

THERMOPLASTIC MATERIALS

The table below provides some brief details on different thermoplastic materials used in injection moulding. The list is by no means exhaustive and there are a number of blends of different materials, e.g. PC/ABS, designed to achieve the best performance properties of the two individual components. Within each group of plastics materials different levels of performance are available. Additional strength may be gained through the addition of fillers, such as talc or glass, in many cases. Also additives to improve UV stability or flame retardancy or provide antimicrobial properties may also be used.

Material	Abbr.	Properties	Typical Applications
Polypropylene	PP	Good chemical resistance	Packaging, containers
PP Homopolymer	HPPP	Semi rigid, durable	Small domestic appliances eg kettles
PP Copolymer	CPPP	Good gloss, texture possible, low cost	Large automotive parts, plates and cups for children and picnics
Polyethylene	PE	Good chemical resistance, flexible or semi rigid depending on grade. Weatherproof, good low temperature performance. Non toxic. Low cost	Low Density –Packaging, containers. High Density – crates, chemical drums, gas/water pipe and fittings, kitchenware
PE Low Density	LDPE/LLDPE		
PE High Density	HDPE		
Polystyrene	PS	Brittle, transparent. Poor UV stability. HIPS up to 7x impact strength of GPPS	GPPS – toys, packaging, cosmetic packaging HIPS – TV cabinets, refrigerator linings, toilet seats
General Purpose	GPPS		
High Impact	HIPS		
Acrylic	PMMA	Rigid, clear, glossy, good weather resistance	Lenses, signs, light diffusers, point of purchase displays
Acrylonitrile Butadiene Styrene	ABS	Rigid, opaque, tough, good gloss, texture possible	Domestic appliances, car fascias, computer housings
Nylon (Polyamide)	PA	Rigid, tough, hardwearing	Gears, bearings, automotive under bonnet parts
Acetal	POM	Rigid, tough, springlike, good wear and electrical properties	Aerosol valves, clock parts, computer printer components
Polycarbonate	PC	Rigid, transparent, excellent impact resistance, good weather resistance, good dimensional stability	Crash helmet visors, vandal proof glazing, riot shields, car headlamp lenses, safety helmets, babies' bottles
Acrylate Styrene Acrylonitrile	ASA	Rigid, opaque, tough, good UV resistance	Housings, telephones, automotive door mirrors and radiator grilles
Styrene Acrylonitrile	SAN	Rigid, transparent, tough, resistant to stress cracking	Lenses, drinking tumblers, kitchen and picnic ware, hi-fi covers
Polyvinyl Chloride	PVC	Rigid or flexible grades, weatherproof, non-flammable, good impact strength and electrical insulation	Drainpipes and guttering, cable insulation, flooring, roofing, hosepipes
Polyurethane	PUR	Flexible, clear, impermeable	Shoe soles and heels, seals, gaskets, rollers, wheels
Polyesters	PBT, PET	Rigid, clear, extremely tough, wide temperature range resistance	Drink bottles, business machine components, transformer parts

Polysulphone	PES, PSU, PEEK	Excellent high temperature stability, rigid or flexible grades available. High cost	Microwave grills, chemotherapy devices, surgical equipment, fuel cells
Polyphenylene Sulphide	PPS	Rigid, opaque, non-burning, good chemical resistance at high temperature	Chemical pumps, medical and dental equipment, transformer parts, heating element bases
Polyvinylidene Fluoride	PVDF	Strong, tough material with excellent chemical and heat resistance	Valves, pumps, bearings in chemical process industry
Polyphenylene Oxide	PPO	Rigid, opaque, glossy, excellent dimensional stability	TV housings, automotive instrument enclosures
Ethylene Vinyl Acetate	EVA	Flexible (rubber-like), good low temperature flexibility, good chemical resistance	Handle grips, ice cube trays, hoses

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