

LAPOX[®] ARC-16 | AH-118 | ADP-11 | Filler

Technical Data Sheet | Polymers Business

Hot cure, pre-accelerated epoxy casting system

Lapox ARC-16	100	pbw
Lapox AH-118	80	pbw
Lapox ADP-11	0 - 8	pbw
Silica	320 - 350	pbw

Description

Lapox ARC-16 is a liquid, modified bisphenol-A based epoxy resin. Lapox AH-118 is a liquid, pre-accelerated anhydride hardener, suitable to cure epoxy resin at elevated temperature. Lapox ADP-11 is a plasticiser to impart flexibility in casted components.

Advantages

This system offers excellent performance properties along with good resistance to thermal shocks. The end properties can be modified to suit individual requirement by changing the amount of plasticiser and filler.

Applications

High voltage application such as post insulators, switchgear components, instrument transformer and dry type distribution transformers.

Processing

Automatic pressure gelation (APG)
Conventional vacuum casting (CVC)

Typical specifications

Lapox ARC-16

Properties	Unit	Test method	Values
Appearance	-	Visual	Clear liquid
Colour	GS	ASTM D1544	Max 2
Viscosity at 25°C	mPa s	ASTM D2196	4,500 - 5,500
Epoxy content	Eq/Kg	ASTM D1652	5.0 - 5.3
Specific gravity at 25°C	-	ASTM D792	1.13 - 1.18
Flash point	°C	ASTM D93	160
Vapour pressure at 20°C at 60°C	Pa	ASTM D323	0.02 Approx 1
Shelf-life	Years	-	2

Lapox AH-118

Properties	Unit	Test method	Values
Appearance	-	Visual	Clear to pale-yellow liquid
Colour	GS	ASTM D1544	Max 8
Viscosity at 25°C	m Pas	ASTM D2196	50 - 150
Specific gravity at 25°C	-	ASTM D792	1.15 - 1.20
Flash point	°C	ASTM D93	165
Vapour pressure at 25°C at 60°C	Pa	ASTM D323	Approx 1 Approx 10
Shelf-life	Year	-	1

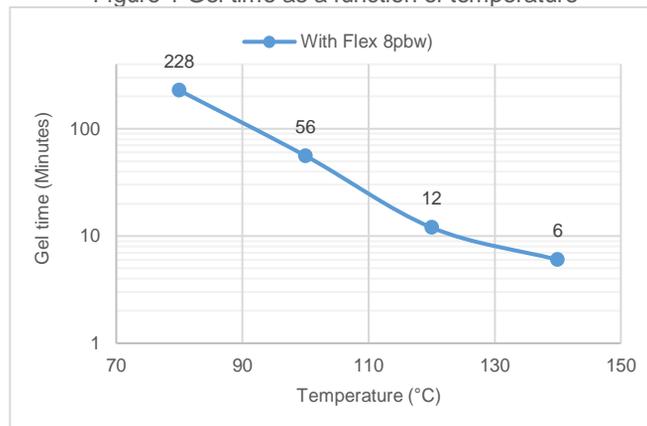
Lapox ADP-11

Properties	Unit	Test method	Values
Appearance	-	Visual	Clear liquid
Colour	GS	ASTM D1544	Max 1
Viscosity at 25°C	m Pas	ASTM D2196	60 - 90
Specific gravity at 25°C	-	ASTM D792	0.95 - 1.05
Flash point	°C	ASTM D93	82
Vapour pressure at 20°C at 60°C	Pa	ASTM D323	Approx 0.03 Approx 1
Shelf-life	Year	-	1

Processing properties

Properties	Unit	Test method	Values
Mixing ratio (by weight)	-	Visual	Resin: 100 Hardener: 80 Additive: 8 Filler: Max 350
Initial mix viscosity	m Pas	ASTM D2196	5,500 / 40°C 3,000 / 60°C 1,500 / 60°C
Pot life (5 kg mix)	Hours	ASTM D2471	8 hours / 25°C
Gel time	Minutes	DIN 16945/6.3.1	See figure 1

Figure 1 Gel time as a function of temperature



Processing recommendations

The resin, hardener, flexibiliser and pre-dried filler are blended at 60°C under a vacuum of approximately 0.5 mbar to 5 mbar. Intensive wetting of the filler is extremely important to achieve better flow and reduce tendency to shrinkage.

