	B	B	A	D	D	A	B	A	A	D	D	D	D	D	D	A	A	A	A
Chloroform	C	C	C	C	D	D	D	B	A	A	B	B	B	B	B	A	D	D	A	B	A	A	D	D	D	D	D	D	A	A	A	A
Chlorosulfonic Acid	C	C	C	C	D	D	D	B	A	A	B	B	B	B	B	A	D	D	A	B	A	A	D	D	D	D	D	D	A	A	A	A
Chocolate Syrup	A	A	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chromic Acid 5%	B	A	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Chromic Acid 10%	C	A	A	A	B	C	D	D	B	A	B	B	B	C	B	A	D	D	D	B	D	B	D	D	D	D	B	C	A	C	C	A
Chromic Acid 30%	C	D	B	A	B	C	C	C	C	A	A	B	B	B	C	A	D	D	D	B	D	B	D	D	D	D	B	C	A	C	C	A
Chromic Acid 50%	C	D	B	A	B	C	C	C	C	A	A	B	B	B	C	A	D	D	D	B	D	B	D	D	D	D	B	C	A	C	C	A
Chromium salts	A	A	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Cider	A	A	A	A	B	A	D	A	A	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Citric Acid	A	A	A	A	B	C	D	D	B	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Citric Oils	A	A	A	A	B	C	D	D	B	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Clorox (Bleach)	A	A	A	A	B	C	D	D	B	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Coffee	A	A	A	A	B	C	D	D	B	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Chloride	A	A	A	A	B	C	D	D	B	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Cyanide	B	A	B	A	B	A	D	A	A	A	B	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Fluoborate	A	A	A	A	B	C	D	D	B	A	A	B	B	B	A	C	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Nitrate	A	A	A	A	B	C	D	D	B	A																						



