Chemical Resistance of Materials

A = Excellent (No Effect) B = Good (Minor Effect) C = Fair (Moderate Effect) D = Poor (Severe Effect)

Qualifiers: • 1 = Satisfactory to 72°F (22°C) • 2 = Satisfactory to 120°F (48°C)

SS = Stainless Steel

Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
Acetaldehyde	C	C	A	C1	A1	D	A
Acetamide	A	A	A	D	A1	C	A
Acetate Solvent	A	A	A	-	B1	A	A
Acetic Acid:							
80%	A	D	D	B1	A	C	B
20%	A	A	D	A1	A	A	A
Glacial	A	D	B	B1	A1	A1	A
Vapors	-	-	D	-	-	A	D
Acetone	D	B1	A	D	A	D	A
Acetylene	-	D	A	D	A1	A	A
Acrylonitrile	A	A	A1	D	A1	A1	A1
Alcohols:							
Benzyl	B	D	B1	-	A	A	B
Ethyl	A	B	A1	B2	A	-	A
Isopropyl	A	A2	D	A2	A2	-	B
Methyl	A	A1	B1	B1	A2	A	A
Propyl	-	A2	D	-	A	A2	A
Allyl Chloride	A	-	-	-	A	A	A
Aluminum Fluoride	A	A2	A1	-	A	A	D
Aluminum Hydroxide	A	A2	A1	B1	A	A	C1
Aluminum Nitrate	-	A2	A1	A1	A2	A2	A
Aluminum Sulfate	A	A2	A2	A	A	A	B2
Alums	-	A	A	-	A	-	A
Aluminum Sulfate	A	A2	A2	A	A	A	B2
Amines	B	C1	D	D	B2	-	A
Ammonia 10%	A	C1	A	D	A2	A	A
Ammonia, Anhydrous	A	B2	A1	D	A	A	A2
Ammonia, liquid	A	C1	B1	D	A2	A	A2
Ammonium Acetate	A	A	A	-	A	-	A
Ammonium Bifluoride	-	A2	-	-	A	A	B1
Ammonium Carbonate	B	B2	A1	-	A	A	B
Ammonium Chloride	A	A2	B	A2	A	A	B2
Ammonium Hydroxide	A	A1	A	D	A	A	A1
Ammonium Nitrate	A	A1	A1	-	A	A	A
Ammonium Persulfate	A	A2	D	-	A	A1	B
Ammonium Phosphate:							
Dibasic	-	A2	C1	A2	A	A	C
Monobasic	-	A	B	-	A	-	C
Tribasic	-	C	B	-	A	-	B
Ammonium Sulfate	A	A1	A1	A2	A	A	B
Ammonium Thiosulfate	-	A	-	-	-	-	A

Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
Amyl Alcohol	A	B2	A1	B1	B1	A	A
Aqua Regia 80% HCL-20% HNO_3	D	B1	D	D	B1	A2	D
Asphalt	-	A1	A	D	B1	A	A
Barium Hydroxide	-	B2	A1	D	B	A	B
Barium Sulfate	B	B2	A1	D	B1	A	B1
Barium Sulfide	A	B2	A1	-	B	A	B2
Beer	A	A2	A1	A2	A1	A	A
Benzaldehyde	B	A1	A1	D	D	A2	B
Benzene	D	D	A1	D	D	A2	B
Benzene Sulfonic Acid	A	A1	D	D	D	-	B
Benzoic Acid	A	A1	D	B1	B1	A	B
Benzyl Chloride	-	-	A2	-	C1	-	B1
Bleach	-	-	A	-	D	A	A
Borax (Sodium Borate)	A	A2	A	-	B	A	A
Boric Acid	A	A2	B	-	A	A	A1
Bromine	D	D	D	C1	D	A	D
Butadiene	D	D	C1	D	C	A	A1
Butane	-	C1	A2	D	A1	A	A2
Butanol (Butyl Alcohol)	-	B2	B1	B1	A1	A	A1
Butyl Amine	-	C1	A2	D	B1	A1	A
Butyl Ether	-	-	A2	-	D	A1	A1
Butylene	-	B1	B1	D	-	A	A
Butyric Acid	D	D	C1	D	B1	A	B2
Calcium Carbonate	-	B1	A	C2	A	A	B
Calcium Chloride 30% in water	A	B2	A1	-	A2	A	B2
Calcium Hydroxide 10%	A	-	A	-	A	A	B
Calcium Hydroxide (saturated)	A	-	A	-	A	A	B
Calcium Hypochlorite 30%	A	-	-	-	A	A	B
Calcium Nitrate	B	A1	A1	A2	A2	A2	B2
Calcium Oxide	-	B1	B	-	A	A	A
Calcium Sulfate	A	B1	D	A2	A	A	B
Carbolic Acid (Phenol)	-	D	D	D	B	A1	B
Carbon Dioxide (Dry)	-	A1	A1	-	A2	A	A1
Carbon Monoxide	-	A2	A1	-	A	B	A
Carbonated Water	-	A	A	-	B	-	A
Carbonic Acid	B	B2	A1	A1	A	A	A
Chlorine Water	C	B1	C1	-	D	B	C
Chlorine, Anhydrous Liquid	C	D	D	C	D	A1	C
Chlorine (dry)	B	D	D	-	D	A	B
Chloroacetic Acid	A	D	D	D	C1	A1	A1
Chlorobenzene (Mono)	D	C1	D	D	C1	A1	B

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Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
Chlorobromomethane	-	A	C	-	A	-	-
Chlorosulfonic Acid	D	D	D	C1	D	D	B2
Citric Acid	A	D	A1	A1	A	A	A2
Citric Oils	B	-	-	-	A	-	A
Clorox® (Bleach)	-	-	A	-	D	A	-
Coffee	-	-	A	-	A	-	A
Copper Chloride	-	-	D	-	A	A	D
Copper Sulfate 5%	A	A2	D	A1	A	A	B
Cresols	D	C1	D	D	D	A2	A
Cyclohexane	D	B1	A	B	D	A	A
Cyclohexanone	B	D	A	D	D	D	A2
Detergents	A	D	A1	A1	A	A	A1
Dextrin	A	-	-	-	A	A	B
Diacetone Alcohol	A	A	A1	D	A1	D	B
Dichloroethane	C	C1	A1	D	D	A	B
Diesel Fuel	D	C1	D	A2	A1	A	A1
Diethyl Ether	D	-	A1	D	A1	A1	B2
Diethylamine	D	D	A	D	A1	D	A
Disodium Phosphate	A	-	-	-	A	A	A
Ethane	-	-	D	-	D	A	A1
Ethanol	A	B	A1	B2	A	-	A
Ethanolamine	-	-	A	-	D	C1	A
Ether	D	D	A	-	D	B1	A
Ethyl Acetate	A	A	A2	D	A1	D	B
Ethyl Benzoate	B	C2	-	D	B1	D	-
Ethyl Chloride	C	C1	A1	D	D	A	A
Ethyl Ether	D	D	A1	-	D	A2	B
Ethylene Glycol	A	A2	A	B1	A	A	B
Ethylene Oxide	B	A	A1	C1	D	A	B
Fatty Acids	A	D	A1	B1	A	A	A
Ferric Chloride	D	A1	A	A2	A	A	D
Ferric Nitrate	-	A2	A1	A1	A	A	B
Ferric Sulfate	-	A2	A1	A1	A	A	A
Ferrous Sulfate	-	A2	D	A1	A	A	B
Formaldehyde 40%	A	D	A	A1	A	A	A
Formic Acid	A	D	D	A1	A1	A	A1
Fruit Juice	-	A	A	-	B	A	A
Fuel Oils	C	B	A1	B1	A	B	A
Furfural	A	D	B	D	D	B2	B
Gallic Acid	A	A	A	-	A	A1	B
Gasoline (high-aromatic)	B	A	A	A	A	A	A

Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
Gasoline, unleaded	B	-	A2	A2	C1	A	A2
Glucose	A	A2	A	A1	A	A	A
Glue, P.V.A	A	A1	A1	-	-	-	A2
Glycerine	A	A1	A1	A2	A	A	A
Glycolic Acid	-	A2	-	-	A	B	A
Heptane	B	B1	A	B	C2	A	A
Hexane	C	D	B	D	B1	A	A
Honey	-	B	A	A1	A	A	A
Hydraulic Oil (petroleum)	A	C	A1	-	D	A	A
Hydraulic Oil (synthetic)	A	A	A1	-	D	A	A
Hydrazine	D	-	-	D	C	A	A
Hydrochloric Acid 20%	A	A2	D	B1	B2	A	D
Hydrochloric Acid 100%	D	-	D	D	B1	A	D
Hydrofluoric Acid 50%	A	A1	D	D	A2	A	D
Hydrofluosilicic Acid 20%	B	B2	D	-	A	A	B1
Hydrogen Gas	A	A2	A2	A2	A	A	A
Hydrogen Peroxide 10%	A	A	C1	A2	A	A	B
Hydrogen Peroxide 50%	A	C2	D	A2	B1	A1	A2
Hydrogen Sulfide (aqua)	A	A	C1	A	A1	A	A
Hydroquinone	-	A	D	-	A	-	B
Hydroxyacetic Acid 70%	-	A	-	-	-	A	-
Iodine	B	A1	A	-	C	A2	D
Iodine (in alcohol)	B	B	C	-	-	A	-
isooctane	B	B	A1	B1	A2	A2	A1
Isopropyl Acetate	B	B1	B1	D	B1	D	A
Jet Fuel (JP3, JP4. JP5)	D	D	C	A1	A1	B	A
Kerosene	B	C1	A	D	B	A	A
Ketones	D	C1	A2	D	C	C1	A
Lacquer Thinner	D	A	A1	B	D	-	A
Lacquer	D	A	A1	D	D	D	A
Lactic Acid	A	A1	B	B	B	B1	B1
Latex	-	-	A1	-	A2	A	A2
Ligroin	-	A	D	-	A2	A	A
Lime	-	A	A1	-	-	A	A
Llinoleic Acid	-	A	-	-	B1	A2	A
Lithium Hydroxide	D	-	-	D	-	-	B
Lubricants	B	D	A1	A1	A1	A	A2
KOH Potassium Hydroxide	B	A	C	D	A	A	A1
NaOH Sodium Hydroxide	B	D	A	D	A	D	B1
Magnesium Bisulfate	-	-	A1	A1	A2	-	A
Magnesium Chloride	A	A1	A1	A2	A2	A	D

