

# Chemical Resistance Charts

## RATING CODES

- (A) Excellent
- (B) Good
- (C) Fair
- (D) Uncertain
- (X) Unsuitable
- (□) Insufficient Data

**Note:** Oscillating pumps require a rating of 'A'. Bellows pumps with poppet or duckbill valves require a rating of 'A' or 'B'. All other pumps and valves require a rating of 'A', 'B', or 'C'.

(Consult factory for an OEM application)

These ratings have been developed from technical publications, material suppliers and laboratory tests, and are presented for your evaluation and not as a guarantee. Because effects of temperature, concentration, combination of chemicals, pressure, agitation, aeration, duration of exposure, combustion, toxicity and other conditions are different for each customer or use, Gorman-Rupp Industries recommends that their products be tested under simulated field service conditions, by qualified personnel, before acceptance. Never test or operate the pump before obtaining a specific rating, a material safety data sheet and other warning material from your chemical supplier. Always use appropriate protective equipment when testing, installing, operating or maintaining the pump. If you are pumping a chemical which is not presently rated in our chart, consult the factory. Our staff will help determine material selections for testing.

CHEMICAL NAME A	CARBON		CERAMICS		ELASTOMERS										METALS				PLASTICS															
	CARBON	CERAMIC ALUMINA	CERAMIC BARIUM FERRITE	AFLAS®	BUNA N (NITRILE)	BUTYL	EPT/EPDM	HYDRIN®	HYPALON®	KEL-F® ELASTOMER	NATURAL RUBBER	NEOPRENE®	NORPRENE®	SILICONE ELASTOMER	SILICONE ELASTOMER 1125	VITON®/FLUOROELASTOMER	BRASS, CARTRIDGE	BRONZE	HASTELLOY® C	MONEL	STAINLESS STEEL (302-305, 630)	STAINLESS STEEL (316)	STAINLESS STEEL (403-416)	EPOXY (ADHESIVE)	HALAR® (ECTFE)	NORYL® GLASS-FILLED (PPO)	NYLON	PHENOLIC	POLYETHYLENE (PET)	POLYPROPYLENE* (PPR)	POLYPROPYLENE BELLOWS STD.	RYTON®, GLASS-FILLED (PPS)	TEFLON® (TFE)	VECTRA® (LCP)
ACETATE SOLVENTS		A		X	X	X	X	X	X	X	X	X	X	B	C	X	A		B	A	A		B	A	X	B	A	B	X	X	A	A	A	
ACETIC ACID		A	A	A	C	C	B	C	C	C	C	X	A	A	B	X	C	A	B	B	A		B	A	A	X	A	C	B	B	A	A	A	
ACETIC ACID 95%	X			X		C				A			A				A	B	B	X			A	A			A	A	A		A			
ACETONE	C	A	B	X	X	C	C	X	X	X	X	X	X	C	X	A	A	A	A	C	A	A	B	A	X	A	B	B	A	B	A	A	A	
ALCOHOL	C				B	B	X		B	A	C	X	C	C	X	B			A	A	A	A	A	A	B	B	A	C	X	X	A	A	B	
ALUM				A	C	B	B		B	A	A	B	A	C	B	X		B	B	X	C	X	B	A	A	C	B	A	A	B		A		
ALUMINUM CHLORIDE		A		X	B	B		B	A	C	B	A	C		B			X	C	X	C		B	A	A	B	X	B	A	B	A	A	B	
AMMONIA				X	C	C	X	X	X	X	A	A			X								B	A	A	A	A				A	A		
AMMONIA-AQUEOUS 30%				A	X	B	B					A						B	A	B	A			A	A			A	B	A				
AMMONIA, ANHYDROUS	C	A		C							A	A			X	X	A	X	A	A			A	A		A					A			
AMMONIUM CHLORIDE		A	A	X	B		A	B	A	X	B	A	B		B	X	X	C	B	X	B	C	B	A	A	B	A	A	B	A	A	A		
AMMONIUM DIHYDROGEN PHOSPHATE									A										A					A	A			A						
AMMONIUM HYDROXIDE		A		C	B	B		B	A	C	C	A	C		X	X	A	A	X	A	A	A	B	A	A	C	A	B	A	B	A	A		
AMMONIUM SULFATE		A		X	B			B	A	X	B	A	B		B	X	A	C	B	B	B	C	B	A	A	B	A	B	A	B	A	A		
B																																		
BARIUM CHLORIDE	X	A		B	B	X	A	B	A	C	A	A	B		B			A	B	A	B		B	A	A	B	B	A	A	B	A	A		
BARIUM FLUORIDE				X	C	X		C	A	X	B	A	X		C								B	A	A	C	X	X	X	X		A		
BARIUM NITRATE	X	A		B	B	B		B	A	X	A		B		B				X	B	B		B	A	A	B	B	B	A	B		A		
BARIUM SULFATE		B		X	B	C	A	B	A	C	B		B		B				B	C	B		A	A	A		A	B	A	B	A	A		
BENZENE		A	X	X	X			C	A	X	C	X	X		B	A			A	A	A	C	C	A	X	B	A	X	X	X	X	A	A	
BENZOIC ACID	C	B		X	A	C		C	A	C	X	A	X		C		C	B	C	C	C		B	A	C	X	C	B	A	A			A	