Chemical Compatibility Table

Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data																																	
	Epoxy	Polypropylene	Polyethylene	PVC	Cyclac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze	Cast iron	Aluminum	Hastelloy C	Carbon/ceramic	Cermagnet A	Viton*	Buna N	Neoprene	Nitrile	Natural rubber	Hypalon*	EPDM	Chemtraz*	Silicone	Ceramic	Carbon/graphite		
Cream Cresols Cresylic Acid Cyanic Acid Cyclohexane	A A A A A	D D C B C	B C D D D	C D C D D	D	D D D D D	A D D D D	A D D D D	A	A A A A A	A A A A A	A A A A A	B A A A A	A	D C C C D	D C C C D	A B B B A	B B B B A	A A A A A	A	A A A A A	D D D D D	C D D D D	A D D D D	D D D D D	D D D D D	D D D D D	D D D D D	A A A A A	A A A A A			
Cyclohexanone Detergents Diacetone Alcohol Dichlorethane Diesel Fuel	C A B B A	D B B A A	D A A A C	D A D C A	D B		A A A A A	A A A A A	A	A A A A A	A A A A A	A A A A A	A	A	A	A B A A A	B B A A A	A A A A A	A	A	D D C A	A A A A A	D B D D B	D A D D B	D B A D B	D D D D B	C A A D D	A A A A A	D A D A A	A A A A A	A A A A A		
Diethylamine Diethylene Glycol Dimethyl Formamide Diphenylene Oxide Dyes	A C A A A	B A A A A	D B A A A	D D D D B	B D		A A A A A	B A B D C	A	A A A A A	B A A A A	A A A A A	D A A A A	A	A A A A C	A A A A A	B B B B B	B B A A A	A A A A A	A	D A A A A	C A D D C	C A D D A	C A D D A	B A A D D	C A D D D	B A B D D	A A A A A	B B B C C	A A A A A	A A A A A		
Epsom Salts (Magnesium Sulfate) Ethane Ethanalamine Ether ³ Ethyl Acetate	A A A A C	A A B D B	A A C C C	A D D C C	A	A A D A A	A D A A A	B A A A A	A	A A A A A	B A A A B	B A A A B	B A A A A	A	C A A A A	A A A A A	B B B B B	B B A A A	A A A A A	A	A A D C D	A A B D D	A A B D D	B B D D C	A B C D D	A B C D B	D D D D D	A D B C B	A A A A A	D B D B B	A A A A A	A A A A A	
Ethyl Chloride Ethyl Sulfate Ethylene Bromide Ethylene Chloride Ethylene Chlorohydrin	A A B D D	C D C C D	C D C C D	D D D D D	D	D A B D	A A A C	A A A A	A	A A A A A	A A A A A	A A A A A	A A A A A	C A B B	A A A A A	C A A A A	B B B B A	B B A A A	A A A A A	A	A A A A A	A A A A D	B A D D A	A A D D C	B D D D B	A A A A A	B A A A A	D D D D C	A A A A A	A A A A A	A A A A A		
Ethylene Diamine Ethylene Dichloride Ethylene Glycol Ethylene Oxide Fatty Acids	A C C A A	C C C C C	C C C C C	A A A C B	D B	D A D D	B B A A	A B B A A	A	A A A A A	A A A A A	A A A A A	A A A A A	B A A A	C A A A C	A A D C A	C B B B A	C B B B A	A A A A A	A	D A D D A	A A D D B	B D D D B	B D D D A	B D D D D	B D D D D	A A A A A	C A A C D	A A A A A	A A A A A	A A A A A	A A A A A	
Ferric Chloride Ferric Nitrate Ferric Sulfate Ferrous Chloride Ferrous Sulfate	A A A A A	B B B A A	A A A A A	A A A A A	C	A D A A C	C D D A C	D D D A D	A	A A A A A	C A A A B	D B B D B	D B B D A	A A A A A	D D D D C	D D D D D	D C C D A	B B B B A	A A A A A	A	A A A A A	A A A A A	B A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	B B B B A	A A A A A	A A A A A	A A A A A	
Fluoboric Acid Fluorine Fluosilicic Acid Formaldehyde 40% Formaldehyde 100%	A C A A A	A D D C A	B D B A A	A D B A A	B	A D C B	D D A A	A D A A	A	A A A A A	C C A A A	B C C A C	D C C B A	D D D D D	D D D D A	D D D D C	A D B B A	A D B B A	A A A A A	A	B A D A	A A B C	A A B C	A A B C	A A B C	A A B C	A A A A A	A A A A A	A A A A A	A A A A A	D D D D D	A A A A A	A A A A A
Formic Acid Freon* 11 Freon 12 Freon 22 Freon 113	C A A A A	A D D C A	B D C A A	A A A A B	B C	C D D B A	D D D A A	A D B A A	A	A A A A A	C A C C D	B C C A A	C A B A A	A	C A A A A	D A A A A	B A A A A	A A A A A	A A A A A	B A A A A	C A B D	B A D A A	A A D A A	B A D A A	A A D A A	A A D A A	A A D A A	A A D A A	A A D A A	A A D A A	A A D A A	A A D A A	A A D A A
Freon TF Fruit Juice Fuel Oils Furan Resin Furfural	A A A A A	D A C D A	B A C D A	A A A A D	B D	D A A A D	A A A A B	A A A A A	A	A A A A A	A A A A A	A A A A A	B A A A A	A	A A A A A	D A A A A	A A A A A	A A A A A	A A A A A	A	B A A D	A A B D	A A C D	A A B D	D A D D	A A D D D	D D D D D	D A C B	A A B B	D D D D	A A A A A	A A A A A	A A A A A
Gallic Acid Gasoline Gelatin Glucose Glue, P.V.A.	A B B A A	C A A A A	B A A A A	A A A A C	D B	A D A A	B A B A	A A A A A	A	A A A A A	B A A A A	B A A A A	B A A A A	A B	A A A A A	A A A A A	C A A A C	B A A A A	A A A A A	A	A A A A A	B A A A A	B A A A A	A A A A A	B A A A A	B A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	B A A A A	
Glycerin Glycolic Acid Gold Monocyanide Grape Juice Grease	A A A A A	A A A A A	A A A A A	A A A A B	C B	A A A A D	A A A A D	A A A A D	A	A A A A A	A A A A A	A A A A A	A A A A A	A B	A A A A C	D A A A A	A A A A A	A A A A A	A A A A A	A	A A A A A	A A A A D	A A A A D	A A A A D	A A A A D	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A
Heptane Hexan Honey Hydraulic Oil (Petro) Hydraulic Oil (Synthetic)	A B A A A	C B A A A	B B B A A	C B A A A	D	D D D D A	A A A A A	A A A A B	A	A A A A A	A A A A A	A A A A A	A A A A A	A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A	A A A A A	A A A A A	A A B A A	A A A A D	D D D D B	D D D D D	D A A A	A A A A A	D D D D A	A A A A A	A A A A A	A A A A A	B A A A B
Hydrazine Hydrobromic Acid 20% Hydrobromic Acid 100% Hydrochloric Acid, Dry Gas Hydrochloric Acid 20%	A B D A A	C B C B A	B B A A A	B A A A A	B	D D D A A	D D D A A	C D A C A	A	A A A A A	D D D D A	D D D D D	A D D D C	A	D C D D D	D D D D D	D D D D D	A C A A A	A A A A A	B A A A A	A	B D D A	B B D D	B D D A	B A A A	B A A A	A A A A	A A A A	C D D D	A A A A	A A A A	A A A A	A A A A

*Delrin, Hypalon, Teflon, Viton - Reg TM E. I. Du Pont de Nemours & Co.

*Chemraz - Reg TM Green, Tweed & Co., Inc.

*Ryton - Reg TM Phillips Petroleum Co.

*Cyclac - Reg TM Borg-Warner Corp.

*Aflas - Reg TM Asahi Glass Co., Ltd. (This chart is available upon request)

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Chemical Compatibility Table



Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data	Epoxy Polypropylene Polyethylene PVC Cyclac* (ABS)	Phenolic Nylon Delrin* (Acetal) Ryton* to 200°F	Teflon* Stainless steel (316) Stainless steel (304) Stainless steel (440) Titanium	Cast bronze Cast iron Aluminum Hastelloy C Carbon/ceramic Cermagnet A	Viton* Buna N Neoprene Nitrile Natural rubber Hypalon*	EPDM Chemraz* Silicone Ceramic Carbon/graphite
Hydrochloric Acid 37% Hydrochloric Acid 100% Hydrocyanic Acid Hydrocyanic Acid (Gas 10%) Hydrofluoric Acid 20%	A C B B A B B A B A A A A A B A A A A C	C D C A D C C A C C C A D C C A	A D D D C A D D D C A D D D C A D D D C	D D D B A C D D D B A C D D D B A C D D D B A C	A B B B B A A B B B B A A B B B B A A B B B B A	A A B A A A A B A A A A B A A A A B A A
Hydrofluoric Acid 50% Hydrofluoric Acid 75% Hydrofluoric Acid 100% Hydrofluosilicic Acid 20% Hydrofluosilicic Acid 100%	C A A B C B C C C D C C C C D C A B A B C A B A B	D D D D A D D D D A D D D D A D D D D A D D D D A	A D D D D A D D D D A D D D D A C C C D A C C C D	D D D B D D D D D B D D D D D B D D D D D B D D D D D B D D	A B A B B A A B A B B A A B A B B A A B A B B A A B A B B A	A A D D A A A D D A A A D D A A A D D A A A D D A
Hydrogen Gas Hydrogen Peroxide 10% Hydrogen Peroxide 30% Hydrogen Peroxide 50% Hydrogen Peroxide 100%	C A A A A B B C A A B B C A A B B C A A A B C C B	D C D A A D C D A A D C D A A D C D A A D C D A A	A A B B A A A A B B A A A A B B A A A A B B A A A A B B A A	A C B B A A A C B B A A A C B B A A A C B B A A A C B B A A	A A A A B A A A A A B A A A A A B A A A A A B A A A A A B A	A A C B A C A A C B A C A A C B A C A A C B A C A A C B A C
Hydrogen Sulfide (aqua) Hydrogen Sulfide (dry) Hydroquinone Hydroxyacetic Acid 70% Ink	A A A B B A A A B B A A A B B A A A B B A A A B B	D C C A A D C C A A D C C A A D C C A A D C C A A	A C C C A A C C C A A C C C A A C C C A A C C C A	D D B A A D D B A A D D B A A D D B A A D D B A A	D A A D B A D A A D B A D A A D B A D A A D B A D A A D B A	A A C A A A A C A A A A C A A A A C A A A A C A A
Iodine (in alcohol) Iodoform Isotane Isopropyl Acetate	C C A C D A B A A A A D A A A A B B D D	D D D C D D D D C D D D D C D D D D C D	A C C C C C B A A D A A C A A A A C A A	D D A B D A A B A A A A B A A A B D B A A	A B D B B A B D B B A B D B B A B D B B	B A D A A B A D A A B A D A A B A D A A
Isopropyl Ether Jet Fuel (JP3, -4, -5) Kerosene Ketones Lacquers	D B A B A B A B A C C B D A C C B C A C C B C	D A A A A D A A A A D A A A A D A A A A D A A A A	A A	A A	D B C B D C D B C B D C D B C B D C D B C B D C D B C B D C	D A D D A A D A D D A A D A D D A A D A D D A A D A D D A A
Lacquer Thinners Lactic Acid Lard Latex Lead Acetate	A C B C B B A B B B B A B B B A A A A B A A A A B	D C D A A D C D A A D C D A A D C D A A D C D A A	A A B B A C A A B B A C A A B B A C A A B B A C A A B B A C	A C D B A A A C D B A A A C D B A A A C D B A A A C D B A A	D D D D D A D D D D D A D D D D D A D D D D D A D D D D D A	D A D A A A D A D A A A D A D A A A D A D A A A D A D A A A
Lead Sulfamate Ligroin Lime Lithium Hydroxide Lubricants	A A A A A A C B A A A B A A A A D B B A A D B B	B D B B D A B B D A B B D A B B D A B B	A C C A A A C C A A A C C A A A C C A A A C C A A	A C D D A A A C D D A A A C D D A A A C D D A A A C D D A A	A B A B B A A B A B B A A B A B B A A B A B B A A B A B B A	A B D A A A B D A A A B D A A A B D A A A B D A A
Magnesium Carbonate Magnesium Chloride Magnesium Hydroxide Magnesium Nitrate Magnesium Oxide	A A A A B A A A A B A A A A B A A A A B A A A A B	A A	A A	A C D B A A A C D B A A A C D B A A A C D B A A A C D B A A	A A	A A
Magnesium Sulfate Maleic Acid Maleic Anhydride Malic Acid Mash	A A A A B A A B A A A D A A A A A B A A A A B A A	A A A A B A A B A A A A B A A A A B A A A A B A A	A B B B A A B B B A A B B B A A B B B A A B B B A	A A B B A A A A B B A A A A B B A A A A B B A A A A B B A A	A A D D B A A A D D B A A A D D B A A A D D B A A A D D B A	A A
Mayonnaise Melamine Mercuric Chloride (Dilute) Mercuric Cyanide Mercury	A A B D A A A A A A A A A A A A A B A B B	D A D B A D A D B A D A D B A D A D B A D A D B A	D A D C A D A D C A D A D C A D A D C A D A D C A	D D D D A A D D D D A A D D D D A A D D D D A A D D D D A A	A C A C D A C A C D A C A C D A C A C D A C A C D	A A
Methane Methanol (Methyl Alcohol) Methyl Acetate Methyl Acrylate Methyl Acetone	A A B B B A A A B D D B D B A D A A A C A A A D	A C A A A A C A A A A C A A A A C A A A A C A A A	A A A A B A A A A B A A A A B A A A A B A A A A B	A A	A A B A D B A A B A D B A A B A D B A A B A D B A A B A D B	D A D A A B D A D A A B D A D A A B D A D A A B D A D A A B
Methyl Alcohol 10% Methyl Bromide Methyl Butyl Ketone Methyl Cellosolve Methyl Chloride	B A A A B C A A D C D A A B C B A A B A D C D D	A C C D A A C C D A A C C D A A C C D A A C C D A	A A A B B A A A B B A A A B B A A A B B A A A B B	A A	D A B D D A D A B D D A D A B D D A D A B D D A D A B D D A	A A
Methyl Dichloride Methyl Ethyl Ketone Methyl Ethyl Ketone Peroxide Methyl Isobutyl Ketone Methyl Isopropyl Ketone	A D A A C A B D D C D C D D C D C D D A D D D D	A C D B A A C D B A A C D B A A C D B A A C D B A	A A A A B A A A A B A A A A B A A A A B A A A A B	A A	D D	D A D A A D A D A A D A D A A D A D A A D A D A A

