

## ISOVAL® 11

Temperature resistant epoxy laminate with excellent mechanical and thermal properties at high operating temperatures according to the following international standards:

IEC 60893	EP GC 203, EP GC 308
DIN 7735	Hgw 2372.4
NEMA LI 1	G11
BS 3953	EP 5, EP 7

### Composition

ISOVAL® 11 is prepared from glasscloth impregnated with the temperature resistant version of the ISOVAL® epoxy system. Laminates exhibit excellent thermal and chemical resistance as well as high mechanical strength at elevated temperatures.

### Application

ISOVAL® 11 can be used as a high quality construction material as well as an electric and thermal insulation material in various machines and equipments, especially in those areas, where high operating temperatures are coupled with high mechanical strength requirements. The extremely good flexural and compressive strength at high temperature enable also application in those areas that traditionally could only be covered by polyimides.

### Machining recommendation

Due to the strength and hardness of the laminate and also the high glass content the tools used can be subject to a great degree of abrasion. We therefore advise that only diamond carbide tipped tools and high speed machinery are used.

### Availability

Thickness: 0,1 - 100 mm, tolerances according IEC 60893

Sheet size: 2140 +30/-0 mm x 1040 +30/-0 mm (0,2 to 80 mm thickness)  
1040 +30/-0 mm x 1040 +30/-0 mm (0,1 to 100 mm thickness)  
2800 +30/-0 mm x 1220 +30/-0 mm (0,5 bis 60 mm thickness)

Colour: green

Machined parts and cuttings are available on request.

## Technical Data

Values in the table are mean values of our production. Values according to the standards are guaranteed.

Properties	Testmethod	Unit	Value
Density	ISO 1183 / A	g/cm <sup>3</sup>	approx. 2,0
Flexural strength at 23 / 100 / 120 150 / 180°C	ISO 178	MPa	400 / 320 / 300 220 / 100
Flexural modulus of elasticity	ISO 178	MPa	approx. 24 000
Impact strength (Charpy) parallel to laminations	ISO 179/3 C	kJ/m <sup>2</sup>	33
Tensile strength	ISO 527	MPa	240
Compressive strength perpendicular to laminations 23 / 180 °C	ISO 604	MPa	500 / 350
Insulation resistance after immersion in water	IEC 167	Ohm	10 <sup>12</sup>
Electric strength at 90°C in oil perpendicular to laminations (thickness 3mm)	IEC 243	kV/mm	13
Breakdown voltage at 90°C in oil parallel to laminations	IEC 243	kV	40
Permittivity at 50 Hz and 1 MHz	IEC 250	-	5,5
Dissipation factor at 50 Hz and 1 MHz	IEC 250	-	0,04
Comparative tracking index	IEC 112	-	CTI 180
Thermal endurance	IEC 216	T.I.	180
Water absorption (thickness 10 mm)	ISO 62 / 1	mg	20
Thermal conductivity	DIN 52612	W/mK	0,3
Linear coefficient of expansion	VDE 0304/2	1/K	1,3 x 10 <sup>-5</sup>
Weight increase after 1000 h stored in Freon	ISO 62 / 1	%	0,1
High energy radiation resistance	IEC 544	Gy	10 <sup>8</sup>
Flexural strength after 1000 h at 100 °C in oil	ISO 178	MPa	> 400