



SP 106

Multi-purpose Epoxy System

- Use for gluing, coatings, laminating and filling
- Rapid curing, even at low temperatures
- Simple to use

Introduction

SP 106 is a simple to use, all-purpose epoxy which can be used for gluing, coating, laminating and filling. With its range of hardeners, and easy 5:1 mix ratio by volume, SP 106 provides a quick and convenient way of using one epoxy system for a very wide range of tasks. SP 106 has been established for over 20 years as the primary epoxy system for the manufacture and repair of wooden boats, and it is now widely used in many other woodworking applications from cabinet making to the manufacture of large wooden moulds. With its Extra Slow Hardener SP 106 can be used for jobs requiring a long working time, or in 'tropical' conditions of high ambient temperatures.

In its unmodified form, SP 106 can be used as a clear coating for wood and other substrates, or for laminating lightweight glassfibre fabrics such as those used for reinforcing joints. When used for clear coating, cured SP 106 should be overcoated with a UV-resistant varnish such as Ultravar 2000.

By using the SP-High Modulus range of filler powders, an SP 106 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.

Instructions for Use

Workshop Conditions

SP 106 should be used at between 15°C-25°C. At lower temperatures the product thickens and therefore it is necessary to prewarm resin, hardener and surfaces to be bonded or coated before use. At higher temperatures and larger volumes the pot life of the mixed resin/hardener is reduced.

Mixing and Handling

Use either Fast, Slow, Extra Slow or 45 minute hardener, depending on the speed of reaction and working time required, in the ratio:

| SP 106 resin | SP 106 hardener |
|-------------------|-----------------|
| 5 : 1 (by volume) | |

Mix as accurately as possible since varying the amount of hardener will not change the cure speed significantly but will greatly reduce the cured strength and water resistance properties of the material.

If using the SP pump dispensing system ensure that the pumps are fitted and used according to the pump pack instructions. Pumps should also be regularly checked and cleaned to ensure that they continue to dispense the correct volumes.

Solvent-free epoxies have limited pot life. Mix sufficient only for immediate use to avoid excessive heat build up and resin wastage through early gelation: with **fast** hardener mix no more than can be used in 5-10 minutes; with **slow and extra slow** hardener mix no more than can be used in 15 - 20 minutes; with **40 minute hardener** mix no more than can be used in 40 minutes.

Mixing Resin & Hardener

The SP 106 resin and hardener should be mixed thoroughly together for at least one minute. To maximise the working life, use from the pot quickly or transfer to a shallow tray to help dissipate the heat of the reaction. See table on "Working Properties".

Surface Preparation

Before using the product ensure that surfaces to be bonded, coated or filled are clean, dry and dust-free. All surfaces should be prepared by abrading with medium grit paper, the dust removed then wiped with SP Fast Epoxy Solvent (Solvent A) for maximum adhesion.

Usage Gluing

SP 106 is a most effective glue for bonding wood, metals, stone, concrete and grp. To enhance gap-filling properties and prevent glue-starved joints, the appropriate filler powders should be added to the mixed resin/hardener to make a 'thicker' mix (see table on adhesive mixes).

Fillet Bonding

Constructing radiused fillet joints using epoxy plus fillers is a convenient and economical method of bonding together plywood panels which meet at an angle. Use either **low density** (glass bubbles or microballoons + colloidal silica) or **high density** (microfibres + colloidal silica) filler mixes depending on use and strength required.

High density mixes are used in structural applications where highest strength is required. Strength is also determined by the radius of the fillet = (2.5 to 3 x thickness of plywood for high density fillet, 5 to 6 x plywood thickness for low density fillet).

Coating

With a minimum of 450 microns coating thickness, SP 106 forms an effective water resistant seal on wood. On flat surfaces this can be achieved in one or two coats (the latter allowing a better surface finish) but on inclined or vertical surfaces multiple thinner coats will be required. It is possible to overcoat when the first coat is still 'tacky' for a rapid build-up (see table "Working Properties"). However, if the epoxy is allowed to cure beyond this tacky state, the coating must be sanded **thoroughly**, preferably using wet abrasive paper, and dry thoroughly before reapplying another epoxy coat or paint system. If the coating is allowed to cure at the lower end of the temperature range, or if the ambient humidity is moderate to high, a greasy surface 'by-product' may form. This is quite normal and should be removed using warm soapy water and a Scotchbrite pad, or SP Cleaning Fluid (Solvent C).