*Delrin, Hypalon, Teflon, Viton - Reg TM E. I. Du Pont de Nemours & Co.

*Chemraz - Reg TM Green, Tweed & Co., Inc.

*Ryton - Reg TM Phillips Petroleum Co.

*Cyclac - Reg TM Borg-Warner Corp.

*Aflas - Reg TM Asahi Glass Co., Ltd. (This chart is available upon request)



Chemical Compatibility Table

Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data		Epoxy	Polypropylene	Polyethylene	PVC	Cyclocac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze	Cast iron	Aluminum	Hastelloy C	Carbon/ceramic	Cermagnet A	Viton*	Buna N	Neoprene	Nitrile	Natural rubber	Hypalon*	EPDM	Chemraz*	Silicone	Ceramic	Carbon/graphite
Methyl Methacrylate		A	D		A	D		D				A	A	A	A		D	A	A	A	A	D	D	D	D	D	D	D	D	A	A	A
Methylamine		A	A	B	C	A	A	A	A	A	A	A	B	B	B		A	A	A	B	A	A	D	D	D	D	D	D	A	A	A	A
Methylene Chloride		A	B	C	A	A	A	A	A	A	A	A	B	B	B		A	A	A	B	A	A	D	D	D	D	D	D	A	A	A	A
Milk		A	A	C	A	A	A	A	A	A	A	A	A	A	A		A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Mineral Spirits		A	A	C	A	A	A	A	A	A	A	A	A	A	A		A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
Molasses		A	A	A	A	D	B					A	A	A	B	A	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Monoethanolamine		A	B	C	A	B						A	B	A	A	B																
Mustard		A	A	A	C	A	B					A	A	A	C	A	B															
Naphtha		A	C	A	A	D	D					A	A	A	A	B																
Naphthalene		A	C	A	A	A	D					A	A	A	A	B																
Natural Gas			A	A								A	A	A	B	A																
Nickel Chloride		A	A	B	B	A	B					A	C	D	D	B																
Nickel Sulfate		A	A	A	B	A	B					A	C	D	D	B																
Nitric Acid (≤15% H ₂ SO ₄)		A	A	C	C							A	C	C	C	D																
Nitric Acid (≥15% H ₂ SO ₄)		D	C		D							A	C	C	C	D																
Nitric Acid (≤1% Acid)			C		D							A	A	C																		
Nitric Acid (≤15% HNO ₃)			C		D							A	A	C																		
Nitric Acid (5-10%)		A	A	B	A	B						A	A	A	B	A																
Nitric Acid (20%)		B	A	C	C	B						A	A	A	B	A																
Nitric Acid (50%)		D	D	C	A	B						A	A	A	B	A																
Nitric Acid (Concentrated)		D	D	C	D	D						A	A	A	C	A																
Nitrogen Fertilizer												A	A	A																		
Nitrous Acid			A	D	A							A	A	A																		
Nitrous Oxide			D	C	A							A	A	A																		
Nitrobenzene		C	B	C	D	D						A	A	B	B	B	A															
Oils																																
Aniline		A	A		D	D						A	A	A	A	D																
Anise		A	A									A	A	A	A																	
Bay		A	A									A	A	A	A																	
Bone		A	A									A	A	A	A																	
Castor		A	A		A							A	A	A	A																	
Cinnamon		A	A									A	A	A	A																	
Citric		A	A									D	A	A	A																	
Clove		A	A									A	A	A	A																	
Cocoa Nut		A	A		A							A	A	A	A																	
Cod Liver		A	A		A							A	A	A	A																	
Corn		A	A	C	B							A	A	A	A																	
Cotton Seed		A	A	B	B							A	A	B	B	B	A															
Creosote		A	A	C	C							A	A	B	B	B	A															
Diesel Fuel (20,30,40,50)		A	A	C	C	A						A	A	A	A	B																
Fuel (1,2,3,5A,5B,6)		A	A	C	C	A						A	A	A	A	A																
Ginger		A	A									A	A	A	A																	
Lemon		A	A									A	A	A	A																	
Linseed		A	A									A	A	A	A																	
Mineral		A	B	B	A							A	A	A	A																	
Olive		A	A	A	C							A	A	A	A																	
Orange		A	A									A	A	A	A																	
Palm		A	A									A	A	A	A																	
Peanut		A	D		A							A	A	A	A																	
Peppermint		A	A									A	A	A	A																	
Pine		A	D		C							A	A	A	A																	
Rapeseed		A	D									A	A	A	A																	
Rosin		A	A	B	C							A	A	A	B																	
Sesame Seed		A	A	A	A							A	A	A	A																	
Silicone		A	A	A	A							A	A	B	A																	
Soybean		A	A	A	A							A	A	A	A																	
Sperm		A										A	A	A	A																	
Tanning		A	B	B	B	B						A	A	A	A																	
Transformer		A	B	C	C							A	A	A	A																	
Turbine		A	B	C	C	D						A	B	B	B																	
Oleic Acid		A	B	C	C							A	A	B	B																	
Oleum 25%		D	D	D	D							A	B	B	A	D																
Oleum 100%		D	D	D	D							A	B	B	A	D																
Oxalic Acid (cold)		A	A	A	A	A						A	B	B	B																	
Ozone		A	D	C	C							A	A	B																		
Paraffin		A	A	C	C	A						A	A	A	A																	
Pentane		A	D	D	A							A	C	C	A																	
Perchloric Acid			C	B	A							A	A	B	A																	
Perchloroethylene		D	D	D	C							A	A	B	A																	
Petrolatum		A	D	B	B							C	A	B	B																	
Phenol (10%)		C	B	A	C							A	B	B	B																	