\*Ratings apply to all polypropylene parts except bellows. When using a bellows metering pump see polypropylene bellows column for ratings which, due to bellows material characteristics, may vary from other polypropylene parts ratings.

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	CARBON	CERAMIC ALUMINA	CERAMIC BARIUM FERRITE	AFLAS®	BUNA N (NITRILE)	BUTYL	EPT/EPDM	HYDRIN®	HYPALON®	KEL-F® ELASTOMER	NATURAL RUBBER	NEOPRENE®	NORPRENE®	SILICONE ELASTOMER	SILICONE ELASTOMER 1125	VITON®/FLUOROELASTOMER	BRASS, CARTRIDGE	BRONZE	HASTELLOY® C	MONEL	STAINLESS STEEL (302-305, 630)	STAINLESS STEEL (316)	STAINLESS STEEL (403-416)	EPOXY (ADHESIVE)	HALAR® (ECTFE)	NORYL® GLASS-FILLED (PPO)	NYLON	PHENOLIC	POLYETHYLENE (PET)	POLYPROPYLENE* (PPR)	POLYPROPYLENE BELLOW STD.	RYTON®, GLASS-FILLED (PPS)	TEFLON® (TFE)	VECTRA® (LCP)		
BORIC ACID		B		X	A	C	A	C	C	C	A	X	C	X	C	X	B	A	X	C	B	C	B	A	A	X	B	B	A	A	A	A	A			
BRAKE FLUID				B	A	A		X	A	X	B		C	X										A	A	X	B		X	X		A	B			
BUTYL ALCOHOL				A	X	B	X		X	A	C	X	C	X	A			A				A		A	A	A	B	B	A	A	B	A	A	A	A	
<b>C</b>																																				
CALCIUM BISULFITE	X			B	B	B		B	A	X	B		X	C	X			X	C	C	X	B	A	A	B	B	A	A	B	A	A					
CALCIUM CHLORIDE		A		A	B	B	B	C	B	A	C	B	A	X	X		A	A		C	B		B	A	A	B	B	B	A	B	A	A	A	A		
CALCIUM HYDROXIDE		A	A	B	B	B	A	B	A	C	X		X	X		X	A		C	A		B	A	A	B	X	B	A	B							
CALCIUM HYDROXIDE 30%, BOILING	X																	A	B	X	C			A	A			A						C		
CALCIUM HYPOCHLORITE, 5%, 70°				A				A			C			A						C	B			A	A			A								
CARBON BISULFIDE		A	A	A	B	X	X	B	A	A	X		B	B		B					B		X	A	X	B	B	X	X	X		A	A			
CARBON DISULFIDE	C	B		B	X	X	X	X	A	X	X	X	X	B	C	C		C	A	C	B	B	A	X	B	B	C	X	X	A	A	A				
CARBON TETRACHLORIDE		A	A	X	X	X	X	X	A	X	X	X	X	B	A	B	A	A	A	B	A		A	A	X	B		X	X	X	A	A	A			
CAUSTIC LIQUID				B	B	B	B	A	B				A	A					A					A	B			A	A	C			C			
