Gurit EPOXY

PRODUCT DATASHEET

Gurit

GR130

EPOXY INFUSION SYSTEM

GR130 is suitable for the molding of large composite components incorporating advanced fibers such as glass, carbon and aramid.

Offering outstanding performance in a variety of liquid infusion processes including SCRIMP™, RIFT (resin infusion under flexible tooling), VARTM (vacuum assisted resin transfer moulding) and RTM (resin transfer molding).

- Uses low toxicity hardeners
- Fiber wetting technology reduces infusion time & improves laminate quality
- Mixed viscosity remains lower for longer
- Other speciality hardeners available
- Mix ratio by weight 100:29

INSTRUCTIONS FOR USE

APPLICATION

The product is optimized for use between 18 - 25°C (64 – 77°F). At lower temperatures the product thickens and may become unworkable. At higher temperatures working times will be significantly reduced. Maximum relative humidity for use is 70%.

MIXING AND HANDLING

The resin and hardener must be stirred well for two minutes or more, with particular attention being paid to the sides and bottom of the container. As soon as the material is mixed the reaction begins. This reaction produces heat (exothermic), which will in turn accelerate the reaction. If this mixed material is left in a confined mixing vessel the heat cannot disperse and the reaction will become uncontrollable.

Gurit produces a separate full Safety Data Sheet for each component of this system. Please ensure that you have the correct SDS to hand for the materials you are using before commencing work. A more detailed guide for the safe use of Gurit resin systems is also available from Gurit and can be found on our website at www.gurit.com. 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).

APPLICATION

GR130 infusion resin is intended for use in any established resin infusion process. The information provided in the tables in this data sheet should allow the user to achieve a successful result with this system. However, if further information is required please contact Gurit Technical Support.

CURE SCHEDULE

A post-cure is required to generate optimum mechanical properties for this system. The recommended minimum cure schedule is 7 hours at 65°C (149°F) or 16 hours at 50°C (122°C). Ambient temperature cure of this system will not generate adequate mechanical properties and is therefore not recommended.

Infused parts can be pre-cured on the mold at temperatures just above ambient, eg 30-45°C (86 – 113°F) to give the part sufficient strength and stiffness to allow earlier demolding. Such parts should still be post cured for the minimum recommended time/temperature indicated above, to obtain adequate in service mechanical properties. Contact Gurit Technical Support for "pre-cure" time and temperature recommendations.

Parts manufactured with Slow and Extra Slow Hardener need a post-cure before de-molding. When sanding or machining a component made from GR130, which has seen no heat, there will be very low degree of cure and therefore the sanding dust will be more of a irritate compared to a post cured laminate.

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 (50 – 77°F)
GR130 Resin	Months	36
Slow & Ex Slow Hardeners	Months	36

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 (50°F and 77°F), 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. Be aware of a possible mixed system color change if very old and new hardeners are used on the same project.

GR130 & 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	GR130 RESIN	SLOW HARDENER	TEST METHOD
Mix ratio by weight	Parts by weight	100	29	-
Mix ratio by volume	Parts by volume	100	35	-
Density at 21°C (ISO 1183-1B)	g/cm^3	1.13± 0.05	0.95 ± 0.05	ISO 1183-1B

COMPONENT & MIXED SYSTEM PROPERTIES

PROPERTY	UNITS	25°C	TEST METHOD
Resin viscosity	cP	415 - 515	-
Slow Hardener viscosity	cP	20 - 30	-
Initial mixed system viscosity	cP	240 - 250	
Mixed density at 21°C (ISO 1183-1B)	g/cm^3	1.10	ISO 1183-1B
Geltime (150 g, mixed in water)*	hrs:min	04:00	Tecam gel time
Latest flow under vacuum	hrs:min	05:07	Theoretical, thin film
Earliest vacuum off time	hrs:min	08:10	Theoretical, thin film
Earliest demold time	hrs:min	11:52	Theoretical, thin film

