

General Plasticware Information

Properties of plastics

	Polystyrene	Polyethylene	Polypropylene
Physical Characteristics			
Letter Symbol	PS	HD-PE (High Density)	PP
Basic Properties	Biologically inert, hard, excellent optical qualities	Biologically inert, high chemical resistance	Biologically inert, high chemical resistance, exceptional toughness
Clarity	Clear	Opaque	Translucent
Autoclave Results	Melts	May distort	Withstands several cycles
Heat Distortion	147-175°F 64-80°C	250°F 121°C	275°F 135°C
Burning Rate	Slow	Slow	Slow
Effects of Laboratory Reagents			
Weak Acids	None	None	None
Strong Acids	Oxidizing acids attack	Oxidizing acids attack	Oxidizing acids attack
Weak Alkalies	None	None	None
Strong Alkalies	None	None	None
Organic Solvents	Soluble in aromatic chlorinated hydrocarbons	Resistant below 80°	Resistant below 80°
Gas Permiability of Thin Wall Products			
O ₂	Low	High	High
N ₂	Very low	Low	Low
CO ₂	High	Very low	Very low

This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Chemical Resistance of Plastics

	PS 20°C	PS 50°C	PP 20°C	PP 50°C	HDPE 20°C	HDPE 50°C	LDPE 20°C	LDPE 50°C
Acetic acid 10 %	1	1	1	1	1	1	1	1
Acetic acid 50 %	2	2	1	1	1	1	1	1
Acetic acid 90 %	4	4	1	2	1	1	1	2
Acetone	4	4	1	3	1	1	3	3
Acetonitrile	4	4	3	4	1	1	1	1
Ammonia	1	1	1	1	1	1	1	1
Ammonia 25 %	2	2	1	1	1	1	1	1
Ammonium acetate	1	1	1	1	1	1	1	1
Amyl alcohol	1	1	1	1	1	1	1	2
Ascorbic acid	-	-	1	1	1	-	1	-
Benzene	4	4	3	4	3	4	3	4
Benzyl alcohol	4	4	4	4	3	4	4	4
Boric acid 10 %	1	1	1	1	1	1	1	1
Carbon tetrachloride	4	4	4	4	3	4	4	4
Carbonic acid	1	1	1	1	1	3	1	1
Chloroform 100 %	4	4	3	4	3	-	3	-
Citric acid 10 %	1	1	1	1	1	1	1	1
Cyclohexanol	3	3	1	3	1	1	1	1
Detergents	-	-	1	1	-	-	-	-
Dichloroacetic acid	-	-	1	1	1	1	-	-
Diethyl ether	4	4	4	4	3	4	4	4
Dimethyl acetamide	4	4	1	1	1	1	3	4
Dimethylsulfoxide (DMSO)	2	2	1	1	1	1	1	1
Emulsifier	-	-	1	1	-	-	-	-
Ethanol 50 %	1	1	1	-	1	1	1	1
Ethanol 96 %	1	1	1	1	1	-	1	-
Ether	4	4	4	4	3	4	4	4
Formaldehyde 10 %	3	3	1	1	1	1	1	1
Formaldehyde 40 %	4	4	1	2	1	2	2	3
Formamide	1	1	1	1	1	1	1	1
Formic acid 50 %	3	3	1	2	1	1	1	2
Glucose	1	1	1	1	1	1	1	1
Glycerine	1	1	1	1	1	1	1	1
Heptane	4	4	3	3	2	3	3	4
Hexanol	-	-	1	-	1	-	1	-
Hydrochloric acid 20 %	1	1	1	1	1	1	1	1
Hydrochloric acid conc.	3	3	1	1	1	1	1	1
Hydrogen peroxide 3 %	1	1	1	1	1	1	1	1
Hydroquinone	4	4	1	-	-	-	1	3
Isoamyl alcohol	1	1	-	-	-	-	-	-
Isobutanol	2	2	1	1	1	1	1	1
Isopropanol	2	2	1	1	1	1	1	1
Isopropyl acetate	4	4	2	3	1	2	2	3
Isopropyl benzene	4	4	3	4	2	3	3	4
Isopropyl ether	-	-	3	4	3	4	3	4
Lactic acid 3 %	2	2	1	2	1	1	1	2
Lactic acid 85 %	2	2	1	2	1	1	1	1
Liquid paraffin	1	1	1	3	1	1	1	3
Methanol	3	4	1	1	1	1	1	1
Methy propyl ketone	4	4	2	3	1	2	2	3
Methyl acetate	4	4	2	3	3	3	3	4
Methyl phenyl ether 100 %	4	4	3	-	-	-	3	-
Methylamine 32 %	-	-	1	-	1	-	1	-

