

SE 84LV FLAX

LOW TEMPERATURE CURE EPOXY PREPREG

- Versatile, high-strength prepreg system
- Curable at temperatures as low as 80°C (176°F)
- Can be processed with vacuum-only processing
- Excellent tack
- Low Viscosity – Ideal for use with heavy fibre weights
- Available with a range of flax natural fibre reinforcements

INTRODUCTION

SE 84LV is an exceptionally versatile hot-melt, epoxy prepreg. It can be cured at temperature as low as 80°C (176°F), or can be used for faster moulding of flax components at 100°C (212°F). This is achieved with an extremely good outlife of up to 8 weeks at 18-22°C (64-72°F). It is a toughened system, and offers excellent mechanical properties on a wide variety of reinforcing fabrics and fibres.

SE 84LV is commonly used in vacuum bagging, press-moulding, autoclave and other pressure moulding processes.

SE 84LV is a very low viscosity system used with heavy fibre weights where low-flow processing conditions (vacuum bag pressure and minimum cure temperature), are likely to be used. With its high compressive strength it is widely used in large heavily loaded components, such as yacht hulls, and spars. It has been selected for use by various America's Cup syndicates and boats racing in the Volvo Ocean Race.

SE 84LV is widely used in sandwich structures with honeycomb, foam and balsa cores, primarily with the toughened SA 80 Adhesive Film.

PROCESSING NOTES - GENERAL

PREPARATION

When preparing the lay-up the prepreg should be removed from the freezer and allowed to thaw in a sealed bag. This may take 6 to 24 hours depending on roll size. This prevents atmospheric moisture from condensing on the prepreg which may cause voiding on cure. The mould surface should be release coated and must have been tested for vacuum integrity prior to lay-up.

LAYING-UP

The following procedure is recommended for preparing vacuum cured laminates.

1. Place the lay-up on a tool or caul sheet which has been treated with a release agent or film. Insert a thermocouple into the lay-up near the centre ply of the thickest edge section, outside the net trim line. A separate prepreg nylon peel ply is available for covering a mould tool prior to lay-up in order to leave a clean, textured surface for subsequent bonding.

2. Apply a peel ply to the surface of the lay-up. Note that for good secondary bonding of a peel-plyed surface of an SE 84LV prepreg laminate, a nylon peel ply, such as Gurit's Stitch Ply A, is strongly recommended. This is particularly important where the cure temperatures are in excess of 90°C (194°F). Cover the peel ply entirely with a perforated release film. Normally, no edge resin bleeder system is used. For thin sections, Gurit WL3600P90 grade release film are recommended, while for sections of 4mm and above, Gurit WL3600P release film is also suitable. With WL3600P the amount of resin bled away is controlled by the number of dry plies of resin bleeder cloth placed over the perforated release film.

3. Install a vacuum bag by standard techniques. Insert at least two vacuum stems through the bag connecting one to the vacuum source and the other, at a point on the part furthest from the source, to a calibrated vacuum gauge. Position part in the oven and apply vacuum to check for bag or system leaks leave part under vacuum for an extended period before applying heat.

4. Commence the heat-up cycle, typically between 0.3°C(0.5°F)/min and 2°C(3.6°F)/min to the final cure temperature. At 85°C (185°F), the temperature should be held up for 10 hours. Faster cures may be obtained at elevated temperatures, e.g. 6 hours at 90°C (194°F) or 3 hours at 100°C (212°F). All temperatures measured by the previously installed thermocouple. When curing at 80°C (176°F) a minimum of 12 hours is recommended. Vacuum should be maintained as high as possible, with a minimum of 85% throughout the cure cycle.

5. Upon completion of cure, turn off heat and cool until part temperature has fallen below 60°C (140°F). When fully cooled, the part may be debagged, trimmed and machined as necessary. A post-cure is not required.

CORE BONDING

This product can be used in conjunction with typical core materials. Representative test panels should be made to ensure that the laminate construction, curing method and other variables allow full filling of any cuts or slits in the foam. The cure cycles given in this datasheet are for typical monolithic flat panels and may not be appropriate for sandwich panels.

