

This manual contains a list of liquids and their compatibility with materials of construction for oval gear, rotary PD and turbine meters. The list is to be used as a guide to determine type of meter to recommend for a particular fluid. Additional information, such as operating temperature, viscosity, contamination, flow rates, etc., should be known before a final decision is made. The seals and packing for meters are also applicable to valves and other accessories.

Compatibility Table

Metals and elastomers noted as:

A—Excellent

B—Good

C—Poor

D—Not Recommended

Blank Space—Insufficient Information

Note 1 Avoid dissimilar metals.

Note 2 For rotary meters recommend LPG trim.

Note 3 C or D rating given due to possible contamination of metered product by metal. Material compatibility may be satisfactory.

The information contained herein is general in nature and while drawn from sources deemed to be reliable and presumed to be accurate, is not guaranteed in any way by Smith Meter.

Any application to a particular situation requires the use of qualified experts and is subject to limitations which are normally present.

Specifications of Materials Used in Smith Meters and Valves

Metals

1. Aluminum—ASTM, B-26, SG-70T6

Chemical Composition

Copper	0.20%
Iron	0.60%
Silicon	6.57.5%
Manganese	0.35%
Zinc	0.30%
Titanium	0.25%
Magnesium	0.20-0.40%
Others	0.15%
Aluminum	Remainder

Density: 0.10 lb/in³.

Thermal Coefficient of Expansion: 11.9×10^{-6} in/in °F.

Chemical Resistance: Organic acids, amines, solvents, alcohols, ketones.

Not Resistant To: hydroxides, acids, acid salts, alkalis.

2. Bronze—ASTM, B-145, Alloy 4A

Chemical Composition

Copper	85%
Tin	5%
Zinc	5%
Lead	5%

Density: 0.318 lb/in³.

Thermal Expansion: 10.2×10^{-6} in/in °F.

Chemical Resistance: Solvents, acetates, esters, alcohols, ketones, petroleum solvents, glycols, aromatic hydrocarbons, and water.

Not Resistant To: Mineral acids, amines, alkalis, hydroxides.

3. Cast Iron—ASTM, A-48, Class 25 and 30

Chemical Composition

Carbon	2.75–3.40%
Sulfur	0.08–0.12%
Silicon	2.10–2.30%
Phosphorous	0.15–0.30%
Iron	Remainder

Density: 0.25 lb/in³.

Thermal Coefficient of Expansion: 6×10^{-6} in/in °F.

Chemical Resistance: 93–95% sulfuric acid, alkalis, hydroxides, ammonia, amines, solvents, alcohols, ethers, ketones, petroleum solvents.

Not Resistant To: Organic acids, dilute acids.

4. Ductile Iron—ASTM, A-536, Grade 60-40-18

Chemical Composition

Total Carbon	3.2–4.1%
Phosphorous	0.015–0.10%
Silicon	1.8–3.0%
Nickel	0–3%
Manganese	0.10–1.00%

Density: 0.24–0.26 lb/in³.

Thermal Coefficient of Expansion: 6.8×10^{-6} in/in °F.

Used in pressure castings for singlecase PD meters and DuraFlow meters, good high temperature applications requiring maximum toughness, and several thermal and mechanical shock.

5. Tungsten Carbide—Carboloy 883 or Equivalent

Chemical Composition (Bearing Material)

Tungsten Carbide	94%
Cobalt	6%

Hardness: 92 Ra.

Specific Gravity: 14.9.

Thermal Coefficient of Expansion: 2.5×10^{-6} in/in °F.

Temperature Range: -250°F to 400°F.

Chemical Resistance: Due to cobalt binder, tungsten carbide is attacked by acids with Ph of 2–3 but is resistant to alkalis, such as sodium hydroxide, up to 40%.

6. Carbon Steel—ASTM, A-216, Grade WCB

Chemical Composition

Carbon	0.30%
Sulfur	0.06%
Manganese	1.00%
Silicon	0.60%
Phosphorous	0.05%
Iron	Remainder

Residual Elements

Copper	0.50%
Chromium	0.40%
Nickel	0.50%
Molybdenum	0.25%

Density: 0.283 lb/in³.

Thermal Coefficient of Expansion: 8.3×10^{-6} in/in °F.

Chemical Resistance: High resistance to alkalis, petroleum products.

Not Resistant To: Acids, water.

Used mainly for strength and for high-pressure vessels.

7. Carbon Steel—ASTM, A-285, Grade C

Chemical Composition

Carbon	0.35%
Sulfur	0.06%
Manganese	0.80%
Silicon	0.69%
Phosphorous	0.05%
Iron	Remainder
Residual Elements	
Copper	0.50%
Chromium	0.40%
Nickel	0.50%
Molybdenum	0.25%

Density: 0.283 lb/in³.

Thermal Coefficient of Expansion: 8.3×10^{-6} in/in °F.

Chemical Resistance: High resistance to alkalis, petroleum products.

Not Resistant To: Acids, water.

Used mainly for strength and for high-pressure vessels.

8. Austenitic Stainless Steels

316 SS Casting—ASTM, A-295, Grade CF-8M

304 SS Wrought—ASTM, A167

Chemical Composition

316

Carbon	0.08%
Silicon	1.50%
Manganese	1.50%
Chromium	18.0–21.0%
Phosphorous	0.04%
Nickel	9.0–12.0%
Sulfur	0.04%
Molybdenum	2.0–3.0%

304

Carbon	0.08%
Silicon	1.0%
Manganese	2.0%
Chromium	18.0–20.0%
Phosphorous	0.45%
Nickel	8.0–12.0%
Sulfur	0.30%

Density: 0.29 lb/in³.

Thermal Coefficient of Expansion: 9.2×10^{-6} in/in °F.

Chemical Resistance: Organic acids, amines, hydroxides, food products, fatty acids, anilines, solvents, alcohols, ethers, and ketones.

Not Resistant To: Mineral acids, high concentrations of acid salts.

9. ARMCO 17-4 PH Stainless Steel

Chemical Composition

Carbon	0.07%
Phosphorous	0.04%
Chromium	15.5–17.5%
Sulfur	0.03%
Nickel	3–5%
Silicon	1.0%
Copper	3.5%
Others	0.15–0.45%
Manganese	1.0%

Density: 0.282 lb/in³.

Thermal Coefficient of Expansion: 6.0×10^{-6} in/in °F.

Condition H900: 38–44 RC.

Excellent corrosion resistance and high hardness to resist effects of wear and corrosion. Better resistance than 400 series stainless steel, but less than 316 stainless steel.

10. Martensitic Stainless Steel—ASTM, A-276, Type 440C SS, Type 416 SS

Chemical Composition

440C (Hardness - 55–60 Rockwell C)

Carbon	0.95–1.20%
Silicon	1.0%
Manganese	1.0%
Chromium	16–18%
Phosphorous	0.040%
Molybdenum	0.75%
Sulfur	0.030%

416 (Hardness - 39–41 Rockwell C)

Carbon	0.15%
Sulfur	0.15%
Manganese	1.25%
Silicon	1.0%
Phosphorous	0.060%
Chromium	12–14%

Density: 0.28 lb/in³.

Thermal Coefficient of Expansion: 5.6×10^{-6} in/in °F.

Stainless steel always used in hardened condition for shafts and bearings.

Chemical Resistance: Resistant to water, steam, crude oil, gasoline, alcohols.

11. HYMU 80

Chemical Composition

Carbon	0.05%
Nickel	79%
Manganese	0.50%
Molybdenum	4%
Silicon	0.15%
Iron	Remainder

Density: 0.316 lb/in³.

Thermal Coefficient of Expansion: 7.2×10^{-6} in/in °F.

High permeability allow used for electromagnetic devices—can become magnetized in low-strength magnetic field.

Corrosion Resistance: Not as good as chromium steel alloys, and protective coatings are needed to improve resistance.

12. Austenitic Stainless Steel—ASTM A479 UNS S 21800, Nitronic 60*

Chemical Composition

Carbon	0.03–0.06%
Chromium	20.2–23.5%
Manganese	4.0–6.0%
Nickel	11.5–13.5%
Phosphorous	0.04%
Molybdenum	1.5–3.0%
Sulfur	0.03%
Nitrogen	0.20–0.40%
Silicon	1.0%
Columbium	0.10–0.30%
Vanadium	0.10–0.30%

Density: 0.285 lb/in³.

Thermal Coefficient of Expansion: 9.2×10^{-6} in/in°C.

Hardness: 31 to 43 Rc.

Chemical Resistance: Excellent resistance to stress corrosion cracking and pitting. Not resistant to mineral acids.

Application: Oval meter shafts, as a substitute for 316 stainless steel, to provide a hard wear-resistant surface and compliance to NACE.

*Trademark: Armco Inc.

13. Hastelloy C265—ASTM B622 N01276

Chemical Composition

Nickel	54-56%
Chromium	14-16%
Tungsten	3.0-4.5%
Molybdenum	15%-17%
Iron	4.0%-7%
Cobalt	2.5%
Silicon08%
Manganese	1.0%
Carbon010%
Vanadium35%
Phosphorus03%
Sulfur010%

Density: 8.89 g/cm³

Coefficient of Thermal Expansion: 7.3×10^{-6} in/in°F

Chemical Resistance: Ferric and cupric chlorides, hot contaminated mineral acids, solvent, chlorine and inorganic and organic acids, sea water and brine solutions resistant to pitting and stress corrosion.

Not resistant to: Dilute hydrochloric acid, hydrofluoric acids.

Platings

1. Electroless Nickel

A nickel coating containing 5–10% phosphorous applied by chemical reduction. It can be applied up to 0.003" thick and hardness will be 40 Rockwell C and above. It is resistant to weak acids, salts, and sea water, and is used as a barrier under hard chrome platings.

2. Hard Chrome

A hard, dense chromium coating applied electrolytically. It can be applied in thicknesses ranging from 0.0002" to 0.010". Its purpose is mainly wear-resistance when applied on hardened shafts. Its microporosity can be a detriment when used on acid applications.

3. Tungsten Carbide (83% Tungsten Carbide 17% Cobalt)

A hard dense thermal spray coating (high velocity oxygen fuel process with cobalt binder). Recommended for severe fretting, sliding and abrasive conditions (bearing applications). Ideal for petroleum applications but not recommended for acidic environments.