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Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
Magnesium Hydroxide	B	A2	B1	A1	A	A	A1
Malic Acid	-	B2	A	-	A1	A	A2
Methane	-	-	A	-	A	A	A
Methanol (Methyl Alcohol)	A	A1	B1	B1	A2	A	A
Methyl Alcohol 10%	A	A1	B1	B1	A2	A	A
Methyl Cellosolve	-	-	C	D	B	A	B
Methyl Chloride	-	C1	B1	D	D	A	A
Methyl Ethyl Ketone	D	D	A1	D	B2	D	A
Methyl Isobutyl Ketone	D	C	B2	D	A	D	B
Methyl Isopropyl Ketone	-	D	A	D	-	-	A
Methyamine	-	A1	-	-	A2	C	A
Methylene Chloride	D	D	C1	D	B1	B1	B
Milk	-	A	A	A	B	A2	A
Mineral Spirits	D	B	A	C	B	-	A
Monochloroacetic Acid	D	-	D	D	-	B1	A1
Monoethanolamine	-	C	A	-	B	C	A
Morpholine	-	-	A2	D	B2	B1	A1
Motor Oil	-	C1	A2	A	A1	B	A2
Naphtha	-	A1	A	B	B	A	A
Natural Gas	-	A	-	-	A	-	A
Nitric Acid (5-10%)	A	B	D	A	A	A1	A
Nitric Acid (20%)	B	C	D	B1	A2	A	A
Nitric Acid (50%)	D	B1	D	B	B	A1	A1
Nitrobenzene	D	C1	B1	D	B1	A1	B
Nitromethane	D	A	B1	D	B2	A2	A1
Nitrous Oxide	-	C	C	-	D	D	B
Oils:							
Citric	-	A	A	A	A	A	A
Corn	-	A	A	-	A2	A	A
Cottonseed	-	A	B	-	A	A	A
Crude Oil	D	-	A	-	A	A	A
Fuel (1, 2, 3, 5A, 5B, 6)	-	B	A	B	B	B	A
Diesel Fuel (20, 30, 40, 50)	-	A	A	-	A1	A	A
Silicone	A	A	A1	-	A	A	A
Turbine	-	C	A	-	B1	A	A
Oleic Acid	C	C2	A	-	B1	A	A
Oxalic Acid (cold)	A	A2	B2	-	A2	B	A
Ozone	A	C1	D	A1	B	A	A
Palmitic Acid	-	-	A	-	B1	A2	A1
Paraffin	B	B	A1	A1	A1	A	A
Pentane	-	D	A1	A	D	A	A

Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
Perchloric Acid	D	B	D	-	C	A	C
Petroleum	D	C1	A1	-	B1	A	A1
Phenol (10%)	D	B	D	B1	B1	A	B
Phenol (Carbolic Acid)	D	D	D	D	B	A1	B
Phosphoric Acid (<40%)	A	A	B1	A	A2	B	C
Phosphoric Acid (>40%)	A	B1	B1	A	A2	B	D
Plating Solutions							
Copper Sulfate Bath R.T.	-	-	D	-	A	A	D
Gold Plating (Acid 75°F)	-	-	A	-	A	-	C
Silver Plating (80°F-120°F)	-	-	A	-	A	-	A
Potassium Bicarbonate	B	A	A1	-	A	B	B
Potassium Bromide	B	A	A1	A1	A	A	B
Potassium Chloride	A	A1	A1	A	A	A	A1
Potassium Dichromate	B	A	B1	A1	A	A	B1
Potassium Ferricyanide	-	A2	B1	-	A2	A2	B1
Potassium Hydroxide	A	A	C1	D	A	A	A1
Potassium Iodide	B	B1	A1	-	A2	A2	A1
Potassium Nitrate	B	A	B1	A1	A	A	B
Potassium Permanganate	A	A	D	A2	A1	A	B
Propane (liquefied)	D	C1	A1	C1	A	A	A
Propylene Glycol	A	B2	A	B1	A2	-	B
Pyridine	D	B1	C1	D	A2	D	A
Resorcinal	-	B2	D	B1	A2	-	-
Rosins	B	B1	A1	-	A2	-	A1
Salicylic Acid	-	B2	A1	A1	A1	A	B2
Sea Water	A	A2	A2	A2	A	A	C
Shellac (Orange)	-	A1	A1	-	A	-	A
Silicone	-	-	A1	A2	A	A	A
Silver Bromide	-	A	-	-	-	-	D
Silver Nitrate	A	A	A1	A2	A1	A	B
Soap Solutions	B	D	A1	A1	A	A1	A1
Sodium Acetate	A	A	B1	A1	A	A	B1
Sodium Benzoate	B	A2	B1	A2	A2	A2	-
Sodium Bicarbonate	A	A2	A	A2	A	A	A1
Sodium Bisulfate	B	A2	A1	A1	A	A	C
Sodium Bisulfite	B	A2	C1	A1	A	A	B1
Sodium Borate (Borax)	B	A2	A1	A1	A2	A	B
Sodium Bromide	-	A2	B1	-	-	A2	C
Sodium Carbonate	A	B2	B1	A2	A	A	A
Sodium Chlorate	-	B2	D	A1	A	A	B1
Sodium Chloride	A	A2	A1	A2	A	A	B

