CHEMICAL RESISTANCE GUIDE FOR VALVES & FITTINGS

INTRODUCTION

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 RATINGS FOR THERMOPLASTICS & ELASTOMERS

Temp. in °F	=	"A" rating, maximum temperature which 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.

THERMOPLASTICS & ELASTOMERS

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 or cold water distribution, and similar applications above the temperature range of PVC. CPVC is joined by solvent cementing, threading or flanging.

PP (Polypropylene) — 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, polypropylene 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, PP 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.

PVDF (Polyvinylidene Fluoride) — KEM-TEMP (KYNAR®) 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 ethylene-propylene 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 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, they are not suited 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.

PEEK (Polyetheretherketone) — PEEK is a high-performance engineered thermoplastic which can be used above the useful range of PTFE. PEEK has physical characteristics approaching some metals (approximately 30K tensile) and has excellent resistance to a wide range of organic and inorganic chemicals. PEEK can be used up to 550°F and is an excellent choice for heat transfer fluids, steam and hydrocarbon services.

GRAPHITE — Graphite is the packing and seal material of choice for most fire-rated products, primarily because of its high temperature rating of approximately 2000°F. Graphite has excellent chemical resistance, can retain compressibility at all temperatures and has a low coefficient of friction. Graphite is not recommended for use in strong oxidizing atmospheres.

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HYPALON is a registered trademark of the DuPont Company

TEFLON is a registered trademark of the DuPont Company.
VITON is a registered trademark of the DuPont Company.

METALS USED IN VALVES & FITTINGS

ALUMINUM — A non-ferrous metal, very lightweight, approximately one-third as much as steel. Aluminum exhibits excellent atmospheric corrosion resistance, but can be very reactive with other metals. In valves, aluminum is mainly used as an exterior trim component such as a handwheel or an identification tag.

COPPER — Among the most important properties of wrot copper materials are their thermal and electrical conductivity, corrosion resistance, wear resistance, and ductility. Wrot copper performs well in high temperature applications and is easily joined by soldering or brazing. Wrot copper is exclusively used for fittings.

BRONZE — One of the first alloys developed in the bronze age is generally accepted as the industry standard for pressure-rated bronze valves and fittings. Bronze has a higher strength than pure copper, is easily cast, has improved machinability, and is very easily joined by soldering or brazing. Bronze is very resistant to pitting corrosion, with general resistance to most chemicals less than that of pure copper.

SILICONE BRONZE — Has the ductility of copper but much more strength. The corrosion resistance of silicon bronze is equal to or greater than that of copper. Commonly used as stem material in pressure-rated valves, silicon bronze has greater resistance to stress corrosion cracking than common brasses.

ALUMINUM BRONZE — The most widely accepted disc material used in butterfly valves, aluminum bronze is heat treatable and has the strength of steel. Formation of an aluminum oxide layer on exposed surfaces makes this metal very corrosion resistant. Not recommended for high pH wet systems.

BRASS — Generally good corrosion resistance. Susceptible to de-zincification in specific applications; excellent machinability. Primary uses for wrot brass are for ball valve stems and balls, and iron valve stems. A forging grade of brass is used in ball valve bodies and end pieces.

GRAY IRON — An alloy of iron, carbon and silicon; easily cast; good pressure tightness in the as-cast condition. Gray iron has excellent dampening properties and is easily machined. It is standard material for bodies and bonnets of Class 125 and 250 iron body valves. Gray iron has corrosion resistance that is better than steel in certain environments.

DUCTILE IRON — Has composition similar to gray iron. Special treatment modifies metallurgical structure, which yields higher mechanical properties; some grades are heat-treated to improve ductility. Ductile iron has the strength properties of steel using similar casting techniques to that of gray iron.

CARBON STEEL — Very good mechanical properties; good resistance to stress corrosion and sulfides. Carbon steel has high and low temperature strength, is very tough and has excellent fatigue strength. Mainly used in gate, globe, and check valves for applications up to 850°F, and in one-, two-, and three-piece ball valves.

3% NICKEL IRON — Improved corrosion resistance over gray and ductile iron. Higher temperature corrosion resistance and mechanical properties. Very resistant to oxidizing atmospheres.

NICKEL-PLATED DUCTILE IRON — Nickel coatings have received wide acceptance for use in chemical processing. These coatings have very high tensile strength, 50 to 225 ksi. To some extent, the hardness of a material is indicative of its resistance to abrasion and wear characteristics. Nickel plating is widely specified as a disc coating for butterfly valves.

400 SERIES STAINLESS STEEL — An alloy of iron, carbon, and chromium. This stainless is normally magnetic due to its martensitic structure and iron content. 400 series stainless steel is resistant to high temperature oxidation and has improved physical and mechanical properties over carbon steel. Most 400 series stainless steels are heat-treatable. The most common applications in valves are for stem material in butterfly valves and backseat bushings and wedges in cast steel valves.

316 STAINLESS STEEL — An alloy of iron, carbon, nickel, and chromium. A nonmagnetic stainless steel with more ductility than 400SS. Austinetic in structure, 316 stainless steel has very good corrosion resistance to a wide range of environments, is not susceptible to stress corrosion cracking and is not affected by heat treatment. Most common uses in valves are stem, body and ball materials.

17-4 PH STAINLESS STEEL® — Is a martensitic precipitation/age hardening stainless steel, offering high strength and hardness. 17-4 PH withstands corrosive attack better than any of the 400 series stainless steels, and in most conditions its corrosion resistance closely approaches that of 300 series stainless steel. 17-4 PH is primarily used as a stem material for butterfly and ball valves.

ALLOY 20Cb-3® — This alloy has higher amounts of nickel and chromium than 300 series stainless steel and with the addition of columbium, this alloy retards stress corrosion cracking and has improved resistance to sulfuric acid. Alloy 20 finds wide use in all phases of chemical processing. Commonly used as interior trim on butterfly valves.

MONEL® — Is a nickel-copper alloy used primarily as interior trim on butterfly and ball valves. One of the most specified materials for corrosion resistance to sea and salt water. Monel is also very resistant to strong caustic solutions.

STELLITE® — Cobalt base alloy, one of the best all-purpose hard facing alloys. Very resistant to heat, abrasion, corrosion, impact, galling, oxidation, thermal shock and erosion. Stellite takes a high polish and is used in steel valve seat rings. Normally applied with transfer plasma-arc; Stellite hardness is not affected by heat treatment.

HASTELLOY C® — A high nickel-chromium molybdenum alloy, which has outstanding resistance to a wide variety of chemical process environments, including strong oxidizers such as wet chlorine, chlorine gas, and ferric chloride. Hastelloy C is also resistant to nitric, hydrochloric, and sulfuric acids at moderate temperatures.

MATERIAL DESIGNATIONS & ASTM STANDARDS FOR LISTED VALVE METALS

Aluminum	ASTM B-85 Die Cast
Copper	ASTM B-75 Wrot & ASTM B-88
Bronze	ASTM B-61 Cast ASTM B-62 Cast ASTM B-584, Alloy 844
Silicon Bronze	ASTM B-98 Alloy B ASTM B-371 Wrot
Aluminum Bronze	ASTM B-148 Cast ASTM B-150 Rod
Brass	ASTM B-16 Wrot ASTM B-124 Forged
Gray Iron	ASTM A-126 Class B
Ductile Iron	ASTM A-395 Heat Treated ASTM A-536 As Cast
Carbon Steel	ASTM A-216-Grade WCB Cast ASTM A-105 Forged ASTM A-352-Grade LCB Cast
3% Ni-Iron	ASTM A-126-Class B Modified
Ni-Plated Ductile Iron	ASTM B-320 Plating
400 Series Stainless Steel	ASTM B-582 Type 416 Wrot ASTM A-217-Grade CA-15 ASTM A-276 Type 410 Wrot
316 Stainless	ASTM 276 Type 316 ASTM A-351-Grade CF-8M
17-4 PH Stainless Steel	ASTM A-564 Type 630
Alloy 20	ASTM A-351-Grade CN-7M ASTM B-473 20Cb-3
Monel	ASTM B-164 ASTM 494 Grade M-35-1
Stellite	AWS 5.13 Hard Face
Hastelloy C	ASTM B-574 ASTM B-494 Grade CW-12 MW

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																	
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Acetaldehyde CH_3CHO	Conc.			120	C	C	350	200	C	C	C	C	275	A	C	C	C	C	B	B	A		B	B	A		A	A	A	A	B	C
Acetamide CH_3CONH_2			73		75	350	200	C	C	C	C	B	550		A		A		A	A			A	A	A	A	A	A	A	A	B	
Acetic Acid CH_3COOH	25%		C	180	73	200	350	180	C	150	C	C	550	A	C	C	C	C	C	C	C	C	C	A	A	A	A	A		A	C	C
Acetic Acid CH_3COOH	50%		C	140	73	200	350	140	C	73	C	C	550	A	C	C	C	C	C	C	C	C	C	A	A	A	A	A		A	C	C
Acetic Acid CH_3COOH	85%		C	100	73	150	350	100	C	73	C	C	550	A	C	C	C	C	C	C	C	C	C	A	A	A	A	A		A	C	C
Acetic Acid CH_3COO	Glacial		C	100	C	100	350	B to 100	C	C	C	C	550	A	C	C	C	C	C	C	C	C	C	C	A	B	A	A		A	C	C
Acetic Anhydride $(CH_3CO)_2O$					C	C	350	C	70	200	B to 70	C	275	A	C	C	C	C	C	C	C	C	C	C	B	B	B	B		A	B	C
Acetone CH_3COCH_3			C	73	C	C	350	130	C	B to 70	C	C	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Acetonitrile CH_3CN			C		C	150		C	C		70	C	275												A		A			A		
Acetophenone $C_6H_5COCH_3$				120		C	350	140	C		C	C	275		C	C	C	C	C	C	C	C	C	C	C					C	C
Acetyl Chloride CH_3COCl		C				125	200	C	C	C	C	185	275		A	A	A	A	C	C	A		C		A	A	A	A			C	A
Acetylene $HC = CH$	Gas 100%	70		73	140	250	250	200	140	70	70	200	275		C	C	C	C	A	A	A	A	A		A	A	A	A			A	C
Acrylic Acid $H_2C:CHCOOH$	97%				C	150	200							A																		
Acrylonitrile $H_2C:CHCN$			C		C	73	350	C	C	140	C	C	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	B	
Adipic Acid $COOH(CH_2)_4COOH$	Sat'd.		185		140	150	350	200	180	140	160	250	275						C	C	B		C		B to 200		B	B to 200		A	B	A
Allyl Alcohol $CH_2 = CHCH2OH$	96%	C	C	140	C	125	250	70	160	70	B to 70	100	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Allyl Chloride $CH2CHCH2Cl$					C	212	350	C	C			70	275								C									C	
Aluminum Acetate $Al(C_2H_4O_2)_3$	Sat'd.					275	350	200	B to 70	C		C	C		C		C			C					A		A	B			C	
Aluminum Ammonium Sulfate (Alum) $AlNH_4(SO_4)_212H_2O$	Sat'd.		180	150	140	275	250	200	140			200		A	B	B	B	B			C			B	A		A	A			A	B
Aluminum Chloride Aqueous $AlCl_3$	Sat'd.		185	180	140	280	250	210	70	200	160	250	275	A	C	C	C	C	C	C	C	C	C	C	A	C	A	A			A	C
Aluminum Fluoride Anhydrous AlF_3	Sat'd.				73	280	250	210	180	200	160	250		A	C	C	C	C	C	C	C		C	C	B	C	B	A				C
Aluminum Hydroxide $AlO_3{\cdot}_3H_2O$	Sat'd.		185	140	140	280	250	210	180		100	200			C	C	C	C	B	B	C		B	B	A	A	A	B				C