CAUSTIC SODA, ALL CONC., 72° & 140°				B	B	C		B	A	X	C		X	X						A	A		B	A	A	B	B	C	C	C	C	A	C			
CHLORINATED SOLVENTS				X	X	X		X	A	X	X		X	B									B	A	X	B	A	C					A	A		
CHLORINATED WATER, SATURATE	X			C	X			B	A	X	B		X	B				A	X	B	C		B	A	B	B	A	B	B	X		A	A			
CHLORINE				X	X	X		X	A	X	X	X	X	X					B	X	X			A	D	B	X	X	X	X	X	X	A	A		
CHLORINE TRIFLUORIDE				X	X	X	X	X	X	X	X		X	C									X	A	C	X	X	X	X	X						
CHLOROACETIC ACID	X		X	X	A	C		C	A	C	X	A	X	X			A	B	B	X		B	A	C	X	X	B	A	A							
CHROMIC ACID		C		A	X	A	C		C	A	C	X	A	X	B	X		A	X	X	C	C	B	A	X	X	X	C	B	B	A	A	A	A		
CHROMIC ACID, 10%, 70°F				A						X	A							A	X					A	B			A	A	A						
CITRIC ACID		A		A	X	A	C	A	C	A	C	C		X	C	X	X	A	B	C	A	C	B	A	A	X	B	A	A	A	A	A	A	A		
CITRIC ACID, HOT, CONC.	X				A				A				A					A	C	X	X			A	A			A	A							
COPPER SULFATE		A	A	X	B	B		B	A	A	B		B	B	X	C		X	C	A	A	B	A	A		B	A	A	B	A	A	B	A	A	B	
CORN OIL		A		A	X	B	A	C	A	X	X	A	C	X		C					A		B	A	X	A	B	A	A	X						
CYCLOHEXANE		A		B	C	X	X		X	A	X	X		A	A		A				A	A	B	A	X		B	X	X	X	A	A	A			
<b>D</b>																																				
DETERGENT SOLUTIONS		A		C	B	C	C	X	C	C	C		B	B	C						A	A	B	A	B	A	B	C	B	B	A	A	A			
<b>E</b>																																				
ETHYL ACETATE		A		X	X	X	X	X	A	X	X		X	X			A	C	A	B	B		B	A	X	B	B	C	A	X	A	A	A			
ETHYL ALCOHOL				B	A			X	B	A		A	C	A	A			A	A		A			A	A		A		A						B	
ETHYLCELLULOSE				X	X	X		X	A	X	X		X	C									B	A	C	B	B	B	C	X					A	
ETHYL CHLORIDE	A	A	A	X	X	X	B	X	A	X	X	X	X	C			A	C	B	A	A		B	A	X	B	B	X	X	X	A	A	A			
ETHYLENE GLYCOL	A	A		A	C	A	B	X	A	A	B	A	A	A	B	A					A	A	A	A	A	A	B	B	A	C	C	A	A			
<b>F</b>																																				
FERRIC CHLORIDE		A		X	X	X	A	X	A	A	B	A	B	C	X	X	A	X	X	X	X	X	B	A	A	B	B	A	A	X	A	A				
FERRIC SULFATE		A		X	B	B	A	B	A		B	A	C	B	X	X	A	C	B	A	A	B	A	A	B	X	A	A	B	A	C					

