

# UVEKOL® FR-C

## Technical Data Sheet

1 / 5

### GENERAL DESCRIPTION

UVEKOL® FR-C (\*) is a ready-for-use acrylic resin for the lamination of glass. It is cured under UV light for 20 minutes.

UVEKOL® FR-C was developed to confer safety impact resistance to fire resistant ceramic glass.

### PHYSICAL PROPERTIES

Typical values:

refractive Index - 25°C	-	1.4818
colour Lovibond	Apha	< 100
dynamic viscosity, cone & plate - 25°C	mPa.s	140
density – 23°C	g / cm <sup>3</sup>	1.38
Shore A hardness after 15" - 21 °C	-	35
shrinkage during polymerization	%	10

(\*) The ® indicates a Registered Trademark in the United States. The mark may also be registered, the subject of an application for registration or a trademark in other countries.

<b>Cytec Surface Specialties S.A./N.V. Anderlechtstraat 33, B-1620, Drogenbos, Belgium</b>		
<b>Telephone:</b> ++32 (0)2 334 51 11	<b>E-mail:</b> <a href="mailto:tsd.radcure@cytec.com">tsd.radcure@cytec.com</a>	<b>Web Site:</b> <a href="http://www.cytec.com">www.cytec.com</a>

**Disclaimer:** Cytec Surface Specialties S.A./N.V. or any of its affiliated companies (hereinafter "Cytec Surface Specialties") decline any liability with respect to the use made by any third party of the information contained herein. The information contained herein represents Cytec Surface Specialties' best knowledge thereon without constituting any express or implied guarantee or warranty of any kind (including, but not limited to, regarding the accuracy, the completeness or relevance of the data set out herein). Cytec Surface Specialties is the sole owner or authorized user of the intellectual property rights relating to the information communicated. The information relating to the use of the products is given for information purposes only. No guarantee or warranty is provided that the product is adapted to the client's specific use. The client should perform its own tests to determine the suitability for a particular purpose. The final choice of use of a product remains the sole responsibility of the client. <sup>TM</sup> trademark of Cytec Surface Specialties Group.

# UVEKOL® FR-C

## Technical Data Sheet

2 / 5

### APPLICATION PROCEDURE

The glass lamination process using UVEKOL® FR-C is simple and does not require heating or pressure.

The glass panes to be laminated are cleaned and joined together with a double-sided adhesive tape, leaving a small opening for filling.

UVEKOL® FR-C is pumped into the cavity between the panes, then cured in an UV oven for 20 minutes (standard time for most laminating applications using UVEKOL® FR-C).

Detailed information about the application procedure can be found in the UVEKOL® USER GUIDE – INSTRUCTIONS FOR THE PRODUCTION OF LAMINATED GLAZING UNITS.

Formula to be used to calculate the required quantity (volume) of UVEKOL® FR-C to be injected is:

$$\text{LENGTH (cm)} * \text{WIDTH (cm)} * \text{THICKNESS OF TAPE (cm)} * 1.10 = \text{VOLUME (ml)}$$

LENGTH (cm) = total length of the pane – 2 x tape width (standard tape = 6 mm)

WIDTH (cm) = total width of the pane – 2 x tape width (standard tape = 6 mm)

The factor of 1.10 compensates for the shrinkage of the resin during cure.

Whenever quantity in weight has to be considered, take into consideration the density of UVEKOL® FR-C is 1.38, remarkably higher than that of the standard grades. When using above formula for the required quantity in weight, the volume (ml) has to be multiplied by 1.38 (density).

UVEKOL® FR-C should not be used with UVEKOL® MB concentrated colour pastes.

