LAPOX® L-12 | K-68(AH-113) | K-13

Technical Data Sheet | Polymers Business

Hot cure epoxy system

Lapox L-12	100	pbw
Lapox K-68 (AH-113)	95	pbw
Lapox K-13	0.1 - 2.0	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-68 (AH-113) is a low viscosity less sensitive to moisture acid anhydride. Both resin and hardener being in liquid form, they are very easy to mix. Gel time and viscosity rise with time can be controlled to suit the application process by variation in dosage of accelerator Lapox K-13. Laminates made with this hardener can be subjected to continuous operation at 170°C. Cured system exhibits excellent mechanical and electrical and thermal properties along with good chemical resistance.

Applications

High performance composite parts at elevated temperature

Processing

Filament winding
Matched die - moulding
Pultrusion
Resin transfer moulding (RTM)

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
Density at 25°C	g/cm^3	ISO 1183	1.1 - 1.2
Epoxy value	Eq/kg	ASTM D1652	5.26 - 5.55

Lapox K-68 (AH-113)

Properties	Unit	Test method	Values
Appearance	-	Visual	Low, viscosity liquid
Colour	GS	ASTM D1544	Max 2
Viscosity at 25°C	m Pas	ASTM D2196	200 - 350
Density at 25°C	g/cm^3	ISO 1183	1.302

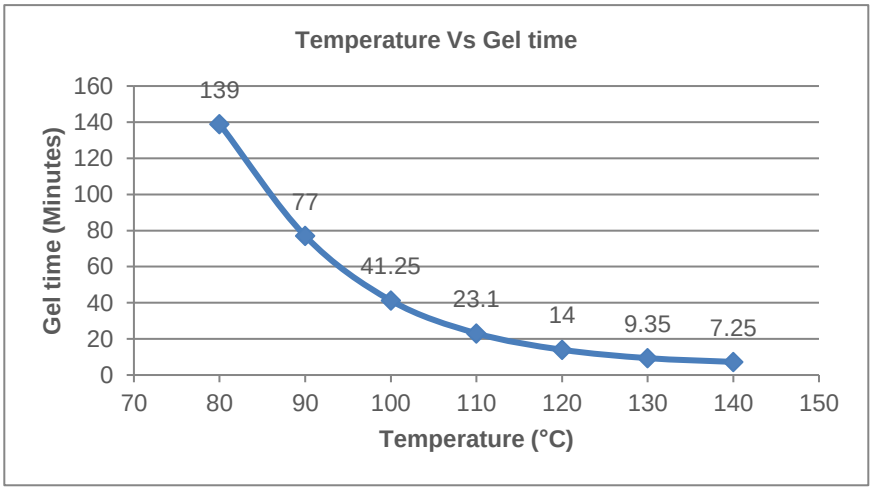
Lapox K-13

Properties	Unit	Test method	Values
Appearance	-	Visual	Clear liquid
Colour	GS	ASTM D1544	Max 2
Viscosity at 25°C	m Pas	ASTM D2196	< 10
Density at 25°C	g/cm^3	ISO 1183	0.88 - 0.92

Processing properties

Properties	Unit	Test method	Values
Mixing ratio (by weight)	-	Visual	Resin : 100 Hardener : 95 Accelerator : 0.1 - 2.0
Initial mix viscosity at 25°C	m Pas	ASTM D2196	1,900 - 2,100
Pot life at 25°C	Minutes	ASTM D2471	50 - 55
Gel time	Minutes	DIN 16945 / 6.3.1	See graph below
Curing schedule	°C / hours	-	100°C / 2 hours + 120°C / 2 hours + 180°C / 2 hours

Gel time is taken with 1% Lapox K-13 accelerator



To simplify the mixing process the resin can be preheated to about 30°C to 50°C before adding the cold hardener. Hardener and accelerator can be premixed thus allowing the use of two component mixing equipment. The processing of the system of elevated temperature of 30°C to 50°C shows the best results. The gelation temperature should not be very high. A higher gelation temperature induces high shrinkage and generates internal stresses. The premix is hygroscopic; precautions must be taken against moisture absorption.

Typical properties of neat cured system

Curing schedule: 100°C / 2 hours +120°C / 2 hours + 180°C / 2 hours
Determined on standard test specimen at 25°C

Properties	Unit	Test method	Values
Tensile strength	MPa	ISO 527	45 - 60
Elongation at break	%	ISO 527	1.5 - 3.0
Elastic modulus in tension	GPa	ISO 527	2.7 - 3.0
Flexural strength	MPa	ISO 178	100 - 140
Flexural elongation at break	%	ISO 178	4 - 7
Elastic modulus in flexural	GPa	ISO 178	2.9 - 3.1
Glass transition temperature (DSC)	°C	ISO 11357 - 2	165 - 185
Water absorption 25°C / 24 hours	% w/w	ISO 62	Max 0.17

Typical electrical properties of cured system

Properties	Unit	Test method	Values
Breakdown strength (50 Hz, 25°C), 20 seconds value for 2 mm sheet	kV/cm	IEC 60243	18 - 20
Loss factor (50 Hz)	%	IEC 60250	2 - 3
Dielectric constant (50 Hz)	-	IEC 60250	3 - 4
Volume resistivity at 1,000 V, 25°C	Ω-cm	IEC 60093 / DIN 53482	10^{14}
Arc resistance	Seconds	IEC 61621 / ASTM D495	180 - 185
Tracking resistance	V	IEC 60112	> 400

Packaging

Lapox L-12 is available in 30 kg, 110 kg and 240 kg carboys. Lapox K-68 (AH-113) is available in 30 kg carboys and Lapox K-13 is available in 1 kg and 5 kg HDPE bottles. Other packing may be considered on request.

Storage and handling

Resin Lapox L-12, hardener Lapox K-68 (AH-113) and accelerator Lapox K-13 have shelf-life of 2 years if stored in their original sealed containers. Resin may crystallise if stored below 15°C. Crystallisation may be reversed completely by heating the material between 60°C and 70°C. It is recommended to use resin and hardener only when they are clear and free from cloudiness. Hardener is sensitive to moisture. Container must be closed properly immediately after use. Both resin and hardener may cause irritation to sensitive skins. If contact does occur to such operators then the resin and hardener should be washed off immediately with soap and warm water, consult physician immediately. 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

E-mail: polymers@atul.co.in
Website: www.atul.co.in

Note

Lapox® is a registered trademark of Atul Ltd.

Manufacturing site
Atul 396 020, Gujarat, India
Telephone: (+91 2632) 230000 | 233261
E-mail: contact@atul.co.in