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FERROUS CHLORIDE		A			X	B	B		B	A		B		B		B		X	C	X	X	X		B	A	A	B	B	B	A	A	B	A	A
FERROUS SULFATE		A			X	B	B		B	A		B	A	C		B		X	C	C	C	C		B	A	A	B	B	B	A	A	B	A	A
FLUORINE					X	X	X		X	X	X	X		X		X					A	A	B		X	A	D	X	X	X	X		X	
FORMALDEHYDE		A			C	A	B	B	X	A	A	X	A	B		B	B	C	B	B	A	A	A	B	A	B	C	C	B	A	A	A	A	
FORMALDEHYDE, 40%	X					A				A		A								C	A	B			A	A			A	A	A			
FREON				X	X	X	B		B	A	X	X	X	X		B	A			B	B	A	A	B	A	X	X	C	B	B	X	A	A	A
FRUIT JUICES		A	A		A	A	B		B	A	A	X		X		B		C		A		A		B	A	A	X	B	A	A	A	A	A	A
FUEL OIL, NORMAL		A			C	X	X	B	X	A	C	X		X		A		A			A	A		B	A	X	A	A	A	A	X	A	A	
<b>G</b>																																		
GASOLINE		A	A	B	C	X	X	C	X	A	X	X	X	C		B		A	A	A	A	B		B	A	X	A	B	X	X	X	A	A	B
GLYCERINE OR GLYCEROL	A	A	A	A	X	A	X	A	B	A	A	B	A	B		B	B	A	A	A	A	A	A	B	A	A	B	B	A	A	A	A	A	A
<b>H</b>																																		
HYDRAULIC OILS		A			C	X	X	B	A	A		A			C	C		A		A	A				A	X			A	X	A		A	
HYDROCARBONS, PURE		A				X	X	C	C	A		X				B				A					A	X			A	X	A		A	
HYDROCHLORIC ACID		X			C	C	B		C	A	X	B	X	X		C	X			X	X	X	X	C	A	A	X	A	A	C	X	A	C	
HYDROCHLORIC ACID, 20%	A	X	A	C				B	A		A	A	A		A		X	A	X	X	X			A	A		A			D		B		
HYDROFLUORIC ACID		X			X	A	C		C	B	C	C	C	X		X	X		C	C	X	X	X	B	A	A	X	B	B	A	A	A	A	B
HYDROFLUORIC ACID, 50%		X	X	A	C	A						C	C	A		A		X	B		X	X			A	A			A	A	C		C	
HYDROFLUOROSILICIC ACID	X		X		X	A	C		C	B	C	C		X		X		B		A	X	X		C	A	A	X	B	A	A	A		B	
HYDROGEN PEROXIDE	X	A	A		A	X	X		X	A	X	X	A	C		X	X	X	A	B	C	A	A	X	A	A	X	X	B	X	X	D	A	
HYDROGEN PEROXIDE, 50%				A		B	A	X	A	C			A	A	A	A				X	C				A	A			A	B	D			
HYDROGEN SULFIDE	X	A	C		B	A	B		B	A	X	X	A	B		C	X		A	X	X	B	X	A	A	A	C	A	A	A	A	A	A	
<b>I</b>																																		
IODINE		A	X		X	X	X		X	A	X	X	A	C		X		X	B	A	C	X			A	X			X	C	X		A	
ISOPAR G						X	X	C	C	B						A				A					A	X			A	X	A			
ISOPROPYL ALCOHOL		A			B	A		A	A	A	A	A	C			A			A	C	A	B			A	A		A	A	A	A	A	B	
<b>L</b>																																		
LACQUER SOLVENTS					X	X	X	X	X	A	X	X	X	C		B	C			A	A	A	A	B	A	X	B	B	B	X	X		A	
LIME, 30%									A											C	A	A			A	B			A					
LUBRICATING OIL		A			A	X	B	A	X	A	X	B	A	B		A		A		A	A	A		A	A	X	A	B	X	X	X	A	A	
<b>M</b>																																		
MAGNESIUM CHLORIDE		A			A	X	B	B	A	B	A	B	B	A	C		C	C	C	A	C	C	A	C	A	A	A	B	B	A	A	B	A	
MAGNESIUM HYDROXIDE	C	A			X	B	C	A	B	A	C	C		X		X	B	A		C	C	A	A	X	A	A	B	X	A	A	B	A	A	
MAGNESIUM SULFIDE					X	B	C		B	A	B	B		C		X								B	A	A	B	B	A	A	B		A	
MANGANESE CHLORIDE					X	B	C		B	A	B	B	A	C		X				C	X	X		X	A	A	B	B	A	A	B		A	
MANGANESE SULFATE					X	B	C		B	A	B	B		C		X								B	A	A	B	B	A	A	B		A	
MERCURIC SULFATE					X	B	C		B	A	B	B		C		X								B	A	A	B	B	A	A	B		A	
METHYL CHLORIDE		A			C	X	X		X	A	X	X		X		X		B		B	A	A		B	A	X	B	C	X	X	X	A	A	
METHYL ETHYL KETONE		A			X	X	A	A	X							X		A		A	A	A			A	X		A	A	A	A	A	A	

