



SP 115

Clear Epoxy Laminating System

- **Excellent clarity**
- **Good ultra-violet resistance**
- **Rapid fibre wet-out**

Introduction

SP 115 is a low viscosity, ultra-clear epoxy laminating system. It has been designed for the manufacture of laminates such as those used in sail and surfboards which are to remain unpainted, and where a very clear finish is required. In this way colourful embedded graphics and attractive fabric weave styles can be kept visible. The material also contains UV filters which give the product its characteristic transparent pale violet/blue colour. These filters both enhance the sharpness of graphics, and, when overcoated with a suitable UV-screening PU varnish, will reduce the tendency of clear laminates to yellow after prolonged exposure to sunlight. The product is particularly suitable for use with glass fibre reinforcements which use fibre sizings optimised for wet-out and laminate clarity, such as RE210D.

SP 115 also exhibits a high degree of toughness and water resistance, enhancing the strength and damage tolerance of the thin laminates typically used in sail and surfboard manufacture. Being completely solvent and styrene-free, polystyrene foam blanks can be safely used to produce boards of the lightest possible weight.

Instructions for Use

Workshop Conditions

SP 115 is optimised for use between 18 - 25°C. At lower temperatures the product thickens and may become unworkable. At higher temperatures working times will be significantly reduced. Low Relative Humidity (<70%) and dry reinforcements are essential, both for creating high clarity laminates to clearly display graphics, and for the development of a full cure.

Surface Preparation

Before using the product ensure that the surfaces to be laminated or coated are clean, dry and dust-free. Use only SP Fast Epoxy Solvent (SP Solvent A) for cleaning sanded laminates. Do not use solvents on polystyrene foam.

When laminating, aim to use the lowest quantity of resin consistent with good fibre wet-out, and apply good consolidation techniques using a rubber squeegee. As a guide, the weight of mixed resin system per sq.m should not be greater than the weight of the fabric per sq.m.

Mixing and Handling

SP 115 resin is combined with SP 115 hardener in the following ratio:

SP 115 resin : SP 115 hardener
5 : 2 (by volume)
3 : 1 (by weight)

Use graduated plastic mixing cups (available from SP) for volumes in excess of 200ml. For smaller volumes use plastic syringes. Do not measure out more than can be used within 10 minutes.

The resin and hardener should be mixed thoroughly in the pot for at least one minute. The resin/hardener reaction generates heat (exotherm) which must be allowed to escape to prevent an uncontrollable rapid gelation in the pot. Transferring the epoxy mix to a shallow tray will help dissipate the heat of the reaction and prolong its usable life.

Cure Schedule

Cure between 15°C - 30°C. The SP 115 will cure at ambient/room temperatures providing adequate properties after 14 days. A laminate cured at ambient temperatures only should be left for as long as possible before being subjected to loads in use. The Cured System Properties table shows the mechanical properties achieved after 28 days at 21°C.

An elevated temperature postcure (up to 50°C) is recommended to fully stabilize the laminate for maximum properties. A postcure gives increased mechanical properties, particularly a higher heat deflection temperature, increased toughness of the finished laminate and increased colour stability.

An elevated temperature postcure can be applied after an initial 24 hour cure at room temperature. Support the moulded component adequately during the post-cure as the laminate will initially soften slightly as the temperature increases. Maximum cure at elevated temperature depends on temperature and time, e.g. 16 hours at 50°C, or longer at lower temperatures.

Additional Information

Overcoating or Over-Laminating

Further layers of SP 115 can be applied over existing SP 115 laminate if it is still tacky.

However, if the SP 115 has cured past the almost "tack free" stage (approx., 1½ hours at 30°C, 2 hours at 20°C and 3 hours at 15°C), it has lost its ability to bond to a fresh layer of mixed resin system. In such a case, if further layers of epoxy are required the surface must be left for a minimum of 12 hours at 25°C, or above, to become adequately hard. This period will be longer at lower temperatures.