Pigmenting

Use Gurit epoxy pigments up to 10% by volume (white, grey, black available). Add the pigment to the SP 106 resin component and then to this volume of SP 106/pigmented resin add the hardener at 5:1 ratio by volume.

Wood Staining

Only water-based wood stains should be used. Do not use spirit or oil-based stains or preservatives.

Fibre Reinforcement

Use SP 106 epoxy with glass, carbon or aramid fabrics as a low cost laminating resin for composite components, sheathing wood, or repairs to grp.

Using Filler Powders

Filler powders control the working properties of the resin mix and are beneficial for almost all bonding operations to give additional gap-filling properties and extend the glue quantity. Fillers are also used for fillet bonding and to create low cost, low density epoxy fairing mixes. When using fillers always mix the resin and hardener first and then stir in the appropriate filler(s) in the correct quantity, as shown in the tables.

Filling and Fairing Mixes

| Description of Mix | Filler Type | Ease of Sanding of Mix | Water Resistance of Mix | Filler Quantity (% by Wt. of R/H Mix) | Filler Quantity (for 1kg R/H Mix) | Silica Addition (% by Wt. of R/H Mix) | Silica Addition (for 1kg R/H Mix) | Approx. Density of Mix | Approx. Vol. of Filler Mix from 1kg R/H Mix |
|---------------------------|---------------|------------------------|-------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|------------------------|---|
| Brown, low density | Microballoons | Easy | Moderate | 25-30% | 250-300g | 2-3% | 20-30g | 0.6g/cm ³ | 2.2 litres |
| White, low density | Glass Bubbles | Moderate | High | 35-40% | 350-400g | 3-5% | 30-50g | 0.5g/cm ³ | 3 litres |

Adhesive Mixes

| Description of Mix | Filler Type | Filler Quantity (% by Wt. of R/H Mix) | Filler Quantity (for 1kg R/H Mix) | Silica Addition (% by Wt. of R/H Mix) | Silica Addition (for 1kg R/H Mix) | Approx. Density of Mix | Approx. Vol. of Filler Mix from 1kg R/H Mix |
|------------------------------|-----------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|------------------------|---|
| Brown, low density | Microballoons * | 15-20% | 150-200g | 4-5% | 40-50g | 0.7g/cm ³ | 1.8 litres |
| White, low density | Glass Bubbles * | 15-20% | 150-200g | 5-6% | 50-60g | 0.6g/cm ³ | 2 litres |
| Opaque, high strength | Microfibres | 7-10% | 70-100g | 3-4% | 30-40g | 0.9g/cm ³ | 1.1 litres |

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

*Microfibres are always preferred for load-carrying adhesive joints.

Coverage

| | |
|------------------------------------|------------------------------------|
| Thickness (per coat) | 50-150 microns* |
| Coating coverage (@ 0.15mm) | Approx. 7m ² /litre** |
| Glue coverage | Approx. 3-4m ² /litre** |

* Depending on temperature and surface inclination.

** Depends on surface porosity and evenness.

For further information, see the Filler Guide.

Properties

| Component Properties | | | | | |
|--|-------|---------------|---------------|---------------------|--------------------|
| | Resin | Fast Hardener | Slow Hardener | Extra Slow Hardener | 40 Minute Hardener |
| Mix Ratio (by weight) | 100 | 18 | 18 | 18 | 18 |
| Mix Ratio (by volume) | 100 | 20 | 20 | 20 | 20 |
| Viscosity @ 15°C (cP) | 2180 | 344 | 143 | 908 | 23 |
| Viscosity @ 20°C (cP) | 1360 | 263 | 106 | 594 | 13 |
| Viscosity @ 25°C (cP) | 815 | 198 | 74 | 394 | 11 |
| Viscosity @ 30°C (cP) | 525 | 153 | 54 | 258 | 7 |
| Shelf Life (months) | 24 | 24 | 24 | 24 | 24 |
| Colour (Gardner) | 1 | 4* | 3* | >8 | Light Yellow |
| Mixed Colour (Gardner) | - | 1 | 1 | 8 | Dark Yellow |
| Component Density (g/cm ³) | 1.164 | 1.008 | 0.968 | 0.979 | 0.98 |
| Mixed Density (g/cm ³) | - | 1.138 | 1.131 | 1.125 | 1.146 |
| Hazard Definition | Xn, N | C | C | C | C |

