

CRYSTIC[®] 783

High Strength Isophthalic Polyester Resin for Closed Mould Use

INTRODUCTION

Crystic[®] 783 is an isophthalic, unsaturated polyester resin for use in structural, high performance applications. It is designed for use in Resin Transfer Moulding (RTM) and can also be used in other resin injection or vacuum assisted techniques. It can also be used in closed mould techniques such as cold press or Prestovac. Laminates produced using **Crystic[®] 783** have high mechanical strength.

VARIANTS

Variants of **Crystic[®] 783** are available.

- **Crystic[®] 783 LV** - a low viscosity version which allows the resin to be filled up to 40 parts per hundred of filler. The resin mix can be easily injected.
- **Crystic[®] 783 HV** - a higher viscosity version but lower than a traditional hand lay up resin.
- **Crystic[®] 783 LR** - a lower reactivity version for the manufacture of larger mouldings with high glass content where a longer fill time is required.

APPROVALS

Crystic[®] 783 LR is approved by Lloyd's Register of Shipping for use in the construction of craft under their survey.

FORMULATION

Crystic[®] 783 can be cured using Accelerator G and either Catalyst M (Curox[®] M200 or Butanox[®] M50) or AAP (acetylacetone peroxide - Curox[®] A200 or Trigonox[®] 44B). However, AAP is usually selected for most applications since it gives a faster mould turn around. An even more efficient cure can be obtained by using Trigonox[®] 524 (acetylacetone peroxide/tert-butyl peroxybenzoate mixture). This catalyst has been specifically developed for RTM applications.

GELTIMES

The geltime of the resin will be determined by the level of accelerator and catalyst used, and the temperature of the workshop and of the mould (if heated). The table below shows typical geltimes for each variant of **Crystic[®] 783**.

Formulation	Temperature	Typical geltime in minutes
Crystic[®] 783 + 2% G + 2% AAP	25°C	7
Crystic[®] 783LV + 2% G + 2% AAP	25°C	5
Crystic[®] 783HV + 1%G + 2% AAP	25°C	10
Crystic[®] 783LR + 0.5% G+ 2% AAP	25°C	50

Table 2 shows how accelerator and catalyst levels affect the geltime (in minutes) of **Crystic[®] 783** at 25°C.

Table 2: Effect of accelerator and catalyst levels on **Crystic[®] 783** geltime at 25°C.

		Addition of AAP		
		1.0%	1.5%	2.0%
Addition of Crystic[®] Accelerator G	1.0%	21.2	15.3	12.4
	1.5%	15.4	10.1	7.9
	2.0%	12.0	8.6	7.1

Table 3 shows the variation in geltime with temperature using 1% **Crystic[®] Accelerator G** and 2% AAP.

Table 3: Effect of temperature on geltime for **Crystic[®] 783** cured using 2% **Crystic[®] Accelerator G** and 2% AAP.

Temperature	Geltime in minutes
25°C	7.1
35°C	2.8
40°C	2.1
50°C	1.1

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.

Curing of these resins should not be carried out at temperatures below 15°C. 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. For geltime information on the variants of **Crystic[®] 783** please consult Scott Bader Technical Service Department.

EXOTHERMS

The exotherm produced during the cure of the resin will depend on the amount and type of accelerator and catalyst used. An increase in the temperature of the mould or the resin will result in a higher peak exotherm. This will also be affected by other factors, such as component thickness and the material from which the mould is constructed. For further recommendations please consult Scott Bader Technical Service Department.

ADDITIVES

If amine co-accelerators, pigments or other additives are to be used, please contact Scott Bader Technical Service Department before proceeding.

POST CURING

For optimum properties the laminates should be allowed to cure for 24 hours at 20°C, followed by a minimum of 3 hours at 80°C.

TYPICAL PROPERTIES

The following tables give typical properties of **Crystic[®] 783** when tested in accordance with BS2782.

Table 4: Typical properties of liquid **Crystic[®] 783** and variants.

Property	Units	Nominal values			
		783	783LV	783HV	783LR
Viscosity at 25°C	poise	2.5	1.3	3.0	2.4
Specific Gravity at 25°C		1.09	1.07	1.09	1.09
Appearance		Yellow	Yellow	Yellow	Yellow
Stability in the dark at 20°C	months	6	6	6	6

Table 5: Typical properties of cured **Crystic[®] 783** (Unfilled casting).

Property	Units	Nominal value	
		†	*
Barcol Hardness (Model GYZ J 934-1)		32	40
Water Absorption 24hrs at 23°C	mg	14.3	19.5
Deflection Temperature under load (1.80 MPa)	°C	71.1	79.6
Specific Gravity at 25°C		1.19	1.19
Elongation at Break at 20°C	%	4.8	3.0
Tensile Modulus	MPa	3217	3802
Tensile Strength	MPa	65.0	73.6
Volumetric Shrinkage	%	8.87	8.79

† Curing Schedule - 24 hrs at 20°C, 16hrs at 40°C

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

Table 6: Typical properties of cured **Crystic[®] 783** (Cured laminate = 1 layer Rovicore 450/B5/450-I).

Property	Units	Nominal value	
		†	*
Glass content	%	21.4	17.2
Tensile Strength	MPa	66.7	63.0
Tensile Modulus	MPa	4917	6374
Elongation at Break	%	1.86	1.36
Flexural Strength	MPa	208.3	213.0
Flexural Modulus	MPa	6802	8124
Notched Izod Impact	J/m	653	640
Charpy Impact	kJ/m ²	54.2	42.6

† Curing Schedule - 24 hrs at 20°C, 16hrs at 40°C

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

Table 7: Typical properties of cured **Crystic[®] 783** (Cured laminate = 3 Layers 450g/m² CFM (Continuous Filament Mat))

Property	Units	Nominal value	
		†	*
Glass content	%	27.5	28.8
Tensile Strength	MPa	92.3	89.8
Tensile Modulus	MPa	6602	7505
Elongation at Break	%	1.88	2.03
Flexural Strength	MPa	168.9	176.0
Flexural Modulus	MPa	6227	6539
Notched Izod Impact	J/m	805	801
Charpy Impact	kJ/m ²	51.6	58.1

† Curing Schedule - 24 hrs at 20°C, 16 hrs at 40°C

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

STORAGE

Crystic[®] 783 and its variants 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 they should be stored under cover.

PACKAGING

Crystic[®] 783 and its variants are supplied in 25kg kegs, 225kg drums, and 1125kg intermediate bulk containers. Bulk supplies can be delivered by road tanker.

HEALTH & SAFETY

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

Technical Leaflet No. 226.7SA

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Before you use this information, kindly verify that this data sheet is the latest version.

All information is given in good faith but without warranty. We cannot accept responsibility or liability for any damage, loss or patent infringement resulting from the use of this information.



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