When the surface is hard enough to sand, further epoxy layers can then be applied. The surface should be first wet sanded to obtain a good key, then wiped with SP Fast Epoxy Solvent (SP Solvent A) to remove the dust, prior to applying the new coating or laminate layer.

Flow Coating

SP 115 may be used as a cosmetic flow coat to obtain a thick, high gloss finish over the laminate. Before any finishing work or polishing with rubbing compound, leave the coating to cure for at least 48 hours, at 20-25°C.

Vacuum bags

These are not normally used in surfboard manufacture from a foam blank. Should the SP 115 system be used in a female mould or over a male plug, where a vacuum bag could be used, vacuum on and vacuum off times are given in Working Properties table.

Sail and Surf Board Construction Guide

Full details of sail and surf board construction and finishing can be found in the Board Construction Guide obtainable from SP.

Application Guides

SP produces a number of application guides to commonly performed tasks using these products. Please contact Technical services or your stockist to obtain a copy.

Properties

Component Properties		
	Resin	Hardener
Mix Ratio (by weight)	100	33.3
Mix Ratio (by volume)	100	40
Viscosity @ 15°C (cP)	1869	231
Viscosity @ 20°C (cP)	1166	173
Viscosity @ 25°C (cP)	723	131
Viscosity @ 30°C (cP)	451	98
Shelf Life (months)	12	12
Colour (Gardner)	pale violet	1
Mixed Colour (Gardner)	-	-
Component Dens. (g/cm ³)	1.163	0.969
Mixed Density (g/cm ³)	-	1.115
Hazard Definition	Xi, N	C

Working Properties vs. Temperature				
	Resin / Hardener			
	15°C	20°C	25°C	30°C
Initial Mixed Viscosity (cP)	1265	856	576	384
†Gel Time - 150g Mix in Water (hrs:mins)	-	1:00	0:35	0:21
†Pot Life - 500g Mix in air (hrs:mins)	0:45	0:33	0:23	0:16
†Latest Vacuum Flow Time (hrs:mins)	2:50	2:10	1:45	1:25
†Earliest Vacuum Off Time (hrs:mins)	4:00	3:10	2:30	2:00
†Demould Time (hrs:mins)	4:40	3:40	2:50	2:10

Notes: For an explanation of test methods used see 'Formulated Products Technical Characteristics'.

All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

†All times are measured from when resin and hardener are first mixed together.

Properties (cont'd)