PLASTICS AT MAX.TEMPERATURE °F / CHEMICALS AND FORMULA	CONCENTRATION	SEAL MATERIALS AT MAX.TEMP °F													METALS															
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Aluminum Nitrate $Al(NO_3)_3 \cdot 9H_2O$	Sat'd.		185	180	140	280	250	210	180	100	100	100		A	C	C	C	C	C	C	C	C	C		A	A	A	C			C	C
Aluminum Oxychloride					140	275						C																			
Aluminum Potassium Sulfate (Alum) $AlK(SO_4) \cdot 12H_2O$	Sat'd.		180	150	140	280	400	200	180	200	160	200		A	B	B	B	B			C			B	A		A	A			A	B
Aluminum Sulfate (Alum) $Al_2(SO_4)_3$	Sat'd.		185	180	140	280	250	210	200	160	140	185	275	A	C	C	C	C	C	C	C		C	C		B			A	C	
Ammonia, Aqueous		See Ammonium Hydroxide																														
Ammonia Gas NH_3	100%		185	150	140	C	400	140	140	140	140	C	550	A	B			C	A		A				A	A	A	A		A	B	B
Ammonia Liquid NH_3	100%		C	73	C	C	400	140	B to 70	70	70	C	275	A	C	C	C	C			A			A	A	A	A	A		A	A	C
Ammonium Acetate $NH_4(C_2H_3O_2)$	Sat'd.			73	140	175	400	140		140	140				C	C	C	C							B			B				
Ammonium Bifluoride NH_4HF_2	Sat'd.		185		140	150	400	200	180			200		A	C			C	C	C	C	C	C	C	B	B	B	B				B to 70
Ammonium Bisulfide $(NH_4)HS$					140	280	400		180																							
Ammonium Carbonate $CH_2O_3 \cdot 2H_3N$	Sat'd.			180	140	280	400	210		140	140	250	275		C			C			A to 140	C		B	B	B	B	B		A	B to 212	B to 70
Ammonium Chloride NH_4Cl	Sat'd.		185	180	140	280	400	210	180	200	160	250	275	A	C			C	C	C	C	C	C	C	B	C	B	B		B	B	
Ammonium Dichromate $(NH_4)_2Cr_2O_7$					73	250		70	100	100	100			A																		
Ammonium Fluoride NH_4F	10%				140	280	400	210	100	200	100			A	C			C			C				C						C	C
Ammonium Fluoride NH_4F	25%				73	280	400	140						A	C			C			C				C						C	C
Ammonium Hydroxide NH_4OH	10%		C	180	140	225	400	210	B to 70	200	150	70	550	A	C	C		C			C			B	A	A	A	B		A	B	C
Ammonia Hydroxide NH_4OH	Sat'd.	C	C	180	100	225	400	175	C	200	150	C	550	A	C	C					C			B to 70	A to 140			B		B	B to 120	C
Ammonium Nitrate NH_4NO_3	Sat'd.	175	185	180	140	280	400	250	180	200	160	100		A	C	C		C								A	A	A		A		C
Ammonium Persulphate $(NH_4)_2S_2O_8$			73	150	140	73	200	210		70	70				C	C	C	C	C	C	C	C	C	B	A		A	C		A	C	C
Ammonium Phosphate (Monobasic) $NH_3H_3PO_4$	All				140	280	400	210	100	140	140	185		A	C	C	C	C	B	B	C		B	A	A	A	A	B		A	B	C
Ammonium Sulfate $(NH_4)_2SO_4$			185	180	140	280	400	210	180	200	160	200		A	C	C	C	C	B	B	C	B	B	B	B	B	A	B		A	C	C
Ammonium Sulfide $(NH_4)_2S$	Dilute					125	350	210	140	200	160				C	C	C	C	C	C	C		C		B		B	B			A	C
Ammonium Thiocyanate NH_4SCN	50-60%				140	275			70	70	70	185			C	C	C	C	C	C	C		C		A	A	A	B		A	B	C

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CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																	
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Amyl Acetate $CH_3COOC_5H_{11}$				C	C	125	100	B to 70	C	C	C	C	550		B	B	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A	
Amyl Alcohol $C_5H_{11}OH$			73	180	100	280	400	210	B to 140	200	140	185	550	A	A	A	A	A	B	B	B		B	A	A	A	A	A				A
n-Amyl Chloride $C_5H_{11}Cl$			C	C	C	280	400	C	C	C	C	200			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
Aniline $C_6H_5NH_2$			C	180	C	120	200	140	C	70	C	C	275	A	C	C	C	C	B	B	C	B	B	A	A	A	A	B		A	C	C
Aniline Chlorohydrate					C																								A			
Aniline Hydrocloride $C_6H_5NH_2 \cdot HCl$	Sat'd.		C		C	75				C	C	185		C	C	C	C	C	C	C	C	C	C	C	C		A				
Anthraquinone $C_{14}H_8O_2$					140							200							C	C	C										
Anthraquinone dic A $C_{14}H_7O_2 \cdot SO_3H \cdot 3H_2O$	c i n o fl u S				0	4 1						0	0 2																			
Antimony Trichloride $SbCl_3$	Sat'd.			180	140	73		140	140	140	140	185	275	A	C	C	C	C	C	C	C	C	C	C	C	C	A	A			C	
Aqua Regia (Nitrohydrochloric Acid) $ClHHNO_3$		C	73	C	C	73	200	C	C	B to 70	C	100	C	C	C	C	C	C	C	C	C	C	C		B		B			B	C	
Argon Ar	Dry						350	200			100	200	550		A		A		A		A				A	A		A	A			A
Arsenic Acid $H_3ASO_4 \cdot Z\backslash xH_2O$	80%		185		140	280	400	185	160	200	180	200		A	C	C	C	C	C	C	C		C	B	A	B	A	A		A	C	
Aryl Sulfonic Acid $C_6H_5SO_3H$					140			140				185																				
Asphalt			C		C	250	350	C	B to 70	C	C	180			A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		A	C	A
Barium Carbonate $BaCO_3$	Sat'd.				140	280	400	250	180	200	160	250			A	A	A	A	B	B	B	B	B	A	A	A	A	A				
Barium Chloride $BaC_{l2} \cdot {}_2H_2O$	Sat'd.	180	180	180	140	280	400	250	180	200	160	300	275	A	A	A	A	A	B	B	C	B	B	B	A		A	A				A
Barium Hydroxide $Ba(OH)_2$	Sat'd.	180	180	180	140	280	400	180	140	150	150	250			C	C	C	C	B	B	C		B	A	A	A	A	A		A		
Barium Nitrate $Ba(NO_3)_2$	Sat'd.		180	70	73	275	250	200	180	200	160	300		A	C	C	C	C	A	A	A		A		A		A					
Barium Sulfate $BaSO_4$	Sat'd.	150	185	C	140	280	400	200	100	200	160	300	550	A	B	B	B	B	B	B	A		B	A	A	A	A	A				
Barium Sulfide BaS	Sat'd.	150	180	180	140	280	400	140	C	200	160	300	275		C	C	C	C	B	B	C		B	A	A	A	A	A				C
Beer		C		180	140	200	300	200	70	200	140	200			A	A	A	A	C	C	C		C	A	A	A	A	A			A	A
Beet Sugar Liquors				180	140	225		210	100	200	160	185					A		B	B	B				A	A	A	A			A	
Benzaldehyde C_6H_5CHO	10%	C		73	73	70		140	C	C	C	C	275	A	A	A	A	A	C	C	B		C	A	A	A	A	B		A		A
Benzene C_6H_6		C	C	C	C	170	250	C	C	C	C	150	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS															
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Benzene Sulfonic Acid C_6HSO_3H	10%			180	140	125		C	C	180	100	185	550		B	B	B	B	C	C	C		C	B	B	B	A	A				
Benzoic Acid C_6H_5COOH	All		73	140	230	350	C	C	200	160	200		C	550	C	C	C	C	C	C		C	A	A	A	A	A		A			
Benzyl Alcohol $C_6H_5CH_2OH$		C	C	120	C	250	400	C	C	C	C	140	275		A	A	A	A	B	B	B		B	A	A	A	A	A	A			A
Bismuth Carbonate $(BiO)_2CO_3$					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		See Sodium Hypochlorite or Calcium Hypochlorite																														
Blood							200		70	70	70	70			B		B		C	C			B		A	A	A	A		A		
Borax $NaB_4O_7 \cdot_{10} H_2O$	Sat'd.			180	140	280		210	140	200	140	185			A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A		
Boric Acid H_3BO_3	Sat'd.		185	180	140	280		210	140	200	140	185	275	A	B	B	B	B	C	C	B		C	B	A	B	A	A		A		
Brake Fluid							300	140	C			C	275		B				B	B	A		B	A	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 $HBrO_3$			185		140	200		70				70			C	C	C	C												C	C
Bromine Br_2	Liquid	C	C	C	C	150	300	C	C	70	C	70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		A	C	C
Bromine Br_2	Gas	C	C	C	C	150	200	C	C	70	C	70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A		A	C	C
Bromine Water	Cold Sat'd.	C	70	C	70	212	300	C	C	70	C	185	C	C	C	C	C	C	C	C	C		C								C	C
Bromobenzene C_6H_7Br		C	C	C	C	150	120	C	C	C	C	150																				
Bromotoluene C_7H_7Br		C	C	C	C	175	70	C	C	C	C	C																				
Butadiene $H_2C:CHHC:CH_2$	50%		73	C	140	250	C	C	C	B to 140	140	185	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Butane C_4H_{10}	50%			73	140	250	350	C	70	200	70	185	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Butyl Acetate $CH_3COOCH(CH_3)C_2H_5)$			73	C	C	73	175	140	C	C	C	C	550		B	B	B	B	B	B	B		B	A	A	A	A	A		A		
Butyl Alcohol $CH_3(CH_2)_2CH_2OH$		C	100	100	100	225	300	200	B to 140	140	140	75	550	A	B	B	B			B			A	A	A	A	A				B
Butyl Cellosolve $HOCH_2CH_2OC_4H_9$					73		200	140	C	100		C		A	A	A	A	A	A	A			A	A	A	A	A	A	A			
n-Butyl Chloride C_4H_9Cl						280	400	C	C	C	C	100			B	B	B	B	B	B	B		B	B	B	B	B	B				
Butylene (C) $CH_3CH:CHCH_3$	Liquid				140	280	400	C	70	C to 100	C	100			A	A	A	A			A			A	A	A	A	A	A	A		
Butyl Phenol $C_4H_9C_6H_4OH$					73	230				B to 70	C																					
Butyl Phthalate				180								70	275																			
Butyl Stearate $CH_3(CH_2)_{16}CO_2(CH_2)_3CH_3$					73	100	250	C	100		C	185			A	A	A	A	B	B			B	A	A	A	A					

