

SP 320

Solvent-Free Clear Epoxy Coating System

- **Easy application**
- **Excellent Clarity**
- **High film-build**

Introduction

SP 320 is a solvent-free, clear epoxy coating that provides a high clarity, tough finish to whatever it is applied to. When used for coating wood, just a few coats will provide both protection and a depth of clarity that can only otherwise be achieved with many more coats of a conventional varnish. The epoxy coating will protect most surfaces from moisture ingress, and will also add strength to softwood surfaces. On horizontal surfaces, SP 320 may be poured on as a flow-coat, providing an instant, thick coating layer in just one application. If the coating is to remain unpainted, the cured material should be overcoated with a UV-resistant varnish such as SP's Ultravar 2000 since an unprotected epoxy coating will gradually yellow in sunlight.

Due to its low viscosity, and excellent wetting characteristics, SP 320 may also be used with lightweight glass reinforcements, such as RE210D, to provide a clear, sheathing layer. When this is further coated with extra layers of SP 320, the result is a glass-reinforced clear coating which is exceptionally strong and hard-wearing.

Whilst primarily designed as a coating, SP 320 is completely solvent-free and so can be mixed with the SP Filler range to produce filling compounds, adhesives and fillet mixes. Some information about the filler range, and how to use the fillers, is contained in this data sheet. Further details can be found in the Filler Guide.

Instructions for Use

Workshop Conditions

SP 320 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. When mixing and using product in cold conditions localised heating is strongly recommended for all applications.

At higher ambient temperatures the product is "thinner" and more runny, and working times are reduced.

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, and the dust removed then wiped with SP Fast Epoxy Solvent (SP Solvent A) for maximum adhesion. Metals usually require a special chemical pre-treatment to create the best bond - please refer to Gurit's Bonding Guide.

Resin and Hardener Ratio

Use either fast or slow hardener depending on the speed of reaction and working time required, in the ratio:-

SP 320 resin	SP 320 hardener
5	2 (by volume)
3	1 (by weight)

Mix as accurately as possible since varying the amount of hardener will not change the cure speed but will greatly reduce the cured strength and water resistance properties of the material. Measurement by weight will provide the greatest accuracy.

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

Mixing Resin and Hardener

The resin and hardener should be mixed thoroughly for at least one minute. Solvent-free epoxies have limited pot life. To maximise resin working life use from the pot quickly, or transfer to a shallow tray to help to dissipate the heat of the reaction - see table on "Working Properties". Mix sufficient only for immediate use to avoid excessive heat build up and resin wastage through early gelation: At 20°C with **fast** hardener mix no more than can be used in 10 minutes; with **slow** hardener mix no more than can be used in 15 - 20 minutes. At higher temperatures and larger volumes, the pot life of mixed resin/hardener is reduced.

Usage

Gluing

SP 320 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 to make a 'thicker' mix should be added (see table on fillers).

Fillet Bonding

Constructing radiused fillet joints using epoxy plus fillers is a

convenient and economical method of bonding together 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. 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 320 forms an effective water resistant seal on wood, grp and other materials. To obtain a rapid build up in the shortest time, it is possible to overcoat when the previous coat has gelled sufficiently and is 'tacky' but before it has become hard. The timing is critical to ensure success with this technique so please refer to the following Working Properties table. It is more common to allow the epoxy to harden fully (say overnight) and then to sand the surface before applying a further coat - this process being applied to each subsequent coat.

Any 'tacky' by-product which may be present on the surface is most effectively removed with 180 grade wet abrasive paper. Do not use solvents to remove this by-product. If dry sanding is required, firstly remove by-product from the surface with a Scotchbrite pad and warm soapy water, flush with clean water and allow to dry. Whereas an SP 320 surface may be wet sanded the following day, dry sanding will require at least 24 hours cure to have elapsed. Ideally, SP Ultravar 2000 should be applied as the final layers, which will supply the necessary ultra-violet protection required by the SP 320. SP Ultravar 2000 also provides high resistance to wear, water and chemicals.

Pigmenting

Use SP's epoxy pigments up to 10% by volume (white, grey, black available). Add pigmented resin mix to resin component and then to this volume of SP 320/pigmented resin add the hardener at 5:2 ratio by volume.

Wood Staining

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

Fibre Reinforcement

Use SP 320 epoxy with glass, carbon or aramid as a low viscosity laminating resin for composite components, small racing boat hulls, sheathing wood, or repairs to grp.

Using Filler Powders

Filler powders control the working properties of the 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 creating 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 following tables.

