

CHEMICAL RESISTANCE GUIDE FOR VALVES & FITTINGS

This chemical resistance guide has been compiled to assist the piping system designer in selecting chemical resistant materials. The information given is intended as a guide only. Many conditions can affect the material choices. Careful consideration must be given to temperature, pressure and chemical concentrations before a final material can be selected. Thermoplastics and elastomers physical characteristics are more sensitive to temperature than metals. For this reason, a rating chart has been developed for each.

MATERIAL RATING FOR THERMOPLASTICS & ELASTOMERS

Temp. in °F = "A" rating, maximum temperature which material is recommended, resistant under normal conditions.

B to Temp. in °F = Conditional resistance, consult factory.

C = Not recommended.

Blank = No data available.

MATERIAL RATINGS FOR METALS

A = Recommended, resistant under normal conditions.

B = Conditional, consult factory.

C = Not recommended.

Blank = No data available.

Temperature maximums for thermoplastics, elastomers and metals should always fall within published temp/pressure ratings for individual valves. THERMOPLASTICS ARE NOT RECOMMENDED FOR COMPRESSED AIR OR GAS SERVICE. This guide considers the resistance of the total valve assembly as well as the resistance of individual trim and fitting materials. The rating assigned to the valve body plus trim combinations is always that of the least resistant part. In the cases where the valve body is the least resistant, there may be conditions under which the rate of corrosion is slow enough and the mass of the body large enough to be usable for a period of time. Such use should always be determined by test before installation of the component in a piping system. In the selection of a butterfly valve for use with a particular chemical, the liner, disc, and stem must be resistant. All three materials should carry a rating of "A". The body of a properly functioning butterfly valve is isolated from the chemicals being handled and need not carry the same rating.

ABS — (Acrylonitrile-Butadiene-Styrene) Class 4-2-2 conforming to ASTM D1788 is a time proven material. The smooth inner surface and superior resistance to deposit formation makes ABS drain, waste, and vent material ideal for residential and commercial sanitary systems. The residential DWV system can be exposed in service to a wide temperature span. ABS-DWV has proven satisfactory for use from -40°F to 180°F. These temperature variations can occur due to ambient temperature or the discharge of hot liquids into the system. ABS-DWV is very resistant to a wide variety of materials ranging from sewage to commercial household chemical formulations. ABS-DWV is joined by solvent cementing or threading and can easily be connected to steel, copper, or cast iron through the use of transition fittings.

CPVC — (Chlorinated Polyvinyl Chloride) Class 23447-B, formerly designated Type IV, Grade 1 conforming to ASTM D-1784 has physical properties at 73°F similar to those of PVC, and its chemical resistance is similar to or generally better than that of PVC. CPVC, with a design stress of 2000 psi and maximum service temperature of 210°F, has proven to be an excellent material for hot corrosive liquids, hot and cold water distribution, and similar applications above the temperature range of PVC. CPVC is joined by solvent cementing, threading or flanging.

P.P. (Polypropylene) — (PP) Type 1 Polypropylene is a polyolefin which is lightweight and generally high in chemical resistance. Although Type 1 polypropylene conforming to ASTM D-2146 is slightly lower in physical properties compared to PVC, it is chemically resistant to organic solvents as well as acids and alkalies. Generally, polypropyl-

ene should not be used in contact with strong oxidizing acids, chlorinated hydrocarbons, and aromatics. With a design stress of 1000 psi at 73°F, polypropylene has gained wide acceptance where its resistance to sulfur-bearing compounds is particularly useful in salt water disposal lines, crude oil piping, and low pressure gas gathering systems. Polypropylene has also proved to be an excellent material for laboratory and industrial drainage where mixtures of acids, bases, and solvents are involved. Polypropylene is joined by the thermo-seal fusion process, threading or flanging. At 180°F., or when threaded, P.P. should be used for drainage only at a pressure not exceeding 20 psi.

PVC — (Polyvinyl Chloride) Class 12454-B, formerly designated Type 1, Grade 1. PVC is the most frequently specified of all thermoplastic materials. It has been used successfully for over 30 years in such areas as chemical processing, industrial plating, chilled water distribution, deionized water lines, chemical drainage, and irrigation systems. PVC is characterized by high physical properties and resistance to corrosion and chemical attack by acids, alkalies, salt solutions, and many other chemicals. It is attacked, however, by polar solvents such as ketones, some chlorinated hydrocarbons and aromatics. The maximum service temperature of PVC is 140°F. With a design stress of 2000 psi, PVC has the highest long term hydrostatic strength at 73°F of any of the major thermoplastics being used for piping systems. PVC is joined by solvent cementing, threading, or flanging.

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PVDF — (KYNAR®) (Polyvinylidene Fluoride) is a strong, tough and abrasion resistant fluorocarbon material. It resists distortion and retains most of its strength to 280°F. It is chemically resistant to most acids, bases, and organic solvents and is ideally suited for handling wet or dry chlorine, bromine and other halogens. No other solid thermoplastic piping components can approach the combination of strength, chemical resistance and working temperatures of PVDF. PVDF is joined by the thermo-seal fusion process, threading or flanging.

EPDM — EPDM is a terpolymer elastomer made from ethylenepropylene diene monomer. EPDM has good abrasion and tear resistance and offers excellent chemical resistance to a variety of acids and alkalines. It is susceptible to attack by oils and is not recommended for applications involving petroleum oils, strong acids, or strong alkalines. It has exceptionally good weather aging and ozone resistance. It is fairly good with ketones and alcohols and has an excellent temperature range from -20°F to 250°F.

HYPALON® (CSM) — Hypalon has very good resistance to oxidation, ozone, and good flame resistance. It is similar to neoprene except with improved acid resistance where it will resist such oxidizing acids as nitric, hydrofluoric, and sulfuric acid. Abrasion resistance of Hypalon is excellent, about the equivalent of the nitriles. Oil and solvent resistance is somewhat between that of neoprene and nitrile. Salts have little if any effect on Hypalon. Hypalon is not recommended for exposure to concentrated oxidizing acids, esters, ketones, chlorinated, aromatic and nitro hydrocarbons. Hypalon has a normal temperature range of -20°F to 200°F.

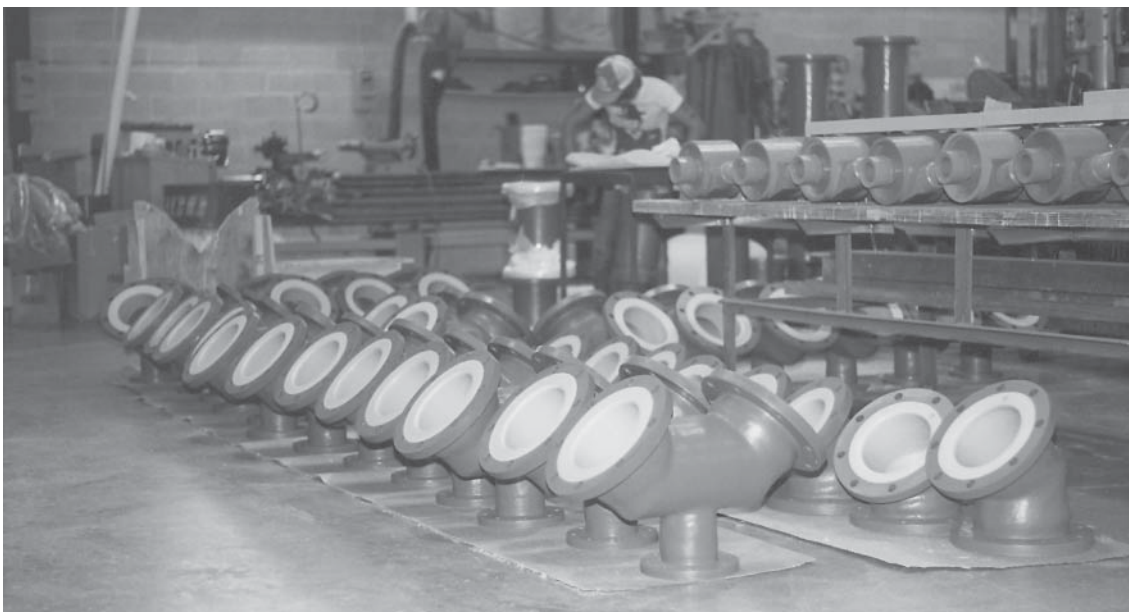
NEOPRENE (CR) — Neoprenes were one of the first synthetic rubbers developed. Neoprene is an all purpose polymer with many desirable characteristics and features high resiliency with low compression set, flame resistance, and is animal and vegetable oil resistant. Neoprene is principally recommended for food and beverage service. Generally, neoprene is not affected by moderate chemicals, fats, greases, and many

oils and solvents. Neoprene is attacked by strong oxidizing acids, most chlorinated solvents, esters, ketones, aromatic hydrocarbons, and hydraulic fluids. Neoprene has a moderate temperature range of -20°F to 160°F. **NITRILE (NBR) — (BUNA-N)** is a general purpose oil resistant polymer known as nitrile rubber. Nitrile is a copolymer of butadiene and acrylonitrile and has a moderate temperature range of -20°F to 180°F. Nitrile has good solvent, oil, water, and hydraulic fluid resistance. It displays good compression set, abrasion resistance and tensile strength. Nitrile should not be used in highly polar solvents such as acetone and methyl ethyl ketone, nor should it be used in chlorinated hydrocarbons, ozone or nitro hydrocarbons.