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CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Amyl Acetate $CH_3COOC_5H_{11}$				C	C	125	100	B to 70	C	C	C	C	550		B	B	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A	
Amyl Alcohol $C_5H_{11}OH$			73	180	100	280	400	210	B to 140	200	140	185	550	A	A	A	A	A	B	B	B		B	A	A	A	A	A				A
n-Amyl Chloride $C_5H_{11}Cl$			C	C	C	280	400	C	C	C	C	200			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	
Aniline $C_6H_5NH_2$			C	180	C	120	200	140	C	70	C	C	275	A	C	C	C	C	B	B	C	B	B	A	A	A	A	B		A	C	C
Aniline Chlorohydrate					C																								A			
Aniline Hydrocloride $C_6H_5NH_2 \cdot HCl$	Sat'd.		C		C	75				C	C	185		C	C	C	C	C	C	C	C	C	C	C	C		A					
Anthraquinone $C_{14}H_8O_2$					140							200						C	C	C												
Anthraquinone dic A $C_{14}H_7O_2 \cdot SO_3H \cdot 3H_2O$	c i n o fl u			S	0	4 1						0	0 2																			
Antimony Trichloride $SbCl_3$	Sat'd.			180	140	73		140	140	140	140	185	275	A	C	C	C	C	C	C	C	C	C	C	C	C	A	A			C	
Aqua Regia (Nitrohydrochloric Acid) $ClHHNO_3$		C	73	C	C	73	200	C	C	B to 70	C	100	C	C	C	C	C	C	C	C	C	C	C		B		B			B	C	
Argon Ar	Dry						350	200			100	200	550		A		A		A		A				A	A		A	A			A
Arsenic Acid $H_3ASO_4 \cdot Z\backslash x H_2O$	80%		185		140	280	400	185	160	200	180	200		A	C	C	C	C	C	C	C		C	B	A	B	A	A		A	C	
Aryl Sulfonic Acid $C_6H_5SO_3H$					140			140				185																				
Asphalt			C		C	250	350	C	B to 70	C	C	180			A	A	A	A	A	A	A	A	A	A	A	A	A	A	B		A	C	A
Barium Carbonate $BaCO_3$	Sat'd.				140	280	400	250	180	200	160	250			A	A	A	A	B	B	B	B	B	A	A	A	A	A				
Barium Chloride $BaC_{l2} \cdot {}_2H_2O$	Sat'd.	180	180	180	140	280	400	250	180	200	160	300	275	A	A	A	A	A	B	B	C	B	B	B	A		A	A				A
Barium Hydroxide $Ba(OH)_2$	Sat'd.	180	180	180	140	280	400	180	140	150	150	250			C	C	C	C	B	B	C		B	A	A	A	A	A		A		
Barium Nitrate $Ba(NO_3)_2$	Sat'd.		180	70	73	275	250	200	180	200	160	300		A	C	C	C	C	A	A	A		A		A		A					
Barium Sulfate $BaSO_4$	Sat'd.	150	185	C	140	280	400	200	100	200	160	300	550	A	B	B	B	B	B	B	A		B	A	A	A	A	A				
Barium Sulfide BaS	Sat'd.	150	180	180	140	280	400	140	C	200	160	300	275		C	C	C	C	B	B	C		B	A	A	A	A	A				C
Beer		C		180	140	200	300	200	70	200	140	200			A	A	A	A	C	C	C		C	A	A	A	A	A			A	A
Beet Sugar Liquors				180	140	225		210	100	200	160	185					A		B	B	B				A	A	A	A			A	
Benzaldehyde C_6H_5CHO	10%	C		73	73	70		140	C	C	C	C	275	A	A	A	A	A	C	C	B		C	A	A	A	A	B		A		A
Benzene C_6H_6		C	C	C	C	170	250	C	C	C	C	150	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Cellosolve Acetate $CH_3COOCH_2CH_2OC_2H_5$					73		300	140	C	C	C	C			B		B			B					B		B			A	B	
Chloral Hydrate $CCl_3CH(OH)_2$	All				140	75				70	B to 70	C	550																		
Chloramine NH_2Cl	Dilute				73					70	70				B	B	B	B	C	C	C				B		B	B				
Chloric Acid $HClO_3 \cdot {}_7H_2O$	10%				140		140			200	140	140			C	C	C	C	C	C	C	C	C	C	B	C	A	C				
Chloric Acid $HClO_3 \cdot {}_7H_2O$	20%				140		140					100			C	C	C	C	C	C	C	C	C	C	C	C	C	A	C				
Chlorine Gas (Dry) (Moisture Content)	<150 PPM		C	C	73	200	400	C	C	C	C	185	C	A	C	C	C	C	B	A*	A*	B	B	B	A		A	A		A	C	C
Chlorine Gas (Wet) (Moisture Content)	>150 PPM	C	C	C	C	200	400	C	C		C	185	C		C	C	C	C	C	C	C	C	C	C	C	C	C	A		A	C	C
Chlorine	Liquid	C	C	C	C	200		C		B to 70	C	B to 100	C		B	B		B	C	C	C		C	C	C	C						
Chlorinated Water	<3500 ppm		73		140	230	400	B to 100	C	B to 70	C	185	C	73	B	B	C	C			C		C	B	A	A	A	A		A	C	C
Chlorinated Water	>3500 ppm		C		C	230	400	C	C	B to 70	C	185	C	73	C	C	C	C			C			C	A	B	A	B		A	C	C
Chloroacetic Acid $CH_2ClCOOH$	50%				140	C	200	70	C	200	C	C	C		C	C	C	C	C	C	C		C	C	C	C	B	B			C	C
Chloroacetyl Chloride $ClCH_2COCl$					73	125																										
Chlorobenzene C_6H_5Cl	Dry			73	C	170	200	C	C	C	C	70	C	A	A	A	A	A	C	C	B		C	A	A	A	A	A		A		
Chlorobenzyl Chloride $ClC_6H_4CH_2Cl$					C	125																			A		A					
Chloroform $CHCl_3$	Dry		C	C	C	125	200	C	C	C	C	70	275	A	A	A	A	A	C	C	C		C	A	A	A	A	A	A			
Chloropicrin CCl_3NO_2					C	150																										
Chlorosulfonic Acid $ClSO_2OH$				C	73	C	200	C	C	C	C	C			C	C	C	C	B	B	C	C	B	C	C	C	B	A		A	C	C
Chromic Acid H_2CrO_4	10%	C	180	150	140	175	350	70	C	140	C	140		C	C	C	C	C	C	C	C	C	C	B to 212	A to 70		A to 125	B		A	C	C
Chromic Acid H_2CrO_4	30%	C	180	150	140	175	350	C	C	140	C	140		C	C	C	C	C	C	C	C	C	C	B to 212	B to 70		A to 125	C		A	C	C
Chromic Acid H_2CrO_4	40%	C	180	150	140	175	300	C	C	140	C	140	C	C	C	C	C	C	C	C	C	C	C	C	B to 70			C		A	C	C
Chromic Acid H_2CrO_4	50%	C	140	C	75	125	200	C	C	140	C	140	C	C	C	C	C	C	C	C	C	C		C	B to 70		B to 212	C		B	C	C
Chromium Potassium Sulfate $CrK(SO_4)_2 \cdot 12H_2O$			73	140	73	200		140	180	200	160	200		A						C					B	B	A	B				
Citric Acid $C_6H_8O_7$	Sat'd.		185	180	140	275	200	210	70	140	140	200	550	A	C	C	C	C	C	C	C		C	B	A	A	A	A		A		C
Coconut Oil				73	140	280	400	C	70	B to 140	100	185	550		B	B	B	B	C	C	B		C	B	A		A	B				
Coffee								140	100			200			A	A	A	A	C	C	C			A	A	A	A		A			A

* Ratings are for body material only.

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		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
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		B				
Copper Acetate $Cu(C_2H_3O_2)_2 \cdot H_2O$	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 CuC_{l2}	Sat'd.		185		140	280	350	210	180	200	160	200		A	C	C	C	C	C	C	C	C	C	B	A		A	B		A	C	C
Copper Cyanide $Cu(CN)_2$			185		140	275	350	210	180		160	185			C	C	C	C	C	C	C	A	C	B	A		A	B				C
Copper Fluoride $CuF_2 \cdot {}_2H_2O$	2%				140	280		210	B to 70	140	140	185		A																		
Copper Nitrate $Cu(NO_3)_2 \cdot {}_3H_2O$	30%				140	280		210	B to 70	200	160	200		A	C	C	C	C	C	C	C		C	B	A		A	C			C	C
Copper Sulfate $CuSO_4 \cdot {}_5H_2O$	Sat'd.		185	120	140	280		210	180	200	160	200		A	C	C	C	C	C	C	C		C	A	A	A	A	C		A	C	C
Corn Oil			C	73	73	275	400	C	180	C	C	300			B	B	B	B	B	B	B	B	B	A	A	A	A	B				A
Corn Syrup				150	140	250			100	200	100	185																				
Cottonseed Oil			185	150	140	280	400	C	180	200		185	275		B	B	B	B	B	B	B		B	A	A	A	A	B			A	
Creosote			73		73		350	C	73	73	C	73	275		B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A		B
Cresol $CH_3C_6H_4OH$	90%			73	C	150	200	C	C	B to 140	C	100	C												B			B				
Cresylic Acid C_7H_8O	50%				140	150	200	C	C	C	C	185	275		A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A		A
Croton Aldehyde $CH_3CH:CHCHO$					C	125	200		C		70	C																				
Crude Oil			185		140	280	400	C	70			200	275		C	C	C	C	C	C	B			A	A	A	A	B				C
Cumene $C_6H_5CH(CH_3)_2$						100	300	C	C	C	C	200									B				B		B	B		A		
Cupric Fluoride CuF_2					140	280		210						A																		
Cuproc Sulfate $CuSO_4 \cdot {}_5H_2O$	Sat'd.	100		73	140	280	250	210	180	140	160	200	550	A																		
Cuprous Chloride CuCl	Sat'd.	70			140	250	3520	200	180	70	70	200		A	C			C															C
Cyclohexane C_6H_{12}		100	C	C	C	280	300	C	C	C	C	185	550		A	A	A	A	B	B	A		B	A	A	A	A	A	A	A		
Cyclohexanol C_6H11OH		100	C	120	C	150	250	C	C	C	C	185	550						A	A			A	A	A	A	A					
Cyclohexanone $C_6H_{10}O$			C	C	C	73	200	70	C	C	C	C	275		B	B	B	B	B	B	B		B	B	A		A	B		A		
Decahydronaphthalene $C_{10}H_{18}$							400	C	C	C	C	200																				
Detergents (Heavy Duty)		C	C	150	C			250	180	200	160	210	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Dextrin (Starch Gum)	Sat'd.				140	250	200	C	180			200			A	A	A	A	B	B	B				A		A					A
Dextrose $C_6H_{12}O_6$					140	275	400	140	180	140	160	200			A	A			A						A		A					