Application Guides

Gurit produces a number of application guides to commonly performed tasks using these products. Please contact Technical Services or your stockist to obtain a copy.

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 ¹
Coating coverage (@ 100 microns)	Approx. 10m ² /litre
Glue coverage	Approx. 3-4m ² /litre

¹ Depending on temperature and surface inclination.

Properties

Component Properties			
	Resin	Fast Hardener	Slow Hardener
Mix Ratio (by weight)	100	33.3	33.3
Mix Ratio (by volume)	100	40	40
Viscosity @ 15°C (cP)	1810	852	987
Viscosity @ 20°C (cP)	1130	570	642
Viscosity @ 25°C (cP)	697	375	409
Viscosity @ 30°C (cP)	425	250	261
Shelf Life (months)	24	12	12
Colour (Gardner)	1	2	'Rose'
Mixed Colour (Gardner)	-	1	-
Component Density (g/cm³)	1.161	0.975	0.969
Mixed Density (g/cm³)	-	1.115	1.113
Solids Content (%b.w.)	100	100	100
Hazard Definition	Xi, N	C	C

*After removal of any surface-by-product. **SP 320 with slow hardener is not recommended to be used as a coating below 18°C.

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.

Useful formulae for calculating the quantity of material needed to cover a given area, are given under 'General Information'.

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

Properties (cont'd)

Cured System Properties		
	Cured (28 days @ 21°C)	
	Fast	Slow
Tg DMTA (Peak Tan δ)(°C)	59.0	65.2
Tg Ult - DMTA (°C)	75.5	82.6
ΔH - DSC (J/g)	1.9	3.8
Tg1 - DMTA (°C)	49.4	56.3
Moisture Absorp. (%)	1.307	1.316
Cured Density (g/cm ³)	1.163	1.158
Linear Shrinkage (%)	1.6	1.6
Barcol Hardness	30	31
Yellowing Index (ΔYI)	33	33
Approx. Coverage (@150μm) (sqm/mixed kg)	5.7	5.7
Shear Strength on Steel (MPa)	16	15
Shear Strength Wet Retention (%)	63	85
Minimum Recommended Coating Temperature	15°C	18°C
Minimum Recommended Cure Temperature	15°C	18°C

Working Properties vs Temperature								
	Resin / Fast Hardener				Resin / Slow Hardener			
	15°C	20°C	25°C	30°C	15°C	20°C	25°C	30°C
Initial Mixed Viscosity (cP)	1810	1170	773	504	1580	1020	647	422
†Gel Time - 150g Mix in Water (hrs:mins)	-	0:20	0:13	0:09	-	0:55	0:29	0:18
†Pot Life - 500g Mix in Air (hrs:mins)	-	0:15	-	0:10	-	0:30	-	0:13
Sag Resistance (μm)	200	155	125	100	200	180	160	150
†Working Time (hrs:mins)	2:10	1:40	1:20	1:05	3:30	2:40	2:00	1:40
†Tack Off Time (hrs:mins)	2:30	2:00	1:30	1:15	5:15**	4:00	3:00	2:15
†Latest Overcoating Time (hrs:mins)	2:45	2:45	2:05	1:35	-**	5:20	4:00	3:00
†Clamp Time (hrs:mins)	3:35	2:50	2:10	1:40	5:30	4:15	3:10	2:25
†Earliest Sanding Time* (hrs:mins)	17:00	13:20	10:20	8:00	27:00	20:30	15:30	11:40