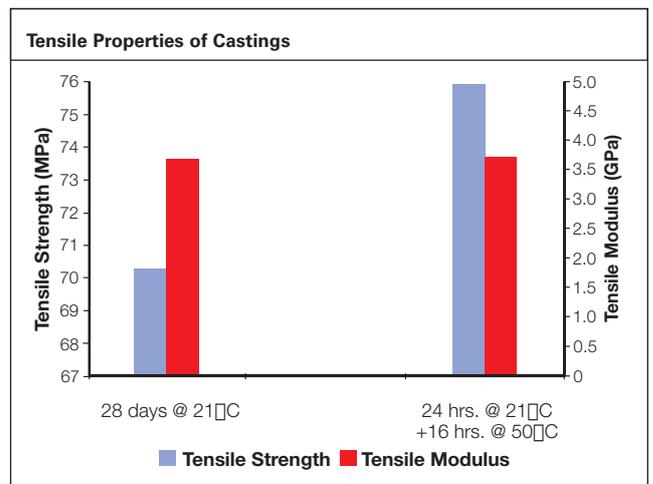
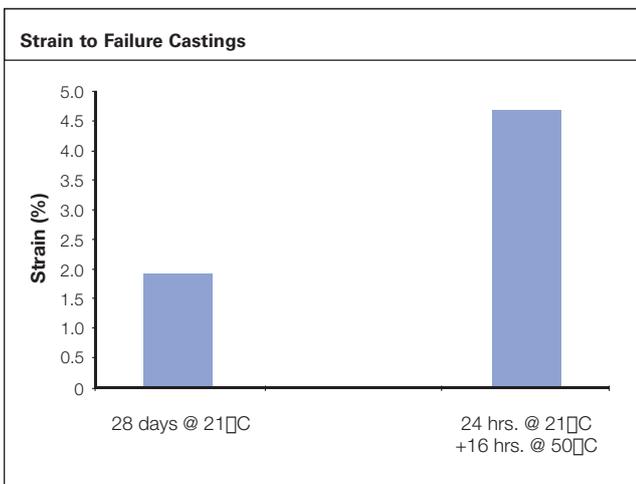
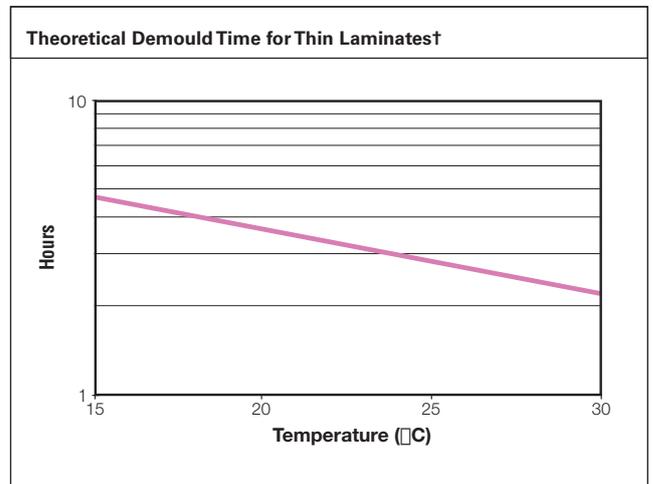
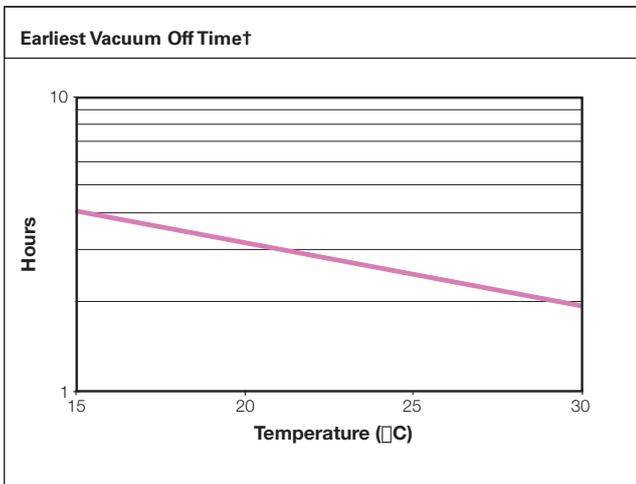
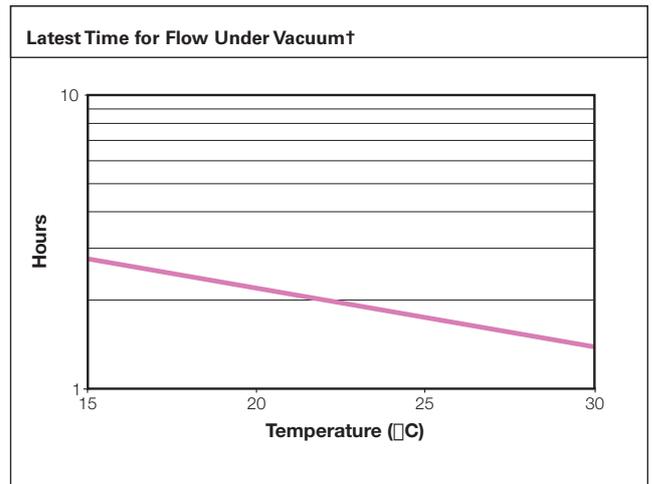
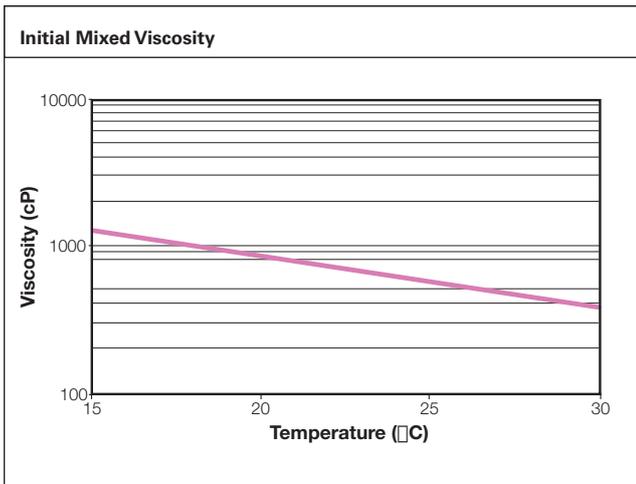
Cured System Properties		
	Cured (28 days @ 21°C)	Cured (24 hrs @ 21°C + 16 hours @ 50°C)
Tg DMTA (Peak Tan δ)(°C)	64.4	84.2
Tg Ult - DMTA (°C)	97.5	97.5
ΔH - DSC (J/g)	39	5
Tg1 - DMTA (°C)	54.4	74.2
Est. HDT (°C)	49	69
Mositure Absorption (%)	1.37	1.20
Cured Density (g/cm ³)	1.161	1.16
Linear Shrinkage (%)	1.6	1.6
Barcol Hardness	30	37
Cast Tensile Strength (MPa)	70.3	75.9
Cast Tensile Modulus (GPa)	3.67	3.70
Cast Strain to Failure (%)	1.9	4.7
Lam. Comp. Strength (MPa)	398	444
Laminate T.V.M. Strain (%)	2.1	2.0
Laminate ILSS (MPa)	49.9	60.2
ILSS Wet Retention (%)	76	77