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Diacetone Alcohol $CH_3COCH_2C(CH)OH$			C	120	C	70	350	70	C		C	C			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Dibutoxyethyl Phthalate $C_20H_30O_6$					C			B to 70	C	140	C	200			A	A	A	A	A	A	A		A		A		A					
n-Dibutyl Ether $C_4H_9OC_4H_9$						100	350	C	C	C	C	C																				
Dibutyl Phthalate $C_6H_4(COOC_4H_9)_2$				120	C	C	350	70	C	C	C	C	275		A	A	A	A	A	A	A				A		A					
Dibutyl Sebacate $C_4H_9OCO(CH_)OCOC_4H_9$					73	C	350	70	C	C	C	C																				
Dichlorobenzene $C_6H_4C_{l2}$					C	150		C	C	C	C	150	C						A	A			A		A		A					
Dichloroethylene $C_2H_4C_{l2}$				C	C	225	350	C	C	C	C	185					B			B					B			A				
Diesel Fuels					140	280	350	C	70	C	C	185	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Diethylamine $C_4H_{10}NH$					C	73	200	70	70			C		A	C	C	C	C	A	A	C			A	A	A	A	B				C
Diethyl Cellosolve $C_6H_{14}O_2$						280		C	140		100	200							A	A			A		A		A					
Diethyl Ether $C_4H_{10}O$				73	73	73		C				C	275	A																		
Diglycolic Acid $0(CH_2COOH)_2$	Sat'd.				140	73	250	70	70			70																				
Dimethylamine $(CH_3)_2NH$				120	140	75		140	C	C	C	C							C						A		A					
Dimethyl Formamide $HCON(CH_3)_2$			C	120	C	C	250	C	100	100	C	C	275		B	B	B	B	B	B	B				A		A	A				
Dimethylhydrazine $(CH_3)_2NNH_2$					C	C						C																				
Dinonyl Phthalate $C_6H_4(COOC_8H_{19})_2$							32	B to 10	C	C	C	B to 10																				
Dioctyl Phthalate $C_6H_4(COOC_8H_{14})_2$			C	C	C	75	200	70		C	C	70	275		A	A	A	A	C	C	C											
Dioxane $0:(CH_2)_4:O$		C		73	C	C		70	C	C	C	C	275	A	A	A	A	A	A	A	A					A		A	A			
Diphenyl Oxide $(C_6H_5)_2O$	Sat'd.					125		C	C		C	300	C		A	A	A	A	A									A				
Disodium Phosphate Na_2HPO_4			185		140	200	400	210	100	140				A	B	B	B	B	B	B					A		A	B				
Dow Therm A $C_{12}H_{10}•C_{12}H_{10}O$					C		212	C	C	C	C	C	C	A	A	A	A	A	B	A	A		A	A	A	A	A	A	A			
Ether $C_4H_{10}O$			C	73	C	125			C	C	C	C			A	A	A		B	B	B	A	A	A	A	A	A	A	A			A
Ethyl Acetate $CH_3COOC_2H_5$		C		120	C	C	200	70	C	C	C	C	550		A	A	B		A	A	A			A	A	A	A	A	B	A		
Ethyl Acetoacetate $CH_3COCH_2COOC_2H_5$		C			C	73	200	100	C			C																				
Ethyl Acrylate $CH_2:CHCOOC_2H_5$			C		C	73	350	70	C	C	C	C			A	A			A	A	A		A	A	A	A	A	A	A	A		
Ethyl Alcohol (Ethenol) C_2H_5OH			140	180	140	280	300	170	180	200	70		550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		

Chemical Resistance Guide for Valves and Fittings

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		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Ethyl Benzyne $C_6H_5C_2H_5$				C	C	125	350	C	C	C	C	70			B	B			B	B	B		B		A		A	A		A		
Ethyl Chloride C_2H_5Cl	Dry			73	C	280	350	B to 70	C	70	B to 70	140	550	A	A	A	B		A	A	A	A	A	A	A	A	A	A	B	A		
Ethyl Chloroacetate $CH_2ClOCO_2CH_5$					C	75																										
Ethylene Bromide $BrCH_2CH_2Br$	Dry	C	C	C	C	280	350	C	C		C	B to 70			A					A	A				A		A	A		A		
Ethylene Chloride $ClCH_2CH_2Cl$	Dry	C		73	C	280	350		C	C		70													A		A	A				
Ethylene Chlorohydrin $ClCH_2CH_2OH$				73	C	73	200	70	C	70	70	C		A								A										
Ethylene Diamine $NH_2CH_2CH_2NH_2$		C		120	C	225		70	100	100	100				A	C		A	A	B				A		A	B				A
Ethylene Dichloride $C_2H_4Cl_2$	Dry	C		73	C	280	350	C	C	C	C	120	275	A	A	A			A	A	A		A		A	A	A	A	A			
Ethylene Glycol CH_2OHCH_2OC		73	185	120	140	280		210	180	200	160	250	550	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A
Ethylene Oxide CH_2CH2O				C	C	C	400	C	C	C	C	C	275		A	A			B	A	A		A		A		A	B		A		
Ethyl Ether $(C_2H_5)_2O$				C	C	125	250	C	C	C	C	C	275																			
Ethyl Formate $HCOOC_2H_5$						73			C		70	C			A	A			A	A			A		A		A					
2-Ethythexanol $CH_3(CH_2)CHC_2H_5CH_2OH$						250				70	C																					
Ethyl Mercaptan C_2H_5SH						75				C				A						A	A				A		A	A				
Ethyl Oxalate $(COOC_2H_5)_2$								140	C		C																					
Fatty Acids R-COOH			73	120	140	280	400	C	140	C	140	185	275	A	C	C	C	C	C	C	C		C		A		A	A		A	C	
Ferric Chloride (Aqueous) $FeCl_3$	Sat'd.		185	180	140	280	400	225	180	200	160	200	550	A	C	C	C	C	C	C	C	C		C	C	C	C	C		A to 175	C	C
Ferric Hydroxide $Fe(OH)_3$	Sat'd.		185	180	140	250	400	180	100	100	100	180							C	C			C		A		A	A			C	C
Ferric Nitrate $Fe(NO_3)_3 \cdot _9H_2O$	Sat'd.		185	180	140	280	400	210	180	140	160	200		A	C	C	C	C	C	C	C		C	B	A	A	A	C		A		C
Ferric Sulfate $Fe_2(SO_4)_3$				180	140	280	200	210	140	140	140	185	550	A	C	C	C	C	C	C	C		C	B	A	A	A	C				C
Ferrous Chloride $FeCl_2$	Sat'd.		185	180	140	280	400	200	180			200	275	A	C	C	C	C	C	C	C	C	C	C	C	C			B	C	C
Ferrous Hydroxide $Fe(OH)_2$	Sat'd.		185	180	73	250	400	180	180			180							C						A					C	
Ferrous Nitrate $Fe(NO_3)_2$			140	140	73	280	400	180	180	140	160	200		A											A	A	A					
Ferrous Sulfate $FeSO_4$		70	185	180	140	280	400	200	180	140	160	200		A	C	C	B		C	C	C	C	C	A	A	A	A	A		A		B
Fish Oil					140		300	C	70	C		70			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			

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		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Fluoboric Acid HBF_4			73	73	140	275	350	140	160	140	160	140			B	B			C	C			C		A		A	A			C	C
Fluorine Gas (Dry) F_2	100%	C	73	C	73	73	C	C	C	140	C	C	C	B to 300	B	B			C	C	A				A	A	A	A		A		
Fluorine Gas (Wet) F_2		C		C	73	73	C	C				100	C	C	C	C			C	C	C				A	A	A	A				
Fluosilicic Acid H_2SiF_6	50%		73		140	280	300	140	100	200	100	210	275		B	B			C	C	C		C	B	B	B	A	A		A	C	C
Formaldehyde HCHO	Dilute			120	140	125	300	140	C	200	140	C	550	A	A	A	B		C	C	B			A	A	A	A	A		A		
Formaldehyde HCHO	35%		73	180	140	125	300	140	C	150	140	C	550	A	A	A	B		C		B			A	A	A	A	A		A		
Formaldehyde HCHO	37%		73	180	140	125	300	140	C	C	100	C	550	A	A	A	B		C		B			A	A	A	A	A		A		
Formaldehyde HCHO	50%		73		140		300	140	C	C	140	C	275	A	B	B	B		C		B			B	A	A	A	A		A		
Formic Acid HCOOH			73	73	73	250	300	200	C	70	140	C	275	A	C	C	B		C	C	C	B	C	A	A	A	A	A		A		
Formic Acid Anhydrous HCOOH			73	180					C	160	100	C													A		A	A				
Freon 11 CCl_3F	100%	C	73		140	200	300	C	70	130	C	70	C	A	A	A	A	A	B	B	B		B	A	A	A	A	A				A
Freon 12 CCl_2F_2	100%		73	73	140	200	C	C		130	130	C	550	A	A	A	A	A	B	B	B		B	A	A	A	A					A
Freon 21 $CHCl_2F$	100%				C	200	300	C	C		C	C		A	A	A	A	A	B	B	B		B	A	A	A	A					A
Freon 22 $CHClF_2$	100%			73	C	200	C	C	C	130	130	C	275	A	A	A	A	A	B	B	B		B	A	A	A	A					A
Freon 113 $C_2Cl_3F_3$	100%				140	200	300	C	130	130	130	130		A	A	A	A	A	B	B	B		B	A	A	A	A					A
Freon 114 $C_2Cl_2F_4$	100%				140	200	300	C	130	70	70	C	275	A	A	A	A	A	B	B	B		B	A	A	A	A					A
Fructose $C_6H_{12}O_6$			185		140	280	300	175	140	140	160	225							A	A			A	A	A	A	A	A				
Furfural C_4H_3OCHO				C	C	75	300	140	C	70	70	C	275		A	A	A	A	A	A	A		A	A	A	A	A	A		A		A
Gallic Acid $C_6H_2(OH)_3CO_2H$			73		140	75	300	70	C	70	70	185			B	B	C		C	C	C		C	A	A	A	A	A		A		
Gasoline, Leaded		C	C	C	140	275	200	C	70	70	70	100	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Gasoline, Unleaded		C	C	C	140	275	200	C	70	70		100	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Gashol		C	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	A	A	A
Gasoline, Sour		C	C	C	140	280	200	C	70			100		A	B	B			A	A	A		A	B	A	A	A	C		A		
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 $Na_2SO_4 \cdot 10H_2O$							200	70	C	100	160	200			A	A		A	A	A			A	A	A	A	A	A	A			
Glucose $C_6H_{12}O_6 \cdot H_2O$		180	185	180	140	280	400	250	180	200	160	300	275		A	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	A

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		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Glycerin $C_3H_5(OH)_3$		140	185	180	140	280	400	200	70	200	160	300	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Glycol		See Ethylene Glycol																														
Glycol Amine															C	C	C		A	A	A		A		A		A					
Glycolic Acid $OHCH_2COOH$	Sat'd.			73	140	73	200		C	C	70	C	550		B	B			C	C	C		C		A		A	B				
Glyoxal CHOCHO									C	C	70				B	B	B		C	C	C		C		A	A	A	B				
Grape Sugar $C_6H_{12}O_6$					140			250	180	200	160	185																				
Grease								C	150	C	100	200			C	C	C	C	A	A	A		A		A	A	A	A	A	A		
Green Liquor								150	150	70	70				C	C	C		A	A		A	A		A	A	A	A				
Gypsum $CaSO_4 \cdot_2 H_2O$	Slurry					275	350	210	180	200	160	200			A	A	B	B	A	A	B	A	A	A	A	A	A	A		A		A
Heptane C_7H_{16}				C	140	280	300	C	70	70	70	185	550		A	A	A		A	A	A	A	A	A	A	A	A	A	A	A		
n-Hexane C_6H_{14}		C	73	73	73	280	300	C	70	70	70	70	550		A	A	A		A	A	A	A	A	A	A	A	A	A	A	A		
Hexanol $CH_3(CH_2)_4CH_2OH$					100	175	300	C	70	70	B to 70	160			A	A	A		A	A	A		A	A	A	A	A	A	A	A		
Hydraulic Oil (Petroluem)					73		300	C	160	70	70	250	550	A	A	A	B		A	A	A		A	A	A		A	A	A			
Hydrazine H_2NNH_2					C	200	250	70	70	70		C	C	A	C	C	C	C	C	C	C		C		A		A	A				
Hydrobromic Acid HBr	20%		73	120	140	280	250	140	C	100	B to 70	185	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C
Hydrobromic Acid HBr	50%			140	140	280	250	140	C	100	B to 70	185	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C
Hydrochloric Acid HCl	<25%	C	180	150	140	280	250	150	C	100		C	275	A	C	C	C	C	C	C	C	C	C	C	B	C	B	C	C		C	C
Hydrochloric Acid HCl	37%	C	160	150	140	280	250	150	C	100		C			C	C	C	C	C	C	C	C	C	C	B	C	B	C	C		C	C
Hydrocyanic Acid HCN	10%			73	140	280	250	200	70	200		185	275		C	C	C	C	C	C	C	C	C	C	A	B	A	A	C	A	C	C
Hydrofluoric Acid HF	<3%	125	73	180	73	250	300	C	C	150	70	150	C	A	C	C	C	C	C	C	C	C	C	C	C	C	B	A	C	A	C	C
Hydrofluoric Acid HF	30%	C	C	140	73	250	300	C	C	150	70	150	C	A	C	C	C	C	C	C	C	C	C	C	C	C	B	A	C	A	C	C
Hydrofluoric Acid HF	40%	C	C	140	73	250	300	C	C	140	C	100	C	A	C	C	C	C	C	C	C	C	C	C	C	A	B	B	C	A	C	C
Hydrofluoric Acid HF	50%	C	C	100	73	200	300	C	C	140	C	75	C	A	C	C	C	C	C	C	C	C	C	C	C	C	B	B	C	A	C	C
Hydrofluosilicic Acid H_2SiF_6	50%		140	140	140	280	300	140	170	150		200		C	B	B			C	C	C		C	B	B	B	A	A			C	C
Hydrogen H_2	Gas		73	73	140	280	300	250	180	200	160	300	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

