Gurit EPOXY

PRODUCT DATASHEET

Gurit

AMPRO™

EPOXY MULTIPURPOSE SYSTEM



AMPRO is a simple to use, all-purpose epoxy ideal for coating applications which can also be used for gluing, laminating and filling. With its fast, low temperature curing hardener and easy 3:1 mix ratio by volume, AMPRO provides a quick and convenient way of using one epoxy system for a very wide range of tasks.

By using the Gurit range of filler powders, an AMPRO Fast Hardener mix can be turned into a very effective adhesive or filling compound. Details of this filler range, and how to use them, are contained in a separate information sheet (Filler Guide) and typical filling and fairing mixes (resin / hardener / filler) are shown in this data sheet.

AMPRO is compatible with all types of foams, polystyrenes, polyurethanes, Gurit PVC, Gurit Kerdyn™ PET and Corecell™ products.

- Ideal for clear coating / laminating applications
- Engineered, with improved health & safety
- Available with Fast, Slow and Extra-Slow blendable hardeners
- No surface residue after cure
- Can also be used for bonding, laminating & filling wood & GRP
- Mix ratio by weight 100:29
- Mix ratio by volume 3:1

INSTRUCTIONS FOR USE

APPLICATION

The product is optimized for use at temperatures between 15 - 25°C (59 - 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

Accurate measurement and thorough mixing are essential when using this system, and any deviation from the prescribed mix ratios will seriously degrade the physical properties of the cured system. 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.

COATING

If exposed to sunlight the product should be painted or coated with a varnish which includes UV filter or blockers.

Prior to this, two coats of AMPRO will achieve a stable substrate. AMPRO has a number of benefits, including:

- Subsequent coats of AMPRO can be applied after just 5 hours at 20°C (68°F) without sanding
- AMPRO is solvent-free and will be fully hardened overnight ready for over-coating or top-coating

The surface to be coated should be dry and clean, before sanding with 180 – 220 grit sandpaper to generate a key, the surface should then be wiped with solvent to remove the dust before the application of the AMPRO.

For best results, an initial thin coat of AMPRO should be applied to the substrate, using a rubber squeegee or brush to remove any excess. If the first coat of AMPRO is too thick, this can cause 'fisheyes' to form in the surface. Once the first coat has cured, subsequent coats of AMPRO can be applied. Due to the 4 day overcoating window of AMPRO (at 20°C (68°F) / 50% RH), the surface does not require sanding between coats to ensure adhesion. If left for more than 4 days, the surface should be sanded with 120 grit sandpaper followed by a solvent wipe down to remove the dust before applying additional coats.

Note: In order to achieve the optimum surface finish, multiple thin layers of AMPRO should be applied.

AMPRO should be sanded before the application of the final paint system or varnish, please refer to the paint or varnish manufacturer's recommendations regarding sandpaper and solvent type to be used for this operation

LAMINATING

AMPRO can be used to laminate all common fiber types. Due to its low viscosity it wets out fibers with ease. Standard hand laminating and vacuum bag processes can be used predominantly with the slower hardeners.

ADHESIVE MIXES

AMPRO can be mixed with standard Gurit fillers to make filling / fairing or adhesive compounds as required

All filler additions are approximate and can be adjusted by the user to achieve the desired consistency.

FILLER TYPE	DESCRIPTION	FILLER QUANTITY		SILICA ADDITION		APPROX. DENSITY	APPROX. VOLUME
		%	FOR 1KG	%	FOR 1KG		
Microballoons	Brown, low density	15 - 20	150 - 200 g	4 - 5	40 - 50 g	0.7 g/cm3	1.8 Ltrs
Glass Bubbles	White, low density	15 - 20	150 - 200 g	5 - 6	50 - 60 g	0.6 g/cm3	2.0 Ltr
Microfibres	Opaque, high strength	7 - 10	70 - 100 g	3 - 4	30 - 40 g	0.9 g/cm3	1.0 Ltr

FILLING AND FAIRING MIXES

All filler additions are approximate and can be adjusted by the user to achieve the desired consistency.

FILLER TYPE	DESCRIPTION	EASE OF SANDING	WATER RESISTANCE	FILLER QUANTITY		SILICA ADDITION		APPROX. DENSITY	APPROX. VOLUME
				%	FOR 1KG	%	FOR 1KG		
Microballoons	Brown, low density	Easy	Moderate	25 - 30	250 - 300 g	2 - 3	20 - 30	0.6 g/cm3	2.2 Ltrs
Glass Bubbles	White, low density	Moderate	High	35 - 40	350 - 400 g	3 - 5	30 - 50	0.5 g/cm3	3.0 Ltrs

COVERAGE

THICKNESS (PER COAT)	AREA	COMMENT
Coating coverage @ 0.25 mm	Approximately 3 m2/kg	Dependent on temperature, surface inclination, surface porosity and evenness
Adhesive coverage @ 1mm	Approximately 1.1 – 1.7 m2/kg	Dependent on flier type, temperature, surface inclination, surface porosity and evenness

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)
AMPRO Resin	Months	24
AMPRO Fast. Slow, Extra 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 - 25°C (50 – 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.

