

CRYSTIC[®] 2-406PA

Introduction

Crystic 2-406PA is a pre-accelerated, thixotropic polyester resin, with low styrene emission. Its rapid impregnation of glass fibre reinforcements, and low exotherm temperature, make it ideal for multi-layer laminates, in spray or hand lay applications.

Crystic 2-406PA is recommended for the manufacture of boat hulls, vehicle bodies and industrial mouldings.

During the laminating phase, styrene emissions from Crystic 2-406PA 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.

A colour change mechanism is included in the formulation. When catalyst is added the resin will change colour from a pale blue to green, this will then clear as the resin cures.

Approvals

Crystic 2-406PA 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

Formulation

Crystic 2-406PA 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 Crystic 2-406 PA	1.0	2.0
Pot life in Minutes at 15°C	36	23
Pot life in Minutes at 20°C	22	16
Pot life in Minutes at 25°C	16	11

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 2-406PA. 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 2-406PA by curing at workshop temperature (20°C). For optimum properties and long term performance, however, laminates should be post cured before being put into service. The laminate should be allowed to cure for 24 hours at 20°C, and then be oven cured for 3 hours at 80°C or 16 hours at 40°C.

Typical Properties

The following tables give typical properties of Crystic 2-406PA when tested in accordance with BS 2782.

Property		Liquid Resin
Appearance		Pale Blue
Viscosity at 25°C 37.35 sec ⁻¹	poise	4.4
Viscosity at 25°C 4500 sec ⁻¹	poise	2.5
Specific Gravity at 25°C		1.10
Volatile Content	%	41
Acid Value	mg KOH/g	16
Stability at 20°C	months	3
Geltime at 25°C using 1% Catalyst M (or Butanox M50)	Minutes	16
Property		Fully Cured* Resin (unfilled casting)
Barcol Hardness (Model GYZJ 934-1)		45
Deflection Temperature under load † (1.80 MPa)	°C	62
Water Absorption 24 hours at 23°C	mg	14
Tensile Strength	MPa	54
Tensile Modulus	MPa	3700
Elongation at Break	%	1.7
Specific Gravity at 25°C		1.20
Volumetric Shrinkage	%	8.35

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

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

Property		C.S.M** Laminate	
		P.B	E.B
Glass Content	%	29.3	27.4
Tensile Strength	MPa	113	74
Tensile Modulus	MPa	7500	6900
Elongation at Break	%	1.8	1.3
Flexural Strength	MPa	224	196
Flexural Modulus	MPa	6900	6800

** Made with 4 layers 450g/m CSM
Curing schedule - 24hrs at 20°C, 16hrs at 40°C

Typical interfacial properties of a Crystic 2-406PA chopped strand mat laminate

Property	Test Method	Normal *	Resin-rich**
Unnotched Charpy impact strength kJ/m ²	ISO 179	72	70
Single lap shear strength MPa	BS 4994 Appendix C	3.8	3.9
Short beam shear strength MPa	BS 2782 Method 341A	22 (18.6†)	21 (19.4†)
Fracture surface energy J/m ²	Scott Bader test	350	300

*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 2-406PA 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 2-406PA is supplied in 25kg and 200 kg containers. Bulk supplies can be delivered by road tanker.

Health and Safety

Please see separate Material Safety Data Sheet.

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