

What is PPS GF40 natural

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PPS, glass-fibre reinforced 40 %

PPS GF40 natural is a polyphenylene sulphide reinforced with 40 % glass fibres. The high reinforcement raises stiffness and heat deflection temperature to a level otherwise reached only by high-performance materials – with the chemical resistance, inherent flame retardancy and almost negligible moisture absorption typical of PPS.

Properties

PPS GF40 natural achieves a tensile modulus of 6,500 MPa and a heat deflection temperature of 260 °C at a continuous service temperature of 220 °C; the coefficient of linear thermal expansion of $30 \cdot 10^{-6}/K$ is in the range of aluminium, enabling high-precision, temperature-stable parts. Creep is very low, chemical resistance covers fuels, oils, acids and alkalis; the material is self-extinguishing (UL 94 V0).

The high glass fibre content makes the material brittle (elongation at break 2 %) and highly abrasive to tools; properties are direction-dependent according to fibre orientation, and machined surfaces are rougher than with unfilled PPS.

Advantages

- Very high stiffness and heat deflection temperature (HDT 260 °C)
- Continuous service temperature 220 °C
- Very low thermal expansion and creep
- Inherently flame retardant, chemically resistant, very low moisture absorption

Disadvantages

- Brittle behaviour, very low elongation at break
- Highly abrasive, carbide tools required
- Direction-dependent properties

Processing

PPS GF40 natural can be machined using all conventional cutting methods; carbide or diamond tools are required because of the highly abrasive glass fibres; sharp cutting edges 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 GF40 natural is used wherever stiff, dimensionally stable components are required at high temperatures and in aggressive media – for example in the oil and gas industry, in the electrical and electronics industry and in vehicle construction.

- Pump housings, impellers and valve parts for hot media
- Insulating carriers, coil formers and connectors
- Precision parts with low thermal expansion

Typical Properties

- Very high stiffness due to glass fibre reinforcement
- Very high continuous service temperature
- Inherently flame retardant

Product Examples

- Pump and valve parts
- Insulating carriers and coil formers
- Precision parts

Typical Industries

- Oil and Gas Industry
- Electrical Industry
- Automotive Industry

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.65
Water absorption	DIN EN ISO 62	%	0.015
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	%	2
Tensile modulus of elasticity	DIN EN ISO 527	MPa	6.500
Ball indentation hardness	DIN EN ISO 2039-1	MPa	250
Shore hardness	DIN EN ISO 868	scale D	92
Thermal Properties			
Melting temperature	ISO 11357-3	°C	285
Coefficient of linear thermal expansion	DIN 53752	10 ⁻⁶ / K	30
Service temperature, long term	Average	°C	0 ... 220
Service temperature, short term (max.)	Average	°C	250
Heat deflection temperature	DIN EN ISO 75, Verf. A, HDT	°C	260