When using Nomex™ or aluminium honeycombs, the separate SA 80 adhesive film is recommended and full details of use are provided on the separate SA 80 data sheet. This adhesive film is supplied on a lightweight glass carrier, or in some cases it can be supplied directly coated onto one face of the SE 84LV prepreg.

The system is fully compatible with Ampreg wet layup epoxy systems and therefore all types of cores may be bonded to a first skin by using a separate 'wet-bonding' operation. In this case, the addition of filler powders to the appropriate resin system is required to provide the correct paste-like consistency.

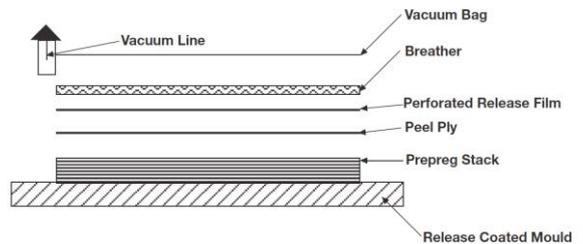
PROCESSING NOTES - CURING

CURE CYCLES

For a good balance of composite properties, it is recommended that the laminate is cured at 80°C (176°F) for a minimum of 12 hours.

SE 84LV with Flax may be cured at higher temperatures for a shorter time. At a maximum cure temperature of 100°C (212°F) cure can be achieved in 3 hours.

It is not recommended to cure SE 84LV under vacuum pressures of less than 85%. If a ramp rate of less than 0.3°C/min (0.5°F/min) is used, users should satisfy themselves that this allows adequate flow.



CURING AT 80°C (176°F)

When curing at 80°C (176°F) it is important to ensure the temperature is monitored off the trailing thermocouple. 80°C (176°F) should be treated as the minimum cure temperature for SE 84LV; 70-75°C (158-167°F) will not generate adequate mechanical properties.

THIN LAMINATES

When using very thin laminates (e.g. with a total laminate fibre weight of less than 300gm²), care needs to be taken to avoid extracting excessive amounts of resin during the cure process. To avoid this, a microporous release film can be used, and for particularly critical components, a prepreg peel ply should be used.

PRODUCT INFORMATION

AVAILABILITY

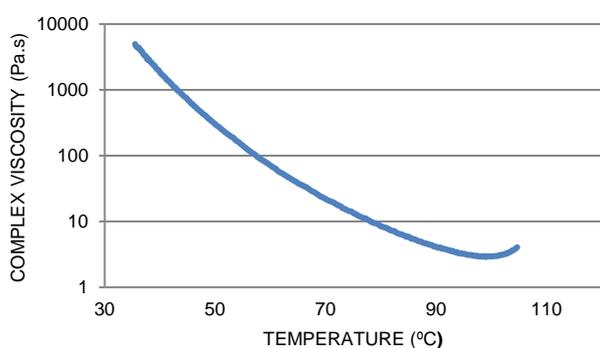
SE 84LV prepregs are available in a variety of fabric forms and collimated unidirectional tapes. Please contact Customer Support to discuss specific requirements and availability.

PREPREG PROPERTIES

RHEOLOGY DATA

SE 84LV resin viscosity profile conducted at 1°C (1.8°F) per minute.

PROPERTY	VALUE	
Minimum Viscosity	2.9 Pa.s	28.8 P
Temperature at Minimum Viscosity	99°C	210°F



TRANSPORT & STORAGE

When stored sealed & out of direct sunlight.

STORAGE TEMP		UNIT	VALUE
-18°C	0°F	months	24
+18-22°C	+64-72°F	weeks	8

All prepreg materials should be stored in a freezer when not in use to maximise their useable life, since the low temperature reduces the reaction of resin and catalyst to virtually zero. However, even at -18°C (0°F), the temperature of most freezers, some reaction will still occur. In most cases after some years, the material will become unworkable.

When not in use SE 84LV products should be maintained at -18°C (0°F). To avoid contamination on their surfaces, allow rolls to reach room temperature before unwrapping.

HEALTH AND SAFETY

Please refer to product SDS for up to date information specific to this product.

MINIMUM CURE TIME & TEMPERATURE

Recommended minimum cure is 12 hours at 80°C (176°F) using vacuum bag processing.

