

Liquid Compatability Guide
Viscosities of Common Fluids
Vacuum Information
Flexible Impeller Pump
Viscosity Corrections
Friction Loss Data
Units Conversion Table

Use this data to make those all important final application analyses before selecting the best pump type.

Helpful Hints:

- **Check all materials of construction in contact with fluid for compatibility**
- **Do not forget the effects of viscosity on piping friction losses**

Liquid Compatibility Guide

Introduction

This Liquid Compatibility Guide was compiled from currently available data supplied by the manufactures of wetted materials used in chemical pump construction. Many variables influence the degree of liquid attack for example if the liquid is still or agitated, alternate wet and dry conditions, amount of aeration, cold, hot or boiling temperatures, concentration and saturation, moisture content, pure or mixed liquids creating fuming conditions, time of exposure...and others.

Because of the foregoing, this listing can only be offered as a guide. ITT Jabsco cannot certify nor warrant the data. All data and subsequent pump suitability for a specific application should be confirmed by customer's field trial including satisfactory pump life endurance test before ordering pumps.

It is the policy of ITT Jabsco for continual improvements, we would therefore welcome any additional liquid compatibility information or comments on the foregoing.

Key Symbols

This Liquid Compatibility Guide was compiled from various charts and tables provided by material manufacturers. Their nomenclature was condensed into key symbols. Their descriptive words shown below can aid in making judgments as to pump suitability for specific applications.

- A Excellent, Fully Resistant, Suitable, Recommended, Excellent Compatibility.
- B Good Resistance, Fair Resistance, Moderate Resistance.
- C Fair to Poor, Minor Effect, Slight Attack.
- X Not Recommended, Severe Effect, Unsatisfactory, Do Not Use.
- (Blank Space) Information Lacking at the Time of Printing.

Liquids Listed

Generally compatible/incompatible as indicated in the tables. Check with customer for other factors (Hygienic, presence of solids etc.) before confirming pump suitability.

Liquids Not Listed

This guide will be revised and updated as new listings are made available. Liquids not listed can be referred to the factory for investigation on an individual basis. Ask the customer if the option offered is acceptable. Alternatively, does he already have information on pump material required?

General Notes

1. Pumping of Gasoline by ITT Jabsco pumps is not recommended.
2. Flushing of pump after use with appropriate liquid prolongs its life.

Material Selection Notes

- Dependent on pump type and availability
1. If Abrasive Liquid-Pump speed should be low and seal should have hard faces, if applicable.
 2. If Crystallizing Liquid-Use flushed mechanical seal or seal with hard faces, if applicable.
 3. If Hazardous Liquid-Use double mechanical seal or make other arrangements, if applicable.
 4. All pump seals are liable to leak due to wear or age. It is the responsibility of the user to take safety precautions to prevent personal injury or environmental contamination, due to leakage of toxic, flammable, corrosive or otherwise, hazardous liquids.

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS				√							√				√			
DRUM EMPTYING PUMPS			√				√				√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	
CENTRIFUGAL PUMPS											√				√	√	√	
LOBE PUMPS											√	√			√	√	√	
SLIDING VANE PUMPS								√			√	√				√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Abietic Acid						B				A	X	X	A	X	A	C	A	A
Acetaldehyde (Ethanal)	CH ₃ CHO	A	A	C	A		A	B	A	A	X	X	A	X	A	C	A	A
Acetamide (Acetic Acid Amide)	CH ₃ CONH ₂	X	A	A	A	B	A	X	A	X		B	A	B	A	B		A
Acetate Solvents	CH ₃ COOR	A	X	X	A	X	A			A	A	X		X	A	X	A	A
Acetic Acid - 20%		A	C	C	A	B	B		A	A	C	C	A	X	A	X	A	A
Acetic Acid - 30%		A	C	C			B	X	A	A	C	C	A	X	A	X	A	A
Acetic Acid - 50%	CH ₃ COOH	C	C	C			B	X	A	A	C	C	A	X	A	X	A	A
Acetic Acid - Glacial	CH ₃ COOH	C	C	B	A		B	X	A	A	C	C	B	X	A	X	A	A
Acetic Anhydride (Acetic Oxide)	(CH ₃ CO) ₂ O	A	A	X	A	B	B	B	A	A	C	C	B	B	A	X	A	
Acetic Methyl Ester				A					A									
Acetone (Dimethylketone)	CH ₃ COCH ₃			X	A		B	A	A	A	A	X	A	X	A	X	A	A
Acetone Cyanohydrin	(CH ₃) ₂ C(OH)CN						A	B	B	B		X	X	B	A	X		
Acetonitrile (Methyl Cyanide)CH ₃ CN			B	A	A	A	A	A	A		C	A	A	A	X	A	A	
Acetophenone (Phenyl Methyl Ketone)	C ₆ H ₅ COCH ₃			B	A	B	B	A	B	A		X	A	X	A	X	A	A
Acetyl Acetone (2, 4-Pentanedione)	CH ₃ COCH ₂ COCH ₃						B	X	B	B		X	A	X	A	X		
Acetyl Chloride	CH ₃ COCl			X	A	A	X	A	A	B		X	C	X	A	B		
Acetylene (Ethyne)	HC=CH			X	A		A	A	A	A	X	A	A	C	A	A	A	A
Acetyl Salicylic Acid (Aspirin)C ₉ H ₈ O ₄	A	X	B		B	A	X	B	B			B	X	A				
Acetylene Tetrabromide (Tetra Bromoethane)	(CHBr ₂) ₂	X	X					X	X		A			X		A	A	
Acid Mine Water				B	B					A	B						A	A
Acridine	C ₁₄ H ₉ N ₃ Cl																	
Acrolein (Acrylaldehyde)	H ₂ C=CHCHO						A	B	B	B		B				A	A	
Acrylonitrile (Vinyl Cyanide)	CH ₂ CHCN	A	X	B		B	A	A	A	A	C	X	X	X	A	X	A	A
Adipic Acid (Hexanedioic Acid)	C ₆ H ₁₀ O ₄			A		B	B	B	A	B		B		X	A	A		
Alkane Sulfonic Acid	C _n H _{2n} SO ₃ H			A			X		A	A							A	
Alkyl Aryl Sulfonate	C _n H _{2n+1} C ₆ H ₅ SO ₃ Na					B			A	B							A	A
Allyl Alcohol (2-Propen-1-ol)	CH ₂ CHCH ₂ OH			A		A	B	A	A	A		A	A	A		B		
Alcohols	R-OH																	
Amyl (1-Pentanol)	C ₅ H ₁₁ CH ₂ OH	A	A	B	A		B		A	A	A	B		B	A	X	A	A
Benzyl (Phenylcarbinol)	C ₆ H ₅ CH ₂ OH	A	A	A			B		A	A	A	X		B	A	A	A	A
Butyl (Butanol)	C ₄ H ₉ CH ₂ OH	A	X	B	A		B		A	A	A	A		A	A	A	A	A
Diacetone (Tyranton)	C ₆ H ₁₂ O ₂	A	A	X			A	A	A	A	A	X	B	X	A	X	A	A
Ethyl (Ethanol)	CH ₃ CH ₂ OH	A	A	A	A		B	A	A	A	A	A		A	A	C	A	A
Hexyl (1-Hexanol)	C ₆ H ₁₃ CH ₂ OH	A	A	A			A		A	A	A	A		B	A	A		A
Isobutyl (2-Methyl-1-Propanol)	C ₄ H ₉ CH ₂ OH	A	C				B		A	A	A	C		A	A	A	A	A
Isopropyl (2-Propanol)	H ₂ CCH(OH)CH ₃	A	A	A			B	C	A	A	A	C		B	A	A	A	A
Methyl (Methanol)	CH ₃ OH	A	A	A			B	A	A	A	A	X		A	A	X	A	A
Octyl (Caprylic Alcohol)	C ₈ H ₁₇ O	A	A				A		A	A	A	B		B	A	A	A	A
Propyl (Propanol)	C ₃ H ₇ CH ₂ OH	A	C	A	A		A		A	A	A	A		A	A	A	A	
Allyl Bromide (3-Bromopropene)	C ₃ H ₅ Br						X	A				X		X	A	B		
Allyl Chloride (3-Chloropropene)	C ₃ H ₅ Cl			A			X	C		B		X	X	X	A	B	A	A
Alka Form										A		C	A		A		A	

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DIAPHRAGM PUMPS				√							√				√					
DRUM EMPTYING PUMPS				√							√				√	√				
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√	√	√	√	√	√	
CENTRIFUGAL PUMPS												√			√	√	√	√	√	
LOBE PUMPS											√				√	√	√	√	√	
SLIDING VANE PUMPS										√					√				√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																				
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC		
LIQUID	FORMULA																			
Alkazene® (Chlorethyl or Polyisopropyl benzenes)												X		X	A	A				
Almond Oil (Artificial)												X	B	X	A	X				
Alum (Aluminium Potassium Sulfate Dodecahydrate)	KAl(SO ₄) ₂ ·12H ₂ O			A					B	B	C	A	A	A	A	X	A	A		
Aluminium Acetate (Burrow's Solution)				A			B	C	A	A	C	C	A	C	A	X	A	A		
Aluminium Ammonium Sulfate (Alum)	AlNH ₄ (SO ₄) ₂											B		B	A	A				
Aluminium Bromide	AlBr ₃											A		A	A					
Aluminium Chlorate	Al(ClO ₃) ₃ ·6H ₂ O			A	A				B	A					B		A	A		
Aluminium Chloride	AlCl ₃	A	X	A	A		X	C	A	B	C	A	A	A	A	A	C	A		
Aluminium Etch		X	X									A		A	A	A				
Aluminium Fluoride	AlF ₃			A	A		A	C	A	C		A	B	A	A	A	A	A		
Aluminium Hydroxide (Alumina Trihydrate)	Al(OH) ₃	A	X	A		A	B	B	B	B	A	B	A	A	A	C	A	A		
Aluminium Nitrate	Al(NO ₃) ₃ ·9H ₂ O			A		A	X		B	A		A	A	A	A	A	A	A		
Aluminium Oxide	Al ₂ O ₃	A	X						A	A	A			A	A	A	A	A		
Aluminium Oxalate											X				A				A	
Aluminium Phosphate	AlPO ₄											A	A	A	A	A				
Aluminium Potassium Sulfate (Potash Alum)	KAl(SO ₄) ₂			A			A	X	B	A		A	A	A	A	A				
Aluminium Silicofluoride	Al ₂ (SiF ₆) ₃			A		A			A	A									A	
Aluminium Sodium Sulfate (Soda Alum)	NaAl(SO ₄) ₂											A	A	A	A	A				
Aluminium Sulfate (Cake Alum)	Al ₂ (SO ₄) ₃	A	A	A	A	A	B	X	A	A		A	A	A	A	A	A	A		
Aminopyridine	C ₅ H ₇ NNH ₂						B		B	A										A
Amines	R-NH ₂	A	X	B	A		A			A	X	X		B	A	X	A	A		
Aminosalicylic Acid	H ₂ NC ₆ H ₃ (OH)CO ₂ H			B			B		B	B					B		A	A		
Ammonia Anhydrous, Liquid	NH ₃	A	A	A	A		A	A	A	A	X	B	A	B	A	X	A	A		
Ammonia Gas - Cold												A		A	A	A				
Ammonia Gas - Hot												C		B	A	X				
Ammonia Liquors		A	A				A	A		A	X			A	A	X	C	A		
Ammonium Acetate	CH ₃ CO ₂ NH ₄			A		A	A	B		A				A	A	A				
Ammonium Alum	K ₂ SO ₄	A	A	A		A	A		A	A		A		A	A	A	A	A		
Ammonium Bicarbonate	NH ₄ HCO ₃	A	X	A		A	B	B	B	X	A	A	A	A	A	A	A	A		
Ammonium Bifluoride - 10%	NH ₄ HF ₂	A	A	A		A	C	X	B	B	X	B		X	A	A				
Ammonium Bisulfite	NH ₄ HSO ₃			B					B	B					B		A	A		
Ammonium Bromide	NH ₄ Br			A			X		A	A					A		A	X		
Ammonium Carbonate	(NH ₄) ₂ CO ₃	A	X	A	A	A	B	B	B	B	X	X	A	B	A	A	A	A		
Ammonium Casenite		A	X							A				A	A					
Ammonium Chloride (Sal Ammoniac)	NH ₄ Cl	A	A	A	A	A	X	X	A	B	X	A	A	A	A	A	A	A		
Ammonium Cupric Sulfate	(NH ₄) ₂ Cu(SO ₄) ₂											A			A	A				
Ammonium Dichromate	(NH ₄) ₂ Cr ₂ O ₇						A	A		A		A	A	A	A	X				
Ammonium Fluoride	NH ₄ F			B		A	B	B	A	B		B		B	A	A				
Ammonium Fluosilicate	(NH ₄) ₂ SiF ₆			A		A	A		A	A									A	
Ammonium Formimate	HCO ₂ NH ₄			B					B	B									B	B
Ammonium Hydrogen Fluoride (see Ammonium Bifluoride)																				
Ammonium Hydroxide (Aqua Ammonia)	NH ₄ OH	A	A	A	A		A	B	A	A	C	B	A	B	A	B	C	A		
Ammonium Hydrogen Phosphate	(NH ₄) ₂ HPO ₄					A													A	
Ammonium Iodide	NH ₄ I			A		A													A	
Ammonium Metaphosphate							B	B	A	B		A	A	A	A				A	
Ammonium Monosulphate									A	A										
Ammonium Nitrate (Amonia)	NH ₄ NO ₃	A	A	A	A	A	B	C	B	A	X	A	A	C	A	A	A	A		
Ammonium Nitrite	NH ₄ NO ₂			A		A					X	A		C	A					