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Sodium Hydrosulfite	-	-	A	-	-	-	-
Sodium Hydroxide							
(20%)	C	B	A	A2	A	A	B2
(50%)	C	B	A	D	A	D	B1
(80%)	C	-	C	D	A	D	B1
Sodium Hypochlorite (100%)	C	B2	D	-	B	A	D
Sodium Hypochlorite (<20%)	A	A	D	C	A	A	C
Sodium Nitrate	B	A2	A1	-	A	A	B1
Sodium Perborate	-	A1	B1	-	A	-	B
Sodium Polyphosphate	B	A	A1	-	A	A	B
Sodium Silicate	A	A2	A1	-	A	A	B
Sodium Sulfate	-	A2	A	A2	A	A	B1
Sodium Sulfite	B	B1	D	-	A2	A	A
Sodium Tetraborate	B	A2	A	-	-	-	A
Sodium Thiosulfate	-	A1	B	D	A2	A	B
Stearic Acid	A	B1	A2	A1	A2	A	A
Stoddard Solvent	-	C2	A	A2	C	A	A
Styrene	-	-	A1	D	-	-	A
Sulfate (Liquors)	A	A2	B1	-	A	A	B
Sulfur Dioxide	D	B1	C1	-	A1	A	A1
Sulfur Trioxide	-	-	D	-	C	-	C
Sulfur Hexaflouride	-	B	B	-	-	-	-
Sulfuric Acid							
Sulfuric Acid (<10%)	A	A1	C1	A1	A2	A	B
Sulfuric Acid (10-75%)	A	A1	D	B1	A1	A	D
Sulfuric Acid (cold concentrated)	B	D	D	-	A2	A	B
Sulfuric Acid (hot concentrated)	B	D	D	D	D	C	C
Sulfurous Acid	B	B2	D	-	A	A	B
Tannic Acid	A	B2	C1	C	A	B	A
Tetrahydrofuran	C	C1	A	D	C2	B1	A
Tetrachloroethane	-	-	C1	-	C	A	A
Toluene (Toluol)	D	C1	A1	D	C1	A1	A
Trichloroacetic Acid	C	A	C	D	A	B	C
Trichloroethylene	D	D	C1	-	C1	B	B
Tricresylphosphate	-	B1	A2	-	A1	D	B
Triethylamine	-	-	A1	-	D	A2	A
Trisodium Phosphate	A	A	A	-	A	A	B
Turpentine	B	D	B	D	D	A	A
Urea	A	A	A	D	A	A	B
Vegetable Juice	-	-	A	-	-	-	A
Vinegar	A	A	A	A2	A	B	A
Water, Deionized	A	-	A1	-	A2	A2	A2
Water, Distilled	A	A2	A1	A2	A	A	A
Water, Fresh	A	A2	A1	A2	A	A	A
Water, Salt	A	A2	A2	A2	A	A	B
Weed Killers	-	-	A	-	-	-	A
Whiskey & Wines	B	C	A1	A1	A	A	A
Zinc Sulfate	A	A2	A	A2	A	A	A

Disclaimer and Safety Warning: The data presented in this publication is for reference only.

It was compiled primarily from outside sources provided by feedstock materials suppliers and resin manufacturers, and is offered to our customers as a means of comparing the characteristics of resins and materials used by Eldon James Corp. at the time of publication. The particular conditions of your use and application of our products are beyond our control; therefore, it is imperative that products be tested in your specific application to determine their ultimate suitability. All information is provided without implied or expressed warranty or guarantee by Eldon James Corp, or the resin and feedstock manufacturers. Eldon James Corp. assumes no liability with respect to the accuracy or completeness of the information contained herein and none of the information provided constitutes a recommendation or endorsement of any kind by the Eldon James Corp.

