TECASINT 1011 natural - Stock Shapes (rods, plates, tubes)

Chemical Designation
PI (Polyimide)

Colour
black

Density
1.34 g/cm^3

Main features
- high thermal and mechanical capacity
- very good thermal stability
- good chemical resistance
- very good electrical insulation
- resistance against high energy radiation
- low outgassing
- high creep resistance
- sensitive to hydrolysis in higher thermal range

Target Industries
- aircraft and aerospace technology
- cryogenic engineering
- electronics
- electrical engineering
- food engineering
- mechanical engineering
- nuclear and vacuum technology
- precision engineering
- semiconductor technology

Mechanical properties	condition	value		test method		comment
Tensile strength	50 mm/min	116	MPa	DIN EN ISO 527-1		(1) eU (2) eA (3) Ensinger Standard
Modulus of elasticity (tensile test)	1 mm/min	3600	MPa	DIN EN ISO 527-1		
Elongation at break (tensile test)	50 mm/min	3.8	%	DIN EN ISO 527-1		
Flexural strength	10 mm/min	170	MPa	DIN EN ISO 178		
Modulus of elasticity (flexural test)	2 mm/min	3450	MPa	DIN EN ISO 178		
Elongation at break (flexural test)	10 mm/min	6	%	DIN EN ISO 178		
Compression strength	10 mm/min	450	MPa	EN ISO 604		
Compression strength	10mm/min, 10% strain	190	MPa	EN ISO 604		
Compressive strain at break	10 mm/min	45	%	EN ISO 604		
Compression modulus	1 mm/min	1950	MPa	EN ISO 604		
Impact strength (Charpy)	max 7.5 J	75.8	kJ/m^2	DIN EN ISO 179-1	1)	
Notched impact strength (Charpy)	max 7.5 J	5	kJ/m^2	DIN EN ISO 179-1	2)	
Shore hardness	Shore D	90		-	3)	

Thermal properties	condition	value		test method		comment
Glass transition temperature		383	°C	-	1)	(1) DMA, maximum loss factor tan d (2) Found in public sources. Individual testing regarding application conditions is mandatory. (3) Thermal expansion XY/Z axis (4) Thermal expansion XY/Z axis
Heat distortion temperature	1.85 MPa	368	°C	DIN 53 461		
Service temperature	long term	-	°C	-	2)	
Thermal expansion (CLTE)	50-200°C	4.3 / 4.3	10^{-5} K^{-1}	DIN 53 752	3)	
Thermal expansion (CLTE)	200-300°C	5.3 / 5.3	10^{-5} K^{-1}	DIN 53 752	4)	
Specific heat		1.04	J/(g*K)	-		
Thermal conductivity	40°C	0.22	W/(K*m)	ISO 8302		

Electrical properties	condition	value		test method	comment
surface resistivity	23°C	> 10^{15}	Ω	DIN IEC 60093	
volume resistivity	23°C	> 10^{15}	Ω*cm	DIN IEC 60093	
Electric strength DC	23°C	> 35	kV*mm^{-1}	ISO 60243-1	
Dielectric loss factor	50 Hz	2.2*10^{-2}		DIN 53483-1	
Dielectric loss factor	1 kHz	2.5*10^{-3}		DIN 53483-1	
Dielectric loss factor	1 MHz	1.5*10^{-2}		DIN 53483-1	
Dielectric constant	50 Hz	3.8		DIN 53483-1	
Dielectric constant	1 kHz	3.9		DIN 53483-1	
Dielectric constant	1 MHz	3.7		DIN 53483-1	

Other properties	condition	value		test method		comment
Water absorption	24 h in water, 23°C	1.3	%	DIN EN ISO 62		(1) Corresponding means no listing at UL (yellow card). The information might be taken from resin, stock shape or estimation. Individual testing regarding application conditions is mandatory.
Water absorption	24 h in water, 80°C	3.8	%	DIN EN ISO 62		
Flammability (UL94)	corresponding to	V0		DIN IEC 60695-11-10;	1)	

- TECASINT 1000 series show significant water uptake. Parts have to be pre-dried before fast heating to above 200 °C (drying process: 2 h per 3 mm wall thickness at 150 °C).

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