| Cured System Properties | | | | |
|------------------------------------|------------------------|-------|------------|--------------------|
| | Cured (28 days @ 21°C) | | | |
| | Fast | Slow | Extra Slow | 40 Minute Hardener |
| Tg DMTA (Peak Tan δ)(°C) | 61.8 | 64.8 | 73.8 | 62.5 |
| Tg Ult - DMTA (°C) | 80.1 | 82.9 | 86.1 | 78.7 |
| ΔH - DSC (J/g) | 2 | 13 | - | 12.3 |
| Tg1 - DMTA (°C) | 51.6 | 53.7 | 61.5 | 47.8 |
| Moisture Absorp. (%) | 1.991 | 1.578 | - | 1.04 |
| Cured Density (g/cm ³) | 1.191 | 1.188 | 1.175 | 1.189 |
| Linear Shrinkage (%) | 1.6 | 1.7 | 1.6 | 0.41 |
| Barcol Hardness | 26 | 30 | 24 | 19 |
| Yellowing Index (ΔYI) | 42 | - | - | 37 |
| Shear Strength on Steel (MPa) | 14.67 | 15.67 | 17.33 | 19.76 |
| Shear Strength Wet Retention (%) | 89 | 76 | - | 73 |

*Material darkens on storage. **After removal of any surface-by-product. ††SP 106 mixes with these hardeners are not recommended for use as coatings at this temperature.

Notes: For an explanation of test methods used see 'Formulated Products Technical Characteristics'.

All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

† All times are measured from when resin and hardener are first mixed together.

Properties (cont'd)

| Working Properties vs Temperature | | | | | | | | | | | | | | | | |
|---|-----------------------|------|------|------|-----------------------|------|------|------|-----------------------------|------|------|------|----------------------------|-------|------|------|
| | Resin / Fast Hardener | | | | Resin / Slow Hardener | | | | Resin / Extra Slow Hardener | | | | Resin / 40 Minute Hardener | | | |
| | 15°C | 20°C | 25°C | 30°C | 15°C | 20°C | 25°C | 30°C | 15°C | 20°C | 25°C | 30°C | 15°C | 20°C | 25°C | 30°C |
| Initial Mixed Viscosity (cP) | 2770 | 1870 | 1263 | 844 | 2181 | 1366 | 862 | 545 | 2872 | 1826 | 1149 | 720 | 1687 | 622 | 573 | 409 |
| †Gel Time - 150g Mix in Water (hrs:mins) | - | 0:17 | - | 0:12 | - | 0:31 | - | 0:16 | - | 0:51 | - | 0:21 | - | 2:02 | 1:23 | 46.9 |
| †Pot Life - 500g Mix in Air (hrs:mins) | - | 0:15 | - | 0:10 | - | 0:19 | - | 0:13 | - | 0:34 | - | 0:14 | - | 0:28 | - | - |
| †Working Time (hrs:mins) | 2:20 | 1:05 | 0:30 | 0:13 | 3:00 | 2:20 | 1:50 | 1:30 | 4:10 | 3:10 | 2:20 | 1:50 | - | 4:00 | - | 2:00 |
| †Tack Off Time (hrs:mins) | 3:30 | 1:30 | 0:45 | 0:21 | - †† | 3:50 | 2:50 | 2:10 | - †† | 5:00 | 3:40 | 2:45 | - | 4:30 | - | 2:30 |
| †Latest Overcoating Time (hrs:mins) | 2:15 | 2:15 | 1:25 | 0:50 | - †† | 5:20 | 3:50 | 2:45 | - †† | 4:00 | 3:00 | 2:15 | - | 7:00 | - | - |
| †Clamp Time (hrs:mins) | 4:20 | 3:15 | 2:25 | 1:45 | 7:10 | 5:00 | 3:10 | 2:20 | 8:40 | 6:25 | 4:50 | 3:30 | - | 9:30 | - | - |
| †Earliest Sanding Time (hrs)** | 20 | 15 | 11 | 8½ | 26 | 19 | 14½ | 11 | 31 | 23 | 17 | 13 | - | 28:00 | - | - |