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COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
				✓						✓			✓			✓		
DIAPHRAGM PUMPS				✓						✓			✓					
DRUM EMPTYING PUMPS				✓				✓		✓			✓	✓				
FLEXIBLE IMPELLER PUMPS		✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓
CENTRIFUGAL PUMPS											✓				✓	✓	✓	✓
LOBE PUMPS										✓		✓	✓		✓	✓	✓	✓
SLIDING VANE PUMPS								✓			✓	✓					✓	✓
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE																		
LIQUID	FORMULA	EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VTION® (F.P.M.)	CARBON	CERAMIC
Ammonium Oxalate	(NH ₄ OOX) ₂	A	X	A			A	X	A	A	X	A		A	A		A	A
Ammonium Perchlorate	NH ₄ ClO ₄						A		A	A								A
Ammonium Persulfate	(NH ₄) ₂ S ₂ O ₈	A	C	A		A	C	X		A	X	C	B	A	A	A	A	A
Ammonium Phosphate, Di-Basic	(NH ₄) ₂ HPO ₄	A	A	A	A		B		A	A	C	A		A	A	A	A	A
Ammonium Phosphate, Monobasic	(NH ₄) ₂ H ₂ PO ₄	A	A	A		A	X	X	A	B		A	A	A	A	A	A	A
Ammonium Phosphate, Tri-Basic	(NH ₄) ₃ PO ₄ •3H ₂ O	A	A	A			X		B	B	X	A		A	A	A	A	A
Ammonium Sulfate	(NH ₄) ₂ SO ₄	A	A	A	A	A	X	B	B	A	C	A	A	A	A	A	A	A
Ammonium Sulfide	(NH ₄) ₂ S			A		A	B		A	B	X	A		A	A	A	A	A
Ammonium Sulfite	(NH ₄) ₂ SO ₃ •H ₂ O			A		A	C	X	A	B		A		A	A			
Ammonium Thiocyanate	NH ₄ SCN						C	C	A	A	X	A	A	A	A	A	A	A
Ammonium Thiosulfate	(NH ₄) ₂ S ₂ O ₃	A	A				A	X		A	X	A	A	A	A	A	A	A
Amyl Acetate (Banana Oil)	CH ₃ CO ₂ C ₅ H ₁₁	A	X	X	A	A	A	B	B	A	A	X	A	X	A	X	A	A
Amyl Alcohol (Pentyl Alcohol)	CH ₃ (CH ₂) ₄ OH			A			A	A	A	B	A	A	A	A	A	A	A	A
n-Amyl Amine (1-Aminopentane)	CH ₃ (CH ₂) ₄ NH ₂											C	X	X	A	X		
Amyl Borate	C ₅ H ₁₁ BO ₃											A		B	A	A		
Amyl Chloride (Chloropentane)	CH ₃ (CH ₂) ₄ Cl			X		A	X	A	B	A	A	X	X	X	A	A	A	A
Amyl Chloronaphthalene												B		X	A	A		
Amyl Naphthalene	C ₁₇ H ₁₈											X	X	X	A	A		
Amyl Nitrate	C ₅ H ₁₁ NO ₃											A			A		A	A
Amyl Phenol	C ₆ H ₄ (OH)C ₅ H ₁₁						A	A	A	A	X				A	A		
Aniline (Aniline Oil) (Amino Benzene)	C ₆ H ₅ NH ₂	A	X	A	A	A	B	A	B	A	A	X	C	X	A	A	A	A
Aniline Dyes		A	X				B	C		B	C	C	C	C	A	B		
Aniline Sulfate	(C ₆ H ₅ NH ₂) ₂ H ₂ SO ₄			B		A	A	A	B	B					A		A	
Aniline Hydrochloride	C ₆ H ₅ NH ₂ •HCl			A		A	X	X	B	X	X	C		X	A	B	A	A
Animal Fats & Oils							A	X	A	A		A	B	C	A	A		
Animal Gelatin										A		A	A	A	A	A		
Anise Oil		A	A							A				C	A			
Anisole (Methylphenyl Ether)	C ₆ H ₅ OCH ₃			C			B	B	B	B				X	A	X		
Anone (see Cyclohexanone)																		
Ansul Ether												C		X	A	X		
Ansul Oil												A						
Anthraquinone	C ₁₄ H ₈ O ₂						B	B	A	B					A			
Antiformin				A		A	B		B			B			A	B	B	
Anti-Freeze (Alcohol Base)		A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A
Anti-Freeze (Glycol Base)		A	A	A		A	A	A	A	A	A	A	B	A	A	A	A	A
Anthraquinone Sulfonic Acid	C ₁₄ (CO) ₂ C ₆ H ₃ SO ₃ H			C			C		B	B				A	B	A	A	
Antimony Fluoride (TRI)	SbF ₅					A												
Antimony Pentachloride	SbCl ₅					A	A	A	A	A		X		A				
Antimony Salts (de Haens Salt)												A			A	C		
Antimony Trichloride (Chloride)	SbCl ₃			A		A	B	A	B	A		B	A		A	A	A	A
Aqua Regia (Nitric & Hydrochloric Acid)				B	X	X	X	X	C	X	X	X	X	X	A	B	A	X
Aroclor®	PCB mixtures			X			A	B	A	A		C	X	X	A	A	A	A
Aromatic Solvents (Hydrocarbons)							A	B	B	A		C	X	X	A	A	A	A
Arsenic Acid	AsH ₃ O ₄	A	C	A	A	A	A	X	B	B		B	A	A	A	A		A
Arsenic Compounds							A			A	X	A			A			A
Arsenic Trichloride (Arsenic Butter)	AsCl ₃						B	B	B	X		C	X	A	A	X		A

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DIAPHRAGM PUMPS					√							√				√		
DRUM EMPTYING PUMPS					√		√					√				√	√	
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√
CENTRIFUGAL PUMPS												√				√	√	√
LOBE PUMPS											√	√	√		√	√	√	√
SLIDING VANE PUMPS										√		√	√			√	√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyethylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Ascorbic Acid	C ₆ H ₈ O ₆			A		A	A	X	A					A	A			
Askare® (Pyranol®)	PCB mixtures								A		B	X	X	A	C			
Asphalt	Hydrocarbons	A	X	A	A		A	B	A	A	B	X	C	A	A			A
Asphalt Emulsions		A	X		A									A		A		
Asphalt Topping	Hydrocarbons						A		A	A	C		A	A	C			
ASTM - Ref Motor Fuel A (Aliphatic)	Hydrocarbons						A	A	A	A	A	X	B	A	A			
ASTM - Ref Motor Fuel B(30% Aromatic)	Hydrocarbons						A	A	A	A		X	X	A	A			
ASTM - Ref Motor Fuel C(50% Aromatic)	Hydrocarbons						A	A	A	A	B	X	X	A	A			
ASTM - Ref # 1 Oil (High Aniline)	Hydrocarbons	A	X				A	A	A	A	A	X	B	A	A	A	A	A
ASTM - Ref # 2 Oil (Medium Aniline)	Hydrocarbons						A	A	A	A	A	X	B	A	A	A	A	A
ASTM - Ref # 3 Oil (Low Aniline)	Hydrocarbons	A	A				A	A	A	A	A	X	C	A	A	A	A	A
ASTM - Ref # 4 Oil (High Aniline)	Hydrocarbons						A	A	A	A	B	X	X	A	A			
Automotive Gasoline (Petrol)	Hydrocarbons				A		A	A	A	A	A	X		A	A	A	A	A
Aviation Gasoline	Hydrocarbons				A		A	A	A	A	A	X	X	A	A	A	A	A
Barbeque Sauce	Water, oils, spices	A	X					X	A	X	A		A	A		A	A	A
Bardol B														A		A		A
Barium Carbonate	BaCO ₃			A	A		X	B	B	B	A	A	A	A	A	A	A	A
Barium Chlorate	Ba(ClO ₃) ₂ ·H ₂ O			A		A	A	X	B	A						A		A
Barium Chloride Dihydrate	BaCl ₂ ·2H ₂ O			A	A		B	B	B	B		A	A	A	A	A	A	A
Barium Chloride	BaCl ₂	A	A	A	A	A	A	C	A	X	C	A		A	A	A	A	A
Barium Cyanide	Ba(CN) ₂			X						A		C		A	A	A		
Barium Hydroxide (Barium Hydrate)	Ba(OH) ₂	A	A	A	A	A	X	B	B	A	A	A	A	A	A	C	A	A
Barium Nitrate	Ba(NO ₃) ₂	A	X	A		A	B	A	A	A	X	A		A	A		A	A
Barium Sulfate (Blanc Fixe)	BaSO ₄			A	A	B	B	B		B	C	A	A	A	A	A	A	A
Barium Sulfide	BaS			A	A	B	X	C	A	B	X	A	A	A	A	A	A	A
Batter		A	X							A	X	A		A			A	A
Bay Oil		A	A							A			X		A			
Beef Extract		A	X					X		A	X	A		A	A	A	A	A
Beer	Water, carbonate	A	A	A	A	A	A	X	A	A	A	C	A	A	A	A	A	A
Beet Sugar Liquors (Sucrose)		A	A	A			A	B	A	A	A	A	A	A	A	A	A	A
Benzaldehyde	C ₆ H ₅ CHO	A	X	X	A	A	A	A	A	A	A	X	B	X	A	X	A	A
Benzene (Benzol)	C ₆ H ₆	A	A	X	A	A	B	B	B	A	A	X	X	X	A	B	A	A
Benzene Sulfonic Acid	C ₆ H ₅ SO ₃ H	A	X	B	A	B	C	A	A	A		C	C	A	A	A	A	A
Benzine (Gasoline)	Hydrocarbons				A		A	A	A	A	A		X	A	A	A	A	A
Benzoic Acid (Benzene Carboxylic Acid)	C ₆ H ₅ COOH	A	C	X	A	A	B	X	A	B	A	X	B	B	A	A	A	A
Benzonitrile					A											A		A
Benzoyl Chloride	C ₆ H ₅ COCl			X		A	X	A	B	B		X	X	X	A	B	A	
Benzoyl Peroxide	(C ₆ H ₅ CO) ₂ O ₂	X	X					X		A	X			A				
Benzyl Acetate	C ₆ H ₅ CH ₂ OC(=O)CH ₃						A	A	B	A		X			A	X		
Benzyl Alcohol	C ₆ H ₅ CH ₂ OH			A	A	A	A	A	B	A		X	C	C	A	A		
Benzyl Benzoate	C ₆ H ₅ CH ₂ OC(=O)C ₆ H ₅						A	B	B	B		X	B	X	A	A	A	A
Benzyl Chloride (Chlorotoluene)	C ₆ H ₅ CH ₂ Cl			X	A	A	X	A	A	B	X	X	X	X	A	A	A	
Benzyl Cyanide	C ₆ H ₅ CH ₂ CN					A												
Benzyl Dichloride (Benzal Chloride)	C ₆ H ₅ CHCl ₂						X	B	B	A		X			A			
Beryllium Chloride	BeCl ₂			A		A				B	X				A		A	A
Beryllium Sulfate	BeSO ₄			A		A	X			A	B					A		A

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS				√							√		√			√		
DRUM EMPTYING PUMPS				√			√				√			√	√			
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	√
CENTRIFUGAL PUMPS										√					√	√	√	√
LOBE PUMPS										√			√	√		√	√	√
SLIDING VANE PUMPS									√		√	√					√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Bichloride of Mercury												A						
Biphenyl (Diphenyl)	C ₆ H ₅ C ₆ H ₅						A	A			X	X	X	A	A			
Bismuth Subcarbonate (Bismuth Carbonate)	(BiO) ₂ CO ₃								B		A	A	A	A	A			
Black Sulfate Liquor				B			C	B	B	A	B	B	A	A	A	A		
Blast Furnace Gas	CO, H ₂ , CH ₄ , CO ₂ , N ₂													A	A	A		
Bleach Solutions	Water, chlorine, oxygen		A	B		A	X		A	B	C	X	A	X	A	B		
Bone Oil		A	X					A		A	A	A		X		A		A
Boiler Feed Water									A	A	B		A	A	X	B	X	
Borax (Sodium Borate)	B ₂ Na ₂ O ₇	A	X	A	A	A	B	B	A	A	B	B	A	A	A	A	A	A
Bordeaux Mixture	Copper sulfate salts								A	A	A	A	A	A	B	A	A	
Boron Trichloride (Chloride)	BCl ₃			A		A	X		B					B		A	A	
Boric Acid (Boracic Acid)	H ₃ BO ₃	A	A	A	A	A	A	X	A	A	A	A	A	A	A	C		
Boron Fuels (H.E.F.)							A	X		A	X			A	A			
Brake Fluid (Non-Petroleum Base)	Silicones or glycols	A	X	X			A	A	A	A	A	X	A	A	A			
Brewery Slop		A	A					A		A	A	A		A	A	A		A
Brine (Sodium Chloride)	Salt Water	A	A	A	A			X	A	A	A	A	A	B	A	A	A	A
Bromine - Anhydrous	Br ₂		X	X			B	C	A	X		X	C	X	A	A		
Bromine Trifluoride	BrF ₃			X			A			B		X	X	X	A	X		
Bromine Water		X	X	X		A	X	X	A	C		X	X	B	A	B		
Bromobenzene	C ₆ H ₅ Br			X	C	B	X	B	B	A	C	X	X	X	A	B	X	A
Bromochloromethane	BrCH ₂ Cl						X	B	B	B		X	B	X	A	C		
Bromotoluene	C ₆ H ₄ BrCH ₃						X	A	A	A		X			A	B		
Bronzing Liquid									A	A		X	B	X	A	X		
Bunker Oil (Fuel) #5, #6 & C	Hydrocarbons				C		A	A	A	A	C	A	X	B	A	A	A	A
Butadiene	C ₄ H ₆			X	A		A	A		A	C	X	C	C	A	C	A	A
Butane (LPG) (Butyl Hydride)	C ₄ H ₁₀	A	X	X	A		A	A	A	A	A	A	X	B	A	A	A	A
Butter	Fats	A	X				A	X		A	X	A	A	C	A	A	A	A
Buttermilk	Fats, water	A	X	A			A	X		A	X	A		A	A	A	A	A
Butyl Acetate	CH ₃ CO ₂ (CH ₂) ₃ CH ₃	A	X	X	A	B	A	A	A	A	A	X	B	X	A	X	A	A
Butyl Acetyl Ricinoleate	C ₂₈ H ₄₄ O ₅								A			C	C	X	A	B		
Butyl Acrylate	CH ₂ CHCO ₂ C ₄ H ₉										X	X	X	A	X			
Butyl Alcohol (Butanol) (Dibutyl Ether)	CH ₃ (CH ₂) ₃ OH			B		A	A	B	A	A	A	A	B	A	A	A	A	A
Butyl Amine (Aminobutane)	CH ₃ (CH ₂) ₃ NH ₂			B	A		A	A		A		B	X	X	A	X	A	A
Butyl Benzoate	C ₁₁ H ₁₄ O ₂						B	B	B	B			B	X	A	A	A	A
Butyl Bromide	CH ₃ (CH ₂) ₃ CH ₂ Br											X			A	B		
Butyl Butyrate	C ₈ H ₁₆ O ₂						A	A	A	A		X			A	X	A	A
Butyl Carbitol® (Butyldigol)	C ₈ H ₁₆ O ₃											A	A	B	A	A		
Butyl Cellosolve® (Butoxyethanol)	C ₆ H ₁₄ O ₂											B		C	A	C		
Butyl Chloride (Chlorobutane)	CH ₃ (CH ₂) ₃ Cl			B		A	X	B	B	B		X			A	A		

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS							
DIAPHRAGM PUMPS				√							√				√				
DRUM EMPTYING PUMPS				√		√					√				√	√			
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√	
CENTRIFUGAL PUMPS												√				√	√	√	
LOBE PUMPS											√				√	√	√	√	
SLIDING VANE PUMPS									√			√	√			√	√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																			
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LIQUID	FORMULA																		
Butyl Ether (Dibutyl Ether)	(CH ₃ (CH ₂) ₄) ₂ O			X	A		A	B	A	A						A			
Butyl Glycol (Glycol Mono Butyl Ether)	C ₈ H ₁₈ O ₂			B			A	C									A		
Butyl Oleate	C ₂₂ H ₄₂ O ₂											C	X	A	A				
Butyl Phenol	C ₁₄ H ₁₄ O						A												
Butyl Phthalate				B	A	A	A				X			A	X	A	A		
Butyl Stearate	C ₂₂ H ₄₂ O ₂						B	B	B	B		A	C	X	A	B	A	A	
Butylene (Butene)	C ₄ H ₈			X	A	B	A		A	A	B	X	X	A	B	A	A		
Butyraldehyde	C ₄ H ₈ O	A	X		A		A	A	A	X	X	C	X	A	X	A	A		
Butyric Acid	C ₄ H ₈ O ₂	A	X	A	A	A	A	X	A	B	C	C	X	A	C	A	A		
Butyric Anhydride	C ₈ H ₁₆ O ₃						A	A	A	A		C							
Butyronitrile	CH ₃ CH ₂ CH ₂ CN											X	A	X	A				
Cadmium Chloride	CdCl ₂			A		A	X		B	A							A		
Cadmium Nitrate	Cd(NO ₃) ₂			A		A													
Cadmium Sulfate	CdSO ₄			A		A	B		B	B							A	A	
Calcium Acetate Hydrate	Ca(CH ₃ COO) ₂ •H ₂ O						C	C	B	B		B	A	C	A	X			
Calcium Bisulfate	Ca(HS) ₂	A	X	A		A	X	X		A	X	A		B	A	A	A	A	
Calcium Bisulfide	Ca(HS) ₂ •6H ₂ O											A			A	A	A	A	
Calcium Bisulfite	Ca(HSO ₃) ₂			A	A		X	X	A	A	C	A	X	A	A	A	A	A	
Calcium Bromide	CaBr ₂			A		A												A	
Calcium Carbonate (Chalk)	CaCO ₃			A			C	B	B	B	A	A	A	A	A	A	A	A	
Calcium Chlorate	Ca(ClO ₃) ₂			A		A	B	B	B	B	C	A	A	A	A	A	A	A	
Calcium Chloride (Brine)	CaCl ₂ •6H ₂ O	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	
Calcium Hydrosulfide (Calcium Sulfhydrate)	Ca(HS) ₂ •6H ₂ O											A			A	A			
Calcium Hydroxide (Slaked Lime)	Ca(OH) ₂	A	X	A		A	X	B	A	B	A	A	A	A	A	A	A		
Calcium Hypochlorite 20% (Calcium Oxichloride)	Ca(ClO) ₂	A	A	A	A	A	X	X	B	B	C	C	B	X	A	B	A	A	
Calcium Nitrate	Ca(NO ₃) ₂			A	A	A	B	B	B	B		A	A	A	A	A	A	A	
Calcium Oxide (Unslaked Lime)	CaO						A	A	A	A		A	A	A	A				
Calcium Permanganate	Ca(MnO ₄) ₂ •4H ₂ O			A		A	B			A	A				A	A	A	A	
Calcium Phosphate	CaHPO ₄											A			A		A	A	
Calcium Silicate	Ca ₂ SiO ₃						A	B	A	A					A	A			
Calcium Sulfate (Gypsum)	CaSO ₄	A	X	A	A	A	C	B	A	A	A	A	A	A	A	A	A	A	
Calcium Sulfide	CaS			A		A	A	B	A	B		A	A	B	A	A			
Calcium Sulfite	CaSO ₃ •2H ₂ O			A		A	B	B		A					A	A			
Calgon®	(NaPO ₃) ₆	A	X	A				X		A	C	A		A	A	A	A	A	
Camphor	C ₁₀ H ₁₆ O			B			A	B	B						B	X	A	A	
Cane Juice	Sucrose, water			X			B	A		A	A			A	B		A	A	
Cane Sugar Liquors	Sucrose, water	A	A	A			A	A		A		A	A	A	A	A			
Capric Acid	CH ₃ (CH ₂) ₈ COOH			C		B	C		C	A							B		
Capronic Acid	CH ₃ (CH ₂) ₆ CO ₂ H			X		B	C		C	A					C		B	B	
Capryl Alcohol (Octanol)	CH ₃ (CH ₂) ₆ CH ₂ OH						A	A	A	A		A	C	B	A	B	B		
Caprylic Acid (Octanoic Acid)	C ₈ H ₁₆ O ₂			X		B	A	A	A	A		C			A		B		
Carbamate	H ₂ NCO ₂ H				A							C	C	C	A	A			
Carbide Slurries				X		X				A	B			A			A	A	
Carbinol (Methanol) (Methyl Alcohol)	CH ₃ OH			A	A	A	B	A	A	A		A	A	A	A	B	A	A	
Carbitol® (Ethylidigol)	C ₆ H ₁₄ O ₃						A	A	A	A		B	C	C	A	C	A	A	
Carbolic Acid (see Phenol)	C ₆ H ₅ OH	A	X	C	A	A	B	A	A	B	C	X	C	C	A	A	A	A	
Carbon Dioxide (Carbonic Acid Gas)	CO ₂	A	A	A	A	A	A	X	A	A	A	A	B	A	A	A	A	A	
Carbon Disulfide (Carbon Bisulfide)	CS ₂	A	A	X	A	B	A	B	C	A	C	X	X	X	A	A	A	A	
Carbon Monoxide	CO	A	A	A			A	A	A	A	C	C	C	A	A	C	A	A	
Carbon Tetrachloride (Tetrachloromethane)	CCl ₄	A	A	X	A	A	X	C	A	B	C	C	X	X	A	A	A	A	
Carbonated Beverages	CO ₂ /H ₂ O			A			C	X	A	A	C	A		A	A	A	A	A	

