Spabond 540

Modified Epoxy Adhesive

- **Long working times for bonding large polyester and epoxy parts**
- **Exceptional impact toughness & peel strength**
- **Excellent bond to polyester & epoxy substrates**
- **Low exotherm & shrinkage in thick bondlines**
- **Sag resistance of up to 30mm on a vertical surface**
- **Available with a range of hardeners, from Fast to Extra Slow**
- **Resin and Hardener pigmented to give a visual indication of mix quality**
- **RINA approved as a structural adhesive for pleasure yachts**

Introduction

Spabond 540 is a modified ambient curing epoxy adhesive designed for bonding polyester or epoxy laminates.

The Adhesive system is available with two resins; Spabond 540 resin is designed for larger gaps up to 30mm and Spabond 540LV for bondline <20mm. Spabond 540LV is available in drums, pails and cartridges.

The high toughness and excellent gap filling properties make this adhesive ideal for stringers/bulkheads, frames and hull-to-deck joints on medium to large production boats.

Instructions for Use

Ideally Spabond 540 should be used between 15 and 25°C and below a relative humidity of 70%. The handling / processing & mechanical properties of the adhesive are likely to be affected outside of these processing conditions.

Surface Preparation

Ensure that polyester / epoxy laminates are fully cured before bonding, then prepare as described below:

Peel-plied surface – To achieve the optimum bond strength it is recommended to use a nylon peel ply. This will provide a clean, contaminant-free textured surface, suitable for secondary bonding.

Alternatively abrade the surface as detailed in the section below:

Abrading - Before using the product ensure that surfaces to be bonded are clean, dry and dust-free. Prepare all surfaces by abrading with 80-120 grit paper or other suitable abrasive, remove dust then wipe with acetone or SP Solvent A (SP Fast Epoxy Solvent).

Please contact SP-High Modulus for a Guide on Surface Preparation and Pre-treatments.

Mix ratio & Colour

The Spabond 540 resin & hardener components are pigmented to give a visual indication of mix quality. Please refer to Component Properties table for resin & hardener colours.

Spabond 540 resins	Spabond 540 hardeners
1 : 1 (by volume)	
Refer to 'Component Properties' table for mix ratio by weight	

Hand mixing

The resin and hardener components should be mixed thoroughly, using a helical paint or paddle mixer until a uniform colour is achieved.

Particular attention should be made to ensure that resin/hardener are thoroughly mixed on the walls and bottom of the mixing container.

Machine mixing

Spabond 540 is compatible with a range of mixing / dispensing equipment. Please contact Gurit Technical Support for information/recommendations on suitable equipment.

Cartridge use (Spabond 540LV only)

If dispensing product from twin cartridges with a mixing / dispensing head, please discard the first mix head length of resin and hardener components, prior to applying adhesive to the job, in order to ensure thorough mixing of the system. We recommend the use of a new mix head for each application, particularly where the time between each application approaches the pot life.

Applying the adhesive

To guarantee the best possible bond, adhesive should be applied to both surfaces of the joint to ensure good wetting of the joint surfaces. The joint should be clamped as soon as possible after application of the adhesive. Please refer to the working properties section to determine the maximum open time for the adhesive.

Properties

Component Properties						
	Resin		Hardener			
	Spabond 540	Spabond 540LV	Fast	Standard	Slow	Extra Slow
Mix Ratio (By Weight)	100	100	94.7	92.1	93.0	91.2
Mix Ratio (By Volume)	100	100	100	100	100	100
Viscosity at 25°C (P)	460	270	300	300	270	290
Shelf Life (months)	12	12	12	12	12	12
Colour	Yellow	Yellow	Red	Purple	Green	Blue
Component Density (g/cm³)	1.14	1.14	1.08	1.05	1.06	1.04
Mixed Density Spabond 540 (g/cm³)	-	-	1.11	1.10	1.10	1.09
Hazard Definition	Refer to MSDS					

Working Properties (mixed resin & hardener)					
		Hardener			
		Fast	Standard	Slow	Extra Slow
Pot Life – 500g mix in air (hrs:mins) 20°C		0:25	0:40	01:30	02:10
Clamp time at 20°C (hrs)[1]		2-5	10-20	20-30	TBC
Sag Resistance at 20°C (mm)	**Spabond 540**	30			
	Spabond 540LV	20			
Working Time (hrs:mins) 20°C*		0:45	02:00	04:00	06:30

[1] Depending on bondline thickness & ambient temperature

* 20mm thickness

Cured neat resin cast properties*								
Property	**Fast Hardener**		**Standard Hardener**		**Slow Hardener**		**Extra Slow Hardener**	
	7 Days @ 21°C	**24 hrs at 21°C +16hrs @ 50°C**	**7 Days @ 21°C**	**24 hrs at 21°C +16hrs @ 50°C**	**7 Days @ 21°C**	**24 hrs at 21°C +16hrs @ 50°C**	**7 Days @ 21°C**	**24 hrs at 21°C +16hrs @ 50°C**
Tensile Strength (MPa)	17	23	17	19	14	18	TBC	17.3
Tensile Elongation (%)	55	30	50	40	70	40	TBC	37.3
Tensile Modulus (GPa)	0.86	1.03	0.70	0.85	0.69	0.85	TBC	0.76
Charpy Impact KJ/m²**	8	8	8	6	7	7	TBC	6.1

** Tested to ISO 179.eA

Mechanical Properties*								
Property	**Fast Hardener**		**Standard Hardener**		**Slow Hardener**		**Extra Slow Hardener**	
	7 Days @ 21°C	**24 hrs at 21°C +16hrs @ 50°C**	**7 Days @ 21°C**	**24 hrs at 21°C +16hrs @ 50°C**	**7 Days @ 21°C**	**24 hrs at 21°C +16hrs @ 50°C**	**7 Days @ 21°C**	**24 hrs at 21°C +16hrs @ 50°C**
Cleavage Strength on Steel (N)	5000	6400	5100	5400	5100	6200	TBC	TBC
Shear Strength on Steel (MPa)	14	16	15	18	14	16	TBC	TBC
Lapshear on Polyester Laminate⁺ (MPa)	10	10	9	10	9	9	TBC	9
Lapshear on Epoxy Laminate⁺(MPa)	13	13	14	14	14	14	TBC	TBC

⁺ Peel plied finish, all samples failed within the laminate

Temperature Performance*				
Property	**Fast Hardener**	**Standard Hardener**	**Slow Hardener**	**Extra Slow Hardener**
Tg2 by DSC 7 Days @ 21°C (°C)	49	52	49	TBC
Tg2 by DSC - 24hrs at 21°C +16hrs @ 50°C (°C)	56	58	52	58
Tg2 Ult by DSC (°C)	69	71	58	TBC
Shore D Hardness - 24hrs at 21°C +16hrs @ 50°C	70	70	69	TBC

***Please note: Cured properties of Spabond 540 and Spabond 540LV are the same when combined with the relevant hardeners.**

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 SP resin systems is also available from SP-High Modulus, and can be found at www.gurit.com

Applicable Risk & Safety Phrase

Please refer to MSDS.

Transport & Storage

The resin and hardeners 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 will result in a shelf life of two years for both the resin and hardeners. 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.

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