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
- Lloyds Register Certified Formats Available

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 540 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.

**working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all SP 540 systems*

PRODUCT INFORMATION

The product is available in a number of formats please contact your local customer support or download the latest product catalogue available on www.gurit.com. The product formats listed to the right also benefit from 3rd Party Certification and specific details can be found by downloading the certificate from guriit.com.

PRODUCT DESCRIPTION	STATUS	CERTIFICATION
Spabond™ 540 Resin and All Hardeners	Valid	Lloyds Register MATS/4850-1

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 2 years for both the resin and hardeners. Storage should be in a warm dry place out of direct sunlight and protected from frost. The storage temperature should be kept constant between 10°C and 25°C, cyclic fluctuations in temperature can cause crystallization. Containers should be firmly closed. Hardeners, in particular, will suffer serious degradation if left exposed to air.

COMPONENT	UNITS	10 – 25°C
Spabond™ 540 Resin	months	24
Spabond™ 540 Hardeners	months	24

For more information on crystallization please refer to the Adhesives section on the Gurit website. (www.gurit.com)

INSTRUCTIONS FOR USE

The product is optimised for use at 15 - 25°C and below a relative humidity of 70%. At lower temperatures the components thicken and may eventually become unworkable. To ensure accurate mixing and good workability pre-warm the resin & hardener as well as the surfaces to be bonded before use.

SURFACE PREPARATION

Before using the product ensure that surfaces to be bonded are clean, dry & dust-free. Prepare all surfaces by abrading with medium grit paper or other suitable abrasive, remove dust then wipe with acetone. Please contact Gurit for a Guide on Surface Preparation and Pre-treatments.

Polyester / vinylester / Epoxy - for best results ensure laminates are fully cured before bonding, then prepare using one of these methods:

- 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.
- 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 Gurit Solvent A (Gurit Fast Epoxy Solvent).

MIXING & HANDLING

Gurit recommends mixing machine dispense. If mixing by hand, mix thoroughly for at least one minute, paying particular attention to the sides and bottom of the mixing vessel, to ensure no streaks remain. Once fully mixed the adhesive should have a uniform colour. Use from pot quickly to maximise resin working life.

CARTRIDGE USE

If dispensing product from a two component cartridge, first prime the cartridge by dispensing slowly until both resin and hardener are at the outlet of the cartridge. Secondly, clean the outlet and attach the mixing head. When starting a new cartridge, dispense and discard a small amount of adhesive (typically the length of a mix head) prior to applying adhesive to the substrate, in order to ensure thorough mixing of the system. If using a pneumatic gun, regulate supply air pressure to a maximum of 4 Bar. Relieve the pressure on the cartridge after use.

APPLICATION

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.

HEALTH AND SAFETY

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. Gurit 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.

APPLICABLE RISK & SAFETY PHRASES

Gurit produces a separate full Safety Data Sheet for all hazardous products. Please ensure that you have the correct SDS to hand for the materials you are using before commencing work.

SPABOND™ 540 & FAST HARDENER

This 1 page product summary is intended for use in conjunction with further advice provided under the Instructions for Use section. All data has been generated from typical production material and does not constitute a product specification.

MIXING AND HANDLING

PROPERTY	UNITS	SP 540 RESIN	FAST HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - colour	Description	Yellow	Red	Pink	-
Appearance - form	Description	Thixotropic paste			-
Mix ratio by weight	Parts by weight	100	95	-	-
Mix ratio by volume	Parts by volume	100	100	-	-
Density at 21 °C	g/cm^3	1.14	1.08	1.11	Archimedes

COMPONENT & MIXED SYSTEM VISCOSITY

PROPERTY	UNITS	15˚C	20˚C	25˚C	30˚C	TEST METHOD
Spabond™ 540 Resin Viscosity	P	-	-	460	-	-
Spabond™ 540 Fast Hardener Viscosity	P	-	-	300	-	-
Working time (20mm thickness)	hrs:min	-	00:45	-	-	-
Pot-life (500 g, mixed in air)*	hrs:min	-	00:25	-	-	-
Clamp Time* (time to 2kN cleavage strength)	hrs	-	2 - 5	-	-	BS 5350 Part C1
Sag resistance*	mm	-	30	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C**	5 HOURS AT 70°C**	TEST STANDARD
Cleavage on steel	$F_{cleavage}$	kN	5.0	6.4	-	BS 5350 Part C1
Lap shear on steel	τ_{steel}	MPa	14	16	-	BS 5350 Part C5
Lap shear on polyester FRP*** (cured for 24hrs after infusing)	$\tau_{polyester}$	MPa	>10 (exceeded interlaminar properties)	>10 (exceeded interlaminar properties)	-	BS 5350 Part C5
Lap shear on epoxy FRP***	τ_{epoxy}	MPa	13	13	-	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C****	5 HOURS AT 70°C****	TEST STANDARD
Glass Transition Temperature	Tg_2	°C	49	56	-	ISO 6721 (DSC)
Tensile Strength	σ_T	MPa	17	23	-	ISO 527-2
Tensile Modulus	E_T	GPa	0.86	1.03	-	ISO 527-2
Tensile Strain	ε_T	%	55	30	-	ISO 527-2
Charpy (notched)	-	kJ/m^2	8	8	-	ISO 179-1
Shore D Hardness	-	-	-	70	-	-