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Hydrogen Cyanide HCN					140	280			70	100	70		275														A					
Hydrogen Fluoride Anhydrous HF			C	73	C	200	250	70	C			C	C	A											A	A	A			A		
Hydrogen Peroxide H_2O_2	50%		185	150	140	150	300	100	C	200	C	185	275	A	C	C	C	C	C	C	B	C	C	A	A	A	A	A			C	C
Hydrogen Peroxide H_2O_2	90%				140	73	30	C	C	200	C	100	250	C	C	C	C	C	C	C	B	C	C	A	A	A	A	B		B	C	C
Hydrogen Phosphide PH_3					140	150																										
Hydrogen Sulfide H_2S	Dry		185	150	140	280		100	C	140	C	140		A	B				B		B				A	B	A	A		A	B	
Hydrogen Sulfide H_2S	Wet				140	225		100	C	70	C	140	550	A	C	C	C	C	C	C	C		C	C	A	C	A	B		B	C	C
Hydrogen Sulfite H_2SO_3								70	C	70		100			C	C	C	C	C	C	C		C	C	A		A	A				C
Hydroquinone $C_6H_4(OH)_2$	Sat'd.				140	250	300	C	70		C	185	275								A				A		A	A				
Hydroxylamine sulfate $(NH_2OH)_2 \cdot H_2SO_4$					140			70			70																					
Hypochlorous Acid HOCl	10%		140	73	140	70	300	70	C			70																				C
Inks							300		70		70	70			A	A	A		C	C	C		C		A		A	A				
Iodine I_2	10%		73	150		150	200	70	70	70	C	70	275	B to 70	C	C	C	C	C	C	C		C	C	C	C	B	A		A		C
Iron Phosphate FeH_3PO_4												180		A	C	C	C	C					B	A	A	A	A	C				C
Isobutane $(CH_3)_2CHCH_3$							140	C	70	C	C	B to 70	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Isobutyl Alcohol $(CH_3)_2CHCH_2OH$						250	300	140	70	70	70	140													A		A					
Isooctane $(CH_3)_3CCH_2CH(CH_3)_2$				73		250	300	C	70	200	70	185	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Isophorone $C(O)CHC(CH_3)CH_2(CH_3)_2CH_2$						175		C	C			C																				
Isopropyl Acetate $CH_3COCOCH(CH_3)_2$		C					200	70	C	C	C	C	550	A	A				A	A	A		A	A	A	A	A	A	A			A
Isopropyl Alcohol $(CH_3)_2CHOH$		C	B to 70	180	140	140	300	140	70	200	70	160	A	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			A
Isopropyl Chloride $CH_3CHClCH_3$						100	200	C	C		C	70																				
Isopropyl Ether $(CH_3)_2CHOCH(CH_3)_2$			C		C	125	140	C	70	C	C	C	550		A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A		
JP-3 Fuel							200	C	70	C	C	185	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
JP-4 Fuel			73		140	200	300	C	70	C	C	300	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
JP-5 Fuel			73		140	200	300	C	70	C	C	300	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
JP-6 Fuel							200	C	100	C	C	100			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Kelp Slurry								C	70	C		100			B	B	B	B	B	B	B		B	A	A	A	A	A	A				

* Ratings are for body material only.

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Kerosene		C	185	73	140	280	250	C	140	C	70	300	550	A	A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	70	A
Ketchup					73		250	210	140	B to 70		200			C	C	C		C	C	C		C	B	A	A	A	A			C	
Ketones		C	C		C	C	200	C	C	C	C	C		A	A	A	A		A	A	A		A	A	A	A	A	A	A			
Kraft Liquors		100	185		140		250		70	70	70	100			C	C	C	C	C	C	C		C		A		A					
Lactic Acid $CH_3CHOHCOOH$	25%			150	140	125	300	70		140	140	70	550	A	C	C	C	C	C	B	C		B	A	A	A	A	A				
Lactic Acid $CH_3CHOHCOOH$	80%			150	73	125	300	70	C	140		70	550	A	C	C	C	C	C	B	C		B	A	A	A	A	A		A		
Lard Oil			185	73	140	280	300	C	140	C	70	185			C	C	C	C	B	B	B		B		A		A	B				C
Latex $(C_2H_6OSi)x$							200	70	70		100	70			A	A			A	A			A		A		A					
Lauric Acid $CH_3(CH_2)_{10}COOH$					140	225	300		70			100							C	C			C		A		A					
Lauryl Chloride $C_{12}H_{25}Cl$							300	140	70			200							C	C			C		A		A					
Lead Acetate $Pb(C_2H_3O_2)_2 \cdot 3H_2O$	Sat'd.		185	180	140	280	300	210	70	100	160	C	275		C	C			C	C	C		C		A		A	A				
Lead Chloride $PbCl_2$				73	140	250	300	C	100	100	70	140		A																		
Lead Nitrate $Pb(NO_3)_2$	Sat'd.		185	180	140	250	300	175	180		140	225	275	A							A				A		A					
Lead Sulfate $PbSO_4$			185	150	140	250	300	210	180	200	140	225		A	B	B			C	C	C		C		B		B	B				
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	A				
Linoleic Acid $CH_3(CH_2)_4HC{:}CHCH_2CH{:}CH(CH_2)_4COOH$					140	250	300	C	B to 70	C		140	275		C	C	C	C	C	C	C		C	C	B	B	A	A		A		C
Linoleic Oil					140	230	300					70																				
Linseed Oil		100	185	150	140	280	300	B to 70	180	200	70	250	550		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	550	A																		
Lithium Chloride LiCl						250		100	70			140	550	A	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	550		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	550		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	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Ludox SiO_2															C	C	C	C	A	A	A		A		A		A	A				
Magnesium Carbonate $MgCO_2$					140	280	225	170	140	140	140	210	275		B	B			B	B	B		B	A	A	A	A	A				
Magnesium Chloride $MgCl_2$	Sat'd.		185	180	140	280	400	170	180	200	160	170	275	A	A	A	B	B	C	C	C		C	C	C	C	B	A		A		A
Magnesium Citrate $MgHC_6H_5O_7 \cdot {}_5H_2O$					140	250	300	175	180			225																				
Magnesium Fluoride MgF_2								140				200		A						C			C		B							
Magnesium Oxide MgO								140	140		160				A	A				A			A					A				
Magnesium Sulfate $MgSO_4 \cdot 7H_2O$			185	180	140	280	300	175	180	140	160	200	550	A	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	550	A	C	C	B	C	C	C	C		C	B	A	B	A	B		A		B
Maleic Acid COOCHCHCH(OH)COOH			185	150	140	250	250	C	100	70	70	200			B	B			C	C	C		C	A	A	A	A	A				A
Manganese Sulfate $MnSO_4 \cdot 4H_2O$				150	140	250	300	175	140	180	160	225	225	A	A	A	A		C	C	B		C		A		A	A				
Mercuric Chloride $HgCl_2$			140	180	140	250	300	210	140	140	140	185	550	A	C	C	C	C	C	C	C	C	C	C	C	C	B	C		A	C	C
Mercuric Cyanide $Hg(CN)_2$	Satd.				140	250	300	70	70	140	70	70	275		C	C	C	C	C	C	C		C		A		A	C				C
Mercuric Sulfate $HgSO_4$	Sat'd.				140	230	300	70	70			70		A	C	C	C	C														C
Mercurous Nitrate $HgNO_3 \cdot 2H_2O$	Sat'd.				140	230	300	70	C		C	70	275	A	C	C	C	C	C	C	C		C	A	A	A	A	C				C
Mercury Hg			185	150	140	275	300	210	140	140	140	185	550	A	C	C	C	C	A	A	A		A	A	A	A	A	B		A		C
Methane CH_4		C			140	275	300	C	180	70	70	185	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Methanol (Methyl Alcohol) CH_3OH		C	C	180	140	280	300	140	140	140	140	C	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Methoxyethyl Oleate $CH_3OCH_2CH_2(OOCC_{17}H_{33})_2$					73																											
Methyl Acetate $CH_3CO_2CH_3$						100	300	B to 70	C	C	C	C	550		B	B			B	B	B		B	B	A		A	A		A		
Methyl Acetone C_4H_8O						C		70		C	C			C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A
Methyl Acrylate $CHCO_2C_2H_5$	Tech. Pure					100	300	B to 70	C	C	C	C							C						A		A	A				
Methyl Amine CH_3NH_2			C	C	C	C	300	70			70	100			C	C			A	A	B		A		A		A	C				
Methyl Bromide CH_3Br					C	280	300	C	70	C	C	185	275		C	C	B		C	C	B				B		B	B				
Methyl Cellosolve $HOCH_2CH_20CH_3$					C	280		70	C	70	70	C			A	A	B		B	B	B			A	A	A	A	A	A			
Methyl Chloride CH_3Cl	Dry	C			C	280	250	C	C	C	C	70			A	A	C	C	A	A	A	A	A	A	A	A	A	A	A	A	C	