*Delrin, Hypalon, Teflon, Viton - Reg TM E. I. Du Pont de Nemours & Co.

*Chemraz - Reg TM Green,

Chemical Compatibility Table



Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data																																
	Epoxy	Polypropylene	Polyethylene	PVC	Cyclac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze	Cast iron	Aluminum	Hastelloy C	Carbon/ceramic	Cermagnet A	Viton*	Buna N	Neoprene	Nitrile	Natural rubber	Hypalon*	EPDM	Chemraz*	Silicone	Ceramic	Carbon/graphite	
Phenol (Carbonic Acid) Phosphoric Acid (<40%) Phosphoric Acid (>40%) Phosphoric Acid Anhydride Phosphoric Acid (crude)	C A A B	B A B B	B A B B	C B B B	D B C C	D D D D	C D B D	D C D D	A A A A	A A B D	B B B D	B A A D	B A B D	A B C C	C D D D	D D D D	B C B A	A A A A	A B B C	D C D D	A A A A	D D D D	D B D D	D D D D	D D D D	D D D D	B B B B	B A A A	D C C C	A B B A	A A A A	
Phosphoric Acid (molten) Photographic Developer Phthalic Anhydride Picric Acid Plating Solutions	A A A A	D A D B	A A D D	D A D A	D B A A	D A C D	D A A A	A A A A	A A A A	A A A B	A A C B	C C A B	A C A A	D A A A	A D B D	D A A A	A A A A	A A B B	A A A C	A A A D	A A A A	A B A B	A A A B	A B B B	A C B B	A A A A	B A A B	A A A A	A D D D	A A A A	A A A A	
Antimony Plating 130F Arsenic Plating 110F Brass Plating: Reg Brass Bath 100F High Speed Brass Bath	B B B B	A A A A	A A A A	A A A A	A A A A	A A A A	D A A A	A A A A	A A A A	A A A A	A A A A	B B B B	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	
Bronze Plating: Cu-Cd Bronze Bath R.T. Cu-Sn Bronze Bath 160F Cu-Zn Bronze Bath 100F Cadmium Plating:	B C B B	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	B B B B	A C D A	D D D A	A A A A	A A A A	A A A A	A A A A	A A A A	C D C C	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	C D C C	A A A A	
Cyanide Bath 90F Fluoborate Bath 100F Chromium Plating: Chromic-Sulfuric Bath Fluosilicate Bath 95F	B B C C	A A A A	A A A A	A A A A	A A A A	A A A A	D D D D	A A A A	A A A A	A A A A	A A A A	B B B B	A D C C	A A A A	A A A A	D D D D	A A A A	A A A A	A A A A	C D B B	A A A A	A A A A	A A A A	D D D D	D D D D	A A A A	A A A A	A A A A	A A A A	A A A A	C D A B	
Fluoride Bath 130F Black Chrome Bath 115F Barrel Chrome Bath 95F Copper Plating (Cyanide): Copper Strike Bath 120F	C C C B	A A A A	A A A A	A A A A	A A A A	D D D A	D D D A	A A A A	A A A A	A A A A	D C D A	D A D C	A A A A	C A A A	D C C C	A A A A	A A A A	A A A A	A A A A	B A A C	C C C C	D C C C	D D D D	D D D D	D D D D	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	B A A C
Rochelle Salt Bath 150F High Speed Bath 180F Copper Plating (Acid): Copper Sulfate Bath R.T. Copper Fluoborate Bath	C C D D	A A A A	D D A A	D D A A	A A A A	A A A A	B B D C	A A A A	A A A A	A A A A	A A A A	C C D D	D A D D	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	D D D A	A A A A	A A A A	B B A B	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	D D A D	
Copper Plating (Misc.) Copper Pyrophosphate Copper (Electroless) Gold Plating: Cyanide 150F	B B D D	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	B B B A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	B A A A	A A A A	D D D D	D D D D	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	B A A B	
Neutral 75F Acid 75F Indium Sulfamate Plating R.T. Iron Plating: Ferrous Chloride Bath	A A A D	A A A A	A A A A	A A A A	A A A A	A A A A	D D D A	A A A A	A A A A	A A A A	C C C A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A	A A A A
Ferrous Sulfate Bath Ferrous Am Sulfate Bath Sulfate-Chloride Bath Fluoborate Bath Sulfamate	D D D D A	A A A A A	D D D D A	D D D D A	A A A A A	A A A A A	D D D D A	A A A A A	A A A A A	A A A A A	C C C D A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	B B B B A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	
Lead Fluoborate Plating Nickel Plating: Watts Type 115-160F High Chloride 130-160F Fluoborate 100-170F	A D D A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	D D D D A	A A A A A	A A A A A	A A A A A	C C C C A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	D A A D	
Sulfamate 100-140F Electroless 200F Rhodium Plating 120F Silver Plating 80-120F Tin-Fluoborate Plating 100F	A B A A A	A D A A A	A D A A A	D D A A A	A D A A A	A D A A A	D D D D A	A D A A A	A D A A A	A D A A A	C C D C A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	D D D D A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	
Tin-Lead Plating 100F Zinc Plating: Acid Chloride 140F Acid Sulfate Bath 150F Acid Fluoborate Bath RT	A D D A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	D D D D A	A A A A A	A A A A A	A A A A A	C C C C A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	D A A D	
Alkaline Cyanide Bath RT Potash Potassium Bicarbonate Potassium Bromide Potassium Carbonate	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	A A A A A	