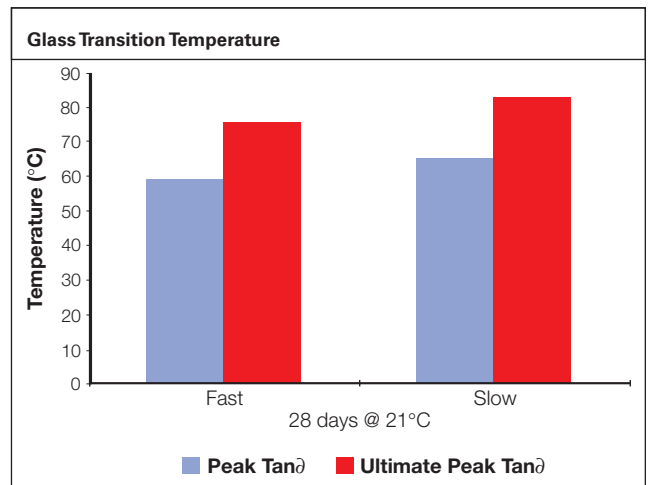
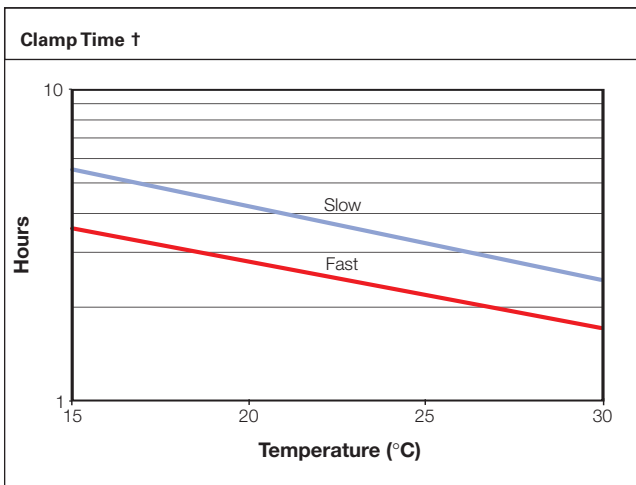
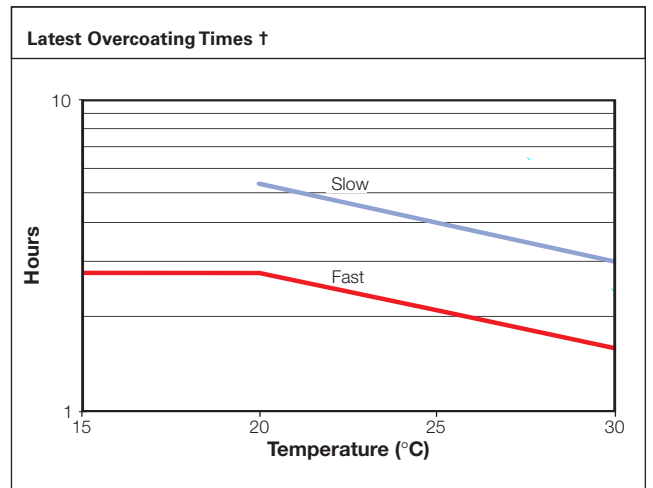
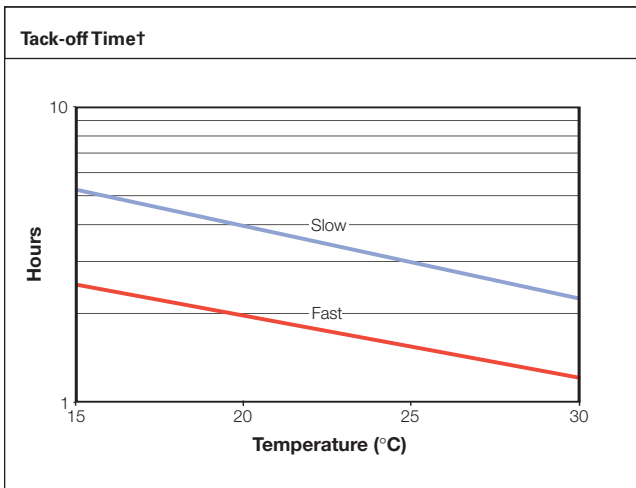
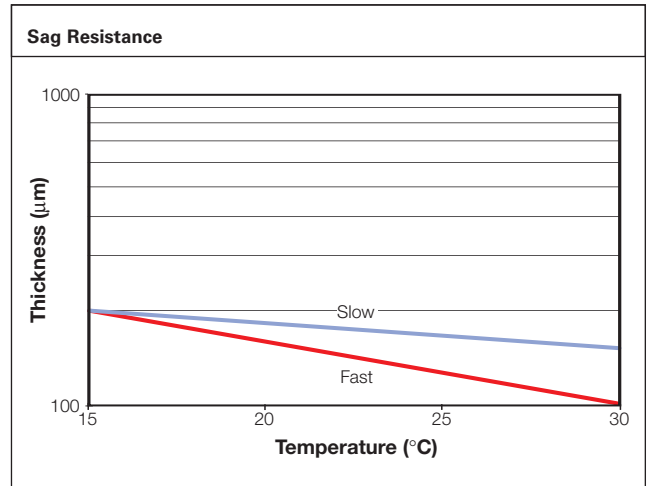
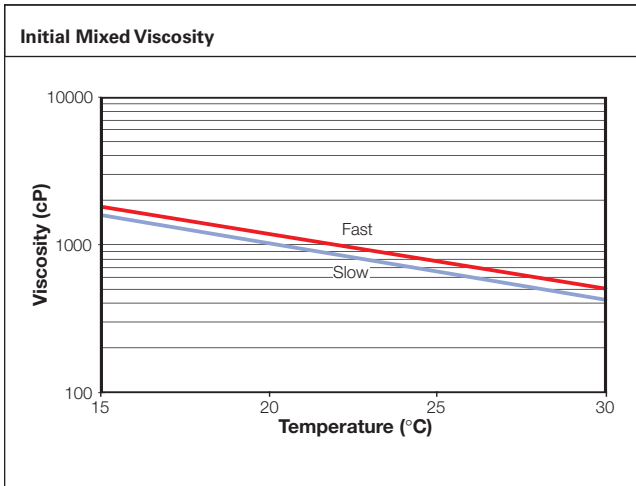
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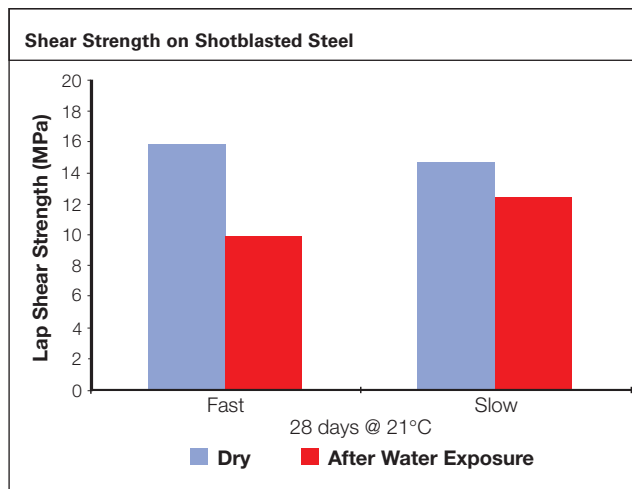
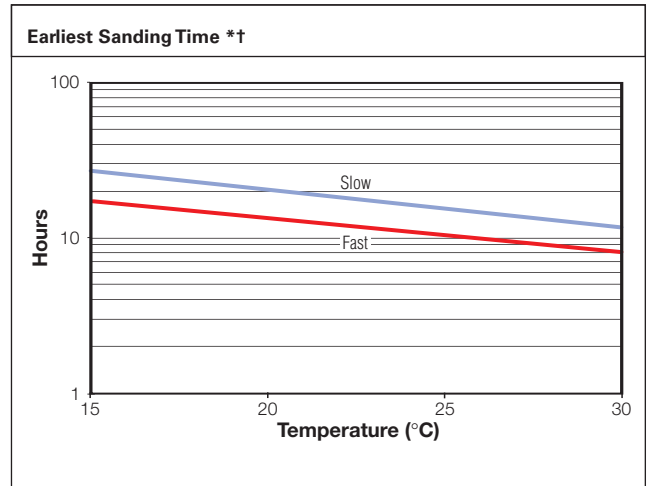
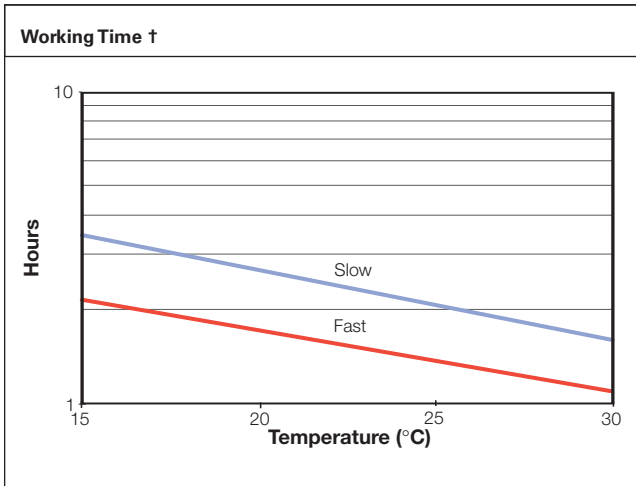
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Health and Safety

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. SP 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 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, and can be found on our website at www.spsystems.com

Applicable Risk & Safety Phrases

Resin

R 36/38, 43, 51/53
S 2, 23, 24/25, 29/56, 37/39, 46

Fast Hardener

R 22, 34, 37, 43, 62
S 1/2, 13, 26, 36/37/39, 45, 56

Slow Hardener

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



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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