Chemical Resistance Chart for Plastic Labware

CHEMICAL	LDPE 20°C	HDPE 20°C	PP 20°C	PMP 20°C	PMMA 20°C	PC 20°C	PVC 20°C	PS 20°C
Acetaldehyde	G	G	G	G	G	L	G	U
Acetamide, Sat.	E	E	E	E	E	U	U	E
Acetic Acid, 50%	E	E	E	E	N	E	E	G
Acetic Anhydride	U	L	G	E	N	U	U	U
Acetone	G	U	E	E	N	U	U	U
Acetonitrile	E	E	L	L	N	U	U	U
Acrylonitrile	E	E	L	L	N	U	U	U
Adipic Acid	E	E	E	E	G	E	E	E
Alanine	E	E	E	E	E	U	U	E
Allyl Alcohol	E	E	E	E	N	G	G	G
Aluminum Hydroxide	E	E	E	E	G	L	E	G
Aluminum Salts	E	E	E	E	E	E	E	G
Amino Acids	E	E	E	E	E	E	E	E
Ammonia	E	E	E	E	G	U	E	G
Ammonium Acetate,Sat.	E	E	E	E	E	E	E	E
Ammonium Glycolate	E	E	E	E	E	G	E	E
Ammonium Hydroxide,30%	E	E	E	E	E	U	E	G
Ammonium Oxalate	E	E	E	E	E	E	E	E
Ammonium Salts	E	E	E	E	E	E	E	G
Amyl Chloride	U	L	U	U	E	U	U	U
Aniline	E	E	G	G	N	L	U	U
Aqua Regia	U	U	U	U	F	U	U	U
Benzaldehyde	E	G	E	E	F	L	U	U
Benzene	U	U	U	G	N	U	U	U
Benzoic Acid, Sat.	E	E	E	E	E	E	E	G
Benzyl Acetate	E	E	E	E	N	L	U	U
Benzyl Alcohol	U	L	U	U	N	U	G	U
Bromine	U	L	U	U	N	L	G	U
Bromobenzene	U	U	U	U	N	U	U	U
Bromoform	U	U	U	U	N	U	U	U
Butadiene	U	L	U	U	G	U	L	U
Butyl Chloride	U	U	U	L	N	U	L	U
Butyl Acetate	G	G	G	G	U	U	U	U
Butyl Alcohol	E	E	E	E	L	G	G	E
Butyric Acid	U	L	U	U	N	L	G	U
Calcium Hydroxide, Conc.	E	E	E	E	G	U	E	G
Calcium Hypochlorite, Sat.	E	E	E	E	G	L	G	G
Carbazole	E	E	E	E	N	U	U	U
Carbon Disulfide	U	U	U	U	F	U	U	U
Carbon Tetrachloride	L	G	G	U	N	U	G	U
Cellosolve Acetate	E	E	E	E	G	L	L	U
Chlorobenzene	U	U	U	L	N	U	U	U
Chlorine, 10% (Moist)	G	G	L	G	E	G	E	U
Chloroacetic Acid	E	E	E	E	N	L	L	G
Chloroform	L	L	U	U	N	U	U	U
Chromic Acid, 50%	E	E	G	G	F	L	E	L
Citric Acid, 10%	E	E	E	E	E	E	G	E
Cresol	U	L	G	G	N	U	U	U
Cyclohexane	U	L	L	U	N	E	L	U
Cyclohexanone	U	L	L	G	N	U	U	U
Cyclopentane	U	L	L	L	G	U	L	U
Diacetone Alcohol	L	E	E	E	N	U	U	G
Diethyl Benzene	U	L	U	U	N	L	U	U
Diethyl Ether	U	L	U	U	F	U	L	U
Diethyl Ketone	U	U	G	L	N	U	U	U
Diethyl Malonate	E	E	E	E	NT	L	G	U
Diethylamine	U	L	G	L	G	U	U	G
Diethylene Glycol	E	E	E	E	E	G	L	G
Diethylene Glycol Ethyl Ether	E	E	E	E	E	L	L	U
Dimethyl Acetamide	L	E	E	L	E	U	U	U
Dimethyl Formamide	E	E	E	E	N	U	L	U
Dimethylsulfoxide	E	E	E	E	NT	U	U	E
Dioxane	G	G	G	L	N	U	L	U
Dipropylene Glycol	E	E	E	E	E	G	G	E
Ether	U	L	U	U	F	U	L	U
Ethyl Acetate	E	E	E	L	N	U	U	U
Ethyl Alcohol (Absolute)	E	E	E	E	G	E	E	L
Ethyl Benzene	U	U	U	U	N	U	U	U

