

Spabond 540PB

Modified Epoxy Adhesive

- **High strength and toughness**
- **Excellent bond to polyester & epoxy grp substrates**
- **Extended working times**
- **Low exotherm & shrinkage in thick bondlines**
- **Sag resistance of 25mm on a vertical surface**
- **Range of working/cure times.**

Introduction

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

The long working times 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 PB 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. (SP item no V620-001 to 006). 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 for a Guide on Surface Preparation and Pre-treatments.

Mix ratio & Colour

The Spabond 540PB resin & hardener components are pigmented to give a visual indication of mix quality.

Resin - Cream

Slow Hardener - Teal

Extra Slow Hardener - Light Blue

SP Spabond 540 resin	SP Spabond 540 hardener
100	37 (by weight)
2.5	1 (by volume)

Mixing & Handling

Spabond 540PB has been designed to bond large polyester and epoxy grp structures and can be mixed and applied using a range of mixing machines. Details of suitable machines are shown below.

Supplier	Website	Machine model
2KM	www.2KM.co.uk	Polymix 9220
Graco / Liquid Control	www.graco.com	TBC
Dekumed	www.dekumed.de	TBC
Dopag	www.dopag.com	TBC

It should be noted that Spabond 540PB has not been formulated for hand mixing. However, for small quantities, it is possible to mix by hand. Please refer to the guidelines below for hand mixing.

Hand mixing

For small quantities of 5kg or less, Spabond 540PB can be mixed in a pail using a drill mixer with a helical paint mixing head. It is recommended to use a low drill speed to ensure that excessive air is not introduced into the adhesive. Alternatively, use a stiff spatula and board and ensure that the adhesive is mixed until a consistent colour is achieved before applying the adhesive to the bondline.

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	Slow	Extra Slow
Mix Ratio (By Weight)	100	37	37
Mix Ratio (By Volume)	100 (2.5)	40 (1)	40 (1)
Viscosity at 25°C(cP)	41400	10300	8700
Shelf Life (months)	12 months	12 months	12 months
Colour	Cream	Teal	Blue
Mixed Colour	Light green		Light blue
Component Density (g/cc)	1.15	1.04	1.01
Mixed Density (g/cc)	1.12	1.12	1.10
Hazard Definition	Refer to MSDS	Refer to MSDS	Refer to MSDS

Mixed Resin & Hardener Properties		
	Slow	Extra Slow
Initial Mixed Viscosity (cP) 25°C	22800	21600
Pot Life – 500g mix in air (hrs:mins) 20°C	00:50	1:30
Clamp time at 20°C	19hrs	30hrs
Sag Resistance at 20°C (mm)	25mm	25mm

Cured System Properties					
Property	7 days Ambient *		28 days Ambient *	24 hrs at 21°C +16hrs @ 50°C	
	Slow	Extra Slow	Extra Slow	Slow	Extra Slow
Tg DMA (Peak Tan d) (°C)	61	51.5	55	73	60.4
Tg2 Ult – DSC (°C)	68	65.6	62.9	65	68.4
Tg2 – DSC (°C)	50	45.6	49.1	60	56.9
Tg1 – DMA (°C)1	51	41.8	44.6	60	44.8
Cured density (g/cc)	1.12	1.15	1.15	1.13	1.16
Linear shrinkage (%)	-0.18	1.4	1.4	-0.27	1.6

* Ambient temperature range of 19 – 21°C.

Cured neat resin cast properties				
Property	Result 7 days Ambient*		24 hrs at 21°C +16hrs @ 50°C	
	Slow	Extra Slow	Slow	Extra Slow
Tensile Strength (MPa)	17	14	20	17
Tensile Elongation (%)	55%	60%	50%	70%
Tensile Modulus (GPa)	0.84	0.51	0.98	0.53

* Ambient temperature range of 19 – 21°C.

Properties (cont'd)

Mechanical Properties on steel					
Property	7 days Ambient *		28 days Ambient*	24 hrs at 21°C +16hrs @ 50°C	
	Slow	Extra Slow	Extra Slow	Slow	Extra Slow
Cleavage Strength (kN)	6.4	5.0	5.5	6.6	5.8
Shear Strength on Steel (MPa)	17	14	16	17	16

Mechanical Properties on Polyester Laminate (peel plied finish)						
Property	7 days Ambient *		28 days Ambient*		24 hrs at 21°C +16hrs@50°C	
	Slow	Extra Slow	Slow	Extra Slow	Slow	Extra Slow
Lapshear (MPa)	7**	7**	7**	7**	6**	7**
Lapshear after water soak (MPa)	-	-	-	-	7**	6**
Peel strength on polyester laminate (J/m ²)	N/A	N/A	N/A	N/A	600**	TBD

* Ambient temperature range of 19 – 21°C.

** All samples failed within the laminate

Mechanical Properties on Epoxy Laminate (peel plied finish)						
Property	7 days Ambient *		28 days Ambient*		24 hrs at 21°C +16hrs@50°C	
	Slow	Extra Slow	Slow	Extra Slow	Slow	Extra Slow
Lapshear (MPa)	14**	13**	13**	13**	15**	12**
Lapshear after water soak (MPa)	-	-	-	-	14**	13**
Peel strength on epoxy laminate (J/m ²)	N/A	N/A	N/A	N/A	1700	TBD

* Ambient temperature range of 19 – 21°C.

** All samples failed within the laminate

Health and Safety

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. SP 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 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, and can be found on our website 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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