

What is PA 46 natural

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PA 46 natural is a high-temperature-resistant polyamide with a melting point of 295 °C. It combines the toughness and wear resistance of polyamides with a significantly higher heat deflection temperature and continuous service temperature than PA 6 or PA 66 – and retains stiffness and hardness even at elevated temperatures.

Properties

PA 46 natural is a semi-crystalline polyamide with a high degree of crystallinity. This results in the very high heat deflection temperature (HDT 160 °C), high stiffness and hardness even at elevated temperatures, and high abrasion resistance with good sliding properties. The material can be machined and welded well.

Like all polyamides, PA 46 natural absorbs moisture from the environment (up to approx. 3.5 % in standard atmosphere); this makes the material tougher and more impact-resistant, while stiffness and dimensional stability decrease somewhat.

Advantages

- Very high heat deflection and continuous service temperature
- High stiffness and hardness even at elevated temperatures
- High abrasion resistance, good sliding properties
- Good machinability and weldability

Disadvantages

- High moisture absorption (up to approx. 3.5 %), causing dimensional and property changes
- Not resistant to strong acids and permanently hot water (hydrolysis)
- Food contact only within the declared scope (see FDA declaration)

Processing

PA 46 natural can be machined using all conventional cutting methods; HSS or carbide tools are sufficient. Good cooling via chip removal remains important to avoid softening or smearing of the surface caused by heat build-up.

For tight tolerances, we take swelling and shrinkage behaviour into account and condition the semi-finished product where required.

Typical Applications

PA 46 natural is used wherever polyamide components are permanently exposed to higher temperatures and must remain stiff and wear-resistant – for example in the electrical industry, vehicle and mechanical engineering and aerospace.

- Sliding and wear parts in warm environments
- Gears, rollers and guide elements
- Insulating and structural parts for electrical engineering

Typical Properties

- Very high heat deflection temperature
- High stiffness and hardness
- Good wear resistance

Product Examples

- Sliding and wear parts
- Gears and rollers
- Insulating and structural parts

Typical Industries

- Electrical Industry
- Vehicle Construction
- Mechanical Engineering
- Aerospace

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.18
Water absorption	DIN EN ISO 62	%	3.70
Flammability (Thickness 3 mm / 6 mm)	UL 94		HB / HB
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	95
Elongation at break	DIN EN ISO 527	%	30
Tensile modulus of elasticity	DIN EN ISO 527	MPa	3.100
Notched impact strength	DIN EN ISO 179	kJ / m ²	6.0
Ball indentation hardness	DIN EN ISO 2039-1	MPa	168
Shore hardness	DIN EN ISO 868	scale D	84
Thermal Properties			
Melting temperature	ISO 11357-3	°C	295
Thermal conductivity	DIN 52612-1	W / (m * K)	0.30
Coefficient of linear thermal expansion	DIN 53752	10 ⁻⁶ / K	80
Service temperature, long term	Average	°C	-40 ... 135
Service temperature, short term (max.)	Average	°C	200
Heat deflection temperature	DIN EN ISO 75, Verf. A, HDT	°C	160