CURED RESIN PROPERTIES

PROPERTY	SYMBOL	UNITS	16 HOURS @ 50°C**	TEST METHOD
Ultimate glass transition temp.	Tg_1	°C	74	ISO 6721 (DMA)
Glass transition temp	Tg_2	°C	68	DSC
Ultimate glass transition temp	Tg_2	°C	80	DSC
Cured density	ρ_{CURED}	g/cm3	1.16	ISO 1183-1A
Tensile strength	σ_T	MPa	72	ISO 527-2
Tensile modulus	E_T	GPa	3.20	ISO 527-2
Tensile strain @ break	ε_T	%	6.50	ISO 527-2

CURED LAMINATE MECHANICAL PROPERTIES

Laminate: 4 plies of XE600 biaxial e-glass

PROPERTY	SYMBOL	UNITS	16 HOURS AT 50°C**	TEST METHOD
Fiber volume fraction	V_{FVF}	%	51	ASTM D 3171 Method II
Tensile strength***	σ_T	MPa	537	ISO 527-4
Tensile modulus***	E_T	GPa	28	ISO 527-4
Compressive strength***	σ_C	MPa	547	SACMA SRM1-94
Compressive modulus***	E_C	GPa	28	SACMA SRM1-94
Flexural strength	σ_F	MPa	664	ISO 14125
Flexural modulus	E_F	GPa	16.2	ISO 14125
ILSS	X_{ILSS}	MPa	44	ISO 14130

**working time properties are highly subjective to ambient conditions and should be used as an approximate guideline*
***initial cure of 24 hours at 21°C ***normalized to 55% fiber volume fraction*

GR130 & 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	GR130 RESIN	EXTRA-SLOW HARDENER	TEST METHOD
Mix ratio by weight	Parts by weight	100	29	-
Mix ratio by volume	Parts by volume	100	35	-
Density at 21°C (ISO 1183-1B)	g/cm^3	1.13	0.93 ± 0.05	ISO 1183-1B

COMPONENT & MIXED SYSTEM PROPERTIES

PROPERTY	UNITS	25°C	TEST METHOD
Resin viscosity	cP	415 - 515	-
Extra-Slow Hardener viscosity	cP	12	-
Initial mixed system viscosity	cP	150	-
Mixed density at 21°C (ISO 1183-1B)	g/cm^3	1.09	ISO 1183-1B
Gel time (150 g, mixed in water)*	hrs:min	10:30	Tecam gel time
Latest flow under vacuum	hrs:min	07:59	Theoretical, thin film
Earliest vacuum off time	hrs:min	12:26	Theoretical, thin film
Earliest demold time	This hardener requires an elevated temperature cure – demold times at temperatures of 15-30°C are not recommended.		Theoretical, thin film

CURED RESIN PROPERTIES

PROPERTY	SYMBOL	UNITS	16 HOURS @ 50°C**	TEST METHOD
Glass transition temp.	Tg_1	°C	64	ISO 6721 (DMA)
Glass transition temp	Tg_2	°C	69	DSC
Ultimate glass transition temp	Tg_2	°C	80	DSC
Cured density	ρ_{CURED}	g/cm3	1.15	ISO 1183-1A
Tensile strength	σ_T	MPa	64.7	ISO 527-2
Tensile modulus	E_T	GPa	3.21	ISO 527-2
Tensile strain @ break	εT	%	6.31	ISO 527-2

CURED LAMINATE MECHANICAL PROPERTIES

Laminate: 4 plies of XE600 biaxial e-glass

PROPERTY	SYMBOL	UNITS	16 HOURS AT 50°C**	TEST METHOD
Fiber volume fraction	V_{FVF}	%	52	ASTM D 3171 Method II
Tensile strength***	σ_T	MPa	492	ISO 527-4
Tensile modulus***	E_T	GPa	27.9	ISO 527-4
Compressive strength***	σ_C	MPa	516	SACMA SRM1-94
Compressive modulus***	E_C	GPa	28.6	SACMA SRM1-94
Flexural strength	σ_F	MPa	738	ISO 14125
Flexural modulus	E_F	GPa	20.7	ISO 14125
ILSS	X_{ILSS}	MPa	49	ISO 14130

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

***initial cure of 24 hours at 21°C ***normalized to 55% fiber volume fraction*

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