



# Simple Guide to Epoxies

Techniques for Using AMPRO™ Multi-purpose Epoxy



## Introduction

This simple guide is designed to provide you with a straight-forward understanding of the correct use of epoxies and features of the AMPRO™ range. For more detailed information please visit the website at [www.gurit.com](http://www.gurit.com).

## What are Epoxy Resins?

Epoxy systems are supplied as two liquids, a Resin and a Hardener. When these are mixed at the correct ratio a chemical reaction takes place and the mix hardens to form a solid. The time taken for the material to harden depends on the products used, temperature, volume and the “speed” of the hardener. **It is critical to understand that proportion of hardener used will not change the speed, and the correct mix ratio must always be observed.**

The mixed epoxy can be applied in a liquid form, before hardening, to coat wood or saturate woven glass or carbon reinforcements (fabric) to protect and stiffen.

Epoxies can also be mixed with fillers (additives) to give other characteristics making them into adhesives or filling and fairing mixes.

This adaptability allows them to be used in a wide variety of applications including marine, construction, general DIY and model-making.

## AMPRO™ Multi-purpose System

AMPRO™ is an award winning, latest generation multi-purpose epoxy system from Gurit. It is a simple to use, all-purpose epoxy which can be used for bonding, coating, laminating and filling.

AMPRO™ provides a quick and convenient way of using one epoxy system for a wide range of tasks. Key features include:

- **Professional:** boat-builder’s choice for bonding, laminating and filling
- **Safer:** uses lower toxicity chemicals with low hazards
- **Stronger:** more flexible resin matrix ideal for working with wood
- **Tack-free:** no surface residue when cured and does not clog sandpaper
- **Water-proof:** AMPRO™ SILICA has been optimised to withstand the marine environment
- **Wide over-coating window:** up to 4 days later without additional surface preparation
- **Faster:** improved cure at temperatures as low as +5C
- **Glossier:** improved coating performance with reduced surface defects
- **Cardboard outer packaging:** less single use plastics
- **Greener:** accredited, bio-based option using a high content of plant based chemicals
- **Simplified:** 4 systems, inter-changeable hardeners and the same 3:1 mix ratio by volume

## One System, Many Uses...

AMPRO™ consists of inter-changeable resins, blend-able hardeners and additives for many uses.

The right combination of AMPRO™ products will depend on your application:

Coating, Sheathing, or Laminating **A + B**

Filling, Fairing or Bonding **A + B + C**

<b>A</b> Select the right system...	AMPRO™	AMPRO™ CLR	AMPRO™ BIO	AMPRO™ SEAL
Low temperature curing	✓	✓		
Clear coating		✓		
Grain enhancing wood coating	✓		✓	
Bio-based content	<10%		40-60%	40-60%
Sealing & priming porous surfaces				✓
Filling, Fairing or Bonding	✓	✓	✓	

<b>B</b> Select the hardener speed...	Fast <b>F</b>	Slow <b>S</b>	Extra-Slow <b>XS</b>
Working time with a brush at 20°C	1-2 hours	4-5 hours	5-6 hours
50g pot-life in air at 20°C	½ hour	1 hour	1½ hours

<b>C</b> Select the additive(s)...		Micro Balloons <b>MB</b>	Glass Bubbles <b>GB</b>	Micro Fibres <b>MF</b>	AMPRO™ Silica <b>AS</b>
Filling & Fairing Mixes	Easy to sand, filling and filleting for cosmetic wood applications	✓			✓
	Water-proof or lowest-cost filler for general applications		✓		✓
	Hard surface finish filler for hard wearing edges and surfaces		✓		✓
Bonding Mixes	General bonding of softwood, brown in colour	✓			✓
	General bonding of softwood, white in colour		✓		✓
	Structural bonding of wood or composite, opaque in colour			✓	✓

## Availability

Gurit AMPRO™ is available in a wide range of sizes from small packs to drums and IBC containers. Please contact your local distributor for further details.

## AMPRO™ Systems

### AMPRO™

#### Low Temperature Curing Multi-purpose System

- SP 106 re-engineered
- 3 : 1 mix ratio by volume
- No surface residue, even at +5°C
- For bonding, laminating & filling
- Available with Fast (F), Slow (SL) & Extra-slow (XS) hardeners



### AMPRO™ BIO

#### Bio-based Epoxy Multi-purpose System

- Accredited bio-based system
- 3 : 1 mix ratio by volume
- No surface residue, even at +5°C
- For bonding, laminating & filling
- Available with Fast (F), Slow (SL) & Extra-slow (XS) hardeners



### AMPRO™ CLR

#### Clear Coating Epoxy Multi-purpose System

- SP 320 re-engineered
- 3 : 1 mix ratio by volume
- No surface residue, even at +5°C
- Ideal for clear coating applications
- Available with Fast (F), Slow (SL) & Extra-slow (XS) hardeners



### AMPRO™ SEAL

#### Sealing & Priming Porous Surfaces

- Eposeal 300 re-engineered
- 3 : 1 mix ratio by volume
- No surface residue, even at +5°C
- For sealing & priming porous surfaces
- Available with Fast (F), Slow (SL) & Extra-slow (XS) hardeners



## AMPRO™ Fillers for Bonding and Filling Mixes

### Glass Bubbles

#### Waterproof Filling & Bonding

GB

- White, hollow glass spheres for waterproof filling and bonding
- Ideal as a finishing filler for hard wearing edges & surfaces
- Refer to the AMPRO™ datasheet for recommended mixes
- Packaged in a re-usable mixing pot



