

Properties of Plastics

Disposal and the environment

- ✓ The plastics used for our products are environmentally neutral during disposal.
- ✓ The plastics can be stored on waste disposal sites without any problems as they do not give off any harmful substances to air, ground or water.
- ✓ The plastics PS, PP, PC and PE are valuable energy carriers to maintain incinerator temperature. The more plastics in waste the less use of fuel.

	Polystyrene	Polypropylene	Polycarbonate	Polyethylene
Abbreviation	PS	PP	PC	HD-PE High Density LD-PE Low Density
Optical features	transparent, bright surface 90% light permeability (at 400-800 nm)	translucent, bright surface	transparent, 88% light transmission (at 400-800 nm)	translucent to opaque, wax-like surface
General mechanical properties	low elongation at break and heat resistance, excellent electrical insulating features, not suitable for high centrifugal forces	high breaking strength, insensitive to tension cracks, high rigidity	displays high levels of mechanical, optical, electrical and thermal properties, autoclavable and gamma capable	relatively low breaking strength and surface hardness, high viscosity, soft to rigid, sensitive to tension cracks, water repellent
Autoclaving	not suitable	Products made from PP can be autoclaved up to 121°C without significantly impairing their mechanical properties. Users are to test for themselves if autoclaving may have any effect on other characteristic product features so as to influence the individual application concerned.	Products made from PC can be autoclaved up to 121°C without significantly impairing their mechanical properties. Users are to test for themselves if autoclaving may have any effect on other characteristic product features so as to influence the individual application concerned.	not suitable
Max. usage temperature* ¹	60 - 70°C	100 - 110°C	115 - 125°C	HD-PE 70 - 80°C LD-PE 60 - 75°C
Short-term max. usage temperature* ¹	75 - 80°C	120 - 140°C	125 - 140°C	HD-PE 90 - 120°C LD-PE 80 - 90°C
Suitable for application in temperature ranges below zero* ²	not suitable	suitable for limited applications* ¹	down to -80°C	suitable for limited applications* ¹
Density g/cm ³	1.05	0.90	1.19	HD-PE 0.95 LD-PE 0.92
Flammability	inflammable	inflammable	inflammable	inflammable
Ignition temperature* ¹	300 - 400°C	300 - 360°C	380 - 450°C	350 - 360°C
Humidity absorption	< 0.1%	< 0.1%	0.1 - 0.3%	< 0.1%
General chemical resistance	PS is resistant to salt solutions, leaching solutions, non-oxidizing acids as well as alkalis and alcohol. Fuel, etheric oils, strong oxidizing agents and aromatic substances lead to the formation of cracks in PS.	PP is resistant to aqueous solutions of inorganic salts, acids, organic solvents up to 60°C. Alcohols, esters and ketones do not "attack" PP either. Aromatic and halogenised carbon dioxides, oxidizing substances such as concentrated nitric acid and with higher temperature fat, oil and wax make PP swell.	PC is resistant to higher concentrations of mineral acids, many organic acids (e.g. carbonic, oleic and citric acid), oxidation and reduction agents, neutral and acidic saline solutions, a number of fats and oils, saturated aliphatic and cycloaliphatic hydrocarbons and alcohols, except for methanol. PC is destroyed by lyes, ammonia gas, its solution and amines. PC is soluble in a number of industrial solvents. Other organic compounds such as benzene, acetone and carbon tetrachloride tend to make it expand or swell.	PE is highly resistant to chemicals. The chemical resistance of HD-PE is generally higher than that of LD-PE. Aqueous solutions, leaching solutions, alcohol, oil as well as water and salt solutions do not "attack" PE. Concentrated, oxidizing acids such as nitric acid and halogens have a decomposing effect.
Disposal	PS is a pure hydrocarbon compound and thus environmentally neutral during disposal. Incineration does not yield any harmful substances.	PP is a pure hydrocarbon compound and thus environmentally neutral during disposal. Incineration does not yield any harmful substances.	PC is a pure hydrocarbon compound and thus environmentally neutral during disposal. Controlled incineration does not yield any harmful substances.	PE is a pure hydrocarbon compound and thus environmentally neutral during disposal. Incineration does not yield any harmful substances.

*¹ Suitability depending on the plastic material and the nature of load applied.

*² Caution: Plastics start to become brittle at temperatures below zero. The suitability of products intended for use in these temperature ranges should be tested prior to application. These notes serve as a guideline only and do not constitute any confirmation of warranted quality.