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.

FORMULATION

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

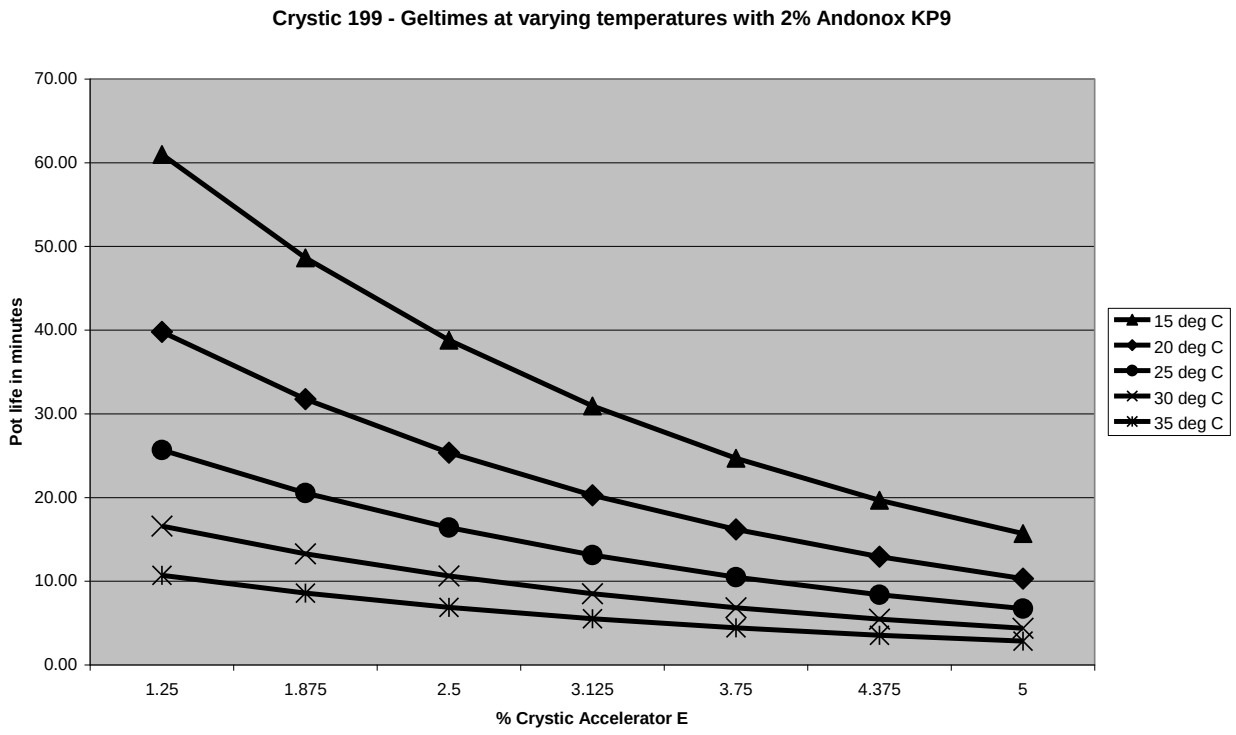
HOT CURING

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 Andonox® 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 E 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% Andonox® 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
Andonox® 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 from date of manufacture when stored in accordance with storage recommendations	months	9
Geltime @ 25ºC using 2% Andonox® 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 between 5°C and 25°C in the original, unopened container in a dry, well ventilated place. Protect from freezing and direct sunlight. Avoid contact with oxidising agents. If stored outside of these recommendations, shelf life will be significantly reduced

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.

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SCOTT BADER

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

Gauteng
11 Belgrade Avenue
Aeroport, Spartan Ext.2
Kempton Park
Tel: (011) 974 7104
Fax: (011) 974 1300

KwaZulu Natal
1 Lubex Road,
Hammarsdale
Tel: (086) 167 3746
Fax: (086) 107 3746

Eastern Cape
Corner Ries & Burman Roads
Deal Party
Port Elizabeth
Tel: (086) 117 3746
Fax: (086) 107 3746

Western Cape
4 Beverly Road
Montague Gardens
Cape Town
Tel: (021) 552 0970
Fax: (021) 552 1031