

Hot cure epoxy prepreg system

Lapox L-12	100	pbw
Lapox K-5	27	pbw

Description

Lapox L-12 is a liquid, unmodified epoxy resin of medium viscosity which can be used with various hardeners for making fiber reinforced composites. Epoxy curing agent Lapox K-5 is an off-white to beige coloured solid aromatic amine in the form of powder or flakes. It is capable to induce cure to the B stage at room temperature but requires elevated temperature for full cure to its C stage. Laminates made with this hardener can be subjected to continuous operation at 165°C. It also possesses good dielectric properties.

Applications

Construction of machinery and equipment housings
 Electrical insulating materials
 Pipes and sheets mouldings
 Prepreg with shorter shelf-life for G-10 and G-11 laminates
 Pressure vessels
 Sport equipment

Processing

Filament winding
 Laminating by the prepreg technique
 Matched die moulding
 Pultrusion

Typical specifications

Lapox L-12

Properties	Unit	Test method	Values
Appearance	-	Visual	Clear, viscous liquid
Colour	GS	ASTM D1544	Max 1
Viscosity at 25°C	m Pas	ASTM D2196	9,000 - 12,000
Epoxy content	Eq/kg	ASTM D1652	5.26 - 5.55
Specific gravity at 25°C	-	ASTM D792	1.1 - 1.2

Lapox K-5

Properties	Unit	Test method	Values
Appearance	-	Visual	Off-white to beige coloured powder flake
Solubility	g / 25 ml	-	30
Melting point	°C	-	88 - 92
Shelf-life	Years	2	-

Processing properties

Properties	Unit	Test method	Values
Mixing ratio (by weight)	-	Visual	Resin: 100 Hardener: 27
Initial mix viscosity	m Pas	ASTM D2196	30 - 100 / 100°C
Pot life	Hours	ASTM D2471	6 hours - 8 hours at 20°C 5 hours - 7 hours at 30°C 3 hours - 5 hours at 40°C
Gel time	Minutes	DIN 16945 / 6.3.1	60 - 90 at 80°C 16 - 20 at 100°C 8 - 10 at 120°C 5 - 7 at 130°C 4 - 6 at 140°C
Curing schedule	°C / hours	-	120°C / 4 hours + 160°C / 2 hours

The solid hardener Lapox K-5 should first be melted and then added to the resin pre-heated to 60°C. Alternatively, the resin can be heated to about 100°C. The solid hardener is added at this temperature with stirring till it gives a clear solution. In order to obtain the maximum pot life, the resin and hardener mixture must be cooled immediately to the desired temperature for convenience of impregnating the glass fiber.

If processing is to be carried out by the prepreg method, a solvent like methyl ethyl ketone is added to the desired extent so as to obtain a viscosity suitable for the impregnation of the glass fabric. After impregnation in the resin bath, the wet fabric or roving is passed through a heating tower where it is pre-cured for about for 15 minutes at 100°C or for 3 minutes at 150°C. The prepreg thus obtained will be dry- to- touch.

Typical properties of neat cured system

Composition:
Curing schedule: 80°C / 6 hours to 8 hours
Determined on standard test specimen at 25°C

Properties	Unit	Test method	Values
Tensile strength	m Pa	ISO 527	70 - 80
Elongation at break	%	ISO 527	2.5 - 5.0
Elastic modulus in tension	g Pa	ISO 527	4.0 - 4.8
Flexural strength	m Pa	ISO 178	140 - 150
Flexural elongation at break	%	ISO 178	5 - 10
Elastic modulus in flexural	g Pa	ISO 178	4.4 - 4.8
Impact strength	kJ/m ²	ISO 179	18 - 20
Glass transition temperature (DSC)	°C	ISO 11357 - 2	150 - 160
Co-efficient of linear thermal expansion (Mean value for temperature range 20°C to 60°C)	K ⁻¹	DIN 53752	45 - 55 X 10 ⁻⁶
Water absorption 25°C / 24 hours	% w/w	ISO 62	Max 0.15

Typical electrical properties of filled cured system

Cured at:

Properties	Unit	Test method	Values
Breakdown strength (50 Hz, 25°C)	kV/mm	IEC 60243	22 - 24
Loss factor (50 Hz, 25°C)	%	IEC 60250	3.5
Dielectric constant (50 Hz, 25°C)	-	IEC 60250	4.3
Volume resistivity at 1,000 V, 25°C	ohm.cm	IEC 60093 / DIN 53482	10 ¹⁵
Arc resistance	Seconds	IEC 61621 / ASTM D495	> 180
Tracking resistance	V	IEC 60112	500

Typical properties of cured, reinforced system

Cured at:

Properties	Unit	Test method	Values
Tensile strength	m Pa	ISO 527 - 2	300 - 320
Tensile elongation at break	%	ISO 527 - 2	2.5 - 5.0
Tensile modulus	g Pa	ISO 527 - 2	30 - 40
Flexural strength	m Pa	ISO 14125	400 - 500
Flexural elongation at break	%	ISO 14125	4 - 7
Flexural modulus	g Pa	ISO 14125	30 - 40
Impact strength	kJ/m ²	ISO 179	150

Packaging

Lapox L-12 is available in 30 kg, 110 kg and 240 kg carboys. Lapox K-5 is available in 1 kg HDPE bottles. Other packing may be considered on request.

Storage and handling

Lapox L-12 and Lapox K-5 have a shelf-life of at least 2 years if stored in its original container away from humidity and excessive heat. Care must be taken to avoid direct contact with skin as far as possible. If contact does occur then wash off immediately with soap and warm water. Please refer to the Safety Data Sheet (SDS) for detailed instructions on storage and handling.

Safety

Wear personal protective equipment (PPE). Avoid contact with the eyes and skin. In case of direct contact and irritation, the resin should be washed off immediately with soap and warm water. Avoid breathing vapours, mist or gas. Please refer to the SDS for detailed safety instructions.

Spills and disposal

In case of spills, sweep up and shovel the spilled material. Keep spilled material in suitable, closed containers for disposal. Soak up with an absorbent such as clay, sand or other suitable material. Flush area with water to remove trace residue. Do not allow the product to reach the sewage system. Waste must be disposed of in accordance with federal, state or local regulations, as applicable.

Contact

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Note

Lapox[®] is a registered trademark of Atul Ltd.

LAPOX[®] L-12 | K-5

Technical Data Sheet | Polymers Business



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