Technical Datasheet

XCR™
Epoxy Coating Resin

Description

XCR is a special high clarity epoxy developed for demanding visual applications including carbon fibre skinning, board manufacture and wood finishing. It is highly UV resistant and is intended for use where laminates will remain unpainted, showcasing reinforcements like carbon fibre or natural fibres, inlaid graphics or wood grains.

Key Features

- Very clear and UV resistant
- Expels trapped air
- Fast curing
- Tough and hard wearing
- Excellent mechanical properties

Recommended Uses

XCR is a versatile high clarity resin with a good level of UV resistance which can be used for general laminating and also as a coating resin.

These attributes make it popular for a range of applications, including;

- Carbon fibre 'Skinning'
- Overcoating / Surface filling
- Wood coating / Deck finishing
- Surfboard / Sailcraft building
- R/C aircraft wing skinning
- Ski / Snowboard finishing

Suitable for hand layup of glass, carbon, aramid, natural and synthetic fibres.

Compatible with the majority of commercial grade foams: polystyrene, polyurethane, PVC foams and others.

Mechanical Properties

Property	Unit	24h Room temp +16h @60°C
Tg Onset (DMTA)	°C	80.0
Tg Max (DMTA)	°C	80.0
Maximum Tensile Strength	MPa	68.0
Tensile Breaking Strength	MPa	65
Tensile Modulus	GPa	3.4
Maximum Flexural Strength	MPa	117.0
Flexural Breaking Strength	MPa	103.0
Flexural Modulus	GPa	3.2
Compressive Yield Strength	MPa	103.0
Offset Compression	%	14.3
Elongation at Max Strength	%	5.6
Elongation at Break	%	8.5
ILSS	MPa	48.0

Instructions for Use

XCR is a chemical product for professional use. It is essential to read and understand the safety and technical information before use.

Follow the guidelines for safe use outlined in the SDS which include the use of appropriate hand and eye protection during mixing and use.

Mix Ratio

XCR resin can be mixed with the XCR hardener using either volume or weight (recommended).

Mix Ratio 100:41 by Weight

Mix Ratio 2:1 by Volume

When working with any epoxy resin it is essential to mix the resin and hardener at exactly the correct mix ratio. Failure to do so will result in a poor or only partial cure of the resin, greatly reduced mechanical properties and possibly other adverse effects. Under no circumstances add 'extra hardener' in an attempt to speed up the cure time; epoxies do not work in this way.

Mixing Instructions

Weigh or measure the exact ratio of resin and hardener into a straight sided container. Using a suitable flat mixing stick, begin to mix the resin and hardener together to combine them completely.

Spend at least a couple of minutes, mixing the resin and hardener together, paying particular attention to the sides and base of the container.

Remember, any resin that has not been thoroughly combined with hardener will not cure.

Double Potting

Once mixed in one container, it is good practice to transfer the mixed resin into a second container and undertake further mixing of the resin using a new mixing stick. Doing so will eliminate the risk of accidentally using unmixed resin from the bottom or sides of the container.

Pot-Life / Working Time / Cure Time

XCR is a highly reactive resin system and once the resin has been mixed with the hardener, the reaction will start to give off heat which will further accelerate the cure of the resin, especially when the resin is in the mixing pot. Transfer the resin from the mixing pot onto the part as soon as possible to extend the working time and avoid the risk of uncontrollable rapid cure in the mixing pot (known as an exotherm).

As with all epoxies, the pot-life/working time will vary significantly depending on the ambient temperature, the starting temperature of the resin and hardener and the volume of resin mixed.

XCR can be used in ambient temperatures between 15°C (59°F) and 30°C (86°F). For best results, an ambient temperature of at least 20°C (68°F) is recommended and maintained throughout the cure. Ensure that both resin and hardener containers are within this temperature range before use. High humidity environments should also be avoided when using the resin.

The table below gives an indication of pot-life and cure properties at a range of different ambient temperatures.

Property	20°C (68°F)	30°C (86°F)
Pot-Life 150g Mixed	8 min	4min
Overcoat Time	02h 50	01h 30
Initial Cure*	08h 30	04h 30

*Point where resin has achieved sufficient strength to become stable

Overcoating (Building Up Layers)

When using XCR for carbon fibre 'skinning' or to build up a thick coat of resin over any part or material it is recommended to build up multiple layers of resin. Subsequent layers should be applied once the previous application has firmed up to a firm but tacky state. Applying additional layers at this 'overcoat time' (or 'B stage') means that applications can be undertaken without any surface preparation as the resin will chemically cross link to the resin beneath.

The table above indicates the approximate 'overcoat time' when a new layer of resin should be applied over the previous layer although the status of the resin should be checked beforehand. The resin should be relatively firm but soft enough to indent with a fingernail and still have a slight tack to the surface.

If the resin exceeds the 'overcoat time' and reaches its 'tack-free' point then it cannot be over-coated without first being treated with a key. The resin should be allowed to cure for at least 9hrs (at 20°C) and then keyed with a 120grit abrasive paper to facilitate a mechanical bond.

See notes below for important advice relating to post-curing of 'skinned' parts.

Full Cure / Post-Cure

As with most epoxy systems, when cured in normal ambient temperatures, full cure is not reached for several days. Although parts will be handleable after around 9hrs (at 20°C), full mechanical properties will take at least 14 days to develop (at 20°C). Where possible, avoid exposing the cured resin to full service rigours for at least this time. To achieve full mechanical properties, a higher heat deflection temperature and a harder, more colour-stable laminate, an elevated temperature post-cure is highly recommended. During post-cure, the resin will initially soften before it hardens further and so it is recommended to leave moulded parts in their mould during post cure to ensure that they are fully supported. Skinned or over-laminated parts will not require supporting during post-cure.

Having allowed the laminate to cure fully at room temperature for at least 24hrs, post cure for 6hrs at 70°C (or longer at lower temperatures) to achieve full properties.

For best results exposure to UV should be limited during the cure cycle. Resin shielded from high levels of UV for at least 7 days whilst curing will obtain greater UV resistance and mechanical properties.

Post-Curing Skinned or Over-laminated Parts

When following the 'skinning' process of over-laminating parts with carbon fibre or other reinforcements, it is **STRONGLY** recommended to post-cure parts **BEFORE** flatting and polishing them as post-curing will cause some sinking of the resin surface.

Once post-cured, this fully cured surface can be flatted and polished for a perfect durable finish.

Exposure to Water

Do not allow the resin to be exposed to water until it has reached its initial cure (at least 24hrs at 20°C).

Where XCR is cured with an open face exposed to the air, the very top surface of the resin may remain reactive to water after curing. For applications where the cured resin may be exposed to water, this reaction can be avoided by polishing the surface of the cured resin using a cutting/polishing compound before exposure to water. If unpolished resin is exposed to water and becomes hazy/cloudy on the surface, this can easily be removed by polishing with a polishing/cutting compound, restoring full gloss and also preventing any future susceptibility to water.

Transport and Storage

Resin and hardener should be kept in tightly seal containers during transport and storage. Both the resin and hardener should be stored in ambient conditions of between 20°C (68°F) and 25°C (77°F).

When stored correctly, the resin and hardener will have a shelf-life of 12 months. Although it may be possible to use the resin after a longer period, a deterioration in the performance of the resin will occur, especially in relation to clarity and cure profile.

Pay particular attention to ensuring that containers are kept tightly sealed. Epoxy hardeners especially will deteriorate quickly when exposed to air.

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