

**Chemical Resistance Chart** First letter of each pair applies to conditions at 73°F (23°C); second letter to conditions at 125°F (52°C).

Tubing material	PVC	PVC Fuel	PUR Ester	PUR Ether	LDPE
Chemical	ClearFLEX 60/M60/V60/70 GP70/GP70B BraidFLEX 70N	FuelFLEX 65	Ester-PUR FLEX 85	Ether-PUR FLEX 84	PolyFLEX 50/50B
Acetaldehyde	NN	NN	—	—	GN
Acetamide, Sat.	NN	NN	NN	NN	EE
Acetic Acid, 5%	EG	EG	EG	GF	EE
Acetic Acid, 50%	FN	FN	FN	NN	EE
Acetic Anhydride	NN	NN	NN	NN	NN
Acetone	NN	NN	NN	NN	GG
Acetonitrile	NN	NN	NN	NN	EE
Acrylonitrile	NN	NN	—	—	EE
Adipic Acid	EF	EF	GF	FF	EG
Alanine	NN	NN	NN	—	EE
Allyl Alcohol	GN	GN	F-	F-	EE
Aluminum Hydroxide	EG	EG	G-	G-	EG
Aluminum Salts	EG	EG	EG	EG	EE
Amino Acids	EF	EF	—	—	EE
Ammonia	GF	GF	—	—	EE
Ammonium Acetate, Sat.	EG	EG	NN	NN	EE
Ammonium Glycolate	GF	GF	—	—	EG
Ammonium Hydroxide, 5%	EG	EG	EG	EG	EE
Ammonium Hydroxide, 30%	GF	GF	EF	EF	EG
Ammonium Oxalate	GF	GF	—	—	EG
Ammonium Salts	EG	EG	GF	EG	EE
n-Amyl Acetate	NN	NN	NN	NN	GF
Amyl Chloride	NN	NN	—	—	NN
Aniline	NN	NN	NN	NN	EG
Aqua Regia	NN	NN	NN	NN	NN
Benzaldehyde	NN	NN	NN	NN	EG
Benzene	NN	NN	NN	NN	FN
Benzoic Acid, Sat.	EG	EG	NN	NN	EE
Benzyl Acetate	NN	NN	NN	NN	EG
Benzyl Alcohol	FN	FN	NN	NN	NN
Bromine	NN	NN	NN	NN	NN
Bromobenzene	NN	NN	NN	NN	NN
Bromoform	NN	NN	NN	NN	NN
Butadiene	NN	NN	—	—	NN
Butyl Chloride	NN	NN	NN	NN	NN
n-Butyl Acetate	NN	NN	NN	NN	GF
n-Butyl Alcohol	FN	FN	FF	NN	EE
sec-Butyl Alcohol	FN	FN	FF	NN	EG
tert-Butyl Alcohol	FN	FN	FF	NN	EG
Butyric Acid	NN	NN	GF	FF	NN
Calcium Hydroxide, Conc.	EG	EG	EG	EG	EE
Calcium Hypochlorite, Sat.	FN	FN	NN	GF	EE
Carbazole	NN	NN	NN	NN	EE
Carbon Disulfide	NN	NN	FF	NN	NN
Carbon Tetrachloride	NN	NN	NN	NN	FN
Cedarwood Oil	NN	FN	GF	GF	NN
Cellosolve Acetate	NN	NN	NN	NN	EG
Chlorobenzene	NN	NN	NN	NN	NN
Chlorine, 10% in Air	EG	EG	NN	NN	GN
Chlorine, 10% (Moist)	FN	FN	NN	NN	GN
Chloroacetic Acid	NN	NN	NN	NN	EE
p-Chloroacetophenone	NN	NN	NN	NN	EE
Chloroform	NN	NN	NN	NN	FN
Chromic Acid, 10%	EN	EN	NN	NN	EE
Chromic Acid, 50%	GN	GN	NN	NN	EE
Cinnamom Oil	NN	NN	GF	GF	NN
Citric Acid, 10%	GF	GF	G-	G-	EE
Cresol	NN	NN	NN	NN	NN

