

What is PES natural

PES natural

PES

PES natural is an amorphous, transparent high-performance thermoplastic with a glass transition temperature of 225 °C. It combines very high heat deflection temperature and dimensional stability with good hydrolysis resistance – PES can be steam sterilised – and is inherently flame retardant.

Properties

PES natural offers high tensile strength and stiffness over a wide temperature range; between 160 and 190 °C it is significantly stronger than polysulfone. It is flame retardant (UL 94 V0) with low smoke generation, microwave-safe, an excellent electrical insulator and can be machined, welded and thermoformed well. The amber transparency allows sight components.

As an amorphous material, PES is sensitive to stress cracking in contact with certain solvents (e.g. ketones, chlorinated hydrocarbons) and has only limited UV resistance; moisture absorption is moderate at approx. 0.7 %.

Advantages

- Very high heat deflection temperature (HDT 200 °C), continuous service up to 180 °C
- Hydrolysis resistant, steam sterilisable, microwave-safe
- High dimensional stability, transparent
- Inherently flame retardant (UL 94 V0), very good insulating properties

Disadvantages

- Sensitive to stress cracking with some solvents
- Limited UV resistance
- Lower toughness than PEEK and PSU at room temperature

Processing

PES natural can be machined using all conventional cutting methods; sharp carbide tools and good cooling via chip removal avoid heat build-up and stress cracking. Cooling lubricants must be compatible with PES – if in doubt, machine dry or with compressed air.

For tight tolerances and thick-walled parts, we recommend intermediate annealing to relieve machining stresses.

Typical Applications

PES natural is used wherever components are exposed to high temperatures, hot water or steam and must remain dimensionally stable and transparent – for example in medical technology, aerospace, the electrical industry and food technology.

- Sight glasses and media-carrying laboratory components
- Sterilisable components for medical technology
- Insulating and functional parts for electrical engineering

Typical Properties

- Very high heat deflection temperature
- Good hydrolysis resistance, steam sterilisable
- High dimensional stability
- Inherently flame retardant

Product Examples

- Sight glasses and laboratory components
- Sterilisable components
- Insulating and functional parts

Typical Industries

- Medical Technology
- Aerospace
- Electrical Industry
- Food Industry

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.37
Water absorption	DIN EN ISO 62	%	0.700
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	%	15
Tensile modulus of elasticity	DIN EN ISO 527	MPa	2.700
Notched impact strength	DIN EN ISO 179	kJ / m ²	7.0
Ball indentation hardness	DIN EN ISO 2039-1	MPa	155
Shore hardness	DIN EN ISO 868	scale D	85
Thermal Properties			
Thermal conductivity	DIN 52612-1	W / (m * K)	0.18
Thermal capacity	DIN 52612	kJ / (kg * K)	1.10
Coefficient of linear thermal expansion	DIN 53752	10 ⁻⁶ / K	55
Service temperature, long term	Average	°C	-50 ... 180
Service temperature, short term (max.)	Average	°C	220
Heat deflection temperature	DIN EN ISO 75, Verf. A, HDT	°C	200