FLUOROCARBON (FKM) (VITON®) (FLUOREL®) — Fluorocarbon elastomers are inherently compatible with a broad spectrum of chemicals. Because of this extensive chemical compatibility, which spans considerable concentration and temperature ranges, fluorocarbon elastomers have gained wide acceptance as a material of construction for butterfly valve O-rings and seats. Fluorocarbon elastomers can be used in most applications involving mineral acids, salt solutions, chlorinated hydrocarbons, and petroleum oils. They are particularly good in hydrocarbon service. Fluorocarbon elastomers have one of the broadest temperature ranges of any of the elastomers, -20°F to 300°F, however, are not suitable for steam service.

TEFLON® (PTFE) — Polytetrafluoroethylene has outstanding resistance to chemical attack by most chemicals and solvents. PTFE has a temperature rating of -20°F to 400°F in valve applications. PTFE, a self lubricating compound, is used as a seat material in ball valves.

VITON is a registered trademark of the DuPont Company
 TEFLON is a registered trademark of the DuPont Company
 HYPALON is a registered trademark of the DuPont Company
 KYNAR is a registered trademark of the Pennwalt Company
 FLUOREL is a registered trademark of the 3M Company



CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)											METALS																		
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NI/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C	
Acetaldehyde CH ₃ CHO	Conc.			120	C	C	350	200	C	C	C	C	B	C	C	C	C	C	B	B	A		B	B	A		A	A	A	A	A
Acetamide CH ₃ CONH ₂				73		75	350	200	C	C	C	C	B		A		A		A	A			A	A	A	A	A	A	A	A	
Acetic Acid CH ₃ COOH	25%	73	180	140	200	350	140	C	200	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	
Acetic Acid CH ₃ COOH	60%	73		73	175	350	140	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	
Acetic Acid CH ₃ COOH	85%		C	120	73	150	350	140	C		C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	
Acetic Acid CH ₃ COOH	Glacial		C	120	73	120	350	140	C		C	C	C	C	C	C	C	C	C	C	C	C	C	A	B	A	A		A		
Acetic Anhydride (CH ₃ CO) ₂ O					C	C	350	C	70	200	B 70	C	B	C	C	C	C	C	C	C	C	C	C	B	B	B	B		A		
Acetone CH ₃ COCH ₃			C	73	C	C	350	130	C	B 70	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Acetophenone C ₆ H ₅ COCH ₃				120		C	350	140	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C						
Acetyl Chloride CH ₃ COCl		C				125	200	C	C	C	C	185	C	A	A	A	A	A	C	C	A		C		A	A	A	A			
Acetylene HC≡CH	Gas 100%	70		73	140	250	250	200	140	70	70	200	A	C	C	C	C	C	A	A	A	A	A	A	A	A	A	A	A	A	
Acrylonitrile			C		C	150			C	C		70	C																		
Acrylic Acid H ₂ C=CHCOOH	97%				C	150	200																								
Acrylonitrile H ₂ C=CHCN			C		C	73	350	C	C	140	C	C	B		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Adipic Acid COOH(CH ₂) ₄ COOH	Sat'd		185		140	150	350	200	180	140	160	250	B	A					C	C	B		C		B	200		B	B	200	
Allyl Alcohol CH ₂ =CHCH ₂ OH	96%			73	125	250	70	160	200	B 70	185				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Allyl Chloride CH ₂ CHCH ₂ Cl				C	212	350	C	C				70	C								C										
Aluminum Acetate Al(C ₂ H ₄ O ₂) ₃	Sat'd					275	350	200	B 70	C	C	C	C		C					C							A		A	B	
Aluminum Ammonium Sulfate (Alum) AlNH ₄ (SO ₄) ₂ ·12H ₂ O	Sat'd			150	140	275	250	200	140			200	A	B	B	B	B	B			C			B	A		A	A			
Aluminum Chloride Aqueous AlCl ₃	Sat'd		185	180	140	280	250	210	70	200	160	250	A	C	C	C	C	C	C	C	C	C	C	C	C	A	C	A	A		
Aluminum Fluoride Anhydrous AlF ₃	Sat'd			73	280	250	210	180	200	160	250		C	C	C	C	C	C	C	C	C	C	C	C	B	C	B	A			
Aluminum Hydroxide AlO ₃ ·3H ₂ O	Sat'd		185		140	280	250	210	180		100	200		C	C	C	C	C	B	B	C		B	B	A	A	A	B			
Aluminum Nitrate Al(NO ₃) ₃ ·9H ₂ O	Sat'd		185	180	140	280	250	210	180	100	100	100	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	C			
Aluminum Oxychloride					140	275						C																			
Aluminum Potassium Sulfate (Alum) AlK(SO ₄) ₂ ·12H ₂ O	Sat'd			150	140	280	400	200	180	200	160	200	A	B	B	B	B	B			C			B	A		A	A			
Aluminum Sulfate (Alum) Al ₂ (SO ₄) ₃	Sat'd		185	180	140	280	250	210	200	160	140	185	C	C	C	C	C	C	C	C	C	C	C	C	C		B			A	
Ammonia Anhydrous NH ₃						250	200				100	C		C	C	C	C	C	A		A				A	A	A	A	A		
Ammonia Gas NH ₃	100%		185	150	140	C	400	140	140	140	140	C	B	B	B			C	A		A				A	A	A	A	A		
Ammonia Liquid NH ₃	100%			73	C	C	400	210	B 70	70	70	C	A	C	C	C	C	C			A			A	A	A	A	A	A		
Ammonium Acetate NH ₄ (C ₂ H ₃ O ₂)	Sat'd			73	140	175	400	140		140	140				C	C	C	C							B			B			
Ammonium Bifluoride NH ₄ HF ₂	Sat'd		185		140	150	400	200	180			200		B 70	C			C	C	C	C	C	C	C	B	B	B	B			
Ammonium Bisulfide (NH ₄)HS					140	280	400		180																						
Ammonium Carbonate CH ₂ O ₃ ·2H ₃ N	Sat'd			180	140	280	400	210		140	140	250	B 212	B 70	C			C			A	140	C		B	B	B	B	B	A	



