

TECASINT 4111 natural - Stock Shapes (rods, plates, tubes)

Chemical Designation

PI (Polyimide)

Colour

yellow

Density

1.47 g/cm³

Main features

- very high thermal and oxidative resistance
- very low water absorption
- high thermal and mechanical capacity
- low outgassing
- good chemical resistance
- high creep resistance
- resistance against high energy radiation
- sensitive to hydrolysis in higher thermal range

Target Industries

- electronics
- electrical engineering
- conveyor technology
- mechanical engineering
- precision engineering
- semiconductor technology

Mechanical properties	parameter	value	unit	norm	comment
Tensile strength	50 mm/min	100	MPa	DIN EN ISO 527-1	(1) eU
Modulus of elasticity (tensile test)	1 mm/min	6100	MPa	DIN EN ISO 527-1	(2) eA
Elongation at break (tensile test)	50 mm/min	1.7	%	DIN EN ISO 527-1	(3) Specimen in 4mm thickness
Flexural strength	10 mm/min	160	MPa	DIN EN ISO 178	
Modulus of elasticity (flexural test)	2 mm/min	6100	MPa	DIN EN ISO 178	
Elongation at break (flexural test)	10 mm/min	2.5	%	DIN EN ISO 178	
Compression strength	10 mm/min	250	MPa	EN ISO 604	
Compression strength	10 mm/min, 10% strain	210	MPa	EN ISO 604	
Compression		15	%	-	
Compression modulus	1 mm/min	2500	MPa	EN ISO 604	
Compressive strain at break	10 mm/min	25	%	EN ISO 604	
Impact strength (Charpy)	max 7.5 J	20	kJ/m ²	DIN EN ISO 179-1	1)
Notched impact strength (Charpy)	max 7.5 J	1.1	kJ/m ²	DIN EN ISO 179-1	2)
Ball indentation hardness		345	MPa	-	3)
Shore hardness	Shore D	90		DIN EN ISO 868	
Thermal properties	parameter	value	unit	norm	comment
Glass transition temperature		n.a.	°C	DIN EN ISO 11357	(1) Thermal expansion XY/Z axis
Heat distortion temperature	1.82 MPa	470	°C	ASTM D 648	(2) Thermal expansion XY/Z axis
Thermal expansion (CLTE)	200-300°C	4.7 / 6.9	10 ⁻⁵ K ⁻¹	DIN 53 752	(3) Thermal expansion XY/Z axis
Thermal expansion (CLTE)	50-200°C	3.6 / 5.2	10 ⁻⁵ K ⁻¹	DIN 53 752	
Thermal expansion (CLTE)	300-400°C	6.5 / 9.9	10 ⁻⁵ K ⁻¹	DIN 53 752	
Specific heat		1.24	J/(g*K)	ASTM E1461	
Thermal conductivity	40°C	0.52	W/(K*m)	ASTM E1461	
Electrical properties	parameter	value	unit	norm	comment
surface resistivity	23°C	10 ¹⁶	Ω	ASTM D 257	
volume resistivity	23°C	10 ¹⁶	Ω*cm	ASTM D 257	
Electric strength DC	23°C	22.7	kV*mm ⁻¹	ASTM D 149	
Dielectric loss factor	1 MHz	0.0013		ASTM D 150	
Dielectric constant	1 MHz	3.7		ASTM D 150	
Other properties	parameter	value	unit	norm	comment
Water absorption	24 h in water, 23°C	0.08	%	DIN EN ISO 62	(1) Corresponding means no listing at UL (yellow card). The information might be taken from resin, stock shape or estimation.
Water absorption	24 h in water, 80°C	0.3	%	DIN EN ISO 62	Individual testing regarding application conditions is mandatory.
Flammability (UL94)	corresponding to	V0		DIN IEC 60695-11-10;	1)
Oxygen Index		53	%	EN ISO 4589-2	

Our information and statements reflect the current state of our knowledge and shall inform about our products and their applications. They do not assure or guarantee chemical resistance, quality of products and their merchantability in a legally binding way. Our products are not defined for use in medical or dental implants. Existing commercial patents have to be observed. The corresponding values and information are no minimum or maximum values, but guideline values that can be used primarily for comparison purposes for material selection. These values are within the normal tolerance range of product properties and do not represent guaranteed property values. Therefore they shall not be used for specification purposes. Unless otherwise noted, these values were determined by tests at reference dimensions and machined specimen. As the properties depend on the dimensions of the semi-finished products and the orientation in the component (esp. in reinforced grades), the material may not be used without a separate testing under individual circumstances. The customer is solely responsible for the quality and suitability of products for the application and has to test usage and processing prior to use. Data sheet values are subject to periodic review, the most recent update can be found at www.ensinger-online.com. Technical changes reserved.