Notes: For an explanation of test methods used see 'Formulated Products Technical Characteristics'.

All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

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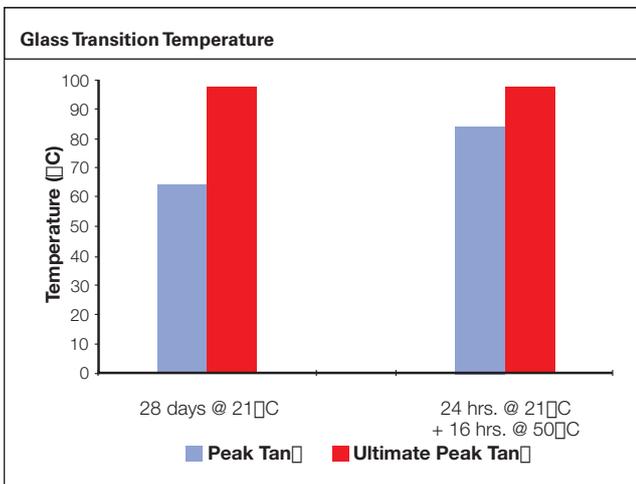
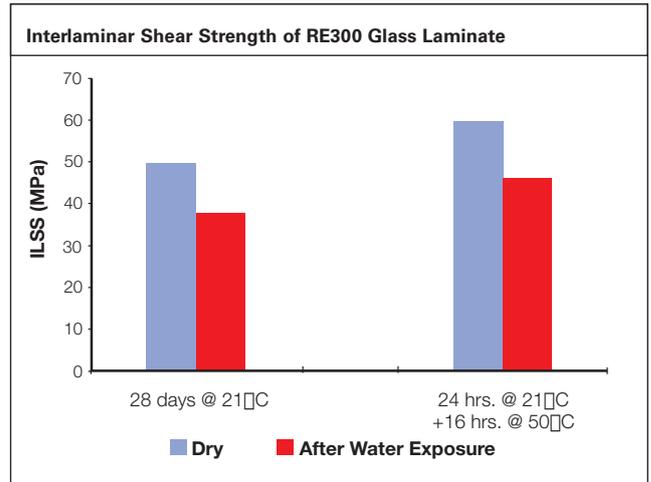
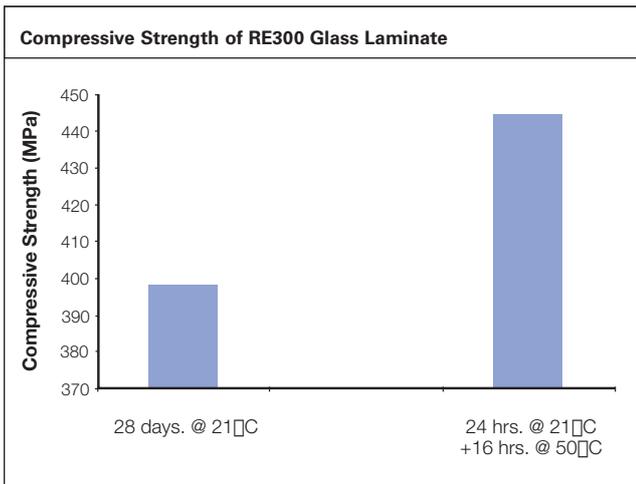


