# AMPRO™ BIO

## BIO-BASED EPOXY MULTIPURPOSE SYSTEM

- For bonding, laminating & filling wood & GRP
- Accredited 40-60% bio-based system
- 3 : 1 mix ratio by volume
- Available with Fast, Slow and Extra-slow blendable hardeners
- No surface residue after cure

Cured Resin Colour

## INTRODUCTION

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

AMPRO™ BIO has been built on the well-established SP 106 which has been the primary epoxy system for the manufacture and repair of wooden boats for over 20 years.

By using the Gurit range of filler powders, an AMPRO™ BIO resin and 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.

| SYSTEM PROPERTIES AT 25°C | | MIXED VISCOSITY* | 150g POT-LIFE* | TACK-OFF TIME* | EARLIEST SANDING TIME* | PAGE |
|---|---|---|---|---|---|---|
| AMPRO ™ BIO Resin | Product Information, Instructions for Use and Health & Safety | | | | | 2 |
| | AMPRO™ Fast Hardener | 1260 cP | ½ hour | 2 ¾ hours | 16 hours | 3 |
| | AMPRO™ Slow Hardener | 1100 cP | ¾ hours | 4 ½ hours | 20 hours | 4 |
| | AMPRO™ Extra-slow Hardener | 1050 cP | 1 hours | 6 hours | 20 hours | 5 |

**working time properties are highly subjective to ambient conditions and should be used an approximate guideline for all AMPRO™ systems at 25°C. Please refer to the correspondaing page of this document for specific testing methods used.*

# PRODUCT INFORMATION

## AVAILABILITY

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.

| PRODUCT DESCRIPTION | STATUS | CERTIFICATION |
|---|---|---|
| AMPRO™ BIO Resin | The product is assigned to class 2 meaning 40% ≤ Biobased Carbon content of the product.. < 60% ★★ | TA8071903328 |
| AMPRO™ Fast Hardener | The product is assigned to class 1 meaning 20% ≤ Biobased Carbon content of the product.. < 40% ★ | TA8071903329 |
| AMPRO™ Slow Hardener | | TA8071903996 |
| AMPRO™ Extra-slow Hardener | | TA8071903997 |

## TRANSPORT & STORAGE

| COMPONENT | UNITS | 10 – 25°C |
|---|---|---|
| AMPRO™ BIO Resin | months | 24 |
| AMPRO™ Hardeners | months | 24 |

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. Typically the physical properties of the hardener are not affected, however the color may darken over time. Be aware of a possible mixed system color change if very old and new hardeners are used on the same project.

# INSTRUCTIONS FOR USE

The product is optimised for use at temperatures between 15 and 25°C. At lower temperatures the product thickens and may become unworkable, however is designed to cure if required at +5°C. At higher temperatures working times will be significantly reduced. Max 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 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™ (@ 20 degree C 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

## FILLING AND FAIRING MIXES

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

| DESCRIPTION | FILLER TYPE | EASE OF SANDING | WATER RESISTANCE | FILLER QUANTITY* | | AMPRO SILICA ADDITION* | | APPROX. DENSITY | APPROX. VOLUME |
|---|---|---|---|---|---|---|---|---|---|
| | | | | % | FOR 1KG | % | FOR 1KG | | |
| Brown, Low Density | Microballons | Easy | Moderate | 25 - 30 | 250 - 300 g | 2 - 3 | 20 - 30 g | 0.6 g/cm$^3$ | 2.2 Litres |
| White, Low Density | Glass Bubbles | Moderate | High | 35 - 40 | 350 - 400 g | 3 - 5 | 30 - 50 g | 0.5 g/cm$^3$ | 3.0 Litres |

**calculated by weight relative to the mixed system of resin and hardener*

## ADHESIVE MIXES

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

| DESCRIPTION | FILLER TYPE | FILLER QUANTITY* | | AMPRO SILICA ADDITION* | | APPROX. DENSITY | APPROX. VOLUME |
|---|---|---|---|---|---|---|---|
| | | % | FOR 1KG | % | FOR 1KG | | |
| Brown, Low Density | Microballons** | 15 - 20 | 150 - 200 g | 4 - 5 | 40 - 50 g | 0.7 g/cm$^3$ | 1.8 Litres |
| White, Low Density | Glass Bubbles** | 15 - 20 | 150 - 200 g | 5 - 6 | 50 - 60 g | 0.6 g/cm$^3$ | 2.0 Litres |
| Opaque, High Strength | Microfibres | 7 - 10 | 70 - 100 g | 3 - 4 | 30 - 40 g | 0.9 g/cm$^3$ | 1.0 Litres |

