

LAPOX[®] ARL-160 | AH-357 | AC-22



Technical Data Sheet | Polymers Business

Epoxy based solvent free hot melt prepreg system

Lapox ARL-160	100	pbw
Lapox AH-357	15	pbw
Lapox AC-22	1-3	pbw

Description

Lapox ARL-160 is a modified high viscosity epoxy resin. Viscosity of resin drops drastically when heated to processing temperature. Lapox AH-357 is an amine hardener in white paste form. This curing agent is suitable to cure epoxy at elevated temperature. Lapox AC-22 is latent amine accelerator in white paste form which increases the curing speed and helps in faster productivity. Higher ratio of accelerator affects the pot life of mix and shelf-life of the prepreg significantly.

This system is ideal for making prepregs of glass, carbon and kevlar by hot melt method. Mixing of ingredients and impregnation of hot mix is possible between 65°C to 75°C by the use of appropriate plant. The prepregs manufactured by this system are stable and has long shelf-life over 4 weeks if stored at 20°C. Shelf-life of prepregs can be increased up to 6 months if stored below 5°C. This system can also be used for impregnation after dilution with suitable solvent. MEK, acetone, IPA, and Xylene solvents can be used for such purpose.

Applications

Fabrication of structural components for recreation, defense, aerospace, infrastructure and general engineering application.

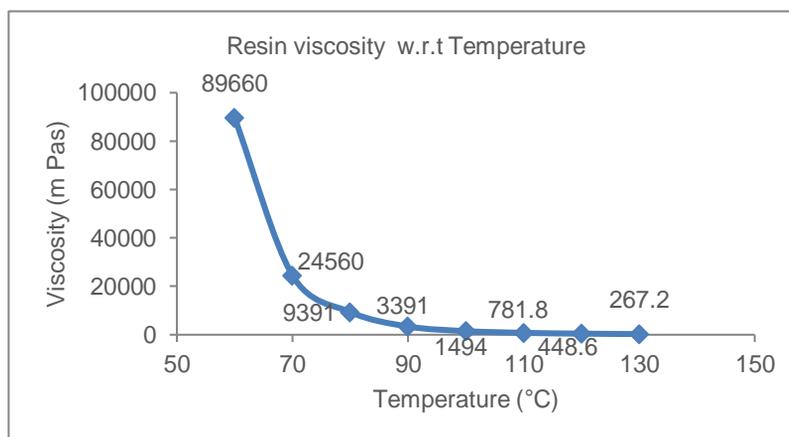
Advantages

Components prepared by these prepregs are extremely high in mechanical strength, electrical and thermal properties.

Typical specifications

Lapox ARL-160

Properties	Unit	Test method	Values
Appearance	-	Visual	Clear, viscous mass
Colour	GS	ASTM D1544	Max 4
Viscosity at 25°C	m Pas	ASTM D2196	9,000 - 14,000
Epoxy content	Eq/kg	ASTM D1652	2.8 - 3.1
Specific gravity at 25°C	-	ASTM D792	0.9 - 1.0
Flash point	°C	ASTM D93	0 - 1
Storage temperature	°C		5 - 40



Lapox AH-357

Properties	Unit	Test method	Values
Appearance	-	Visual	White paste
Solid content at 25°C	%	-	100
Specific gravity at 25°C	-	ASTM D792	1.25
Storage temperature	°C		< 8