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Health and Safety

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. SP-High Modulus recommends the use of disposable nitrile gloves for most applications. The use of barrier creams is not recommended, but to preserve skin condition a moisturising cream should be used after washing.
2. Overalls or other protective clothing should be worn when mixing, laminating or sanding. Contaminated work clothes should be thoroughly cleaned before re-use.
3. Eye protection should be worn if there is a risk of resin, hardener, solvent or dust entering the eyes. If this occurs flush the eye with water for 15 minutes, holding the eyelid open, and seek medical attention.
4. Ensure adequate ventilation in work areas. Respiratory protection should be worn if there is insufficient ventilation. Solvent vapours should not be inhaled as they can cause dizziness, headaches, loss of consciousness and can have long term health effects.
5. If the skin becomes contaminated, then the area must be immediately cleansed. The use of resin-removing cleansers is recommended. To finish, wash with soap and warm water. The use of solvents on the skin to remove resins etc must be avoided.

Washing should be part of routine practice:

- before eating or drinking
- before smoking
- before using the lavatory
- after finishing work

6. The inhalation of sanding dust should be avoided and if it settles on the skin then it should be washed off. After more extensive sanding operations a shower/bath and hair wash is advised.

SP-High Modulus produces a separate full Material Safety Data Sheet for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work. A more detailed guide for the safe use of resin systems is also available from SP-High Modulus, and can be found at www.gurit.com

Applicable Risk & Safety Phrases

Resin

R 36/38, 43, 51/53
S 2, 23, 24/25, 29/56,
37/39, 46

Hardener

R 20/21/22, 34, 43, 68, 52/53
S 1/2, 9, 26, 29/56, 36/37/39,
45



Transport & Storage

The resin and hardener should be kept in securely closed containers during transport and storage. Any accidental spillage should be soaked up with sand, sawdust, cotton waste or any other absorbent material. The area should then be washed clean (see appropriate Safety Data Sheet).

Adequate long term storage conditions for both materials will result in a shelf life of two years for the resin and one year for the hardener. Storage should be in a warm dry place out of direct sunlight and protected from frost. The temperature should be between 10°C and 25°C. Containers should be firmly closed. Hardeners, in particular, will suffer serious degradation if left exposed to air.

Notice

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The Company strongly recommends that Customers make test panels and conduct appropriate testing of any goods or materials supplied by the Company 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. 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.

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