AMPRO & AMPRO FAST HARDENER PROPERTIES

This product summary is intended for use in conjunction with further advice provided under the Instructions for Use section.

PROPERTY	UNITS	AMPRO RESIN	FAST HARDENER	MIXED SYSTEM
Color	-	Clear	Pale Amber	Clear
Mix ratio by volume	Parts by volume	3	1	-
Mix ratio by weight	Parts by weight	100	29	-
Density at 21°C (ISO 1183-1B)	g/cm3	1.16	1.04	1.13

COMPONENT PROPERTIES

PROPERTY	UNITS	TEMPERATURE 15°C	TEMPERATURE 25°C	TEST METHOD
AMPRO Resin viscosity	cP	1708	529	CAP2000LT
AMPRO Fast Hardener viscosity	cP	1680	620	CAP2000LT

WORKING TIME PROPERTIES

PROPERTY	UNITS	TEMPERATURE 20°C	TEST METHOD
Thin-film gel-time (0.5mm)	hrs:min	1.33	Gurit internal method
Pot-life (150 g, mixed in water)	hrs:min	0.28	Tecam gel time
Tack off time	hrs:min	2:50	Gurit internal method
Earliest sanding time	hrs:min	12:00	Gurit internal method

THERMAL PROPERTIES

PROPERTY PROGRESSION AT 21°C	UNITS	7 DAYS	14 DAYS	21 DAYS	28 DAYS	TEST METHOD
Glass transition temperature (Tg1)	°C	43.9	44.8	47.0	46.6	ISO 6721 (DMA)

CURED RESIN PROPERTIES

PROPERTY	SYMBOL	UNITS	28 DAYS @ 21°C*	16 HOURS @ 50°C*	TEST METHOD
Glass transition temperature	Tg1	°C	46.6	55.5	(DMA)
Ultimate glass transition temp.	UTg2	°C	55.5	55.5	(DSC)
Tensile strength	σ_T	MPa	50.6	56.2	ISO 527-2
Tensile modulus	E_T	GPa	3.05	3.08	ISO 527-2
Tensile elongation	ε_T	%	4.85	10.8	ISO 527-2
Flexural strength	σ_F	MPa	85.3	90.8	ISO 178
Flexural modulus	E_F	GPa	2.83	2.86	ISO 178
Flexural elongation	ε_F	%	12.0	11.9	ISO 178
7 day water uptake @ 50°C (coupon size 60x60x1mm)	-	mgrams (%)	58.7 (0.83)	-	ISO 62
ILSS	X_{ILSS}	MPa	35.7	-	ISO 14130

** initial cure of 24 hours at 20°C*

ADHESIVE PERFORMANCE (AFTER 28 DAYS AT 21°C CURE)

PROPERTIES	SYMBOL	UNITS	PLYWOOD	STEEL	TEST STANDARD
Lapshear strength	τ	MPa	2.3 (Failed in wood)	16.4	BS 5350 Part C5

AMPRO & AMPRO SLOW HARDENER PROPERTIES

This product summary is intended for use in conjunction with further advice provided under the Instructions for Use section.

PROPERTY	UNITS	AMPRO RESIN	SLOW HARDENER	MIXED SYSTEM
Color	-	Clear	Pale Amber	Clear
Mix ratio by volume	Parts by volume	3	1	-
Mix ratio by weight	Parts by weight	100	29	-
Density at 21°C (ISO 1183-1B)	g/cm3	1.16	1.01	1.12

COMPONENT PROPERTIES

PROPERTY	UNITS	TEMPERATURE 15°C	TEMPERATURE 25°C	TEST METHOD
AMPRO Resin viscosity	cP	1708	529	CAP2000LT
AMPRO Slow Hardener viscosity	cP	537	232	CAP2000LT

WORKING TIME PROPERTIES

PROPERTY	UNITS	TEMPERATURE 20°C	TEST METHOD
Thin-film gel-time (0.5mm)	hrs:min	2:21	Gurit internal method
Pot-life (150 g, mixed in water)	hrs:min	1:15	Tecam gel time
Tack off time	hrs:min	4:00	Gurit internal method
Earliest sanding time	hrs:min	16:00	Gurit internal method

