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What is POM-H EN

POM-H

POM-H (polyoxymethylene homopolymer / acetal homopolymer) – semi-crystalline engineering thermoplastic

POM-H is the homopolymer variant of polyoxymethylene and the high-performance member of the acetals: compared with the copolymer POM-C it offers somewhat higher strength, stiffness and hardness – ideal for highly loaded, precise functional parts.

Classification and basic character

POM (polyoxymethylene, also polyacetal or acetal resin) is a semi-crystalline engineering thermoplastic and is offered in two variants: as a homopolymer (POM-H) and as a copolymer (POM-C). POM-H has a particularly high degree of crystallinity and, as a result, the highest mechanical values among the acetals – high strength, stiffness, hardness as well as pronounced creep and fatigue strength. The best-known trade name is Delrin.

How POM-H is produced and processed

POM-H is produced by polymerisation of formaldehyde into long, very regular chains. This uniform, highly crystalline structure is the reason for the high strength, hardness and very good sliding properties. POM-H is processed as injection-moulding granulate and as extruded or compression-moulded semi-finished stock (rods, plates, tubes), from which we machine precision parts. With thick-walled rods, centreline porosity can occur due to the manufacturing process, which we take into account when selecting the stock.

Mechanical and physical properties

POM-H reaches a yield stress of around 72 MPa at a modulus of about 3,100 MPa and a density of roughly 1.42 g/cm³. The material is hard, very stiff and strong, yet tough and impact-resistant even at low temperatures. Notable are the very good sliding and wear properties, the high restoring force and the excellent fatigue strength – ideal for highly loaded gears, bearings, spring elements and snap-fit connections.

Chemical and thermal resistance

POM-H is very well resistant to solvents, fuels, oils, alcohols and neutral media. It is not resistant to strong acids, strong alkalis and strongly oxidising media; towards hot water and alkalis it is more sensitive than POM-C. The service temperature ranges from about -50 °C to a continuous +100 °C, briefly up to around 140 °C. POM-H is a good electrical insulator but not flame retardant (UL 94 HB). Physiologically safe grades for food contact are available.

POM-H or POM-C?

Both types are very similar but differ in detail:

- POM-H (homopolymer, e.g. Delrin) – highest strength, stiffness and hardness, very good creep and fatigue strength; ideal for highly loaded functional parts
- POM-C (copolymer) – better resistance to hot water, alkalis and hydrolysis, lower tendency to voids/centreline porosity; ideal for thick-walled and precise machined parts
- With thick-walled rods of POM-H, watch out for possible centreline porosity – POM-C is often the safer choice here

When POM-H is the right choice

POM-H pays off whenever high mechanical load, precision and dimensional accuracy are required – for example:

- Highly loaded gears, bearings and drive elements with tight tolerances
- Spring and snap-fit connections that need lasting restoring force
- Sliding applications with a low coefficient of friction and low wear
- Precision turned and milled parts where dimensional accuracy matters
- As a metal replacement for weight and cost reduction in dry running

When POM-H is NOT the right choice

Just as important are the limits of the material:

- Permanent contact with hot water, steam or alkalis – POM-C or another material is more suitable here
- Strong acids and strongly oxidising media – POM is not resistant
- Continuous use above approx. 100 °C or requirements for flame retardancy (only UL 94 HB)
- Very thick-walled round parts with a dense core – risk of centreline porosity; then choose POM-C
- Applications with UV/weathering exposure outdoors without a stabilised grade

What does POM-H cost?

POM-H is one of the most economical engineering plastics. As a rough guide, semi-finished stock (natural rod/plate) ranges from about 5–12 €/kg; black, food-grade or modified grades as well as small dimensions are higher. The part price is mainly determined by the stock form and dimension, material utilisation (waste), machining effort and batch size. We are happy to quote binding prices on request based on your drawing.

Machining at Liedtke

Like POM-C, POM-H is one of the best machinable plastics – turning, milling, drilling and sawing produce clean results with excellent surface finish and tight tolerances. The low moisture absorption ensures high dimensional accuracy even after machining. For thick-walled parts we check the stock for possible centreline porosity and take the comparatively high thermal expansion into account. This lets us reliably produce precision parts down to ±0.02 mm – from single parts to series production.

Advantages and disadvantages at a glance

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

Advantages

- Highest strength, stiffness and hardness of the acetals
- Excellent creep and fatigue strength
- Very good sliding and wear properties
- High dimensional accuracy due to low moisture absorption
- Outstanding machinability, low material price

Disadvantages

- Sensitive to hot water, alkalis and strong acids
- Not flame retardant (UL 94 HB), limited to approx. 100 °C continuous use
- Tendency to centreline porosity in thick-walled rods
- Unstabilised only conditionally UV/weather resistant

Practical tip: where hot water, alkalis or hydrolysis are involved we switch to POM-C; for thick-walled parts we specifically select low-porosity stock. This keeps the advantages of POM-H usable without running into its limits.

Typical Properties

- Highest strength, stiffness and hardness of the acetals
- Excellent creep and fatigue strength

Product Examples

- Highly loaded gears, pinions and drive elements
- Plain bearings, bushings and sliding strips

Typical Industries

- Mechanical and plant engineering
- Automotive industry
- Food and packaging industry

- Very good dimensional stability and accuracy
- Low moisture absorption
- Very good sliding and wear properties
- Outstanding machinability
- Good chemical resistance (solvents, fuels)
- Food-grade variants available

- Guide elements and rollers
- Precision turned and milled parts
- Spring and detent elements
- Snap-fit and clamp connections
- Valve and pump parts
- Housings, holders and insulating parts
- Conveyor and materials-handling parts
- Components for food and packaging technology

- Electronics and electrical engineering
- Medical technology
- Conveyor and drive technology
- Consumer goods industry
- Precision engineering

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm³	1.42
Water absorption (saturation, 23 °C)	DIN EN ISO 62	%	0.9
Flammability	UL 94		HB
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	72
Yield strain	DIN EN ISO 527	%	12
Tensile modulus	DIN EN ISO 527	MPa	3100
Ball indentation hardness	DIN EN ISO 2039-1	MPa	160
Shore hardness	DIN EN ISO 868	scale D	83
Thermal Properties			
Melting temperature	ISO 11357-3	°C	175
Thermal conductivity	DIN 52612-1	W / (m * K)	0.31
Specific heat capacity	DIN 52612	kJ / (kg * K)	1.5
Coefficient of linear thermal expansion	DIN 53752	10^{-6} / K	110
Service temperature, long-term	Average	°C	-50 ... 100
Service temperature, short-term (max.)	Average	°C	140
Heat deflection temperature	DIN EN ISO 75, method A, HDT	°C	100
Electrical Properties			
Dielectric constant	IEC 60250		3.7
Dielectric dissipation factor (100 Hz)	IEC 60250		0.005

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	Test Method	Unit	Value
Volume resistivity	DIN EN 62631-3-1	Ω * cm	$>10^{13}$
Surface resistivity	DIN EN 62631-3-2	Ω	$>10^{13}$
Dielectric strength	IEC 60243	kV / mm	20

The values given are typical average values for unreinforced POM-H natural, provided as information about our products and as an aid to material selection. Price figures are rough, non-binding guide values and may vary depending on market situation, grade, dimension and quantity. We do not legally warrant any specific properties or suitability for a particular purpose. With thick-walled rods, watch out for possible centreline porosity. As the properties also depend on the dimensions of the semi-finished stock, the grade and the degree of crystallinity, the actual property values may deviate.

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