Gurit EPOXY

PRODUCT DATASHEET

Gurit

SPABOND™ 540LV

MODIFIED EPOXY ADHESIVE



Spabond 540LV is a modified ambient curing epoxy adhesive designed for bonding dissimilar materials, polyester and / or epoxy laminates.

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.

Spabond 540LV unique advantage compared polyester and methacrylate achieves is it extend working time making it idea for bonding large structures like hull to deck joints.

- 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 with slower hardener speeds
- Sag resistance of up to 20mm on a vertical surface
- Available with a range of hardeners, from Standard to Extra Slow
- Resin and hardener pigmented to give a visual indication of mix quality
- Mix ratio by volume 1:1

INSTRUCTIONS FOR USE

APPLICATION

The product is optimized for use at 15 - 25°C. 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. Maximum relative humidity for use is 70%.

SURFACE PREPARATION

Before using the product ensure that surfaces to be bonded are clean, degreased, dry and dust-free.
Prepare all surfaces by abrading either with shot blasting or with medium grit paper or other suitable abrasive.
After abrading ensure removal of all dust.

Metals – Prepared according to Gurit surface preparation guide

Epoxy laminates - it is recommended to use a suitable Peel Ply as the last stage in their manufacture, otherwise prepare as above. Trials may be required to test Peel Ply suitability.

Polyester or Vinylester laminates - ensure laminates are fully cured before bonding, it is recommended to use a suitable Peel Ply as the last stage in their manufacture, otherwise prepare as above.

Timber - sand with abrasive paper across grain. Degrease oily timber with a fast-evaporating solvent (e.g. acetone). For resinous or gummy timber, etch with 2% caustic soda solution, wash off with fresh water and dry.

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 color. Use from pot quickly to maximize 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.

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 will result in a shelf life, as per table, from the date of manufacture for both the resin and hardeners, see product container label for expiry date.

COMPONENT	UNITS	10 – 25°C
Spabond 540LV Resin	Months	24
Spabond 540 Hardeners	Months	24

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. Hardener, in particular, will suffer serious degradation if left exposed to air. Hardeners may darken over time, however the physical properties are not affected.

SPABOND 540LV & SPABOND 540 STANDARD HARDENER

This 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.

PROPERTY	UNITS	SPABOND 540LV RESIN	SPABOND 540 STANDARD HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - color	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 PROPERTIES

PROPERTY	UNITS	15°C	20°C	25°C	30°C	TEST METHOD
Spabond 540LV Resin viscosity	P	-	-	270	-	-
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	-	20	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	7 DAYS AT 21°C	16 HOURS AT 50°C****	TEST STANDARD
Cleavage on steel (0.5mm bondline)	$F_{cleavage}$	kN	5.1	5.4	BS 5350 Part C1
Lap shear on steel (0.5mm bondline)	τ_{steel}	MPa	15	18	BS 5350 Part C5
Lap shear on polyester FRP*** (0.5mm bondline)	$\tau_{polyester}$	MPa	>9 (exceeded interlaminar properties)	>10 (exceeded interlaminar properties)	BS 5350 Part C5
Lap shear on epoxy FRP*** (0.5mm bondline)	τ_{epoxy}	MPa	14	14	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	7 DAYS AT 21°C	16 HOURS AT 50°C****	TEST STANDARD
Glass transition temperature	Tg_2	°C	52	58	ISO 11357 (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 impact strength	-	kJ/m2	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*
***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 540LV & SPABOND 540 SLOW HARDENER

This 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.

PROPERTY	UNITS	SPABOND 540LV RESIN	SPABOND 540 SLOW HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - color	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 PROPERTIES

PROPERTY	UNITS	15°C	20°C	25°C	30°C	TEST METHOD
Spabond 540LV Resin viscosity	P	-	-	270	-	-
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	-	20	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	7 DAYS AT 21°C	16 HOURS AT 50°C****	TEST STANDARD
Cleavage on steel (0.5mm bondline)	$F_{cleavage}$	kN	5.1	6.2	BS 5350 Part C1
Lap shear on steel (0.5mm bondline)	τ_{steel}	MPa	14	16	BS 5350 Part C5
Lap shear on polyester FRP*** (0.5mm bondline)	$\tau_{polyester}$	MPa	>9 (exceeded interlaminar properties)	>9 (exceeded interlaminar properties)	BS 5350 Part C5
Lap shear on epoxy FRP*** (0.5mm bondline)	τ_{epoxy}	MPa	14	14	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	7 DAYS AT 21°C	16 HOURS AT 50°C****	TEST STANDARD
Glass transition temperature	Tg_2	°C	49	52	ISO 11357 (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 impact strength	-	kJ/m2	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*
***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 540LV & SPABOND 540 EXTRA SLOW HARDENER

This 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.

PROPERTY	UNITS	SPABOND 540LV RESIN	SPABOND 540 EXTRA SLOW HARDENER	MIXED SYSTEM	TEST METHOD
Appearance - color	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 PROPERTIES

PROPERTY	UNITS	15°C	20°C	25°C	30°C	TEST METHOD
Spabond 540LV Resin viscosity	P	-	-	270	-	-
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	-	20	-	-	-

ADHESIVE PERFORMANCE**

MECHANICAL PROPERTIES	SYMBOL	UNITS	7 DAYS AT 21°C	16 HOURS AT 50°C****	TEST STANDARD
Cleavage on steel (0.5mm bondline)	$F_{cleavage}$	kN	-	-	BS 5350 Part C1
Lap shear on steel (0.5mm bondline)	τ_{steel}	MPa	-	-	BS 5350 Part C5
Lap shear on polyester FRP*** (0.5mm bondline)	$\tau_{polyester}$	MPa	-	>9 (exceeded interlaminar properties)	BS 5350 Part C5
Lap shear on epoxy FRP*** (0.5mm bondline)	τ_{epoxy}	MPa	-	-	BS 5350 Part C5

CURED MECHANICAL AND THERMAL PROPERTIES**

MECHANICAL PROPERTIES	SYMBOL	UNITS	7 DAYS AT 21°C	16 HOURS AT 50°C****	TEST STANDARD
Glass transition temperature	Tg_2	°C	-	58	ISO 11357 (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 impact strength	-	kJ/m2	-	6	ISO 179-1
Shore D hardness	–	-	-	-	-

**working time properties are highly subjective to ambient conditions and should be used an approximate guideline*
***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*

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 moisturizing cream should be used after washing.
2. 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 vapors 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 & vaping
   - 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.

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.

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.

CONTACT INFORMATION

Please see local contact information at www.gurit.com

24-HOUR CHEMICAL EMERGENCY NUMBER

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

Europe	+44 1273 289451
Americas	+1 646 844 7309
APAC	+65 3158 1412

All trademarks used or mentioned in this document are protected by law.