Non-Metals

Elastomers/Sealants

1. Buna-N

A co-polymer of butadiene and acrylonitrile. It has excellent resistance to petroleum products, water and ethylene glycol-base fluids. It is not recommended for ketones, acids, and halogenated hydrocarbons.

Temperature Range: -40°F to 225°F.

Color Code: Red.

Hardness: 75–90 Durometer.

2. Viton A

A fluoroelastomer composed of vinylidene fluoride and hexafluoro propylene. It contains about 65% fluorine and is recommended for aromatic hydrocarbons, acids, and halogenated hydrocarbons (Trichloroethylene). It is not recommended for ketones and amines.

Temperature Range: 10°F to 400°F.

Color Code: Yellow.

Hardness: 80–90 Durometer.

3. Ethylene Propylene Rubber (EPR)

A co-polymer of ethylene and propylene. It is recommended for ketones, alcohols, water, and steam. It is not recommended for petroleum products as it swells rapidly in contact with these fluids.

Temperature Range: -65°F to 300°F.

Color Code: Green and Red.

Hardness: 75–90 Durometer.

4. Fluorosilicone

A group of elastomers made up of silicon, oxygen, carbon hydrogen, and fluorine. Used mainly as diaphragm material. Excellent resistance to petroleum oils and fluids, mildly resistant to aromatic hydrocarbons and chlorinated solvents. Poor abrasion resistance.

Temperature Range: -80°F to 400°F.

5. Polyurethane

Formed by reaction of polyols with diisocyanates. Used in seals of 4-way valve and prover spheres. Resistant to oils, gasoline, and other petroleum-based products. Not recommended for ketones, chlorinated solvents, and water-based solutions.

Temperature Range: -20°F to 180°F.

Thermal Coefficient of Expansion: $5.5\text{--}10 \times 10^{-5}$ in/in °F.

Specific Gravity: 1.04 to 1.26.

Hardness: 85–90 Shore A.

6. Master Gasket*

A methacrylate ester which, when isolated from air contact, form a flexible polymer seal. It acts as the seal between the single-case meter housing and cover.

It is resistant to glycols, water, oils, gasoline, and diesel fuels but should not be used with sodium and potassium hydroxide, acids, lyes, and ammonia solutions.

Temperature Range: -60°F to 300°F.

*Trademark: Loctite Company.

7. Gylon*

A filled polytetrafluoroethylene (PTFE) which is compressible and can be formed into diaphragms and gaskets.

It is chemically inert, has good abrasion resistance, and resists cold-flow common to unfilled Teflon materials.

Temperature Range: -350°F to 500°F.

*Trademark: Garlock Inc.

8. Gore Tex*

A pure, soft polytetrafluoroethylene (PTFE) which is used as a sealant or gasket for irregular surfaces. It has the same chemical inertness as Teflon (TFE).

Temperature Range: -350°F to 500°F.

*Trademark: W.L. Gore & Associates, Inc.

9. Chemraz*

An elastomeric teflon which is used as O-Rings and other types of seals in meters, valves, and accessories. It combines the resilience and low sealing force of an elastomer with the chemical resistance approaching Teflon.

Temperature Range: -20°F to 450°F.

Color Code: Two green stripes.

Hardness: 75–85 Durometer.

*Trademark: Greene, Tweed and Company.

Plastics

1. Teflon*

A fluorocarbon consisting of polytetrafluoroethylene (TFE). This material is relatively inert to most chemicals, has low coefficient of friction, good abrasion resistance and low coefficient of expansion.

Temperature Range: -40°F to 300°F (diaphragm and seal applications).

Color Code: White, milk-like.

Density: 2.22 g/cm³.

Thermal Coefficient of Expansion: 4.8×10^{-5} in/in °F.

Temperature Range: -100°F to 400°F.

*Trademark: E.I. Dupont Corporation.

2. Tefzel*

Tefzel is an injection molding grade of ethylene and tetrafluoroethylene (TFE), modified with glass fibers. It has outstanding chemical resistance, mechanical strength, and abrasion resistance. Very strong oxidizing agents, such as nitric, organic bases, and amines, at their boiling points will affect it to various degrees.

Temperature Range: -100°F to 302°F.

Thermal Coefficient of Expansion: 5.2×10^{-5} in/in °F.

Specific Gravity: 1.70–1.86.

*Trademark: E.I. Dupont Corporation.

3. Rulon*

Trade name for a family of specially-compounded forms of TFE fluorocarbons. It is used as a bearing material with a low coefficient of friction, excellent abrasion resistance, and chemical resistance equal to TFE. It requires no lubrication and is capable of performing under severe temperatures.

Temperature Range: -400°F to 550°F.

Color Code: Maroon.

*Trademark: Dixon Corporation.

4. Ryton*

Trade name for material made from polyphenylene sulfide. It is used as engineering plastic with high strength, low coefficient of expansion, high temperature resistance, and good chemical resistance.

Temperature Range: -20°F to 300°F.

Density: 1.34–1.69 g/cm³.

Thermal Coefficient of Expansion: $1.5\text{--}2.0 \times 10^{-5}$ in/in °F.

Not Resistant To: Concentrated sulfuric acid or nitric acids.

*Trademark: Phillips Petroleum Company.

5. Kynar*

Trade name for fluoroplastic polyvinylidene fluoride used for coating magnets and other metals in corrosion environments.

Temperature Range: -80°F to 350°F.

Specific Gravity: 1.75.

Thermal Coefficient of Expansion: 8.5×10^{-5} in/in °F.

Resistant To: Acids and bases, solvents, oxidizing agents.

Not Resistant To: Polar solvents such as ketones and esters.

*Trademark: Pennsalt Chemical Company.

6. Nylons

Family of thermoplastic polyamide resins. Used as injection-molded units or fluidized bed powders. Used in meters as functional parts—wear strips, valve guides, exterior parts, bearing retainers, absorbs moistures, not resistant to mineral acids.

Temperature Range: -20°F to 250°F.

Thermal Coefficient of Expansion: 5.5×10^{-5} in/in °F.

7. Epoxies

Powder coatings designed for coating interior of pipes, valve float guards, etc., for resistance to dilute acids, alkalines, salts, aliphatic and aromatic hydrocarbons.

Temperature Range: -20°F to 180°F.

Thermal Coefficient of Expansion: $2.5\text{--}3.6 \times 10^{-5}$ in/in °F.

Not Resistant To: Methylene chloride, phenols, and some mineral acids.

8. Peek (Polyetheretherketone)

A high temperature engineering plastic which is compounded with 35% carbon fiber and 5% PTFE (Teflon). It has excellent mechanical properties. It has excellent resistance to oxygenated hydrocarbons, ethers alcohols reformed gasoline and neat MTBE.

Density: 1.49 g/cm³

Coefficient of Thermal Expansion: 1.7×10^{-5} in/in °F

Temperature Range: -40 to 500 °F

* Vitrex (ICI) Trademark

Ceramics and Carbon

1. Ceramagnet A-19*

Family of ceramic permanent magnetic materials belonging to group of hard ferrites consisting of Barium Ferrite. Parts are magnetized with multiple poles on OD and ID of ring to transmit torque through a barrier without a mechanical connection, thus eliminating packing glands.

Temperature Range: -20°F to 600°F.

Thermal Coefficient of Expansion: 10.2×10^{-6} in/in °C.

Density: 4.7–5.11 g/cm³.

Resistant To: Solvents, salts, petroleum oils, caustics. When immersed in corrosive fluids, the material is encapsulated with Tefzel and Ryton.

*Trademark: Stackpole Carbon.

2. Carbon Pure-Bon (P-6038C2)*

Resin impregnated carbon-graphite self-lubricating and non-galling material. Remarkable chemical resistance; only strong oxidizing acids, such as fuming nitric, will attack carbon.

Temperature Range: -65°F to 350°F.

Thermal Coefficient of Expansion: 2.0×10^{-6} in/in °F.

Hardness (Scleroscope): 90.

*Trademark: Pure Carbon Company.

Typical

(60°F)

Gr.
Chemicals
(60°F)
Remarks
Abetic Acid

Viscosity
Formula
(CPS)

S p .

A - Excellent B - Good C - Poor
D - Not Recommended
Blank Space - Insufficient Information

				Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Fyton	Carbon	Peek	Hastelloy C-276	Chemraz
		A	A						A	A		A	A	A						
Acetaldehyde	CH ₃ CHO	0.783	0.22	B	D	C	A	C	A	A	A	C	A	D	A	A	A	A	A	D
Acetates	(CH ₃ COO-)			A	A	B	A	B	A	A	A	D	A	D	A	A	A	A	A	A
Acetic Acid (50%)	CH ₃ COOH	1.057	1.22	C	D	D	C	D	A	A	D	B	B	D	A	A	A	A	A	A
Acetic Acid (Glacial)	CH ₃ COOH	1.049		A	B	D	C	D	A	A	B	B	B	D	A	A	A	A	A	A
Acetic Anhydride	(CH ₃ CO) ₂ O	1.083	0.90	B	C	D	A	D	B	B	C	D	B	D	A	A	A	D	A	A
Acetone	CH ₃ COCH ₃	0.797	0.31	B	A	A	A	A	B	B	B	D	A	D	A	A	A	A	A	A
Acrylic Emulsions				B	B	C	A	C	A	A	A	A		A	A	A	A	A	A	A
Acrylonitrile	H2CCHCN	0.800		B	A	C	A	A	A	A	A	D	D	C	A	A	A	A	A	A
Alcohol-Allyl	CH ₂ CHCH ₂ OH	0.852	1.36	B	B	B	A	B	B	B	B	A			A	A	A	A	A	A
Alcohol-Amyl	CH ₃ (CH ₂) ₅ CH ₂ OH	0.817	4.65	A	B	B	A	B	A	A	B	B	A	B	A	A	A	A	B	A
Alcohol-Butyl	CH ₃ (CH ₂) ₄ CH ₂ OH (Butanol)	0.810	2.94	A	B	B	A	B	A	A	B	A	B	A	A	A	A	A	A	A
Alcohol-Diacetone	CH ₃ COCH ₂ C(CH ₃) ₂ OH	0.940	3.20	A	B	B	A	B	A	A	B	D	A	D	A	A	A	A	A	A
Alcohol-Ethyl	C ₂ H ₅ OH	0.804	1.20	B	B	B	A	B	A	A	B	A	A	C	A	A	A	A	A	A
Alcohol-Furfuryl	C ₄ H ₃ OCH ₂ OH	1.128		B	B	B	A	B	B	B	B	D	B	C	A	A	A	A	A	A
Alcohol-Isopropyl	(CH ₃) ₂ CHOH	0.786		B	B	B	A	B	B	B	B	B	A	A	A	A	A	A	A	A
Alcohol-Methyl	CH ₃ OH	0.792	0.59	D	B	B	A	B	A	A	B	A	A	D	A	A	A	A	A	A
Aliphatic Solvents				A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	A
Alkyd Resin				B	B	C	A	C	A	A	A	A	D	A	A	A	A	A	A	A
																				Viscosity Prime Factor
Alkyl Benzene	C ₂ H ₅ -C ₆ H ₆			B	B	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A
Allyl Chloride	CH ₂ CHCH ₂ CL	0.938		D	B	B	B	B	B	B	B	A			A	A	A	A	A	A
AluminumAmmonium Sulfate (Alum.)	AlNH ₄ (SO ₄) ₂	1.645		D	D	D	D	D	B	A	D	A	A	A	A	A	A	A	A	A
Aluminum Chloride (10%)	AlCl ₃ ·6H ₂ O	1.07		D	D	D	D	D	B	A	D	A	A	A	A	A	A	A	B	A
AluminumSodium Sulfate (Aq.)	Al ₂ (SO ₄) ₃ ·Na ₂ SO ₄ ·24H ₂ O	1.67		D	D	D	D	D	B	A	D	A	A	A	A	A	A	A	A	A
Amines	(NH ₃)			C	D	B	A	B	A	A	A	B	B	D	A	A	A	A	A	A
Ammonia (Anh.)	NH ₃	0.77	0.25	B	D	B	B	A	A	A	A	B	A	D	A	A	A	A	A	A
Ammonia Solutions	NH ₄		@ -33°F	B	D	B	B	A	A	A	A	B	A	D	A	A	A	A	A	A
Ammonium Carbonate	NH ₄ HCO ₃			B	D	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A
Ammonium Chloride (0-24%)	NH ₄ Cl	1.04-1.06		C	D	B	B	B	A	A	B	A	A	A		A	A	A	A	A
AmmoniumHydroxide (28%)	NH ₄ OH	0.900		C	D	B	B	B	B	B	B	C	A	D	A	A	A	A	A	A
AmmoniumHydroxide (34%)	NH ₄ OH	0.882		C	D	B	B	B	B	B	B	D	A	D	A	A	A	A	A	A
Ammonium Nitrate (8-42%)	NH ₄ NO ₃	1.03		B	D	D	B	D	A	A	A	A	A	B	A	A	A	A	A	A
Ammonium Phosphate	(NH ₄) ₃ HPO ₄	1.61		B	D	D	B	D	A	A	A	A	A		A	A	A	A	A	A
Ammonium Sulfate	(NH ₄) ₂ SO ₄	1.28		C	B	C	B	C	A	A	B	A	A	D	A	A	A	A	A	A
Amyl Acetate	CH ₃ CO ₂ C ₅ H ₁₁	0.879	0.89	B	B	C	A	C	A	A	A	D	A	D		A	A	A	A	A
Aniline	C ₆ H ₅ NH ₂	1.023	4.40	C	C	C	A	C	A	A	B	D	B	C	A	A	A	A	A	A
Anionic Detergents				A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A
Antimony Trichloride	SbCl ₃	3.14		D	D	D	D	D	D	D	D				A			A	A	A
Asphalt @ 450°F	Bitumens		2,000 SSU	C	A	A	B	A	A	A	A	D	D	C	A		A	A	A	A
																				Ventilated Ext.
Barium Carbonate	BaCO ₃	3.85		B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A
Barium Chloride (26%)	BaCl ₂ ·2H ₂ O	1.27		D	B	C	C	C	C	C	B	A	A	A	A	A	A	A	A	A
Barium Hydroxide	Ba(OH) ₂	1.656		D	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A	A
Barium Sulfate	BaSO ₄	4.25		D	C	C	B	C	B	B	B	A	A	A	A	A	A	A	A	A

Note 1: Avoid dissimilar metals.

A - Excellent B - Good C - Poor
D - Not Recommended
Blank Space - Insufficient Information

Chemicals	Formula	Sp. Gr. (60°F)	Typical Viscosity (60°F) (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Barium Sulfide	BaS	4.25		D	C	C	B	C	B	B	B	A	A	A	A	A	A	A	A	A	
Beef Tallow				D	D	B	A	B	A	A	A	A	B	A	A	A	A	A	A	A	Steam Clean
Beer				A	B	C	A	C	A	A	A	A	A	A	A	A	A	A	A	A	SS Meter Preferred
Beet Sugar Liquors	Sucrose			A	A	B	A	B	A	A		A	A	A	A	A	A	A	A	A	
Benzaldehyde				A	A	A	A	A	A	A	A				A	A	A		A	A	
Benzene	C ₆ H ₆	0.879	0.652	B	B	B	A	B	B	B	B	D	D	A	A	A	A	A	A	A	
Benzoic Acid	C ₆ H ₅ COOH	1.265		B	B	D	B	D	B	B	B	D	D	A	A	A	A	A	A	A	
Benzyl Alcohol	C ₆ H ₅ CH ₂ OH	1.040		B	B	A	A	A	B	B	B	D	B	A	A	A	A	A	A	A	
Boric Acid	H ₃ BO ₃	1.434		B	B	D	B	D	A	A	B	A	A	A	A	A	A	A	A	A	
Butadiene	C ₄ H ₆	0.621		A	C	B	A	B	A	A	A			A	A	A	A	A	A	A	Note 2
Butane	C ₄ H ₁₀	0.599		A	A	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Butyl Acetate	CH ₃ COOC ₄ H ₉	0.875	0.732	B	B	A	A	B	B	B	B	D	B	D	A	A	A	A	A	A	
Butylene	C ₄ H ₈	0.595		A	A	A	A	A	A	A	A	B	D	A	A	A	A	A	A	A	Note 2
Butylene Glycol	HOCH ₂ CH ₂ CH(OH)CH ₃	1.00		A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	
Butylethyl Ketone	C ₄ H ₉ COC ₂ H ₅	0.819		A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Butylaldehyde	CH ₃ (CH ₂)CHO	0.804	0.43	A	A	A	A	A	A	A	A	D	B	D	A	A	A	A	A	A	B
Butyrcellosolve	CH ₂ OHCH ₂ OC ₄ H ₉	0.901	6.40	A	A	A	A	A	A	A	A	D	B	D	A		A	A	A	A	
Butyric Acid	C ₄ H ₂ OOH	0.958	1.61	B	C	D	B	D	B	B	C	D	B	B	A		A	A	A	A	
Buttermilk				A	D	D	B	D	A	A	A	A	A	A	A	A	A	A	A	A	
Bunker Oils				A	B	B	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Calcium Chloride (38%)	CaCl ₂ ·6H ₂ O	1.33		D	B	D	B	D	B	B	C	A	A	A	A	A	A	A	A	A	Note 1
Calcium Hydroxide	Ca(OH) ₂	2.34		D	C	C	B	C	B	B	B	A	A	A	A	A	A	A	A	A	
Calcium Hypochlorite (Aq.)	Ca(OCl) ₂			C	D	D	C	D	C	C	C	B	A	A	A	D	A	D	C	A	Hastelloy C
Calcium Nitrate (Aq.)	Ca(NO ₃) ₂ ·4H ₂ O	1.82		D	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	Note 1
Calcium Sulfate (10%)	CaSO ₄	2.45	14 CPS	B	B	B	B	B	A	A	A	B	A	A	A	A	A	A	A	B	Note 1
Camphene	C ₁₀ H ₁₆	0.833		B	B	B	B	B	B	B	B	A	D	A	A	A	A	A	A	A	
Carbolic Acid (20%)	Phenol	1.07	65 SSU	A	A	D	B	D	A	A	B	D	B	A	A		A		A	A	Note 3
Capric Acid	CH ₃ (CH ₂) ₈ COOH	0.885 @ 40°C		B	B	B	C	B	C	A	B	B	C	A	A		A	A	A	A	
Caproic Acid	CH ₃ (CH ₂) ₄ COOH	0.927 @ 20°C	3.10	A	C	D	B	D	A	A	B	B	C	A	A		A	A	A	A	Fatty Acid
Caprylic Acid	CH ₃ (CH ₂) ₆ COOH	0.915 @ 20°C		A	C	D	B	D	A	A	B	B	C	A	A		A	A	A	A	Fatty Acid
Carbitol	C ₄ H ₉ OC ₂ H ₄ OC ₂ H ₄ OH	0.953	6.40	A	A	A	A	A	A	A	A	B	B	B	A	A	A	A	A	A	
Carbitol Acetate	CH ₃ COOC ₂ H ₄ OC ₂ H ₄ OC ₂ H ₅	1.01	2.70	A	A	A	A	A	A	A	A	D	B	D	A		A	A	A	A	
Carbon Dioxide	CO ₂	1.10 @ -37°C		A	A	A	A	A	A	A	A	A	B	B	A		A	A	A	A	Note 2
Carbonic Acid	H ₂ CO ₃	2.44		A	D	C	A	A	A	A	A	B	A	A	A		A	A	A	A	Exists Only in Solid
Carbon Tetrachloride (Dry)	CCl ₄	1.59	1.03	C	C	C	A	C	A	A	C	B	D	A	A	A	A	A	A	A	
Carbon Disulphide	CS ₂	1.26	0.36	A	C	B	B	B	A	A	B	A	D	A	A	A	A	A	A	A	Note 1
Castor Oil		0.969	98.0	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	
Cellosolve	HOC ₂ H ₄ OC ₄ H ₉	0.901	6.40	A	A	A	A	A	A	A	A	D	B	D	A		A	A	A	A	
Cellosolve Acetate	CH ₃ COOC ₂ H ₄ OC ₂ H ₅	0.978	1.32	A	A	A	A	A	A	A	A	D	B	D	A		A	A	A	A	
Cerotic Acid	CH ₃ (CH ₂) ₂₄ COOH	0.819 @ 100°C		A	C	D	C	D	A	A	B	B	C	A	A		A	A	A	A	
Cetane	Hexadecane	0.773		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Chlorinated Solvents				A	A	A	A	A	A	A	A	D	D	A	A		A	A	A	A	No Water Present
Chlorine (Dry)	CL ₂	1.46		D	D	B	D	C	B	B	B	D	D	A	A	D	A	D	A	A	No Moisture Present

Note 1: Avoid dissimilar metals.