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		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NIKEL	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C	
Ammonium Chloride NH4Cl	Sat'd		185	180	140	280	400	210	180	200	160	250	B		C			C	C	C	C	C	C	B	C	C	B	B		B	
Ammonium Dichromate (NH4)2Cr2O7					73	250		70	100	100	100																				
Ammonium Fluoride NH4F	10%				140	280	400	210	100	200	100		C	C	C			C			C				C						
Ammonium Fluoride NH4F	25%				73	280	400	140					C	C	C			C			C			C							
Ammonium Hydroxide NH4OH	10%		185	180	140	225	400	210	B 70	200	70	70	B	C	C	C		C			C		B	A	A	A	A	B		A	
Ammonium Nitrate NH4NO3	Sat'd	175	185	180	140	280	400	250	180	200	160	100		C	C	C		C							A	A	A			A	
Ammonium Persulphate (NH4)2S2O8			73	150	140	73	200	210		70	70		C	C	C	C	C	C	C	C	C	C	B	A			A	C		A	
Ammonium Phosphate (Monobasic) NH3H3PO4	All				140	280	400	210	100	140	140	185	B	C	C	C	C	C	B	B	C		B	A	A	A	A	B		A	
Ammonium Sulfate (NH4)2SO4			185	180	140	280	400	210	180	200	160	200	C	C	C	C	C	C	B	B	C	B	B	B	B	B	A	B		A	
Ammonium Sulfide (NH4)2S	Dilute				125	350	210	140	200	160			A	C	C	C	C	C	C	C	C		C		B		B	B			
Ammonium Thiocyanate NH4SCN	50-60%				140	275			70	70	70	185	B	C	C	C	C	C	C	C	C		C		A	A	A	B		A	
Amyl Acetate CH3COOC5H11				C	C	125	100	B 70	C	C	C	C	A		B	B	B	B	B	B	B	A	B	A	A	A	A	A	A	A	
Amyl Alcohol C5H11OH			73	180	C	280	400	210	B 140	200	140	185		A	A	A	A	A	A	A	A	B	B	A	A	A	A	A	A		
n-Amyl Chloride C5H11Cl					C	280	400	C	C	C	C	200	C		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Aniline C6H5NH2			C	180	C	120	200	140	C	70	C	C	C	C	C	C	C	C	B	B	C	B	B	A	A	A	A	B		A	
Aniline Chlorohydrate					C																										A
Aniline Hydrochloride C6H5NH2·HCl	Sat'd		C		C	75				C	C	185			C	C	C	C	C	C	C	C	C	C	C	C		A			
Anthraquinone C14H8O2					140							200							C	C	C										
Anthraquinone Sulfonic Acid C14H7O2·SO3H·3H2O					140							200																			
Antimony Trichloride SbCl3	Sat'd			180	140	73		140	140	140	140	185	C		C	C	C	C	C	C	C	C	C	C	C	C	C	A	A		
Aqua Regia (Nitrohydrochloric Acid) CHHNO3			73		C	73	200	C	C	B 70	C	100	C		C	C	C	C	C	C	C	C	C	B	A	B	B			B	
Argon Ar	Dry					350	200			100	200		A	A		A		A		A				A	A		A	A			
Arsenic Acid H3AsO4·1/2H2O	80%		185		140	280	400	185	160	200	180	200	C		C	C	C	C	C	C	C	C	C	B	A	B	A	A		A	
Aryl Sulfonic Acid C6H5SO3H					140			140				185																			
Asphalt			C		C	250	350	C	B 70	C	C	180	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		A
Barium Carbonate BaCO3	Sat'd				140	280	400	250	180	200	160	250			A	A	A	A	A	B	B	B	B	B	A	A	A	A			
Barium Chloride BaCl2·2H2O	Sat'd				140	280	400	250	180	200	160	300		A	A	A	A	A	B	B	C	B	B	B	A		A	A			
Barium Hydroxide Ba(OH)2	Sat'd				140	280	400	200	180	200	140	300			C	C	C	C	B	B	C		B	A	A	A	A	A		A	
Barium Nitrate Ba(NO3)2	Sat'd				73	275	250	200	180	200	160	300			C	C	C	C	A	A	A		A		A		A				
Barium Sulfate BaSO4	Sat'd		185		140	280	400	200	100	200	160	300			B	B	B	B	B	B	B	A	B	A	A	A	A	A			
Barium Sulfide BaS	Sat'd				140	280	400	140	C	200	160	300			C	C	C	C	C	B	B	C	B	A	A	A	A	A			
Beer		C		180	140	200	300	200	70	200	140	200	A	A	A	A	A	A	A	C	C	C	C	A	A	A	A	A			

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		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNAN	HYPALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NI/IRON	NI PLATED DUCTILE	400-SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C	
Beet Sugar Liquors				180	140	225		210	100	200	160	185	A				A		B	B	B				A	A	A	A	A		
Benzaldehyde C6H5CHO	10%	C		73	73	70		140	C	C	C	C		A	A	A	A	A	C	C	B		C	A	A	A	A	A	B		A
Benzene C6H6		C	C	C	C	170	250	C	C	C	C	150		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Benzene Sulfonic Acid C6H5SO3H	10%			180	140	125		C	C	180	100	185			B	B	B	B	C	C	C		C	B	B	B	A	A			
Benzoic Acid C6H5COOH	All			73	140	230	350	C	C	200	160	200			C	C	C	C	C	C	C		C	A	A	A	A	A		A	
Benzyl Alcohol C6H5CH2OH				150	C	250		C	C	140	B to 140	B to 140		A	A	A	A	A	B	B	B		B	A	A	A	A	A	A		
Bismuth Carbonate (Bi)2CO3				140				70	100	70																					
Black Liquor	Sat'd		185	140	175	225	180	180	70	70	200			C	C	C	C	B	B	B		B	B	A	B	A	B				
Bleach	5% Active Cl2		180	120	140	280	200	140	C			185			C	C	C	C	C	C	C		C	B	A	B	A	A		A	
Bleach	12% Active Cl2	C	180	C	140	280	200	140	C	70		185			C	C	C	C	C	C	C		C	B	A	B	A	A		A	
Blood						200		70	70	70	70			B		B		C	C			B		A	A	A	A		A		
Borax Na2B4O7·10H2O	Sat'd			180	140	280		210	140	200	140	185			A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A
Boric Acid H3BO3	Sat'd		185	180	140	280		210	140	200	140	185			B	B	B	B	C	C	B		C	B	A	B	A	A		A	
Brake Fluid						300	140	C				C			B				B	B	A		B	A	A	A	A				
Brine	Sat'd		185	180	140	280	400	250	180	180	160	300			A	A	A		C	C	C	B	C	B	A	B	A	A		A	
Bromic Acid HBrO3			185		140	200		70				70	C	C	C	C	C	C													
Bromine Br2	Liquid	C		C	C	150		C	C	70	C	70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		A
Bromine Br2	Vapor	C		C	140	150		C	C	70	C	70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A		A
Bromine Water	Cold Sat'd	C		C	140	212		C	C	70	C	185	C	C	C	C	C	C	C	C	C		C								
Bromotoluene C7H7Br					C	150		C				150																			
Bromotoluene C6H5CH2Br				C	C	175																									
Butadiene H2C=CHC=CH2	50%		73		140	250	350	C	C	B to 140	140	185	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Butane C4H10	50%			73	140	250	350	C	70	200	70	185	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Butyl Acetate CH3COOCH2CH3 (C2H5)			73	C	C	73	175	140	C	C	C	C			B	B	B	B	B	B	B		B	A	A	A	A	A		A	
Butyl Alcohol CH3(CH2)2CH2OH		C	73	100	100	225	300	200	B to 140	140	140	75		B	B	B	B			B			A	A	A	A	A				
Butyl Cellosolve HOCH2CH2OC4H9					73			200	140	C	100				A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	
n-Butyl Chloride C4H9Cl					280	400		C	C	C	C	100			B	B	B	B	B	B	B		B	B	B	B	B	B			
Butylene (C) CH3CH=CHCH3	Liquid				140	280	400	C	70	C	C	100			A	A	A	A			A			A	A	A	A	A	A	A	
Butyl Phenol C4H9C6H4OH					73	230			B to 70	C																					
Butyl Phthalate				180								70																			
Butyl Stearate CH3(CH2)16CO2(CH2)3CH3					73	100	250	C	100			185			A	A	A	A	B	B			B	A	A	A	A				
Butyrolidic HOCH2C=CCH2OH					73					100	B to 70																				