Cytec Surface Specialties S.A./N.V. Anderlechtstraat 33, B-1620, Drogenbos, Belgium

Telephone: ++32 (0)2 334 51 11

E-mail: [tsd.radcure@cytec.com](mailto:tsd.radcure@cytec.com)

Web Site: [www.cytec.com](http://www.cytec.com)

**Disclaimer:** Cytec Surface Specialties S.A./N.V. or any of its affiliated companies (hereinafter "Cytec Surface Specialties") decline any liability with respect to the use made by any third party of the information contained herein. The information contained herein represents Cytec Surface Specialties' best knowledge thereon without constituting any express or implied guarantee or warranty of any kind (including, but not limited to, regarding the accuracy, the completeness or relevance of the data set out herein). Cytec Surface Specialties is the sole owner or authorized user of the intellectual property rights relating to the information communicated. The information relating to the use of the products is given for information purposes only. No guarantee or warranty is provided that the product is adapted to the client's specific use. The client should perform its own tests to determine the suitability for a particular purpose. The final choice of use of a product remains the sole responsibility of the client. <sup>TM</sup> trademark of Cytec Surface Specialties Group.

# UVEKOL® FR-C

## Technical Data Sheet

3 / 5

### HEAT AND FIRE RESISTANCE OF UVEKOL® FR-C BASED GLASS LAMINATES

UVEKOL® FR-C was developed to confer safety impact resistance to fire resistant ceramic glass.

UVEKOL® FR-C laminates have successfully been tested in fire tests according to EN1363.

### IMPACT PROPERTIES OF UVEKOL® FR-C BASED GLASS LAMINATES

Thanks to the use of appropriate acrylated oligomers, UVEKOL® FR-C interlayers confer a high level of impact resistance.

As a consequence, UVEKOL® FR-C in a 5 / 1 / 5\* composition passes the pendulum test according to the standard CPSC \*\* 16CFR1201 highest category II, or ANSI Z-97.1, class A - category II (CPSC) and class A (ANSI) at the highest drop height, both 48 inches = 121.9 cm.

The most commonly used tests for safety performance are pendulum tests.

In this approach, a soft body impactor (bag, tyre) is swung from a standardized drop height against a vertically positioned test panel.

The test simulates a person slipping and falling against a safety glass: a balustrade, banister or facade.

\* 5 / 1 / 5 = 5 mm glass, 1 mm interlayer, 5 mm glass

\*\* CPSC = Consumer Product Safety Commission

ANSI = American National Standards Institute

Cytec Surface Specialties S.A./N.V. Anderlechtstraat 33, B-1620, Drogenbos, Belgium

Telephone: ++32 (0)2 334 51 11

E-mail: [tsd.radcure@cytec.com](mailto:tsd.radcure@cytec.com)

Web Site: [www.cytec.com](http://www.cytec.com)

**Disclaimer:** Cytec Surface Specialties S.A./N.V. or any of its affiliated companies (hereinafter "Cytec Surface Specialties") decline any liability with respect to the use made by any third party of the information contained herein. The information contained herein represents Cytec Surface Specialties' best knowledge thereon without constituting any express or implied guarantee or warranty of any kind (including, but not limited to, regarding the accuracy, the completeness or relevance of the data set out herein). Cytec Surface Specialties is the sole owner or authorized user of the intellectual property rights relating to the information communicated. The information relating to the use of the products is given for information purposes only. No guarantee or warranty is provided that the product is adapted to the client's specific use. The client should perform its own tests to determine the suitability for a particular purpose. The final choice of use of a product remains the sole responsibility of the client. <sup>TM</sup> trademark of Cytec Surface Specialties Group.

# UVEKOL® FR-C

## Technical Data Sheet

4 / 5

### AGEING OF UVEKOL® FR-C BASED GLASS LAMINATES

UVEKOL® FR-C laminates resist heat, UV light and humidity. They have been tested under natural and accelerated conditions. Some of the most relevant data are summarized below:

RESISTANCE	TEST	STANDARD	PERFORMANCE
HEAT	resistance to temperature changes – Klima test cycles between -30 °C and +80 °C	DIN 52344	100 cycles no defects (delaminations, others)
HEAT + MOISTURE	durability test = high temperature test (hot boiling test)	EN 12543-4	no defects
UV	Q-panel ageing – 351 nm continuous UV irradiation	ASTM G53	4 / 1 / 4 laminate with ceramic glass 960h - $\Delta E = 1.3$ (°) 1 500h - $\Delta E = 1.6$ 2 100h - $\Delta E = 1.7$
	Florida natural ageing Sub-Tropical Testing Service orientation 5° south	ASTM G7 (ANSI Z97.1)	4 / 1.5 / 4 laminate with ceramic glass after 15 months: no defects $\Delta E = 1.4$

