Properties of Materials

Eldon James

Materials - General Information

NYLON

WHITE NYLON • BLACK NYLON **NATURAL NYLON**

The invention of nylon in the early 30's, and its introduction in 1938, was truly a major breakthrough in polymer chemistry. No resin has yet been introduced that can begin to match the unique combination of properties that have made nylon the most versatile and broadly used plastic material. Nylon's use as an injection molding material has grown as new applications have emerged across many industries. This growth is driven by continued research and market development, which has led to a wide diversity of product lines.

Eldon James' nylon choice, is one of the three most proven nylon resins. It is a lubricated version of 6/6 Nylon made by the polymerization of hexamethylenediamine and adipic acid, which each contain six carbon atoms (6/6). Of the melt processable nylon homopolymers, the 6/6 nylon series exhibits the highest melting point and a superior dry-as-molded strength and stiffness. It possesses an outstanding balance of properties, combining: strength, moderate stiffness, high service temperature, and excellent toughness. It exhibits low coefficients-of-friction, has excellent resistance to abrasion, and it is particularly resistant to repeated impact. Nylon resists fuels, lubricants, and many chemicals; however, it is attacked by phenols, strong acids, and oxidizing agents. Acceptable sterilization methods include Ethylene Oxide or Autoclave. Visit the Technical Section of our Website @ eldonjames.com for more detail.

• NATURAL NYLON IS NSF/ANSI 61 & 51 Certified •
White and Black Nylon are not NSF/ANSI Certified

GLASS-FILLED BLACK NYLON

The glass fibers provide a minimum average length in the finished part to achieve optimum mechanical properties. The glass is bonded to nylon through the use of certain coupling agents which have been developed to assure retention of physical properties under various environmental conditions. Glass-reinforced nylon is manufactured to give optimum strength combined with excellent injection molding performance. This is achieved by uniform dispersion of the glass fibers in the base nylon.

GLASS-FILLED BLACK NYLON - Offers these advantages over un-reinforced nylon:

- **Ford & GM approval**
- superior tensile strength (over 2 times greater than conventional nylon)
- greater stiffness (3 times greater)
- higher impact strength
- excellent fatigue endurance
- enhanced creep resistance
- excellent retention of tensile strength and stiffness at high temperatures
- better dimensional stability
- superior retention of physical properties when exposed to high temperatures, hot oils, greases, and lubricants
- low thermal expansion (similar to metals)

Materials - General Information

POLYVINYLIDENE FLUORIDE (PVDF)

PVDF has been used as a pipe liner in **chemical processing plants** since its introduction nearly 30 years ago. It has also been used extensively in the **paper and paper pulp industries**, where equipment is constantly exposed to high concentrations of Chlorine and Chlorine Dioxide. In these applications the permeation resistance of PVDF components far surpassed that of PTFE.

PVDF products are used extensively in **silicon microcircuit fabrication**. Processes in this industry commonly use **deionized water**, a fluid that is highly corrosive to steel. The deionized water is often sanitized through the injection of **ozone and exposure to UV light**, both of which can seriously degrade the integrity of materials less durable than PVDF.

Properties of PVDF:

• High thermal stability • High purity • Low permeability to most gases and liquids • High dielectric strength
• Resistance to most chemicals and solvents • Weather resistant-inert to UV radiation • Resistant to fungi
• Mechanical strength and toughness • Resistant to nuclear radiation • Low flame and smoke characteristics

• NATURAL PVDF (material without colorant) is NSF/ANSI Standard 61 & 51 Certified • FDA USP Class VI

POLYPROPYLENE

Polypropylene, like most of the polyolefins, is highly resistant to solvents and chemicals. Polypropylene has outstanding resistance to water and other inorganic environments. It resists most strong mineral acids and bases, but, like the other polyolefins, it is subject to attack by oxidizing agents.
Polypropylene has excellent resistance to environmental stress-cracking. Acceptable sterilization methods include Gamma Radiation and Ethylene Oxide, see sterilization chart for details.

