Chemical and Physical Properties

Chemical Resistance and Physical Properties of Plastics

ABS: Acrylonitrile Butadiene Styrene
Acetal: Polyoxymethylene
EVA: Ethylene Vinyl Acetate
HDPE: High-density polyethylene
HIPS: High-Impact Polystyrene
LDPE: Low-density polyethylene
PC: Polycarbonate
PP: Polypropylene
PS: Polystyrene
PVC: Polyvinyl Chloride

Chemical Resistance Summary

Resin	Max use temp (°F/°C)	Brittleness temp (°F/°C)	Transparency	Sterilization					Specific gravity (g/mL)	Flexibility	Permeability (approximate) cc-mm / m²-24hr-Bar			Water absorption (%)
				Autoclave	Gas	Dry heat	Radiation	Disinfectants			N_2	O_2	CO_2	
HDPE	248/120	-148/-100	Translucent	No	Yes	No	Yes	Yes	0.95	Rigid	651	2868	8990	<0.01
LDPE	176/80	-148/-100	Translucent	No	Yes	No	Yes	Yes	0.92	Excellent	2790	7750	41,850	<0.01
PC	275/135	-211/-135	Transparent	Yes	Yes	No	Yes	Yes	1.20	Rigid	775	4650	16,663	0.35
PP	275/135	32/0	Translucent	Yes	Yes	No	No	Yes	0.90	Rigid	744	3720	12,400	<0.02
PS	194/90	68/20	Transparent	No	Yes	No	Yes	Some	1.05	Rigid	853	4650	17,825	0.05
PVC	158-70	-22/-30	Transparent	No	Yes	No	No	Yes	1.34	Rigid	31-310	62	62	0.15-0.75

Physical Properties

Classes of substances; temperature 20 °C	LDPE	HDPE	PC	PP	PS	PVC
Acids, weak or dilute	E	E	E	E	E	E
Acids, strong or concentrated	E	E	G	E	E	E
Alcohols, aliphatic	E	E	G	E	E	E
Aldehydes	G	G	F	G	N	N
Bases	E	E	N	E	E	E
Esters	G	G	N	G	N	N
Hydrocarbons, aliphatic	G	F	F	G	N	E
Hydrocarbons, aromatic	G	F	N	F	N	N
Hydrocarbons, halogenated	F	N	N	F	N	N
Ketones	G	G	N	G	N	N
Oxidizing agents, strong	F	F	N	F	N	G

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. Depending on the plastic, the effect may be cracking, crazing, loss of strength, discoloration. Solvents may cause softening, swelling, and permeation losses with PPCO, PP, PMP, LDPE, and HDPE; the solvent effects on these materials are normally reversible.

N - **Not recommended** for continuous use. Immediate damage may occur. Depending on the plastic, the effect will be severe cracking, crazing, loss of strength, discoloration, deformation, dissolution, or permeation loss.