Liquid Compatibility Guide

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DIAPHRAGM PUMPS				√								√				√			
DRUM EMPTYING PUMPS				√			√					√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√	√
CENTRIFUGAL PUMPS												√				√	√	√	√
LOBE PUMPS											√		√			√	√	√	√
SLIDING VANE PUMPS								√				√	√					√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																			
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC	
LIQUID	FORMULA																		
Carbonic Acid (liquid)	H ₂ CO ₃	A	A	A	A		X	A	B		B		A	A	A	A	A	A	A
Casein	a phosphoprotein						B	B	B		A	A	A	A	A	A	A	A	A
Castor Oil	a mixture of fatty acids	A		B		A	A	B	A	A	A	B	X	A	A	A	A	A	A
Catsup (Ketchup)				A			B	X	A	A	C	A		C	A	A	A	A	A
Cellosolve® (Glycol Ethers)	HOCH ₂ CH ₂ OR			A	A	B	A		A	A		C	C	C	A	B			
Caustic Potash/Solution (see Potassium Hydroxide)																			
Caustic Soda (see Sodium Hydroxide)																			
Cellulose Acetate	C ₆ H ₁₂ O ₅					A	B	B	A		B		B	A	C	A	A	A	A
Cellulose Ether				B		A			B										
Cellulube® Hydraulic Fluids (Phosphate Esters)							A	A	A	A	A	X	A	X	A	B	A	A	A
Cetyl Alcohol	CH ₃ (CH ₂) ₁₈ OH					A				A							A		
China Wood Oil (Tung)										A				A	A				
Chloramine T (Tosylchloramide Sodium)	C ₇ H ₇ ClNO ₂ S•Na			X		A	B			A							B		
Chloric Acid	HClO ₃			B		A	X		C	X		X		A		B	A	A	A
Chlorinated Lime - 35% Bleach	Ca(ClO) ₂			B		A	X	X		A		C	A	X	A	A	A		
Chlorinated Water				B	X		C		A	B		C		C	A	A			
Chlorine, Dry	Cl ₂		X	X		X	X					C		C	A	A			
Chlorine, Wet	Cl ₂ /H ₂ O		X	X		X	B	C	A	A		C	X	X	A	A			
Chlorine, Anhydrous Liquid	Cl ₂		X	X		X	X	C	A	X		X		X	A	A			
Chlorine Dioxide	ClO ₂						B		B	X		X	C	X	A	B			
Chlorine Trifluoride	ClF ₃			X			A			A		X	X	X	A	B			
Chloroacetic Acid (Monochloroacetic Acid)	ClCH ₂ COOH	X	X	A	A	A	X	X	A	X	X	X	B	C	A	C	A		
Chloroacetone (Monochloroacetone)	ClCH ₂ COCH ₃	X	X	X			X	B	B	B		X	A	C	A	C	A	A	A
Chlorobenzene (Monochlorobenzene)	C ₆ H ₅ Cl	A	X	X	A	A	X	B	B	B	A	X	X	X	A	A	A	A	A
Chlorobutadiene (Chloroprene)	C ₄ H ₅ Cl	A	X	X			X	B	B	B	X	X	X	X	A	A			
Chlorobromomethane	ClCH ₂ Br	X	X	X			X	B		B	X	X		X	A	A			A
Chloroform	CHCl ₃	A	A	X	A	A	X	A	A	A	A	X	X	X	A	A	A	A	A
1-Chloronaphthalene	C ₁₀ H ₇ Cl			X		A	X	B	A	B		X	X	X	A	C			
Chlorosulfonic Acid	HSO ₃ Cl	X	X	X	X	C	B	B	A	B		X	X	X	A	X	A		
Chlorophenol (5% Aqueous)					A				A	A		A					A		
o-Chlorophenol	C ₆ H ₅ ClO				A		B	B	B	B		X	X	X	A	B	A	A	A
Chlorothene® (see Trichloroethane)	CH ₃ CCl ₃						X	X	A	A		X		X	A	C			
Chlorotoluene															A	A	A	A	A
Chlorotrifluoroethylene	C ₂ H ₂ ClF ₃						B	B	B	B		X			A				
Chlorox® Bleach		A	X	B				X	B	A		C		B	A	A	A	A	A
Chocolate Syrup	Corn syrup, water, sugar	A	X	A				X		A	A	A		A	A		A	A	A
Chrome Alum															A	A	A	A	A
Chromic Acid - To 25%	H ₂ CrO ₄	C	C	A	A	A	B	B	B	X	X	A	X	A	A	C	A		
Chromic Acid - Over 25%	H ₂ CrO ₄	C	C	A	A	A	X	B	B	X	X	C	X	A	A	C	A		
Chromium Sulfate	Cr(SO ₄) ₃			A		A	A		B	B							A		
Cider (Apple Juice)	Sucrose, water	A	X	A		A	B	X	A	A		A		A	A	A	A	A	A
Cinnamon Oil	Cinnamic acid esters	A	A					X		A	X	X		X	A	X			A
Citric Acid	C ₆ H ₈ O ₇ •H ₂ O	A	A	B	A	A	B	X	A	A	C	B	A	A	A	A	A	A	A
Citric Oils	Citric acid esters	A	X	A				X		A	C	C	B	X	A	A			A
Citrus Pectin Liquor		A								A				A	A	A			
Clay Slurry							A								A				
Clove Oil (Eugenol)	C ₁₀ H ₁₂ O ₂	A	A					X		A	X	A		X	A				
Coal Tar (Tar Oil) (Creosote)	Hydrocarbon Mix						A								A		A	A	A
Cobalt Chloride (Cobaltions)	CoCl ₂ •H ₂ O			A			X						A	C	A	A			

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS					√							√				√		
DRUM EMPTYING PUMPS				√			√					√			√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√
CENTRIFUGAL PUMPS												√				√	√	√
LOBE PUMPS											√	√	√		√	√	√	√
SLIDING VANE PUMPS									√			√	√				√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Coconut Oil (Coconut Butter)	Fatty acid mixture	A	A	A		A	B	A		A	A	B	A	X	A	A	A	A
Cod Liver Oil (Fish Oil)	Glycerides, acids, esters	A	A				A	X		A		B	A	X	A	A	A	A
Coffee	Fatty oils, acids, cellulose, water			A			A		A	A	A		A	A		A	A	
Cooking Lye (see Calcium Bisulfite)																		
Copper Arsenide	Cu ₃ As			A		A												
Copper Acetate	Cu(C ₂ H ₃ O ₂) ₂ •H ₂ O			A		A	X	A	B	B		B	A	C	A		A	A
Copper Carbonate	Cu ₂ (OH) ₂ CO ₃								A	A							A	A
Copper Chloride	CuCl ₂ •2H ₂ O	A	X	A		A	X	X	B	X	X	A	A	A	A	A	A	A
Copper Cyanide	CuCN	A	A	A	A	A	X	A	A	A	X	A	A	A	A	A	A	A
Copper Fluoroborate		A	A				X	X	B	X		B		A	A	A		
Copper Nitrate Hexahydrate	Cu(NO ₃) ₂ •6H ₂ O			A	A	A	X	X	B	A	X	A	A	A	A	A	A	A
Copper Sulfate (Blue Copperas)	CuSO ₄ •5H ₂ O	A	A	A	A	A	X	X	A	A	C	A	A	A	A	A	A	A
Copper Sulfide	CuS											A		A	A			
Corn Oil (Maize oil)	Glycerides of fatty acids	A	A	A		A	B	C		B	A	A	C	C	A	A	A	A
Corn Starch Slurry							A					A		A		A	A	
Cotton Seed Oil		A	A	A	A		A	C		A	A	A	X	A	A	A	A	A
Cream		A	A	A				X		A	C	A		C	A	A	A	A
Creosol	CH ₃ O(CH ₂) ₂ CH ₂ OH	A	X		A	A	A	C	A	A	X	X	X	X	A	C	A	A
Creosote, Coal-Tar (Tar Oil)	Hydrocarbon mixture	A	X	X			B	B	B	B	A	A	X	X	A	A	A	A
Creosote, Wood Tar	Mixture of phenols			X						B		A	X	X	A	A		
Cresylic Acid (Cresol)	C ₈ H ₁₀ O ₂	A	X	X		B	B	C	B	A	C	C	X	X	A	A	A	A
Crotonaldehyde	CH ₃ CH=CHCHO			B		B	A	A	A	A		X		A	A	A		A
Crude Oil							A		A	C					A	A	A	A
Cumene (Isopropylbenzene)	C ₉ H ₈ CH(CH ₃) ₂						B	B	B	B		X	X	X	A	A		
Cupric Chloride (see Copper Chloride)																		
Cupric Nitrate (see Copper Nitrate)																		
Cutting Oil (Water Soluable)		A	A				A	A	A	A	A	C		X	A	A	A	A
Cutting Oil (Sulfur Base)		A	C				A	A	A	A	A			C	A		A	A
Cyanic Acid	HOCN	A	X									C		C				
Cyclohexane	C ₆ H ₁₂	A	X	X	A	A	B	B	B	B	A	B	X	X	A	A	A	A
Cyclohexanol	C ₆ H ₁₁ OH			B	A	A	C	B	A	A		B	X	A	A	A	A	
Cyclohexanone	C ₆ H ₁₀ O			X	A	B	B	B	B	B		X	C	X	A	X	A	
Cyclopentane	C ₅ H ₁₀						B	B	B	B		B	X	A	A	A		
Cymene (Isopropyltoluene)	C ₁₀ H ₁₄											C	X	X	A	A		
DDT (Kerosene/Toluene Solvent)										A	A	A			A		A	A
Decahydronaphthalene (Decalin®)	C ₁₀ H ₁₈			A		A	C					X	X	X	A	A	A	
Decanal	CH ₃ (CH ₂) ₈ CHO											X	X		A	X		
Decane	CH ₃ (CH ₂) ₈ CH ₃			A						B		B	C	X	A	A	A	A
Decyl Alcohol (Decanol)	C ₁₀ H ₂₁ OH											A		X	A	A	B	
Denatured Alcohol	Ethanol & denaturant			A		B	B	A	A		A	A	B	A	B	A	A	A
Detergent Solutions				A	A	A	B			A	A	A	A	A	A	A	A	A
Developing Fluids & Solutions							X	A	A	X	A	C	A	A	A	A	A	A
Dextrose	C ₆ H ₁₂ O ₆						A	X	A	A		B	A	B	A	A		
Diacetone Alcohol (Diacetone)	C ₆ H ₁₂ O ₂			X			A	A	A	A	A	X	B	X	A	X	A	A

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DIAPHRAGM PUMPS				√							√		√			√		
DRUM EMPTYING PUMPS				√			√				√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	√
CENTRIFUGAL PUMPS											√				√	√	√	√
LOBE PUMPS										√			√	√	√	√	√	√
SLIDING VANE PUMPS								√			√						√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Dibenzyl Ether	(C ₆ H ₅ CH ₂) ₂ O	A	X				B	B	B	B	X	X	C	X	A	C		
Dibenzyl Sebecate	C ₂₄ H ₃₀ O ₄											X	C	X	A	B	A	A
Dibromochloropropane	BrCH ₂ CHClBr		X					X		A	X					A		
Dibutyl Amine	(C ₄ H ₉) ₂ NH			X				A	A	A		C	X	X	A	X		
Dibutyl Ether (Butyl Ether)	C ₈ H ₁₈ O	A	X	X		A		X		A	X		X					
Dibutyl Phthalate (DBP)	C ₁₆ H ₂₂ O ₄			X	A		A	A	A	A		X	A	X	A	B	A	A
Dibutyl Sebecate (DBS)	C ₁₈ H ₃₄ O ₄				C		B		A		A	X	C	X	A	C		
Dichloroacetic Acid	Cl ₂ CHCOOH				B		A					X		X	A	X		
o-Dichlorobenzene	C ₆ H ₄ Cl ₂				B		A	X	B	A	B		X	X	X	A	A	
Dichlorobutane	C ₄ H ₈ Cl ₂						X	B		B		X			A	A	A	A
Dichloroethyl Ether	C ₄ H ₈ Cl ₂ O						B					X			A			
Dichloro Isopropyl Ether	C ₆ H ₁₂ OCl ₂			X								X	X	X	A	X		
Dicyclohexylamine	(C ₆ H ₁₁) ₂ NH											X	X	X	A	B		
Diesel Oil (Fuel ASTM # 2)	Hydrocarbons	A		B		A	A	A	A	A	A	A	C	A	A	A	A	
Diester Synthetic Oils		A	A				A	A	A	A		B	X	X	A	A		
Diethanol Amine	C ₄ H ₁₁ NO ₂			A		B		A	A	A		B		A	A		A	A
Diethyl Amine	(CH ₃ CH ₂) ₂ NH			A		B	B	B	A	A		C	C	C	A	X		
Diethyl Benzene	C ₆ H ₄ (C ₂ H ₅) ₂											X	X	X	A	A	A	A
Diethyl Carbonate	(C ₂ H ₅ O) ₂ CO							A				X		X	A		A	A
Diethyl Ether (Ether)	(CH ₃ CH ₂) ₂ O			X	A	B	B	A	A	A	C	B	X	C	A	X	A	A
Diethyl Phthalate (DEP)	C ₁₂ H ₁₄ O ₄						A	A	A	A		X			A	C		
Diethyl Sebecate	C ₁₄ H ₂₆ O ₄	A		A			A	A	A	A		X	C	X	A	B		
Diethylene Ether (Dioxane)	C ₄ H ₈ O ₂						A	A		A		X	A	X	A	X		
Diethylene Glycol (Digol)	C ₄ H ₁₀ O ₃	A		A			A	A	A	A		A	A	A	A	A	A	A
Diethylene Triamine	(NH ₂ C ₂ H ₄) ₂ NH						A	A	A	A		B			A		A	A
Diisobutyl Ketone	C ₈ H ₁₆ COC ₄ H ₉			C		A	A	A	A	A		X	B	X	A	X	A	A
Diisobutylene	C ₈ H ₁₆			A	A		A			A		B		C	A	C	A	
Diisodecyl Adipate (DIDA)	C ₂₆ H ₅₀ O ₄											X			A	C		
Diisodecyl Phthalate (DIDP)	C ₂₈ H ₄₇ O ₄											X	A	X	A	C		
Diisooctyl Adipate (DIOA)	C ₂₂ H ₄₂ O ₄						A	A	A	A		X			A	C		
Diisooctyl Phthalate (DIOP)	C ₂₄ H ₃₉ O ₄											X			A	C		
Diisooctyl Sebecate (DIOS)	C ₂₆ H ₄₆ O ₄												B		A	A		
Diisopropyl Amine	((CH ₃) ₂ CH) ₂ NH											B			A			
Diisopropyl Benzene	C ₆ H ₄ (C ₃ H ₇) ₂											X	X	X	A	A		
Diisopropyl Ketone	((CH ₃) ₂ CH) ₂ CO	A							A			X	A	X	A	X	A	A
N,N-Dimethylaniiline	C ₆ H ₅ N(CH ₃) ₂			X	A		B	B				X	C	X	A	X	A	A
Dimethyl Ether	CH ₃ OCH ₃			X			B	B	B	B		A		B	A	A		
N,N-Dimethyl Formamide (DMF)	HCON(CH ₃) ₂			A	A	A	A		A	A		C		X	A	X	A	A
Dimethyl Phthalate	C ₆ H ₄ (CO ₂ CH ₃) ₂				A							X	C	X	A	C	A	A