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																	
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Methyl Chloroform CH_3CCl		C	C			125	200	C	C	C	C	70							A	A			A		A		A					
Methyl Ethyl Keytone) K E M ($CH_3COC_2H_5$																A	A	A	A	A	5	7A	2		C	A		A		C	A	C	A			A	C	C
Methyl Formate $HCOOCH_3$								100	C	C	70	C			A	A	A		A	A	C		A	A	A	A	A	A		A			
Methyl Isobutyl Carbinol $(CH_3)_2CHCH_2CH(CH_3)OH$							200	70	70	70	70	70																					
Methyl Isobutyl Keytone $(CH_3)_2CHCH_2COCH_3$		C	C	C	C	C	200	70	C	C	C	C	275	A					A						A	A	A	A	A				
Methyl Isopropyl Keytone $CH_3COCH(CH_3)_2$						C	150	C	C	C	C	C																					
Methyl Methacrylate $C_5H_8O_2$					73	125	150	C	C	70	C	C									C												
Methyl Sulfate $(CH_3)_2SO_4$					73	280	70																										
Methylene Bromide CH_2Br_2					C	175	250	C	C	C	C	70																					
Methylene Chloride CH_2Cl_2					C	C	250	C	C	C	C	70	C		B	B	B		B	B	B				A	A	A	A		A			
Methylene Chlorobromide CH_2ClBr					C			C	C	C	C	C							A	A					A		A						
Methylene Iodine CH_2I_2						C	200	250					250																				
Methylsulfuric Acid CH_3HSO_4					140	125																											
Milk			70	170		225	400	250	180	200	160	300	550		B	B	B	B	C	C	C		C	C	A	A	A	A			C	A
Mineral Oil		70	185	120	140	280	300	C	140	B to 70	70	300	550		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
Monochloroacetic Acid $CH_2ClCOOH$	50%		73	73	140	150	200	C	70	C	C	70		A	C	C	C	C	C	C	C		C	C	C	C	B	B				C
Monochlorobenzene C_6H_5Cl	Tech. Pure			73		170	200	C	C	C	C	70	C	A	A	A			A	A	A	A	A	A	A	A	A	A	A	A			
Monoethanolamine $HOCH_2CH_2NH_2$					C	C	100	70	70	C	C	185		A			C		B	B	B		B		A		A	B					
Morpholine C_4H_8ONH						75	200	70	C	C	C	C	275		B	B			B	B	B		B	B	B	B	B	B					
Motor Oil			185	73	140		350	C	180			250	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A
Naphtha		B to 70	73	73	140	280	200	C	140	C	C	150	550		A	A	B		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	275		A	A	B		A	A	A	A		A	A	A	A	A	A	A	A		
Natural Gas				73	140	280	300	C	140	140	140	185	550		A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A
Nickel Acetate $NI(OOC_2H_3)_2 \cdot 4H_2O$					73	250	300	70	70	C		C																			C		
Nickel Ammonium Sulfate $NISO_4 \cdot (NH_4)2SO_4 \cdot 6H_2O$							250		140	200	160				C	C	C	C	C	C	C				A		A	C			C		

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Nickel Chloride $NiCl_2$	Sat'd.		185	180	140	280	406	210	180	200	160	210	275	A	C	C	B		C	C	C				A		A	C		A		
Nickel Nitrate $Ni(NO_3)_2 \cdot 6H_2O$	Sat'd.				140	280	400	210	180			250	275	A	C	C			C	C	C			A	A	A	A	C			C	
Nickel Sulfate $NiSO_4$	Sat'd.		185	180	140	280	400	210		200	160	300		A	C	C	B		C	C	C									A		A
Nicotine $C_{10}H_{14}N_2$					140	70			C	70	C													B	A		A	B				
Nicotine Acid CsH_4NCOOH					140	250		70			140				B	B			C	C	C			B	B	B	B	B				A
Nitric Acid HNO_3	<10%	73	185	140	140	175	250	70	C	100	C	185	550	A	C	C	C	C	C	C	C	C		B	A	A	A	C			C	C
Nitric Acid HNO_3	30%	C	150	73	140	125	250	70	C	100	C	160	275	C	C	C	C	C	C	C	C		B	A		A					C	C
Nitric Acid HNO_3	40%	C	120	C	100	125	250	C	C	70	C	140	C	C	C	C	C	C	C	C	C		B	A		A					C	C
Nitric Acid HNO_3	50%	C	120	C	100	125	250	C	C	70	C	120	C	C	C	C	C	C	C	C	C	C		B	A		A				C	C
Nitric Acid HNO_3	70%	C	100	C	73	C	250	C	C	C	C	100	C	C	C	C	C	C	C	C	C	C		C	A		A				B	C
Nitric Acid $HNO_3 \cdot NOx$	Fuming	C	C	C	C	C	70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A		A	C			B	C
Nitrobenzene $C_6H_5NO_2$				73	C	73	400	C		C	C	70	C	A	B	B			A	A	A				A		A	A		A		
Nitroethane $CH_3CH_2NO_2$	Tech. Pure					70			C		C	C								A												
Nitrogen Gas N_2						275	300		140	100	140	185	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A
Nitroglycerin $CH_2NO_3CHNO_3CH_2NO_3$					C	125	70								B	B				B	B				A		A	B				
Nitroglycol $C_2H_4N_2O_6$					C					70	70																					
Nitromethane CH_3NO_2	Tech. Pure					120		70	C		C		275												A							
Nitrous Acid HNO	10%				73	230	400		C			100	275		C	C	C	C	C	C	C			B	B	B	B	C			C	C
Ntrous Oxide N_2O				73	73	C	400		C	B to 140	C	70	550	A	B	B			C	B	B				A		A	C		A		
n-Octane CH_8H_{18}						275	400	C	B to 70			70		550	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A
Oleic Acid $CH_3(CH_2)_7CH(CH_2)_7COOH$			185	150	140	250	250	B to 70	100	70	B to 70	185	550	A	B	B	A		B	B	C			B	A	A	A	A		A		A
Oleum		See Sulfuric Acid, Fuming																														
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
Oxalic Acid HOOCCOOH	50%		185	180	140	125	300	150	C		100	100	275	A	C	C	C		C	C	C	C	C	B	A	A	A	A		A	C	
Oxygen (Gas) O_2			185	150	140	280	406	210	B to 70	140	140	185	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Ozone O_3					140	225	300	210	C	140	C	185	275	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F																																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Palm Oil						200	200	C	140	C		70			C	C			C	C	C		C		A		A	A				
Palmitic Acid $CH_3(CH_2)_{14}COOH$	10%		73	180	140	250	300	70	100	70	C	185	550		B	B	B	A	B	B	B		B	B	A	A	A	A				A
Palmitic Acid $CH_3(CH_2)_{14}COOH$	70%		73	180	73	250	300		100	C	C	185	550		B	B	B	A	B	B	B		B	B	A	A	A	A			A	
Parafin $C_{36}H_{74}$		B to 70			140	250	250	C	100		140	300	550		A	A	A		B	A	A	B	B	A	A	A	A	A	A	A		A
Peanut Oil			C		C	250	250	C	100			150			A	A			A	A			A		A		A					
Pentachlorophenol C_6Cl_5OH		C	C		C		70	C	C	C	C	250																				
n-Pentane $CH_3(CH_2)_3CH_3$		C					100	C	100		70	100	550		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Peracetic Acid CH_3COOOH	40%				73																											
Perchloric Acid $HClO_4$	10%		140	73	73	200	250	70	C	70	70	70	275	A					C						A		A	A				
Perchloric Acid $HClO_4$	70%		185	73		125		70	C	C	C	185	C	C					C						B		B	A				
Perchloroethylene $Cl_2C:CCl_2$						275	200	C	C	C	C	200			B	B			B	B	B		B	A	A	A	A	A		A		
Perphosphate			170	170	140		250	70	70			70																				
Phenol C_6H_5OH		C	73	73	73	125		70	C	C	C	200	C	A	A	A	C		C	C	C		C	A	A	A	A	A		A		
Phenylhydrazine $C_6H_5NHNH_2$					C	125	B	C	C	C		C																				
Phospate Esters									C		C	100			C	C			C	C			C		A		A	A				
Phosphoric Acid H_3PO_4	10%		210	180	140	275	300	140	70	200	140	200	550	A	C	C	C	C	C	C	C	C	C	C	B	A	A	A	C			C	C
Phosphoric Acid H_3PO_4	50%		210	180	140	275	300	70	C	200	70	200	550	A	C	C	C	C	C	C	C	C	C	C	B	A	A	A	C			C	C
Phosphoric Acid H_3PO_4	85%		73	180	140	275	300	70	C	200	C	200	275	A	C	C	C	C	C	C	C	C	C	C	B	A	B	A	C			C	C
Phosphoric Anhydride P_2O_5			73	73	73	200															C				A		A				B	
Phosphorus (Red)					70	75	300																		A		A					
Phosphorus (Yellow)					73		300																									
Phosphorus Pentoxide P_2O_5			73	73	73	200		140									C				B				A		A				C	
Phosphorus Trichloride PCl_3					C	200	300		C	C	C			A											A		A	A			C	
Photographic Solutions			185	150	140					100	100	185								C					A		A					
Phthalic Acid $C_6H_4(COOH)_2$					73	200			C	140	C	140	550	A	A	A			B	B	C		B		A	A	A	B		A		A
Picric Acid $C_6H_2(NO_2)_3OH$	10%	C	140	170	170	73		140	C	70	70	140			C	C	C	C	C	C	C	C	C	B	A		A	C		A	C	C
Pine Oil									70		C	70			C	C	B		B	B	B		B	A	A	A	A	A				
Plating Solutions (Brass)			185	180	140	200	300	70			100	70																				

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Plating Solutions (Cadmium)			185	180	140	200	300	70			100	70																			
Plating Solutions (Chrome)			210	180	140	200	300				160														A		A				
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		A		C		C							A		A*				C
Plating Solutions (Rhodium)			185	180	140	200	300					70																			
Plating Solutions (Silver)			185	180	140	200	300	70			70	70													A		A			A	
Plating Solutions (Tin)			210	180	140	200	300	100				140															A	A			
Plating Solutions (Zinc)			185	180	140	200	300	70				70									B										
Polysulfide Liquor							300	70	70	70	70	100			C	C	C	C	B	B			B		B		B	B			C
Polyvinyl Acetate ($C_4H_6O_2$)						275	350	70	70	70	70	70			B	B	B		A	A	C		A	B	B	B	B	B			
Potash		See Potassium Carbonate																													
Potassium Alum $ALK(SO_4)_2 \cdot 12H_2O$					140	280	400	210	180	200	160	200																			
Potassium Aluminum Sulphate $AlK(H_2SO_4)_2$					140	280	400	210	180	200	160	200				B		C			C			B	A		A	A		B	B
Potassium Amyl Xanthate $C_6H_{11}OS_2K$					73																										
Potassium Bicarbonate KH_2CO_3	Sat'd.		73	170	140	200	400	170	70	200	160	200	275								A				A		A			A	
Potassium Bichromate $K_2Cr_2O_7$	Sat'd.				140	230	400	170	180			300	B	A		A		B			B			B	A		A			A	
Potassium Bisulfate $KHSO_4$					140	275	400	170	180	140	140	200		A	B	B	B		C	C	C	C	C		A		A	C			
Potassium Bromate $KBrO_3$				180	140	275	400		180	140	140	250							C	A	A		A		A		A				
Potassium Bromide KBr				180	140	280	400	170	180	200	160	200	275	A	B	B	B		C	C	C				A		A	A			
Potassium Carbonate K_2CO_3		70		180	140	280	400	170	180	200	160	200	550	A	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A			B
Potassium Chlorate $KClO_3$ (Aqueous)				180	140	200	400	140	B to 70	140	100	140		C	B	B			A	A	A	A		A	A	A	A	A	A			B
Potassium Chloride KCl			185	180	140	280	400	210	180	200	160	200				B	A	A	B	B	B	B	C	B	B	B	A	A	A	A		A
Potassium Chromate K_2CrO_4					140	280	400	170	140	70	70	200		C	A	A	B		B	B	B		B		A	A	A	A				
Potassium Cyanide KCN			185		140	280	400	140	180	200	160	185			C	C	C	C	B	B	B	B		A	A	A	A	A		A	C	C