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	PS 20°C	PS 50°C	PP 20°C	PP 50°C	HDPE 20°C	HDPE 50°C	LDPE 20°C	LDPE 50°C
Methylene chloride	4	4	3	4	4	4	4	4
Naphthalene	-	-	1	-	1	3	-	-
Nitrobenzene	4	4	4	4	3	4	4	4
Oxalic acid	1	1	1	1	1	1	1	1
Ozone	3	3	1	2	1	1	1	2
Palmitic acid	1	1	3	4	3	-	2	-
Phenol 10 %	4	4	1	1	1	1	1	1
Phenol 100 %	4	4	1	1	2	3	3	3
Phosphoric acid 1-5 %	2	2	1	1	1	1	1	1
Phosphoric acid 85 %	1	1	1	2	1	1	1	1
Phthalic acid	1	1	1	1	1	1	1	1
Potassium carbonate	1	1	1	1	1	1	1	1
Potassium chromate	1	1	1	1	1	1	1	-
Potassium permanganate	1	1	1	1	1	3	1	1
Propanol	3	3	1	1	1	1	1	1
Sodium hypochloride	1	1	2	3	2	3	2	3
Sodium acetate	2	2	1	1	1	1	1	1
Sodium hydroxide 30 %	1	1	1	1	1	1	1	1
Sodium hydroxide 45 %	1	1	1	1	1	1	1	1
Sodium hydroxide 60 %	1	1	1	1	-	-	-	-
Sodium permanganate	2	3	1	1	1	1	1	1
Sodium thiosulfate	1	1	1	1	1	1	1	1
Sodium chloride	1	1	1	1	1	1	1	1
Stearic acid	1	2	1	1	1	1	1	1
Sulphuric acid 1-6 %	1	1	1	1	1	1	1	1
Sulphuric acid 60 %	2	2	1	3	1	3	1	3
Sulphuric acid conc.	4	4	4	4	4	4	4	4
Tannin acid	1	1	1	1	-	-	-	-
Terpentine oil	-	-	-	-	3	4	3	4
Tetrahydrofuran	4	4	3	4	3	4	4	4
Toluene	4	4	3	4	3	4	3	4
Trichloroacetic acid	4	4	1	1	1	4	2	3
Urea	1	2	1	1	1	1	1	1
Uric acid	-	-	1	-	1	-	1	-
Urine	3	3	1	1	1	1	1	1
Xylene	4	4	4	4	2	3	2	4

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As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Resistance scale from 1 to 4

- 1 = resistant i.e. the plastics may be treated with the chemical compound at room temperature over several years without any significant alterations in its physical, optical and chemical properties
- 2 = limited resistant i.e. the plastics may be treated with the chemical compound at room temperature over several weeks without any significant alterations in its physical, optical and chemical properties
- 3 = moderate resistant i.e. the plastics may be treated with the chemical compound at room temperature for short time only (several minutes to one hour) without any alterations in physical, optical and chemical properties (mixing and measuring is possible)
- 4 = no resistant i.e. treating the plastics with the substance named may cause alterations in physical, optical and chemical properties within seconds