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Chemical Resistance of Polyethylene, Polypropylene, and Polystyrene

The following table contains an evaluation of chemical resistance to various fluids. In general, common chemical names are used.

When assessing the resistance of TPP products to chemicals, the following factors must be considered:

- Exposure time
- Concentration of chemicals
- Thermal stress (e.g., autoclave)
- Mechanical stress (e.g., applied force)
- Exposure to UV radiation
- Aging effects (e.g., caused by detergents)
- Other environmental factors

TPP's recommendations are based on technical literature and information provided by raw material manufacturers. They have been carefully prepared and are intended as a general guide for users of plastic materials. However, they cannot replace suitability testing performed by the user under actual working conditions.

Resistance is categorized based on the material's stability under standard conditions.

+ = **Resistance**	± = **Limited Resistance**	– = **Not Resistant**
Continuous exposure to the substance does not cause damage within 30 days. The plastic may remain resistant for years.	Continuous exposure to the substance causes minor damage, some of which may be reversible within 7–30 days (e.g., swelling, softening, reduced mechanical strength, discoloration).	Not suitable for continuous exposure. Immediate damage may occur (e.g., loss of mechanical strength, deformation, discoloration, cracking, dissolution).

Resistance to chemicals	Polyethylene (PE) 20 °C	Polypropylene (PP) 20 °C	Polystyrene (PS) 20 °C
A			-
Acetaldehyde	±	±	-
Acetic acid	+	+	±
Acetic acid 5%	+	+	+
Acetic acid 50%	+	+	±
Acetic acid (glacial)	+	+	-
Acetone	+	+	-
Acetonitrile	+	+	-
Acetophenone	+	+	-
Adipic acid	+	+	+
Allyl alcohol	+	+	±
Aluminum chloride	+	+	+
Amino acids	+	+	+

Resistance to chemicals	Polyethylene (PE) 20 °C	Polypropylene (PP) 20 °C	Polystyrene (PS) 20 °C
Ammonia (aqueous, saturated)	+	+	+
Ammonia (liquid, 100%)	+	+	±
Ammonium acetate saturated	+	+	+
Ammonium chloride saturated	+	+	+
Amyl acetate 100%	±	±	-
Amyl alcohol 100%	+	+	±
Aniline 100%	+	+	-
Aqua regia HCl / HNO_3= 3:1	-	-	-
Arsenic acid	+	+	+
B			
2-Butanol	+	+	±
Benzaldehyde	+	+	-
Benzene	-	-	-
Benzyl alcohol	±	-	-
Boric acid	+	+	+
Butyl acetate 100%	±	-	-
C			
Calcium chlorate	+	+	+
Calcium chloride	+	±	+
Calcium hydroxide	+	±	±
Calcium hypochlorite	+	±	+
Carbazole	+	+	+
Carbon tetrachloride	±	-	-
Chlorine aqueous saturated	±	+	–
Chlorine liquid 100%	–	–	–
Chlorobenzene	±	–	–
Chloroform	±	±	–
Chromic acid up to 40%	–	+	+
Citric Acid saturated	+	+	+
Copper sulfate aqueous	+	+	+
D			
1,4-Dioxane	±	±	
Decahydronaphthalene (Decalin)	+	±	–
Dibutyl phthalate	+	+	–
Diethyl ether	±	+	–
Diethyl malonate	+	+	–
Diethylene dioxide	+	+	
Diethylene glycol	+	+	±
Dimethyl sulfoxide (DMSO)	+	+	+
E			
Ethyl acetate	+	±	–
Ethanol (absolute)	-	+	±
Ethyl alcohol 40%	+	+	±
Ethyl alcohol 96%	+	+	±
Ethylene chloride	-	-	-

Resistance to chemicals	Polyethylene (PE) 20 °C	Polypropylene (PP) 20 °C	Polystyrene (PS) 20 °C
Ethylene glycol	+	+	+
Ethylene oxide 100%	±	±	–
F			
Fatty acids	+	+	+
Fluorinated hydrocarbon	–	±	–
Fluorine	–	–	
Fluorine gas	-	-	–
Formaldehyde	+	+	–
Formaldehyde 10%	+	+	±
Formaldehyde 40%	+	+	–
Formic acid up to 100%	+	+	±
Formic acid up to 40%	+	+	±
H			
Hexane	+	+	±
Hydrobromic acid up to 100%	+	+	–
Hydrochloric acid	+	+	±
Hydrochloric acid 20%	+	+	+
Hydrochloric acid 5%	+	+	+
Hydrochloric acid up to 40%	+	+	+
Hydrofluoric acid 4%	+	+	±
Hydrofluoric acid 48%	+	+	–
Hydrogen peroxide 30%	+	+	
I			
Isopropanol	+	±	+
Isopropyl ether 100%	+	+	+
L			
Lactic acid 10%	+	+	±
Lactic acid up to 100%	+	+	±
Lead acetate	+	–	
M			
2-Methoxyethanol	+	+	-
Magnesium chloride saturated	+	+	+
Mercury	+	+	+
Mercury hydroxide	+	+	±
Methanol (100%)	+	+	±
2-Methoxyethyl oleate	+	+	–
Methyl alcohol	+	+	+
Methylene chloride	-	±	–
N			
n-Butanol	+	+	+
n-Octane	+	+	–
Nitric acid 40 – 50%	±	±	±
Nitric acid up to 30%	+	+	±

Resistance to chemicals	Polyethylene (PE) 20 °C	Polypropylene (PP) 20 °C	Polystyrene (PS) 20 °C
O			
Oxalic acid saturated	+	+	+
Ozone	±	+	±
P			
2-Propanol	+	+	+
Perchloroethylene	–	–	–
Petroleum ether	±	±	–
Phenol 90%	+	–	–
Phosphoric acid	+	+	+
Phosphoric acid 5%	+	+	±
Phosphoric acid 85%	+	+	+
Phosphorus trichloride	+		
Potassium hydroxide up to 50%	+	+	±
Potassium permanganate 30%	+	+	±
Propylene glycol	+	+	+
Pyridine	–	–	–
S			
Silicone oil	+	+	+
Silver nitrate	+	+	±
Sodium carbonates up to 50%	+	+	+
Sodium dichromate saturated	+	+	+
Sodium hydroxide 1%	±	+	±
Sodium hydroxide (10–60%)	±	+	+
Sodium hypochlorite 15%	+	+	+
Stearic acid	+	+	+
Sulfuric acid 10 - 30%	+	+	±
Sulfuric acid 50%	+	+	±
Sulfuric acid (96–98%)	±	±	–
Sulfuric acid up to 10%	+	+	+
T			
Tartaric acid saturated	+	+	±
Tetrahydrofuran	-	±	–
Tincture of iodine	+	+	±
Toluene	±	±	–
Tributyl citrate	±	±	–
Trichloroethylene	-	–	–
Triethylene glycol	+	+	+
Tripropylene glycol	+	+	+
Trisodium phosphate	+	+	
U			
Urea saturated	+	+	+
X			
Xylene	±	-	±
Z			
Zinc chloride saturated	+	+	±
Zinc sulfate saturated	+	+	+

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