Note 2: For rotary meters recommend LPG trim.

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Chemicals	Formula	Sp. Gr. (60°F)	Typical Viscosity (60°F) (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Chloroacetic Acid	CH ₂ ClCOOH	1.370 @ 70°C		D	D	D	D	D	D	D	D	D	B	D	A	D	A		A	A	Hastelloy
Chlorobenzene	C ₆ H ₅ Cl	1.105 @ 25°C	0.79	B	B	B	A	B	B	B	B	D	D	A	A	B	A	A	A	A	
Chloroform (Dry)	CHCl ₃	1.485 @ 20°C	0.58	D	B	B	A	B	A	A	A	D	D	A	A	A	A	A	A	A	Note 1
Chlorosulfonic Acid	ClSO ₂ OH	1.76 @ 20°C		B	B	B	D	B	B	B	D	D	D	D	A	D	A	A	A	A	
Chlorothene	CH ₃ CCl ₃	1.319 @ 25°C		A	A	A	A	A	A	A	A	D		A	A	B	A	A	A	A	
Chromic Acid	H ₂ CrO ₄	2.67		D	D	D	D	D	C	C	D	B	D	A	A	D	A	D	D	A	Lead, Alloy 20
Citric Acid	C ₆ H ₄ OH(COOH) ₃	1.54		C	D	D	C	D	A	A	D	A	A	A	A	A	A	A	A	A	
Coca Cola							A		A	A	A			A	A	A	A	A	A	A	
Coconut Oil		0.925	27.0	B	B	C	A	C	A	A	B	A	A	A	A	A	A	A	A	A	Note 3
Codliver Oil		0.918	160 SSU	A	A	D	A	D	A	A	B	A	A	A	A	A	A	A	A	A	Note 3
Copper Nitrate 5–50%	Cu(NO ₃) ₂ ·3H ₂ O	2.174		D	D	D	D	D	A	A	B			A	A	A	A	A	A	A	
Copper Sulfate	CuSO ₄ ·5H ₂ O	2.284		C	D	D	C	D	B	B	B	A	A	A	A	A	A	A	A	A	
Cottonseed Oil		0.915–0.921	70.4	B	B	C	A	C	B	B	B	A	C	A	A	A	A	A	A	A	No Cd. Plating Note 3
Corn Oil	(Fatty Acid)	0.914–0.921	26.0*	B	B	C	A	C	A	B	B	A	C	A	A	A	A	A	A	A	*Vis. @ 130°F Note 3
Cresylic Acid (50%)	(Cresol)	1.034		C	C	D	C	C	B	B	A	D	D	A	A		A		A	A	
Creosote	(Coal Tar)	1.04–1.10	12.0	B	A	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Crude Oil (Sweet)	0.2–0.5% Sulfur			A	B	B	A	A	A	A	A	B	D	A	A	A	A	A	A	A	
Crude Oil (Sour)	0.5–2.5% Sulfur			A	D	B	B	B	A	A	B	B	D	A	A	A	A	A	A	A	Note 1
Cryogenics	Liquid O ₂ , N ₂ , CO ₂			A	D	D	A	D	A	A	B	D	D	D	A	D	D		A	D	
Cumene	C ₆ H ₅ CH(CH ₃) ₂	0.862	0.73	B	B	A	B	B	B	B	D	D	A	A	D	A	A	A	A	A	
Cupric Chloride	CuCl ₂ ·2H ₂ O	2.39		D	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A	A	
Cuprous Chloride	CuCl	3.35		D	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A	A	
Cutting Oil-Water Emulsions				A	A	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Cyclo Hexane	C ₆ H ₁₂	0.779	1.02	A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Cyclo Hexanone	C ₆ H ₁₀ O	0.943		B	B	B	A	D	B	B	B	D	B	D	A	A	A	A	A	A	
D.D.T.	(ClC ₆ H ₄) ₂ CHCCL ₃			D	D	A	A	A	A	A	A	B	D	A	A	A	A	A	A	A	
Decyl Alcohol	C ₁₀ H ₂₁ OH	0.829		A	A	A	A	A	A	A	A			A	A	A	A	A	A	A	
Denatured Alcohol	(Denatured Ethyl Alcohol)			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Diammonium Phosphate	Ammonium Phosphate	1.61		B	D	D	D	D	A	A	B	A	A		A	A	A	A	A	A	
Dioctylphthalate	(C ₈ H ₁₇ COO) ₂ C ₆ H ₄	0.965		B	A	B	A	B	B	A	B	D	B	B	A	A	A	A	A	A	
Dibutyl Phthalate	C ₆ H ₄ (COOC ₄ H ₉) ₂	1.048 @ 20°C	20.0	B	B	B	A	B	B	A	B	D	B	B	A	A	A	A	A	A	
Dichloroethyl Ether	C ₂ H ₄ ClOC ₂ H ₄ Cl	1.222	2.95	A	A	A	A	A	A	A	A	D	C	C	A		A	A	A	A	
Dichloro Propane	CH ₃ CHClCH ₂ Cl	1.158	0.88	B	B	A	A	A	A	A	A	B	D	A	A	A	A	A	A	A	
Diethanol Amine	(HOCH ₂ CH ₂) ₂ NH	1.092		A	D	A	A	A	A	A	A	B	B	D	A		A	A	A	A	Note 1
Diethyl Aniline	(C ₂ H ₅) ₂ C ₆ H ₃ NH ₂	0.959		B	D	A	A	A	B	B	B	D	A	D	A		A	A	A	A	Note 1
Diethyl Ketone	C ₂ H ₅ COC ₂ H ₅	0.816		A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Diethylene Glycol	C ₄ H ₈			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Hygroscopic Liquid
Diethylene Triamine	(NH ₂ C ₂ H ₄) ₂ NH	0.954	7.0	A	D	A	A	A	A	A	A	B	B	D	A	A	A	A	A	A	Note 1
Diethyl Sulfate	(C ₂ H ₅) ₂ SO ₄	1.180	1.79	A	A	A	B	A	A	A	A	A		A	A		A	A	A	A	Anhydrous
Di-octyl Adipate	D.O.A.	0.926	13.7	D	D	A	A	A	A	A	A	D	B	B	A	A	A	A	A	A	
Dipentene	C ₁₀ H ₁₆	0.847 @ 15°C		A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	

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Chemicals	Formula	Sp. Gr. (60°F)	Typical (60°F) Viscosity (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PHSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Diisobutyl Ketone	C ₄ H ₉ COC ₄ H ₉	0.808		A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Dimethylamine	(CH ₃) ₂ NH	0.686		A	D	A	A	A	A	A	A	B	B	D	A	B	A	A	A	A	Note 1
Dimethyl Formamide	HCON(CH ₃) ₂	0.953		D	D	A	A	A	A	A	A	D	B	B	A	A	A	A	A	A	
Dioxane	C ₄ H ₈ O ₂	1.035 @ 20°C	1.31	B	A	A	A	A	A	A	A	D	B	D	A	A	A	A	A	A	
Dipropylene Glycol	(C ₃ H ₆ OH) ₂ O	1.025	107.0	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	
Dodecyl Benzene	Detergent			A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	
Dowtherms	Diphenyl Oxides	1.060		A	A	B	A	B	A	A	A	D	D	A	A		A	A	A	A	
Ethane	C ₂ H ₆	0.446		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Ether Dimethyl	CH ₃ OCH ₃	0.661	0.23	B	B	B	B	A	A	A	A	D	C	C	A	A	A	A	A	A	
Ethers	(C ₂ H ₅) ₂ O	0.736	0.23	B	B	B	A	B	A	A	A	D	C	C	A	A	A	A	A	A	
Ethanol Amine	HOCH ₂ CH ₂ NH ₂	1.017		A	D	B	A	B	A	B	B	B	B	D	A	A	A	A	A	A	Note 1
Ethyl Acetate	CH ₃ COOC ₂ H ₅	0.883	0.45	A	C	C	A	B	B	B	B	D	B	D	A	A	A	A	A	A	
Ethyl Acrylate	CH ₂ CHCOOC ₂ H ₅	0.92		A	A	A	A	A	A	A	A	D	B	D	A	A	A	A	A	A	
Ethyl Amine	CH ₃ CH ₂ NH ₂	0.689		A	D	B	A	B	A	B	B	B	B	D	A	A	A	A	A	A	Note 1
Ethyl Aniline	C ₂ H ₅ NHC ₆ H ₅	0.963	2.04	B	D	A	A	A	B	B	B	D	A	D	A	A	A	A	A	A	
Ethyl Benzene	C ₆ H ₅ C ₂ H ₅	0.867	0.64	A	B	B	A	A	B	B	B	D	A	A	A	A	A	A	A	A	Note 2
Ethyl Chloride (Dry)	C ₂ H ₅ Cl	0.921		B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	D	Note 2
Ethyl Chloride (Wet)	C ₂ H ₅ Cl	0.921		D	C	D	C	D	C	C	D	A	A	A	A	A	A	A	A	D	Note 2
Ethyl Ether	(C ₂ H ₅) ₂ O	0.714	0.23	B	B	B	B	A	A	A	A	D	C	C	A	A	A	A	A	A	
Ethyl Hexanol	CH ₃ CH ₂ CH ₂ COH(C ₂ H ₅) ₂	0.83		B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Ethyl Lactate	CH ₃ CHOHCOOC ₂ H ₅	0.1020		B	B	B	B	B	B	B	B	A		A	A	A	A	A	A	A	
Ethyl Mercaptan	C ₂ H ₅ SH	0.839		B	D	A	B	D	B	B	B	D	D	A	A	A	A	A	A	A	Note 1
Ethyl Propyl Myristate	CH ₃ (CH ₂) ₁₂ COOC ₂ H ₅			A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Ethyl Propyl Palmitate	C ₂ Hg(CH ₂) ₁₄ COOC ₂ H ₅	0.83		A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Ethylene Chlorohydrin	ClCH ₂ CH ₂ OH	1.204	3.4	D	B	B	B	B	B	B	B	D	B	A	A	A	A	A	A	A	
Ethylene Cyanohydrin	HOCH ₂ CH ₂ CN	1.04		B	B	B	B	D	B	B		A	D	A	A	A	A	A	A	A	
Ethylene Diamine	(CH ₂) ₂ (NH ₂) ₂	0.899	1.54	C	D	B	A	B	A	A	B	A	A	D	A	A	A	A	D	A	Note 1
Ethylene Dichloride	CH ₂ ClCH ₂ Cl	1.25	0.83	D	B	D	B	D	A	A	B	C	C	A	A	A	A	A	D	A	Anhydrous
Ethylene Glycol	(CH ₂ OH) ₂	1.15	2.18	A	B	B	A	B	B	B	B	A	A	A	A	A	A	A	A	A	
Ethylene Glycol Acetate	CH ₂₀₀ CH ₂						A		A			D	A	D	A	A	A	A	A	A	
Ethyl Oxide	Ether	0.714	0.23	B	B	B	A	B	A	A	A	D	C	C	A	A	A	A	A	A	Dry Liquid
Ethylene	H ₂ CCH ₂	0.610 @ 0°C		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Ethyl Tertiary Butyl Ether (ETBE)	C ₂ H ₅ OC ₄ H ₉			A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Fatty Acids				A	D	D	B	D	B	A	B	B	C	A	A	A	A	A	A	A	
Ferric Chloride	FeCl ₃	2.8		D	D	D	D	D	D	D	D	D	D	A	A	A	D	A	C	A	Hastelloy C
Ferric Sulphate	Fe ₂ (SO ₄) ₃ ·9H ₂ O	2.0-2.1		D	D	D	D	D	B	A	B	A	A	A	A	A	A	A	A	A	
Ferrous Chloride	FeCl ₂ ·4H ₂ O	1.93		D	D	D	D	D	D	D	D	A	A	A	A	A	D	A	B	A	
Ferrous Sulphate	FeSO ₄ ·7H ₂ O	1.89		D	B	D	D	D	B	A	A	A	A	A	A	A	A	A	A	A	
Fish Oil							A		A	A	A	A		A	A	A	A	A	A	A	
Flexol Plasticizer	DoP			A	A	A	A	A	B	B	B	D	B	B	A		A	A	A	A	
Formaldehyde (37%)	HCHO	1.075		B	A	C	C	C	A	A	B	C	B	D	A	A	A	B	A	A	Note 3
Formic Acid	HCOOH	1.22 @ 20°C		B	C	D	C	D	B	A	C	A	A		A	A	A		A	A	All Con- centration
Fruit Juices	Fructose			B	B	D	A	D	A	A	A	A		A	A	A	A	A	A	A	No SO ₂ Present
Furfural (25%)	C ₄ H ₃ OCHO	1.15	1.49	B	B	B	B	B	B	B	B	D	B	D	A	A	A	A	A	A	
Fertilizer Solutions	NH ₄ NO ₃ Phosphate KC ₁ NH ₄	0.811		D	D	A	A	A	A	A	A	A	A		A	A	A	A	A	A	Note 1
Freon-11, 12	CCl ₃ F			B	B	B	A	B	A	A	A	B	D	B	A	A	A	D	A	B	