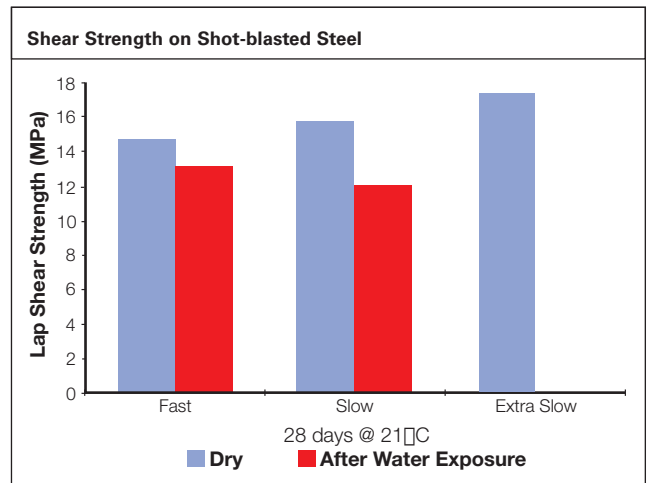
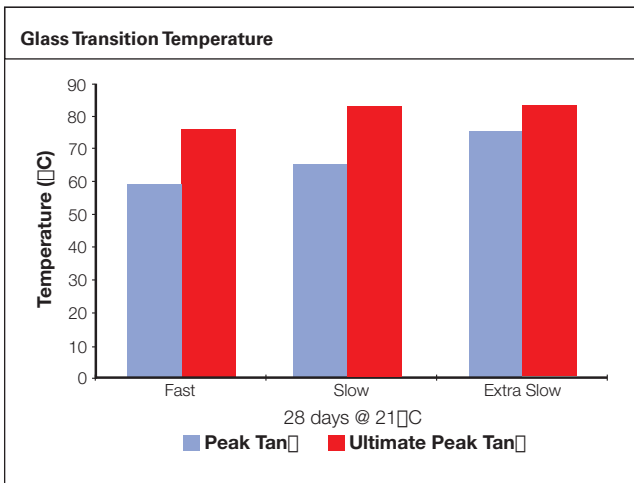
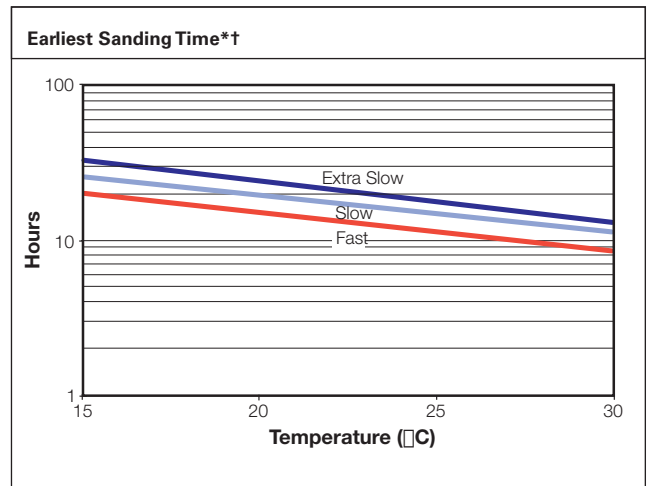
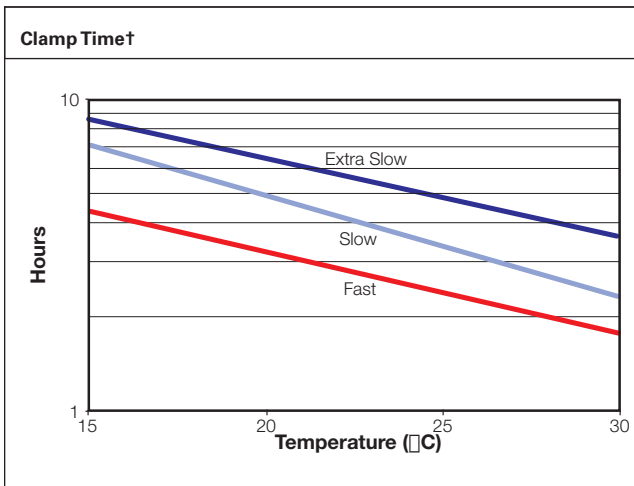
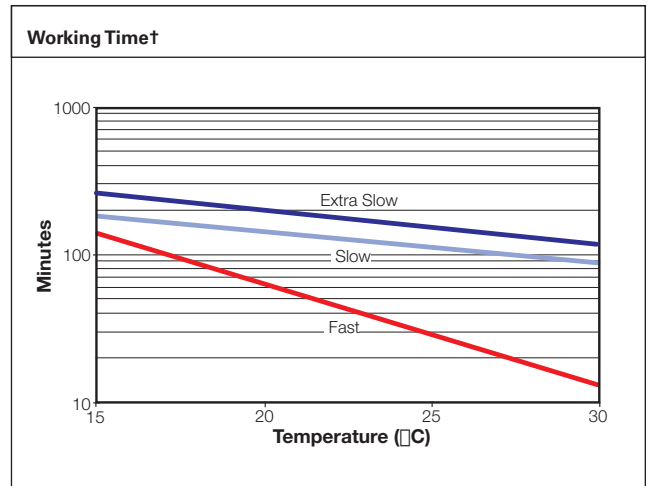
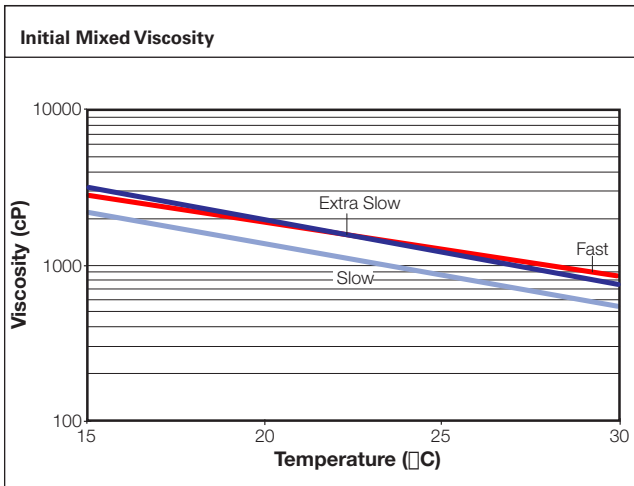
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Notes: For an explanation of test methods used see 'Formulated Products Technical Characteristics'.

