



POLYPROPYLENE (PP)

Polypropylene is a semi-crystalline thermoplastic with high rigidity and very good chemical resistance. Characteristic for polypropylene is a CH₃ side-group in the monomer structural unit, which can be aligned in various spatial positions during polymerisation. The various spatial alignments are significant for the physical properties and differ according to the following:

- Isotactic (regular, one-sided alignment in the macromolecule),
- Syndiotactic (regular, double-sided alignment in the macromolecule),
- Atactic (irregular, random alignment in the macromolecule).

Standard Colours: Grey / White

Mechanical Properties		
Density DIN53 479	g/cm ³	0.91
Yield Stress DIN53 455	MPa	32
Elongation at break DIN53 455	%	70
Modules of elasticity resulting from tensile test DIN53 457	MPa	1,400
Modules of elasticity resulting from bending test DIN53 457	MPa	1,400
Flexural strength DIN53 452	MPa	45
Impact strength DIN53 453	KJ/m ²	o. B.
Notched-bar impact strength DIN 53 453	KJ/m ²	7
Ball indentation Hardness H _{358/30} DIN53 456	MPa	70
Creep rate stress at 1% elongation DIN53 444	MPa	4
Sliding friction coefficient against steel (dry running) ³	-	0.35
Sliding wear against steel (dry running) ³	µm/km	11.0
Thermal Properties		
Melting temperature DIN53 736	°C	+162
Thermal conductivity DIN52 612	W/(k m)	0.22
Specific thermal capacity	J/(g K)	1.7
Coefficient of linear expansion	10 ⁻⁵ - K ⁻¹	16
Operating temperature range (long-term)	°C	0 +80
Operating temperature range (short-term)	°C	+100
Fire behaviour after UL 94 IEC 60695	-	HB
Electrical Properties		
Dielectric constant DIN53 483	-	2.25
Dielectric loss factor DIN53 483	-	0.00033
Specific volume resistance DIN53 482	Ω-cm	>10 ¹⁶
Surface resistance DIN53 482	Ω	10 ¹⁴
Dielectric strength DIN53 481	KV/mm	52
Creep resistance DIN53 480	-	KA 3c
Miscellaneous data		
Moisture absorption in natural Rubber until saturated DIN53 715	W(H ₂ O)%	<0.01
Water absorption until saturated DIN53 495	W _s %	<0.01
Specific properties		as PE-HD, but higher thermal strength

Alignment

A distinction is also made between homopolymers and copolymers; copolymers are tougher but have less mechanical and chemical stability. As the physical properties improve considerably with the increase in the isotactic concentration in the polymer, isotactic polypropylene homopolymers should be the first choice for use in the technical area. The polypropylene finished products that we offer consist of high density polypropylene types produced by extrusion or moulding processes.

Main properties

- Low density compared to other materials (0.91 g/cm³)
- Minimum water absorption (< 0.01%)
- Excellent chemical resistance, also to solvents
- High corrosion resistance
- Relatively high surface hardness
- Very good electrical insulator
- Physiologically safe

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Applications

- Pump parts
- Component parts in chemical apparatus construction
- Fittings
- Valve bodies
- Product holders for electroplating processes
- Punching plates

Areas of use

- Electroplating industry
- Chemical industry
- Machine engineering
- Stamping/punching plants



Sliding properties - PP-H is subject to strong sliding abrasion and is thus not suitable for use in sliding applications.

Chemical resistance - PP-H is resistant to acids, alkaline solutions, salts and salt solutions, alcohols, oils, fats, waxes and many solvents. Aromatics and halogenated hydrocarbons cause swelling. PP-H is not resistant to strong oxidising materials (e.g. nitric acid, chromic acid or halogens) and there is a danger of stress corrosion cracking.

Behaviour in fire - PP-H is rated as normal flammable. When the source of ignition is removed PP-H continues to burn, forming droplets. However, apart from carbon dioxide, carbon monoxide and water, only small quantities of carbon black and molecular constituents of the plastic develop as conflagration gases. The oxygen index (the oxygen concentration required for combustion) at 18% is low compared to other plastics.

Weathering effects - PP-H is not resistant to UV rays. UV rays, in combination with atmospheric oxygen, oxidise the surface and discolouration occur. If the material is exposed to the effects of UV rays for a longer period, this will cause irreparable damage and decomposition of the surface.

Machining - In addition to its good welding properties, PP-H can also be machined on machine tools. The semi-finished products can be drilled, milled, sawed, planed and turned on a lathe. It is also possible to cut a thread into the material or insert a threaded element. Generally, no cooling or lubricating emulsion is necessary. During cutting, it is very important to ensure that the tools that are used are always adequately sharp. Blunt tools cause the surface to heat, which can cause "smearing" and consequently unacceptable surface finishes.

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