CRYSTIC® 199

Highly Heat and Chemical Resistant Isophthalic Polyester Resin

Introduction
Crystic 199 is an isophthalic unsaturated polyester resin. It is recommended for use in high performance applications, such as the aircraft industry, where superior thermal and electrical properties are required. Fully cured laminates made with Crystic 199 have excellent chemical and heat resistance. They can withstand long periods (1 year) at temperatures up to 150ºC, and shorter periods at temperatures up to 200ºC, with no serious loss of properties. A preaccelerated version, Crystic 199PA, has the same geltime as given in table 2 but with no added accelerator.

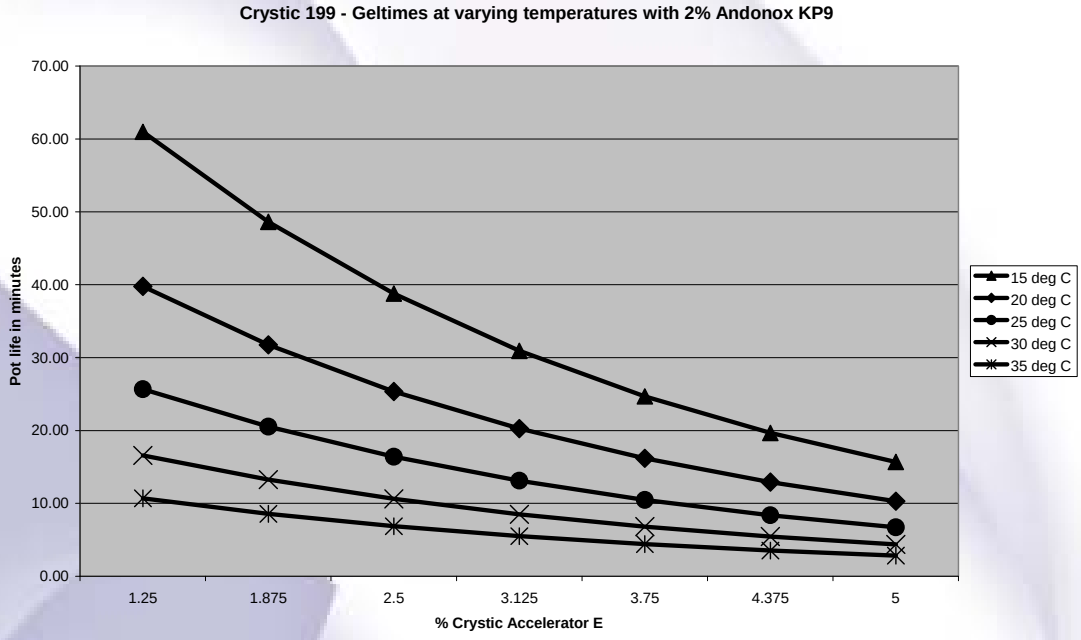
Approvals
Crystic 199 meets the requirements of BS 3532: 1990 Type C, and is approved to DTD 5537 and 5549, Class MC and EC. It also meets the requirements of SABS 1668:1997 for use in underground petrol storage tanks. It carries the SANS 713:2007 mark.

Formulation
Crystic 199 can be used in both hot and cold curing formulations.

Hot Curing
The recommended catalyst is benzoyl peroxide (Benox® C50) which should be added at 2% into the resin. The catalyst must be thoroughly dispersed into the resin, and the catalysed mix will remain usable for approximately 4-6 days at workshop temperature (18ºC - 25ºC). Cure will take place at temperatures between 80ºC and 130ºC, but for most applications 120ºC will be satisfactory. For optimum heat resistant properties, the laminate should be cured at a temperature of 80ºC - 100ºC for half an hour to one hour, and then post cured.

Cold Curing
Crystic 199 should be allowed to attain workshop temperature (18ºC-25ºC) before use. It requires the addition of a catalyst and an accelerator to start the curing reaction.