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Chemicals	Formula	Sp. Gr. (60°F)	Typical Viscosity (60°F) (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Fuel Oils #1-#3		0.82-0.95		A	A	A	A	A	A		A	A	D	A	A	A	A	A	A	A	34-45 SSU
Fuel Oils #4-#6		0.82-0.95		A	A	A	A	A	A		A	A	D	A	A	A	A	A	A	A	50-3,000SSU
Gallic Acid	C ₆ H ₂ (OH) ₃ CO ₂ H	1.69		B	C	D	B	D	B	B	B	B	B	A	A	A	A	A	A	A	
Gasoline	C ₆ H ₁₄ -C ₁₀ H ₂	0.66-0.69		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Glass Water	Sodium Silicate			D	D	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	Note 1
Galuber's Salts	Sodium Sulfate	1.46		A	B	B	B	B	B	A	B	D	B	A	A	A	A	A	A	A	Note 1
Gluconic Acid	CH ₂ OH(CHON) ₄ COOH			B	B	B	B	A	B	B	B	A		A	A		A	A	A	A	
Glycerol (Glycerine)	C ₃ H ₅ (OH) ₃	1.260		A	A	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	2.950 SSU @ 68.6°F
Glyoxal	OHCHO	1.26		B	B	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	
Gypsum	CaSO ₄ ·2H ₂ O	2.31		B	B	B	B	B	A	A	A	A	A	A	A		A	A	A	A	
Glucose	Corn Syrup			A	A	B	A	B	A	A	A	A	A	A	A	A	A	A	A	A	67,500 SSU @ 100°F
Glycols	Ethanediol	1.11		B	B	D	A	B	A	A	B	A	A	A	A	A	A	A	A	A	90-240 SSU @ 70°F
Hempseed Oil		0.925													A		A	A	A	A	
Heptane	C ₇ H ₁₆	0.683	0.409	A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Hexadecane	(Cetane) C ₁₆ H ₃₄	0.773	3.3	A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Hexane	C ₆ H ₁₄	0.659	0.326	A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Hexyl Alcohol	C ₆ H ₁₃ OH	0.818		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Hexylene Glycol	C ₆ H ₁₂ (OH) ₂	0.921		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Hydraulic Oil	Petroleum Based		60.0	A	B	B	A	A	A	A	A	D	A	A	A	A		A	A	A	
Hydroidic Acid	HI	1.70		D	D	D	D	D	B	B	B		A	A		A		A		A	
Hydrobromic Acid (48%)	HBr	1.488		D	D	D	D	D	D	D	D	D	A	A	A	A	A	D	B	A	
Hydrochloric Acid-All Concentration Rubber, Glass-	HCl	1.19		D	D	D	D	D	D	D	D	D	C	A	A	D	D	D	A	A	Hastelloy A-Lined Vessels
Hydrocyanic Acid	HCN	0.697		A	D	B	D	A	B	B	B	B	A	A	A	A	A	D		A	
Hydrofluoric Acid	HF			D	D	D	D	D	D	D	D	D		B	D	A	A	D	B	A	Rubber, Lead Linings
Hydrogen Peroxide (30%)	H ₂ O ₂			D	D	D	D	D	A	A	B	B	A	A	A	A	A	A	A	A	Low Pressure and Temp.
Hydrogen Peroxide (70%)	H ₂ O ₂	1.46		D	D	D	D	D	A	A	A	D	C	A	A	A	A	A	A	A	SS Must be Passivated
Hydrogen Sulfide (N. Aq.)	H ₂ S	1.185		A	D	B	D	D	A	A	B	A	A	D	A	A	A	A	A	A	
Hydrogen Sulfide (Aq.)	H ₂ S	1.185		A	D	B	D	D	A	A	B	D	A	D	A	A	A	A	A	A	
Iron Potassium Sulfate	FeK(SO ₄) ₂ ·12H ₂ O	1.80		A	B	D	B	D	B	B	B	A	A	A	A		A	A	A	A	
Iso-Butane	(CH ₃) ₂ CHCH ₃	0.564		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Iso-Butanol	(CH ₃) ₂ CHCH ₂ OH	0.806	4.0	A	B	B	A	B	A	A	A	A	B	A	A	A	A	A	A	A	
Iso-Butylamine	(CH ₃) ₂ CHCH ₂ NH ₂	0.731	0.55	A	D	B	A	B	A	A		C	D	D	A	A	A	A	A	A	
Isobutyl Acetate	C ₄ H ₉ OOCC ₃ H ₇	0.868	0.7	A	B	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Iso-Decanol	C ₁₀ H ₂₁ OH	0.839		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Iso-Hexanol	C ₆ H ₁₃ OH	0.818		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Iso-Octane	C ₈ H ₁₈	0.691		A	A	B	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Iso-Pentane	(CH ₃) ₂ CHCH ₂ CH ₃	0.619	0.22	A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Iso-Propanol	C ₃ H ₇ OH	0.786	2.10	A	A	B	A	B	A	A	B	B	A	A	A	A	A	A	A	A	
Iso-Propyl Acetate	CH ₃ COOCH(CH ₃) ₂	0.869	0.49	A	C	C	A	B	B	B	B	D	B	D	A	A	A	A	A	A	
Iso-Propyl Ether	(CH ₃) ₂ CHOCH(CH ₃) ₂	0.723	0.32	A	A	B	A	A	A	A	A	B	D	D	A	A	A	A	A	A	
Iso-Propyl Amine	C ₃ H ₇ NH ₂	0.688		A	D	B	A	B	A	B	B		A		A	A	A	A	A	A	
Iso-Phorone	C ₉ H ₁₄ O	0.922	2.62	A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	

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Blank Space - Insufficient Information