Tubing material	PVC	PVC Fuel	PUR Ester	PUR Ether	LDPE
Chemical	ClearFLEX 60/M60/V60/70 GP70/GP70B BraidFLEX 70N	FuelFLEX 65	Ester-PUR FLEX 85	Ether-PUR FLEX 84	PolyFLEX 50/50B
Cyclohexane	NN	NN	E-	G-	FN
Cyclohexanone	NN	NN	NN	NN	NN
Cyclopentane	NN	NN	E-	G-	NN
Decalin	NN	NN	NN	NN	GF
n-decane	FN	GN	E-	E-	FN
Diacetone Alcohol	NN	NN	—	—	FN
o-Dichlorobenzene	NN	NN	NN	NN	FN
p-Dichlorobenzene	NN	NN	NN	NN	FN
1,2-Dichloroethane	NN	NN	NN	NN	NN
2,4-Dichlorophenol	NN	NN	NN	NN	NN
Diethyl Benzene	NN	NN	NN	NN	NN
Diethyl Ether	NN	NN	G-	F-	NN
Diethyl Ketone	NN	NN	NN	NN	GF
Diethyl Malonate	NN	NN	FN	NN	EE
Diethylamine	NN	NN	NN	NN	NN
Diethylene Glycol	FN	FN	GF	FF	EE
Diethylene Glycol Ethyl Ether	NN	NN	FN	FN	EE
Dimethyl Acetamide	NN	NN	NN	NN	FN
Dimethyl Formamide	NN	NN	NN	NN	EE
Dimethylsulfoxide	NN	NN	—	—	EE
1,4-Dioxane	FN	FN	NN	NN	GF
Dipropylene Glycol	FN	FN	GF	FF	EE
Ether	NN	NN	FN	NN	NN
Ethyl Acetate	NN	NN	NN	NN	EE
Ethyl Alcohol, 40%	GF	GF	FN	FN	EG
Ethyl Alcohol (Absolute)	FN	FN	NN	NN	EG
Ethyl Benzene	NN	NN	NN	NN	FN
Ethyl Benzoate	NN	NN	NN	NN	FF
Ethyl Butyrate	NN	NN	—	—	GN
Ethyl Chloride, Liquid	NN	NN	FN	FN	FN
Ethyl Cyanoacetate	NN	NN	—	—	EE
Ethyl Lactate	NN	NN	—	—	EE
Ethylene Chloride	NN	NN	NN	FN	GN
Ethylene Glycol	FN	GN	GF	GF	EE
Ethylene Glycol Methyl Ether	FN	FN	FN	FN	EE
Ethylene Oxide	GN	GN	NN	NN	FF
Fatty Acids	EG	EG	—	—	EG
Fluorides	GF	GF	—	—	EE
Fluorine	FN	FN	NN	NN	FN
Formaldehyde, 10%	GN	GN	—	—	EE
Formaldehyde, 40%	FN	FN	NN	NN	EG
Formic Acid, 3%	EG	GG	GF	NN	EG
Formic Acid, 50%	GF	GF	FN	NN	EG
Formic Acid, 98 - 100%	NN	NN	NN	NN	EG
Freon TF	NN	NN	E-	E-	EG
Fuel Oil	NN	GN	GF	FF	FN
Gasoline	NN	GN	GN	FN	FN
Glacial Acetic Acid	NN	NN	NN	NN	EG
Glutaraldehyde (Disinfectant)	FN	FN	—	—	EG
Glycerine	GF	EF	GF	GF	EE
n-Heptane	NN	FN	EG	GF	FN
Hexane	NN	FN	EG	GF	NN
Hydrazine	NN	NN	NN	NN	NN
Hydrochloric Acid, 1-5%	EF	EF	GF	GF	EE
Hydrochloric Acid, 20%	GF	GF	NN	NN	EE
Hydrochloric Acid, 35%	GN	GN	NN	NN	EE
Hydrofluoric Acid, 4%	GN	GN	GF	GF	EG
Hydrofluoric Acid, 48%	FN	FN	NN	NN	EE

