

What is PPS natural

PPS natural

PPS, polyphenylene sulphide

PPS natural is a semi-crystalline high-performance thermoplastic based on polyphenylene sulphide. It combines a continuous service temperature of 220 °C with excellent chemical resistance, inherent flame retardancy (UL 94 V0) and almost negligible moisture absorption – an economical alternative to PEEK for many high-temperature applications.

Properties

PPS natural offers a yield stress of 90 MPa and a tensile modulus of 4,150 MPa with high hardness (Shore D 88). Below 200 °C there is practically no solvent that attacks PPS; the material is resistant to fuels, oils, acids and alkalis and hydrolysis resistant against hot water. The very low moisture absorption (0.02 %) and low thermal expansion ensure high dimensional stability; PPS is also a very good electrical insulator.

Unreinforced PPS is comparatively brittle (elongation at break 3 %) and impact sensitive; the heat deflection temperature under load (HDT 110 °C) is well below the continuous service temperature. Above 200 °C, some oxidising acids and halogens attack the material.

Advantages

- Continuous service temperature 220 °C, short term up to 260 °C
- Excellent chemical and hydrolysis resistance
- Inherently flame retardant (UL 94 V0), very good insulator
- Very low moisture absorption, high dimensional stability

Disadvantages

- Low toughness, impact sensitive
- Heat deflection temperature under load only 110 °C
- Not resistant to oxidising acids at high temperatures

Processing

PPS natural can be machined using all conventional cutting methods; sharp carbide tools and good cooling via chip removal avoid heat build-up and residual stresses in the part.

For tight tolerances and thick-walled parts, we recommend intermediate annealing to relieve machining stresses; thanks to the low moisture absorption, no conditioning is required.

Typical Applications

PPS natural is used wherever components must withstand high temperatures and aggressive media at the same time – for example in the oil and gas industry, in the electrical and electronics industry, in vehicle construction and in chemical plant engineering.

- Pump and valve components for aggressive media
- Insulating and connector parts for high temperatures
- Seals, bushings and guides in the engine compartment

Typical Properties

- Very high continuous service temperature
- Inherently flame retardant
- High chemical resistance
- Very low moisture absorption

Product Examples

- Pump and valve components
- Insulating and connector parts
- Seals and bushings

Typical Industries

- Oil and Gas Industry
- Electrical Industry
- Automotive Industry
- Chemical Plant Engineering

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.35
Water absorption	DIN EN ISO 62	%	0.020
Flammability (Thickness 3 mm / 6 mm)	UL 94		V0 / V0
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	90
Elongation at break	DIN EN ISO 527	%	3
Tensile modulus of elasticity	DIN EN ISO 527	MPa	4.150
Ball indentation hardness	DIN EN ISO 2039-1	MPa	190
Shore hardness	DIN EN ISO 868	scale D	88
Thermal Properties			
Melting temperature	ISO 11357-3	°C	285
Service temperature, long term	Average	°C	-20 ... 220
Service temperature, short term (max.)	Average	°C	260
Heat deflection temperature	DIN EN ISO 75, Verf. A, HDT	°C	110
Electrical Properties			
Surface resistivity	DIN EN 62631-3-2	Ω	10 ¹⁵