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)											METALS																				
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNAN	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% N/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C			
Butyric Acid CH ₃ CH ₂ COOH				180	73	230	300	140		C	C	70			A	A	A	A	C	C	C	C	C	B	A	A	A	A					
Cadmium Cyanide Cd(CN) ₂			185		140							70																					
Calcium Bisulfide Ca(HS) ₂ ·6H ₂ O					C	280	200		100	C		185													A		A						
Calcium Bisulfite Ca(HSO ₃) ₂			185	180	140	280	350		C	70	200	70	185		C	C	C	C	C	C	C	C		C	B	A		A	C		A		
Calcium Carbonate CaCO ₃			185	180	140	280	350	210	100	70	70	70	300		A	C	C	C	C	B	B	B		B	A	A	A	A	A		A		
Calcium Chlorate Ca(ClO ₃) ₂ ·2H ₂ O					140	280	350	140	70	70	70	185		C	B	B	B	B	B	B	B	B	B	B	B	A		A	A				
Calcium Chloride CaCl ₂		100	185	180	140	280	350	210	100	200	160	250		B	B	B	B	B	A	A	C		C	B	A	B	A	A	B	A			
Calcium Hydroxide Ca(OH) ₂			185	180	140	280	250	210	140	200	70	250	C	C	C	C	C	C	C	C	C	C		C	A	A	A	A	A		A		
Calcium Hypochlorite Ca(OCl) ₂	30%		185	150	140	200	200	70	C	140		185	C	C	C	C	C	C	C	C	C	C		C	B	B	B	B	C		B		
Calcium Nitrate Ca(NO ₃) ₂				180	140	280	200	210	180	100	100	200		B	B	B	B	B	B	B	B		B		A		A	A					
Calcium Oxide CaO					140	250		210	180	200	160								A	A	B				A	A	A						
Calcium Sulfate CaSO ₄		100			140	280	200	210	180	200	160	200		A	A	B	B	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	
Camphor C ₁₀ H ₁₆ O		C			73		350	210	100	70	C	250			B	B	B	B	B	B	B	B		B	A	A	A	A	B				
Cane Sugar C ₁₂ H ₂₂ O ₁₁				73	140	275	400	250	180	100	160	200			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Caprylic Acid CH ₃ (CH ₂) ₆ COOH					175	350													A	A	B		A		A		A						
Carbitol				73		200	70	70	70	70	100			B	B	B	B	B	B	B	B		B		B		B	B					
Carbon Dioxide CO ₂	Dry 100%	100	185	150	140	280	400	200	180	200	160	200	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Carbon Dioxide CO ₂	Wet	100	185	150	140	280	400	210	180	200	160	200	A	A	A	A	A	A	B	B	B	B	B	A	A	A	A	A	A	A	A	A	
Carbon Disulfide CS ₂				C	C	73	200		B to 70	C	C	70		C	B	B	B	B	A	A	A		A	A	A		A	A				A	
Carbon Monoxide CO	Gas		185		140	275	400	250	70	200	70	250	A		A	A	A	A	A	A	A	B		A	A	A	A	A	A			A	
Carbon Tetrachloride CCl ₄		C	73	C	73	280	350	C	C	C	C	185		B	A	A	A	A	C	C	A		C	A	A	A	A	A	A			A	
Carbonic Acid H ₂ CO ₃	Sat'd		185		140	280	350	210	180	70	70	200			C	C	C	C	B	B	B	B	B	B	A	A	A	A	A	B			
Castor Oil			185		140	280	350	140	140	150	100	140	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Caustic Potash KOH	50%		185		140	280	350	200	180	200	160	C									B			A	A	A	A	A					
Caustic Soda NaOH (Sodium Hydroxide)	Up to 40%	70	210	180	100	C	350	180	C	140	160	C	C	B	B	C	C	C	C	B	B	B	B	B	A	A	A	A	A				
Cellosolve C ₄ H ₁₀ O ₂					73	280	200	140	C	70		C			A	A	A	A	A	A	A		A		A		A			A			
Cellulosolve Acetate CH ₃ COOCH ₂ CH ₂ O C ₂ H ₅					73		300	140	C	C	C	C	B		B						B					B		B				A	
Chloral Hydrate CCl ₃ CH(OH) ₂	All				140	75				70	B to 70	C																					
Chloramine NH ₂ Cl	Dilute				73					70	70				B	B	B	B	C	C	C				B		B	B					
Chloric Acid HClO ₃ ·7H ₂ O	10%				140		140			200	140	140			C	C	C	C	C	C	C	C	C	C	C	B	C	A	C				
Chloric Acid HClO ₃ ·7H ₂ O	20%				140		140					100			C	C	C	C	C	C	C	C	C	C	C	C	C	A	C				
Chlorine Gas (Dry) (Moisture Content)	0-20 PPM			C	73	200	400	C	C	C	C	185	C	C	C	C	C	C	C	B	A*	A*	B	B	B	A		A	A			A	

Note: * Ratings are for body material only.