**calculated by weight relative to the mixed system of resin and hardener* ***Microfibres are always preferred for load-carrying adhesive joints*

## COVERAGE

For further information please refer to the Gurit Filler Guide.

| THICKNESS (PER COAT) | COVERAGE | COMMENT |
|---|---|---|
| Coating Coverage (at 250 microns) | Approximately 3 m$^2$/kg | Dependant on temperature, surface inclination, surface porosity and evenness |
| Adhesive Coverage | Approximately 1.5 - 2.0 m$^2$/kg | Dependant on temperature, surface inclination, surface porosity and evenness |

## INSTRUCTIONS FOR USE

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. 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, drinking or 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.

# AMPRO™ BIO RESIN & FAST HARDENER

## MIXING AND HANDLING

| PROPERTY | UNITS | AMPRO™ BIO RESIN | FAST HARDENER | MIXED SYSTEM |
|---|---|---|---|---|
| Colour | - | Brown Tint | Amber | Brown Tint |
| Mix ratio by weight | Parts by weight | 100 | 30 | - |
| Mix ratio by volume | Parts by volume | 3 | 1 | - |
| Density at 21 °C (ISO 1183-1B) | g/cm$^3$ | 1.10 | 0.99 | 1.07 |

## COMPONENT & MIXED SYSTEM PROPERTIES*

| PROPERTY | UNITS | 15˚C | 25˚C | TEST METHOD |
|---|---|---|---|---|
| AMPRO™ BIO Resin Viscosity | cP | 3028 | 979 | - |
| AMPRO™ Fast Hardener Viscosity | cP | 1918 | 707 | - |
| Initial Mixed System Viscosity | cP | - | 1263 | - |

## WORKING TIME PROPERTIES*

| PROPERTY | UNITS | 20˚C | TEST METHOD |
|---|---|---|---|
| Thin-Film Gel-time | hrs:min | 01:19 | - |
| Pot-life (150 g, mixed in water) | hrs:min | 00:23 | Tecam Gel Time |
| Tack-off Time | hrs:min | 02:40 | Internal Gurit Method |
| Earliest Sanding Time** | hrs:min | 16:00 | Internal Gurit Method |

**working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all AMPRO™ systems*
***it is not recommended to apply at low temperatures, but a cure temperatures as low as +5°C is possible*

## AMBIENT CURE THERMAL PERFORMANCE PROGRESSION at 21°C

| PROPERTY PROGRESSION AT 21°C | SYMBOL | UNITS | 7 DAYS | 14 DAYS | 21 DAYS | 28 DAYS | TEST STANDARD |
|---|---|---|---|---|---|---|---|
| Glass Transition Temperature | $Tg_1$ | °C | 44 | 46 | 46 | 47 | ISO 6721 (DMA) |

## CURED RESIN PROPERTIES

| PROPERTIES | SYMBOL | UNITS | 28 DAYS AT 21°C | 16 HRS AT 50°C*** | TEST STANDARD |
|---|---|---|---|---|---|
| Glass Transition Temperature | $Tg_2$ | °C | - | 55 | ISO 11357 (DSC) |
| Ultimate Glass Transition Temp. | $UTg_2$ | °C | - | 62 | ISO 11357 (DSC) |
| Glass Transition Temperature | $Tg_1$ | °C | 47 | 55 | ISO 6721 (DMA) |
| Ultimate Glass Transition Temp. | $UTg_1$ | °C | 53 | - | ISO 6721 (DMA) |
| Tensile Strength | $\sigma_T$ | MPa | 40.7 | 42.0 | ISO 527-2 |
| Tensile Modulus | $E_T$ | GPa | 1.9 | 2.0 | ISO 527-2 |
| Tensile Elongation | $\varepsilon_T$ | % | 30.7 | 30.5 | ISO 527-2 |
| Flexural Strength | $\sigma_F$ | MPa | 70.3 | 70.5 | ISO 178 |
| Flexural Modulus | $E_F$ | GPa | 2.1 | 2.0 | ISO 178 |
| Flexural Elongation | $\varepsilon_F$ | % | >12.0 | >12.0 | ISO 178 |
| 28 Day Water Uptake (coupon size 60x60x1mm) | - | mg (%) | - | 48 (0.6) | ISO 62 |
| ILSS *(8 x RE301H8, 50% resin content)* | $X_{ILSS}$ | MPa | - | 34 | ISO 14130 |