**working time properties are highly subjective to ambient conditions and should be used an approximate guideline for all SP 540 systems*
***cured properties of Spabond 540 and Spabond 540LV are the same when combined with the relevant hardeners*
****peel plied finish, all samples failed within the laminate*
*****initial cure of 24 hours at 21°C*

SPABOND™ 540 & STANDARD HARDENER

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MIXING AND HANDLING

PROPERTY	UNITS	SP 540 RESIN	STANDARD HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - colour	Description	Yellow	Purple	Grey	-
Appearance - form	Description	Thixotropic paste			-
Mix ratio by weight	Parts by weight	100	92	-	-
Mix ratio by volume	Parts by volume	100	100	-	-
Density at 21 °C	g/cm^3	1.14	1.05	1.10	Archimedes

COMPONENT & MIXED SYSTEM VISCOSITY

PROPERTY	UNITS	15˚C	20˚C	25˚C	30˚C	TEST METHOD
Spabond™ 540 Resin Viscosity	P	-	-	460	-	-
Spabond™ 540 Standard Hardener Viscosity	P	-	-	300	-	-
Working time (20mm thickness)	hrs:min	-	02:00	-	-	-
Pot-life (500 g, mixed in air)*	hrs:min	-	00:40	-	-	-
Clamp Time* (time to 2kN cleavage strength)	hrs	-	10 – 20	-	-	BS 5350 Part C1
Sag resistance*	mm	-	30	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C**	5 HOURS AT 70°C**	TEST STANDARD
Cleavage on steel	$F_{cleavage}$	kN	5.1	5.4	-	BS 5350 Part C1
Lap shear on steel	τ_{steel}	MPa	15	18	-	BS 5350 Part C5
Lap shear on polyester FRP*** (cured for 24hrs after infusing)	$\tau_{polyester}$	MPa	>9 (exceeded interlaminar properties)	>10 (exceeded interlaminar properties)	-	BS 5350 Part C5
Lap shear on epoxy FRP***	τ_{epoxy}	MPa	14	14	-	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C****	5 HOURS AT 70°C****	TEST STANDARD
Glass Transition Temperature	Tg_2	°C	52	58	-	ISO 6721 (DSC)
Tensile Strength	σ_T	MPa	17	19	-	ISO 527-2
Tensile Modulus	E_T	GPa	0.70	0.85	-	ISO 527-2
Tensile Strain	ε_T	%	50	40	-	ISO 527-2
Charpy (notched)	-	kJ/m^2	8	6	-	ISO 179-1
Shore D Hardness	-	-	-	70	-	-

**working time properties are highly subjective to ambient conditions and should be used an approximate guideline for all SP 540 systems*
***cured properties of Spabond 540 and Spabond 540LV are the same when combined with the relevant hardeners*
****peel plied finish, all samples failed within the laminate*
*****initial cure of 24 hours at 21°C*

SPABOND™ 540 & SLOW HARDENER

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MIXING AND HANDLING

PROPERTY	UNITS	SP 540 RESIN	SLOW HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - colour	Description	Yellow	Green	Light Green	-
Appearance - form	Description	Thixotropic paste			-
Mix ratio by weight	Parts by weight	100	93	-	-
Mix ratio by volume	Parts by volume	100	100	-	-
Density at 21 °C	g/cm^3	1.14	1.06	1.10	Archimedes

