

What is PPE natural

PPE natural

PPE, modified polyphenylene ether

PPE natural is an amorphous engineering thermoplastic based on modified polyphenylene ether (PPE blend). It is characterised by very low moisture absorption, high dimensional stability, very good electrical insulating properties and high resistance to hot water and steam – at low weight and with flame retardancy.

Properties

PPE natural combines a yield stress of 65 MPa and a tensile modulus of 2,400 MPa with good toughness (elongation at break 30 %) and a continuous service temperature of around 105 °C; under low load the material remains dimensionally stable up to more than 140 °C. Moisture absorption of only 0.07 % (24 h) ensures constant dimensions and electrical values independent of ambient humidity; the density of 1.08 g/cm³ is among the lowest of all engineering plastics. PPE is hydrolysis resistant, resistant to many acids, alkalis and cleaning agents, and flame retardant without additives (UL 94 V-1).

As an amorphous material, PPE is sensitive to stress cracking in contact with aromatic and chlorinated solvents, fuels and oils, and has only limited UV resistance. Wear resistance is lower than that of POM or PA; the product is not declared for food contact.

Advantages

- Very low moisture absorption, high dimensional stability
- Very good electrical insulating properties
- Hydrolysis and hot-water resistant, flame retardant (UL 94 V-1)
- Low weight, good toughness

Disadvantages

- Sensitive to stress cracking with aromatic and chlorinated solvents, fuels and oils
- Limited UV resistance, lower wear resistance than POM/PA
- Not generally declared for food contact (see FDA declaration)

Processing

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

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

Typical Applications

PPE natural is used wherever dimensionally stable, electrically insulating components are required in humid or hot environments – for example in the electrical industry, in medical technology, in the paper industry and in mechanical engineering.

- Insulating and housing parts for electrical engineering
- Components in contact with hot water and steam
- Dimensionally stable precision parts for medical technology and automation

Typical Properties

- Very low moisture absorption
- Good dimensional stability
- Good electrical insulating properties
- High hydrolysis resistance

Product Examples

- Insulating and housing parts
- Hot-water and steam components
- Precision parts

Typical Industries

- Electrical Industry
- Medical Technology
- Paper Industry
- Mechanical Engineering

	Test Method	Unit	Value
General Properties			
Density	ASTM D792	g / cm ³	1.08
Water absorption (24 h)	ASTM D570	%	0.07
Water absorption (saturation)	ASTM D570	%	0.20
Flammability (thickness 3.2 mm)	UL 94		V-1
Mechanical Properties			
Yield stress	ASTM D638	MPa	65
Elongation at break	ASTM D638	%	30
Tensile modulus of elasticity	ASTM D638	MPa	2.400
Flexural strength	ASTM D790	MPa	92
Flexural modulus	ASTM D790	MPa	2.500
Notched impact strength (Izod)	ASTM D256	J / m	187
Rockwell hardness	ASTM D785	scale R	119
Coefficient of friction (dynamic)	Average		0.39
Thermal Properties			
Thermal conductivity	Average	W / (m * K)	0.23
Coefficient of linear thermal expansion	ASTM D696	10 ⁻⁶ / K	60
Service temperature, long term	Average	°C	104
Heat deflection temperature (1.8 MPa)	ASTM D648	°C	127
Heat deflection temperature (0.45 MPa)	ASTM D648	°C	143
Electrical Properties			
Dielectric constant (1 MHz)	ASTM D150		2.7
Dissipation factor (1 MHz)	ASTM D150		0.001
Dielectric strength	ASTM D149	kV / mm	20
Surface resistivity	ASTM D257	Ω	10 ¹⁷