### Microballoons

#### Wood Filling & Bonding

MB

- Brown, hollow phenolic resin spheres ideal for **wood** applications
- Easy to profile and sand for filling, filleting and bonding
- Refer to the AMPRO™ datasheet for recommended mixes
- Packaged in a re-usable mixing pot



### Microfibres

#### Structural Bonding

MF

- Opaque, very fine cellulose wood fibres for **structural** bonding
- Suitable for both wood and GRP
- Refer to the AMPRO™ datasheet for recommended mixes
- Packaged in a re-usable mixing pot



### AMPRO™ Silica

#### Waterproof Resin Thickener

AS

- Fine waterproof, white powder used to thicken the epoxy system
- Can be used with Glass Bubbles, Microballoons and Microfibres
- Refer to the AMPRO™ datasheet for recommended mixes
- Packaged in a re-usable mixing pot



## Using Epoxy Systems

The important points to remember when using epoxy systems are:

- Accurate measurement of the resin and hardener components - If the mix ratio of the resin to the hardener is incorrect the epoxy will never cure correctly. There are two methods for measuring the resin and hardener at the correct ratio:

1. By volume using pumps, cups or syringes
2. By weight using digital scales which are accurate and relatively cheap

**Note: the mix ratio will be different by volume and by weight.**

- Mixing of the resin and hardener - Once dispense to the correct ratio, the components must be mixed thoroughly otherwise the system will not cure properly. As a guide, small quantities (approximately 100g) should be mixed well for at least 2 minutes and larger quantities progressively more. Ideally, use a flat mixing stick or pallet knife to mix, paying particular attention to the sides and corners. For adhesive and filler mixes, always mix the resin and hardener first before adding the filler and then mix it again.

- Exothermic Heat - When the epoxy resin and hardener are mixed, a chemical reaction begins, which will turn it into a solid material. As part of this reaction heat is generated. The rate of the reaction and amount of heat generated is determined by a number of factors:

- **Hardener speed:** more rapid curing systems like AMPRO™ with Fast hardener, will generate more heat during this process.
- **Temperature:** The warmer the epoxy, the faster the chemical reaction occurs and so more heat is generated and the faster the reaction.
- **Volume:** If the mixed system remains in the mixing pot, the heat cannot escape into the environment and so heats the material around it. The higher the volume the faster and hotter the exotherm. By transferring the mixed epoxy to a shallow container, like a paint tray, the surface area is increased and thus the heat can escape increasing the working time.

- Over-coating - it is usual apply multiple layers of epoxy and this can be done in 1 of 2 ways:

1. Within the specified over-coating window where-by subsequent coats are applied “wet on tacky”. This means that when the first coat has thickened sufficiently and is not moved or dragged when applying the second, but before the first coat has cured too far to ensure a chemical bond.

2. After the previous coat has fully cured, it will have reacted too far to generate a chemical bond. The time it will take to fully cure will be dependent on the ambient temperature and the hardener speed. However, a sufficient mechanical bond can be achieved by sanding and cleaning the surface and applying a second coat. A range of epoxy compatible solvents are available, both for surface preparation and tool cleaning.

AMPRO™ has been designed to have a robust 4 day over-coating window without further surface preparation.

Finishing - as with all epoxies, for a clear finish that does not become darker over time, we recommend the use of a UV stable varnish to reduce deterioration caused by ultra violet in sunlight and give a hard-wearing, high-gloss surface finish.

**Note: for details of the over-coating & cure times, please refer to the product datasheet.**

This is only an introduction to Gurit's retail products and a brief overview on how they can be used. For more information on Gurit's products please visit the website at [www.gurit.com](http://www.gurit.com).

Like many chemicals, epoxies can be harmful if used incorrectly. Please read the health and safety information on the data sheet for the product you are using. Gloves, overalls and safety goggles are recommended and when sanding, a dust mask should be worn.

## What is the AMPRO™ Range Replacing?

**General Purpose:** SP 106 and Handipack is replaced with either AMPRO™ or AMPRO™ BIO

System	Colour	Low Temp. Curing	Clear Coating	Wood-grain Enhancing	Bio-based Content	Sealing & Priming	Filling & Bonding
SP 106		★★★	N/A	★★★	None	N/A	★★★★
Handipack		★★★★		★★★	None		★★★
AMPRO™		★★★★★		★★★★	<10%		★★★★★
AMPRO™ BIO		★★★★		★★★★★	40-60%		★★★★★

**Clear Coating:** SP 320 and SP 115 is replaced with AMPRO™ CLR\*

System	Colour	Low Temp. Curing	Clear Coating	Wood-grain Enhancing	Bio-based Content	Sealing & Priming	Filling & Bonding
SP 320		★★	★★★★★	N/A	None	N/A	★★★
SP 115		★★★	★★★★★		None		★★
AMPRO™ CLR		★★★★★	★★★★★		None		★★★★★

**Sealing & Priming Porous Surfaces:** Eposeal 300 is replaced by AMPRO™ SEAL

System	Colour	Low Temp. Curing	Clear Coating	Wood-grain Enhancing	Bio-based Content	Sealing & Priming	Filling & Bonding
Eposeal 300		★★★	N/A	N/A	None	★★★★	N/A
AMPRO™ SEAL		★★★★			40-60%	★★★★	

\*NOTE: For a clear finish that does not become darker over time, we recommend the use of a UV stable varnish to reduce deterioration caused by ultra violet in sunlight and give a hard-wearing, high-gloss surface finish

★ = Very Poor    ★★ = Poor    ★★★ = Average    ★★★★ = Good    ★★★★★ = Excellent