COMPONENT & MIXED SYSTEM VISCOSITY

PROPERTY	UNITS	15˚C	20˚C	25˚C	30˚C	TEST METHOD
Spabond™ 540 Resin Viscosity	P	-	-	460	-	-
Spabond™ 540 Slow Hardener Viscosity	P	-	-	270	-	-
Working time (20mm thickness)	hrs:min	-	04:00	-	-	-
Pot-life (500 g, mixed in air)*	hrs:min	-	01:30	-	-	-
Clamp Time* (time to 2kN cleavage strength)	hrs	-	20 - 30	-	-	BS 5350 Part C1
Sag resistance*	mm	-	30	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C**	5 HOURS AT 70°C**	TEST STANDARD
Cleavage on steel	$F_{cleavage}$	kN	5.1	6.2	-	BS 5350 Part C1
Lap shear on steel	τ_{steel}	MPa	14	16	-	BS 5350 Part C5
Lap shear on polyester FRP*** (cured for 24hrs after infusing)	$\tau_{polyester}$	MPa	>9 (exceeded interlaminar properties)	>9 (exceeded interlaminar properties)	-	BS 5350 Part C5
Lap shear on epoxy FRP***	τ_{epoxy}	MPa	14	14	-	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C****	5 HOURS AT 70°C****	TEST STANDARD
Glass Transition Temperature	Tg_2	°C	49	52	-	ISO 6721 (DSC)
Tensile Strength	σ_T	MPa	14	18	-	ISO 527-2
Tensile Modulus	E_T	GPa	0.69	0.85	-	ISO 527-2
Tensile Strain	ε_T	%	70	40	-	ISO 527-2
Charpy (notched)	-	kJ/m^2	7	7	-	ISO 179-1
Shore D Hardness	-	-	-	69	-	-

**working time properties are highly subjective to ambient conditions and should be used an approximate guideline for all SP 540 systems*
***cured properties of Spabond 540 and Spabond 540LV are the same when combined with the relevant hardeners*
****peel plied finish, all samples failed within the laminate*
*****initial cure of 24 hours at 21°C*

SPABOND™ 540 & EXTRA-SLOW HARDENER

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MIXING AND HANDLING

PROPERTY	UNITS	SP 540 RESIN	X-SLOW HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - colour	Description	Yellow	Blue	Green	-
Appearance - form	Description	Thixotropic paste			-
Mix ratio by weight	Parts by weight	100	91	-	-
Mix ratio by volume	Parts by volume	100	100	-	-
Density at 21 °C	g/cm^3	1.14	1.04	1.09	Archimedes

COMPONENT & MIXED SYSTEM VISCOSITY

PROPERTY	UNITS	15˚C	20˚C	25˚C	30˚C	TEST METHOD
Spabond™ 540 Resin Viscosity	P	-	-	460	-	-
Spabond™ 540 Extra-slow Hardener Viscosity	P	-	-	290	-	-
Working time (20mm thickness)	hrs:min	-	06:30	-	-	-
Pot-life (500 g, mixed in air)*	hrs:min	-	02:10	-	-	-
Clamp Time* (time to 2kN cleavage strength)	hrs	-	-	-	-	BS 5350 Part C1
Sag resistance*	mm	-	30	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C**	5 HOURS AT 70°C**	TEST STANDARD
Cleavage on steel	$F_{cleavage}$	kN	-	-	-	BS 5350 Part C1
Lap shear on steel	τ_{steel}	MPa	-	-	-	BS 5350 Part C5
Lap shear on polyester FRP*** (cured for 24hrs after infusing)	$\tau_{polyester}$	MPa	-	>9 (exceeded interlaminar properties)	-	BS 5350 Part C5
Lap shear on epoxy FRP***	τ_{epoxy}	MPa	-	-	-	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C****	5 HOURS AT 70°C****	TEST STANDARD
Glass Transition Temperature	Tg_2	°C	-	58	-	ISO 6721 (DSC)
Tensile Strength	σ_T	MPa	-	17	-	ISO 527-2
Tensile Modulus	E_T	GPa	-	0.76	-	ISO 527-2
Tensile Strain	ε_T	%	-	37	-	ISO 527-2
Charpy (notched)	-	kJ/m^2	-	6	-	ISO 179-1
Shore D Hardness	-	-	-	-	-	-

**working time properties are highly subjective to ambient conditions and should be used an approximate guideline for all SP 540 systems*
***cured properties of Spabond 540 and Spabond 540LV are the same when combined with the relevant hardeners*
****peel plied finish, all samples failed within the laminate*
*****initial cure of 24 hours at 21°C*

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:

Telephone	+ 44 1983 828000 (08:30 – 17:00 GMT)
Email	technical.support@gurit.com

24-HOUR CHEMICAL EMERGENCY NUMBER

For advice on chemical emergencies, spillages, fires or exposures:

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