CRYSTIC® VE671 and VE671TPA

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.

VERSIONS

Crystic® VE671 is available preaccelerated as **Crystic® VE671PA**. **Crystic® VE671PA** has similar gel and cure behaviour to the formulation described for 25°C in Table 1.

Crystic® VE671 is also available in a preaccelerated and thixotropic version, called **Crystic® VE671TPA. Crystic® VE671TPA** is available in different gel time versions.

Note: Low catalyst levels should not be used due to a risk of catalyst exhaustion. Rather, inhibitors should be used. Should a lengthened geltime be needed, contact our technical personnel for advice.

Adding more than 2% Cadox L50A catalyst will not appreciably shorten the geltime.

FORMULATION

Crystic® VE671 requires the addition of an accelerator and a catalyst for curing to take place. Cadox L50A catalyst should be used in order to reduce the possibility of foam formation. Typical accelerator and catalyst formulations are given below in Table 1 with respective gel times at specific temperatures.

Table 1: Geltimes in minutes of **Crystic® VE671** using Cadox L50A Catalyst

Temperature	Cobalt 6% Solution	DMA 10% Solution	Cadox L50A Catalyst	Gel Time in minutes
25°C	0.3%	1.0%	1.25%	25
35°C	0.2%	0.5%	1.25%	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 50% phthalate-based BPO powders such as Lucidol CH-50. It is important to ensure that the accelerator is thoroughly mixed into the resin before mixing in the catalyst.

Table 2: Geltimes in minutes of **Crystic® VE671** using Lucidol CH-50

Temperature	Lucidol CH-50 Catalyst	DMA 10% Solution	Inhibitor TBC 10 % Sol	Gel Time in minutes
15°C	2%	1.1%		35
25°C	2%	1.1%		20
25°C	2%	1.0%	0.17%	40
35°C	2%	1.0%	0.17%	35

Care should be exercised when working under cool conditions with benzoyl peroxide catalysts. Extra additions of more reactive accelerators may be required.

TYPICAL PROPERTIES

Tables 3 to 6 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 3: Characteristics of liquid **Crystic® VE671**

Property	Units	Nominal value
Acid Value	mgKOH/g	9 max
Viscosity at 25°C Brookfield LVT sp.3 @ 60rpm	mPa.s	450
Colour	Gardner	7 Max
Non Volatile content	%	60
Shelf Life at 25ºC	months	6

Table 4: Characteristics of liquid **Crystic® VE671PA**

Property	Units	Nominal value
Colour / Appearance		Purple / Clear
Acid Value	mgKOH/g	Max 8.5
Non Volatile content	%	58
Viscosity @ 25° C using Brookfield RVT @ 100rpm	mPa.s	425
Geltime using 1.25% Cadox L50A @ 25° C	Minutes	25
Shelf Life	months	3 at 25ºC†

Table 5: 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 6: Crystic® VE671 Laminate Properties

Temp ^{0}C	**Flexural strength DIN 53452 N/mm^2**	**Flexural modulus DIN 53452 N/mm^2 x 10^3**	**Tensile strength DIN 53455 N/mm^2**	**Tensile modulus DIN 53455 N/mm^2 x 10^3**	**Compression strength ASTM D-695 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** and **VE671TPA** as quickly as possible.

STORAGE

Crystic® VE671 and its variants should be stored in the shade in suitable, closed containers. It is recommended that the storage temperature 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 are kept in a horizontal position to avoid the possible ingress of water.

PACKAGING

Crystic® VE671 is supplied in 25kg pails, 200kg drums and 1000kg intermediate bulk containers.

HEALTH AND SAFETY

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

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