

CRYSTIC[®] VE671 and VE671PA

Low Viscosity Epoxy Vinyl Ester Resin

Introduction

Crystic VE671 is a low viscosity epoxy vinyl ester resin. It is particularly suitable for contact moulding, filament winding and injection moulding applications. Crystic VE671 has excellent chemical resistance to a wide range of substances, as quoted in the Crystic brochure 'Corrosion Resistant Resins for Chemical Containment and Piping' available from your Scott Bader representative. Under EN13121-2:2003 this resin is rated category 7A.

Formulation

Crystic VE671 requires the addition of an accelerator and a catalyst for curing to take place. Norox[®] MEKP-925H should be used in order to reduce the possibility of foam formation. A specially formulated accelerator, Crystic Accelerator VE is recommended, as shown in the examples in Table 1:

Table 1: Geltimes in minutes of Crystic VE671

■ = combination not recommended.

Catalyst O level		1%			2%		
		1 %	2 %	4 %	1 %	2 %	4 %
Temp	15° C	■	■	26	■	■	16
	25° C	■	35	13	■	18	9
	35° C	28	14	■	18	10	■

Crystic VE671 can also be cured using benzoyl peroxide (BPO) catalysts. This is recommended where the laminate is intended to be in contact with sodium hypochlorite solution. Table 2 gives suggested formulations for working with Benox C50, a 50% phthalate-based BPO powder. It is important to ensure that the accelerator (and inhibitor) is thoroughly mixed into the resin before mixing in the catalyst.

Table 2: Geltimes in minutes of Crystic VE671 using Benox C50

Temperature	Catalyst %	Accelerator D %	Inhibitor TBC 010 %	Geltime in minutes
15°C	2	1.1		35
25°C	2	1.1		20
25°C	2	1.0	0.17	40
25°C	2	1.0	0.63	180
35°C	2	1.0	0.17	35

Versions

Crystic VE671 is available preaccelerated. Crystic VE671PA has similar gel and cure behaviour to the formulation described in Table 1 above. Table 4 gives typical geltimes at a range of temperatures. Note: Low catalyst levels should not be used with this version due to a risk of catalyst exhaustion. Adding more than 2% Norox[®] MEKP-925H catalyst will not appreciably shorten the geltime. Should a lengthened geltime be needed, contact Scott Bader (Pty) Ltd.

Table 3: Geltimes of Crystic VE671PA[†] at varying temperatures.

Catalyst type		Norox MEKP-925H
Catalyst addition		2%
Temperature	15°C	35
	25°C	25
	35°C	12

Typical Properties

Tables 5 to 8 give the typical properties of liquid and solid Crystic VE671 and VE671PA, when tested in accordance with the relevant BS, EN, or ISO test methods.

Table 4: Characteristics of liquid Crystic VE671

Property	Units	Nominal value
Acid Value	mgKOH/g	9 max
Viscosity at 25°C poise [Brookfield RVT]	centipoise	450±50
Colour	Gardner	7 Max
Non Volatile content	%	>58%
Shelf Life	months	6 at 25°C

Table 5: Characteristics of liquid Crystic VE671PA

Property	Units	Nominal value
Colour / Appearance		Purple / Clear
Acid Value	mgKOH/g	Max 8.5
Non Volatile content	%	> 55 %
Viscosity @ 25° C using Brookfield RVT @ 100rpm	centipoise	450±50
Gelttime using 2% Norox MEKP-925H catalyst @ 25° C	Minutes	25
Shelf Life	months	1 at 25°C [†]

Table 6: Characteristics of cured cast Crystic VE671

Property	Units	Nominal value
Tensile Modulus**	GPa	3.3
Tensile Strength**	Mpa	80
Barcol Hardness** (GYZJ 934-1)		35
Deflection Temperature under load*** (1.80 MPa)	°C	100-105
Elongation to Break**	%	4-5
Water Absorption (7 days)	mg	40

Table 7: Crystic VE671 Laminate Properties

Temp ° C	Flexural strength DIN 53452	Flexural modulus DIN 53452	Tensile strength DIN 53455	Tensile modulus DIN 53455	Compression strength ASTM D-695
	N/mm ²	N/mm ² x 10 ³	N/mm ²	N/mm ² x 10 ³	N/mm ²
23	208	7,6	137	9,2	214
65	196	6,9	139	8,9	-
93	188	5,5	145	8,5	-
107	100	3,3	124	6,2	-
121	38	1,6	76	4,3	-
149	22	1,6	50	-	-

Glass Content - 40 %

Laminate Construction - V / M / M / W_R / M / W_R / M

** Curing schedule: 24hr @ 20°C, 3hr @ 100°C

*** Curing schedule: 24hr @ 20°C, 5hr @ 80,°C 3hr @ 100°C

† NB: The geltime of preaccelerated vinyl ester resins lengthens on storage. Users are advised to use up stocks of Crystic VE671PA as quickly as possible.

Storage

Crystic VE671 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 are kept in a horizontal position to avoid the possible ingress of water.

Packaging

Crystic VE671 is supplied in 25kg and 200kg containers.

Health and Safety

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

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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.

SCOTT BADER COMPANY LIMITED

Scott Bader (Pty) Ltd
Reg. No. 93/00466/07
1 Lubex Road,
Hammarisdale
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
Ave
Broadacres, Sandton
Tel: (011) 064 5673

KwaZulu Natal
1 Lubex Road,
Hammarisdale
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