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)											METALS																		
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% N/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C	
Chlorine Gas (Moisture Content)	20-50 PPM	C		C	C	200	400	C	C		C	185	C	C	C	C	C	C	C	C	A*	C	C	C	A*		C	A		A	
Chlorine Gas (Moisture Content)	50+ PPM	C		C	C	200	400	C	C		C	185	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A		A	
Chlorine	Liquid	C	C	C	C	200		C		B to 70	C				B	B		B	C	C	C		C	C	C	C					
Chlorinated Water	10 ppm		73		140	230	400	210	140	B to 70	C	185	C	C	B	B	C	C			C		C	B	A	A	A	A		A	
Chlorinated Water	Sat'd		73		140	230	400	70	C	B to 70	C	185	C	C	C	C	C	C			C		C	A	B	A	B		A		
Chloroacetic Acid CH ₂ ClCOOH	50%				140	C	200	70	C	200	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B			
Chloroacetyl Chloride ClCH ₂ COCl					73	125																									
Chlorobenzene C ₆ H ₅ Cl	Dry			73	C	170	200	C	C	C	C	70			A	A	A	A	C	C	B		C	A	A	A	A	A		A	
Chlorobenzyl Chloride ClC ₆ H ₄ CH ₂ Cl					C	125																			A		A				
Chloroform CHCl ₃	Dry		C	C	C	125	200	C	C	C	C	70			A	A	A	A	C	C	C		C	A	A	A	A	A	A		
Chloropicrin CC13NO ₂					C	150																									
Chlorosulfonic Acid ClSO ₂ OH				C	73	C	200	C	C	C	C	C	C	C	C	C	C	B	B	C	C	C	B	C	C	C	B	A		A	
Chromic Acid H ₂ CrO ₄	10%		210	150	140	175	350	70	C	140		100	C	C	C	C	C	C	C	C	C	C	C	C	B to 212	A to 70		A to 125	B		A
Chromic Acid H ₂ CrO ₄	30%		210	150	140	175	350	C	C	140		100	C	C	C	C	C	C	C	C	C	C	C	C	B to 212	B to 70		A to 125	C		A
Chromic Acid H ₂ CrO ₄	40%		210	150	140	175	300	C	C	140		140	C	C	C	C	C	C	C	C	C	C	C	C	C	B to 70			C		A
Chromic Acid H ₂ CrO ₄	50%		210	C	C	180	200	C	C	140		140	C	C	C	C	C	C	C	C	C	C	C	C	B to 70		B to 212	C		B	
Chromium Potassium Sulfate CrK(SO ₄) ₂ ·12H ₂ O			73	140	73	200		140	180	200	160	200									C				B	B	A	B			
Citric Acid C ₆ H ₈ O ₇	Sat'd		185	180	140	275	200	210	70	140	140	200		C	C	C	C	C	C	C	C	C	C	C	B	A	A	A	A		A
Cocunut Oil				73	140	280	400	C	70	B to 140	100	185			B	B	B	B	C	C	B		C	B	A		A	B			
Coffee								140	100		200		A	A	A	A	A	A	C	C	C		A	A	A	A	A	A		A	
Coke Oven Gas				73	140	230	400	70	B to 70	140		185			B	B	B	B	A	A	A	A	A	A	A	A	A		B		
Copper Acetate Cu(C ₂ H ₃ O ₂) ₂ ·H ₂ O	Sat'd		73	73	73	250	350	100	180	C	160	140			C	C	C	C	C	C	C		C	B	A		A	B		A	
Copper Carbonate CuCO ₃	Sat'd				140	280	350	210				185												B	A		A	A			
Copper Chloride CuCl ₂	Sat'd		185		140	280	350	210	180	200	160	200	C	C	C	C	C	C	C	C	C	C	C	C	B	A		A	B		A
Copper Cyanide Cu(CN) ₂			185		140	275	350	210	180		160	185		C	C	C	C	C	C	C	C	C	A	C	B	A		A	B		
Copper Fluoride CuF ₂ ·2H ₂ O	2%				140	280		210	B to 70	140	140	185																			
Copper Nitrate Cu(NO ₃) ₂ ·3H ₂ O	30%				140	280		210	B to 70	200	160	200	C	C	C	C	C	C	C	C	C		C	B	A		A	C			
Copper Sulfate CuSO ₄ ·5H ₂ O	Sat'd		185	120	140	280		210	180	200	160	200	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	C		A
Corn Oil			C	73	73	275	400	C	180	C	C	300		A	B	B	B	B	B	B	B	B	B	B	A	A	A	A	B		
Corn Syrup				150	140	250			100	200	100	185																			
Cottonseed Oil			185	150	140	280	400	C	180	200		185		A	B	B	B	B	B	B	B	B	B	A	A	A	A	B			
Creosote			73		73		350	C	73	73	C	73		B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)											METALS																							
	CONCENTRATION	ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNAN	HYPALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% N/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C					
Dioxane O-(CH ₂) ₄ -O		C		73	C	C		70	C	C	C	C						A	A	A	A	A													
Diphenyl Oxide (C ₆ H ₅) ₂ O	Sat'd					125		C	C		C	300						A	A	A	A	A													
Disodium Phosphate Na ₂ HPO ₄			185		140	200	400	210	100	140								B	B	B	B	B				A				A	B				
Dow Therm A C12H10-C12H10O					C		212	C	C	C	C	C						A	A	A	A	B	A	A	A	A	A	A	A	A	A	A			
Ether C ₄ H ₁₀ O			C	73	C	125			C	C	C	C		A	A	A	A			B	B	B	A	A	A	A	A	A	A	A	A	A			
Ethyl Acetate CH ₃ COOC ₂ H ₅		C		120	C	C	200	70	C	C	C	C						A	A	B		A	A					A	A	A	A	B	A		
Ethyl Acetoacetate CH ₃ COCH ₂ COOC ₂ H ₅		C			C	73	200	100	C			C																							
Ethyl Acrylate CH ₂ CHCOOC ₂ H ₅			C		C	73	350	70	C	C	C	C						A	A		A	A	A	A	A	A	A	A	A	A	A	A	A		
Ethyl Alcohol (Ethanol) C ₂ H ₅ OH			140	180	140	280	300	170	180	200	70							A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Ethyl Benzene C ₆ H ₅ C ₂ H ₅				C	C	125	350	C	C	C	C	70						B	B		B	B		B				A		A	A		A		
Ethyl Chloride C ₂ H ₅ Cl	Dry			73	C	280	350	B to 70	C	70	B to 70	140						A	A	B		A	A	A	A	A	A	A	A	A	A	B	A		
Ethyl Chloroacetate CH ₂ ClCO ₂ C ₂ H ₅					C	75																													
Ethylene Bromide BrCH ₂ CH ₂ Br	Dry				C	280	350		C			B to 70						A				A	A					A		A	A		A		
Ethylene Chloride ClCH ₂ CH ₂ Cl	Dry	C		73	C	280	350		C	C		70																A		A	A				
Ethylene Chlorohydrin ClCH ₂ CH ₂ OH				73	C	73	200	70	C	70	70	C										A													
Ethylene Diamine NH ₂ CH ₂ CH ₂ NH ₂		C		120	C	225		70	100	100	100			A	A	C		A	A	B							A		A	B					
Ethylene Dichloride C ₂ H ₄ Cl ₂	Dry	C		73	C	280	350	C	C	C	C	120						A	A		A	A	A	A	A	A	A	A	A	A	A	A	A		
Ethylene Glycol CH ₂ OHCH ₂ OH		73	185	120	140	280		210	180	200	160	250		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Ethylene Oxide CH ₂ CH ₂ O					C	C	C	400	C	C	C	C						A	A		B	A	A					A		A	B		A		
Ethyl Ether (C ₂ H ₅) ₂ O					C	C	125	250	C	C	C	C																						A	
Ethyl Formate HCOOC ₂ H ₅						73			C		70	C						A	A			A	A						A		A				
2-Ethylhexanol CH ₃ (CH ₂) ₃ CH ₂ C ₂ H ₅ CH ₂ OH						250					70	C																							
Ethyl Mercaptan C ₂ H ₅ SH						75					C										A	A							A		A				
Ethyl Oxalate (COOC ₂ H ₅) ₂								140	C		C																								
Fatty Acids R-COOH			73	120	140	280	400	C	140	C	140	185	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	
Ferric Chloride (Aqueous) FeCl ₃	Sat'd		185	180	140	280	400	225	180	200	160	200	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A to 175	
Ferric Hydroxide Fe(OH) ₃	Sat'd		185	180	140	250	400	180	100	100	100	180	C	C							C	C												A	
Ferric Nitrate Fe(NO ₃) ₃ ·9H ₂ O	Sat'd		185	180	140	280	400	210	180	140	160	200		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	
Ferric Sulfate Fe ₂ (SO ₄) ₃				180	140	280	200	210	140	140	140	185		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	
Ferrous Chloride FeCl ₂	Sat'd		185	180	140	280	400	200	180			200	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	
Ferrous Hydroxide Fe(OH) ₂	Sat'd		185	180	73	250	400	180	180			180	C																					A	
Ferrous Nitrate Fe(NO ₃) ₂			140	140	73	280	400	180	180	140	160	200																						A	

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)										METALS																		
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NI IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C
Ferrous Sulfate FeSO4	70	185	180	140	280	400	200	180	140	160	200		B	C	C	B		C	C	C	C	C	A	A	A	A	A	A	A	A
Fish Oil				140		300	C	70	C		70		A	A	A	C		B	A	A		A	A	A	A	A	A	A	A	
Flue Gas							C	180			300			A	A			A	A	A		A	A	A	A	A	A	A	A	
Fluoboric Acid HBF4		73	73	140	275	350	140	160	140	160	140	C	C	B	B			C	C			C		A		A	A	A	A	
Fluorine Gas (Dry) F2	100%		73	C	73	73	C		C	140	C	C		B	B			C	C	A				A	A	A	A	A	A	
Fluorine Gas (Wet) F2				73	73	C	70				100			C	C			C	C	C				A	A	A	A	A	A	
Fluosilicic Acid H2SiF6	50%	73		140	280	300	140	100	200	100	210	C	C	B	B			C	C	C		C	B	B	B	B	A	A	A	
Formaldehyde HCHO	Dilute			120	140	125	300	140	C	200	140	C		A	A	B		C	C	B			A	A	A	A	A	A	A	
Formaldehyde HCHO	35%	73	180	140	125	300	140	C	150	140	C			A	A	B		C		B			A	A	A	A	A	A	A	
Formaldehyde HCHO	37%	73	180	140	125	300	140	C	C	100	C			A	A	B		C		B			A	A	A	A	A	A	A	
Formaldehyde HCHO	50%	73		140		300	140	C	C	140	C			B	B	B		C		B			B	A	A	A	A	A	A	
Formic Acid HCOOH		73	73	73	250	300	200	C	70	140	C			C	C	B		C	C	C	B	C	A	A	A	A	A	A	A	
Formic Acid Anhydrous HCOOH		73	180					C	160	100	C													A		A	A			
Freon 11 CCl3F	100%	C	73		140	200	300	C	70	130	C	70		A	A	A	A	A	B	B	B		B	A	A	A	A	A	A	
Freon 12 CCl2F2	100%		73	73	140	200	C	C		130	130	C		A	A	A	A	A	B	B	B		B	A	A	A	A	A	A	
Freon 21 CHCl2F	100%				C	200	300	C	C		C	C		A	A	A	A	A	B	B	B		B	A	A	A	A	A	A	
Freon 22 CHClF2	100%		73	C	200	C	C	C	130	130	C			A	A	A	A	A	B	B	B		B	A	A	A	A	A	A	
Freon 113 C2Cl3F3	100%			140	200	300	C	130	130	130	130			A	A	A	A	A	B	B	B		B	A	A	A	A	A	A	
Freon 114 C2Cl2F4	100%			140	200	300	C	130	70	70	C			A	A	A	A	A	B	B	B		B	A	A	A	A	A	A	
Fructose C6H12O6		185		140	280	300	175	140	140	160	225								A	A			A	A	A	A	A	A	A	
Furfural C4H3OCHO			C	C	75	300	140	C	70	70	C			A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	
Gallic Acid C6H2(OH)3CO2H		73		140	75	300	70	C	70	70	185			B	B	C		C	C	C		C	A	A	A	A	A	A	A	
Gasoline, Leaded		C	C	C	140	275	200	C	70	70	70	100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Gasoline, Unleaded		C	C	C	140	280	200	C	70	70		100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Gasohol		C		C	140	280	200	C	70			100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Gasoline, Sour		C		C	140	280	200	C	70			100		B	B			A	A	A		A	B	A	A	A	C			
Gelatin			150	180	140	250	300	200	180	200	160	250			C	C	B		C	C	C		C	C	C	A	A			
Glauber's Salt Na2SO4·10H2O							200	70	C	100	160	200			A	A		A	A	A			A	A	A	A	A	A	A	
Glucose C6H12O6·H2O		180	185	180	140	280	400	250	180	200	160	300	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Glue					250	400	100	140	200	160	250		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Glycerin C3H5(OH)3		140	185	180	140	280	400	200	70	200	160	300	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Glycol OHCH2CH2OH			185		140	280	300	200	140	200	160	250			A	A			A	A	A		A	A	A	A	A	A	A	