*Delrin, Hypalon, Teflon, Viton - Reg TM E. I. Du Pont de Nemours & Co.

*Chemraz - Reg TM Green, Tweed & Co., Inc.

*Ryton - Reg TM Phillips Petroleum Co.

*Cyclac - Reg TM Borg-Warner Corp.

*Aflas - Reg TM Asahi Glass Co., Ltd. (This chart is available upon request)



Chemical Compatibility Table

Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data																															
	Epoxy	Polypropylene	Polyethylene	PVC	Cyclac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze	Cast iron	Aluminum	Hastelloy C	Carbon/ceramic	Cermagnet A	Viton*	Buna N	Neoprene	Nitrile	Natural rubber	Hypalon*	EPDM	Chemraz*	Silicone	Ceramic	Carbon/graphite
Potassium Chlorate	A	A	A	A	C	A	C	B	A	A	B	B	B	A	B	D	B	C	A	A	A	A	C	A	B	A	A	A	A	A	C
Potassium Chloride	A	A	A	A	A	D	B	A	A	A	B	B	B	A	D	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A
Potassium Chromate	A	A	A	A	A	D	B	A	C	A	B	B	B	A	D	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A
Potassium Cyanide Solutions	A	A	A	A	A	D	B	A	C	A	B	B	B	A	D	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A
Potassium Dichromate	A	A	A	A	A	D	B	A	C	A	B	B	B	A	D	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A
Potassium Ferrocyanide	A	A	A	B	C	C	B	D	A	A	B	B	C	A	D	D	C	B	B	A	A	A	B	A	B	A	A	A	B	C	A
Potassium Hydroxide (Caustic Potash)	A	A	A	A	C	C	B	B	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	B	C	A
Potassium Nitrate	A	A	B	A	A	A	D	C	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Potassium Permanganate	A	A	A	A	C	A	D	C	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Potassium Sulfate	A	A	A	A	A	A	D	C	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Potassium Sulfide	A	A	A	A	A	A	D	C	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Propane (liquefied)	A	B	C	A	B	A	A	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Propylene Glycol	C	A	B	C	B	A	A	A	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Pyridine	A	A	B	D	A	A	C	A	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Pyrogallol Acid	A	A	A	A	A	A	D	C	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Rosins	A	A	B	C	A	A	A	B	A	A	A	A	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Rum	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Rust Inhibitors	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Salad Dressings	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sea Water	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Shellac (Bleached)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Shellac (Orange)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Silicone	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Silver Bromide	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Silver Nitrate	A	A	B	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Soap Solutions	A	A	C	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Soda Ash (see Sodium Carbonate)	A	A	B	B	A	A	B	B	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Acetate	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Aluminate	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Bicarbonate	A	A	A	A	B	A	A	A	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Bisulfate	A	A	A	A	C	A	A	B	A	A	B	D	D	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Bisulfite	A	A	A	A	B	D	C	B	A	A	B	B	C	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Borate	A	A	A	A	A	A	A	A	A	A	B	B	C	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Carbonate	C	A	B	A	C	A	B	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Chlorate	A	A	B	A	A	A	D	A	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Chloride	A	A	A	A	B	A	A	A	A	A	C	B	C	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Chromate	C	A	A	A	A	D	D	D	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Cyanide	A	A	A	A	A	A	D	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Ferrocyanide	A	A	A	A	A	A	D	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Fluoride	A	A	A	A	A	A	D	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hydrosulfite	A	A	A	A	C	C	A	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hydroxide (20%)	B	A	A	A	C	D	A	C	A	A	A	B	B	B	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hydroxide (50%)	A	A	B	A	C	D	A	C	A	A	A	B	B	B	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hydroxide (80%)	C	B	A	A	A	D	D	D	A	A	C	C	C	D	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hypochlorite (<20%)	A	A	A	A	A	D	D	D	A	A	A	C	C	D	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hypochlorite (100%)	D	B	B	C	A	D	D	D	A	A	D	D	D	C	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Hyposulfate	C	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Metaphosphate	A	A	A	B	A	A	A	B	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Metasilicate	A	A	A	A	A	A	A	D	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Nitrate	A	A	A	A	A	A	A	A	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Perborate	B	A	A	A	A	A	B	B	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Peroxide	C	B	A	B	A	D	A	D	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Polyphosphate	A	A	A	A	A	A	A	B	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Silicate	A	A	A	A	A	A	A	C	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Sulfate	A	A	A	A	A	A	A	B	A	A	B	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Sulfide	A	A	A	A	A	D	A	B	A	A	B	D	D	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Sulfite	A	A	B	A	A	A	D	A	A	A	B	A	C	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Tetraborate	A	A	A	A	A	A	B	C	A	A	A	A	C	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sodium Thiosulfate (hypo)	A	A	A	A	A	A	B	C	A	A	A	B	C	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sorghum	A	A	A	A	A	A	D	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Soy Sauce	A	A	A	A	A	D	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Stannic Chloride	A	A	A	A	A	A	B	C	A	A	D	D	D	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Stannic Fluoroborate	A	A	A	A	A	A	C	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Stannous Chloride	A	A	B	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Starch	A	A	A	A	A	A	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Stearic Acid	B	A	B	B	C	D	A	A	A	A	A	B	B	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Stoddard Solvent	A	C	C	C	D	D	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Styrene	A	A	A	A	A	D	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sugar (Liquids)	A	A	A	A	A	D	A	A	A	A	A	A	A	A	D	D	C	B	B	B	A	A	B	A	B	A	A	A	A	C	A
Sulfate (Liqu																															