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MINERAL OILS		A			C	X	X	B	X	C	X	B	A	B	A	B		A		A	A	A		A	A	D	A	A	A	B	X	A	A	A		
MUSTARD		A			C	B	B	C	C	B	C	X		A	C	C	X		C	B	C	C	B	X	B	A	A	B	C	A	A	B		A	A	
<b>N</b>																																				
NICKEL CHLORIDE	X	A	C		X	B	C		B	A	B	C	A	C	X	X	X	A	C	C	X	X	B	A	A	B	B	A	A	B		A				
NICKEL SULFATE		A	B		X	B	C		B	A	B	C		C	X			C	B	C	C	B	X	B	A	A	B	C	A	A	B		A			
NITRIC ACID			A		X	X	X	X	X	X	X	X	X	X	X	X	X			X	C	B	C	X	A	X	X	C	B	X	X	D	A	A		
NITRIC ACID, 20%	X	C	B	A	X	B	B	X	A	B		X	C		C	B		X	A	X	A	A			A	B		X	A	A	D		A			
NITRIC OXIDE					X	B	C		X	A	C	C	A	X	X				X				X	A	C	C	X	B	X	X		A				
<b>O</b>																																				
OIL - NO. 1 ASTM					A	B	X	X		X	A	X	B	A	B	A								A	A	X	A	B	X	X	X	A	A	B		
OIL - NO. 3 ASTM					B	B	X	X		X	A	X	B	A	B	A								A	A	X	A	B	X	X	X	A	A	B		
<b>P</b>																																				
PHOSPHORIC ACID		X			A	X	A	C		C	A	C	C	A	X				A	B	A			B	A	A	X	A	A	A	A	A	A	A	A	
PHOSPHORIC ACID, 10%			A		A					A									A	X	A	B			A	A			A	A	D		A			
PHOTO CHEMICALS - STANDARD TYPES															A										A	A			A						A	
PHOTOGRAPHIC - DEVELOPERS		A	C		X	B	B	X	C	X	A	C							A	A	C	A		B	A	A	B	B	A	A	B		A	A		
PHOTOGRAPHIC - FIXER			X		C	B	A	B	C	C		B			B				B	C	B			A	A			A	B					A		
POTASSIUM BICARBONATE		A			A							A		A	A					C	B	C			A	A			A							
POTASSIUM CARBONATE	C	A	A		C	B	B		B	A	A	B		C	B				B	C	C	C		B	A	A	C	A	A	A	B	A	A	A	A	
POTASSIUM CHLORATE	C	A			X	B	B		B	A	C	B		B	C				X	A	C			B	A	A	B	A	B	A	B	A	A	A	A	
POTASSIUM CHLORIDE	X	A	A		X	B	B	X	B	A	B	B	A	B	C	C	C	B	A	C	B	C		B	A	A	B	A	B	A	B	A	A	A	A	
POTASSIUM DICHROMATE, 40%								A												C	A	A			A	A			A							
POTASSIUM HYDROXIDE		A	A		C	B	B	A	B	A	C	X		B	X	X	X	B	C	B	B	A	B	A	A	B	C	B	B	B	A	A	D			
POTASSIUM NITRATE		A	A		X	B	B	X	B	A	B	B		B	C			B	B	C	A	C		B	A	A	B	A	B	A	B		A			
POTASSIUM SULFATE		A	A		X	B	B	A	B	A	B	B		B	C	B	C	B	A	C	B	A		B	A	A	B	A	B	A	B		A			
PROPYLENE GLYCOL		A			A	C	A		X	A	A	C		A	A					C	C	B		A	A	B	B	A	A	C	C	A	A	B		
<b>S</b>																																				
SALINE SOLUTION - ALL CONC.						A				A										A					A	A			A	A	A	A	A	A		
SILICONE OILS & GREASES		A	A		X	B	C	A	X	A	X	C		X	B					B	A			A	A	A	A	B	B	A	B	A	A	A	A	
SODIUM BICARBONATE		A	A		X	X	B	A	B	A	C	B		X	X	A	A	B	A	A	A	A	A	A	A	A	B	A	A	A	X	A	A	A		
SODIUM BISULFATE	X	A			A	X	B	B		B	A	C	C		C	B	X	C	B	B	X	A	X	B	A	A	B	A	A	A	B	A	A			
SODIUM CARBONATE		A	A		A	X	X	X	C	B	A	B	B		X	X		B		A	C	A		B	A	A	B	A	A	A	X	A	A	B		
SODIUM CHLORATE		A			A	X	B	B		B	A	C	B		C	B			A	C	C	C		B	A	A	B	A	A	A	B	A	A			
SODIUM CYANIDE	C	A	A		X	B	B	A	B	A	C	B		C	B	X	X		X	C	A	A		B	A	A	B	A	A	B		A				
SODIUM HYDROSULFITE					X	B	B		B	A	C	B		C	B									B	A	A	C	A	A	A	B		A			
SODIUM HYDROXIDE			A		A	B	A	A	X	A	A	C	B		A	C	A	X		B	C	X	A	X	A	A	C	C	A	A	A	D	A	D		
SODIUM HYDROXIDE, 40 - 80%, 175°F					A	A	A			A	A								C	A	X	C			A	A			A	A	D		D			