(°)  $\Delta E$  is a measure for a difference in colour =  
colour after ageing minus colour before ageing (in L\*, a\*, b\*)

Cytec Surface Specialties S.A./N.V. Anderlechtstraat 33, B-1620, Drogenbos, Belgium

Telephone: ++32 (0)2 334 51 11

E-mail: [tsd.radcure@cytec.com](mailto:tsd.radcure@cytec.com)

Web Site: [www.cytec.com](http://www.cytec.com)

**Disclaimer:** Cytec Surface Specialties S.A./N.V. or any of its affiliated companies (hereinafter "Cytec Surface Specialties") decline any liability with respect to the use made by any third party of the information contained herein. The information contained herein represents Cytec Surface Specialties' best knowledge thereon without constituting any express or implied guarantee or warranty of any kind (including, but not limited to, regarding the accuracy, the completeness or relevance of the data set out herein). Cytec Surface Specialties is the sole owner or authorized user of the intellectual property rights relating to the information communicated. The information relating to the use of the products is given for information purposes only. No guarantee or warranty is provided that the product is adapted to the client's specific use. The client should perform its own tests to determine the suitability for a particular purpose. The final choice of use of a product remains the sole responsibility of the client. <sup>TM</sup> trademark of Cytec Surface Specialties Group.

# UVEKOL® FR-C

## Technical Data Sheet

5 / 5

### PACKAGING

UVEKOL® FR-C is available in polyethylene drums containing 180 litres, and Schütz containers with 1 000 litres.

Containers when empty are taken back by Schütz (Schütz ticket system).

As density is different (= 1.38) from that of the standard grades, the weight of the resin is different too:

180 litres correspond to 248 kilos net weight,

1 000 litres correspond to 1 380 kilos net weight.

### STATUTORY LABELLING

For Statutory Labelling information, please refer to Safety Data Sheet.

### TRANSPORT REGULATIONS

Information on transport regulations can be found in the Safety Data Sheet, section 14: transport information.

### QUALITY CERTIFICATION

UVEKOL® FR-C manufacturing is certified ISO 9001 and ISO 14001.

### STORAGE AND HANDLING

UVEKOL® FR-C should be stored in a dry place, away from sources of heat, at a temperature of 15 °C to 30 °C for best performance.

UVEKOL® FR-C resins have a shelf life of 6 months from the date of manufacture that can be derived from the batch number.

September 2008

<b>Cytec Surface Specialties S.A./N.V. Anderlechtstraat 33, B-1620, Drogenbos, Belgium</b>		
<b>Telephone:</b> ++32 (0)2 334 51 11	<b>E-mail:</b> <a href="mailto:tsd.radcure@cytec.com">tsd.radcure@cytec.com</a>	<b>Web Site:</b> <a href="http://www.cytec.com">www.cytec.com</a>

**Disclaimer:** Cytec Surface Specialties S.A./N.V. or any of its affiliated companies (hereinafter "Cytec Surface Specialties") decline any liability with respect to the use made by any third party of the information contained herein. The information contained herein represents Cytec Surface Specialties' best knowledge thereon without constituting any express or implied guarantee or warranty of any kind (including, but not limited to, regarding the accuracy, the completeness or relevance of the data set out herein). Cytec Surface Specialties is the sole owner or authorized user of the intellectual property rights relating to the information communicated. The information relating to the use of the products is given for information purposes only. No guarantee or warranty is provided that the product is adapted to the client's specific use. The client should perform its own tests to determine the suitability for a particular purpose. The final choice of use of a product remains the sole responsibility of the client. <sup>TM</sup> trademark of Cytec Surface Specialties Group.