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What is POM-C EN

POM-C

POM-C (polyoxymethylene copolymer / acetal copolymer) – semi-crystalline engineering thermoplastic

POM-C is one of the most important engineering plastics and a true all-rounder for mechanical engineering: it combines high strength and stiffness with excellent dimensional stability, very good sliding properties and outstanding machinability – ideal for precise turned and milled 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-C is characterised by a very uniform crystal structure, high dimensional stability and better resistance to hot water, alkalis and hydrolysis. Thanks to its low moisture absorption the material is particularly dimensionally accurate.

How POM-C is produced and processed

POM-C is produced by copolymerisation of formaldehyde (or trioxane) with a comonomer. The built-in comonomer units stabilise the molecular chain and are the reason for the better resistance to hot water, alkalis and hydrolysis as well as the low tendency to centreline porosity. POM-C is processed as injection-moulding granulate and as extruded semi-finished stock (rods, plates, tubes), from which we machine precision parts – including thick-walled parts with a dense core.

Mechanical and physical properties

POM-C reaches a yield stress of around 67 MPa at a modulus of about 2,800 MPa and a density of roughly 1.41 g/cm³. The material is hard, stiff and strong, yet tough and impact-resistant even at low temperatures. Notable are the very good sliding and wear properties at a low coefficient of friction as well as the high restoring force – ideal for gears, bearings, spring elements and snap-fit connections.

Chemical and thermal resistance

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

POM-C or POM-H?

Both types are very similar but differ in detail:

- POM-C (copolymer) – better resistance to hot water, alkalis and hydrolysis, lower tendency to voids/centreline porosity, very good dimensional accuracy; ideal for thick-walled and precise machined parts
- POM-H (homopolymer, e.g. Delrin) – somewhat higher strength, stiffness and hardness, but more sensitive to hot water and alkalis
- For the machining of precise parts, POM-C is usually the first choice

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When POM-C is the right choice

POM-C pays off whenever precision, dimensional accuracy and good sliding properties at a moderate price are required – for example:

- Precision turned and milled parts with tight tolerances and good surface finish
- Thick-walled parts where a dense, low-porosity core is important
- Sliding applications (bearings, bushings, sliding strips) with a low coefficient of friction
- Gears, spring and snap-fit elements with high restoring force
- Applications in contact with hot water or in the food sector

When POM-C is NOT the right choice

Just as important are the limits of the material:

- Contact with strong acids or strongly oxidising media – POM is not resistant
- Continuous use above approx. 100 °C or requirements for flame retardancy (only UL 94 HB)
- When the highest mechanical load/hardness is required – POM-H is then at an advantage
- Permanent UV/weathering exposure outdoors without a stabilised grade
- When extreme temperature or chemical resistance is needed – then PVDF, PPS or PEEK

What does POM-C cost?

POM-C 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

POM-C is one of the best machinable plastics of all – 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 very tight tolerances and thick-walled parts we take the comparatively high thermal expansion and possible stress relieving 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

- High stiffness, strength and hardness
- Excellent dimensional stability and accuracy
- Very good sliding and wear properties
- Better hot-water/hydrolysis resistance than POM-H
- Outstanding machinability, low material price

Disadvantages

- Not resistant to strong acids and oxidising agents
- Not flame retardant (UL 94 HB), limited to approx. 100 °C continuous use
- Somewhat lower strength/hardness than POM-H
- Unstabilised only conditionally UV/weather resistant

Practical tip: where the highest strength is required we choose POM-H; where aggressive chemistry or high temperatures prevail we switch to PVDF, PPS or PEEK. For the majority of precise functional parts, however, POM-C is the most economical and reliable choice.

Typical Properties

- High stiffness, strength and hardness
- Excellent dimensional stability and accuracy
- Low moisture absorption

Product Examples

- Gears, pinions and drive elements
- Plain bearings, bushings and sliding strips
- Guide elements and rollers

Typical Industries

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

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- Very good sliding and wear properties
- Outstanding machinability
- Good chemical resistance (solvents, fuels)
- Good electrical insulation properties
- Food-grade variants available

- Precision turned and milled parts
- Housings, holders and insulating parts
- Valve and pump parts
- Snap-fit and clamp connections
- Spring and detent elements
- 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	1.41
Water absorption (saturation, 23 °C)	DIN EN ISO 62	%	0.8
Flammability	UL 94		HB
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	67
Yield strain	DIN EN ISO 527	%	9
Tensile modulus	DIN EN ISO 527	MPa	2800
Ball indentation hardness	DIN EN ISO 2039-1	MPa	145
Shore hardness	DIN EN ISO 868	scale D	80
Thermal Properties			
Melting temperature	ISO 11357-3	°C	166
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	98
Electrical Properties			
Dielectric constant	IEC 60250		3.8
Dielectric dissipation factor (100 Hz)	IEC 60250		0.005
Volume resistivity	DIN EN 62631-3-1	Ω * cm	>10^{13}

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	Test Method	Unit	Value
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-C 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. 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.