Tubing material	PVC	PVC Fuel	PUR Ester	PUR Ether	LDPE
Chemical	ClearFLEX 60/M60/V60/70 GP70/GP70B BraidFLEX 70N	FueIFLEX 65	Ester-PUR FLEX 85	Ether-PUR FLEX 84	PolyFLEX 50/50B
Hydrogen Peroxide, 3%	EG	EG	EG	EG	EE
Hydrogen Peroxide, 30%	GN	GN	GG	GG	EG
Hydrogen Peroxide, 90%	NN	NN	—	—	EG
Iodine Crystals	NN	NN	NN	NN	NN
Isobutyl Alcohol	GN	GN	FF	FF	EE
Isopropyl Acetate	NN	NN	NN	NN	GF
Isopropyl Alcohol	GN	GN	GF	GF	EE
Isopropyl Benzene	NN	NN	NN	NN	FN
Isopropyl Ether	NN	NN	GF	FN	NN
Jet Fuel	NN	FN	—	—	FN
Kerosene	NN	GN	GF	FF	FN
Lacquer Thinner	NN	NN	FN	FN	NN
Lactic Acid, 3%	EG	EG	EG	EG	EG
Lactic Acid, 85%	GF	GF	GF	FF	EE
Mercury*	GN	GN	EG	EG	EE
2-Methoxyethanol	GN	GN	G-	G-	EG
Methoxyethyl Oleate	NN	NN	GF	FF	EG
Methyl Acetate	NN	NN	NN	NN	FN
Methyl Alcohol	FN	FN	FN	FN	EE
Methyl Ethyl Ketone	NN	NN	NN	NN	EG
Methyl Isobutyl Ketone	NN	NN	NN	NN	GF
Methyl Propyl Ketone	NN	NN	NN	NN	GF
Methyl-t-butyl Ether	NN	NN	—	—	NN
Methylene Chloride	NN	NN	NN	NN	FN
Mineral Oil (Petroleum)	NN	GN	EG	GF	GN
Mineral Spirits	NN	GN	GN	FN	FN
Nitric Acid, 1-10%	EF	EF	NN	FN	EE
Nitric Acid, 50%	GN	GN	NN	NN	GN
Nitric Acid, 70%	NN	NN	NN	NN	FN
Nitrobenzene	NN	NN	NN	NN	NN
Nitromethane	NN	NN	NN	NN	NN
n-Octane	NN	GN	EG	GF	EE
Orange Oil	NN	FN	GF	GF	FN
Ozone	GF	GF	G-	G-	EG
Perchloric Acid	NN	NN	NN	NN	GN
Perchloroethylene	NN	NN	NN	NN	NN
Phenol, Crystals	FN	FN	NN	NN	GN
Phenol, Liquid	FN	FN	NN	NN	NN
Phosphoric Acid, 1-5%	EG	EG	NN	NN	EE
Phosphoric Acid, 85%	GF	GF	NN	NN	EE
Picric Acid	NN	NN	FN	FN	NN
Pine Oil	NN	FN	FN	FN	GN
Potassium Hydroxide, 1%	EG	EG	E-	E-	EE
Potassium Hydroxide, conc.	GF	GF	G-	G-	EE
Propane Gas	FN	GN	GF	FF	NN

Tubing material	PVC	PVC Fuel	PUR Ester	PUR Ether	LDPE
Chemical	ClearFLEX 60/M60/V60/70 GP70/GP70B BraidFLEX 70N	FueIFLEX 65	Ester-PUR FLEX 85	Ether-PUR FLEX 84	PolyFLEX 50/50B
Propionic Acid	FN	FN	GF	FF	FN
Propylene Glycol	GN	GN	G-	G-	EE
Propylene Oxide	FN	FN	—	—	EG
Resorcinol, Sat.	NN	NN	NN	NN	EE
Resorcinol, 5%	NN	NN	NN	NN	EE
Salicylaldehyde	NN	NN	—	—	EG
Salicylic Acid, Powder	GF	GF	—	—	EE
Salicylic Acid, Sat.	GF	GF	—	—	EE
Salt Solutions, Metallic	EG	EG	G-	G-	EE
Silicone Oil	GF	GF	E-	G-	EG
Silver Acetate	GN	GN	—	—	EE
Silver Nitrate	EG	EG	E-	E-	EG
Skydrol LD4	NN	NN	NN	NN	GF
Sodium Acetate, Sat.	GN	GN	NN	NN	EE
Sodium Hydroxide, 1%	EG	EG	E-	E-	EE
Sodium Hydroxide, 50%-Sat.	GN	GN	G-	G-	GG
Sodium Hypochlorite, 15%	EG	EG	EG	NN	EE
Stearic Acid, Crystals	EG	EG	EF	EF	EE
Sulfuric Acid, 1-6%	EG	EG	GN	EF	EE
Sulfuric Acid, 20%	EF	EF	FN	EF	EE
Sulfuric Acid, 60%	FN	FN	NN	NN	EG
Sulfuric Acid, 98%	NN	NN	NN	NN	GG
Sulfur Dioxide, Liq., 46 psig	NN	NN	—	—	NN
Sulfur Dioxide, Wet or Dry	GN	GN	—	—	EE
Sulfur Salts	GN	GN	—	—	FN
Tartaric Acid	EG	FG	G-	G-	EE
Tetrahydrofuran	NN	NN	NN	NN	FN
Thionyl Chloride	NN	NN	—	—	NN
Toluene	NN	NN	FN	NN	FN
Tributyl Citrate	NN	NN	NN	NN	GF
Trichloroacetic Acid	FN	FN	NN	NN	FN
1,2,4-Trichlorobenzene	NN	NN	NN	NN	NN
Trichloroethane	NN	NN	NN	NN	NN
Trichloroethylene	NN	NN	NN	NN	NN
Triethylene Glycol	FN	FN	GF	FN	EG
2,2,4-Trimethylpentane	NN	FN	GF	FN	FN
Tripropylene Glycol	FN	FN	GF	FN	EE
Tris Buffer Solution	FN	FN	—	—	EG
Turpentine	FN	FN	GF	GF	FN
Undecyl Alcohol	GF	GF	EG	GF	EF
Urea	GN	GN	F-	F-	EE
Vinylidene Chloride	NN	NN	NN	NN	NN
Xylene	NN	NN	FN	NN	GN
Zinc Stearate	GF	GF	E-	G-	EE