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DIAPHRAGM PUMPS					√							√				√		
DRUM EMPTYING PUMPS					√		√					√				√	√	
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√
CENTRIFUGAL PUMPS												√				√	√	√
LOBE PUMPS											√	√	√		√	√	√	√
SLIDING VANE PUMPS										√		√				√	√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
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LIQUID	FORMULA																	
Dimethyl Sulfate	(CH ₃) ₂ SO ₄							A				X			A	X		
Dimethyl Sulfide	(CH ₃) ₂ S						A	A	A	A		X			A			
Dinitrotoluene (DNT)	CH ₃ C ₆ H ₃ (NO ₂) ₂	A								A		X	X	X	A	C		
Diocetyl Phthalate (DOP)	C ₂₄ H ₃₈ O ₄						A	A	A	A		X	B	X	A	B	A	A
Diocetyl Sebecate	C ₂₆ H ₅₀ O ₄	A					A	A	A	A		X	C	X	A	C		
Dioxolanes (Dioxolans)	Glycol ethers											X	B	X	A	C		
Dipentene (Limonene)	C ₁₀ H ₁₆						A	A	A	A		C	X	X	A	A	A	A
Diphenyl Oxides (Phenyl Ether)	C ₆ H ₅ OC ₆ H ₅	A					B	A	A	A	A	X	C	X	A	A	A	A
Dipropylamine	C ₆ H ₁₅ N											B			A			
Dipropylene Glycol	(C ₃ H ₆ OH) ₂ O			A								A			A	A		
Dipropyl Ketone (Butyrene)	(C ₃ H ₇) ₂ CO											X			A			
Disinfectant Deodorant		A	A	A						A		A		C	A	A		
Distillery Wort		A	A							A	A			A	A		A	A
Dispersing Oil # 10							A	A	A	A		X	X	X	A	C		
Divinyl Benzene (DVB)	C ₆ H ₄ (CH:CH ₂) ₂											X			A	A		
Dodecyl Benzene (Alkane)	C ₆ H ₅ (CH ₂) ₁₁ CH ₃						A	A		A		X			A	A		
Dow Corning® (Silicones)	((CH ₃) ₂ SiO) ₂						A			A	A	A		A	A	A		
Dowtherm® (Biphenyl & Phenyl Ether)	(C ₆ H ₅) ₂ and (C ₆ H ₅) ₂ O						A	B	A	A		X	X	X	A	A	A	
Drycleaning Fluids	Chlorinated hydrocarbons			X			A	A		A		C		X	A	A		
Dyes - Abrasive										A		X		X	A	C		
Dyes - Water Based				C			B			A				A	A	A		
Dyewood - Liquor										A							A	
Embalming Fluid (Undertakers Restorative)									A	A	A			A	A			
Epichlorohydrin	C ₃ H ₅ ClO	A		A	A	X	A	A	A	A		X	B	X	A	X	A	A
Epsom Salts (Magnesium Sulfate)	H ₂ O.S.Mg			A			A		B	A		A		A	A	A		
Ethane	C ₂ H ₆			C			A	A	A	A	A	A	X	C	A	A	A	A
Ethanolamine (Aminoethanol)	C ₂ H ₇ NO	A	A	X	A	B	B	A		A		B	B	C	A	X	A	A
Ether Compounds		A	X		A					A	A			A			A	A
Ethyl Acetate (Ester)	C ₄ H ₈ O ₂	A	A	C	A	A	A	A	A	A		X	B	X	A	X	A	A
Ethyl Acetoacetate (Acetoacetic Ester)	C ₆ H ₁₀ O ₃						A	A	A	A		X	C	X	A	X	A	A
Ethyl Acrylate	CH ₂ CHCO ₂ CH ₂ CH ₃	A		B			A	A	A	A		X	C	X	A	X		
Ethyl Alcohol (Ethanol)	CH ₃ CH ₂ OH			A	A	A	B	B	A	A	A	A	A	A	A	B	A	A
Ethyl Aluminium Dichloride	CH ₃ CH ₂ AlCl ₂											X			A	B		
Ethyl Amine (Monoethylamine)	CH ₃ CH ₂ NH ₂						B	B		A		X	A	C	A	X		
Ethyl Benzene	CH ₃ CH ₂ C ₆ H ₅			B		B	B	B	A	B		X	X	X	A	A	A	A
Ethyl Benzoate	C ₉ H ₁₀ O ₂			B			A	A	A	A		X	C	X	A	A	A	A
Ethyl Bromide (Bromoethane)	CH ₃ CH ₂ Br						X	A	A	A		X	B	B	A		A	A
Ethyl Butyl Acetate	C ₈ H ₁₆ O ₂											X			A	X		
Ethyl Butyl Alcohol	C ₈ H ₁₄ O											A			A	B		

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DRUM EMPTYING PUMPS				√		√				√				√	√			
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	√
CENTRIFUGAL PUMPS										√					√	√	√	√
LOBE PUMPS										√		√	√		√	√	√	√
SLIDING VANE PUMPS								√			√	√					√	√
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LIQUID	FORMULA																	
Ethyl Butyl Ketone	C ₈ H ₁₄ O											X			A	X		
Ethyl Butyraldehyde	C ₆ H ₁₂ O											X			A	X		
Ethyl Butyrate	C ₈ H ₁₆ O ₂			B			B	A	A	A		X	X	X	A	C		
Ethyl Caprylate (Ethyl Octanoate)	C ₁₀ H ₂₀ O ₂											X	X	X	A			
Ethyl Cellosolve®	C ₄ H ₁₀ O ₂											C	B	C	A	X		
Ethyl Cellulose (Ethocel®)				C			B	A	B	B		B	B	B	A	C	A	A
Ethyl Chloride (Chloroethane)	C ₂ H ₅ Cl	A	X	X	A	C	X	B	B	A	A	A	A	C	A	A	A	A
Ethyl Chlorocarbonate (Ethyl Chloroformate)	C ₂ H ₅ ClCO ₂									A				C	A	A	A	A
Ethyl Cyanide (Propionitrile)	C ₃ H ₇ CN											X	A	B	A	X		
Ethyl Ether (Ether)	C ₂ H ₅ OC ₂ H ₅	A	A	B		B		C		A	X	X	X		A	X	A	A
Ethyl Formate	C ₃ H ₆ O ₂						B	A	B	B		X	C	B	A	A	A	A
Ethylhexyl Acetate	C ₁₀ H ₂₀ O ₂											X			A	X		
Ethylhexyl Alcohol (Ethylhexanol)	C ₈ H ₁₇ OH						A	A	A	A					A	B		
Ethyl Iodide	CH ₃ CH ₂ I														A			
Ethyl Isobutyrate	C ₆ H ₁₂ O ₂											X	X	X	A			
Ethyl Mercaptan (Ethanethiol)	CH ₃ CH ₂ SH						B	A	B	B		X	X	C	A	B	A	A
Ethyl Oxalate	C ₆ H ₁₀ O ₄											X	A	X	A	B		
Ethyl Pentachlorobenzene	C ₂ H ₅ C ₆ Cl ₅			X			X					X		X	A	A		
Ethyl Propionate	C ₅ H ₁₀ O ₂						A	A	A	A		X	X	X	A			
Ethyl Pyridine										A				A	A		A	A
Ethyl Silicate (Tetraethyl Silicate)	C ₈ H ₂₀ O ₄ Si						B	A	A	A		A	A	A	A	A		A
Ethyl Sulfate	C ₂ H ₅ OSO ₂ OH									X		A			A	A	A	A
Ethylene (Ethene)	C ₂ H ₄						A	A		A		B	C	A	A	A	A	A
Ethylene Chlorohydrin	ClCH ₂ CH ₂ OH			X		A		B	A	A		X	A	B	A	B	A	A
Ethylene Diamine	(CH ₂) ₂ (NH ₂) ₂			A	A	B	C	A	A	A		B	A	A	A	X	A	A
Ethylene Dibromide (Ethylene Bromide)	Br(CH ₂) ₂ Br			X			X	X	B	B		X	C	X	A	B	A	A
Ethylene Dichloride (Dutch Oil) Ethylene Chloride	Cl(CH ₂) ₂ Cl	A	X	X	A	A	X	B	B	B	C	X	X	X	A	B	A	A
Ethylene Glycol (Ethylene Alcohol) (Glycol)	(CH ₂ OH) ₂	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Ethylene Glycol Monobutyl Ether (Butyl Cellosolve®) (2-Butoxyethanol)	C ₆ H ₁₄ O ₂						A	A	A	A		B	B	X	A	C		
Ethylene Glycol Monoethyl Ether Acetate (Cellosolve Acetate®)	C ₆ H ₁₂ O ₃						A	A	A	A		C	B	X	A	C		
Ethylene Glycol Monomethyl Ether (Methyl Cellosolve®)	CH ₃ O(CH ₂) ₂ OH						B	B	A	A		C	B	C	A	X		
Ethylene Oxide	(CH ₂) ₂ O	A	X	C	X	A	A	B	A	A	A	X	X	X	A	C	A	A

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS					√							√				√		
DRUM EMPTYING PUMPS					√		√					√				√	√	
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√
CENTRIFUGAL PUMPS												√				√	√	√
LOBE PUMPS											√	√	√		√	√	√	√
SLIDING VANE PUMPS									√			√	√				√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE																		
LIQUID	FORMULA	EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
Ethylene Trichloride (Trichloroethene)	C1HClCl ₂			X			X	A		A		X	X	X	A	A		
Ethylidene Chloride	CH ₂ CHCl ₂						X	B	B	A		X	X	X	A			
Fatty Acids	C _n H _{2n+1} COOH	A	X	B		A	A	X	A	A	B	B	X	C	A	A	A	A
Ferric Chloride	FeCl ₃	A	A	A	A	A	X	X	A	X	X	A	A	A	A	A	A	A
Ferric Hydroxide	FeHO ₂								B	A		B			A	C		
Ferric Nitrate	Fe(NO ₃) ₃	A		A	A	A	X	X	A	B	X	A	A	A	A	A	A	A
Ferric Oxide	FeO ₂	A												C				
Ferric Sulfate	Fe ₂ (SO ₄) ₃	A	X	A	A	A	C	X	A	B	X	A	A	A	A	A	A	A
Ferrous Chloride	FeCl ₂	A	A	A	A	A	X	X	B	B	C	A	A	A	A	A	A	A
Ferrous Nitrate	Fe(NO ₃) ₂			A		A	X			A					A	A	A	
Ferrous Sulfate	FeSO ₄	A		A	A	A	A	C	A	B	C	A	A	A	A	A	A	A
Fish Oil				A		A	A		A	A	X	A		A	A	A	A	
Fluoboric Acid (Fluoroboric Acid)	HF ₄	A	A	A	A		X	X		A		A	A	B	A	C	A	A
Fluorine (Liquid)	F ₂			X			A			A		X	C	C	A	B		
Fluorobenzene	FC ₆ H ₅			X								X	X	X	A	A		
Fluorolube (Fluorocarbon Oils)	FxCyHz			X			A	A	A	A		C	A	A	A	B	A	A
Fluosilicic Acid (Sand Acid)	H ₂ SiF ₆	A		A	A	A	X	X	B	A	C	B	B	A	A	A	A	A
Formaldehyde (Formalin)	HCHO	A		A	A	B	A	C	A	A	A	B	A	C	A	A	A	A
Formamide	HCONH ₂						A	B	B	B		A	A	A	A	X		
Formic Acid	HCOOH	A	C	A	A	A	X	X	A	C	C	C	B	B	A	C	A	A
Freon 11(MF) (Trichlorofluoromethane)	CCl ₃ F	A		B	A		B	A	A	A	A	C	X	B	A	B	A	A
Freon 12 (Dichlorodifluoromethane)	Cl ₂ CF ₂	A		X			A	A		A	X	B	B	B	A	B	A	A
Freon 13 (Chlorotrifluoromethane)	ClCF ₃	A		X			A	A	A	A	A	A	A	A	A	A		
Freon 13B1 (Bromotrifluoromethane)	BrCF ₃	A		X								A	A	A	A	A		
Freon 14 (Tetrafluoromethane)	CF ₄	A		X								X	B	X	A			
Freon 21 (Dichlorodifluoromethane)	FCHCl ₂	A		X			A				A	X	X	B	A	X		
Freon 22 (Chlorodifluoromethane)	HCClF ₂	A		X			A	A	A	A	A	X	C	B	A	X	A	A
Freon 31		A		X	A		A	C	A		A	C		X	A		A	A
Freon 32		A		X			A				A	C		C	A			
Freon 112		A		X			A				A	A		A	A		A	A
Freon 113 (TF) (Trichlorotrifluoroethane)	Cl ₃ CCF ₃	A		X			B			A	A	B	X	A	A	B	A	A
Freon 114 (Dichlorotetrafluoroethane)	C ₂ Cl ₂ F ₄	A		X			B			A	A	A	C	A	A	A	A	A
Freon 114B2	C ₂ Br ₂ F ₄	A		X								B	X	A	A	B		
Freon 115 (Chloropentafluoroethane)	C ₂ ClF ₅	A		X			A				A	A	A	A	A	B		
Fruit Juices/Pulp/Wine	Water, sucrose			A	A	A	A	X	A	A	C	A		A	A	A	A	A
Fuel Oils (ASTM Nos. 1 to 9)	Hydrocarbons			C	A	A	A	A	A	A	A	A	X	C	A	A	A	A
Fumaric Acid (2-Butenedioic Acid)	C ₄ H ₂ O ₄											C		B	A	A	A	A

