

CRYSTIC[®] 397

Isophthalic NPG Polyester Resin for Critical Applications

Introduction

Crystic 397 is an isophthalic/neopentyl glycol unsaturated polyester resin, with a high heat deflection temperature an excellent water and chemical resistance. It is recommended for the fabrication of high performance laminates for critical applications in aggressive environments. Crystic 397 is suitable for contact moulding and filament winding processes. A pre-accelerated, thixotropic version of the resin is available as Crystic 397PA.

Surfaces in contact with aggressive environments should be made resin rich by incorporating a surfacing tissue, or a layer of Crystic Gelcoat 69PA. Alternatively, fabric backed polypropylene (e.g. Celmar[®]) or certain grades of uPVC can be used, backed with glass fibre reinforced Crystic[®]397. Performance figures for fully cured Crystic 397 laminates, in more than 200 chemical environments are shown in Technical leaflet No. 145.3, "Safe Chemical Containment".

Approvals

Crystic 397 is approved in the UK by Wine Laboratories Ltd for vessels to contain wines and sherries up to 25% alcohol content. Crystic Gelcoat 69PA backed with Crystic 397 is approved in the UK by the WRC (Water Byelaws Advisory Service) for use in contact with potable water.

Formulation

Crystic 397 should be allowed to attain workshop temperature (18°C - 20°C) before use. It requires the addition of accelerator and catalyst to start the curing reaction. The recommended accelerators are Crystic Accelerator E and Crystic Accelerator G. The recommended catalysts are Andonox[®] KP9 or, where mouldings are to be used with foodstuffs Norox[®] MEKP-925H.

N.B. For applications involving foodstuffs, thorough catalyst dispersion is vital, as any undercure in the laminate is a potential source of tainting.

The required amount of accelerator must be stirred into the resin and mixed in thoroughly before use. Accelerated resin can be stored for some time in closed drums, but it is recommended that it be used as soon as possible to avoid lengthening of the geltime. Catalyst should be added carefully with stirring just before the resin is required. Some recommended formulations are given in Table 1:

Table 1: Recommended formulation for Crystic 397.

Component	Parts by weight
Crystic 397	100
Catalyst Andonox [®] KP9 or Norox [®] MEKP 925 H	1.0 – 3.0
Crystic Accelerator E or G	1.0 – 4.0

N.B. Peroxide catalysts are highly reactive and may decompose with explosive violence, or cause fires, if they come into contact with flammable materials, metals or accelerators. For this reason they must never be stored in metal containers or be mixed directly with accelerators.

The temperature and the amount of Crystic Accelerator E or G, and the amount of Catalyst M or O control the gel time of the resin formulation. Users are urged to carry out their own geltime tests to ensure that the pot life is suitable for their application. The resin, mould and workshop should all be at, or above, 15°C before curing is carried out. Scott Bader (Pty) Ltd. will not be liable for problems caused by use at lower temperatures than recommended.

Additives

Crystic 397 may be pigmented by the addition of up to 5% Crystic Pigment Paste. Certain pigments, fillers or extra styrene can adversely affect the food taint, toxicity and chemical resistant properties of Crystic 397. Customers should therefore satisfy themselves that any additions made will give the performance required.

Post Curing

Satisfactory laminates for many applications can be made with Crystic 397 by curing at workshop temperature (20°C). However, for optimum chemical, water 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. Mouldings that are to be used with foodstuffs should be allowed to cure for 24 hours at 20°C and then be oven cured for a minimum of 3 hours at 85°C. They should be thoroughly wet-steam cleaned for at least one hour prior to use. If wet-steam cleaning is not practical, suitably shaped mouldings can be filled with hot water (60°C- 80°C) containing non-perfumed detergent. After 2 hours, they should be emptied and thoroughly rinsed with several batches of clean hot water. These precautions are essential to avoid the tainting of foodstuffs.

Typical Properties

The following tables give typical properties of Crystic 397 when tested in accordance with BS 2782.

Property	Units	Liquid Resin
Appearance		Yellow, clear, bit free
Viscosity at 25°C Brookfield RVT sp.3 at 100rpm	centipoise	600
Specific Gravity at 25°C		1.05
Volatile Content	%	57
Acid Value	mg KOH/g	13
Stability at 20°C	months	6 at 25°C
Geltime at 25°C using: 100pbw Crystic 397 2pbw Andonox® KP9 catalyst 4pbw Crystic Accelerator E	minutes	21

Property	Units	Fully cured* resin (unfilled casting)
Barcol Hardness (Model GYZJ 934-1)		44
Deflection Temperature under load † (1.80 MPa)	°C	117
Water Absorption 24 hours at 23°C	mg	19
Tensile Strength	MPa	60
Tensile Modulus	MPa	3300
Elongation at Break	%	2.5
Specific Gravity at 25°C		1.16
Volumetric Shrinkage	%	9.5

*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

Storage

Crystic 397 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 drums be kept in a horizontal position to avoid the possible ingress of water. Wherever possible, containers should be stored under cover.

Packaging

Crystic 397 is supplied in 25kg and 225kg containers.

Health and Safety

Please see the applicable Material Safety Data Sheets, depending on the curing system used.

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