\*Ratings apply to all polypropylene parts except bellows. When using a bellows metering pump see polypropylene bellows column for ratings which, due to bellows material characteristics, may vary from other polypropylene parts ratings.

CHEMICAL NAME	CARBON		CERAMICS		ELASTOMERS													METALS					PLASTICS											
	CARBON	CERAMIC ALUMINA	CERAMIC BARIUM FERRITE	AFLAS®	BUNA N (NITRILE)	BUTYL	EPT/EPDM	HYDRIN®	HYPALON®	KEL-F® ELASTOMER	NATURAL RUBBER	NEOPRENE®	NORPRENE®	SILICONE ELASTOMER	SILICONE ELASTOMER 1125	VITON®/FLUOROELASTOMER	BRASS, CARTRIDGE	BRONZE	HASTELLOY® C	MONEL	STAINLESS STEEL (302-305, 630)	STAINLESS STEEL (316)	STAINLESS STEEL (403-416)	EPOXY (ADHESIVE)	HALAR® (ECTFE)	NORYL® GLASS-FILLED (PPO)	NYLON	PHENOLIC	POLYETHYLENE (PET)	POLYPROPYLENE* (PPR)	POLYPROPYLENE BELLOW STD.	RYTON®, GLASS-FILLED (PPS)	TEFLON® (TFE)	VECTRA® (LCP)
SODIUM HYPOCHLORITE				A	X	B	B	X	B	A	C	X		C	A	B	X			X	X	X	X	B	A	A	C	A	A	B	X	D	A	
SODIUM HYPOCHLORITE, 5%	X		C	A		B		A	A					A	A				X	B	A			A	A				B	X	D			
SODIUM IODIDE				C	B	B		A	A	C	B		X	X									B	A	B	B	C	B	C	C		A		
SODIUM NITRATE	C	A	A	X	B	B	A	B	A	C	C		C		B	C	C	C	C	C	C	C	A	B	A	A	B	A	A	B	A		A	
SODIUM PEROXIDE	X	A		X	X	X		C	A	X	X		C		X	C	C	B	C	A	A	A	X	A	B	X	B	B	X	X		A		
SODIUM PHOSPHATE				A	X	B	B		B	A	C	B		C		B				A	B	B		B	A	A	B	A	A	B	A		A	
SODIUM SULFATE	C	A		X	B	B	X	B	A	C	B		C		B	B	B	B	A	A	B	A	B	A	A	B	A	A	A	B	A	A	A	
SODIUM SULFIDE	C	A		X	B	B		B	A	C	B		C		B	X	X	A	C	X	B	A	B	A	A	B	A	A	A	B	A	A	A	
SODIUM SULFITE				X	B	B		B	A	C	B		C		B				C	A	A		B	A	A	B	A	A	A	B	A	A	A	
SODIUM THIOSULFATE	X	A		X	B	B		C	A	C	B		C		B	X	X		C	B	A	A	B	A	A	B	A	A	B	A	A	A		
SOFT DRINK SYRUPS					A								A							D				A	A			A	A		A			