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS				√							√			√				
DRUM EMPTYING PUMPS				√			√				√			√	√			
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	√
CENTRIFUGAL PUMPS										√					√	√	√	√
LOBE PUMPS										√		√	√		√	√	√	√
SLIDING VANE PUMPS									√		√	√					√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M)	CARBON	CERAMIC
LIQUID	FORMULA																	
Furan (Furfuran)	C ₄ H ₄ O		A	C	A		A	A	A	A	X	A	A	A	X	A	A	A
Furfural (Ant Oil)	C ₅ H ₄ O ₂	A	X	X	A	A	A	B	B	A	X	B	B	A	C	A	A	A
Furfuryl Alcohol	C ₅ H ₆ O ₂			C		A	A	A	A					A	X			
Fusel Oil (Grain oil)	C ₇ H ₁₂ O													A	A			
Gallic Acid	C ₇ H ₆ O ₅			A	A	B	A	X	B	B	C	B	B	C	A	A	A	A
Gasoline (Unleaded)	C ₄ to C ₁₂ hydrocarbons			C	A		A	A	A	C	X	X	X	A	A	A	A	A
Gasoline (Petrol)	Hydrocarbons			C	A		A	A	A	C	A	X	X	A	A	A	A	A
Gelatin	Water soluble proteins	A	X	A		A	A	A		A	A	A	A	A	B	A	A	A
Ginger Oil	C ₁₁ H ₂₀ O ₄	A	A					X		A	X			A	A	A		A
Glacial Acetic Acid					A			X	A					A	A	A		
Glauber's Salt (Sodium Sulfate Decahydrate)	Na ₂ SO ₄ •10H ₂ O			A		A	A		A	A		A	B	A	A	A	A	A
Gluconic Acid	C ₆ H ₁₂ O ₇			A		A	B	C	A	A		C		A	A			
Glucose (Corn Syrup)	C ₆ H ₁₂ O ₆	A	A	A		A	A	A		A	A	A	A	A	A	A	A	A
Glue (Sizing)		A	X	A			A	A	A	B	A	A	B	A	A	A	A	A
Glycerol (Glycerine)	C ₃ H ₈ O ₃	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A
Glycolic Acid	HOCH ₂ COOH	A		A	A	B			A	B		A		A	A	A	A	A
Glycols				A	A		B	B		B		A		A	A	A	A	A
Gold Monocyanide	AuCN	A	A						A	X	A	A		A	A	A		
Grape Juice	Water, sucrose	A	A	A		A		X		A	C	C		X	A	A	A	A
Grapefruit Oil		A	A					X		A	X	X		X	A			
Grease	Hydrocarbons	A	X			A	A		A	A	A			X	A	A	A	A
Green Sulfate Liquor				A			B	C	B	A		B	A	B	A	A		
Hair Solution (Breck-Clairol)		A							A	A		A		A		A	A	A
Halowax Oil	Chlorinated naphthalenes						X					X	X	X	A	A		
Heptanal	CH ₃ (CH ₂) ₅ CHO			A			A	A	A	A		A			A	A		
Heptane	C ₇ H ₁₆	A	X	C	A	A	A	A	A	A	A	X	C	A	A	A	A	A
Hexanal	CH ₃ (CH ₂) ₄ CHO						A	B	B	A		X	B	A	A	C		
Hexalin (Cyclohexanol)	C ₆ H ₁₁ OH											B	C	A	A	A		
Hexamine	(CH ₂) ₆ N ₄						A		A	A		A		A		A	A	A
n-Hexane	C ₆ H ₁₄			C	A		A	A	A	A	A	X	B	A	A	A	A	A
n-Hexene 1 (Hexylene)	C ₆ H ₁₂											A	X	B	A	A		
Hexyl Alcohol (1-Hexanol)	C ₆ H ₁₃ OH						A	A		A	A	A	C	B	A	A		
Hexylene Glycol (Brake Fluid)	C ₆ H ₁₂ (OH) ₂						A	A	A	A		A	C	A	A	A		
Honey		A	X	A			A	A	A	A	A	A	A	A	A		A	A
Horseradish		A			A							X		A	A		A	A
Hydraulic Oil (Petroleum Base)	Hydrocarbons	A	X	X			A	A	A	A	A	X	X	A	A	A	A	A
Hydraulic Oil (Skydrol 700)		A	X				A		A	A	X		X		X			
Hydrazine (Diamine)	H ₂ NNH ₂	A	A	A		A	A	X	A	A	X	C	A	C	A	X	A	
Hydrobromic Acid	HBr	C	X	B	A	A	X	A	A	X		X	A	C	A	A		
Hydrochloric Acid 10%	HCl	A	A	A	A	A	X	C	B	X	X	B	A	B	A	A	A	A

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COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS					√						√				√			
DRUM EMPTYING PUMPS					√		√				√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	
CENTRIFUGAL PUMPS											√				√	√	√	
LOBE PUMPS										√		√		√	√	√	√	
SLIDING VANE PUMPS									√		√	√				√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Hydrochloric Acid 20%	HCl	A	X	A	A	A	X	C	A	X	X	B	A	B	A	A	A	
Hydrochloric Acid 30% (Conc.)	HCl	A	X	B	A	A	X	X	A	X	X	C	A	C	A	B	A	
Hydrocyanic Acid (Formonitrile)	HCN	A	X	A		A	A	X	B	A	X	B	A	C	A	A		
Hydrogen Bromide	HBr													A				
Hydrogen Chloride	HCl									C	C	A	A	A	A		A	
Hydrogen Fluoride - Anhydrous	HF			A			X		A	X		X	C	C	A	A		
Hydrofluosilicic Acid (Fluosilicic Acid)	H ₂ SiF ₆			C		B		X	X	X	A	C		C	A	A	C	
Hydrofluoric Acid (Conc.) Cold	HF	X	X	X	A	A	C	X	B	X	X	X	C	C	A	B	X	
Hydrogen Peroxide - 3%	H ₂ O ₂	A	X	A	X	A	A					X	B	B	B	A	A	
Hydrogen Peroxide - 10%	H ₂ O ₂	A	X	A	X	A	A	B	A	A	X	C	B	C	A	A	C	
Hydrogen Peroxide - 30%	H ₂ O ₂	A	X	A	X	A	A	X	A	B	X	C	B	X	A	A	C	
Hydrogen Peroxide - 90%	H ₂ O ₂	A	X		X	A	A	X		A	X	X	C	B	A	A	C	
Hydrogen Sulfide (Wet)	H ₂ S	A	X	A	A	A	A	X	A	A	X	X	A	C	A	X	A	
Hydrogen Tetroxide									A	A					A			
Hydroquinone	C ₆ H ₄ (OH) ₂			A		A	A	B	B	A		C		X	A	C		
Hydroxyacetic Acid - 10% (Glycolic)	HOCH ₂ COOH	A	X				B		A	B		A		A	A	A	A	
Hypochlorous Acid	HClO			C		B	X	X	A	X	X	X	B	X	A	A	X	
Ice Cream								X		A	C	A			A		A	
Ink		A	C				C	X	A	A	C	A		A	A	A	A	
Insecticides															A	A	A	
Iodine	I ₂	A		A	X	A	A	X	A	X	X	B	B	B	A	A	A	
Iodoform	CHI ₃						A	A	A	A	C		A		A		A	
Isoamyl Acetate	C ₇ H ₁₄ O						A	A	A	A		X	B	X	A	X		
Isoamyl Alcohol	C ₅ H ₁₂ O											A	A	A	A	A		
Isoamyl Butyrate	C ₉ H ₁₈ O ₂						A	A	A	A		X			A	X		
Isoamyl Chloride	C ₅ H ₁₁ Cl						X					X	X	X	A	A		
Iso - Butane	(CH ₃) ₂ CHCH ₃											A			A			
Isobutyl Acetate							A	A	A	A		X	C	X	A	X		
Isobutyl Alcohol (Isobutanol)	C ₄ H ₁₀ O			A	A	A	A					A	B	A	B	A	A	
Isobutyl Amine	C ₄ H ₁₁ N											X			A	X		
Isobutyl Chloride	C ₄ H ₉ Cl						X	B	A	B		X			A	B		
Isobutyric Acid	C ₄ H ₈ O ₂						A					X	A	B	A			
Isododecane	C ₁₂ H ₂₆						B	B	B	B		B	X	A	A	A		
Isooctane (Trimethylpentane)	C ₈ H ₁₈	A		A	A	A	A	A	A	A		A	X	B	A	A	A	
Isopentane	C ₅ H ₁₂											A			A	A	A	
Isophorone (Keytone)	C ₉ H ₁₄ O						A	A	A	A		X	C	X	A	X	A	
Isopropyl Acetate	C ₅ H ₁₀ O ₂			B			A	A	A	A		X	B	X	A	X		
Isopropyl Alcohol (Isopropanol)	C ₃ H ₈ O	A	A	A	A	A	A	A	A	A		B	B	A	A	A	A	
Isopropyl Amine	C ₃ H ₇ NH ₂							A		A		X			A	X		

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DIAPHRAGM PUMPS				√								√				√		
DRUM EMPTYING PUMPS				√			√					√			√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√		√	√	√	
CENTRIFUGAL PUMPS											√				√	√	√	√
LOBE PUMPS											√		√		√	√	√	√
SLIDING VANE PUMPS									√			√	√				√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
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LIQUID	FORMULA																	
Isopropyl Chloride	(CH ₃) ₂ CHCl			X			X	A	A		X	X	X	A	B			
Isopropyl Ether (Diisopropyl Ether)	C ₆ H ₁₄ O			X			B	A	A	A	C	X	X	A	C	A	A	
Jam				A		A			A		A		A			A	A	
Jet Fuels (JP1 to JP6) (ASTM-A, A1 & B)		A	X	X	A		A	A	A	A	A	X	X	A	A	A	A	A
Kerosene (Kerosene)	Hydrocarbons	A	X	X	A	A	A	A	A	A	A	X	X	A	A	A	A	A
Ketchup (see Catsup)																		
Ketones (see Appropriate Formula)																		
Lacquers		A	A	A			X	B	A	A	X	X	X	A	X	A	A	
Lacquer Solvents				C		C	X	B	A	A	X	X	X	A	X			
Lactic Acid	C ₃ H ₆ O ₃	A	X	A	A	A	A	X	A	A	C	B	A	B	A	A	A	A
Lactol (Aliphatic Naptha Solvent)	C ₁₃ H ₁₂ O ₃						A	A	A	A		C		X	A	A		
Lanolin				A		A												
Lard (Lard Oil)	Olein, stearin	A	X	A		A	A	A	A	B	A	A	X	C	A	A	A	A
Latex	Rubber emulsion	A	X	A		X	A			A		A		A	A		X	X
Lauryl Alcohol (n-Dodecanol)	C ₁₂ H ₂₆ O			A		A	A	A	A	A		A			A	B		
Lavender Oil	Ester mixture											B	X	X	A	B		
Lead Acetate (Sugar of Lead)	Pb(CH ₃ CO ₂) ₂			A	A	A	X		B	B	C	B	A	A	A	X	A	A
Lead Chloride	PbCl ₂			A			X		B	B				B	A		A	A
Lead Chromate	PbCrO ₄			A		A				A						A		A
Lead Nitrate	Pb(NO ₃) ₂			A		A	X	B	B	B		B	A	A	A	A	A	A
Lead Sulfamate		A		A								B		A	A	A		
Lemon Oil (Cedro Oil)	Hydrocarbons	A	A				A			A				X	A	A		
Ligroin (Ligroine) (Benzine)	Petroleum fraction			X				A		A		A	X	B	A	A		
Lignin Liquor	Blend of aromatic oils	A								A	A	A		A	A	A		
Lime, Soda (Slaked Lime & Soda Ash)	CaO	A	X							A	A	B	A	B	A	B		A
Lime Bleach				B			X					A	A	C	A	A		
Lime Slurries							B			B		B		A	A	B		
Lime Sulfur	CaS+CaSO ₄			A			X			A	C	A	A	A	A	A		
Limonene	C ₁₀ H ₁₆											C	X	X	A	A		
Linoleic Acid	C ₁₈ H ₃₂ O ₂			A			A		A	A		B	X	X	A	B		
Linseed Oil (Flaxseed Oil)	Glycerides	A	X	A	A	A	A	A	A	A	A	A	X	X	A	A	A	A
Lindol (Tritolyl Phosphate)	C ₂₁ H ₂₁ O ₄ P											X		C	A	B	A	A
Liquid Petroleum Gas (LPG)					A							A			A			
Lithium Bromide	LiBrH ₂ O							A				A		X	A	A		
Lithium Chloride	LiCl			A			C				C	A			A		A	A
Lithium Hydroxide	LiOH						X			C	X				A			
Lithium Sulfate	LiSO ₄			A		A			A									
Lubricating Oils				C	A	A	A	A	A	A	A	A	X	X	A	A	A	A
Lithophones	ZnSbAsO ₄			A		A				A	A							
Lye (Potassium Hydroxide)	KOH			A	A					A		C		B	A	B	A	
Lysol (Boiling)									A	C							A	A
Magnesium Acetate	Mg(OOCCH ₃) ₂											A			A			
Magnesium Bisulfite	Mg(HSO ₃) ₂			A		A				A								
Magnesium Carbonate	MgCO ₃			A		A	A	B	B	B		A	C	A	A	A	A	A
Magnesium Chloride	MgCl ₂ O	A	A	A	A	A	A	B	A	B	A	A	A	A	A	A	A	A
Magnesium Hydroxide (Milk of Magnesia)	Mg(OH) ₂			A	A	A	A	A	A	A	A	B	A	B	A	A	A	A

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COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS							
DIAPHRAGM PUMPS				√							√	√				√			
DRUM EMPTYING PUMPS				√		√					√					√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√			√	√	
CENTRIFUGAL PUMPS											√					√	√	√	
LOBE PUMPS											√	√	√			√	√	√	
SLIDING VANE PUMPS									√			√	√				√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																			
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC	
LIQUID	FORMULA																		
Magnesium Nitrate	Mg(NO ₃) ₂ ·6H ₂ O	A	A	A	A	A	B	B	B	A	X	A	A	A	A	A	A		
Magnesium Oxide	MgO	A	X				A	A	A	A	A		A	A	B		A		
Magnesium Silicofluoride	MgSiF ₆			A		A	A		A							A			
Magnesium Sulfate (Epsom Salts)	MgSO ₄ ·7H ₂ O	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Manganese Carbonate	MnCO ₃							C	A							C			
Manganese (II) Chloride	MnCl ₂			A		A			A	X				A		A	A		
Manganese Nitrate (Magnesium Nitrate)	Mn(NO ₃) ₂ ·6H ₂ O	A	A	A	A	A	B	B	B	A	X	A	A	A	A	A	A		
Manganese Sulfate	MnSO ₄			A		A			A	A				A		A	A		
Maleic Acid	(CHCOOH) ₂			A			A	B	A	B		X	X	A	A	A	A		
Maleic Anhydride	C ₄ H ₂ O ₃						A	B	A	A			X		A	A	A		
Malic Acid (Apple Acid)	C ₄ H ₆ O ₅			A		A	B		B	A	X	B	X	C	A	A	A		
Malt Beverages					A				A	A			A	A	A	A	A		
Maple Sugar Liquors (Sucrose)	Water, sucrose								A			A	A	A	A	A	A		
Mash									A	A			A	A		A	A		
Mayonnaise	Water, fats, oils	A		A			X	X	A	A			A	A	A	A	A		
Melamine	C ₃ H ₆ N ₆							X			X	C		C	A				
Mercuric Chloride (Mercury)	HgCl ₂	A	A	A		A	X	X	B	X	X	A	A	B	A	A	C		
Mercuric Cyanide (Mercury)	Hg(CN) ₂			A		A	X	B	B	B	X	B	A	B	A	A	A		
Mercurous Nitrate	Cl ₂ Hg ₂			A		A	X	B	B	B		B	A	B	A	A	A		
Mercury	Hg	A	X	A		A	X	A	A	A	X	A	A	A	A	A	A		
Mercury Salts				A		A	X	X			X	A		A		A	A		
Mesityl Oxide	C ₈ H ₁₀ O						A	A	A	A		X	B	X	A	X			
Methane	CH ₄			A			A	A	A	A		A	X	B	A	A			
Methanol (see Methyl Alcohol)	CH ₃ OH																		
Methyl Acetate	CH ₃ CO ₂ CH ₃			C		B	A	A	A	A	A	X	C	C	A	X	A		
Methyl Acetoacetate	C ₅ H ₈ O ₃						A	A	A			X			A	X			
Methyl Acetone (Mixture of Acetone/Acetate/Alcohol)									A										
Methyl Acrylate	C ₅ H ₈ O ₂	A						A		A		X	C	C	A	X	A		
Methyl Acrylic Acid (Crotonic Acid)	CH ₃ (CH) ₂ COOH												C	C	A	X			
Methyl Alcohol	CH ₃ OH			A	A	A	B	A	A	A	A	A	A	A	A	B	A		
Methyl Amine (Monomethylamine)	CH ₃ NH ₂			A		X	B	B	B	A		B	A	A	A	A			
Methyl Amyl Acetate	C ₈ H ₁₆ O ₂						A	A	A	A		A			A	X			
Methyl Amyl Alcohol	C ₈ H ₁₈ OH						A	A	A	A		A			A	X			
Methyl Aniline	C ₇ H ₉ N			C								A	A	A	A	C			
Methylated Spirit (see Ethyl Alcohol)																			
Methyl Bromide (Brom Methane)	CH ₃ Br			X		A	X	A	B	A		C	A	X	A	A	A		
Methyl Butyl Ketone (2-hexanone)	CH ₃ COC ₄ H ₉	C		X			A	A	A	A		X	B	X	A	X	A		
Methyl Butyrate	C ₅ H ₁₀ O ₂						A	A	A	A		X	X	X	A				
Methyl Cellosolve®	C ₅ H ₈ O ₂	C		A			A				A	X	A	X	A	X	A		
Methyl Chloride	CH ₃ Cl	A		X	A	X	X	A	A	A	C	X	C	X	A	B	A		
Methyl Chloroform (see Trichloroethane)																			
Methyl Cyclopentane	C ₅ H ₁₂	A										B	X	X	A	A			
Methyl Dichloride	CH ₂ Cl ₂			X			X					X		X	A	A			
Methyl Ethyl Ketone (Butanone)	C ₄ H ₈ O	C	A	X	A	X	A	A	A	A		X	A	X	A	X			
Methyl Ether (see Dimethyl Ether)												A		A		A	A		
Methyl Formate	HCOOCH ₃						A	A		A		X	C	B	A	X	A		
Methyl Glycol	C ₃ H ₈ O ₂			A		A											A		
Methyl Hexane	C ₇ H ₁₆											A	X	A	A	A			