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)										METALS																				
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NI IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C		
Lemon Oil				C		250	300			140	100	200							C	C			C	B	A	A	A	A				
Ligroin										100	C	70	100																			
Lime Slurry CaO								100	100	160	100							A	A			A				A		A	A			
Lime Sulfur (CaS)x				73	140			210	C	160	100	185						C	C	C	C	A	A	A		A		A	A			
Linoleic Acid CH3(CH2)4HC=CHCH2CH: CH(CH2)7COOH					140	250	300		C	B to 70	C		140					C	C	C	C	C	C	C	B	B	A	A			A	
Linoleic Oil					140	230	300						70																			
Linseed Oil		100	185	150	140	280	300		B to 70	180	200	70	250	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Liqueurs					140					70	70																					
Lithium Bromide LiBr					140	225	300			140		200																				
Lithium Chloride LiCl					250			100	70			140						B	B	B		B	B	C		B		A		A	A	
Lithium Hydroxide LiOH								100	70			140						C	C	C	C	A	A		A		A		A	B		
Lubricating Oil (ASTM #1)			73	C	140	280	350		C	180	C	70	150	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Lubricating Oil (ASTM #2)			73	C	140	280	350		C	180	C	70	150	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Lubricating Oil (ASTM #3)			73	C	140	280	350		C	180	C	70	150	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Ludox SiO2																		C	C	C	C	A	A	A	A	A	A	A	A	A	A	
Magnesium Carbonate MgCO2					140	280	225	170	140	140	140	210						B	B			B	B	B		B	A	A	A	A	A	
Magnesium Chloride MgCl2	Sat'd		185	180	140	280	400	170	180	200	160	170		A	A	A	B	B	C	C	C	C		C	C	C	C	B	A		A	
Magnesium Citrate MgH6O7·5H2O					140	250	300	175	180			225																				
Magnesium Fluoride MgF2								140				200												C		B						
Magnesium Hydroxide Mg(OH)2	Sat'd		185	180	140	280	300	170	180	200	160	225		B	C	C	B	B	A	A	A	A		A	A	A	A	A	A	A	A	
Magnesium Nitrate Mg(NO3)2·2H2O			185	180	140	280	300	140	70	140	160	225		A	C	C							B		A	A	A	A	B			
Magnesium Oxide MgO								140	140		160							A	A					A							A	
Magnesium Sulfate MgSO4·7H2O			185	180	140	280	300	175	180	140	160	200		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Maleic Acid HOOCCH:CHCOOH	Sat'd		185	180	140	250	250	70	C		C	200						B	C	C	C	C	C		C	B	A	B	A	B	A	
Malic Acid COOHCH2CH(OH)COOH			185	150	140	250	250	C	100	70	70	200		A	B	B					C	C	C		C	A	A	A	A	A		
Manganese Sulfate MnSO4·4H2O				150	140	250	300	175	140	180	160	225						A	A	A		C	C	B		C		A		A	A	
Mercuric Chloride HgCl2			140	180	140	250	300	210	140	140	140	185	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	A
Mercuric Cyanide Hg(CN)2	Sat'd				140	250	300	70	70	140	70	70						C	C	C	C	C	C		C		A		A	C		
Mercuric Sulfate HgSO4	Sat'd				140	230	300	70	70			70						C	C	C	C	C										
Mercurous Nitrate HgNO3·2H2O	Sat'd				140	230	300	70	C		C	70						C	C	C	C	C	C		C	A	A	A	A	C		
Mercury Hg			185	150	140	275	300	210	140	140	140	185						C	C	C	C	C	A	A	A	A	A	A	B		A	
Methane CH4		C			140	275	300	C	180	70	70	185	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)										METALS																										
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NI IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C								
Methanol (Methyl Alcohol) CH ₃ OH		C	C	180	140	280	300	140	140	140	140	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Methoxyethyl Oleate CH ₃ OCH ₂ CH ₂ (OOC ₁₇ H ₃₃) ₂					73																																	
Methyl Acetate CH ₃ CO ₂ CH ₃						100	300	B to 70		C	C	C	C						B	B	B		B	B	A			A	A					A				
Methyl Acetone C ₃ H ₆ O						C		70		C	C		C						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
Methyl Acrylate CH ₂ =CHCOOCH ₃	Tech. Pure					100	300	B to 70		C	C	C	C																									
Methyl Amine CH ₃ NH ₂			C	C	C	C	300	70				70	100						C	C		A	A	B		A		A		A		C						
Methyl Bromide CH ₃ Br					C	280	300	C	70	C	C	C	185						C	C	B		C	C	B			B		B	B							
Methyl Cellosolve HOCH ₂ CH ₂ OOH ₃					C	280		70	C	70	70	C							A	A	B		B	B	B		A	A	A	A	A	A	A	A	A			
Methyl Chloride CH ₃ Cl	Dry	C			C	280	250	C	C	C	C	70	C						A	A	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A			
Methyl Chloroform CH ₃ CCl		C	C			125	200	C	C	C	C	70																										
Methyl Ethyl Keytone (MEK) CH ₃ COC ₂ H ₅		C	C	C	C	C	200	70	C	C	C	C							A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
Methyl Formate HCOOCH ₃								100	C	C	70	C							A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Methyl Isobutyl Carbinol (CH ₃) ₂ CHCH ₂ CH ₂ (CH ₃)OH							200	70	70	70	70	70																										
Methyl Isobutyl Keytone (CH ₃) ₂ CHCH ₂ COCH ₃		C	C	C	C	C	200	70	C	C	C	C																										
Methyl Isopropyl Keytone CH ₃ COCH(CH ₃) ₂						C	150	C	C	C	C	C																										
Methyl Methacrylate CH ₂ =C(CH ₃)COOCH ₃					73	125	150	C	C	70	C	C																										
Methyl Sulfate (CH ₃) ₂ SO ₄					73	280	70																															
Methylene Bromide CH ₂ Br ₂					C	175	250	C	C	C	C	70																										
Methylene Chloride CH ₂ Cl ₂					C	C	250	C	C	C	C	70							B	B	B		B	B	B											A		
Methylene Chlorobromide CH ₂ ClBr					C			C	C	C	C	C																										
Methylene Iodide CH ₂ I ₂					C	200	250					250																										
Methylsulfuric Acid CH ₃ HSO ₄					140	125																																
Milk			70	170		225	400	250	180	200	160	300	C	A	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Mineral Oil		70	185	120	140	280	300	C	140	B to 70	70	300	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Molasses				73	140	150	300	100	150	150	150	185							A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Monochloroacetic Acid CH ₂ ClCOOH	50%		73	73	140	150	200	C	70	C	C	70							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Monochlorobenzene C ₆ H ₅ Cl	Tech. Pure			73		170	200	C	C	C	C	70								A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Monoethanolamine HOCH ₂ CH ₂ NH ₂					C	C	100	70	70	C	C	185																										
Motor Oil			185	73	140		350	C	180			250	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Morpholine C ₄ H ₈ ONH					75	200	70	C	C	C	C	C								B	B		B	B	B		B	B	B	B	B	B	B	B	B	B		
Naphtha		B to 70	73	73	140	280	200	C	140	C	C	150	A							A	A	B		A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Naphthalene C ₁₀ H ₈		B to 70			C	200	250	C	C	C	C	170	A							A	A	B		A	A	A	A	A	A	A	A	A	A	A	A	A	A	