Chemical Compatibility Table



Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data																																	
	Epoxy	Polypropylene	Polyethylene	PVC	Cyclac* (ABS)	Phenolic	Nylon	Delrin* (Acetal)	Ryton* to 200°F	Teflon*	Stainless steel (316)	Stainless steel (304)	Stainless steel (440)	Titanium	Cast bronze	Cast iron	Aluminum	Hastelloy C	Carbon/ceramic	Cermagnet A	Viton*	Buna N	Neoprene	Nitrile	Natural rubber	Hypalon*	EPDM	Chemraz*	Silicone	Ceramic	Carbon/graphite		
Sulfur Chloride	C	C	C	C	D	A	A	D	B	B	A	A	A	D	D	D	D	A	C	A	A	A	D	D	D	D	D	D	A	A	C	C	D
Sulfur Dioxide	A	A	A	A		A	A	B	B	B	A	A	A	A	D	D	D	D	A	C	A	A	D	D	D	D	D	D	A	A	A	C	A
Sulfur Dioxide (Dry)	A	A	A	A		A	A	B	B	B	A	A	A	A	D	D	D	D	A	C	A	A	D	D	D	D	D	D	A	A	A	C	A
Sulfur Hexafluoride	A	C	A	B	A	A	A	B	B	B	A	A	A	A	D	D	D	D	A	C	A	A	D	D	D	D	D	D	A	A	A	C	A
Sulfur Trioxide	A	C	A	B	A	A	A	B	B	B	A	A	A	A	D	D	D	D	A	C	A	A	D	D	D	D	D	D	A	A	A	C	A
Sulfur Trioxide (Dry)	A	D	C	A		D	A	D	D	A	A	A	D	D	D	D	D	D	B	B	A	A	D	D	D	D	D	B	B	A	A	D	
Sulfuric Acid (<10%)	A	A	A	A	A	D	D	D	A	A	A	D	D	D	D	D	D	D	B	B	A	A	D	D	D	D	D	B	B	A	A	D	
Sulfuric Acid (10-75%)	A	A	A	A	A	D	D	D	A	A	A	D	D	D	D	D	D	D	B	B	A	A	D	D	D	D	D	B	B	A	A	D	
Sulfuric Acid (75-100%)	C	C	D	B	D	D	D	D	A	A	A	D	C	D	D	D	D	D	B	B	A	A	D	D	D	D	D	B	B	A	A	D	
Sulfuric Acid (Hot Conc)	D	D	D	D		D	D	D	A	A	A	D	C	D	D	D	D	D	B	B	A	A	D	D	D	D	D	B	B	A	A	D	
Sulfuric Acid (Cold Conc)	D	A	C	B	A	D	D	C	A	A	A	B	C	C	D	D	D	D	B	B	A	A	D	D	D	D	B	B	A	A	D	A	
Sulfurous Acid	A	A	B	A		A	C	A	A	A	A	B	C	C	D	D	D	D	B	B	A	A	D	D	D	D	B	B	A	A	D	A	
Sulfuryl Chloride	A	A	A	A		A	C	A	A	A	A	B	C	C	D	D	D	D	B	B	A	A	D	D	D	D	B	B	A	A	D	A	
Tallow	A	A	C	B	A	A	C	A	B	A	A	A	B	B	A	A	A	A	B	A	A	A	A	B	A	A	B	A	A	B	A	A	
Tannic Acid	A	A	C	B	A	A	C	A	B	A	A	A	B	B	A	A	A	A	B	A	A	A	A	B	A	A	B	A	A	B	A	A	
Tanning Liquors	A	A	A	A		C	A	B	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	B	B	A	A	A	A	
Tartaric Acid	A	A	A	A		A	B	B	B	A	A	C	C	B	C	A	A	A	B	A	A	A	A	A	A	A	B	B	A	A	A	A	
Tetrachloroethane	A	C	B	C		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	D	B	A	A	A	A	
Tetrachloroethylene	A	C	B	C		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	D	B	A	A	A	A	
Tetrahydrofuran	A	C	B	C		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	D	B	A	A	A	A	
Tin Salts	B	A	C	A	D	A	A	C	B	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	B	B	B	A	A	
Toluene (Toluol)	A	A	A	A	D	A	A	C	B	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	B	B	B	A	A	
Tomato Juice	D	A	A	A		D	A	C	A	A	A	C	D	D	A	A	A	A	B	A	A	C	D	D	D	D	D	B	B	B	A	A	
Trichloroacetic Acid	A	C	B	C		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	B	B	B	A	A	