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Iso-Valeric Acid	C ₅ H ₉ OOH	0.931											A		A		A	A		A	
Inks—Printers		1.00–1.38	500.0	B	C	D	A	D	B	A	B				A	A	A	A	A	A	
Jet Fuel	JP-4, JP-5, JP-6			A	B	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Gasoline-Kerosene Blend
Kerosene		0.802	30 SSU	A	A	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Ketone, Butylethyl	C ₇ H ₉ COC ₂ H ₅	0.819		A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Ketone, Diethyl	(C ₂ H ₅) ₂ CO	0.816		A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Ketone, Di-Iso-Propyl	C ₄ H ₈ CO			A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Ketone, Methyl Ethyl	CH ₃ COC ₂ H ₅	0.825	.40	A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Ketone (MIBK)	C ₄ H ₉ COCH ₃	0.804	0.59	A	A	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Lactic Acid	CH ₃ CHOHCOOH	1.2 @ 20°C		A	D	D	C	D	A	A	C	A	A	A	A	A	A	A	B	A	
Lacquer		0.900		A	A	D	A	D	A	A	A	A		A	A	A	A	A	A	A	
Lard Oil	Grease Oil	1.470		A	A	C	A	C	A	A	A	A	B	A	A	A	A	A	A	A	287 SSU @ 100°F - Note
3																					
Latex Sol (70%)	Ph 1.7		900.0						A	A	A	A		A	A	A	A	A	A	A	
Lauric Acid	CH ₃ (CH ₂) ₁₀ COOH	0.833		A	C	D	C	A	A	A	A	A		A	A	A	A	A	A	A	
Lecithin	1.0	5,000 SSU		A	A	C		C	A	A	A			A	A	A	A	A	A	A	
Ligroin	Petroleum Ether			A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Linoleic Acid	C ₁₀ H ₁₇ (CH ₂) ₇ COOH	0.905		A	B	B	C	B	A	A	B	B	D	B	A	A	A	A	A	A	
Linolenic Acid	(C ₁₀ H ₁₅ CH ₂) ₂ COOH	0.916		A	B	B	C	B	A	A	B	B	D	B	A	A	A	A		A	
Linseed Oil	Flaxseed Oil	0.931	33.0	A	B*	B*	A	B*	A	A	B	A		A	A	A	A	A	A	A	Corrosive if Free Acid Present
Liquefied Pet. Gas	L.P.G.			A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Liquid Feed	Morea	1.2	22.0					A	A	A	A		A	A	A	A		A	A	A	
Magnesium Hydroxide	Mg(OH) ₂	2.36		D	B	B	B	B	A	A	A	B	A	A	A	A	A	A	A	A	Note 1
Magnesium Chloride (10%)	MgCl ₂ ·6H ₂ O	1.56		D	D	B	B	B	A	A	C	A	A	A	A	A	A	B	A	A	
Magnesium Nitrate	Mg(NO ₃) ₂ ·6H ₂ O	1.46		B	C	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	Note 1
Magnesium Sulfate	Mg(SO ₄)·7H ₂ O	1.678		B	D	B	B	B	A	A	D	A	A	A	A	A	A	A	A	A	Note 1
Maize Oil									A	A	A	A		A	A	A	A	A	A	A	
Maleic Acid	(CHCOOH) ₂	1.59		B	B	B	C	B	A	A	B	D	D	A	A	A	A	A	A	A	
Malonic Acid	CH ₂ (COOH) ₂	1.63					C	A	A					A	A	A	A	A	A	A	
Menhaden Oil (10%)	Moss Bunker Oil	0.927–0.933	28.0				A	A	A					A	A	A	A	A	A	A	Viscosity @ 100°F
Mercuric Chloride	HgCl ₂	5.32		D	D	D	D	D	D	D	D	A	A	A	A		A		A	A	Titanium
Mesityl Oxide (Ketone)	(CH ₃) ₂ C ₃ HOCH ₃	0.863	0.60	B	B	B	A	A	B	B	B	D	B	D	A		A	A	A	A	
Methyl Acetate	CH ₃ COOCH ₃	0.924	0.38	A	C	C	B	B	B	B	B	D	B	D	A	A	A	A	A	A	Alloy 20
Methyl Acrylate	C ₃ H ₃ OOCH ₃	0.957		A	B	B	A	A	A	A	A	D	B	D	A	A	A	A	A	A	
Methyl Amine	CH ₃ NH ₂		0.23	B	D	B	B	B	B	B	B		A		A	A	A	A	A	A	Note 1
Methyl Amyl Acetate	C ₈ H ₁₆ O ₂	0.859		A	C	C	B	B	B	B	B		A	D	A	A	A	A	A	A	
Methyl Amyl Alcohol	C ₆ H ₁₃ OH	0.807		A	B	B	A	B	A	A	A		A		A	A	A	A	A	A	
Methyl Aniline	C ₆ H ₅ NH(CH ₃)	0.991	2.02	B	D	A	B	A	B	B	B	D	A	D	A	A	A	A	A	A	Note 1
Methyl Cellosolve	CH ₃ OCH ₂ CH ₂ OH			A	A	B	A	B	A	A	A	C	B	D		A	A	A	A	A	
Methyl Cyclohexane	C ₇ H ₁₄	0.769		A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	A	
Methyl Cyclo Hexanol	CH ₃ C ₆ H ₁₀ OH			A	B	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Methyl Glycol Acetate				A	C	C	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Methyl Methacrylate	CH ₂ C(CH ₃)COOCH ₃	0.940		A	A	A	A	A	A	A	A	D	D	D	A	A	A	A	A	A	
Methyl Pyrrolidone	CH ₃ NC ₃ H ₆ CO			D	D	A	A	A	A	A	A	D	A	D	A	A	A	A	A	A	
Methyl Salicylate	C ₆ H ₄ OHCOOCH ₃	1.180					A	A	A	A	D	B	C	A	A	A	A	A	A	A	

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Note 3: C or D rating given due to possible contamination of metered product by metal. Material compatibility may be satisfactory.

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Chemicals	Formula	Sp. Gr. (60°F)	Typical (60°F) Viscosity (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Methyl Teritary Butyl Ether (MTBE)	CH ₃ OC ₄ H ₉	0.74	.35	A	A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	
Methylene Chloride	CH ₂ Cl ₂	1.33	0.42	D	B	B	B	B	B	B	B	D	D	B	A		A	A	A	A	Note 1
Methylene Dichloride				C	B	B	B	B	B	B	B	D	D	B	A	A	A	A	A	A	Note 1
Methylene Glycol	CH ₂ (OH) ₂			B	B	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Milk	Lactic Acid	1.028–1.035	1.16				A		A	A	A	A	A	A	A		A	A	A	A	
Mineral Spirits	Naphtha			A	B	B	A	B	B	B		A	D	A	A	A	A	A	A	A	Note 2
Molasses (Crude)	Mother Liquor	1.40–1.46	151.5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Viscosity @ 130°F
Molasses (Edible)	Blackstrap	1.46–1.49	1320.0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Viscosity @ 130°F
Monochlorobenzene	C ₆ H ₅ CL	1.105		B	B	B	A	B	B	B	B	D	D	A	A	A	A	A	A	A	
Monoethanolamine				D	D	A	A	A	A	A	A	D	B	D	A	A	A	A	A	A	
Muriatic Acid	Hydrochloric			D	D	D	D	D	D	D	D	D	C	A	A	A	A	D	A	A	
Myristic Acid	CH ₃ (CH ₂) ₁₂ COOH	0.873		A	A	A	C	A	A	A	A			A		A	A	A	A	A	
Methane	CH ₄	0.554		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Naphtha (Aliphatic)		0.665		A	B	B	A	A	B	B	B	A	D	A	A	A	A	A	A	A	Note 2
Naphtha (Aromatic)		0.885–0.970		A	B	B	A	A	B	B	B	B	D	A	A	A	A	A	A	A	Note 2
Naphtha (V.M. and P.)				A	B	B	A	A	B	B	B	B	D	A	A	A	A	A	A	A	Note 2
Neatsfood Oil		0.916					A		A	A	A	A	B	A	A	A	A	A	A	A	230 SSU @ 100°F
Nickel Ammonium Sulfate (10%)	NiSO ₄ ·(NH ₄) ₂ ·6H ₂ O	1.92		D	D	D	D	D			D	A	A	A	A		A	A	A	A	Monel
Nickel Chloride (37%)	CiCl ₂ ·6H ₂ O	1.35		D	D	D	D	D	D	B	D	A	A	A	A		A	A	A	A	
Nickel Sulfate (25%)	NiSO ₄ ·6H ₂ O	1.20		D	B	D	D	D	A	A	A	A	A	A	A		A	A	A	A	
Nitro Benzene	C ₆ H ₅ NO ₂	1.198		B	B	B	A	A	B	B	B	D	D	B	A	A	A	C	B	A	
Nitro Ethane	C ₂ H ₅ NO ₂	1.052		A	A	A	A	A	A	A	A	D	B		A	A	A	C	B	A	
Nitro Propane	C ₃ H ₇ NO ₂	1.003		A	A	A	A	A	A	A	A	D	B	D	A	A	A	C	B	A	
Nonenes	C ₉ H ₁₈	0.743		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Nitric Acid (10%)	HNO ₃	1.074		B	D	D	D	D	A	A	B	D	D	A	A	A	A	A	B	A	
Nitric Acid (30%)	HNO ₃	1.186		D	D	D	D	D	A	A	B	D	D	A	A	D	A	D	A	A	
Nitric Acid (50%)	HNO ₃	1.318	0.76	D	D	D	D	D	A	A	B	D	D	B	A	D	A	D	A	A	
Nitric Acid (70%)	HNO ₃	1.421		D	D	D	D	D	A	A	B	D	D	B	A	D	A	D	B	A	
Nitric Acid (100%)	HNO ₃	1.502		A	D	D	D	D	A	A	D	D	D	B	A	D	A	D	B	D	
Nitrocumene	C ₆ H ₄ CH(CH ₃) ₂ NO ₂			C	D	B	B	B	B	B	B	B	C	D	A	A	A	A	A		
Nitro Fluorobenzene	C ₆ H ₄ NO ₂ FL		2.0	C	D	B	B	B	B	B	B	B	C	D	A	A	A	C	B		
N. Octane	C ₈ H ₁₈	0.702	0.54	A	A	A	A	A	A	A	A	B	D	A	A	A	A	A	A	A	
Oleic Acid (40%)	CH ₃ (CH ₂) ₁₄ C ₂ H ₂	0.890		D	D	D	C	D	A	A	B	C	D	B	A		A		A	A	Note 3
Oxalic Acid (50%)	(COOH) ₂	1.653		D	D	B	C	B	A	A	B	B	A	A	A		A	C	A	A	
Olive Oil	Sweet Oil	0.910	84.0	A	B	B	A	B	A	A	A	A	B	A	A	A	A	A	A	A	200 SSU @ 100°F
Oil-Lube			113.0	A	B	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Oils-Mineral				A	B	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Oils-Petroleum				A	B	B	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Oils-Water Emu.				A	A	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Ortho-Dichloro-Benzene	C ₆ H ₄ CL ₂	1.305		B	B	B	B	B	B	B	B	D	D	A	A	A	A	A	B	A	
Palmitic Acid	CH ₃ (CH ₂) ₁₄ COOH	0.841		B	B	C	C	C	B	B	B	A	D	A	A		A	A	A	A	
Palm Oil		0.924 @ 100°	44.0	A	B	C	A	C	B	B	B	A	C	A	A	A	A	A	A	A	
Paradyne				A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	