SOLVENT - TONER KEROSENE BASE								A											A					A	X			A	A					
SOYBEAN OIL		A		A	X	B	A	X	A	X	X	A	B	A	A		A		B	A	A		A	A	X	A	B	A	B	X	A	A	A	
STANNIC CHLORIDE		A		X	B	B		B	A	C	C		X		B		X		C	X	X		B	A	A	B	A	A	B	A		A		
STANNOUS CHLORIDE				X	B	B		B	A	C	B		X		B				C	X			B	A	A	B	A	A	B	A		A		
SULFUR CHLORIDE	X	C	X	X	X	X	X	A		X	A	B	A	A	X	A		X	C	X	X		A	D	C		A	B			A			
SULFUR DIOXIDE		A		A	X	X	X	A		X	A	B	A	A		X	B	B	A	B			A	A	C	A	B	B		A	A			
SULFUR TRIOXIDE		A		X	X	X	X	A		X	X	B	X	A		A		C	C	C			A	B		A				A				
SULFURIC ACID			C	A	X	X	C	X	C	B	X	X	A	X	A	B		X	X	C	B		C	A	C	X	B	C	X	D	A	C		
SULFUROUS ACID			C	X	A	C		C	A	C	X	A	X	A	C	X	X	B	X	C	C	X	B	A	A	X	C	A	A	A		A	C	
T																																		
TOLUENE OR TOLUOL	A	A		X	X	X	X	X		A	C	X		X	X	A	X		A	A	A	C		A	X		A	X	X	X	A	A	A	
TRIBUTYL PHOSPHATE				X	X	X	X		X	A	X	X		C	X					A	A		B	A	X	B	B	X	B	X		A		
TRICHLOROETHYLENE	C	A		X	X	X	X	X	X	A	X	X		X		C	A	X		A	A	C	A	B	A	X	C	C	X	X	X	C	A	A
TURPENTINE	C	A		C	X	X	X	X	A	A	X	C	X	C	B	C	C		B	C	A	C	B	A	X	C	A	X	X	X	X	A	A	
V																																		
VEGETABLE OILS	C			B	C	B	A	X	A	B	C	A	B	A	A	C			C	C	C	C	A	A	X	A	B	X	X	X	A	A	A	
VINEGAR	X	A	A	C	A	C		B	A	C	C		X		C	X	C		C	C	B	C	B	A	A	C	B	A	A	A	A	A	A	
W																																		
WATER, DEIONIZED		A		A	C	B	A	C	A	B	C	C	A	C	A	A	X	A	A	A	A	A		A	A	A	B	A	A	A	B	A	A	A
WATER, FRESH		A		A	A	B	A	C	A	B	C	B	A	C	A	A	X	A	A	A	A	A		A	A	A	B	A	A	A	B	A	A	A
WATER, GLYCOL				C	B	B		X	A	C	B		B		B								A	A	A	B	B	A	A	B	A	A	C	
WETTING AGENTS						A	A								A									A	B			A						
Z																																		
ZINC CHLORIDE		A		X	B	B		B	A	C	B	A	B	A	B	X	X	C	A	X	X	X	A	A	A	B	B	A	A	B	A	A		
ZINC SULFATE		A	A	X	B	B		B	A	C	B		B		B	C	A	C	C	C	A	C	A	A	A	B	A	A	A	B	A	A		

