Engineering plastics

Material selection guide • sheets, rods, tubes and finished parts

PURPOSE OF THIS GUIDE

When selecting a material, temperature, mechanical load, wear and friction, chemical resistance, moisture absorption and dimensional accuracy must all be considered. This guide summarises key benefits and typical uses of common materials.

Precision components
POM / PET
dimensionally stable parts

Rollers and guides
PA
tough and wear resistant

Sliding surfaces
PE1000
low friction

Transparent sheets
PC / PMMA
impact or optical clarity

General engineering plastics

MAIN PROPERTIES

Material	Key properties	Typical application
POM-C / POM-H	Rigid, dimensionally stable and readily machined; low friction and good wear resistance.	Bushings, gears, precision machine components.
PA6 / PA66 / cast PA6	Tough, with high mechanical strength and wear resistance; absorbs moisture.	Rollers, wheels, loaded machine components.
PE-UHMW / PE1000	Excellent wear and impact resistance, with very low friction.	Slideways and chain guides, material handling.
PE500 / PE300 / PE-HD	Lightweight polyethylenes with good chemical resistance.	Tanks, enclosures, basic machine components.
PET	Rigid, with low moisture absorption and good dimensional stability.	Precision-machined components.
PP	Lightweight, chemically resistant and weldable.	Chemical process tanks and structural components.
PVC-U	Rigid, chemically resistant, readily machined.	Chemical process equipment, covers.
ABS	Rigid, impact resistant and easily machined.	Equipment housings and prototypes.

Important: fillers, manufacturing method and specific grade can significantly affect mechanical, thermal and wear characteristics.

Transparent and high-performance plastics

Enclosure materials • high thermal and mechanical loads

Transparent and enclosure materials

Material	Defining property	Typical application
PC – polycarbonate	Transparent plastic with high impact strength.	Machine guards, inspection windows.
PMMA – acrylic	Excellent optical clarity and good weather resistance.	Displays and transparent technical covers.
Specialty sheets	UV-stabilised, coloured, ESD and other grades.	Application-specific covers.

High-performance polymers

SPECIALITY MATERIALS

Material	Key characteristics	When to choose it
PEEK	High thermal, chemical and mechanical resistance; filled grades also available.	Highly loaded precision part.
PPS	High stiffness, dimensional stability, heat and chemical resistance.	Components exposed to heat and chemicals.
PEI	Heat-resistant rigid amorphous material with good electrical properties.	Electrical insulating and hot components.
PSU / PES / PPSU	Heat-resistant amorphous polymers with varying hydrolysis and chemical resistance.	Process, electrical and hygienic components.
PAI	High-strength, wear- and heat-resistant specialty polymer.	Heavily loaded, dimensionally accurate part.
PI	For extreme heat loads and tribological applications.	Special high-temperature applications.

WHICH GROUP SHOULD YOU CHOOSE?

For general precision components consider POM or PET; for high mechanical load choose PA; for impact-loaded transparent guards PC and for optical clarity PMMA. At high temperatures, PEEK, PPS, PEI or another high-performance grade may be justified.

Fluoropolymers

PTFE • PVDF • PFA • FEP • ETFE • ECTFE • PCTFE

WHEN TO CHOOSE A FLUOROPOLYMER

Fluoropolymers are selected mainly for chemical resistance, non-stick behaviour and special thermal properties. Their rigidity, creep, machinability and weldability vary substantially.

Fluoropolymer overview

Material	Properties	Typical application
PTFE	Non-stick, low-friction and extremely chemically resistant.	Seals, films, bushings, liners.
PVDF	Chemically resistant and more rigid than PTFE; thermoplastically weldable.	Chemical processing tank and pipe components.
PFA / FEP	Melt-processable fluoropolymers with good and chemical resistance.	Films, tubes, hoses and coatings.
ETFE / ECTFE	Good mechanical strength and chemical resistance.	Special industrial protective and structural components.
PCTFE	Low gas permeability and good dimensional stability.	Cryogenic and gas-barrier applications.
MFA / THV	Specialty formulations selected for specific applications.	Custom engineering solutions.

MATERIAL SELECTION GUIDANCE

PTFE: non-stick surfaces and seals; PVDF: weldable chemical equipment; PFA/FEP: films and tubing; PCTFE: gas-barrier and cryogenic use. Always verify operating loads and the correct material grade.

CHECKING CHEMICAL AND TEMPERATURE RESISTANCE

Continuous operating temperature and chemical compatibility must be checked against the specific grade's datasheet, chemical concentration, mechanical load and contact duration.

Material selection in practice

Typical applications • cut to size • CNC machining

Practical selection guide

Key requirement / application	Suggested materials	Further checks
Precision bushing, gear	POM, PET	Creep, load, thermal expansion.
Highly loaded roller or guide	PA, cast PA	Moisture, lubrication, temperature.
Wear-prone chain guide, sliding surface	PE1000	Contact pressure and sliding speed.
Chemical tank or enclosure	PP, PVC-U, PVDF	Media, concentration, temperature.
Transparent machine guard	PC	Impact, UV, cleaning chemicals.
High thermal and mechanical loads	PEEK, PPS, PAI, PI	Sustained load, temperature, cost.
Chemically resistant sliding or sealing component	PTFE	Creep, dimensional accuracy, load.
Electrical or ESD application	PEI / ESD grade	Resistance range, certification.

Semi-finished stock and machining

Process	Typical option
Sheet, rod, tube	Standard or special semi-finished stock, cut to size.
CNC turning	Bushings, rings, spacers, rollers and turned components.
CNC milling	Machined holes, contours and complex components from drawings or samples.
Specialty grades	Glass-filled, carbon-filled, graphite-filled and ESD grades.

INFORMATION FOR YOUR ENQUIRY

Material grade or required properties; sheet/rod/tube form; dimensions and quantity; operating temperature; mechanical and chemical loads; drawings or samples; required certificates.