\*Mercury will permeate through all resins listed but only chemically attack those resins not listed as EE.

### Chemical Resistance Classifications

- E** 30 days of constant exposure cause no damage. Plastic may even tolerate for years.
- G** Little or no damage after 30 days of constant exposure to the reagent.
- F** Some effect after 7 days of constant exposure. Depending on the plastic, the effect may be crazing, cracking, loss of strength or discoloration. Solvents may cause softening, swelling and/or permeation losses.
- N** Not recommended for continuous use. Immediate damage may occur. Depending on the plastic, the effect will be a more severe crazing, cracking, loss of strength, discoloration, deformation, dissolution or permeation loss.
- Not tested. Finger Lakes Extrusion recommends that you test under your own conditions.

**NOTE: The chemical resistance information in this chart is a general guide only. Because many factors can affect chemical resistance, you should test under your own conditions. If any doubt exists about specific applications, contact Finger Lakes Extrusion.**

## Chemical Usage Guide

	ClearFLEX 60	ClearFLEX 70	FuelFLEX 65	BraidFLEX 70N	FLEX GP70	Ether-PUR FLEX 84	Ester-PUR FLEX 85	PolyFLEX 50
<b>Material</b>	PVC	PVC	PVC Fuel	PVC Reinf.	PVC	PUR Ether	PUR Ester	LDPE
Acids – Weak	E	E	E	E	E	F	F	E
Acids – Strong	F	F	F	F	F	N	N	E
Alcohols – Aliphatic	G	G	E	G	G	F	F	E
Aldehydes	N	N	N	N	N	F	F	G
Bases – Weak	E	E	E	E	E	G	G	E
Bases – Strong	G	G	G	G	G	F	F	G
Esters	N	N	N	N	N	N	N	G
Hydrocarbons - Aliphatic	F	F	G	F	F	E	E	F
Hydrocarbons – Aromatic	N	N	N	N	N	N	N	F
Hydrocarbons – Halogenated	N	N	N	N	N	N	N	N
Ketones	N	N	N	N	N	N	N	G
Oxidizing Agents – Strong	F	F	F	F	F	N	N	F

NOTE: The chemical resistance information in this chart is a general guide only. Because many factors can affect chemical resistance, you should test under your own conditions. If any doubt exists about specific applications, contact Finger Lakes Extrusion.

## Tolerances

	ClearFLEX 60	ClearFLEX 70	FuelFLEX 65	BraidFLEX 70N	FLEX GP70	Ether-PUR FLEX 84	Ester-PUR FLEX 85	PolyFLEX 50
<b>Inside Dia., +/- inches</b>	PVC	PVC	PVC Fuel	PVC Reinf.	PVC	PUR Ether	PUR Ester	LDPE
1/16 and under 1/8	.003	.003	.005	—	.007	.005	.005	.007
1/8 and under 5/16	.005	.005	.008	.010	.010	.009	.009	.007
5/16 and under 1/2	.008	.008	.010	.012	.015	.012	.012	.007
1/2 and under 3/4	.010	.010	.015	.015	.020	.018	.018	.010
3/4 and under 1-1/8	.015	.015	.020	.015	.030	.025	.025	.015
1-1/8 and under 1-3/4	.020	.020	—	.020	.040	.035	.035	—
1-3/4 and under 2-1/2	.031	.031	—	.031	.055	—	—	—
2-1/2 and under 3	—	—	—	—	.065	—	—	—
3 and under 4	—	—	—	—	.080	—	—	—
<b>Wall Thickness, +/- inches</b>								
0 to under 1/16	.003	.003	.004	—	.005	.005	.005	.006
1/16 to under 1/8	.003	.003	.005	—	.006	.006	.006	.008
1/8 to under 1/4	.005	.005	.010	—	.020	.009	.009	—
1/4 to under 3/8	.010	.010	.015	—	.030	—	—	—
3/8 to 1/2	.015	.015	.025	—	.040	—	—	—



**Finger Lakes Extrusion**  
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