

## ISOVAL® FR4-HF

ISOVAL® FR4-HF is in accordance with the following international standards:

IEC 60893:	EP GC 202
DIN 7735:	Hgw 2372.1
NEMA LI 1:	FR 4
BS 3953:	EP-4

### Composition

ISOVAL® FR4-HF is a halogen free epoxy glass laminate with a limiting temperature > 180°C and good mechanical and electrical properties.

ISOVAL FR4-HF is UL-listed with file no. E236557. Detailed information can be found in the internet on <http://www.ul.com>.

### Toxicity

ISOVAL® FR-4 HF is free of halogens, antimony, nitrogen, phosphor and sulfur.

### Corrosiveness

According to VDE 0472/ part 813 the conflagration gases of ISOVAL® FR4 - HF are non-corrosive.

### Availability

Thickness:	0,2 - 150 mm, tolerances according IEC 60893
Standard sheet size:	1300 +30/-0 mm x 1065 ±10 mm
	2130 +30/-0 mm x 1230 +10/-0 mm (up to 70 mm thickness)
	2800 +30/-0 mm x 1220 +30/-0 mm (up to 90 mm thickness)
Colour:	green

Machined parts and cuttings, other sheet sizes and thicknesses are also available upon request.

Technical Data

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

Properties according IEC 893	Testmethod	Unit	Value
Density	ISO 1183/A	g/cm <sup>3</sup>	approx. 2.0
Flexural strength at 23°C	ISO 178	MPa	350
Flexural modulus of elasticity at 23°C	ISO 178	MPa	approx. 22000
Tensile strength	ISO 527	Mpa	240
Compressive strength perpendicular to laminations	ISO 604	MPa	500
Impact strength (Charpy) parallel to laminations	ISO 17 /3 C	kJ/m <sup>2</sup>	33
Insulation resistance after immersion in water	IEC 167	Ohm	10 <sup>11</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
Comparative tracking index	IEC 112	-	CTI 200
Thermal endurance	IEC 216	T.I.	180
Water absorption (thickness 10 mm)	ISO 62/1	mg	25
Flammability thickness ≥3 mm	UL 94	-	V0
thickness 0,75-2,9 mm		-	V1
LOI (limiting oxygen index)	ASTM-D 2863/91	-	> 88
Smoke density: 1,5 mm laminate Dsa 90"	ASTM-E 662	-	1
Smoke density: 1,5 mm laminate Dsa 4'	ASTM-E 662	-	3