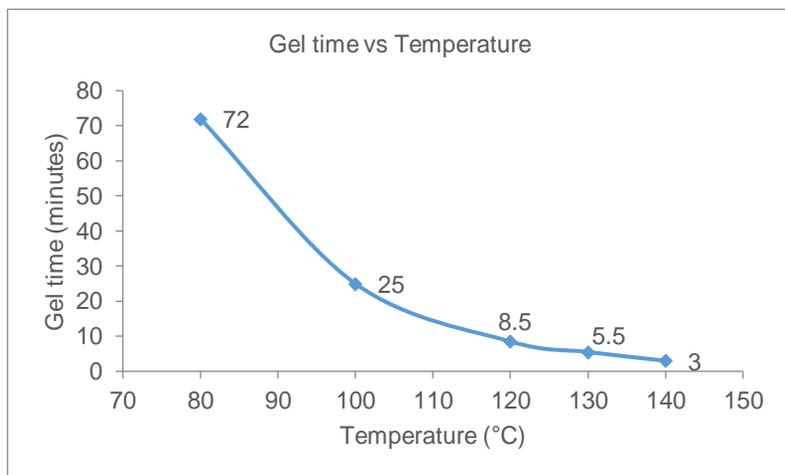
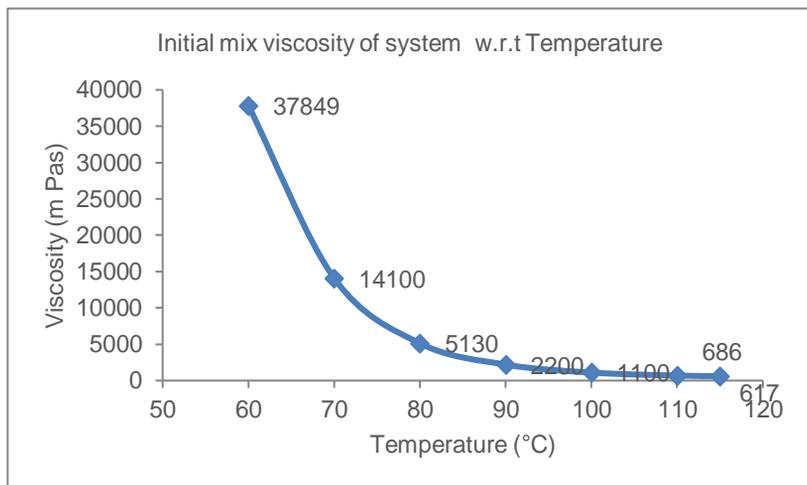
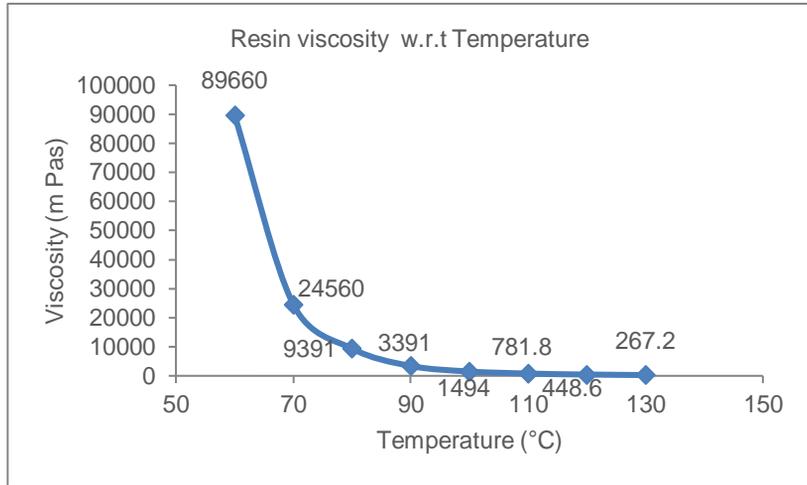
Lapox Solvent AC-22

Properties	Unit	Test method	Values
Appearance	-	Visual	White to off-white paste
Specific gravity at 25°C	-	ASTM D792	1.05
Storage temperature	°C		< 8

Processing properties

Properties	Unit	Test method	Values
Mixing ratio (by weight)	-	Visual	Resin: 100 Hardener: 15 Accelerator: 1
Initial mix viscosity	m Pas	ASTM D2196	37,849 at 60°C 14,100 at 70°C 5,130 at 80°C
Pot life at 20°C	Weeks	ASTM D2471	4
Gel time of mix	Minutes	DIN 16945 / 6.3.1	80°C / 68 - 75 minutes 100°C / 22 - 30 minutes 120°C / 8 - 9 minutes 130°C / 5 - 6 minutes 140°C / 2 - 3 minutes
Curing schedule	°C / hours	-	120°C / 1 hour + 140°C / 1 hour

