



CR 3400

In-Mould Epoxy Gelcoat / Surfacing System

- **Easy to sand**
- **May also be used with some Gurit preregs**

Introduction

CR 3400 is an in-mould epoxy surfacing system for epoxy laminates, and is designed to be used as the base for the subsequent application of a paint scheme. CR 3400 is therefore formulated to be easily sandable so that once released, the CR 3400 surface can be readily keyed prior to the application of the paint system. This feature gives additional benefits in that any minor surface defects caused by laminate print-through or mould imperfections can easily be sanded away.

CR 3400 is applied into a mould in the same way as other epoxy gelcoats, and has similar handling characteristics. However, the product has a considerably longer overcoating window than other gelcoats - up to one day with Standard hardener at 20°C. This means that the system can also be used in a very flexible manufacturing environment.

CR 3400 is designed to be backed up with Ampreg 22 and Ampreg 26 epoxy laminating systems. Under certain conditions it may also be used in conjunction with SP SE70, SE84 preregs, ST70 and ST 95 SPRINT® systems. CR3400 must be painted prior to water immersion.

Instructions for Use

Mixing & Handling

CR 3400 resin is mixed with the CR 3400 hardener in the following ratio:-

CR 3400 Resin	CR 3400 Hardener
100	: 30 (by weight)

Accurate measurement and thorough mixing are essential when using this system and any deviation from the prescribed mixing ratios will seriously degrade the physical and mechanical properties of the cured system. The resin and hardener must be well stirred for a minute 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 speed the reaction. If the mixed material is left in a confined mixing cup the heat cannot disperse and the reaction will become uncontrollable. It is important, therefore that any volume of material above 500 ml should either be used immediately or placed in a plastic roller tray to increase the surface area to dissipate the heat. As a general rule mix quantities should be limited to amounts which can be applied within 20-30 minutes at 20°C.

Application

The mixed system can be applied either by brush or roller. The working temperature required is between 15°C and 25°C with the humidity less than 70%. The recommended application thickness is 300 - 500 microns, which it is possible to achieve in one coat (500µ on a flat surface and 300µ on a vertical surface). However, the optimum thickness is the minimum required to achieve opacity and coherence without splitting or sagging. After application the surface should be allowed to cure until it is almost tack free (i.e. when touched, it leaves a slight finger print but is not 'sticky'). The laminate should then be laid up onto the CR 3400 as soon as possible after this stage, but in any case within a limit of 24 hours from application. Temperature should be maintained between 20°C and 25°C throughout this period, with humidity less than 70%. As a guide, at 20°C the CR 3400 can be laminated onto after approximately 5 hours.

For applications below the waterline (or where the component will be immersed in water) users **must** contact Technical Services for advice, prior to application of the product.

Cure Schedule

The minimum time before demoulding will depend on the cure schedule of the associated laminate. However, regardless of laminating system, it is recommended that demoulding does not occur before 16 hours. CR 3400 should be allowed a minimum of 7 days if left solely at ambient temperature before it can be considered to be adequately cured. An elevated temperature post-cure of the associated laminate will reduce the cure time of the CR 3400 system.

Release Agents

Due to the excellent adhesive qualities of epoxy resins, care must be taken with regard to mould preparation. The mould release systems which have been used successfully with CR 3400 and are recommended for mould release are Freekote FRP and Freekote 44.

These are high gloss finish mould releases and provide excellent results if the manufacturers instructions are followed. They are also particularly easy to use and quick to set up. The following mould releases may also be suitable, but users should evaluate them carefully on their particular mould surfaces:

1. 4 coats of hard wax (bees wax or Simonize original wax) allowing time for each coat to dry and be polished before application of the next coat. This should be followed by two coats of PVA release agent.
2. 6 to 12 coats of Polywax liquid wax, allowing time for each coat to dry and be polished before application of the next coat.