FDA USP Class VI

HIGH DENSITY POLYETHYLENE (HDPE)

When used unmodified for the manufacture of food contact articles, HDPE will comply with FDA 21 CFR177.1520. HDPE also has various applications in medical products. It has excellent resistance to chemicals, excellent toughness, and has an aesthetically pleasing glossy white finish.

• Natural HDPE is NSF/ANSI 61 & 51 Certified •

316L STAINLESS STEEL

316L is a molybdenum-bearing austentic stainless steel which offers a high stress-to-rupture and tensile strength in elevated temperature environments. It is more resistant to corrosion than type Type 304 and It is also more resistant to pitting. Molybdenum-containing stainless steels are used in the manufacture of certain food and pharmaceutical products where minimizing metallic contamination is desirable. Fittings produced with the 316L alloy perform well in harsh physical environments, maintaining their strength and impact resistance under a wide range of temperatures; however, molybdenum-bearing stainless steel is less resistant than other types of stainless steel to highly oxidizing acids, such a nitric acid. The material has wide application in the dairy industry and is accepted by the Dairy and Food Industries Supply Association-Sanitary Standards Committee. It is approved for preparation and storage of foods by the National sanitation Foundation and is used extensively in the brewery, beverage, and bio-processing industries.

Typical Properties of Materials

Property	ASTM Test Method	Kynar	Polypro-pylene	Nylon	Glass filled Nylon	High Density Polyethylene	316L Stainless Steel
TENSILE STRENGTH AT BREAK, PSI	D638	5,400	—	12,000	27,000	1,600	70,000 (ASTM-A240)
ELONGATION AT BREAK %	D638	100-400	375	300	3	320	40 (ASTM-A240)
TENSILE YIELD STRENGTH, PSI	D638	6,500	4,400	12,000	—	3,000	25,000 (ASTM-A240)
FEXURAL MODULUS, KPSI	D790	360	170	410	1,300	138	—
ROCKWELL HARDNESS (R SCALE)	D785	—	R180-102	R121	—	—	—
ROCKWELL HARDNESS (M SCALE)	—	—	M79	—	M101	—	—
SHORE HARDNESS (D SCALE)	D2240	D76-80	—	—	—	—	—
COEF. OF LINEAR THER-MAL EXPANSION, 10-5 IN/IN/°F	D696	7.6	—	4	1.3	—	—
DEFLECTION TEMP. UNDER FLEXURAL LOAD, °F @ 264 PSI	D648	244	—	194	480	—	—
DEFLECTION TEMP. UNDER FLEXURAL LOAD, °F @ 66 PSI	D648	—	190	455	—	—	—
WATER ABSORPTION, %, 24 HOURS	D570	0.015	0	1.2	0.7	—	—
IZOD IMPACT, (NOTCHED), FT-LB/IN	D256	3.1	0.5	1	2.2	0.9	—

Data for Nylon and Glass-Filled Nylon is for dry, as-molded with approximately 0.2% water content.

Absence of entry indicates data not available or not applicable.

**** Disclaimer:** 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. Thus, it is imperative that you test our products 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.

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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SS = Stainless Steel

Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
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

Chemical	HDPE	LDPE	NYLON	POLYCARBONATE	POLYPROPYLENE	KYNAR®	316L SS
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)
C = Fair (Moderate Effect)
D = Poor (Severe Effect)

Acetic Acid	A
Acetone	A
Air	A
Ammonia	A
Benzene	B
Carbon Dioxide	A
Chlorine Water	C
Ethanol	A
Ethylene Glycol	A
Gasoline, Unleaded	A
Hydrochloric Acid	D
Hydrofluoric Acid	B
Isopropyl Alcohol	B
Methyl Ethyl Ketone(MEK)	A
Methanol	A
Oxygen	A
Ozone	A
Steam	A
Sulfuric Acid	B
Toluene	A
Trichloroethylene	B
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