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Chemicals	Formula	Sp. Gr. (60°F)	Typical Viscosity (60°F) (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Paraffin		0.83–0.93		A	A	B	A	B	A	A	A	A	B	A	A	A	A	A	A	A	
Para-tert-Amyl Phenol	(CH ₃) ₂ C ₂ H ₅ CC ₆ H ₄ OH	0.955		A	A	B	A	B	A	A	A	D	A	A	A	A	A	B	B	A	
Para-tert-Butyl Phenol	(CH ₃) ₃ CC ₆ H ₄ OH	1.03		D	D	A	A	A	A	A	A	A		A	A	A	A		B	A	
Paratex	Water Softner			D	D	A	A	A	A	A	A	A		A	A	A	A	A	A	A	
Parathion	C ₁₀ H ₁₄ NO ₅ PS						A	A	A	A	A	A		A	A	A	A	A	A	A	
Peanut Oil		0.920 @ 100°	38.0	A	B	C	A	C	B	B	B	A	C	A	A	A	A	A	A	A	
Pear Oil	Amyl Acetate	0.879	0.89	A	B	C	A	C	B	B	B	D	A	D	A	A	A	A	A	A	Note 3
Pentane	C ₅ H ₁₂	0.626		A	B	B	A	B	B	B	B	A	D	A	A	A	A	A	A	A	
Perchloroethylene	C ₂ Cl ₄	1.65	0.84	B	C	B	A	A	A	A	A	B	D	A	A	A	A	A	A	A	
Perilla Oil		0.932		A	B	B	A	B	A	A	B	A	A	A	A		A	A	A	A	
Petroleum Ether	Ligroin	0.665		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Petroleum Spirits	Naphtha			A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Phenolic Resins				A	C	C	A	C	A	A	A	A	B	A	A	A	A	A	A	A	
Phenol (20%)	C ₆ H ₅ OH	1.07	12.7	A	A	B	A	B	A	A	B	D	A	A	A	A	A	D	A	A	Use SS to Prevent Product Discoloration
Phosphoric Acid (10%)	H ₃ PO ₄	1.053		D	D	D	D	D	B	B	B	D	D	A	A	A	A	A	A	A	
Phosphoric Acid (25%)	H ₃ PO ₄	1.152		D	D	D	D	D	B	B	D	D	D	A	A	A	A	A	A	A	Most Concentrations Use Hastelloy, Alloy 20
Phosphoric Acid (75%)	H ₃ PO ₄	1.579		D	D	D	D	D	D	B	D	D	D	A	A	A	A	A	A	A	
Phthalic Acid	C ₆ H ₄ (CO ₂ H) ₂	1.58		B	B	C	C	D	B	B	B	C	C	A	A		A	A	A	A	
Phthalic Anhydride	C ₆ H ₄ (CO) ₂	1.527		B	B	C	B	D	B	B	B	C	C	A	A	A	A	A	A	A	
Picric Acid	C ₆ H ₂ (NO ₂) ₃ OH	1.76		C	D		C		A	A		A	A	A	A	A	A	A	A	A	
Polyethylene Glycol	H(OC ₂ H ₄)NOH			A	B	B	A	B	B	B	B	A	A	A	A	A	A	A	A	A	
Polyester Resin				D	D	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Polypropylene Glycol	CH ₃ CHOH (CH ₂ OCHCH ₂) _n -CH ₂ OH			A	B	B	A	B	B	B	B	A	A	A	A	A	A	A	A	A	
Polyvinyl Acetate	(H ₂ C ₂ HOOC ₂ H ₃)	1.19		A	A	A	A	B	A	A	A		A		A		A	A	A	A	
Polyvinyl Acetate Emulsion	PVac+H ₂ O			A	A	A	A	B	A	A	A		A		A	A	A	A	A	A	
Polyvinyl Alcohol	(CH ₂ CHOH) _x	1.98	2000.0	A	B	A	A	A	A	A	A	A		A	A	A	A	A	A	A	
Polymerized Gasoline				A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Potassium Chloride	KCl	1.98		D	B	C	C	C	A	A	B	A	A	A	A	A	D	A	A	A	Note 1
Potassium Aluminum Sulfate	AlK(SO ₄) ₂ ·12H ₂ O	1.75		B	B	C	C	C	A	A	B	A	A	A	A	A	A	A	A	A	Note 1
Potassium Cyanide (25%)	KCN	1.52		D	D	D	D	B	A	A	B	A	A	A	A		A		A	A	Note 1
Potassium Hydroxide (25%)	KOH	2.044		D	D	B	B	B	B	B	B	B	A	D	A	A	A	A	A	A	Note 1
Potassium Hydroxide	KOH			D	D	D	B	D	A	A	A	B	A	D	A	A	A	A	A	A	Note 1
Potassium Sulfate	K ₂ SO ₄	2.66		B	B	C	B	B	B	B	B	A	A	A	A	A	A	A	A	A	Note 1
Potassium Sulfide	K ₂ S	1.80		B	D	D	B	D	B	B	B	A	A	A	A	A	A	A	A	A	Note 1
Potash (Aq.)	K ₂ CO ₃	2.33		C		A	B	A	A	A	B	A	A	A	A	A	A	A	A	A	Note 1
Propane	C ₃ H ₈	0.531		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	Note 2
Propionic Acid (20%)	CH ₃ CH ₂ CO ₂ H	0.994		B	B	D	C	D	B	B	D		A		A	A	A	A	A	A	
Propylene	C ₃ H ₇	0.513		A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	Note 2
Propylene Diamine	C ₃ H ₆ (NH ₂) ₂	0.873	1.70	B	B	B	A	B	A	A		D	D	D	A	A	A	A	A	A	
Propylene Glycol	C ₃ H ₆ (OH) ₂	1.038	58.0	A	B	B	A	B	B	B	B	A	A	A	A	A	A	A	A	A	
Propylene Oxide	C ₃ H ₆ O	0.830		B	B	B	A	B	A	A	B	D	B	D	A	A	A	A	A	A	
Prussic Acid	HCN	0.697		A	D	B	C	A	B	B	B	B	A	A	A		A		A	A	
Pyridine	N(CH) ₄ CH	0.978		A	B	B	B	B	A	A	B	D	B	D	A	B	A	A	A	A	

Note 1: Avoid dissimilar metals.

Note 2: For rotary meters recommend LPG trim.

Note 3: C or D rating given due to possible contamination of metered product by metal. Material compatibility may be satisfactory.

A - Excellent B - Good C - Poor
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Blank Space - Insufficient Information

Chemicals	Formula	Sp. Gr. (60°F)	Typical (60°F) Viscosity (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Pyrogallic Acid	C ₆ H ₃ (OH) ₃	1.463		B	B	D	C	D	B	B	B	B	B	A	A		A	A	A	A	
Pyrrrolidine	C ₄ H ₉ N	0.866		B	B	B	A	B	A	A	B	D	A	D	A		A	A	A		
Rayon (Spun Viscose)				B	B	B	A	B	A	A	B		A		A		A	A	A	A	40,000 SSU @ 80°F
Raffinate		0.712		A	A	A	A	A	A	A	A			A	A		A	A	A	A	
Resins and Rosins				B	B	C	A	C	B	B	B	A		A	A	A	A	A	A	A	Note 3
Ricinoleic Acid	C ₁₈ H ₃₂ O(OH) ₂	0.940		B	A	A	C	A	A	A	A			A		A	A	A	A	A	Not Over 21°F
Rotograde-Ink				D	D	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	
Rubber Solvent				A	A	A	A	A	A	A	A			A	A		A	A	A	A	100,000 SSU
Salicylic Acid	C ₆ H ₄ (OH)(COOH)	1.48	2.71	C	C	D	C	D	A	A	B	B	A	A	A	A	A	A	A	A	
Shellacol				A	A	B	A	A	A	A	A			A	A	A	A	A	A	A	
Shortening							A		A	A	A			A	A	A	A	A	A	A	Note 3
Sodium Aluminate	Na ₂ Al ₂ O ₄			C	B	C	B	C	B	A	B	A	A	A	A	A	A	A	A	A	
Soap Solutions (0-20%)	Stearates			C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium Bicarbonate (50%)	NaHCO ₃	1.019-1.108		D	B	B	B	B	A	A	B	A	A	A	A	A	A	A	A	A	Note 1
Sodium Carbonate (0-20%)		1.146		D	D	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium Chloride (30%)	NaCl	1.012-1.164		D	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	Pitting may Occur
Sodium Chromate	NaCrO ₄	1.261		B	B	B	B	B	B	B	B	A	A	A	A	A	D	A	A	A	
Sodium Cyanide	NaCn			D	D	B	D	D	A	A	B	A	A		A	A	A		A	A	Note 1
Sodium Hydroxide (20%)	NaOH	1.219		D	A	A	A	A	A	A	A	B	A	B	A	A	A	A	A	A	Note 1
Sodium Hydroxide (30%)	Caustic	1.262		D	A	A	A	A	A	A	A	B	A	B	A	A	A	A	A	A	Note 1
Sodium Hydroxide (50%)	Soda	1.525		D	D	B	C	B	B	B	B	B	A	B	A	A	A	A	A	A	Note 1
Sodium Hydroxide (70%)	Soda	1.788		D	D	D	C	D	B	B	B	B	A	B	A	A	A	A	A	A	Note 1
Sodium Hypochlorite (5%)	NaOCl			D	D	D	C	D	D	D	D	B	B	A	A	A	A	A	A	A	Hastelloy C
Sodium Meta Phosphate	NaPO ₃			D	B	B	B	D	B	B	B	A	A	A	A		A	A	A	A	Note 1
Sodium Metasilicate	Na ₂ SiO ₃	2.61		D	D	B	C	B	A	A	A	A	A	A	A	A	A	A	A	A	No Brass
Sodium Monochloro Acetic Acid	NaCH ₃ COOCL	1.328		D	D	D	D	D	A	A	A	D	D	A	A	A	A	A	A	A	
Sodium Nitrate	NaNO ₃	1.36		A	B	B	C	B	A	A	B	B	A		A	A	A	A	A	A	Note 1
Sodium Perborate (10%)	NaBO ₂			D	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	
Sodium Peroxide (10%)	Na ₂ O ₂	2.80		C	D	C	B	B	A	A	B	B	A	A	A	A	A	A	A	A	Note 1
Sodium Phosphate (5%)	Na ₂ HPO ₄	1.52		D	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	Note 1
Sodium Silicate	Na ₂ O-SiO ₂	1.56		D	D	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	Note 1
Sodium Sulfate (0-50%)	Na ₂ SO ₄	1.047		A	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	Note 1
Sodium Sulfide	Na ₂ S·5H ₂ O	1.02-1.36		D	D	C	B	C	B	B	B	A	A	A	A	A	A	A	A	A	Note 1
Sodium Thiosulfate (25%)	Na ₂ S ₂ O ₃	1.232		A	B	D	B	D	B	B	B	B	A	A	A	A	A	A	A	A	Pitting may Occur
Sodium Xylene Sulfonate	(CH ₃) ₂ C ₆ H ₃ SO ₃ Na-H ₂ O			A	B	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	
Solvesso-100-150 Aromatic Solvents		0.889	1.17	A	A	A	A	A	A	A	A	C	D	A	A	A	A	A	A	A	
Soybean Oil		0.924	40.6	B	B	D	A	D	A	A	A	A	D	A	A	A	A	A	A	A	No Cad. Plating - Note 3
Stoddard's Solvent		0.780		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Soups							A		A	A				A	A	A	A	A	A	A	
Sperm Oil		0.878	42.0				A		A	A				A	A	A	A	A	A	A	110 SSU & 100°F
Stannic Chloride	SnCl ₄	1.21		D	D	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A	
Stannous Chloride	SnCl ₂	2.71		D	D	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A	
Starch	(C ₆ H ₁₀ O ₅) _n	1.5		B	B	A	A	A	A	A	A		B	A	A	A	A	A	A	A	Visc. 100-100,000 SSU

Note 1: Avoid dissimilar metals.

