

CRYSTIC GELCOAT 14PA

High Performance Vinylester Brush Tooling Gelcoat

Introduction

Crystic Gelcoat 14PA is a pre-accelerated brush gelcoat specially formulated from a urethane modified, vinyl ester base resin and is available in a restricted range of colours. The information contained in this leaflet also applies to pigmented versions.

Applications

Crystic Gelcoat 14PA is designed for use in the manufacture of high quality, FRP composite tooling.

Features and Benefits

Crystic Gelcoat 14PA is heat resistant with high impact strength and good resistance to chemical attack. It is extremely resilient and can be polished to a high gloss. With its unique combination of properties, Crystic Gelcoat 14PA can help to overcome the problems of surface defects often encountered in FRP composite tooling. It is particularly effective against a phenomenon which has come to be known as 'water marking'. This manifests itself after first use of the mould as follows:

- combinations of gloss and matt areas in patches on the mould surface
- surface undulations caused by shrink-back, often following the line of brush marks
- a permanent defect which returns after apparent rectification and removal

Crystic Gelcoat 14PA also reduces general reinforcement print-through.

Formulation

Crystic Gelcoat 14PA should be allowed to attain workshop temperature (18° - 20°C) before use. Stir well by hand, or with a low shear mixer to avoid aeration, and then allow to stand to regain thixotropy. The air drying properties of the base resin mean that a skin may form on the surface of the gelcoat if it is left uncovered. Once weighed out, therefore, it should be kept in covered containers until it is used. Crystic Gelcoat 14PA requires only the addition of catalyst to start the curing reaction. The recommended catalyst is Butanox M50 (or other equivalent catalyst) which should be added at 2% into the gelcoat (please consult our Technical Service Department for advice, if other catalysts are to be used). The catalyst should be thoroughly incorporated into the gelcoat, with a low shear mechanical stirrer where possible.

Pot Life

Temperature	Pot Life in Minutes
15°C	29
20°C	22
25°C	14

The gelcoat, mould and workshop should all be at, or above, 15°C before curing is carried out.

Application

Crystic Gelcoat 14PA is a tooling gelcoat and the application should be controlled at 0.5-0.6mm wet film thickness. As a guide, approximately 500-750g/m² of gelcoat mixture (depending on pigment) will give the required thickness when evenly applied. This will also allow for any rubbing down which may be necessary during the life of the mould. Due to the air drying nature of its base resin, Crystic Gelcoat 14PA cures to an almost tack-free surface. This has no adverse affect on the adhesion of the backing laminate.

Additives

Crystic Gelcoat 14PA is supplied in a restricted range of colours. This eliminates the potential for mixing errors with small quantities of pigment paste. The addition of fillers or pigments can adversely affect the durability of the mould, in use.

Recommended Testing

It is recommended that customers test all pigmented gelcoats before use under their own conditions of application to ensure the required surface finish is achieved.

Typical Properties

The following tables give typical properties of Crystic Gelcoat 14PA when tested in accordance with appropriate SB, BS EN or BS EN ISO test methods.

Property		Liquid Gelcoat
Appearance		Yellowish, cloudy
Viscosity @ 25°C		thixotropic
Specific Gravity @ 25°C		1.07
Acid Value	mgKOH/g	4.9
Volatile Content	%	47
Stability in the dark @ 20°C	months	3
Gel time @ 25°C using 2% Catalyst M (Butanox M50)	minutes	10

Property		Fully cured *Gelcoat (unfiled casting)
Barcol Hardness (model GYZJ 934-1)		40
Water Absorption 24 hrs @ 23°C	mg	18
Deflection Temperature under load† (1.80 MPa)	°C	100
Elongation at Break	%	3.5
Tensile Strength	MPa	78
Tensile Modulus	MPa	3000

* Curing Schedule - 24 hrs @ 20°C, 3 hrs @ 80°C

† Curing Schedule - 24 hrs @ 20°C, 5 hrs @ 80°C, 3 hrs @ 120°C

Post Curing

For optimum life, a mould constructed using Crystic Gelcoat 14PA should be fully cured before being put into use. This can be achieved by placing the mould in an oven at 40°C for 30 hours. If this is not practical, the mould should be left in warm conditions (20°C) for 2-3 weeks prior to use. Where a mould is likely to experience severe conditions (eg due to high exotherm temperatures within backing laminates), it should be post cured at an elevated temperature. Contact our Technical Service department for advice.

Mould Release System

When a new mould is manufactured, traces of residual monomer (styrene) remain within the tooling gelcoat. Although post curing at 80°C will reduce this to an insignificant level, exposing a new mould to this temperature is not always practical or desirable. The first release from a new mould is, therefore, likely to be the most difficult, particularly if a mould which is not post cured is subjected to elevated temperatures during its initial use. These temperatures could arise from the exotherm of the laminate contained within the mould, or from the mould itself being passed through a heated curing area during use. The following procedure was developed to combat release problems on new moulds manufactured and cured at workshop temperature (18°C - 20°C). It demonstrates an excellent release performance on new moulds and is equally effective on moulds of any age:

1. Before first use, allow the mould to mature for a minimum of 7 days at 18°C or above.
2. Clean the mould thoroughly with Frekote PMC.
3. Apply 2 coats of Frekote FMS (mould sealer), allowing a minimum of 10 minutes between coats.
4. Apply 4 coats of Frewax, allowing a minimum of 10 minutes between coats.
5. Optional - apply 1 coat of a hard wax such as Mirroglaze or Polywax. This will reduce any tendency to de-wet or pre-release when the mould is used.
6. After the first release, use a masking tape test to check that the release agent remains on the mould surface. If so, apply 1 coat of Frewax or a hard wax. If not, repeat steps 2 to 4.
7. Continue as 6 until the release performance becomes predictable and easy then re-apply 1 coat of release agent as and when required.

Storage

Crystic Gelcoat 14PA should be stored in its original container and out of direct sunlight. It is recommended that the storage temperature should be less than 20°C where practical, but should not exceed 30°C. Ideally, containers should be opened only immediately prior to use.

Packaging

Crystic Gelcoat 14PA is supplied in 25 kg and 225 kg containers.

Health and Safety

Please see separate Material Safety Data Sheet