****initial cure of 24 hours at 21°C*

## ADHESIVE PERFORMANCE (AFTER 16 HRS AT 50°C CURE)

| PROPERTIES | SYMBOL | UNITS | PLYWOOD | TEAK | STEEL | TEST STANDARD |
|---|---|---|---|---|---|---|
| Lapshear Strength | $\tau$ | MPa | 2.3 (failed in wood) | 6.0 (failed in wood) | 17.7 | BS 5350 Part C5 |
| Lapshear Strength Wet Retention (saturated for 28 days at 23°C in water) | $\tau_{wet}$ | MPa | - | - | 15.4 | BS 5350 Part C5 |

# AMPRO™ BIO RESIN & SLOW HARDENER

## MIXING AND HANDLING

| PROPERTY | UNITS | AMPRO™ BIO RESIN | SLOW HARDENER | MIXED SYSTEM |
|---|---|---|---|---|
| Colour | - | Brown Tint | Amber | Brown Tint |
| Mix ratio by weight | Parts by weight | 100 | 30 | - |
| Mix ratio by volume | Parts by volume | 3 | 1 | - |
| Density at 21 °C (ISO 1183-1B) | g/cm$^3$ | 1.10 | 1.00 | 1.09 |

## COMPONENT & MIXED SYSTEM PROPERTIES*

| PROPERTY | UNITS | 15˚C | 25˚C | TEST METHOD |
|---|---|---|---|---|
| AMPRO™ BIO Resin Viscosity | cP | 3028 | 979 | - |
| AMPRO™ Slow Hardener Viscosity | cP | 570 | 250 | - |
| Initial Mixed System Viscosity | cP | - | 1100 | - |

## WORKING TIME PROPERTIES*

| PROPERTY | UNITS | 20˚C | TEST METHOD |
|---|---|---|---|
| Thin-Film Gel-time | hrs:min | 01:54 | - |
| Pot-life (150 g, mixed in water) | hrs:min | 00:43 | Tecam Gel Time |
| Tack-off Time | hrs:min | 04:30 | Internal Gurit Method |
| Earliest Sanding Time** | hrs:min | 20:00 | Internal Gurit Method |

**working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all AMPRO™ systems*
***it is not recommended to apply at low temperatures, but a cure temperatures as low as +5°C is possible in the time stated*

## AMBIENT CURE THERMAL PERFORMANCE PROGRESSION at 21°C

| PROPERTY PROGRESSION AT 21°C | SYMBOL | UNITS | 7 DAYS | 14 DAYS | 21 DAYS | 28 DAYS | TEST STANDARD |
|---|---|---|---|---|---|---|---|
| Glass Transition Temperature | $Tg_1$ | °C | 40 | 43 | 44 | 45 | ISO 6721 (DMA) |

## CURED RESIN PROPERTIES

| PROPERTIES | SYMBOL | UNITS | 28 DAYS AT 21°C | 16 HRS AT 50°C*** | TEST STANDARD |
|---|---|---|---|---|---|
| Glass Transition Temperature | $Tg_1$ | °C | 45 | 49 | ISO 6721 (DMA) |
| Ultimate Glass Transition Temp. | $UTg_1$ | °C | 53 | - | ISO 6721 (DMA) |
| Tensile Strength | $\sigma_T$ | MPa | 36.3 | 42.4 | ISO 527-2 |
| Tensile Modulus | $E_T$ | GPa | 1.9 | 2.0 | ISO 527-2 |
| Tensile Elongation | $\varepsilon_T$ | % | 49.6 | 31.2 | ISO 527-2 |
| Flexural Strength | $\sigma_F$ | MPa | 61.8 | 67.0 | ISO 178 |
| Flexural Modulus | $E_F$ | GPa | 1.8 | 1.9 | ISO 178 |
| Flexural Elongation | $\varepsilon_F$ | % | >12.0 | >12.0 | ISO 178 |
| 28 Day Water Uptake (coupon size 60x60x1mm) | - | mg (%) | - | 28.4 (0.6) | ISO 62 |
| ILSS *(8 x RE301H8, 50% resin content)* | $X_{ILSS}$ | MPa | - | 32.3 | ISO 14130 |

****initial cure of 24 hours at 21°C*

## ADHESIVE PERFORMANCE (AFTER 16 HRS AT 50°C CURE)

| PROPERTIES | SYMBOL | UNITS | PLYWOOD | TEAK | STEEL | TEST STANDARD |
|---|---|---|---|---|---|---|
| Lapshear Strength | $\tau$ | MPa | 2.1 (Failed in wood) | - | 14.9 | BS 5350 Part C5 |
| Lapshear Strength Wet Retention (saturated for 28 days at 23°C in water) | $\tau_{wet}$ | MPa | - | - | 16.2 | BS 5350 Part C5 |

