Laminating

KINETIX® R246LV

KINETIX® R246 is a solvent-free, low viscosity epoxy laminating resin formulated for use with H126, H128, H160, H161 and H162 hardeners. The system cures at room temperature or with low elevated temperature post-cure and is suitable for a wide range of fibre reinforced composite manufacturing applications.

The low viscosity promotes effective fibre wet-out and laminate consolidation, making the system suitable for hand lay-up, vacuum bagging and machine impregnation processes. Extended working time makes R246 suitable for large or complex laminating operations. Cured laminates exhibit good mechanical properties and toughness, with HDT increasing following elevated temperature post-cure.

MIX RATIO
100 parts resin to 25 parts hardener by weight.

Note: Do not attempt to control cure time by altering the hardener ratio. Contact ATL Composites for further information.

UNCURED PROPERTIES

			R246LVX	H126	H128	H160	H161	H162
				Super Fast	Fast	Medium	Slow	Super Slow
Physical State			Clear	Clear Pale	Clear Pale	Clear Pale	Clear Pale	Clear Pale
Viscosity mPas	ASTM D2196	@ 25°C	750 - 900	160	60	30	25	20
Specific Gravity	ASTM D1475	g/ml@ 25°C	1.10	0.99	0.95	0.95	0.94	0.93

Post-cure is required before handling or removal from the mould or support framework. H128 may exhibit brittle behaviour at ambient cure, while H162 may display plastic-like characteristics. Care should be taken when removing peel-ply or performing secondary bonding operations prior to completion of the post-cure.

CURED PROPERTIES

			H126	H128	H160	H161	H162
			Super Fast	Fast	Medium	Slow	Super Slow
Pot Life - 100g	@ 25°C		40 min	55 min	120 min	190 min	300 min
Thin laminate open time	@ 25°C		4 hrs	4 hrs 20 min	8 hrs 45 min	9 hrs 20 min	10 hrs
Demold time	@ 25°C		9 hrs 25 min	9 hrs 35 min	28 hrs	33hrs 30 min	28 hrs
Mix viscosity mPas	@ 25°C		460	400	300	260	240
Shore 'D' Hardness	1 Day	@ 25°C	73	69	59	74	68
	2 Weeks		79	83	71	80	77
HDT	24 hours	@ 25°C	47°C	50°C	38°C	42°C	44°C
	2 Weeks	@ 25°C	53°C	53°C	46°C	47°C	48°C
	+16 hours	@ 40°C	65°C	61°C	53°C	57°C	58°C
	+ 16 hours	@ 50°C	70°C	71°C	57°C	60°C	63°C
	+ 8 hours	@ 60°C	79°C	80°C	63°C	62°C	65°C
	+ 8 hours	@ 80°C	96°C	97°C	65°C	68°C	71°C
	+ 4 hours	@ 100°C	97°C	97°C	65°C	71°C	73°C
	+ 3 hours	@ 100°C	97°C	97°C	67°C	74°C	77°C
Ultimate HDT			97°C	98°C	68°C	75°C	77°C +

⁎ Laminate - 2 layers of 400g biaxial @ 25°C / fibre fraction 50%

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MONITORING OF CURE

A laminator wishing to monitor progress of cure has a number of on the spot options open to him. Small test aliquots of mixed resin can be placed in waxed lids during lamination. These should be subjected to the same cure conditions as the actual laminate, and later compared with standard samples which are known to be fully cured.

The samples should be flat on the bottom and approximately 2 to 3 mm thick. Allowance should be made for the possible effect of foam core insulating the curing resin, and reducing the cure of the inner layer.

A better alternative means of comparison is to meter the development of Heat Distortion Temperature (HDT) by immersing the aliquots in a vessel of warming water and noting the temperature at which the resin becomes rubbery. Providing sample thickness is kept constant, this simple technique gives surprisingly reproducible results.

CAUTION

When cured these resins, like all plastics, undergo a transition to a rubbery state when heated above their HDT.

Operators should be constantly aware that a partly cured resin will not have developed full HDT, and that components should not be heated above this temperature when they are not supported by vacuum and a mould. Be aware, for example, that heating will cause a considerable build up of pressure in gases in a low density core, and this will always tend to lift a laminate.

Care should also be taken to avoid heating unsupported laminates above the HDT of bonding resins and foam cores.

CALCULATING RESIN/HARDENER FOR A FIBREGLASS LAMINATE

As a rough rule for the amount of resin/hardener required to achieve proper wetting out and consolidation of a laminate, use a 1:1 ratio of fibreglass weight per m^2 to resin/hardener weight, plus wastage e.g. 1m2 of 600 grm biaxial E-fibreglass will require 600 grms of mixed resin and hardener + a 10% wastage factor

STORAGE

KINETIX R246LV resin and associated hardeners will keep for 2 years if kept in original containers at room temperature (15˚C to 32˚C), and out of direct sunlight. Containers should be tightly sealed to prevent moisture absorption.

PACK SIZES

Order Code		Order Code		PACK
RESIN		HARDENER		
RC246LV	4 KG	HC126	1 Kg	1.5 Kg
		HC128	1 Kg	
		HC160	1 Kg	
		HC161	1 Kg	
		HC162	1 Kg	
RC246LV	18 KG	HC126	4.5 KG	
		HC128	4.5 KG	
		HC160	4.5 KG	
		HC161	4.5 KG	
		HC162	4.5 KG	
RC246LV	192 KG	HF126	48 KG	
		HF128	48 KG	
		HF160	48 KG	
		HF161	48 KG	
		HF162	48 KG	

HEALTH AND SAFETY

KINETIX R246LV and associated hardeners have moderate sensitising potential, and should be kept out of the eyes and off the skin.

• Use with good ventilation and appropriate safety equipment including impervious gloves and safety glasses.

• If skin contact occurs, remove contaminated clothing immediately and wash the affected area thoroughly with water, avoiding the use of solvents except in the case of massive contamination.

• If eye contact occurs, immediately flush with running water for at least 15 minutes and seek medical advice.

• If swallowed:
Resins - DO NOT induce vomiting, and contact a doctor or the Poisons Information Centre.

Hardeners - DO NOT induce vomiting, give plenty of milk or water and contact a doctor or the Poisons Information Centre.