Surface Finish

CR 3400 is designed to provide a smooth, base for the application of various paint schemes. It is not recommended that the CR 3400 is left unpainted since it will yellow quickly on exposure to UV light. On demoulding, the CR 3400 surface should be wiped with a fast evaporating solvent (e.g. SP Solvent A) to remove any traces of mould release, sanded to key the surface, and then painted as per the paint manufacturer's recommendations.

Properties

Component Properties		
	Resin	Standard Hardener
Mix Ratio (by weight)	100	30
Viscosity @ 15°C (cP)	10230	1650
Viscosity @ 20°C (cP)	6730	1050
Viscosity @ 25°C (cP)	4340	660
Viscosity @ 30°C (cP)	2790	410
Shelf Life (months)	12	24
Colour (Gardner)	white	7
Mixed Colour	-	off-white
Component Dens. (g/cm ³)	1.698	1.055
Mixed Density (g/cm ³)	-	1.550
Hazard Definition	Xi, N	Xn

Working Properties vs. Temperature				
	Resin / Standard Hardener			
	15°C	20°C	25°C	30°C
Initial Mixed Viscosity (cP)	7655	4780	2930	1830
†Pot Life - 500g Mix in Air (hrs:mins)	-	1:00	-	0:45
Sag Resistance (µm)	550	400	280	200
†Tack-off Time (hrs:mins)	5:50	5:00	4:20	3:40
†Latest Overcoating Time (hrs:mins)	6½	24	16	12
Min. Rec. Thickness (µm)	300	300	300	300
Prepreg Compatibility	Contact Technical Services			

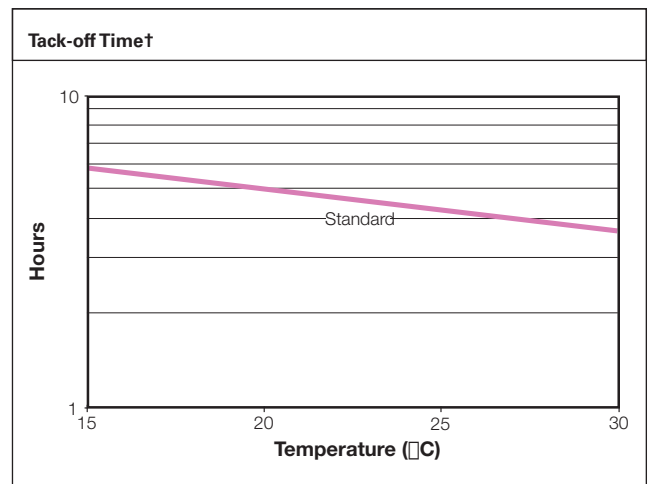
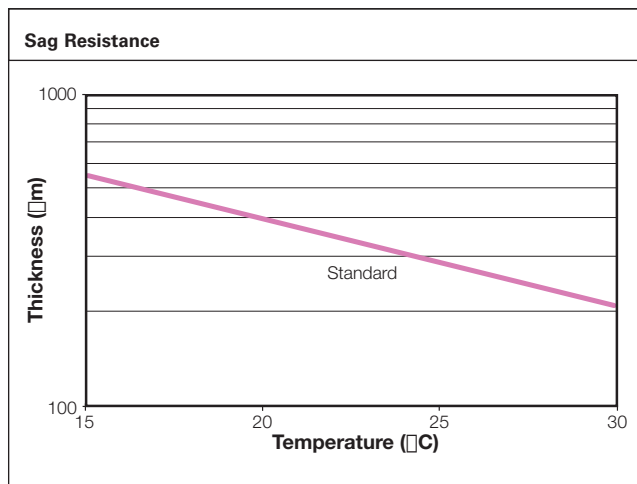
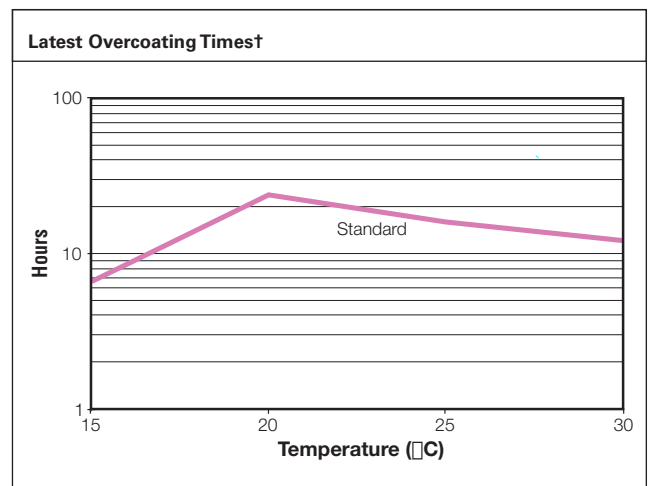
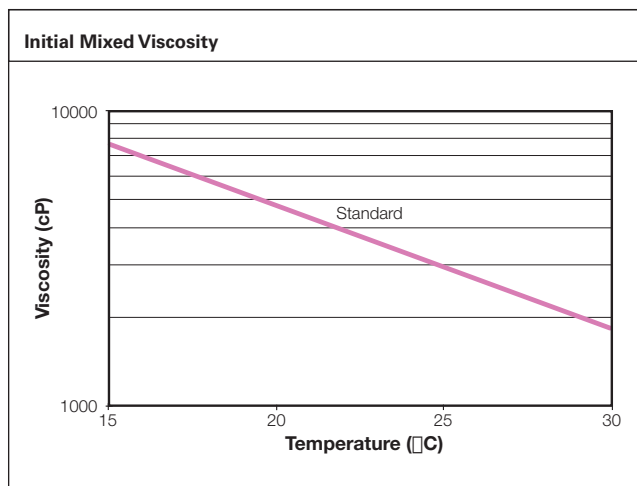
Notes: For an explanation of test methods used see 'Formulated Products Technical Characteristics'.

