

Chemical Resistance Reference Chart



AJ product series: WHYTE, PRYCE

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This chart provides a guideline for the chemical resistance plastic materials used in SA products.

Because so many factors can affect chemical resistance, test your product under your actual conditions of use. Effects of Chemicals on Plastics. Chemicals can affect the strength, flexibility, surface appearance, colour, dimensions, and weight of a plastic. These changes are caused by: (1) an attack on the polymer chain resulting in oxidation, reaction of functional groups, and depolymerisation; (2) dissolution in a solvent and solvent absorption or permeation that causes softening and swelling; and (3) stress cracking from a "stress-cracking agent."

Environmental stress cracking is the failure of a plastic in the presence of certain types of chemicals, but it is not a result of a chemical attack. Simultaneous presence of three factors causes stress cracking: tensile stress in the plastic, its inherent stress-cracking susceptibility, and a stress-cracking agent. Common stress-cracking agents are detergents, surface active chemicals, lubricants, oils, ultrapure water, and plating additives such as brighteners and wetting agents. Relatively small concentrations of stress-cracking agent may be sufficient to cause cracking.

Mixing and/or diluting certain chemicals in plastic containers can be potentially dangerous. The combining of different chemicals or two or more compounds of classes may produce a synergistic or undesirable chemical effect, resulting in an increased temperature that can affect chemical resistance (as temperature increases, resistance to attack decreases), causing product failure. Other factors that also affect chemical resistance include pressure, internal or external stresses (e.g., centrifugation), length of exposure, and concentration of the chemical. Always pre-test your specific usage and follow correct safety procedures.

Attention: Please be aware that, although several polymers may have excellent resistance to various flammable organic chemicals and solvents, OSHA H CFR 29 1910.106 for flammable and combustible materials or other local regulations may restrict the volume of solvents that may legally be stored in an enclosed area.

Key to Chart on Following Pages

E – No damage after 30 days of constant exposure

G – Little or no damage after 30 days of constant exposure

F – Some effect after seven days of constant exposure

N – Immediate damage may occur. Not recommended for continuous use

S – Surface etching possible

First letter of each pair applies to minimum temperature conditions; the second to maximum temperature

PLASTIC RESIN CODE	DESCRIPTION	APPEARANCE	TEMP MAX °C	TEMP MIN °C	AUTOCLAVABLE	DRY-HEAT	GAMMA	MICRO-WAVABLE	ETHYLENE OXIDE
HDPE	High-density polyethylene	Opaque	120	-35	No	No	Yes	Yes	Yes
PP	Polypropylene	Translucent	135	-20	Yes	No	Yes	Yes	Yes

Reference taken from: www.nationalscientific.com

CHEMICAL	HDPE	PP
1,4-Dioxane	GG	FN
2,2,4-Trimethylpentane	FN	FN
2-Methoxyethanol	EE	GE
2-Propanol	EE	EE
Acetaldehyde	GF	GN
Acetamide, Sat.	EE	EE
Acetic Acid, 5%	EE	EE
Acetic Acid, 50%	EG	EE
Acetic Acid, Glacial	GG	EG
Acetic Anhydride	FF	GF
Acetone	NN	GN
Acetonitrile	EE	EG
Acetophenone	FF	FN
Acrylonitrile	EE	EG
Adipic Acid	EE	EE
Alanine	EE	EE
Allyl Alcohol	EE	EE
Aluminum Chloride	EE	EE
Aluminum Hydroxide	EE	EG
Aluminum Salts	EE	EE
Amino Acids	EE	EE
Ammonia (pure)	EE	EE
Ammonia, 25%	EE	EE
Ammonium Acetate, Sat.	EE	EE
Ammonium Chloride	EE	EE
Ammonium Glycolate	EE	EG
Ammonium Hydroxide, 5%	EE	EE
Ammonium Hydroxide, 30%	EE	EG
Ammonium Oxalate	EE	EG
Ammonium Salts	EE	EE
Amyl Alcohol	EE	EF
Amyl Chloride	FN	NN
Aniline	GF	EG
Aqua Regia	NN	NN
Arsenic Acid	EE	EE
Benzaldehyde	GN	EG
Benzenamine	GF	EG
Benzene	NN	NN
Benzoic Acid, Sat.	EE	EG
Benzyl Acetate	EE	EG
Benzyl Alcohol	FN	GG
Boric Acid	EE	EE
Bromine	FN	NN
Bromobenzene	NN	NN
Bromoform	NN	NN
Butadiene	FN	NN
Butyl Acetate	GF	FN
Butyl Chloride	NN	NN
Butyric Acid	FN	NN
Calcium Chloride	EE	EE
Calcium Hydroxide, Conc.	EE	EE
Calcium Hypochlorite, Sat.	EE	EE
Carbazole	EE	EE
Carbon Disulfide	NN	NN
Carbon Tetrachloride	GF	GF
Caustic Potash	EE	EE
Caustic Soda, 1%	FF	EE
Caustic Soda	GF	EE
Cedarwood Oil	FN	NN
Cellosolve Acetate	EE	FN
Chlorine Water	GF	FN
Chlorine, 10% (Moist)	GF	FN
Chlorine, 10% in air	EF	FN
Chlorine, wet gas	GF	FN
Chloroacetic Acid	EE	EG
Chlorobenzene	NN	NN
Chloroform	FN	NN
Chromic Acid, 10%	EE	EE
Chromic Acid, 20%	EE	GG
Chromic Acid, 50%	EE	GF
Chromic:Sulfuric	NN	NN