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A - Excellent B - Good C - Poor
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Blank Space - Insufficient Information

Chemicals	Formula	Sp. Gr. (60°F)	Typical (60°F) Viscosity (CPS)	Aluminum	Bronze	Cast Iron	Tungsten Carb.	Carbon Steel	304SS-17-4PhSS	316 SS	440CSS	Buna-N	EPR	Viton	Teflon	Ryton	Carbon	Peek	Hastelloy C-276	Chemraz	Remarks
Steam Condensate				A	A	A	A	A	A	A	A	D	A	C	A	A	A	A	A	A	
Stearic Acid	CH ₃ (CH ₂) ₁₆ CO ₂ H	0.839		B	C	C	C	C	A	A	B	B	B		A	A	A	A	A	A	
Styrene	C ₆ H ₅ CHCH ₂	0.904		A	B	A	A	A	A	A	A	D	D	B	A	A	A	A	A	A	
Sugar Solutions	Glucose		2.8 x 10 ⁶	A	A	D	A	B	A	A	A	A	A	A	A	A	A	A	A	A	
Sulfate Liquors				D	D	B	A	B	B	A	B	B	A	A	A	A	A	A	A	A	
Sulfonic Acid	C ₆ H ₅ HSO ₃			D	B	D	C	D	B	B	B				A		A	A	B	A	
Sulfur	S	2.06	10.94	A	D	A	B	A	A	A	B	D	D	C	A		A	A	A	A	All Iron Up to 350°F
Sulfur Dioxide	SO ₂		@ 120°C	B	B	B	B	B	B	D	D	B	A	A	A	A		A	A		
Sulfuric Acid (0-7%)	H ₂ SO ₄	1.074		D	D	D	C	D	D	B	D	D	D	A	A	A	A	A	A	A	Hastelloy B, C, D
Sulfuric Acid (30%)	H ₂ SO ₄	1.228		D	D	D	D	D	D	D	D	D	D	A	A	A	A	A	A	A	Rubber or Glass-Lined Equip. Needed
Sulfuric Acid (50%)	H ₂ SO ₄	1.407		D	D	D	D	D	D	D	D	D	D	A	A	A	A	D	A	A	
Sulfuric Acid (85%)	H ₂ SO ₄	1.790		D	D	B	D	B	B	A	D	D	D	A	A	D	D	D	A	A	
Sulfuric Acid (93%)	H ₂ SO ₄	1.835	23.0	D	D	B	D	B	B	A	C	D	D	A	A	D	D	D	A	A	
Sulfurized Oil				B	D	B	B	B	B	B	B	D	D	D	A	A	A	A	A	A	
Tall Oil	Liquid Rosin			D	B	B	A	B	B	B	B	B	D	A	A	A	A	A	A	A	
Tallow—Oil				B			A	A	A	A	A	A		A	A	A	A	A	A	A	
Tar Oil	Creosote	1.04-1.10	12.0	B	A	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Tannic Acid (10%)	C ₁₄ H ₁₀ O ₉	1.04		C	B	C	C	C	A	A	B	A	A	A	A	A	A	A	A	A	
Tergitol Nonionic NPX	Phenyl Ether	1.063	373 cks			D	A	D	A	A	A				A	A	A	A	A	A	
Teritary Amyl Methyl Ether	C ₅ H ₁₁ OC ₄ H ₉			A	A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	
Tetrahydrofuran	C ₄ H ₈ O	0.880		A	A	A	A	A	A	A	A	D	A	D	A	A	A		A	A	
Tetra Methyl Benzene	(CH ₃) ₄ C ₆ H ₂	0.896		A	A	A	A	A	A	A	A	A		A	A	A	A	A		A	
Tetrapropylene	C ₁₂ H ₂₄	0.770		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A		A	
Textile Spirits		0.689		A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A	
Titanium Sulfate (10%)	(TiSO ₄) ₂ ·9H ₂ O	1.47		D	B	D	B	D	B	B	D						A			B	Hygroscopic
Toluene	C ₆ H ₅ CH ₃	0.866	0.59	A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	
Toluene Diisocynate	CH ₃ C ₆ H ₃ (NCO) ₂	1.22	38-750 SSU	D	D	A	A	A	A	A	A	D	A	B	A	A	A	A	A	A	
Tomato Paste				B	C	C	A	C	A	A	A	D	A	D	A	A	A	A	A	A	
Tri-Chloro-Acetic Acid	CCl ₃ COOH	1.62		D	D	D	D	D	D	D	D	B	B	C	A	A	A		A	A	Glass Linings Needed
Trichloro Ethane (Dry)	C ₂ H ₃ Cl ₃	1.44	1.20	A	A	A	A	A	A	A	A	D	D	A	A	C	A	A	A	A	No Water
Trichloroethylene	C ₂ HCl ₃	1.45	0.55	A	B	B	A	B	B	B	B	D	D	A	A	C	A	A	A	A	
Triclene D	Trichloroethylene	1.45	0.55	A	B	B	A	B	B	B	B	D	D	A	A	C	A	A	A	A	
Tri-Decyl Alcohol	C ₁₂ H ₂₅ CH ₂ OH	0.845		A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	
Triethanol Amine	(HOCH ₂ CH ₂) ₃ N	1.12	500 SSU	A	D	A	A	A	A	A	A	B	B	D	A	A	A	A	A	A	Note 1
Triethylene Glycol	HO(C ₂ H ₄ O) ₃ H	1.12	0.47	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Trimethylamine	(CH ₃) ₃ N	0.662		A	D	A	A	A	A	A	A	B	A	D	A	A	A	A	A	A	Note 1
Triethylene Tetraamine	Na ₃ PO ₄ ·10H ₂ O	2.53		D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Tri-Sodium Phosphate	Na ₃ PO ₄ ·10H ₂ O	2.53		D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Triton X-100	Surfactant		34.0	A	A	A	A	A	A	A	B	A		A	A	A	A	A	A	A	
Tuna Fish Oil				B	D	B	A	B	A	A	A	A		A	A	A	A	A	A	A	
Tung Oil	Wood Oil	0.936		B	B	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Turpentine	C ₁₀ H ₁₆	0.87	1.48	A	B	B	A	B	A	A	A	A	D	A	A	A	A	A	A	A	
Urea	CO(NH ₂) ₂	1.335		B	D	C	A	C	B	B	B	A	B		A	A	A	A	B	A	
Urea Formaldehyde				D	D	A	A	A	A	A	A	A		A	A	A	A	A	A	A	

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Uran-Poly-N	Fertilizer			D	D	A	A	A	A	A	A	A		A	A	A	A	A	A	A	Note 1
Varnish	Spar	0.900	281.0	A	A	C	A	C	A	A	A	B	D	A	A	A	A	A	A	A	
Vegetable Oil				A	B	B	A	B	A	A	B	A	A	A	A	A	A	A	A	A	No Cad. Plating
Vinyl Acetate	CH ₃ COOCHCH ₂	0.933		D	D	A	B	A	A	A	A		A	D	A	A	A	A	A	A	
Vinyl Chloride	CH ₂ CHCl	0.912		D	D	A	B	A	A	A	A			A	A	D	A	A	A	A	
Vinegar	4% Acetic Acid	1.04		C	B	D	C	D	A	A	D	B	A	A	A	A	A	A	A	A	
Water (Distilled)	H ₂ O	1.00		A	A	D	B	D	A	A	A	A	A	D	A	A	A	A	A	A	
Water-Sea	H ₂ O	1.025		B	B	D	B	D	A	A	C	A	A	D	A	A	A	A	A	A	Note 1
Water-Fresh	H ₂ O	1.00		A	A	C	B	C	A	A	A	A	A	D	A	A	A	A	A	A	Note 1
Whiskey and Wine				D	A	D	A	D	A	A	A	A	A	A	A	A	A	A	A	A	SS Preferred
Xylene	C ₆ H ₄ (CH ₃) ₂	0.868	0.620	A	A	A	A	A	A	A	A	D	D	A	A	A	A	A	A	A	
Zeolites	Hydrated Silicates			D	D	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	Note 1
Zinc Sulfate	ZnSO ₄	1.966		D	C	B	B	B	A	A	C	A	A	A	A	A	A	A	A	A	
Zinc Chloride	ZnCl ₂	2.91		D	D	C	D	D	D	D	D	A	A	A	A	A	A	A	A	A	

Note 1: Avoid dissimilar metals.

Revisions included in AB0A002 Issue/Rev. 0.2 (12/96):

Included Update AB0A002U1 which added Master Gasket, Gylon, Gore Tex, and Chemraz Sealants; and Electroless Nickel, Hard Chrome, and Austenitic Stainless Steel Platings.

Added Ethyl Teritary Butyl Ether (ETBE), Methyl Teritary Butyl Ether (MTBE), and Teritary Amyl Methyl Ether to the list , of Chemicals.

Added Peek, Chemraz, and Hastelloy C-276 to list of Metals.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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