Silica filler should be thoroughly pre-dried at 150°C for 24 hours in air circulating oven. The use of good fillers has no significant effect on cure times, but results in slightly longer gel times. Filler impurities and high moisture content may reduce pot life and considerably increase the reactivity of the mix. This could lead to a strong exothermic reaction resulting in higher shrinkage and cracking of castings.

Mix must be thoroughly degassed if the castings are intended for application in high voltage engineering. Since this is pre-accelerated system, mixing operation should be unduly prolonged as it tends to increase mix viscosity. And in worst case, it can cure in blender itself.

Lapox ADP-11 is a liquid plasticiser, which is used to impart flexibility and to control shrinkage of the system during cure. Higher loadings of plasticiser shall reduce the glass transition temperate. The quantity of Lapox ADP-11 to be added must be decided by the user according to the requirements of glass transition temperature and flexibility. Then the complete mix is cast in preheated moulds (containing the parts to be encapsulated) under a vacuum of 5 mbar to 20 mbar. Uniform thin layer of a good release agent like Lapox K-28 must be applied on the surface of the mould before casting to ensure a smooth release product.

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Technical Data Sheet | Polymers Business

Typical moulding conditions

		Unit	Value
Mould Temperature	APG process	°C	120 - 150
	CVC process	°C	80 - 100
De-moulding	APG process	Minutes	10 - 45
	CVC process	Hours	4 - 8
Minimum Post curing	APG process	Hours / °C	10 / 140°C
	CVC process	Hours / °C	4 / 80°C + 8 / 140°C

Typical properties of filled cured system

Curing schedule: 140°C / 10 hours
Determined on standard test specimen at 25°C

Properties	Unit	Test method	Values
			Lapox ARC-16 (100) Lapox AH-118 (80) Lapox ADP-11 (8) Silica (350)
Filler loading	%	-	65
Cured density	g/cm ³	DIN 55990	1.75 - 1.85
Tensile strength	MPa	ISO 527	75 - 85
Elongation at break	%	ISO 527	0.8 - 1.2
Elastic modulus in tension	GPa	ISO 527	10 - 13
Flexural strength	MPa	ISO 178	130 - 150
Flexural elongation at break	%	ISO 178	1.3 - 1.8
Elastic modulus in flexural	GPa	ISO 178	11.5 - 12.5
Impact strength	kJ/m ²	ISO 179	10 - 15
Glass transition temperature (DSC)	°C	ISO 11357-2	100 - 110
Water absorption 25°C / 10 days	% w/w	IEC 60062	0.1 - 0.2

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Technical Data Sheet | Polymers Business

Typical electrical properties of filled cured system

Cured at 140°C / 10 hours

Properties	Unit	Test method	Values
Breakdown strength (50 Hz, 25°C)	kV/mm	IEC 60243	17 - 21
Loss factor (50 Hz, 25°C)	%	IEC 60250	2 - 3
Dielectric constant (50 Hz, 25°C)	-	IEC 60250	4
Volume resistivity at 1,000 V, 25°C	ohm.cm	IEC 60093	>10 ¹⁵
Arc resistance	Seconds	ASTM D495	180 - 190
Tracking resistance	V	IEC 60112	>600 - 0.0

Packaging

Lapox ARC-16 is available in 30 kg, 110 kg carboy, 200 kg MS drums. Lapox AH-118 is available in 30 kg, 110 kg carboy, 200 kg MS drums. And Lapox ADP-11 is available in 1 kg and 5 kg HDPE bottles and 30 kg carboys. Other packing may be considered on request.

Storage and handling

Lapox ARC-16, Lapox AH-118 and Lapox ADP-11 should be stored in a cool and dry place, preferably in an original sealed container and should not be exposed to direct sunlight. These products can be stored at room temperature (RT), away from humidity and excessive heat. Under these conditions, the shelf-life will correspond to the time stated in respective table in current TDS. Partly used containers should be closed immediately after use. Lapox AH-118 and Lapox ADP-11 are sensitive to moisture, storage containers should be ventilated with dry air only. 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.

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