

CRYSTIC 2-414PA

Introduction

Crystic 2-414PA is a pre-accelerated, thixotropic polyester resin with low styrene emission. Its rapid wet-out, low exotherm and fast hardening characteristics make it ideal for thick multi-layer laminates in spray or hand - lay applications. Crystic 2-414PA is recommended for boat building and general moulding applications where a fast mould turn round is required. During the laminating phase, styrene emissions from Crystic 2-414PA are considerably reduced, compared with a normal resin. Levels significantly lower than current or proposed legislation can be attained. This reduction in styrene emission is achieved with no loss of interlaminar adhesion.

Approvals

Crystic 2-414PA is approved by Lloyd's Register of Shipping for the construction of craft under their survey. It also meets the requirements of BS 3532 : 1990 : Type A

Product Characteristics

FORMULATION

Crystic 2-414PA should be allowed to attain workshop temperature (18°C - 20°C) before use. It needs only the addition of a catalyst to start the curing reaction. The recommended catalyst is Catalyst M (or Butanox M50). The catalyst should be added at 1% or 2% into the resin and thoroughly dispersed, shortly before use. The geltime of the resin can be approximately determined from the table below.

POT LIFE

Parts of Catalyst M to 100 Parts Resin	1.0	2.0
Pot life in Minutes at 15°C	65	43
Pot life in Minutes at 20°C	39	32
Pot life in Minutes at 25°C	28	23

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

ADDITIVES

The addition of certain pigments, fillers or extra styrene may adversely affect the properties of Crystic 2-414PA. Users should seek advice from our Technical Service Department before making any additions.

POST CURING

Satisfactory laminates for many applications can be made from Crystic 2-414PA by curing at workshop temperature (20°C). Some increase in properties may be obtained by post curing. The laminate should be allowed to cure for 24 hours at 20°C, and then be oven cured for 16 hours at 40°C.

TYPICAL PROPERTIES

The following tables give typical properties of Crystic 2-414PA when tested in accordance with BS 2782.

Property		Liquid Resin
Appearance		Pinkish mauve
Viscosity @ 25°C 37.35 sec ⁻¹	poise	4.6
Viscosity @ 25°C 4500 sec ⁻¹	poise	2.5
Specific Gravity @ 25°C		1.10
Volatile Content	%	40
Acid Value	mg KOH/g	16
Stability in the dark @ 20°C	months	3
Geltime @ 20°C using 1% Catalyst M (or Butanox M50)	minutes	39

Property		Fully Cured* Resin (unfilled casting)
Barcol Hardness (Model GYZJ 934-1)		46
Deflection Temperature under load † (1.80 MPa)	°C	61
Water Absorption 24 hours at 23°C	mg	15
Tensile Strength	MPa	53
Tensile Modulus	MPa	3700
Elongation at Break	%	2.0
Specific Gravity @ 25°C		1.20
Volumetric Shrinkage	%	8.2

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

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

Property		C.S.M** Laminate
Glass Content	%	26.9
Tensile Strength	MPa	89
Tensile Modulus	MPa	6900
Elongation at Break	%	1.5
Flexural Strength	MPa	166
Flexural Modulus	MPa	6400

** Made with 4 layers 450g/m² PB CSM

Curing schedule - 24hrs @ 20°C, 16hrs @ 40°C

Typical interfacial properties of a Crystic 2-414PA chopped strand mat laminate

Property	Test Method	Normal *	Resin-rich**
Single lap shear strength MPa	BS 4994 Appendix C	4	4
Short beam shear strength MPa	BS 2782 Method 341A	18†	20†
Fracture surface energy J/m ²	Scott Bader test	250	230

The laminate was post-cured for 24hrs at 20°C, followed by 16hrs at 40°C

- * 24hrs delay between 2 lay-ups of 2 x 450 g/m² chopped strand mat
- ** 2 x 450 g/m² CSM. Allowed to gel. Then 700 g/m² pure resin interface. Then 24hrs delay. Then 2 x 450 g/m² CSM.
- † Data obtained using 5 days delay instead of 24hrs

Storage

Crystic 2-414PA should be stored in the dark in suitable closed containers. 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. Where they have to be stored outside, it is recommended that they are kept in a horizontal position to avoid the possible ingress of water.

Packaging

Crystic 2-414PA is supplied in 25kg and 200 kg containers. Bulk supplies can be delivered by road tanker.

Health & Safety

Please see separate Material Safety Data Sheet.

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