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CHEMICAL	LDPE 20°C	HDPE 20°C	PP 20°C	PMP 20°C	PMMA 20°C	PC 20°C	PVC 20°C	PS 20°C
Ethyl Benzoate	L	G	G	G	N	U	U	U
Ethyl Butyrate	G	G	G	L	N	U	U	U
Ethyl Chloride, Liquid	L	L	L	L	N	U	U	U
Ethyl Cyanoacetate	E	E	E	E	N	L	L	G
Ethyl Lactate	E	E	E	E	F	L	L	L
Ethylene Chloride	G	G	L	U	N	U	U	U
Ethylene Glycol	E	E	E	E	E	G	E	E
Ethylene Glycol Methyl Ether	E	E	E	E	E	L	L	U
Ethylene Oxide	L	G	L	L	E	L	L	U
Fatty Acids	E	E	E	E	E	G	E	E
Fluorides	E	E	E	E	N	E	E	G
Fluorine	L	G	L	L	N	G	E	U
Formaldehyde, 40%	E	E	E	E	E	E	G	U
Formic Acid, 98-100%	E	E	E	E	N	L	L	L
Freon TF	E	E	E	L	G	G	G	L
Fuel Oil	L	G	E	G	G	E	E	U
Gasoline	L	G	G	G	G	L	G	U
Glutaraldehyde (Disinfectant)	E	E	E	L	G	E	E	E
Glycerine	E	E	E	E	E	E	E	E
Hexane	U	G	G	L	E	L	G	U
Hydrazine	U	U	U	U	N	U	U	U
Hydrochloric Acid,35%	E	E	E	E	E	U	G	L
Hydrofluoric Acid,48%	E	E	E	E	U	U	G	U
Hydrogen Peroxide,90%	E	E	E	E	N	E	E	E
Iodine Crystals	U	U	L	G	N	U	U	U
Isobutyl Alcohol	E	E	E	E	F	E	E	G
Isopropyl Acetate	G	E	G	G	N	U	U	U
Isopropyl Alcohol	E	E	E	E	F	E	E	E
Isopropyl Benzene	L	G	L	U	N	U	U	U
Isopropyl Ether	U	U	U	U	F	U	U	U
Jet Fuel	L	L	L	L	G	U	E	G
Kerosene	L	G	G	G	G	E	E	U
Lacquer Thinner	U	L	L	L	N	U	U	U
Lactic Acid,85%	E	E	E	E	E	E	G	G
Mercury	E	E	E	E	E	U	E	E
Methoxyethyl Oleate	E	E	E	E	E	L	U	U
Methyl Acetate	L	L	G	E	N	U	U	U
Methyl Alcohol	E	E	E	E	F	G	E	L
Methyl Ethyl Ketone	U	U	E	U	N	U	U	U
Methyl Isobutyl Ketone	U	U	G	L	N	U	U	U
Methyl Propyl Ketone	G	E	G	L	N	U	U	U
Methyl-t-butyl Ether	U	L	L	E	G	U	U	U
Methylene Chloride	L	L	L	L	N	U	U	U
Mineral Oil	G	E	E	E	E	E	E	E
Mineral Spirits	L	L	L	E	F	U	G	L
Nitric Acid,1-10%	E	E	E	E	E	E	E	G
Nitric Acid,50%	G	G	L	L	G	G	G	U
Nitric Acid,70%	L	G	U	L	F	U	L	U
Nitrobenzene	U	L	U	U	N	U	U	U
Nitromethane	U	L	L	E	N	U	U	U
n-Octane	E	E	E	E	E	G	L	U
Ozone	E	E	E	E	E	E	E	L
Perchloric Acid	G	G	G	G	N	U	G	G
Perchloroethylene	U	U	U	U	F	U	U	U
Phenol, Liquid	U	U	U	U	N	U	U	U
Phosphoric Acid,85%	E	E	E	E	F	E	E	E
Picric Acid	U	U	U	E	N	U	U	G
Pine Oil	G	E	E	G	E	G	L	U
Potassium Hydroxide,Conc.	E	E	E	E	E	U	E	G
Propane Gas	U	L	U	U	E	L	E	U
Propionic Acid	L	E	E	E	N	U	G	G
Propylene Glycol	E	E	E	E	E	G	L	E
Propylene Oxide	E	E	E	E	N	G	L	U
Resorcinol,Sat.	E	E	E	E	N	G	L	G
Salicylaldehyde	E	E	E	E	G	G	L	U
Salicylic Acid,Sat.	E	E	E	E	F	E	G	E
Salt Solutions, Metallic	E	E	E	E	E	E	E	G
Silicone Oil	E	E	E	E	E	E	E	E