Trichloroethane	A	C	B	C		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	B	B	B	A	A	
Trichloroethylene	C	C	C	D	D	A	C	B	A	A	A	B	B	B	A	A	C	A	B	A	C	A	C	D	D	D	D	D	A	D	A	A	
Trichloropropane	A	A	A	B	D	D	A	A	C	A	A	A	B	A	A	A	A	A	B	A	A	A	D	D	D	D	D	D	A	D	A	A	
Tricresylphosphate	A	A	B	D		D	A	A	C	A	A	A	B	A	A	A	A	A	B	A	A	A	D	D	D	D	D	D	A	D	A	A	
Triethylamine	A	A	D	A		A	A	A	D	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	D	A	D	A	A	
Trisodium Phosphate	A	A	A	A		A	A	A	A	A	A	B	A	B		A	A	A	B	A	A	A	D	D	D	D	D	D	A	D	A	A	
Turpentine	B	B	C	B		A	A	A	A	A	A	A	B	B	C	A	D	A	B	A	A	A	D	A	D	D	D	D	A	D	A	A	
Urea	A	A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	D	A	D	D	D	D	A	D	A	A	
Uric Acid	A	A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	D	A	D	D	D	D	A	D	A	A	
Urine	A	A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	D	A	D	D	D	D	A	D	A	A	
Varnish	A	A	C	D		A	C	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	D	A	D	D	D	D	A	D	A	A	
Vegetable Juice	A	A	B	A	B	A	C	B	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	D	D	D	D	A	D	A	A	
Vinegar	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	C	D	D	D	A	D	A	A	
Water, Acid, Mine	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	C	D	D	D	A	D	A	A	
Water, Distilled	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	C	D	D	D	A	D	A	A	
Water, Fresh	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	C	C	D	D	D	A	D	A	A	
Water, Salt	A	A	A	A		A	A	A	A	A	A	B	B	C	A	D	A	B	C	A	A	A	C	C	C	D	D	D	A	D	A	A	
Weed Killers	A	A	A	A		A	A	A	A	A	A	B	B	C	A	D	A	B	C	A	A	A	C	C	C	D	D	D	A	D	A	A	
Whey	A	A	A	A		A	A	A	A	A	A	B	B	C	A	D	A	B	C	A	A	A	C	C	C	D	D	D	A	D	A	A	
Whiskey & Wines	B	A	C	A		A	A	A	A	A	A	B	B	C	A	D	A	B	C	A	A	A	C	C	C	D	D	D	A	D	A	A	
White Liquor (Pulp Mill)	A	A	A	A		A	A	A	A	A	A	B	B	C	A	D	A	B	C	A	A	A	C	C	C	D	D	D	A	D	A	A	
White Water (Paper Mill)	A	A	C	A	D	A	A	A	B	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	D	A	D	A	A	
Xylene	A	A	C	A	D	A	A	A	B	A	A	A	A	A	A	A	A	A	B	A	A	A	D	D	D	D	D	D	A	D	A	A	
Zinc Chloride	A	A	A	A		A	A	A	C	C	A	A	D	D	A	D	A	B	A	A	A	A	D	D	D	D	D	D	A	D	A	A	
Zinc Hydrosulfite	A	A	A	A		A	A	A	C	C	A	A	D	D	A	D	A	B	A	A	A	A	D	D	D	D	D	D	A	D	A	A	
Zinc Sulfate	A	A	A	A		A	A	A	C	C	A	A	D	D	A	D	A	B	A	A	A	A	D	D	D	D	D	D	A	D	A	A	

*Delrin, Hypalon, Teflon, Viton - Reg TM E. I. Du Pont de Nemours & Co.

*Chemraz- Reg TM Green, Tweed & Co., Inc.

*Ryton - Reg TM Phillips Petroleum Co.

*Cyclac - Reg TM Borg-Warner Corp.

*Aflas - Reg TM Asahi Glass Co., Ltd. (This chart is available upon request)