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What is PP-H EN

PP-H

PP-H (polypropylene homopolymer) – semi-crystalline standard thermoplastic, chemically resistant, weldable and light

PP-H (polypropylene homopolymer) is a semi-crystalline thermoplastic from the family of polyolefins. It combines very broad chemical and corrosion resistance with good strength and stiffness, very low density and excellent weldability. This makes PP-H the classic material of chemical apparatus and tank construction – more load-bearing and temperature-resistant than PE-HD, but more brittle in the cold.

Classification and basic character

PP-H belongs to the polyolefins – thermoplastics with a pure hydrocarbon chain. As a homopolymer it is stiffer, harder and more temperature-resistant than PE-HD and than the tougher PP copolymer (PP-C), but more brittle and impact-sensitive at low temperatures. With a density around 0.90 g/cm^3, PP-H is one of the lightest engineering plastics and floats on water. It absorbs virtually no moisture and is chemically resistant across a very wide range.

Chemical resistance and weldability

The outstanding features of PP-H are its broad chemical and corrosion resistance and its very good weldability. It withstands acids, alkalis, salt solutions and many solvents and can be reliably hot-gas and extrusion welded. This is why PP-H is the standard material for welded tanks, pipework, scrubbers and electroplating baths in chemical plant engineering as well as in drinking water and wastewater technology.

How PP-H is made and processed

PP-H is produced by polymerisation of propylene into a homopolymer. For engineering parts it is extruded into semi-finished stock such as plates, round bars and pipes. From these we machine components – turning, milling, drilling and sawing are clean. Its particular strength is weldability: whole welded tanks and apparatus are built from PP-H plates. Because of the high thermal expansion and creep tendency, tight tolerances are only achievable to a limited extent.

Mechanical, thermal and electrical properties

PP-H reaches a yield stress of over 30 MPa with a tensile modulus over 1,500 MPa and a density above 0.90 g/cm^3 – it is stiffer and stronger than PE-HD, but less impact-resistant (notched impact strength over 4 kJ/m²) and brittle in the cold. The service temperature ranges from about 0 °C up to a continuous +100 °C, short-term to around 150 °C – considerably higher than PE-HD. Electrically, PP-H is an excellent insulator with very high resistivity. The high coefficient of linear thermal expansion (120–190 · 10^{-6}/K) must be considered in the design.

When PP-H is the right choice

PP-H is worthwhile whenever chemical resistance, weldability and temperature resistance up to 100 °C are required at low cost – for example:

- Welded tanks, containers and pipework in chemical plant engineering
- Electroplating and pickling baths, scrubbers and exhaust air purification plants
- Components for drinking water, wastewater and process water technology
- Cleanroom and ventilation systems as well as aquafarming installations
- Corrosion-free constructions in contact with aggressive media

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When PP-H is NOT the right choice

Equally important are the limits of the material:

- Applications below 0 °C or with impact/shock loading – PP-H is brittle in the cold; use PP-C (copolymer) or PE-HD
- Precision parts with tight tolerances – high thermal expansion, creep tendency; use PET or POM
- High mechanical load or stiffness requirements – moderate modulus and strength
- Components with fire-safety requirements – PP-H only reaches UL 94 HB
- Permanent outdoor use with natural-coloured stock – not UV-resistant without stabilisation

What does PP-H cost?

PP-H is one of the most economical engineering plastics and is priced at the level of PE-HD, considerably below POM, PET, PA and high-performance plastics. As a rough guide, semi-finished stock prices are in the range of about 3–8 €/kg. The component price is determined mainly by the semi-finished shape and dimension, material utilisation (offcut), machining or welding effort and lot size. We are happy to quote binding prices on request based on your drawing.

Machining and welding at Liedtke

PP-H machines easily and cleanly – turning, milling, drilling and sawing are effortless. Because of the high thermal expansion, we use adapted cutting parameters and ensure good cooling. Its strength is weldability: on request we build complete welded tanks and apparatus from PP-H plates. This is how we reliably produce components and assemblies for chemical and water technology – from single pieces to series production.

Advantages and disadvantages at a glance

An honest assessment – and how the disadvantages can be mitigated in practice:

Advantages

- Very broad chemical and corrosion resistance
- Excellently weldable – ideal for tank and apparatus construction
- Higher strength, stiffness and temperature than PE-HD (up to 100 °C)
- Very low density and moisture absorption
- Physiologically inert, suitable for food contact

Disadvantages

- Brittle and impact-sensitive in the cold (service from about 0 °C)
- High thermal expansion and creep tendency – limited dimensional stability
- Moderate mechanical strength and stiffness
- Only UL 94 HB, and natural grade not UV-resistant

Practical tip: PP-H plays to its strengths wherever chemical resistance, weldability and temperatures up to 100 °C matter – for example in chemical tank and apparatus construction. Where cold or impact loading is expected, we recommend the tougher PP-C (copolymer) or PE-HD; for high stiffness and dimensional stability PET or POM.

Typical Properties

- Very broad chemical and corrosion resistance
- Excellently weldable
- High strength and stiffness (for a polyolefin)
- Temperature-resistant up to 100 °C
- Very low density (light)
- Very low moisture absorption
- Suitable for food contact

Product Examples

- Welded tanks, containers and pipework
- Electroplating and pickling baths, scrubbers
- Exhaust air purification and ventilation systems
- Components for drinking water and wastewater technology
- Cleanroom and aquafarming components

Typical Industries

- Chemical plant engineering
- Drinking water and wastewater technology
- Cleanroom technology
- Electroplating and surface technology
- Ventilation and environmental technology
- Aquafarming

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- Electrically insulating
- Corrosion-free structural parts

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm³	>0.90
Moisture absorption	DIN EN ISO 62	%	<0.1
Flammability (thickness 3 mm / 6 mm)	UL 94		HB
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	>30
Elongation at break	DIN EN ISO 527	%	>50
Tensile modulus	DIN EN ISO 527	MPa	>1500
Notched impact strength	DIN EN ISO 179	kJ / m²	>4
Shore hardness	DIN EN ISO 868	scale D	>70
Thermal Properties			
Melting temperature	ISO 11357-3	°C	162 ... 167
Coefficient of linear thermal expansion	DIN 53752	10^{-6} / K	120 ... 190
Service temperature, long-term	Average	°C	0 ... 100
Service temperature, short-term (max.)	Average	°C	150
Vicat softening temperature	DIN EN ISO 306, Vicat B	°C	90
Electrical Properties			
Volume resistivity	DIN EN 62631-3-1	Ω * cm	$>10^{14}$
Surface resistivity	DIN EN 62631-3-2	Ω	$>10^{14}$
Dielectric strength	IEC 60243	kV / mm	>40

The values stated are typical average values for PP-H natural; they serve as an aid to material selection and are not a legally binding warranty of specific properties. PP-H is resistant to a very wide range of chemicals; media resistance must be verified case by case at elevated temperatures and with oxidising media. As a homopolymer, PP-H is brittle at temperatures below about 0 °C – for cold or impact loading, PP-C (copolymer) is preferable. Natural-coloured PP-H has only limited UV resistance without stabilisation. Price information is a rough, non-binding guide and may vary depending on market situation, grade, dimension and quantity.

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