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DIAPHRAGM PUMPS				√								√				√		
DRUM EMPTYING PUMPS				√			√					√				√	√	
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√	√		√	√
CENTRIFUGAL PUMPS											√					√	√	√
LOBE PUMPS											√				√	√	√	√
SLIDING VANE PUMPS								√			√	√				√	√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Methyl Iodide	CH ₃ I						X	A	A			X	A	X	A			
Methyl Isobutyl Ketone (Hexone)	C ₈ H ₁₆ O	C	A	C	A		A	B	A	B		X	C	X	A	X	A	A
Methyl Isopropyl Ketone	C ₇ H ₁₄ O	C	A	C	A					A		X	C	X	A	X		A
Methyl Methacrylate	C ₅ H ₈ O ₂	A					B			A		X	X	X	A	C	A	A
Methyl Oleate	C ₁₉ H ₃₆ O ₂											X	C	X	A	B		
Methyl Propyl Ketone	C ₇ H ₁₄ O											X	B	X	A	X		
Methyl Salicylate (Betula Oil)	C ₈ H ₈ O ₃						A	A				X	C	X	A	B	A	A
Methylacrylic Acid	C ₄ H ₆ O ₂													B	A	B		
Methylamine	CH ₃ NH ₂			A			B	B	B	A		B	A	A	A	A		
Methylene Bromide	CH ₂ Br ₂	A					X	A	A	A		X		X	A	B	A	A
Methylene (Di) Chloride (Dichloromethane)	CH ₂ Cl ₂	A		X	A	A	X	B	A	A	A	X	X	X	A	B	A	A
Milk		A	A	A			A	X	A	A	A	B	A	A	A	A	A	A
Mine Water							B		A	B	A	A			A		A	A
Mineral Oil (Petroleum)	Hydrocarbons	A	A	B	A		A	A	A	A	A	A	X	X	A	A	A	A
Mineral Spirits					A							A			A		A	A
Mixed Acids + Water	H ₂ O+																	
Sulfuric + Nitric + Hydrofluoric + H ₂ O	H ₂ SO ₄ +HNO ₃ +HF			X			A					X						
Sulfuric + Nitric + H ₂ O	H ₂ SO ₄ +HNO ₃			X			C	X	X	B	B	X	X	B	X	A	A	X
Sulfuric + Phosphoric + H ₂ O	H ₂ SO ₄ +H ₃ PO ₄			C			A								B	B		
Molasses (Wort)		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Molybdc Acid 5%									A	A					A		A	A
Monobromobenzene															A	A		
Monochlorobenzene	C ₆ H ₅ Cl	A		X	A		X	A		A		X		X	A	A	A	A
Monochloroacetic Acid	CH ₂ ClCO ₂ H			B			B	X		C								
Monochloroacetic Acid Ethyl Ester	C ₄ H ₇ ClO ₂			A			B	X				X			A	A		
Monochloroacetic Acid Methyl Ester	C ₄ H ₆ ClO ₂			A			B					X			A	A		
Monoethanolamine	NH ₂ C ₂ H ₄ OH			X	A		B	A		A		B		C	A	C		
Monomethyl Ester		A													A			
Mono Vinyl Acetate																A		
Mono Vinyl Acetylene	C ₂ H ₂	A													A	A	A	A
Morpholine	C ₄ H ₉ ONH			A	C	A	A		A	A					A		A	A
Muriatic Acid (see Hydrochloric Acid)					C				A						A		A	A
Mustard		A	X	A			B	X	A	A	A	C		A	A	X	A	A
Naphtha (Petroleum Spirits) (Thinner)	Petroleum fractions	A	A	X	A	A	A	B	A	A	C	A	X	X	A	A	A	A
Naphtha Coal tar (Benzol)	Hydrocarbons						A	B	A	A		X	X	X	A	A		
Naphthalene (Tar Camphor)	C ₁₀ H ₈	A	A	A	A	A	B	A	A	A	C	X	X	X	A	A	A	A
Naphthenic Acid							A				A	C	A		A	A	A	A
Naphthoic Acid	C ₁₁ H ₂ O ₂						B	B	B	A		B	X		A	A		
Natural Gas					A		A	A	A	A	C	X		X	A	A	A	A
Neatsfoot Oil										A		A	C		A	A	A	A
Neohexane (2,2-dimethylbutane)	C ₆ H ₁₄											A			A	A		
Neosol							B	B	A	A		A	B	A	A	C		
Neville Acid												C	C	C	A	B		
Nickel Acetate (Diacetate)	Ni(CH ₃ CO ₂) ₂						B				A	B	A	B	A	X	A	A
Nickel Chloride	NiCl ₂	A	A	A	A	A	X	X	A	B	A	A	A	A	A	A	A	A
Nickel Nitrate (Dinitrate)	Ni(NO ₃) ₂ •6H ₂ O			A	A	A	X		B	A		A	A	A	A	A	A	A
Nickel Sulfate	NiSO ₄	A	C	A	A	A	X	X	B	A	C	A	A	A	A	A		
Nitrana (Ammonia Fertilizer)										A		B		B	A	C		

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DIAPHRAGM PUMPS				√							√					√		
DRUM EMPTYING PUMPS				√				√			√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√	√		√	√	√
CENTRIFUGAL PUMPS											√					√	√	√
LOBE PUMPS											√	√	√		√	√	√	√
SLIDING VANE PUMPS									√		√	√					√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
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LIQUID	FORMULA																	
Nitric Acid - 10%	HNO ₃	A	X	A	X	A	A	X	A	A	X	X	B	B	A	A		
Nitric Acid - 25%	HNO ₃	A	X	A	X	A	X	X	A	A		X	B	C	A	A	C	A
Nitric Acid - 35%	HNO ₃	A	X		X	A	X	X	A	A		X	C	X	A	A	C	A
Nitric Acid - 50%	HNO ₃	A	X	C	X	A	X	X	X	A		X	X	X	A	A	A	
Nitric Acid - 70%	HNO ₃	A	X		X	B	*	X	X	A		X	X	X	A	A	A	
Nitric Acid - (Conc.)	HNO ₃			X	X		A	X	A	A		X	X	X	A	B	X	A
Nitric Acid (Red Fuming)		X	X	X			A	X	B	A		X	X	X	A	B	A	
Nitrobenzene	C ₆ H ₅ NO ₂	A	X	A	A	A	A	A	B	A	C	X	X	X	A	B	A	A
Nitroethane	C ₂ H ₅ NO ₂			C			A	A	A	A		X	C	C	A	X		
Nitrogen Tetroxide	N ₂ O ₄			X			A	B	A	A		X	X	X	A	C		
Nitromethane	CH ₃ NO ₂			C	A		A	A	A	A		X	C	C	A	X	A	A
1-Nitropropane	CH ₃ (CH ₂) ₂ NO ₂	A					A	A	A	A		X	A	C	A	X	A	A
Nitrous Acid	HNO ₂					A	A			A							A	
Oakite										A					A		A	A
Octadecane	CH ₃ (CH ₂) ₁₆ CH ₃											A	X	B	A	A		
n-Octane	C ₈ H ₁₈			X								A	X		A	A		
Octyl Acetate	C ₈ H ₁₆ O ₂						A			A		X			A	X		
Octyl Alcohol	C ₈ H ₁₈ O									A		A			A		A	A
Oleic Acid (Red Oil)	C ₁₈ H ₃₄ O ₂	A		B	A	A	A	C	A	B	C	C	C	X	A	B	A	A
Octachlorotoluene	C ₇ Cl ₈			X			X					X		X	A	A		
Oleum (Fuming Sulfuric Acid)	H ₂ SO ₄ /SO ₃			X		X	X	X		SO ₃		C		X	A	A		A
Olein (Triolene)	C ₅₇ H ₁₀₄ O ₆											B		C	A			
o-Dichlorobenzene	C ₆ H ₄ Cl ₂			X			X	A		A		X		X	A	A		
Oric Acid									A	A							A	
Olive Oil (Mixed Glycerides of Acids)		A		A	A	A	A	A	A	A	A	A	C	C	A	A	A	A
Orange Oil		A				A				A		A		X	A	A		A
Ortho-Dichloro Benzene										A					A		A	A
Oxalic Acid	(COOH) ₂	A		A	A	A	B	X	B	B		C	A	B	A	C	A	A
Oxygen	O						A				A	C			C			
Ozone	O ₃			X			A	A	A	A		X	A	B	A	A		
Paints & Solvents		X	X				X		A	A	A	X		X	A	C		
Paint Thinner, DUCO	Hydrocarbons			X			X		A	A	A	A	X	C	A	B		
Palm Oil (Mixture of Terpenes)		A				A		A	A	A	A	A		X	A	A	A	A
Palmitic Acid	C ₁₆ H ₃₂ O ₂			A		A	B	B		A	C	B	B	C	A	B	A	A
Paracymene										A					A	A	A	A
Para-Dichlorobenzene										A					A	A	A	A
Paraffins (Paraffin Oil)	Hydrocarbons	A	A	A	A	A	A	A	A	A	A	A			A	A	A	A
Paraformaldehyde	(CH ₂ O) _n						A	A	A	A		B		B	A	C	A	A
Paraldehyde	C ₆ H ₁₂ O ₃						A	A	A	A		C	A	B	A	X		
Peanut Oil (Glycerides of Fatty Acids)		A				A		A	A	A	A	A	X	X	A	A	A	A
Pectin Liquor										A		A			A		A	A
Penicillin	C ₁₆ H ₁₈ N ₂ O ₅ S					A			A					A	A	A	A	
Pentachloroethane (Pentalin)	Cl ₅ CHCCl ₃						X	A	A	A		X		X	A	A		
Pentachlorophenol (PCP)	C ₆ Cl ₅ OH						A	A	A	A		X	X	X	A	A		
Pentane (Amyl Hydride)	C ₅ H ₁₂						A	B		B		A	X	B	A	A		
Peppermint Oil		A				A				A	A	X		X	A	A		A
Perchloric Acid (Chloric Acid)	HClO ₄				A		X	X		B	X	X	B	B	A	A	A	A

Liquid Compatibility Guide

COMPONENTS IN CONTACT WITH THE LIQUID BEING PUMPED		HOUSINGS & SHAFTS										IMPELLERS, DIAPHRAGMS, VALVES & SEALS						
DIAPHRAGM PUMPS				√							√			√				
DRUM EMPTYING PUMPS				√						√				√	√			
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√		√	√	√	
CENTRIFUGAL PUMPS											√				√	√	√	
LOBE PUMPS										√		√		√	√	√	√	
SLIDING VANE PUMPS									√		√	√				√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Perchloroethylene (Tetrachloroethylene)	C ₂ Cl ₄	X		X	A	A					X	X	X					
Petrolatum (Petroleum Jelly)		A					A	C		A	A	A	C		A	A	A	
Petroleum (Crude Oil) (Sour)	Hydrocarbons			B	A	B	B	A	A		B	X	C	A	A			
Petroleum Ether				A	A				A			A		A		A	A	
Phenethyl Alcohol (Benzyl Carbinol)	C ₈ H ₉ (CH ₂) ₂ OH					A	A	A	A		X	B	X	A	X			
Phenol (Carbolic Acid)	C ₆ H ₅ OH	A	X	C	A		B	A	A	B	C	X	C	C	A	A	A	
Phenol Sulfonic Acid	C ₆ H ₆ SO ₄						B	B				X			A	X		
Phenolic Resins								A	A								A	
Phenyl Acetate	CH ₃ COOC ₆ H ₅											X	B	X	A	X		
Phenylbenzene	C ₆ H ₅										X		X	A	A			
Phenyl Cellosolve														A	A			
Phenyl Ethyl Ether (Phenetole)	C ₆ H ₅ OC ₂ H ₅										X	X	X	A	C			
Phenyl Hydrazine	C ₆ H ₅ NHNH ₂			X		A	A	X			X	X	X	A	A			
Phorone (Diisopropylidene Acetone)	C ₉ H ₁₄ O										X	C	X	A	A			
Phosphate Esters									A					A	A			
Phosgene	COCl ₂			X		B		A			X			A	A	A	A	
Phosphoric Acid - 10%	H ₃ PO ₄	A	X	A	A	A	X	X	A	A	X	A	B	A	A	A	A	
Phosphoric Acid - 20%	H ₃ PO ₄	A	X	A	A	A	X	X	A	A	X	C	A	B	A	A	A	
Phosphoric Acid - 50%	H ₃ PO ₄	A	X	A	A	A	X	X	C	A	X	X	B	B	A	A	A	
Phosphoric Acid (Conc.)	H ₃ PO ₄	A	X	A	A	A	X	X		A	X	X	B	B	A	A	A	
Phosphoric Anhydride (Dry)	P ₂ O ₅									A		X		X	A	X	A	
Phosphorus Oxychloride	POCl ₃			B		B	B	B	B				X	A				
Phosphorus Trichloride	PCl ₃			A	A	A	C	B	A	A		X	A	X	A	A	C	
Photographic Developer/Fixer		A	A	A	A		C	X	A	A	X	A		A	A	A	A	
Phthalic Anhydride	C ₆ H ₄ (CO) ₂ O						A	C	A	A	A			A	X	A	C	
Pickling Solution (Acid)		A	X									X	X	A	B	A	A	
Picric Acid (Carbazotic Acid)	C ₆ H ₃ N ₃ O ₇	A	X	B		A	A	C	B	A	X	B	B	B	A	A	A	
Pine Oil (Yarmor)	Cyclic terpene alcohols	A	C				A	B		A	X	B	X	X	A	A	A	
Pine Tar Oil								A	A								A	
Pinene	C ₁₀ H ₁₆											B	X	X	A	A		
Piperidine	C ₅ H ₁₁ N										X	X	X	A	X			
Plasticizer			A								X		C		A			
Plating Solution - Cadmium		A	A	A						A		B		B	A			
Plating Solution - Chrome		C		A					A		X	C	X	A	A	A	A	
Plating Solution - Copper		A	A	A		A	X			A				A		A	A	
Plating Solution - Gold		A	A	A						A				A		A	A	
Plating Solution - Iron		A	A	A						A				A		A	A	
Plating Solution - Lead				A							B		B	A				
Plating Solution - Nickel		A	A	A		A								A		A	A	
Plating Solution - Silver		A	A	A					A					A				
Plating Solution - Tin		A	A	A						A						A	A	
Plating Solution - Zinc		A	A	A						A				A		A	A	
Polyvinyl Acetate Emulsion	PVAc + H ₂ O							B				A	C	A		A	A	
Polyelectrolyte						A					A					A	A	
Potassium Acetate	CH ₃ CO ₂ K			A		A	B	A	B	B		B	A	B	A	X	A	
Potassium Bicarbonate	KHCO ₃	A	A	A	A	A	B	B	B	A	X	A		A	A	A	A	
Potassium Bisulfate	KHSO ₄			A		A	A	X			A			A	A	A		
Potassium Bisulfite	KHSO ₃			A		A	B		B	B		A		A	A	A		
Potassium Bromide	KBr			A	A	A	A	B	A	B	C	A	A	A	A	A	A	
Potassium Carbonate (Potash)	K ₂ CO ₃	A	A	A	A	B	X	B	A	B	X	A	A	A	A	A	A	
Potassium Chlorate	KClO ₃			A	A	A	X	B	A	A	C	A	A	A	A	A	A	
Potassium Chloride	KCl	A	A	A	A	A	X	B	A	A	C	A	A	A	A	A	A	