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.

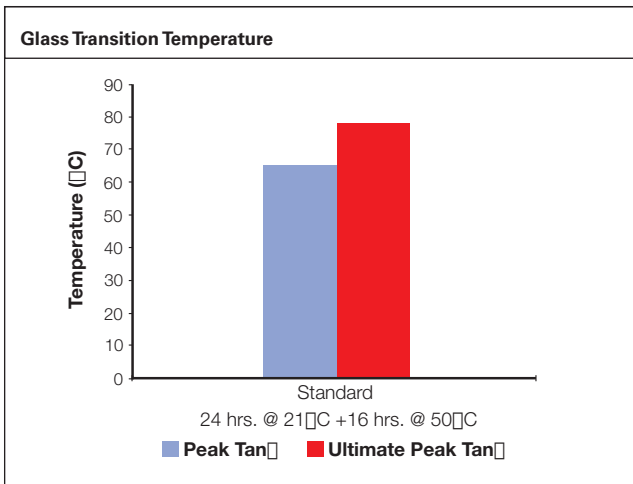
Properties (cont'd)

Cured System Properties	
	Cured (28 days @ 21°C)
	Standard Hardener
Tg DMTA (Peak Tan δ)(°C)	65.4
Tg Ult - DMTA (°C)	78.4
ΔH - DSC (J/g)	0
Tg1 - DMTA (°C)	52.4
Cured Density (g/cm ³)	1.540
Total Linear Shrinkage (%)	0.8
Barcol Hardness	38
Yellowing Index (ΔYI)	34
Approx. Cover. (@200μm) (m ² /mixed kg)	3.2
Approx. Cover. (@300μm) (m ² /mixed kg)	2.15
Approx. Cover. (@300μm) (g/m ²)	465
Strain to Fail on Laminate (%)	1.6
Water Soak Blister Rating	15



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Properties (cont'd)



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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 and Safety Phrases

Resin

R 36/38, 43, 51/53
S 23, 24, 26, 28, 37/39, 57

Standard Hardener

R 20/22, 36/38, 43
S 9, 24, 26, 37



Transport & Storage

The CR 3400 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 for both materials will result in a shelf life of six months for the resin and two years for the hardener. 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. The hardener, in particular, will suffer serious degradation if left exposed to air.

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