All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

† All times are measured from when resin and hardener are first mixed together.

Mechanical Properties



*After removal of any surface-by-product.

Notes: For an explanation of test methods used see 'Formulated Products Technical Characteristics'.

All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

† All times are measured from when resin and hardener are first mixed together.

Health and Safety

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. SP-High Modulus 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. Overalls or other 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 or drinking
- before 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.

SP-High Modulus produces a separate full Material Safety Data Sheet for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work. A more detailed guide for the safe use of SP resin systems is also available from SP-High Modulus, and can be found at www.gurit.com

Applicable Risk & Safety Phrases

Resin

R 20/21/22, 36/38, 43, 51/53
S 2, 9, 13, 29/56, 36/37/39, 46

Fast Hardeners

R 20/21/22, 34, 43, 52/53, 62, 68
S 1/2, 9, 26, 29/56, 36/37/39, 45

Slow Hardener

R 20/21/22, 34, 43, 52/53, 68
S 9, 20, 26, 36/37/39, 45, 61

Extra Slow Hardener

R 20/21/22, 34, 43, 52/53, 68
S 9, 20, 26, 36/37/39, 45, 61

40 Minute Hardener

R 22, 34, 43
S 20, 23, 26, 36/37/39, 45, 60



Transport & Storage

The resin and hardeners should be kept in securely closed containers during transport and storage. Adequate long term storage conditions for both materials will result in a shelf life of two years for the resin and one year for the hardeners.

Storage should be in a warm dry place out of direct sunlight and protected from frost. The temperature should be between 10°C and 25°C. Containers should be firmly closed. Hardeners, in particular, will suffer serious degradation if left exposed to air.

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