Liquid Compatibility Guide

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DRUM EMPTYING PUMPS				√		√				√				√	√			
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	
CENTRIFUGAL PUMPS											√				√	√	√	
LOBE PUMPS										√		√	√		√	√	√	
SLIDING VANE PUMPS									√		√	√			√	√	√	
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LIQUID	FORMULA																	
Potassium Chromate	K ₂ CrO ₄	C	X	A		A	A	A	A	A	A	A	A	A	A	A	A	
Potassium Copper Cyanide	K ₂ (Cu(CN) ₄)									X	A	A	A	A	A			
Potassium Cyanide	KCN	A	X	A	A	A	C	B	B	X	A	A	A	A	A	C	A	
Potassium Dichromate (Bichromate)	K ₂ Cr ₂ O ₇	C	X	A	A	A	A	A	B	A	X	A	A	A	A	A	A	
Potassium Ferricyanide	K ₃ Fe(CN) ₆			A		A	C			A	A	X		A		A	A	
Potassium Ferrocyanide	C ₆ FeN ₆ 4K			A		A				A								
Potassium Fluoride (Hydrogen)	KHF ₂			A		A				A								
Potassium Hydroxide (Hydrate) (Caustic Potash) (Lye)	KOH	A	C	A	A		X	B	B	A		B	A	B	A	B		
Potassium Hypochlorite	KClO			A		A			A	X				A		A	A	
Potassium Iodate	KIO ₃			A		A				A						A		
Potassium Iodide	KI			A			B		B	B		A	A	A	A	A	A	
Potassium Nitrate (Saltpeter)	KNO ₃			A	A	A	A	B	B	B	A	A	A	A	A	A	A	
Potassium Nitrite	KNO ₂			B		A	B	B	B			A	A	A	A			
Potassium Oxalate	K ₂ C ₂ O ₄ H ₂ O								A	A						A	A	
Potassium Perchlorate	KClO ₄			A		A				A								
Potassium Permanganate (Purple Salt)	KMnO ₄	C	A	B	A	A	A	B	A	B		C	A	C	A	B	A	
Potassium Perfluoro Acetate									A		C	A		A		A	A	
Potassium Persulfate (Pot. Peroxide Disulfate)	K ₂ S ₂ O ₈			A		A			B									
Potassium Phosphate	KH ₂ PO ₄			A		A	X	X	B	B	C	A	A	A	A	A	A	
Potassium Silicate	K ₂ SiO ₃			A		A	B	B	B	B		A	A	A	A	A	A	
Potassium Sulfate	K ₂ SO ₄	A	A	A	A	A	B	B	A	A	C	A	A	A	A	A	A	
Potassium Sulfide	K ₂ S			A	A	A	X	B	B	B	C	A	A	A	A	A	A	
Potassium Thiocyanate	KCNS			A		A	A		A	A				A		A	A	
Potassium Sulfite	K ₂ SO ₃ 2H ₂ O			A	A	A	A	X		B		A	A	A	A	A	A	
Potassium Tartrate	KHC ₄ H ₄ O ₆															A		
Prestone					A		A	A		A	A		X	A	C	A	A	
Propane (LPG)	C ₃ H ₈			X			A	A	A	A	A	X	B	A	A	A	A	
Propanol (see Propyl Alcohol)																		
Propargyl Alcohol	CHCCH ₂ OH			A		B	B					A			A	A		
Propionaldehyde (Propanal)	C ₃ H ₇ CHO						A	A	A	A		X		A	X	A	A	
Propionic Acid (Methylacetic Acid)	CH ₃ CH ₂ CO ₂ H			A		A	A	X	A	B	C	X	A	X	A	A	A	
n-Propyl Acetate	C ₆ H ₁₄ O ₂			C			A		A	A		X	A	X	A	X		
Propyl Alcohol (1-Propanol)	CH ₃ CH ₂ CH ₂ OH			A	A	A	A	A	A	A		B	A	B	A	A		
n-Propyl Nitrate (NPN)	CH ₃ (CH ₂) ₂ NO ₃	A					A	X				A	B		A	C		
Propylene	C ₃ H ₆						A	A	A	A		X	X	X	A	A	A	
Propylene Chlorohydrin	CH ₂ ClCH ₂ OH														A	C	A	
Propylene Dichloride	C ₃ H ₄ Cl ₂						X	A	B	A		X	X	X	A	B	A	
Propylene Glycol (Methyl Glycol)	C ₃ H ₈ (OH) ₂	A	A	A	A	A	A	A	A	A		A	A	C	A	A	A	
Propylene Oxide	C ₃ H ₆ O			C		B	B	B		A		C	X	A	X			
Protein Solutions				A		A				A		A	A			A	A	
Pydraul (Phosphate Ester Base Fluid)								A	A	A		X	B	X	A	A		
Pyranol												A		X	A	A		
Pyridine	N(CH) ₂ CH	A	X	C	A	B	A	B	A	A	X	X	C	X	A	X	A	
Pyrogallol (Pyrogallic Acid)	C ₆ H ₆ O ₃					B			A	A	C			A	A	A	A	
Pyroigneous Acid (Wood Vinegar)				A	A		B	X		A	C	C	C	C	A	A	A	
Pyrophosphoric Acid	H ₄ P ₂ O ₇			A		A												
Pyrrrole (Azole)	C ₄ H ₅ N											X	X	X	A	C		
Quinic Acid	C ₇ H ₁₄ O ₇			A		A				A								
Quaternary Ammonium Salts (Germicide)	NH ₄ (X)	A	A				X			A	X	A	A	A				
Quinic Sulfate				A		A				A								
Quinine (Bisulphate)(Sulphate)	C ₂₀ H ₂₄ N ₂ O ₂						A		A	C				A	A	A		
Quench Oil							A		A	A		B		B	A	A		
Quinone	C ₆ H ₄ O ₂					A			A					A				
Rape-Seed Oil (Colza Oil)		A						A	A	A	A	B	A	C	A	A	A	
Red Oil							C			A	C		X	A	A	A	A	
Rose Oil (Geranoiol, citronellol)		A	A							A			C	A	A			
Rosin	C ₂₀ H ₃₀ O ₂			A			A		A	A	A	A	C	A		A	A	
Rosin Oil (Rosinol)												A		A	A			



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				√							√		√			√		
DIAPHRAGM PUMPS				√							√				√			
DRUM EMPTYING PUMPS				√			√				√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	
CENTRIFUGAL PUMPS										√					√	√	√	
LOBE PUMPS										√		√		√	√	√	√	
SLIDING VANE PUMPS								√			√	√			√	√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE		EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyethylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
LIQUID	FORMULA																	
Rotenone	C ₂₃ H ₂₂ O ₆														A	A		
Rubber Latex Emulsions	(C ₂ H ₅) _n H ₂ O						A		A	A					A	A		
Rubber Solvents (Petroleum Distillate)	Hydrocarbons						A		A	A	X		C	A	X			
Rum	Alcoholic liquor from molasses	A	A						A	A	A	A	A	A	B	A	A	
Rust Inhibitors		A	A	A					A	A	A		C	A	A			
Saccharin Solutions	C ₆ H ₄ COSO ₂ NH			A		A												
Salad Dressing	Fats, oils, water			A			B	X		A	A				A	A	A	
Sal Ammoniac (Ammonium Chloride)	NH ₄ Cl						X	X		A	X	A		A	A	A	A	
Sal Soda (Sodium Carbonate)	NaCO ₃						X	A	A	A		A	A	A	A			
Salicylic Acid	HOC ₆ H ₄ COOH			A		A	A	X	A	B	C	B	A	B	A	B	A	
Salt Water (Brine)	NaCl/H ₂ O	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	
Sanitizers									A		A		A		A			
Sea Water	(Brine)	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	
Sesame Seed Oil	Olein, stearin, palmitin	A					A	A		A	A		C	A	A	A	A	
Sewage				A			B	B	A	A	A	C	B	A	A	A	A	
Shellac		A					A	A		A	A		X	A		A	A	
Shave Cream									A	A	A			A	A	A	A	
Silica Gel		A	A						A	A			A	A				
Silicate Esters	Si(OR) ₄	A										B	X	A	A	A		
Silicone Oils (Versilube Etc)	((CH ₃) ₂ SiO ₂) _n	A	A	A	A	A	B	B	A	A	A	A	C	A	A	A	A	
Silicon Tetrachloride (Silicon Chloride)	SiCl ₄						A							A	A			
Silver Bromide	AgBr						X		A	C				A		A	A	
Silver Chloride	AgCl								C	X				A		A	A	
Silver Cyanide	AgCN			A			X	A	A	A			A	A		A	A	
Silver Nitrate	AgNO ₃	A	A	A	A	A	X	X	A	A	X	B	A	A	A	A	A	
Skydrol Hydraulic Fluid® (Phosphate Ester Base)									A	A	A	X	A	X	A	X		
Soap Solutions	Salt of fatty acid in H ₂ O	A	A	A	A	A	C	X	A	A	A	A	B	A	A	A	A	
Soda Ash (Sodium Carbonate)	Na ₂ CO ₃	A	A				A	X	A	A	A	A	A	A	A	A	A	
Sodium Acetate	NaCH ₃ CO ₂			A	A	A	A	A	A	A	A	C	A	C	A	X	A	
Sodium Aluminate	Na ₂ Al ₂ O ₄			A					A	B	A	A		A	A	A	A	
Sodium Arsenite (Sodium Dioxoarsenate)	Na ₂ AsO ₃	A	A	A			A		X				X	A				
Sodium Benzoate	NaA ₂ O ₂			A			A		A	A	A					A	A	
Sodium Bicarbonate (Baking Soda)	NaHCO ₃	A	A	A	A	A	B	C	A	A	A	A	A	A	A	A	A	
Sodium Bisulfate (Nitric Cake) (Hypo)	NaHSO ₄	A	A	A	A	A	B	C	B	B	C	A	A	A	A	A	A	
Sodium Bisulfite	NaHSO ₃	A	X	A			A	B	B	B	A	C	C	A	A	A	A	
Sodium Borate	Na ₂ B ₄ O ₇			A	A	A	B	C	A	A	A	A	A	A	A	A	A	
Sodium Bromate	NaBrO ₃			A			A	A						A		A		
Sodium Bromide	NaBr			A			A	C	C	B				A		A	A	
Soda Caustic (see Sodium Hydroxide)																		
Sodium Chlorate	NaClO ₃			A	A	A	B	B	B	B	A	A	A	B	A	A	A	
Sodium Chloride (Table Salt)	NaCl	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	
Sodium Chlorite	NaClO ₂			A			A	X		A	A				A	A	X	
Sodium Chromate	Na ₂ CrO ₄	C	X	A			A	A	A	A	A			A	A	A	A	
Sodium Citrate (Trisodium Citrate)	3NaC ₆ H ₅ O ₇								A						A		A	
Sodium Cyanide	NaCN	A	A	A	A	A	X	A			A	X	A	A	A	A	A	
Sodium Ethylate	NaC ₂ H ₅ O						X			A				A				
Sodium Dichromate (Sodium Bichromate)	Na ₂ Cr ₂ O ₇ •2H ₂ O		A	A	A							A	B	A	A	A	A	
Sodium Ferricyanide	Na ₃ Fe(CN) ₆ H ₂ O								A	C					A		A	
Sodium Ferrocyanide	Na ₄ Fe(CN) ₆ •10H ₂ O														A	A	A	
Sodium Fluoride	NaF			A			A	B		B	B	C	A	A	A	A	A	
Sodium Formate	NaHCO ₂						A			A								

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DRUM EMPTYING PUMPS				√			√			√					√	√		
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	√
CENTRIFUGAL PUMPS											√					√	√	√
LOBE PUMPS										√		√	√		√	√	√	√
SLIDING VANE PUMPS								√			√					√	√	√
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Sodium Hexametaphosphate (Calgon)	(NaPO ₃) ₆	A	X				C	B	A	B		B	B	B	A	A		
Sodium Hydrogen Phosphate	NaHPO ₄			A		A												
Sodium Hydrogen Sulfate (Sodium Bisulfate)	NaH ₂ PO ₄			A		A											A	
Sodium Hydrogen Sulfite	NaHSO ₃			A		A	A	A	A	C	A		A	A	A	A	A	A
Sodium Hydroxide (Caustic Soda) (Lye)	NaOH	A	X	A	X	A	X	B	B	A	X	B	A	B	A	X	A	A
Sodium Hypochlorite	NaClO	C	X	B	X	A	X	X	B	X	X	X	C	B	A	B	A	X
Sodium Hyposulfite	Na ₂ H ₂ PO ₂ ·H ₂ O								A	A					A		A	A
Sodium Iodide	NaI			A		A	A			X					A		A	
Sodium Lactate	NaC ₃ H ₅ O ₃								A	A		A			A		A	
Sodium Metaphosphate (Kurul's Salt)	Na(PO ₃) ₃ H	A	A	X			X		A	B	C	B	A	C	A	A	A	A
Sodium Metasilicate	Na ₂ SiO ₃						B		A	A		A		A	A	A		
Sodium Nitrate (Chile Saltpeter)	NaNO ₃	A	A	A	A	A	A	A	A	A		C	A	B	A	A	A	
Sodium Oleate	NaC ₁₇ H ₃₃ CO ₂						A		A	A					A		A	
Sodium Oxalate	Na ₂ C ₂ O ₄			A			A		A	A		A			A		A	
Sodium Nitrite	NaNO ₂					A	A	A	A	A	C	A		X	A	A	A	A
Sodium Perborate	NaBO ₃	C	A	A		A	X	B	B	A	X	C	A	B	A	A	A	A
Sodium Perchlorate	NaClO ₄			A		A	A		A	A					A		A	A
Sodium Peroxide (Sodium Dioxide)	Na ₂ O ₂	C	X	B		A	B	A	B	B	X	B	B	B	A	A	A	A
Sodium Persulfate	Na ₂ S ₂ O ₈			A		A	X			A		X			A		A	
Sodium Phosphate Di	Na ₂ HPO ₄	A	A	A		A	X	A		A	C	A		C	A		A	A
Sodium Phosphate Mono	NaH ₂ PO ₄			A		A	A	X		C	A	A			A	A	A	A
Sodium Phosphate Tribasic (TSP)	Na ₃ PO ₄	A	A	A		B	X	B	A	B	X	B	A	B	A	A	A	A
Sodium Pyrophosphate	Na ₂ P ₂ O ₇	A	C	A		A									A		A	
Sodium Silicates (Water Glass)	Na ₂ SiO ₃	A	A	A	A	A	A	A	B	A	C	A	A	A	A	A	A	A
Sodium Sulfate (Glauber's) (Salt Cake) (Thenardite)	Na ₂ SO ₄	A	A	A	A	A	B	B	A	A	C	A	A	B	A	A	A	A
Sodium Sulfide (Petahydrate)	Na ₂ S·5H ₂ O	A	X	A	A	A	A	B	B	A	C	A	A	A	A	A	A	
Sodium Tripolyphosphate	Na ₃ P ₃ O ₁₀	A	A	A	A	A		X		A	X	A			A		A	A
Sodium Sulfite	Na ₂ SO ₃	A	A	A	A	A	A	X	B	A	C	A	A	A	A	A	A	
Sodium Tartrate	Na ₂ C ₄ H ₄ O ₆ ·2H ₂ O						A		A	A							A	
Sodium Tetraborate	Na ₂ B ₄ O ₇ ·10H ₂ O			C	A					A		A		A	A	A		A
Sodium Thiosulfate (Antichlor)	Na ₂ S ₂ O ₃	A	A	A	A	A	A	C	B	A	X	A	A	A	A	A	A	
Solder (Tin Based)									A	C								A
Sorgum		A	X						A	A	A		A	A	A			
Soybean Oil	Triglycerides of acids	A	X	B	A		A	A	A	A	A	A	C	X	A	A	A	A
Soy Sauce	Fermented soya	A	X						X		A	A		A	A	A	A	A
Sperm Oil (Whale Oil)	Fatty acid esters	A							A	A	A	A		X	A	A	A	A
Stannic Chloride (Tin Chloride)	SnCl ₄	A		A	A	A	X	C	B	A	X	A	B	B	A	A	A	
Stannic Fluoborate	Sn(BF ₄) ₂	A	A						X		A	X		A	A	A	A	
Stannous Chloride (Tin Salt)	SnCl ₂			A	A		X	B	A	A	X	A	B	A	A	A	A	
Starch	C ₆ H ₁₀ O ₅	A	A	A	A	A	A	C	A	A	A	A	B	A	A	C	A	A
Steam					A		X		A	A					A		A	A
Stearic Acid	CH ₃ (CH ₂) ₁₆ CO ₂ H	A	X	A		A	C	C	B	A	A	B	B	B	A	A	A	A
Stoddard Solvent	Petroleum distillate	A	X	A			A	A	X	A	A	A	X	C	A		A	A
Styrene (Vinylbenzene)	C ₆ H ₅ CH=CH ₂	A	X				A	A	A	A	A	X	X	X	A	A	A	A
Succinic Acid	C ₄ H ₆ (COOH) ₂			A		A	A		A	A		A			A	A	A	A
Sucrose Solution (Sugar)	C ₁₂ H ₂₂ O ₁₁ /H ₂ O			A		A	A	A	A	A	A	A	A	A	A	A	A	A
Sulfamic Acid	H ₂ NSO ₃ H						A	X	A	X		B		A	A			
Sulfate Liquors									X		X							
Sulfite Liquors		A	X	A		A			A			A	C	B	A	A		
Sulfolane	CH ₃ CH ₂ CH ₂ CH ₂ SO ₂				A					A							A	
Sulfur	S			A	A	A	A	A	B	A	X	X	A	B	A	A	C	A
Sulfonated Fatty Alcohols									A	A				A	A		A	A
Sulfonated Vegetable Oils									A	A		A		A			A	A