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Potassium Dichromate $K_2Cr_2O_7$	Sat'd.		185		140	280	400	170	180	200		300	275	C	B	B	C		B	B	C			A	A	A	A	A				
Potassium Ethyl Xanthate $KS_2COC_2H_5$					73																											
Potassium Ferricyanide $K_3Fe(CN)_6$					140	280	400	140	70	200	150	140	550		C	C			B	B	C				A		A	A			C	
Potassium Ferrocyananide $K_4Fe(CN)_6 \cdot 3H_2O$					140	280	400	140	70	200	150	140	550		B	B	C	C	C	C	C			B	A		A	A			C	C
Potassium Fluoride KF					140	275	400	140	180			250		A											A		A	A				
Potassium Hydroxide KOH	25%	140	180	180	140	C	300	140	B	140	160	C	275	A	C	C	C		B	B	B	B		A	A	A	A	A			C	
Potassium Hypochlorite KClO		C	180	C	140	200	400	C	C to 70	70		70			C	C					C				A		A	C				
Potassium Iodide KI				73		250	400	140	100	140	160	180		A	B	B					B	B			A		A	A				
Potassium Nitrate KNO_3					140	280	400	210	180	140	140	250	275	C	A	A	B	B	B	B	B	B		A	A	A	A	A	A	A		A
Potassium Perborate			170	170	140	275	400		70		70			A																		
Potassium Perchlorate $KClO_4$					140	200	200	140	C	150		150																				
Potassium Permanganate $KMnO_4$	10%			150	140	250	400	210	C	100	100	140			B	B			A	A	A			A	A	A	A	A	A			
Potassium Permanganate $KMnO_4$	25%			150	73	250	400	140	C	100	100	140			B	B			A	A	A			A	A	A	A	A	A			
Potassium Persulfate $K_2S_2O_8$					140	125	400	210	C	200	140	200																				
Potassium Sulfate K_2SO_4				180	140	280	200	210	140	140	140	250		A	A	A	B	B	A	A	A	A	B	A	A	A	A	A	A	A		A
Potassium Sulfide K_2S						275	300		100		70	100	550		C	C	C	C	C	C	C	B		B	B	B	B	C		A		C
Potassium Sulfite $K_2SO_3 \cdot 2H_2O$							300	140	70		70	200			B	B	B		C	C	C				A		A	B				
Potassium Tetraborate $K_2B_4O_7 \cdot 8H_2O$					140	275	400	170	180	140	140	200		A						A	A		A		A		A					
Potassium Tripolyphosphate $K_5P_3O_{10}$							300		70		70	100		A			B		A		A	A			A		A	A			C	
Propane C_3H_8			73		140	280	300	C	70	B to 70	70	70	550	A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A
Propargyl Alcohol $HC{:}CCH_2OH$		C		140	100	140		140		140	C	140																				
Propionic Acid $CH_3CH_2CO_2H$		C							140	70	C														A		A					A
Propyl Acetate $C_3H_7OOCCH_3$						100	140	B to 70	C	C	C	C	550					A			A			A	A	A	A	A	A		A	
Propyl Alcohol $CH_3CH_2CH_2OH$		C		140		140	350	140	140	140	140		550		A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A
n-Propyl Bromide $CH_3CH_2CH_2Br$							300	B to 70			70	70			B	B	B		B	B	B				A		A	B				
Propylene Dichloride $CH_3CClCHCl$					C	200		C	C		C	B to 70									A							A				

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Propylene Glycol $CH_3CHOHCH_2OH$	<25%	C	180	140	C	150	300	70	180	70	100	140	550	A	B to 70	B to 70		B to 70			B to 70				A to 140			B to 70		B to 70	B to 70	B to 70
Propylene Glycol $CH_3CHOHCH_2OH$	<25%	C	C	140	C	150	300	70	180	70	100	140	550	A	B to 70	B to 70		B to 70			B to 70				A to 140			B to 70		B to 70	B to 70	B to 70
Propylene Oxide CH_3CHCH_2O					C	C	150	70	C	C	C	C									A				A		A					
n-Propyl Nitrate $C_3H_7NO_3$							200	70	C	C	C	C							A	A			A		A		A					
Pyridine $N(CH)_4CH$				73	C	C		B to 70	C	C	C	C	C		B	B			B	B	B		B	C	B		A	B				
Pyrogallic Acid $C_6H_3(OH)_3$					73	150	150		70		70				A	A			A	A	A		A	A	A	A	A	A	A	A		
Pyrrole $CHNH(CH)_2CH$								C	C	C	C	C			B	B			B	B	B		B		B		B	B				
Quinone $C_6H_4O_2$								100		C		C							A	A			A		A		A					
Rosin							200		70	70	70	100			C	C			C	C	C		C	A	A	A	A	A				
Salicylaldehyde C_6H_4OHCHO					C	125	200	70	70			70																				
Salicylic Acid $C_6H_4(OH)(COOH)$					140	200	300	210	C	70	C	185			B	B			C	C	C		C		A		A	B				
Selenic Acid H_2SeO_4					140	150			70	70	70																					
Silicic Acid $SiO_2 \cdot nH_2O$					140		400	140	100	140	140	200																				
Silicone Oil			150	150	73	250	350	140	140	140	70	185	550	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Silver Chloride AgCl														A	C	C	C	C	C	C	C		C	C	C	C	A to 70	A				C
Silver Cyanide AgCN			185		140	280	350	140	C		70	140			C	C	C	C	C	C	C		C		A to 100		A to 70	A				C
Silver Nitrate $AgNO_3$		70	185	180	140	280	350	210	140	200	160	250	550	A	C	C	C	C	C	C	C		C	B	A		A	C				C
Silver Sulfate Ag_2SO_4		70			140	250	350	170	140			200		A																		
Soaps		70	185	73	140		400	210	180	140	140	250	550		B	B	A		B	B	B		B	A	A	A	A	B		A		
Sodium Acetate $NaC_2H_3O_2$	Sat'd.		185	180	140	280	400	170	C	70		C	275		A	A	B		B	B	C		B	B	A		A	A		A		
Sodium Alum $AlNa(SO_4)_2 \cdot 12H_2O$					140	280		170	180	140	140	210									C									C	
Sodium Aluminate $NaAlO_2$	Sat'd.						300	200	180	140	140	200	275		C	C	B		B	B	A		B		A		A	A		A		
Sodium Benzoate C_6H_5COONa			140	170	140	280	300	210	140			200	550															A				
Sodium Bicarbonate $NaHCO_3$		70	185	180	140	280	400	250	180	200	160	300	550		A	A	B	B	A	A	C		A	A	A	A	A	A	A	A		A
Sodium Bichromate $Na_2Cr_2O_7 \cdot 2H_2O$	Sat'd.		140	140	140	250	400	140	140	70	70	200	275	C	C	C								A	A	A	A	A				
Sodium Bisulfate $NaHSO_4$		70		180	140	280		200	180	100	140	250			C	C	C	C	C	C	C		C	B	A		A	A				C

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS															
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Sodium Bisulfite $NaHSO_3$			185	180	140	280	400	200	180	200	140	250	550		B	B			C	C	C		C		A		A	C		A		
Sodium Borate (Borax) $Na_2B_4O_7 \cdot 10H_2O$	Sat'd.			73			300	140	70	100	100	140	550	A	A	A			B	B			B	A	A	A	A	A				
Sodium Bromide NaBr	Sat'd.		180	180	140	280	300	210	70		70	250	275	A	B	B			C	C	C		C		A		A	A				
Sodium Carbonate Na_2CO_3		70	185	180	140	280	400	140	140	140	140	300	550		A	A	B	B	A	A	A	A	A		A	A	A	A	B	A		C
Sodium Chlorate $NaClO_3$	Sat'd.			180	73	250	350	B to 140	B to 70		B to 140	100			A	A	C		B	B	B		B	B	A	A	A	C				
Sodium Chloride NaCl	.		210	180	140	280	350	140	140	100	160	200			B	A	A	A	B	B	B	B	C	A	B	B	B	B	A	A	A	A
Sodium Chlorite $NaClO_2$	25%		73		C	250	200	C	C	140		C		C																		
Sodium Chromate $Na_2CrO_4 \cdot 10H_2O$						200		70	70		70	70		C	A	A			B	B	B		B	A	A	A	A	A				
Sodium Cyanide NaCN			185	180	140	280	350	140	140	140	140	140		200	275	C	C	C	C	A	A	A	A		A	A	A	A	A			C
Sodium Dichromate $Na_2Cr_2O_7 \cdot 2H_2O$	20%		185	180	140	200	300	140	C	200	C	200		C	C	C	C		B	B	B				A		A	B				
Sodium Ferricyanide $Na_3Fe(CN)_6 \cdot H_2O$	Sat'd.		140	140	100	275	350	140	70			140			C	C			C	C					A		A					
Sodium Ferrocyanide $Na_4Fe(CN)_6 \cdot 10H_2O$	Sat'd.		185		140	275	350	140	70			140													A		A	A				
Sodium Fluoride NaF			140	185	140	280	350	140	70	140	70	140	275	A	A	A	B		C	C	C				A		A	A				
Sodium Hydroxide NaOH	<10%	140	210	180	140	100	400	180	140	200	160	C	275	A	A		A			A	A		B	A	A	A	A	A	A	A	C	
Sodium Hydroxide NaOH (Caustic Soda)	30%	70	210	180	140	C	350	140	100	140	160	C	275	A	A		B			B	B		B	A	A	A	A	A			C	
Sodium Hydroxide NaOH	50%	70	210	180	140	C	350	140	C	140	160	C	275	A	B	C	C	C	B	B	B	B	B	A	A	A	A	A			C	B
Sodium Hydroxide NaOH	70%	C	140	180	140	C	350	70	C	100	100	C		A	C	C	C	C	B	B	B	B	B	A	A	A	A	A			C	B
Sodium Hypochlorite $NaOCl \cdot 5H_2O$	5%	C	185	B to 100	73	275	350	70	C	150	C	185	C		C	C	C	C	C	C	C	C	C	C	A		A	A		A	C	C
Sodium Hypochlorite $NaOCl \cdot 5H_2O$	Sat'd.	C	185	C	73	B to 200	350	C	C	150	C	140	C		C	C	C	C	C	C	C	C	C	C	A		A	A		A	C	C
Sodium Iodide NaI						275				140	160			A																		
Sodium Metaphosphate $(NaPO_3)n$				73		280		70	70	70		70		A	C	C	C		C	C	C				A		A	B				
Sodium Nitrate $NaNO_3$	Sat'd.		185	180	140	280	400	210	140	140	140	225	275	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	B	A		B
Sodium Nitrite $NaNO_2$					140	280	400	170	C	140	140	200			A	A			B	B	B				A		A	A				
Sodium Palmitate $CH_3(CH_2)_{14}COONa$	5%					250	350																									
Sodium Perborate $NaBO_2 \cdot H_2O_2 \cdot 3H_2O$				73	140		350	70	70	70	70	70	275	A	C	C			B	B	B			A	A	A	A	A		A		