Mix the hardener Lapox AH-357 and accelerator Lapox AC-22 in desired ratio to get the homogenous paste. Heat the resin to 90°C and add above mixture and stir to make it homogenous paste. Maintain mix temperature between 65°C to 75°C (lower temperature is preferred to control rise in viscosity due to reactivity). Consume the mix quickly before viscosity rises above acceptable limit. Cooling of the prepregs to be done immediately to avoid cross linking of polymer at elevated temperature.



Prepreg parameters

Properties	UOM	Values
Resin content	%	35 - 40
Shelf-life of prepreg at 20°C	Weeks	4 - 5
Pressure (vacuum) for moulding	torr	1 - 50
Curing temperature	Time / °C	1 hour / 120°C + 1 hour / 140°C

DSC kinetic data

DSC - Isothermal cure data

Isothermal run 1	90°C	100°C	110°C	120°C
Peak	114 minutes	59 minutes	21 minutes	10.2 minutes
Onset	22 minutes	16 minutes	4 minutes	2.5 minutes
60%	111.3 minutes	16 minutes	31.2 minutes	18.2 minutes
80%	139 minutes	74.2 minutes	42 minutes	25 minutes
95%	216.3 minutes	122 minutes	72 minutes	44.1 min
Delta H	158.12 J/g	177.5 J/g	260 J/g	340 J/g
Isothermal cycle	220 minutes	130 minutes	80 minutes	60 minutes

MTDSC – Dynamic run data followed by isothermal curing

Dynamic run 2	90°C	100°C	110°C	120°C
Delta H	86 J/g	45.4 J/g	17.08 J/g	2.16 J/g
T _g	83.7°C	95°C	117.42°C	120°C
Peak	128°C	128°C	129.2°C	182°C

Typical properties of neat cured system

Curing schedule: 120°C / 1 hour + 140°C / 1 hour
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	3 - 5
Elastic modulus in tension	g Pa	ISO 527	2.8 - 3.3
Flexural strength	m Pa	ISO 178	110 - 130
Flexural elongation at break	%	ISO 178	6 - 10
Elastic modulus in flexural	g Pa	ISO 178	3.0 - 3.6
Compressive strength	m Pa	ISO 604	120 - 140
Hardness	Shore D	ISO 868	80 - 90
Glass transition temperature (DSC)	°C	ISO 11357 - 2	110 - 120
Water absorption 25°C / 24 hours	% w/w	ISO 62	Max 0.5

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Typical electrical properties of filled cured system

Curing schedule: 120°C / 1 hour + 140°C / 1 hour

Properties	Unit	Test method	Values
Breakdown strength (50 Hz, 25°C)	kV/mm	IEC 60243	20 - 22
Loss factor (50 Hz, 25°C)	%	IEC 60250	2.5 - 3.0
Dielectric constant (50 Hz, 25°C)	-	IEC 60250	4.5 - 5.2
Volume resistivity at 1000 V, 25°C	ohm.cm	IEC 60093 / DIN 53482	10 ¹⁵
Arc resistance	Seconds	IEC 61621 / ASTM D495	180
Tracking resistance	V	IEC 60112	300

Packaging

Lapox ARL-160 is available in 30 kg, 110 kg and 240 kg carboys. Lapox AH-357 and Lapox AC-22 are available in 1 kg HDPE bottles. Other packing may be considered on request.

Storage and handling

Resin Lapox ARL-160 has shelf-life of 1 year. Hardener Lapox AH-357 and accelerator Lapox AC-22 have shelf-life of 6 months if stored in their original sealed containers at recommended storage temperature. Hardener and accelerator are sensitive to moisture, thus, container must be closed properly immediately after use. Both resin and hardener may cause irritation to sensitive skins. If contact does occur then it should be washed off immediately with soap and warm water and take medical advice. 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

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