CHEMICAL	HDPE	PP
Cinnamon Oil	NN	NN
Citric Acid, 10%	EE	EE
Copper Sulfate	EE	EE
Cresol	FN	GF
Cyclohexane	FN	GN
Cyclohexanone	FN	FN
Cyclopentane	FN	FN
Decahydronaphtalene	EG	NN
Decalin	EG	NN
Diacetone	NN	GF
Diacetone Alcohol	EE	GF
Dibutylphthalate	FN	GN
Diethyl Benzene	FN	NN
Diethyl Ether	FN	FN
Diethyl Ketone	NN	GG
Diethyl Malonate	EE	EE
Diethylamine	FN	GN
Diethylene Dioxide	GG	NN
Diethylene Glycol	EE	EE
Diethylene Glycol Ethyl Ether	EE	EE
Dimethyl Acetamide	EE	EE
Dimethyl Formamide	EE	EE
Dimethylsulfoxide	EE	EE
Dioxane	GG	NN
Dipropylene Glycol	EE	EE
DMSO	EE	EE
Ethanol, 40%	EE	EE
Ether	FN	NN
Ethyl Acetate	EE	GN
Ethyl Alcohol (Absolute)	EE	EE
Ethyl Alcohol, 40%	EE	EE
Ethyl Alcohol, 96%	EG	EE
Ethyl Benzene	FN	NN
Ethyl Benzoate	GG	GF
Ethyl Butyrate	GF	GN
Ethyl Chloride	NN	FN
Ethyl Chloride, Liquid	FF	FN
Ethyl Cyanoacetate	EE	EE
Ethyl Lactate	EE	EE
Ethylene Chloride	NN	NN
Ethylene Glycol	EE	EE
Ethylene Glycol Monomethyl Ether	EE	GF
Ethylene Oxide	GF	FN
Ethylene Oxide Gas	GG	GG
Ethylene Oxide, 100%	GF	FN
EtO Gas	EE	EE
EtO	GF	FN
Fatty Acids	EE	EG
Fluorides	EE	EE
Fluorine	GN	NN
Formaldehyde, 10%	EE	EE
Formaldehyde, 40%	EG	EE
Formalin, 10%	EE	EE
Formalin, 40%	EG	EE
Formic Acid	EE	EG
Formic Acid, 3%	EE	EE
Formic Acid, 100%	EE	EG
Formic Acid, 50%	EE	EG
Formic Acid, 85%	EE	EG
Freon TF	EG	EG
Fuel Oil	GF	EF
Gasoline	FN	FN
Glutaraldehyde	EE	EE
Glutaraldehyde Disinfectant	EE	EE
Glycerine	EE	EE
Glycerol	EE	EE
Hexane	GF	GF
Hydrazine	NN	NN
Hydrobromic Acid, 69%	EG	EG
Hydrochloric Acid, 5%	EE	EE
Hydrochloric Acid, 20%	EE	EE

