STEMATEC F2372.1

Product data sheet

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STEMPLAST HATZIAVGOUSTIS
ENGINEERING PLASTICS

Material:	glass epoxy resin
IEC/EN 60893-3-1 Norm:	EP GC 202
NEMA LI-1 Norm:	FR-4
DIN 7735 Norm:	Hgw 2372.1
Product's shape:	semi-finished products

Material characteristics

Excellent mechanical properties, very high impact loading, excellent electrical properties, high surface hardness, low moisture absorption.

Application examples

Boards for printed circuits, spools, insulating covers, gears, vibration devices.

General properties

Density ρ	1.70-1.90 gr/cm^3	DIN EN ISO 1183-1 DIN 53479/ASTM D792 sim.
Moisture absorption *(immersion in water, 50x50x3 mm, 23 °C/24h)*	15 mg	DIN EN ISO 62 DIN 53495 sim. ASTM D570

Mechanical properties

Tensile stress at yield σ_Y Tensile strength σ_T Elongation at break ε_B Modulus of elasticity E_t	220 MPa 18000 MPa	DIN EN ISO 527 DIN 53455 sim. ASTM D638
Flexural stress at yield σ_Y Flexural strength σ_b Modulus of elasticity E_b	 350 MPa 18000 MPa	DIN EN ISO 178 DIN 53452 sim. ASTM D790
Compressive strength σ_c *(parallel to layers)* Compressive strength σ_c *(perpendicular to layers)*	200 MPa 550 MPa	DIN EN ISO 604 / ASTM D695 DIN 53454/53457 sim.
Impact strength Charpy a_n 10 and a_n 15	100 kJ/m^2	DIN EN ISO 179 (DIN 53453)
Charpy a_k 10	50 kJ/m^2	DIN EN ISO 179 (DIN 53453)
Charpy notched a_k 15		DIN EN ISO 179 (DIN 53453)
Creep rate stress at 1% strain after 1000 h $\sigma_{1/1000}$		DIN EN ISO 899-1 DIN 53444/ASTM D2990 sim.
Hardness ball indentation $H_{358/30}$		DIN EN ISO 2039-1 (DIN 53456)
Rockwell	M110	DIN EN ISO 2039-2 ASTM D785
Shore scale D		DIN EN ISO 868 (DIN 53505) ASTM D2240 sim.
Coefficient of sliding friction μ Wear rate S *(dry running against steel, P=0.05 MPa, V=0.6 m/s, t=60 °C, near running surface)*		DIN ISO 7148-2 sim. Pin on disc apparatus

Electrical properties

Dielectric constant (relative permittivity) ε_r		
100 Hz	3.2	IEC 60250
1 MHz	3.2	DIN 53483 sim.
Dielectric dissipation factor tanδ		VDE 0303-4
100 Hz	0.001	ASTM D150
1 MHz	0.002	
Surface resistivity σ *(immersion in water 24h)*	$>10^{10}$ Ω	IEC 60093 / VDE 0303-30 DIN 53482 sim. / ASTM D257
Dielectric strength E_d		IEC 60243-1 / VDE 0303-21
(in oil at 90 °C, parallel to layers)	40 kV	DIN 53481 sim. / ASTM D149
(in oil at 90 °C, perpendicular to layers)	40 kV	
Tracking resistance V	CTI 200	IEC 60112 / VDE 0303-11 DIN 53480 sim. ASTM D3638 / UL 746A

Thermal properties

Melting temperature T_m *(DSC, 10 °C/min)*		ISO 11357-1,-3 ASTM D3418 sim.
Thermal conductivity λ *(23 °C)*	0.30 W/(m·K)	ISO 22007-2 / ISO 8302 sim. DIN 52612-2/ASTM C177 sim.
Specific heat (thermal capacity) c		ISO 11357-4 ASTM E1269/ASTM C351 sim.
Coefficient of linear thermal expansion α *(average value 23-60 °C)*	$10\text{-}20 \cdot 10^{-6} \cdot K^{-1}$	ISO 11359-2 DIN 53752/ASTM E831 sim.
Service temperature		
long term *(min / max - 5000 h)*	- / 120 °C	
short term *(not under stress - few hours)*	130 °C	
Vicat softening point		ISO 306
VST A50 - 10N		DIN 53460 sim.
VST B50 - 50N		ASTM D1525
Heat deflection temperature		DIN EN ISO 75-1,-2
HDT A - 1.80 MPa		DIN 53461 sim.
HDT B - 0.45 MPa		ASTM D648
Flammability according to UL94 *(thickness 3 / 6 mm)*	V-0	
oxygen index		ISO 4589 -1,-2 ASTM D2863 sim.

The above mentioned electrical properties result from measurements on natural material.
The indicated values result from numerous individual measurements for an approximation of the values and correspond to our today's knowledge. They serve as information about our products and are presented as a guide to choose from our range of materials. This, however, does not include an assurance of specific properties or the suitability for particular application purposes that are legally binding. Since the properties also depend on the dimension of the semi-finished products and the degree of crystallisation (e.g. nucleating by pigments), the actual values of the properties of a particular product may differ from the indicated values.