The recommended catalyst is Norox® KP9. The catalyst should be added at 2% into the resin, and thoroughly dispersed. This mix will remain usable for approximately 8 hours at workshop temperature (18ºC - 25ºC). Shortly before use, the correct amount of Crystic Accelerator E should be stirred into the catalysed resin. The amount of Crystic Accelerator can be approximately determined from the chart below;



Pot Life
Use of Crystic Accelerator E at a constant catalyst level is the best way to control the pot life. The above chart allows the geltime to be predicted for various temperature conditions at 2% Norox® KP9. However, the catalyst type and level also affect the geltime of Crystic 199. The recommended range of formulations is given in Table 1.

Table 1: Recommended formulations for Crystic 199:

Component	Parts by weight
Crystic 199	100
Crystic Accelerator E	1.0 – 5.0
Norox KP9 or Norox MEKP-925H	1.0 – 3.0

Where mouldings are to be used with foodstuffs, Norox MEKP-925H is recommended. This catalyst also gives a longer pot life at a given temperature and can be useful when working at high ambient temperatures.

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 resin, mould and workshop should be at, or above, 15ºC before curing is carried out. Scott Bader (Pty) Ltd. will not be liable for problems caused by use at lower temperatures than recommended.

Additives
For use on large vertical or inclined surfaces, up to 20% of Crystic Pregel may be added to Crystic 199 to give it thixotropic properties. Fillers and pigments can adversely affect the heat, chemical and weather resistance of Crystic 199, so should not be used if optimum properties are required. Customers should satisfy themselves that any additions made will give the performance required.

Post Curing
The post curing temperature will depend on the temperature which the laminate is to withstand. It should be increased in increments of 20ºC to the final operating temperature, with a minimum of five hours post curing time at each 20ºC increase.

Typical Properties
The following tables give typical properties of Crystic 199 when tested in accordance with BS 2782.

Table 2: Typical properties of liquid Crystic 199.

Property	Units	Nominal value
Appearance		Clear, yellowish-brown
Viscosity @ 25ºC 37.35 sec^{-1}	centipoise	700
Specific gravity @ 25ºC		1.10
Volatile Content	%	37
Acid Value	mg KOH/g	27
Stability in the dark @ 20ºC	months	6
Geltime @ 25ºC using 2% Norox KP9, 2% Crystic Accelerator E	minutes	20

Table 3: Typical properties of fully cured* Crystic 199 (Unfilled casting).

Property	Units	Nominal value
Barcol Hardness (Model GYZJ 934-1)		48
Water Absorption 24hrs @ 23ºC	mg	29
Deflection Temperature under load † (1.80 MPa)	ºC	119
Elongation at Break	%	1.7
Tensile Strength	MPa	55
Tensile Modulus	MPa	3300
Specific Gravity @ 25ºC		1.19
Refractive Index n 20/d		1.554
Dielectric Loss (tan δ at 1000Hz)		0.005
Dielectric Constant (at 1000Hz)		3.1

*Curing schedule - 24hrs @ 20ºC, 3hrs @ 80ºC
†Curing schedule - 24hrs @ 20ºC, 5hrs @ 80ºC, 3hrs @120ºC

Storage
Crystic 199 should be stored in the dark in suitable, closed containers. It is recommended that the storage temperature should be less than 20ºC where practical, but should not exceed 30ºC. 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 199 is supplied in 25kg kegs, 225kg drums, and 1125kg intermediate bulk containers. Bulk supplies can be delivered by road tanker.

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

Technical Leaflet No 102.22SA
August 2013

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

SCOTT BADER COMPANY LIMITED

Scott Bader (Pty) Ltd
Reg. No. 93/00466/07
1 Lubex Road,
Hammarsdale
P.O. Box 1539, Hillcrest,
3650. South Africa
Tel: +27 (0) 31 736 8500
Fax:+27 (0) 31 736 8511

Gauteng
Broadacres Business Centre
Cnr Cedar Rd and 3rd A ve
Broadacres, Sandton
Tel: (011) 064 5673

KwaZulu Natal
1 Lubex Road,
Hammarsdale
Tel: (031) 736 8500

Eastern Cape
Freightpak Building
Chevrolet St
Markman Industrial
Port Elizabeth
Tel: (041) 409 783

Western Cape
Unit 4B
Tyger Lake
Niagara Way
Tyger Valley
Cape Town
Tel: (021) 914 6011