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# Equivalents Tables

FROM	TO CENTISTOKES
Saybolt	.22 t — 180/t
Redwood	.26 t — 171/t
Engler	.14 t — 374/t

1. To convert Saybolt, Redwood and Engler to Centistokes, use the chart opposite, where t = time in seconds.
2. To convert Centistokes to Centipoise, multiply Centistoke by Density:  
CP = CS x Density.

VOLUMETRIC UNIT	VOLUMETRIC UNITS - EQUIVALENTS			
	Cubic Centimeter	Fluid Ounce	Liter	US Gallon
Cubic Centimeter	•	0.034	0.001	2.64 x 10 <sup>4</sup>
Fluid Ounce	29.6	•	0.030	7.81 x 10 <sup>3</sup>
Liter	1000	33.8	•	0.264
US Gallon	3785	128	3.785	•

LINEAR UNIT	LINEAR UNITS - EQUIVALENTS				
	Millimeter	Centimeter	Inch	Foot	Meter
Millimeter	•	0.10	0.0394	3.28 x 10 <sup>3</sup>	0.001
Centimeter	10	•	0.394	0.033	0.01
Inch	25.4	2.54	•	0.083	0.0254
Foot	305	30.5	12	•	0.305
Meter	1000	100	39.4	3.28	•

LIQUID PRESSURE	LIQUID PRESSURES - EQUIVALENTS					
	Lb/In <sup>2</sup> (psi)	Ft Water	Kg/Cm <sup>2</sup>	Atmosphere	Bar	Inch Mercury
Lb/In <sup>2</sup> (psi)	•	2.31	0.070	0.068	0.069	2.04
Ft Water	0.433	•	0.030	0.029	0.030	0.882
Kg/Cm <sup>2</sup>	14.2	32.8	•	0.968	0.981	29.0
Atmosphere	14.7	33.9	1.03	•	1.01	29.9
Bar	14.5	33.5	1.02	0.987	•	29.5
Inch Mercury	0.491	1.13	0.035	0.033	0.034	•

TYPICAL VISCOSITY - EQUIVALENTS					
Centistokes	Centipoise	Saybolt Universal SSU	Engler Seconds	Redwood No. 1 Seconds	Typical Fluids @ 70° F
1.00	.8	31	54	29	Water
2.5	2.05	35	59	32	Kerosene
7.4	5.9	50	80	44	No. 2 Fuel Oil
15.7	12.6	80	125	69	No. 4 Fuel Oil
43.2	34.6	200	295	170	Hydraulic Oil
65.4	52.2	300	470	254	SAE 10W Oil
110	88	500	760	423	SAE 10 Oil
220	173	1000	1500	896	SAE 20 Oil
440	352	2000	3000	1690	SAE 30 Oil
1080	880	5000	7500	4230	SAE 50 Oil
2160	1760	10,000	15,000	8460	SAE 60-70 Oil
10,800	8800	50,000	75,000	43,660	Molasses B