

# Polypropylene (PP)

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Polypropylene is a semi-crystalline thermoplastic with high rigidity and very good chemical resistance. Characteristic for polypropylene is a CH<sub>3</sub> 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).

## 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/cm<sup>3</sup>)
- Minimum water absorption (< 0.01%)
- Excellent chemical resistance, also to solvents
- High corrosion resistance
- Relatively high surface hardness
- Very good electrical insulator
- Physiologically safe

## Colours

Natural (white), grey (≈ RAL 7032)

Other colours available on request.

## 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 occurs. 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.

## Areas of use

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

## Applications

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

## 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.