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)												METALS																				
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% Ni/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C				
Natural Gas				73	140	280	300	C	140	140	140	185	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Nickel Acetate Ni(OOCH3)2•4H2O				73	250	300	70	70	C		C	C																						
Nickel Ammonium Sulfate NiSO4•(NH4)2SO4•6H2O						250		140	200	160		C	C	C	C	C	C	C	C	C	C			A			A	C						
Nickel Chloride NiCl2	Sat'd		185	180	140	280	406	210	180	200	160	210		C	C	B		C	C	C	C			A			A	C				A		
Nickel Nitrate Ni(NO3)2•6H2O	Sat'd				140	280	400	210	180			250	C	C	C			C	C	C			A	A	A	A	A	C						
Nickel Sulfate NiSO4	Sat'd		185	180	140	280	400	210		200	160	300		A	C	C	B		C	C	C												A	
Nicotine C10H14N2					140	70		C	70	C													B	A			A	B						
Nicotinic Acid C8H7NO2					140	250		70			140			A	B	B			C	C	C			B	B	B	B	B	B					
Nitric Acid HNO3	10%		185	180	140	175	250	70	C	100	C	185	C	C	C	C	C	C	C	C	C	C		B	A		A							
Nitric Acid HNO3	30%	C	180	120	140	125	250	70	C	100	C	160	C	C	C	C	C	C	C	C	C		B	A		A								
Nitric Acid HNO3	40%	C	100	73	100	125	250	C	C	70	C	140	C	C	C	C	C	C	C	C	C		B	A		A								
Nitric Acid HNO3	50%	C	73	100	100	125	250	C	C	70	C	185	C	C	C	C	C	C	C	C	C		B	A		A								
Nitric Acid HNO3	70%	C	73	C	73	C	250	C	C	C	C	100	B	C	C	C	C	C	C	C	C		C	A		A								
Nitric Acid HNO3	100%	C		C	C	C	70	C	C	C	C	C	B	C	C	C	C	C	C	C	C		C	A		A	C							
Nitrobenzene C6H5NO2				73	C	73	400	C		C	C	70		B	B			A	A	A					A		A	A	A	A		A		
Nitroethane CH3CH2NO2	Tech. Pure				70			C		C	C									A														
Nitrogen Gas N2					275	300		140	100	140	185		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Nitroglycerin CH2NO3CH-NO3 CH2NO3					C	125	70							B	B				B	B					A		A	B						
Nitroglycol					C					70	70																							
Nitromethane CH3NO2	Tech. Pure				120		70	C		C															A									
Nitrous Acid HNO2	10%				73	230	400		C			100	C	C	C	C	C	C	C	C	C		B	B	B	B	B	C						
Nitrous Oxide N2O				73	73	C	400		C	B to 140	C	70		B	B			C	B	B					A		A	C				A		
n-Octane CH8H18					275	400		C	B to 70			70	A	A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A	
Oleic Acid CH3(CH2)7CH=CH(CH2)7COOH			185	150	140	250	250	B to 70	100	70	B to 70	185		A	B	B	A		B	B	C			B	A	A	A	A	A	A			A	
Oleum xH2SO4+ySO3				C	C	C	150	100	C	C	C	70		C	C	C	C	C	C	C	C				A		A	C					A	
Olive Oil					250	350		140	B to 100	140	150		A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A			
Oxalic Acid HOOC-COOH•2H2O	50%		185	180	140	125	300	150	C		100	100	C		C	C	C		C	C	C	C	C	B	A	A	A	A	A	A			A	
Oxygen (Gas) O2			185	150	140	280	406	210	B to 70	140	140	185	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Ozone O3					140	225	300	210	C	140	C	185	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Palm Oil					200	200		C	140	C		70			C	C			C	C	C				A		A	A						
Palmitic Acid CH3(CH2)14COOH	10%		73	180	140	250	300	70	100	70	C	185		A	B	B	B	A	B	B	B		B	B	A	A	A	A	A					
Palmitic Acid CH3(CH2)14COOH	70%		73	180	73	250	300		100	C	C	185		A	B	B	B	A	B	B	B		B	B	A	A	A	A						

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)										METALS																								
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NIIRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C						
Paraffin C36H74		B to 70			140	250	250	C	100		140	300		A	A	A	A		B	A	A	B	B	A	A	A	A	A	A	A	A	A				
Peanut Oil					250	250		100				150			A	A			A	A			A		A		A									
n-Pentane CH3(CH2)3CH3		C					100	C	100		70	100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Peracetic Acid CH3COOOH	40%				73																															
Perchloric Acid HClO4	10%		140	73	73	200	250	70	C	70	70	70							C													A	A	A		
Perchloric Acid HClO4	70%		185	73		125		70	C	C	C	185							C													B	B	A		
Perchloroethylene C12C.CC12					275	200	C	C	C	C	C	200			B	B			B	B	B		B	A	A	A	A	A	A	A	A	A		A		
Perphosphate			170	170	140		250	70	70			70																								
Phenol C6H5OH		C	73	73	73	125		70	C	C	C	200			A	A	C		C	C	C		C	A	A	A	A	A	A	A	A			A		
Phenylhydrazine C6H5NHNH2					C	125	B to 70	C	C	C		C																								
Phosphate Esters										C		C	100						C	C			C		A						A	A				
Phosphoric Acid H3PO4	10%		210	180	140	275	300	140	70	200	140	200	C	C	C	C	C	C	C	C	C	C	C	C	B	A	A	A	A	C						
Phosphoric Acid H3PO4	50%		210	180	140	275	300	70	C	200	70	200	C	C	C	C	C	C	C	C	C	C	C	C	B	A	A	A	A	C						
Phosphoric Acid H3PO4	85%		73	180	140	275	300	70	C	200	C	200	C	C	C	C	C	C	C	C	C	C	C	C	B	A	B	A	C							
Phosphoric Anhydride P2O5			73	73	73	200							B													A						A				
Phosphorus (Red)					70	75	300																				A						A			
Phosphorus (Yellow)					73		300																													
Phosphorus Pentoxide P2O5			73	73	73	200		140					C													A							A			
Phosphorus Trichloride PCl3					C	200	300		C	C	C		C													A						A	A			
Photographic Solutions			185	150	140					100	100	185																								
Phthalic Acid C6H4(COOH)2					73	200		C	140	C	140			A	A	A			B	B	C		B		A	A	A	A	B					A		
Picric Acid C6H2(NO2)3OH	10%	C	140	170	170	73		140	C	70	70	140	C	C	C	C	C	C	C	C	C	C	C	C	B	A					A	C			A	
Pine Oil								70		C	70				C	C	B		B	B	B		B	A	A	A	A	A	A							
Plating Solutions (Brass)			185	180	140	200	300	70				100	70																							
Plating Solutions (Cadmium)			185	180	140	200	300	70				100	70																							
Plating Solutions (Chrome)			210	180	140	200	300					160																								
Plating Solutions (Copper)			210	180	140	200	300	70				160	70																							
Plating Solutions (Gold)			185	180	140		300	70				125	70																							
Plating Solutions (Lead)			210	180	140	200	300	70	70			70	70																							
Plating Solutions (Nickel)			210	180	140	200	300	70				70		C		C		C																A*		
Plating Solutions (Rhodium)			185	180	140	200	300					70																								
Plating Solutions (Silver)			185	180	140	200	300	70				70	70	A																						

Note: A* rating for Electroless Plating only.

CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)										METALS																			
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NIIRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C	
Sodium Phosphate NaH ₂ PO ₄	Neutral			180		280	400	170	140	200	140	200		B	B	B	B	B	B	B	B	A	B	A	A	A	A	A	B		A
Sodium Silicate 2Na ₂ O:SiO ₂				180		280		200	140	200	140	200			C	C	B		A	A	A		A	A	A	A	A	A	A	A	A
Sodium Sulfate Na ₂ SO ₄	Sat'd	70	185	150	140	280	400	140	140	140	140	200		A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Sulfide Na ₂ S		70	185	150	140	280	350	140	180	200	140	200		C	C	C	C	C	B	B	C	B	B	A	A	A	A	A	A	A	
Sodium Sulfite Na ₂ SO ₃		70	185	180	140	280	350	140	140	140	140	200			A	A	C		B	B	B		B	B	A	A	A	C		A	
Sodium Thiosulphate Na ₂ S ₂ O ₃ ·5H ₂ O				150	140	280	350	200	140	200	160	200	A		B	B	C		C	C	C		C		A		A	A			
Sour Crude Oil					140	280		C	C	70	C	200			C				A	A	A		B	A	A	A	A	A	A	A	A
Soybean Oil					250	400		C	140	200	70	250			A	A	B		A	A	B	A	A	A	A	A	A	A	A	A	A
Stannic Chloride SnCl ₄			185		140	280	350	100	140	70	C	200		C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	
Stannic Chloride SnCl ₂	15%		185		140	280	350	70	140	200	160	200			C	C	C	C	C	C	C	C	C		A		A	C			
Starch					140	200	300	170	180	200	160	200				B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A
Steam (Low Pressure)					280	400		C	C	C	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Steam (Medium Pressure)						400		C	C	C	C	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		A
Steam (High Pressure)							C	C	C	C	C	C	C	C	C	C	C	C	B	A	C	B	A	A	A	A	A	C			A
Stearic Acid CH ₃ (CH ₂) ₁₆ COOH			185	73	140	275	350	C	140	70	70	100		A	A	A	C	B	C	C	C	B	C	A	A	A	A	A	A	A	A
Stoddard's Solvent					280		C	140	C	C	185		A		A	A			A	A	A		A	A	A	A	A	A	A	A	A
Styrene (C ₆ H ₅ CH=CH ₂) _n					180	350		C	C	C	C	100			B	B	B		B	B	B		B	A	A	A	A	A	A	A	A
Succinic Acid CO ₂ H(CH ₂) ₂ CO ₂ H				150	140	150	200	70	70			70			A	A			A	A	A		A	A	A	A	A	A	A	A	A
Sugar C ₆ H ₁₂ O ₆					275	350		140	100	140	140	200			C	C				B	C		B	A	A	A	A	A	A	A	
Sulfamic Acid HSO ₃ NH ₂	20%			180	140	C		C	C	70	70	C		A	B	B	B		C	C	C		C		A		A	B			
Sulfate Liquors (Oil)			73			200		70	70			70		C	C	C	C	C	B	A		A		A		A	A	A	A		
Sulfite Liquors	6%			140		350		140	70	70	70	140									C	B		A		A					
Sulfur S			C	140	250	350		C	70	70	250		C	C	C	C	C	C	B	B	C	B	B	B	A		A	A		A	
Sulfur Chloride S ₂ Cl ₂				C	73	350		C	C	70	C	70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C	
Sulfur Dioxide SO ₂	Dry		C	73	140	175	350	70	C	200	C	100	A	A	A	B	A	A	A	A	A			A	A	A	A	A	A	A	A
Sulfur Dioxide SO ₂	Wet		C	73	73	150		140	C	200		140	B	C	C	B	B	C						C	A	C	A	A		A	
Sulfur Trioxide SO ₃					140	C		70	C	C	C	140		C	C			C					C	B	B	A	A		A		
Sulfuric Acid H ₂ SO ₄	Up to 30%	100	210	180	140	250	250	140	C	100	100	200		C	C	C	C	C	C	C	C	C	C	C	A	B	A	A	C	A	
Sulfuric Acid H ₂ SO ₄	50%	70	210	150	140	250	250	140	140	150	C	200		C	C	C	C	C	C	C	C	C	C	C	A	C	A	A	C	A	
Sulfuric Acid H ₂ SO ₄	60%	C	210	150	140	250	250	140	C	150	C	250	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	A	B	C	A
Sulfuric Acid H ₂ SO ₄	70%	C	210	120	140	200	200	140	C	150	C	250	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	A	C	C	A
Sulfuric Acid H ₂ SO ₄	80%	C	210	73	140	200	200	70	C	150	C	150	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	A



CHEMICAL RESISTANCE CHART

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)										METALS																							
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUOROCARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	BRASS	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% NI/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C					
Triethylamine (C ₂ H ₅) ₃ N					140	125			140	70	200				A	A															A				
Trimethylpropane (CH ₂ OH) ₃ C ₃ H ₅					73				180	200	160	300																							
Trisodium Phosphate NaPO ₄ 12H ₂ O *		70	185	185	140	280	350	70	70	185	70	185			C	C				B	B									A	A	A	A		
Tung Oil								C	100	100	100	100			B	B	B			B	B	B								B	A	A	A	A	A
Turpentine			73	C	140	280		C	70	C	C	150		A	A	A	A	A	A	A	A	A	A							A	A	A	A	A	A
Urea CO(NH ₂) ₂			185	180	140	250		210	140	140	140	185			C		B	B			C	C	C						A	A	A	B	C		
Urine				180	140		400	210	140	140	140	70								C	C	C							A	A	A	A	A		
Varnish					250	350	C	70		C	70				A	A	A	B	B	C	C	C							B	A	A	A	A		A
Vaseline (Petroleum Jelly)				150	C		300	C	140	70	140	70								A	A	A							A	A	A	A	A	A	A
Vegetable Oil			185	100	70	275	300	C	70	70	70	200		A		A													A	A	A	A	A	A	
Vinegar		73	150	140	140	225	300	140	C	200	70	C	C	C	B	C	C	C	C	C	C	C							A	A	A	A	A	A	A
Vinyl Acetate CH ₃ COOCH ₂ CH ₂				C	C	250	350	70	70	C	C	C			B	B				B	B	B							A		A	B			
Water, Acid Mine H ₂ O			185		140	230	400	200	180	180	160			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	B	B	B
Water, Deionized H ₂ O		70	210	180	140	280	400	200	70		160			A	A	B	B	C	C	C	C	C			C	B	A	A	A	A	A	A		A	
Water, Distilled H ₂ O		70	210	180	140	280	400	250	180	200	160			A	A	A	A	B	B	C	C	C	B	C	A	A	A	A	A	A	A	B	A		
Water, Potable H ₂ O		70	210	180	140	280	400	250	180	200	160			B	A	A	A	A	A	B	B	B	A	B	A	A	A	A	A	A	A	A	A		
Water, Salt H ₂ O		70	210	180	140	280	400	250	180	200	160			C	B	B	B	C	C	C	C	C	B	C	B	A	A	A	A	A	A	B	A		
Water, Sea H ₂ O		70	210	73	140	280	400	250	180	200	160			C	B	B	B	C	C	C	C	C	B	C	B	B	A	A	A	A	C	A			
Water, Soft H ₂ O		70			200	400	250	180	200	160				A	A	A	A	A	B	C	C	B	B	C	A	A	A	A	A	A	A	A	A		
Water, Waste H ₂ O		70	185	180	140	230	400	200			70			B	B	B	B	B	B	B	B	B	B	B	B	B	A		A	A		A			
Whiskey			185	150	140	200	350	200	140	140	140	140			A	C	C	B		C	C	C			C	B	A		A	A		A			
White Liquor			185		140	230			140	140	140				C	C	C			C	C	C			C	A		A	A		A				
Wine			185	150	140	200	350	170	140	140	140	140			C	C				C	C	C			C	B	A		A	A					
Xylene (Xylol) C ₆ H ₄ (CH ₃) ₂		C	C	C	C	200	350	C	C	C	C	150		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Zinc Acetate Zn(C ₂ H ₃ O ₂) ₂ 2H ₂ O *					250			180	70	70	160	70			C	C	C	C	C	C	C	C							A		A	A			
Zinc Carbonate ZnCO ₃									100	100					B	B												B		A	B				
Zinc Chloride ZnCl ₂			185	180	140	280	400	180	70	200	160	200			C	C	C			C	C	C			C	C	B	B	A	A					
Zinc Nitrate Zn(NO ₃) ₂ 6H ₂ O *					140	280		180	140	200	200																		A	A	A				
Zinc Sulfate Zn-SO ₄ 7H ₂ O *			185	180	140	280	400	180	140	200	140	200			A	C	C	B		C	C	C	B	C	A	A	A	A	A	A	A		A		
Trichloroacetic Acid CCl ₃ COOH				150	140	125	200	70	B to 70	70	70	C		C		B	C			C	C	C						C	B		B				
Trichloroethylene CHCl ₂ CCl ₂		C	C	C	C	280	200	C	C	C	C	185		A	A	A	A	A	A	B	B	B						A	A	A	A	A	A	A	
Triethanolamine (HOCH ₂ CH ₂) ₃ N		70			73	125		70	70	150	70	C			C	C				C	C	C	C					C	A		A	A			

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