Chemical Resistance Chart for Plastic Labware

CHEMICAL	LDPE 20°C	HDPE 20°C	PP 20°C	PMP 20°C	PMMA 20°C	PC 20°C	PVC 20°C	PS 20°C
Silver Acetate	E	E	E	E	E	E	G	G
Silver Nitrate	E	E	E	E	E	E	E	G
Sodium Acetate, Sat.	E	E	E	E	E	E	G	G
Sodium Hydroxide, 1%	E	G	E	E	E	E	E	G
Sodium Hydroxide, 50% to Sat	G	G	E	E	E	U	U	E
Sodium Hyprochlorite, 15%	E	E	G	E	E	G	E	E
Stearic Acid, Crystals	E	E	E	E	E	E	E	E
Sulfuric Acid, 60%	E	E	E	E	G	G	E	G
Sulfuric Acid, 98%	G	G	L	G	N	U	G	U
Sulfur Dioxide, Liquid	U	U	U	U	N	G	L	U
Sulfur Salts	L	G	L	L	G	L	U	U
Tartaric Acid	E	E	E	E	E	E	E	G
Tetrahydrofuran	L	G	G	L	N	U	U	U
Thionyl Chloride	U	U	U	U	N	U	U	U
Toluene	L	L	L	L	N	L	U	U
Tributyl Citrate	G	E	G	G	F	U	L	U
Trichloroacetic Acid	L	L	L	E	N	L	L	L
Trichloroethane	U	L	U	U	N	U	U	U
Trichloroethylene	U	L	U	U	N	U	U	U
Tris Buffer, Solution	E	E	E	E	E	G	G	G
Turpentine	L	G	G	L	F	L	G	U
Undecyl Alcohol	E	E	E	E	N	G	E	G
Urea	E	E	E	E	E	G	G	E
Vinylidene Chloride	U	L	U	U	N	U	U	U
Xylene	G	L	L	L	N	U	U	U
Zinc Stearate	E	E	E	E	E	E	E	E

Resin Codes:

LDPE ..... Low-Density Polyethylene

HDPE ..... High-Density Polyethylene

PP ..... Polypropylene

PMP ..... Polymethylpentene

PMMA ..... Acrylic

PC ..... Polycarbonate

PVC ..... Polyvinyl Chloride

PS ..... Polystyrene

Chemical Resistance: This chemical resistance chart is a general guide only. Because of the variety of factors that can affect the chemical resistance of a plastic product, it is recommended that the user make tests under expected use conditions. Chemicals may affect the strength, appearance, color, dimensions, flexibility or weight of plastics. Variable factors like temperature, pressure, chemical concentration, length of exposure, and combinations of chemical reagents can affect the chemical resistance of plasticware. As temperature increases, resistance to chemical attack decreases. Environmental stress cracking differs from chemical attack and is caused by the combined factors of tensile stress, the inherent susceptibility of the plastic to stress crack and stress-cracking agents. Such agents as detergents, lubricants, plating additives and brighteners and surface-active agents, even in small concentrations, may cause cracking.

Letter Codes:

E=Excellent
No damage after 30 days of constant exposure

G=Good
Little or no damage after 30 days of constant exposure

L=Limited
Some effect after 7 days of constant exposure

NT=Not Tested

U=Unsatisfactory
Immediate damage, not recommended

Physical Properties of Resins

	Max. Use Temp. (°C)	Brittleness Temp. (°C)	Transparency	Flexibility
LDPE	80	-100	Translucent	excellent
HDPE	120	-100	Translucent	rigid
PP	135	0	Translucent	rigid
PMP	175	+20	Clear	rigid
PMMA	90	-60	Clear	rigid
PC	135	-135	Clear	rigid
PVC	70	-30	Clear	rigid
PS	90	+20	Clear	rigid

	Sterilization* Autoclaving	Sterilization* Gas	Sterilization* Dry Heat	Sterilization* Disinfectants	Specific Gravity
LDPE	No	Yes	No	Yes	0.92
HDPE	No	Yes	No	Yes	0.95
PP	Yes	Yes	No	Yes	0.90
PMP	Yes	Yes	Yes	Yes	0.83
PMMA	No	No	No	Some	1.18
PC	Yes	Yes	No	Yes	1.20
PVC	No	Yes	No	Yes	1.34
PS	No	Yes	No	Some	1.05

*Sterilization:

- **Autoclaving** - Clean and rinse item with distilled water before autoclaving. Certain chemicals which have no appreciable effect on resins at room temperature may cause deterioration at autoclaving temperatures unless removed with distilled water beforehand.
- **Gas** - Ethylene oxide.
- **Dry Heat** - at 160°C.
- **Disinfectants** - Benzalkonium chloride, formalin, ethanol, etc.

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