

CRYSTIC[®] 196E

Orthophthalic Polyester Resin for Use in Hot Climates

Introduction

Crystic 196E is an orthophthalic polyester resin designed for use in hot climates.

Applications

Crystic 196E is recommended for the manufacture of mouldings for land transport, building, marine and industrial applications. It is a versatile resin suitable for use in hand and spray lay-up, filament winding, pultrusion, cold press moulding and resin injection processes.

Features and Benefits

The handling characteristics of Crystic 196E are especially suited to use in high ambient temperatures. Fully cured mouldings made with Crystic 196E have excellent mechanical and electrical properties, with good rigidity, dimensional stability and impact resistance. The low levels of residual styrene in fully cured Crystic 196E makes it suitable for use where non-toxic, non - tainting laminates are required.

Approvals

Crystic 196E is approved by Lloyd's Register of Shipping for use in the construction of craft under their survey.

Formulation

Crystic 196E should be allowed to attain workshop temperature (18°C - 25°C) before use. It requires the addition of a catalyst and an accelerator to start the curing reaction.

The recommended accelerator is Accelerator E which must be thoroughly dispersed in the resin. This mix will remain usable for approximately one month at ambient temperature (25°C). Shortly before use, the catalyst should be added. The recommended catalyst is Catalyst M (or Butanox M50) which should be added at 2% into the accelerated resin mix, and thoroughly dispersed. For low taint applications, the catalyst should be Catalyst 0 (or Interlox LA3), also at a 2% addition. It should be noted that resin which has been accelerated for several days may have a shorter pot life than freshly accelerated resin.

NB. Catalyst and accelerator must not be mixed directly together as they can react with explosive violence.

The amount of Accelerator E can be approximately determined from the table overleaf.

Pot Life

Catalyst with 2% Catalyst M

Parts of Accelerator E to 100 Parts Resin	1.0	2.0	3.0	4.0
Pot life in minutes at 20°C	40	25	20	18
Pot life in minutes at 25°C	30	20	17	15
Pot life in minutes at 30°C	24	18	14	12

The resin and the workshop should be at, or above, 20°C before curing is carried out.

Additives

Crystic 196E may be pigmented by the addition of up to 5% Crystic Pigment Paste. The addition of Crystic Pregel to Crystic 196E will enable its use as a barrier coat. Up to 40% of Pregel 17 or, where heat resistance is important, Pregel 27 may be used. Crystic 196E may be modified with Crystic Prefil F to produce low fire hazard laminates. The addition of certain pigments, fillers or extra styrene may adversely affect the food taint, toxicity and chemical resistant properties of Crystic 196E. Customers should therefore satisfy themselves that any additions made will give the performance required.

Chemical Resistance

A useful guide to the chemical resistance of fully cured Crystic 196E laminates in over 200 chemical environments can be obtained by referring to Crystic 196 in the current edition of Technical Leaflet 145.3 - Safe Chemical Containment.

Typical Properties

The following tables give typical properties of Crystic 196E when tested in accordance with BS 2782.

Property		Liquid Resin
Appearance		Clear, yellowish
Viscosity at 25 °C 8.73 sec ⁻¹	Poise	9
Specific Gravity at 25 °C		1.12
Volatile Content	%	33
Acid Value	Mg KOH/g	22
Stability at 25 °C	months	6
Geltime at 25 °C using 2% Catalyst M (or Butanox M50), 4% Accelerator E	minutes	15
Property		Fully Cured* Resin (unfilled casting)
Barcol Hardness (Model GYZJ 934-1)		45
Deflection Temperature under load † (1.80 MPa)	°C	72
Water Absorption 24 hours at 23°C	mg	17
Tensile Strength	MPa	69
Tensile Modulus	MPa	3800
Elongation at Break	%	2.3
Refractive Index n ²⁰		1.560
Dielectric Loss (tan δ at 10000 Hz)		0.006
Dielectric constant (at 1000Hz)		3.0
Residual Styrene Content **	%	0.01

* Curing schedule – 24 hours at 20 °C, 3 hours at 80°C

† Curing schedule – 24 hours at 20 °C, 5 hours at 80°C, 3 hours at 120 °C

** Measured by BPF Approved Method for Freight Containers

Property		C.S.M** Laminate
Glass Content	%	30
Tensile Strength	MPa	102
Tensile Modulus	MPa	6700
Elongation at Break	%	1.6
Flexural Strength	MPa	171
Flexural Modulus	MPa	6600

** Made with 4 layers 450g/m² PB CSM
Curing schedule – 24 hours at 20°C, 16 hours at 40°C

Post Curing

Satisfactory laminates for many applications can be made with Crystic 196E by curing at workshop temperatures (20 °C). However, for optimum mechanical and heat resistant properties, laminates must be post cured before being put into service. Mouldings should be allowed to cure for 24 hours at 20°C and then be oven cured for 3 hours at 80°C.

For low taint applications, mouldings should be allowed to cure for 24 hours at 20°C and then be oven cured for 3 hours at 85°C. This should be followed by wet steam cleaning for at least one hour. If the moulding is of a suitable shape, it can be filled with hot water (80°C) for 2 hours instead of steam cleaning. The water should contain a perfume-free detergent, and several batches of clean water should be used for rinsing.

Storage

Crystic 196E 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.

Packaging

Crystic 196E is supplied in 225kg steel containers. For transportation purposes, Crystic 196E is Class 3.3 in IMCO code and UN No. 1866; ADR No. 31 (c). Packing Group 3; Tremcard No. 30G35.

Health & Safety

Please see separate Material Safety Data Sheet.

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