An extended listing of chemical resistance can be found on our Website @ *eldonjames.com* > Technical

Chemical Resistance of 316L Stainless Steel

A = Excellent (No Effect)
B = Good (Minor Effect)
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Acetic Acid	A	Hydrofluoric Acid	B
Acetone	A	Isopropyl Alcohol	B
Air	A	Methyl Ethyl Ketone(MEK)	A
Ammonia	A	Methanol	A
Benzene	B	Oxygen	A
Carbon Dioxide	A	Ozone	A
Chlorine Water	C	Steam	A
Ethanol	A	Sulfuric Acid	B
Ethylene Glycol	A	Toluene	A
Gasoline, Unleaded	A	Trichloroethylene	B
Hydrochloric Acid	D	Water, Fresh	A

Disinfectant and Sterilization Methods of 316L Stainless Steel

Formalin	Excellent
Isopropyl Alcohol	Excellent
Ethyl Alcohol	Excellent
Ethylene Oxide	Excellent
Autoclave	Excellent
E-Beam	Excellent
Gamma	Excellent
Dry Heat	Excellent

Stainless Steel Barb Details

Use with Hose ID	EJ Barb #	Thru Hole ID	Barb Diameter
1/8"	2	.100"	.215"
3/16"	3	.127"	.260"
1/4"	4	.167"	.314"
5/16"	5	.217"	.372"
3/8"	6	.312"	.498"
1/2"	8	.400"	.619"
5/8"	10	.495"	.743"
3/4"	12	.667"	.956"

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Sterilization Stability of Resin Materials

MATERIAL	GAMMA RADIATION	ETHYLENE OXIDE	AUTOCLAVE
KYNAR	Highly compatible, but will discolor to a brownish hue. Physical properties typically improve	Excellent	Excellent
POLYCARBONATE	Compatible to 10 MRad dose with little loss of physical properties. Will discolor to light yellow-green hue.	Highly compatible with 1005 EtO; may stress crack if in EtO/CFC mix, due to moulding stresses.	Not recommended. May craze or crack due to moulding stresses.
RADIATION STABLE POLYCARBONATE	Excellent up to 10 MRad dose-with little loss of physical prpoerties. Light viole hue turns clear upon sterilization.	Highly compatible. Withstands normal EtO sterilization conditions, but multiple exposures can reduce tensile elongation properties.	Not recommended
POLYPROPYLENE	Excellent up to commonly used sterilization doses (approximately 6 MRad)	Fair; may stress crack in EtO/CFC mix due to moulding stresses.	Poor. Parts may distort due to low heat deflection temperature
NYLON, AND GLASS FILLED NYLON	Physically compatible with commonly used sterilization doses, but may discolor to a brownish hue.	Very good. Some susceptibility to oxidizing agents.	Very good. Components may swell slightly due to water absorbtion
ABS	Compatible to 10 MRad dose with some loss of impact strength, but increased tensile strength. Some discoloration to slight brownish hue	Excellent retention of properties for at least 5 sterilization cycles.	Poor. Parts may distort due to low heat deflection temperature
POLYURETHANE (TUBING)	Excellent. Some discoloration may occur, but reverses over time. No significant effect on physical properties	Excellent. No noticeable effect on physical properties	Not recommended. Hydrolysis of polyurethane may create aromatic impurities
POLYETHYLENE (TUBING)	Excellent. Tensile strength increases and modulus of elasticity decreases due to cross -linking of polymer	Excellent	Not Recommended. Tubing may distort at common autoclave temperatures
KYNAR TUBING	Highly compatible, but will discolor to a brownish hue. Physical properties typically improve	Excellent	Excellent