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT T MAX.TEMPERATURE °F					SEAL MATERIALS AT MAX.TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Sodium Perchlorate $NaClO_4$		170	170		140	250	350		B to 70																						
Sodium Peroxide Na_2O_2					140	200	250	140	B to 70	200	70	185		C	C	C	C	C	C	C	C			A	A	A	A	A		B		B
Sodium Phosphate NaH_2PO_4	Acid			180		280	400	170	140	200	140	200	550	A	B	B	B	B	B	B	B	A	B	A	A	A	A	B		A		B
Sodium Phosphate NaH_2PO_4	Alkaline			180		280	400	170	140	200	140	200	550	A	B	B	B	B	B	B	B	A	B	A	A	A	A	B		A		B
Sodium Phosphate NaH_2PO_4	Neutral			180		280	400	170	140	200	140	200	550	A	B	B	B	B	B	B	B	A	B	A	A	A	A	B		A		B
Sodium Silicate $Na2SiO_3$				180		280		200	140	200	140	200	550		C	C	B		A	A	A		A	A	A	A	A	A	A	A		
Sodium Sulfate Na_2SO_4	Sat'd.	70	185	150	140	280	400	140	140	140	140	200	275	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A		A
Sodium Sulfide Na_2S		70	185	150	140	280	350	140	180	200	140	200	550		C	C	C	C	B	B	C	B	B	A	A	A	A	A				C
Sodium Sulfite Na_2SO_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 $NaS_2O_3 \cdot 5H_2O$				150	140	280	350	200	140	200	160	200	550		B	B	C		C	C	C		C		A		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		
Soybean Oil						250	400	C	140	200	70	250			A	A	B		A	A	B	A	A	A	A	A	A	A	A			
Stannic Chloride $SnCl_4$			185		140	280	350	100	140	70	C	200	275	A	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C			C
Stannous Chloride $SnCl_2$	15%		185		140	280	350	70	140	200	160	200		A	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				
Steam (Low Pressure)						280	400	C	C	C	C	C	550	A	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			A	A	A	A	A	A	A	A	A	A	A	A	A	B		A	B	A
Steam (High Pressure)							C	C	C	C	C	C			C	C	C	C	C	B	A	C	B	A	A	A	A	C		A	C	C
Stearic Acid $CH(CH_2)_{16}COOH$			185	73	140	275	350	C	140	70	70	100	550	A	A	A	C	B	C	C	C	B	C	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	
Styrene $(C_6H_5CHCH_2)n$						180	350	C	C	C	C	100	275		B	B	B		B	B	B		B		A		A	A		A		
Succinic Acid $CO_2H(CH_2)_2CO_2H$				150	140	150	200	70	70			70			A	A			A	A	A		A	A	A	A	A	A	A	A		
Sugar $C_6H_{12}O_6$						275	350	140	100	140	140	200			C	C				B	C		B	A	A	A	A	A				
Sulfamic Acid HSO_3NH_2	20%			180	140	C		C	C	70	70	C			B	B	B		C	C	C		C		A		A	B				A
Sulfate Liquors (Oil)				73			200	70	70			70			C	C	C	C	B	A			A		A		A	A				C
Sulfite Liquors	6%				140		350	140	70	70	70	140									C	B			A		A					
Sulfur S				C	140	250	350		C	70	70	250	275	A	C	C	C	C	B	B	C	B	B	B	A		A	A		A	C	C
Sulfur Chloride S_2Cl_2				C		73	350	C	C	70	C	70		A	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C		C	C

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT T MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Sulfur Dioxide SO_2	Dry		C	73	140	175	350	70	C	200	C	100	550	A	A	B	A	A	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		A	C	B	B	C						C	A	C	A	A		A	B	C
Sulfur Trioxide SO_3					140	C		70	C	C	C	140		C	C			C						C	B	B	A	A		A		C
Sulfuric Acid H_2SO_4	Up to 30%	100	210	180	140	250	250	140	C	100	100	250		A	C	C	C	C	C	C	C	C	C	C	A	B	A	A	C	A		C
Sulfuric Acid H_2SO_4	50%	70	210	150	140	250	250	70	140	150	C	250	C	A	C	C	C	C	C	C	C	C	C	C	A	C	A	A	C	A		C
Sulfuric Acid H_2SO_4	60%	C	210	150	140	250	250	C	C	150	C	250	C	A	C	C	C	C	C	C	C	C	C	C	B	B	A	B	C	A	C	C
Sulfuric Acid H_2SO_4	70%	C	210	120	140	200	200	C	C	150	C	200	C	212	C	C	C	C	C	C	C	C	C	C	B	C	A	C	C	A	C	C
Sulfuric Acid H_2SO_4	80%	C	180	73	140	200	200	C	C	150	C	180	C	212	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	A	C	C
Sulfuric Acid H_2SO_4	90%	C	150	C	100	200	200	C	C	70	C	160	C	212	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	A	C	C
Sulfuric Acid H_2SO_4	93%	C	140	C	100	200	200	C	C	70	C	160	C	160	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C	A	C	C
Sulfuric Acid H_2SO_4	94%	C	140	C	100	150	200	C	C	C	C	160	C	160	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C	A	C	C
Sulfuric Acid H_2SO_4	95%	C	135	C	100	150	200	C	C	C	C	160	C	B to 160	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C	A	C	C
Sulfuric Acid H_2SO_4	96%	C	130	C	100	150	200	C	C	C	C	160	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C	B	C	C
Sulfuric Acid H_2SO_4	98%	C	125	C	C	150	200	C	C	C	C	160	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	C	B	C	C
Sulfuric Acid $*H_2SO_4 \cdot ySO_3$	Fuming	C	C	C	C	C	200	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	B	C	C		C	C
Sulfurous Acid H_2SO_3	Sat'd.	C	180	140	140	210	350	75		150	C	100	275	A	C	C	C	C	C	C	C	C	C	B	A	A	A	A	C	A		C
Surfactants Non-Ionic		C	C	100	C							B to 125																				
Tall Oil					140	280	250	C	140	C	B to 70	70			B	B	B		B	B	B		B	A	A	A	A	A	B		A		
Tannic Acid $C_{76}H_{52}O_{46}$	10%	C	185	180	140	225	250	70	100	100	100	100			A	A			B	B	C	B	B	B	A	A	A	A		A		
Tanning Liquors			185		140				70	70	70	200			A	A			B						A		A				A	
Tar						250	250	C	C	70	70	185	275		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
Tartaric Acid $HOOC(CHOH)_2COOH$				150	140	250	250	C	70	200	70	70	275	A	A	A	C	C	C	C	C	C	C	A	A	A	A	A		A		B
Terpineol $C_{10}H_{17}OH$					C			C	70	C	C																					
Tetrachloroethane $CHCl_2CHCl_2$						250	400	C	C	C	C	70													A		A					
Tetrachloroethylene $C_{l2}C:CCl_2$		C				275	350	C	C	C	C	70																				
Tetraethyl Lead $Pb(C_2H_5)_4$					73	280	350	C	70	C		70	275		A	A				B	B		A				A	A				

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Tetrahydrofuran C_4H_8O			C	C	C	C		C	C	C	C	C	275																		
Tetralin $C_{10}H_{12}$							200	C	C		C	C																			
Tetra Sodium etahpsohporyP41 $NaP_2O_7 \cdot 10H_2O$														A																	
Thionyl Chloride $SOCl_2$					C				C		C		275	A																	
Thread Cutting Oils					73	200	350	C	70			70			A				A	A	A			A	A	A	A		A	A	A	
Titanium Tetrachloride $TiCl_4$					C	150		C		C	C	185	275	A	C	C					C				B		B	B				
Toluene (Toluol) $Ch_3C_6H_5$		C	C	C	C	175	200	C		C	C	70	275		A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A
Tomato Juice				180		200	350	200	C	C	70	200			B				C	C	B				A	A	A	A			A	
Transformer Oil				120	140		300	C	140		C	140	550	A	A					A	A				A	A	A	A		A	A	
Transformer Oil DTE/30							300	C	140	C	C		550	A	A					A	A				A	A	A	A		A	A	
Tributyl Citrate $C_{18}H_{32}O_7$					73																										
Tributyl Phosphate $(C_4H_9)_3PO_4$					C	73	300	70	C	C	C	C			B	B	B		A	A	A			B	A		A	A				
Trichloroacetic Acid CCl_3COOH				150	140	125	200	70	B to 70	70	70	C		A	B	C			C	C	C			C	B		B					
Trichloroethylene $CHCl:CCl_2$		C	C	C	C	280	200	C	C	C	C	185	275	A	A	A	A	A	B	B	B			A	A	A	A	A	A	A	A	A
Triethanolamine $(HOCH_2CH_2)_3N$		70			73	125		70	70	150	70	C	275		C	C			C	C	C	C		C	A		A	A				
Triethylamine $(C_2H_5)_3N$					140	125			140		70	200				A	A												A			
Trimethylpropane $(CH_2OH)_3C_3H_5$				73				180	200	160	300																				
Trisodium Phosphate $N_3PO_4 \cdot 12H_2O$		70	185	185	140	280	350	70	70	185	70	185	550	A	C	C			B	B		A			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	550		A	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	550			B	B			C	C	C				A	A	B	C			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	B	B	C	C	C			B	A	A	A	A		A		A
Vaseline (Petroleum Jelly)				150	C		300	C	140	70	140	70	550						A	A	A			A	A	A	A	A	A	A		
Vegetable Oil		C	C	100	C	275	300	C	70	70	70	200	550		A	A				A	A			A	A	A	A	A	A		A	
Vinegar		73	180	180	140	225	300	180	C	200	70	C	550		C	C	C	C	C	C	C			A	A	A	A	A		A	C	B
Vinyl Acetate $CH_3COOCH:CH_2$				C	C	250	350	70	70	C	C	C	275		B	B		B	B	B				A		A	B					
Water, Acid Mine H_2O			185		140	230	400	200	180	180	160			A	C	C	C	C	C	C	C	C	C	A	A	A	A	B	B	B	C	C

Chemical Resistance Guide for Valves and Fittings

CHEMICALS AND FORMULA	CONCENTRATION	PLASTICS AT MAX. TEMPERATURE °F					SEAL MATERIALS AT MAX. TEMP °F								METALS																
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYPALON	NEOPRENE	FLUORO-CARBON	PEEK	GRAPHITE	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	ALUMINUM	COPPER
Water, Deionized H_2O		70	210	180	140	280	400	200	70		160			A	B	B	C	C	C	C	C		C	B	A	A	A	A		A	A	A
Water, Distilled H_2O		70	210	180	140	280	400	250	180	200	160			A	A	A	B	B	C	C	C	B	C	A	A	A	A	A	B	A	A	A
Water, Potable H_2O		70	210	180	140	280	400	250	180	200	160		550	A	A	A	A	A	B	B	B	A	B	A	A	A	A	A	A	A	B	A
Water, Salt H_2O		70	210	180	140	280	400	250	180	200	160			A	B	B	B	C	C	C	C	B	C	B	A	A	A	A	B	A	C	B
Water, Sea H_2O		70	210	73	140	280	400	250	180	200	160			A	B	B	B	C	C	C	C	B	C	B	B	A	A	A	C	A	C	B
Water, Soft H_2O		70				200	400	250	180	200	160			A	A	A	A	B	C	C	B	B	C	A	A	A	A	A	A	A	A	A
Water, Waste H_2O		70	185	180	140	230	400	200				70		A	B	B	B	B	B	B	B	B	B	B	B	A		A	A		A	B	B
Whiskey			185	150	140	200	350	200	140	140	140	140			C	C	B		C	C	C		C	B	A		A	A		A		A
White Liquor			185		140	230			140	140	140		550		C	C	C		C	C	C		C		A		A	A				
Wine			185	150	140	200	350	170	140	140	140	140	550		C	C			C	C	C		C	B	A		A	A				
Xylene (Xylol) $C_6H_4(CH_3)_2$		C	C	C	C	200	350	C	C	C	C	150	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Zinc Acetate $Zn(C_2H_3O_2)_2 \cdot 2H_2O$						250		180	70	70	160	70			C	C	C	C	C	C	C		C		A		A	A				
Zinc Carbonate $ZnCO_3$									100	100			275		B	B									B		A	B				
Zinc Chloride $ZnCl_2$			185	180	140	280	400	180	70	200	160	200	275	A	C	C	C		C	C	C		C	C	B	B	A	A				
Zinc Nitrate $Zn(NO_3)_2 \cdot 6H_2O$					140	280		180	140	200		200	275	A											A	A	A					
Zinc Sulfate $ZnSO_4 \cdot 7H_2O$			185	180	140	280	400	180	140	200	140	200	275	A	C	C	B		C	C	C	B	C	A	A	A	A	A		A		A

Kaynak: NIBCO INC.