CHEMICAL	HDPE	PP
Hydrochloric Acid, 35%	EE	EG
Hydrofluoric Acid, 4%	EE	EE
Hydrofluoric Acid, 48%	EE	EG
Hydrogen Peroxide, 3%	EE	EG
Hydrogen Peroxide, 30%	EE	EF
Hydrogen Peroxide, 90%	EE	EF
Iodine Crystals	NN	EE
Iso-Propanol, 100%	EE	EE
Isobutanol	EE	EE
Isobutyl Alcohol	EE	EE
Isopropanol	EE	EE
Isopropanol, 100%	EE	EE
Isopropyl Acetate	EG	GF
Isopropyl Alcohol	EE	EE
Isopropyl Alcohol, 100%	EE	EE
Isopropyl Benzene	FN	FN
Isopropyl Ether	FN	NN
Jet Fuel	FN	FN
Kerosene	FN	FN
Lacquer Thinner	FN	FN
Lactic Acid, 3%	EE	EE
Lactic Acid, 85%	EE	EG
Lead Acetate	EE	EE
Magnesium Chloride	EE	EE
MEK	NN	EG
Mercuric Chloride	EE	EE
Methanol	EE	EE
Mercury	EE	EE
Methanol, 100%	EE	EE
Methoxyethyl Oleate	EE	EG
Methyl Acetate	FF	GF
Methyl Alcohol	-	EE
Methyl Alcohol, 100%	EE	EE
Methyl Ethyl Ketone	NN	EG
Methyl Isobutyl Ketone	NN	GF
Methyl Propyl Ketone	FN	GF
Methyl-t-Butyl Ether	FN	FN
Methylene Chloride	FN	FN
MIBK	NN	GF
Mineral Oil	EF	EF
Mineral Spirits	FN	FN
n-Amyl Acetate	EG	GF
n-Butanol	EE	EE
n-Butyl Acetate	GF	GF
n-Butyl Alcohol	EE	EE
n-Decane	FN	FN
n-Heptane	FF	FF
n-Octane	EE	EE
Nitric Acid, 10%	EE	EE
Nitric Acid, 20%	GG	FF
Nitric Acid, 50%	FN	FN
Nitric Acid, 70%	FN	NN
Nitrobenzene	NN	NN
Nitromethane	FN	FN
o-Dichlorobenzene	NN	FN
Oil, Cedarwood	FN	NN
Oil, Cinnamon	FN	NN
Oil, Mineral	EE	EE
Oil, Pine	FN	EG
Orange Oil	GF	GF
Oxalic Acid, 10%	EE	EE
Ozone	GN	FN
p-Chloroacetophenone	EE	EE
p-Dichlorobenzene	NN	GF
Perchloric Acid	GN	GN
Perchloric Acid, Concentrated (70%)	GN	GN
Perchloroethylene	NN	NN
Petroleum	GN	NN
Phenol, 100%	NN	NN
Phenol, 50%	NN	NN
Phenol, Crystals	GF	GN

CHEMICAL	HDPE	PP
Phenol, Liquid	NN	NN
Phosphoric Acid, 5%	EE	EE
Phosphoric Acid, 85%	EE	EG
Picric Acid	NN	NN
Pine Oil	FN	EG
Potassium Chloride	EE	EE
Potassium Hydroxide, 01%	FF	EE
Potassium Hydroxide, 30%	EE	EE
Potassium Hydroxide, Concentrated	EE	EE
Potassium Permanganate	EE	EG
Propane Gas	EE	NN
Propionic Acid	EF	EG
Propylene Glycol	EE	EE
Propylene Oxide	EE	EG
Pyridine	NN	EE
Resorcinol, 5%	EE	EE
Resorcinol, Sat.	EE	EE
Salicylaldehyde	EE	EG
Salicylic Acid, Powder	EE	EE
Salicylic Acid, Sat.	EE	EE
Salt Solutions, Metallic	EE	EE
sec-Butanol	EE	EE
sec-Butyl Alcohol	EE	EE
Silicone Oil	EE	EE
Silver Acetate	EE	EE
Silver Nitrate	EE	EE
Skydrol LD4	EG	EG
Sodium Acetate, Sat.	EE	EE
Sodium Carbonate	EE	EE
Sodium Dichromate	EE	EE
Sodium Hydroxide, 1%	FF	EE
Sodium Hydroxide, 10%	EE	EE
Sodium Hydroxide, Concentrated (50%)	EE	EE
Sodium Hypochlorite, 15%	EG	FN
Stearic Acid	GG	EE
Stearic Acid, Crystals	EE	EE
Sulfur Dioxide	EN	EE
Sulfur Dioxide, Liquid	FN	NN
Sulfur Dioxide, Wet or Dry Gas	EE	EE
Sulfur Salts	GF	FN
Sulfuric Acid, 6%	EE	EE
Sulfuric Acid, 20%	EE	EE
Sulfuric Acid, 30%	EE	EE
Sulfuric Acid, 60%	EG	GF
Sulfuric Acid, 98%	FN	FN
Sulfuric Acid, Concentrated (96%)	FN	FN
Tartaric Acid	EE	EE
TCA	FN	GF
tert-Butanol	EE	EG
tert-Butyl Alcohol	EE	EG
Tetrahydrofuran	FN	GF
THF	FN	GF
Thionyl Chloride	NN	NN
Tincture of Iodine	GF	EE
Toluene	NN	NN
Tributyl Citrate	EG	GF
Trichloroacetic Acid	FN	GF
Trichloroethane	NN	NN
Trichloroethylene	NN	NN
Triethylene Glycol	EE	EE
Tripropylene Glycol	EE	EE
Tris Buffer, Solution	EG	EG
Trisodium Phosphate	EE	EE
Turpentine	FN	FN
Undecyl Alcohol	EG	EG
Urea	EE	EE
Vinylidene Chloride	FN	NN
Xylene	FN	NN
Zinc Chloride, 10%	EE	EE
Zinc Stearate	EE	EE
Zinc Sulfate, 10%	EE	EE