THERMAL PROPERTIES

PROPERTY PROGRESSION AT 21°C	UNITS	7 DAYS	14 DAYS	21 DAYS	28 DAYS	TEST METHOD
Glass transition temperature (Tg1)	°C	43.8	44.3	46.6	47.3	ISO 6721 (DMA)

CURED RESIN PROPERTIES

PROPERTY	SYMBOL	UNITS	28 DAYS @ 21°C*	16 HOURS @ 50°C*	TEST METHOD
Glass transition temperature	Tg1	°C	47.3	58.0	(DMA)
Ultimate glass transition temp.	UTg2	°C	58.0	58.0	(DSC)
Tensile strength	σ_T	MPa	49.8	54.4	ISO 527-2
Tensile modulus	E_T	GPa	2.98	2.90	ISO 527-2
Tensile elongation	ε_T	%	3.98	13.6	ISO 527-2
Flexural strength	σ_F	MPa	81.1	88.0	ISO 178
Flexural modulus	E_F	GPa	2.89	2.79	ISO 178
Flexural elongation	ε_F	%	5.55	11.5	ISO 178
7 day water uptake @ 50°C (coupon size 60x60x1mm)	-	mgrams (%)	66.9 (0.96)	-	ISO 62
ILSS	X_{ILSS}	MPa	36.5	-	ISO 14130

** initial cure of 24 hours at 20°C*

ADHESIVE PERFORMANCE (AFTER 28 DAYS AT 21°C CURE)

PROPERTIES	SYMBOL	UNITS	PLYWOOD	STEEL	TEST STANDARD
Lapshear strength	τ	MPa	2.7 (Failed in wood)	15.6	BS 5350 Part C5

AMPRO & AMPRO EXTRA-SLOW HARDENER PROPERTIES

This product summary is intended for use in conjunction with further advice provided under the Instructions for Use section.

PROPERTY	UNITS	AMPRO RESIN	EXTRA-SLOW HARDENER	MIXED SYSTEM
Color	-	Clear	Pale Amber	Clear
Mix ratio by volume	Parts by volume	3	1	-
Mix ratio by weight	Parts by weight	100	29	-
Density at 21°C (ISO 1183-1B)	g/cm3	1.16	1.01	1.12

COMPONENT PROPERTIES

PROPERTY	UNITS	TEMPERATURE 15°C	TEMPERATURE 25°C	TEST METHOD
AMPRO Resin viscosity	cP	1708	529	CAP2000LT
AMPRO Extra-Slow Hardener viscosity	cP	340	148	CAP2000LT

WORKING TIME PROPERTIES

PROPERTY	UNITS	TEMPERATURE 20°C	TEST METHOD
Thin-film gel-time (0.5mm)	hrs:min	2:49	Gurit internal method
Pot-life (150 g, mixed in water)	hrs:min	1:32	Tecam gel time
Tack off time	hrs:min	5:00	Gurit internal method
Earliest sanding time	hrs:min	16:00	Gurit internal method

THERMAL PROPERTIES

PROPERTY PROGRESSION AT 21°C	UNITS	7 DAYS	14 DAYS	21 DAYS	28 DAYS	TEST METHOD
Glass Transition Temperature (Tg1)	°C	43.6	44.6	46.8	45.6	ISO 6721 (DMA)

CURED RESIN PROPERTIES

PROPERTY	SYMBOL	UNITS	28 DAYS @ 21°C*	16 HOURS @ 50°C*	TEST METHOD
Glass transition temperature	Tg1	°C	45.6	56.5	(DMA)
Ultimate glass transition temp.	UTg2	°C	57.2	57.2	(DSC)
Tensile strength	σ_T	MPa	49.9	53.7	ISO 527-2
Tensile modulus	E_T	GPa	2.99	2.92	ISO 527-2
Tensile elongation	ε_T	%	5.89	13.8	ISO 527-2
Flexural strength	σ_F	MPa	81.1	88.0	ISO 178
Flexural modulus	E_F	GPa	2.79	2.79	ISO 178
Flexural elongation	ε_F	%	5.46	11.5	ISO 178
7 day water uptake @ 50°C (coupon size 60x60x1mm)	-	mgrams (%)	64.0 (0.95)	-	ISO 62
ILSS	X_{ILSS}	MPa	36.5	-	ISO 14130

** initial cure of 24 hours at 20°C*

ADHESIVE PERFORMANCE (AFTER 28 DAYS AT 21°C CURE)

PROPERTIES	SYMBOL	UNITS	PLYWOOD	STEEL	TEST STANDARD
Lapshear strength	τ	MPa	2.2 (Failed in wood)	19.3	BS 5350 Part C5

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

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