PROPERTY	OVEN / VAC BAG	TEST STANDARD
Typical Laminate	8 plies of SE 84 RF300T prepreg with 60% resin content	-
Typical Ramp Rate	1 – 2°C (2 – 4°F) per minute	-
Cure Temperature	85°C (176°F)	-
Cure Dwell Time	12 (hours)	-
Cure Pressure	-1bar (14.5Psi)	-
De-mould Temperature	< 60°C (140°F)	-
Dry T _{g1} (DMA)	75°C / 167°F**	ISO 6721 (DMA)

** T_{g1} is dependent on fabric style being used and moisture content of fabric, therefore T_g can be variable

CURING LARGE STRUCTURES

Gurit provides detailed processing notes for large structures to be built using SE84LV / SA 80; these notes are available from the Technical Department on request.

MECHANICAL PROPERTIES

Cured using standard vacuum bag processing techniques and a minimum cure time of 12hrs at 80°C (176°F). Values are representative of the typical properties to be expected but do not constitute a guaranteed specification.

CURED RESIN PROPERTIES

PROPERTY	SYMBOL	SE 84LV RESIN CAST	TEST STANDARD
Tensile Strength	σ_T	82 MPa	ISO 527-2
Tensile Modulus	E_T	3.9 GPa	ISO 527-2
Flexural Strength	σ_F	123 MPa	ISO 178
Flexural Modulus	E_F	3.5 GPa	ISO 178
Compressive Strength	σ_C	163 MPa	ISO 604
Glass Transition Temperature	T_{g1}	115°C	ISO 6721

WOVEN LAMINATE PROPERTIES

Cured using standard processing techniques and standard cure of 12 hours at 80°C (176°F). Where test directions are provided they are with respect to the warp direction of the roll.

PROPERTY	SYMBOL	UNIT	SE 84LV / RF300T	TEST STANDARD
Resin Content	-	%	56	ASTM D 3171 Method II
Cured Ply Thickness	-	mm	0.52	ASTM D792
Fibre Volume Fraction	-	%	37 - 39	ASTM D 3171 Method II
0° Tensile Strength*	X_T	MPa	143	ISO 527-4
0° Tensile Modulus*	E_t	GPa	13.8	ISO 527-4
0° Compressive Strength*	X_c	MPa	138	SACMA SRM1-94
0° Compressive Modulus*	E_c	GPa	12.1	SACMA SRM1-94
0° Flexural Strength	X_F	MPa	195	ISO 14125
0° Flexural Modulus	E_{F11}	GPa	11.5	ISO 14125
ILSS	τ_M	MPa	20.6	ISO 14130

*Normalised to 40% fibre volume fraction

NOTICE

All advice, instruction or recommendation is given in good faith but the selling Gurit entity (the Company) only warrants that advice in writing is given with reasonable skill and care. No further duty or responsibility is accepted by the Company. All advice is given subject to the terms and conditions of sale (the Conditions) which are available on request from the Company or may be viewed at Gurit's Website: www.gurit.com/terms-and-conditions.aspx

The Company strongly recommends that Customers make test panels in the final process conditions and conduct appropriate testing of any goods or materials supplied by the Company prior to final use to ensure that they are suitable for the Customer's planned application. Such testing should include testing under conditions as close as possible to those to which the final component may be subjected. The Company specifically excludes any warranty of fitness for purpose of the goods other than as set out in writing by the Company. Due to the varied nature of end-use applications, the Company does, in particular, not warrant that the test panels in the final process conditions and/or the final component pass any fire standards.

The Company reserves the right to change specifications and prices without notice and Customers should satisfy themselves that information relied on by the Customer is that which is currently published by the Company on its website. Any queries may be addressed to the Technical Services Department.

Gurit is continuously reviewing and updating literature. Please ensure that you have the current version by contacting your sales contact and quoting the revision number in the bottom left-hand corner of this page.

TECHNICAL CONTACT INFORMATION

For all other enquiries such as technical queries:

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Email technical.support@gurit.com

24-HOUR CHEMICAL EMERGENCY NUMBER

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