# AMPRO™ BIO RESIN & EXTRA-SLOW HARDENER

## MIXING AND HANDLING

| PROPERTY | UNITS | AMPRO™ BIO RESIN | EXTRA-SLOW HARDENER | MIXED SYSTEM |
|---|---|---|---|---|
| Colour | - | Brown Tint | Amber | Brown Tint |
| Mix ratio by weight | Parts by weight | 100 | 30 | - |
| Mix ratio by volume | Parts by volume | 3 | 1 | - |
| Density at 21 °C (ISO 1183-1B) | g/cm$^3$ | 1.10 | 1.00 | 1.08 |

## COMPONENT & MIXED SYSTEM PROPERTIES*

| PROPERTY | UNITS | 15˚C | 25˚C | TEST METHOD |
|---|---|---|---|---|
| AMPRO™ BIO Resin Viscosity | cP | 3028 | 979 | - |
| AMPRO™ Extra-Slow Hardener Viscosity | cP | 385 | 198 | - |
| Initial Mixed System Viscosity | cP | - | 1044 | - |

## WORKING TIME PROPERTIES*

| PROPERTY | UNITS | 20˚C | TEST METHOD |
|---|---|---|---|
| Thin-Film Gel-time | hrs:min | 02:14 | - |
| Pot-life (150 g, mixed in water) | hrs:min | 01:04 | Tecam Gel Time |
| Tack-off Time | hrs:min | 06:00 | Internal Gurit Method |
| Earliest Sanding Time** | hrs:min | 20:00 | Internal Gurit Method |

**working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all AMPRO™ systems*
***it is not recommended to apply at low temperatures, but a cure temperatures as low as +5°C is possible*

## AMBIENT CURE THERMAL PERFORMANCE PROGRESSION at 21°C

| PROPERTY PROGRESSION AT 21°C | SYMBOL | UNITS | 7 DAYS | 14 DAYS | 21 DAYS | 28 DAYS | TEST STANDARD |
|---|---|---|---|---|---|---|---|
| Glass Transition Temperature | $Tg_1$ | °C | 42 | 44 | 46 | 47 | ISO 6721 (DMA) |

## CURED RESIN PROPERTIES

| PROPERTIES | SYMBOL | UNITS | 28 DAYS AT 21°C | 16 HRS AT 50°C*** | TEST STANDARD |
|---|---|---|---|---|---|
| Glass Transition Temperature | $Tg_1$ | °C | 47 | 49 | ISO 6721 (DMA) |
| Ultimate Glass Transition Temp. | $UTg_1$ | °C | 49 | TBC | ISO 6721 (DMA) |
| Tensile Strength | $\sigma_T$ | MPa | 36.0 | 32.0 | ISO 527-2 |
| Tensile Modulus | $E_T$ | GPa | 1.8 | 1.6 | ISO 527-2 |
| Tensile Elongation | $\varepsilon_T$ | % | 47.9 | 49.2 | ISO 527-2 |
| Flexural Strength | $\sigma_F$ | MPa | 60.1 | 62.1 | ISO 178 |
| Flexural Modulus | $E_F$ | GPa | 1.8 | 1.8 | ISO 178 |
| Flexural Elongation | $\varepsilon_F$ | % | >12.0 | >12.0 | ISO 178 |
| 28 Day Water Uptake (coupon size 60x60x1mm) | - | mg (%) | - | 45.3 (0.7) | ISO 62 |
| ILSS *(8 x RE301H8, 50% resin content)* | $X_{ILSS}$ | MPa | - | 29.5 | ISO 14130 |

****initial cure of 24 hours at 21°C*

## ADHESIVE PERFORMANCE (AFTER 16 HRS AT 50°C CURE)

| PROPERTIES | SYMBOL | UNITS | PLYWOOD | TEAK | STEEL | TEST STANDARD |
|---|---|---|---|---|---|---|
| Lapshear Strength | $\tau$ | MPa | 2.2 (failed in wood) | 9.5 (failed in wood) | 15.6 | BS 5350 Part C5 |
| Lapshear Strength Wet Retention (saturated for 28 days at 23°C in water) | $\tau_{wet}$ | MPa | - | - | TBC | BS 5350 Part C5 |

## NOTICE

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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:

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

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