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DIAPHRAGM PUMPS				√							√		√			√		
DRUM EMPTYING PUMPS				√		√				√				√	√			
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	√
CENTRIFUGAL PUMPS										√					√	√	√	√
LOBE PUMPS										√				√	√	√	√	√
SLIDING VANE PUMPS									√		√	√	√			√	√	√
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
RATING KEY:- A = EXCELLENT B = GOOD C = FAIR TO POOR X = NOT RECOMMENDED = NO DATA AVAILABLE																		
LIQUID	FORMULA	EPOXY	PHENOLIC	POLYPROPYLENE	RYTON® (Polyphenylene Sulphide)	KYNAR® (P.V.D.F)	ALUMINIUM	CAST IRON	HASTELLOY-C®	STAINLESS STEEL 304/316/CARP 20	BRONZE/BRASS	BUNA-N (NITRILE)	NORDEL® (E.P.D.M.)	NEOPRENE	TEFLON® (P.T.F.E)	VITON® (F.P.M.)	CARBON	CERAMIC
Sulfur Chloride	S ₂ Cl ₂			X		A	B	X	A	B	C	X	X	A	A	A	A	C
Sulfur Dioxide	SO ₂		A		A	A	A	B	A	A	A	C	B	C	A	A	A	A
Sulfur Hexafluoride	SF ₆											B	A	A	A	A		
Sulfur Trioxide (Anhydride)	SO ₃	A		X		X	B	B	B	A	C	C	C	A	A	A	A	A
Sulfuric Acid 10%	H ₂ SO ₄	A	C	A	X	A	X	X	A	A		B	A	A	A	A	A	C
Sulfuric Acid 25%	H ₂ SO ₄	A	C	A	X	A	X	X	A	B		C	B	B	A	A	A	C
Sulfuric Acid 50%	H ₂ SO ₄	A	C	A	X	A	X	X	A	X		C	B	B	A	A	A	C
Sulfuric Acid 60%	H ₂ SO ₄	C	X	A	X	A	X	X	A	X		X	B	C	A	A	A	C
Sulfuric Acid 75%	H ₂ SO ₄	C	X	A	X	A	X	C	A	C		X	C	X	A	A	A	C
Sulfuric Acid 95%	H ₂ SO ₄	C	X	X	X	A	X	B	A	A		X	C	X	A	A	A	C
Sulfuric Acid (Conc.)	H ₂ SO ₄			X		A	X	B	A	B		X	C	X	A	A	A	C
Sulfuric Acid (Fuming)	H ₂ SO ₄		X				C	X	B	B		X	X	X	A	B	A	C
Sulfurous Acid	H ₂ SO ₃	A		A	A	A	B	X	B	B	X	B	C	X	A	A	A	A
Talc Slurry												A		A	A			
Tall Oil (Liquid Rosin)	Rosin acids			A			X	B	A	B		A	X	B	A	A		
Tallow	Fat from cattle			B		A	A			A	A	A			A	A	A	A
Tannic Acid	C ₇₆ H ₅₂ O ₄₆	A		A	A	A	A	A	B	A	A	C	C	B	A	A	A	A
Tanning Liquors/Oil	Tannic acid/oil	A	C	A		B	A		A	A	A		B	A	A	A	A	A
Tar, Bituminous (Coal Tar) (Pitch)	Mixture of aromatic & phenolic hydrocarbons			A		X	A		A	A	A	B	X	C	A	A	A	A
Tartaric Acid	C ₄ H ₆ O ₆	A	A	A	A	A	A	X	A	A	A	B	B	A	A	A	A	A
Teepol												A		A				
Terpenes	C ₁₀ hydrocarbons						A	X				C	X	X	A	A		
Terpineol (Terpilenol)	C ₁₀ H ₁₈ O			X			A	A	A	A		C	C	X	A	A		
Tertiary Butyl Alcohol	(CH ₃) ₃ COH			B								A		A	A	B		
Tertiary Butyl Catechol	C ₉ H ₁₀ O ₂						C	B		B		X		B	A	A		
Tertiary Butyl Mercaptan	C ₄ H ₁₀ S											X		X	A	A		
Tetra Bromomethane	CB ₄			X			X					X		X	A	A		
Tetrachloroethane (Acetylene Tetrachloride)	(Cl ₂ HC) ₂	A		X		A	X	A	A	C	C	X	X	X	A	A	A	A
Tetrachloroethylene	C ₂ Cl ₄			A											A			
Tetrachlorodifluoroethane	(Cl ₂ FC) ₂											X		X	A			
Tetraethyl Lead	Pb(C ₂ H ₅) ₄	A		A		A	B	A		A	A	B	X	X	A	B	A	A
Tetraethylene Glycol (TEG)	HO(C ₂ H ₄ O) ₃ C ₂ H ₆ O											A			A	A		
Tetrahydrofuran (THF)	C ₄ H ₈ O			C	A	A				A	X	C	X	A	X	A	A	A
Tetrahydronaphthalene (Tetralin)	C ₁₀ H ₁₂	A		C	A	B	A	A	A	A		X	X	X	A	A	A	
Tetra Titanate	Ti(C ₂ H ₃) ₄											B	B	A	A	A		
Thioglycolic Acid	HSCH ₂ COOH	A	X					X		A	X				C			
Thionyl Chloride	SOCl ₂		X	B		X	C	A	A	A	X	X	X	X	A	B		
Thiophene	C ₄ H ₄ S											X	X	X	A	C		
Titanium Sulfate	Ti(SO ₄) ₂			A		A												
Titanium Tetrachloride	TiCl ₄			B			X	A	B	B		C	X	X	A	A	A	A

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DIAPHRAGM PUMPS				√							√				√			
DRUM EMPTYING PUMPS			√			√					√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√								√	√	√		√	√	√	
CENTRIFUGAL PUMPS												√			√	√	√	
LOBE PUMPS											√	√	√		√	√	√	
SLIDING VANE PUMPS								√			√	√				√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
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LIQUID	FORMULA																	
Toluene (Toluol)	C ₆ H ₆	A	A	X	A	A	A	A	A	A	A	C	X	X	A	X	A	A
Toluene Diisocyanate	CH ₃ C ₆ H ₃ (NCO) ₂												A	X	A			
Toluidine	CH ₃ C ₆ H ₄ NH ₂						A	A	A	A		X			A	B		
Tomato Pulp & Juice		A		A	A	A	B		A	A	A	A			A		A	A
Toothpaste		A	X					X	A	A	A	A		C	A	A	A	A
Transformer Oil (Petroleum)	Hydrocarbons	A	A	B			A	A	A	A		B	X	X	A	A	A	A
Transmission Fluid (Type A)		A					A	A	A	A	A	A	X	C	A	A	A	A
Triacetin	C ₂₁ H ₄₀ (OCOCH ₃) ₃						B					A	A	B	A	X		
Triallyl Phosphate	P(OC ₃ H ₅) ₃			B								X	A	C	A	A		
Triaryl Phosphate	(C ₆ H ₅ O) ₃ PO											X	A	C	A	A		
Tributoxy Ethyl Phosphate	(C ₄ H ₉ O) ₃ P(C ₂ H ₅)											X	A	X	A	B		
Tributyl Mercaptan												X		X	A	A		
Tributyl Phosphate (TBP)	(C ₄ H ₉) ₃ PO ₄	A		A			A	A		A		X	C	X	A	X	A	A
Trichloroacetic Acid (TCA)	CCl ₃ COOH	C	X	B	A	A	X	X	B	X	X	C	C	B	A	B	A	A
Trichlorobenzenes	C ₆ H ₃ Cl ₃						X	A	B	A		X		X	A	B	A	A
Trichloroethane	C ₂ H ₃ Cl ₃	A	X	X	A	B	X	A	A	A		X	X	X	A	B	A	A
Trichloroethylene (Ex-Tri) (Hi-Tri)	C ₂ HCl ₃	A	A	X	A	A	X	B	A	A	A	X	X	X	A	C	A	A
Trichloropane	CH ₃ CHClCHCl ₂	A	X							A	A	X		X		A		
Trichloropropane	C ₃ H ₃ Cl ₃		X	X			X	A	A	A	A	X		A	A	B	A	A
Tricresyl Phosphate (Lindol) (TCP)	(CH ₃ C ₆ H ₄ O) ₃ PO	A		B				A	A	B	A	X	A	C	A	C	A	A
Tridecyl Alcohol (Tridecanol)	C ₁₂ H ₂₅ CH ₂ OH											A			A	B		
Triethanol Amine (TEA)	N(C ₂ H ₄ OH) ₃			A	A	A	A	A	A	A	A	X	B	A	A	C	A	A
Triethyl Aluminium (ATE)	Al(C ₂ H ₅) ₃											X		X	A	B		
Triethyl Amine	(CH ₃ CH ₂) ₃ N	A		C		X		A	A	A		A		B	A			
Triethyl Borane	(C ₂ H ₅) ₃ B	A										X		X	A	A		
Triethyl Phosphate (TEP)	(C ₂ H ₅) ₃ PO ₄				A		A		A	A					A		A	
Triethylene Glycol (TEG)	CH ₂ OCH ₂ CHOH ₂			A								A			A	A		
Trimethylene Glycol	HO(CH ₂) ₃ OH						A	A	A	A		A			A	A		
Trinitrotoluene (TNT)	CH ₃ C ₆ H ₂ (NO ₂) ₃											X	X	B	A	C		
Trioctyl Phosphate	(C ₈ H ₁₇ O) ₃ PO			A								X	A	X	A	B		
Triphenyl Phosphite	(C ₆ H ₅ O) ₃ P				A					C					A		A	A
Tung Oil (Wood Oil)	Fatty acids	A		A			A		A	A		A	X	C	A	A	A	A
Turbine Oil			A					A	A		C	A	A	A	A			
Turpentine	C ₁₀ H ₁₆	A		X	A	X	A	A	A	A	C	A	X	X	A	A	A	A
Undertakers Restorative (see Embalming Fluid)																		
Unsymmetrical Dimethyl Hydrazine (UDMN)	H ₂ NN(CH ₃) ₂											C	A	C	A	X		
Uric Acid	C ₅ H ₄ N ₄ O ₃			A		A	X		A	A		A			A		A	
Urea (Carbamide)	CO(NH ₂) ₂			A	A		B			B		B		B	A	A		
Urea Formaldehyde		A								A		C	A		A			
Urine		A	A	A		A	A	A	A	A	C	A		A	A	A	A	A
Valeric Acid	CH ₃ (CH ₂) ₃ COOH						A					X	A	X	A			

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DIAPHRAGM PUMPS				√							√				√			
DRUM EMPTYING PUMPS				√			√				√				√	√		
FLEXIBLE IMPELLER PUMPS		√	√							√	√	√	√	√		√	√	
CENTRIFUGAL PUMPS											√				√	√	√	
LOBE PUMPS										√					√	√	√	
SLIDING VANE PUMPS								√			√	√				√	√	
REFER TO APPROPRIATE TECHNICAL MANUAL AS SOME OF THE COMBINATIONS MAY NOT BE AVAILABLE																		
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LIQUID	FORMULA																	
Vanilla Extract (Vanillin)	C ₈ H ₁₀ (CHO) (OCH ₃)(OH)	A	X						A			A		A	A	X	A	A
Varnish (Oil of Turpentine)	Oil, gum resins	A	A	A			A	C	A	A		B	X	X	A	A	A	A
Vaseline (Petroleum Jelly)				A	A	A	A	A	A	A		A		A	A	A	A	A
Vegetable Juices		A	A				C		A	C	A		C	A			A	A
Vegetable Oils		A	C	X	A		A	B	A	A	A	B	A	C	A	A	A	A
Vinegar (Dilute Acetic Acid)		A		A	A	A	C	X	A	A	C	C	A	B	A	A	A	A
Vinyl Acetate	CH ₃ COOC HCH ₂			B		A	B	A	A	A		X		B	A	X		
Vinyl Chloride (Chloroethylene)	CH ₂ CHCl			X		A	X	A	A	A		X	C	X	A	A		
Viscose Spinning Solution				A		A	A			A					A			
Walnut Oil												A		B	A	A		
Water - Deionized/Demineralized		A	A	A		A		X	C	C	X	A			A		A	
Water - Distilled	H ₂ O	A	A	A	A	A	A	A	C	C	X	A	A	C	A	A	A	A
Water - Fresh	H ₂ O	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A
Waxes	Hydrocarbons			A		A	A		A	A		A	X	A	A			
Weed Killers		A					X			A	C	B		C	A	A		
Whiskey	Ethanol, esters, acids	A	A	A		A	A	X	A	A	X	B	A	A	A	A	A	A
White Oil (Mineral) (Petroleum)	Mixture of liquid hydrocarbons								A	A		A	X	X	A	A	A	A
White Sulfate Liquor		A	A	A			B	C	B	A		B	A	A	A	B		
Wines				A		A	C	X	A	A	X	A	A	A	A	B	A	A
Wort, Distillery	Sugar Solution from malt						A	B	A	A				A	A	A		
Xylene (Xylol)	C ₈ H ₁₀ (CH ₃) ₂	A	A	X	A	A	A	B	A	B	A	X	X	X	A	A	A	A
Xylidines (Xylidin)	(CH ₃) ₂ C ₆ H ₃ NH ₂						B	B				X	X	A	X			
Yeast/Yeast Wort				A		A				A	A	A			A		A	A
Zeolite	Hydrated alkali aluminium silicates								A	A		C	A	C	A	A	A	A
Zinc Acetate	Zn(C ₂ H ₃ O ₂) ₂						C					C	A	B	A	X		
Zinc Ammonium Chloride	(NH ₄) ₂ SNCl ₆			A			C			C		A			A		A	A
Zinc Carbonate	ZnCO ₃						B	B	B	B		A			A	A		
Zinc Chloride/Solution	ZnCl ₂	A	A	A	A	A	A	B	A	A	X	B	A	B	A	A	C	A
Zinc Cyanide	Zn(CN) ₂											A			A		A	A
Zinc Hydrosulfite	ZnHSO ₃	A	A				X			A	X	A		A	A	A	A	A
Zinc Nitrate	Zn(NO ₃) ₂ ·6H ₂ O											A			A		A	A
Zinc Phosphate/Solution	Zn ₃ (PO ₄) ₂											A			A		A	A
Zinc Sulfate	ZnSO ₄	A	A	A	A	A	B	X	B	B		A	A	A	A	B	A	