

Fire resistant **UVEKOL** grades

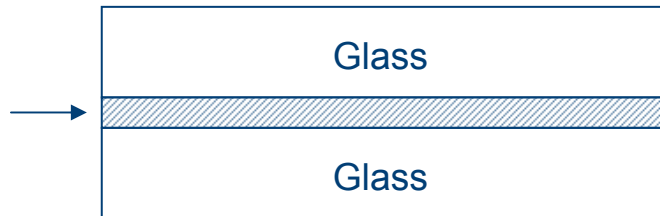
GLASS LAMINATING SYSTEM

- UVEKOL® FR
- UVEKOL® FR-C

Laminated Glass Panels UV-Technology :

- Uvekol S: Confer safety impact resistance
- Uvekol A: Confer acoustic damping

Cured Uvekol interlayer



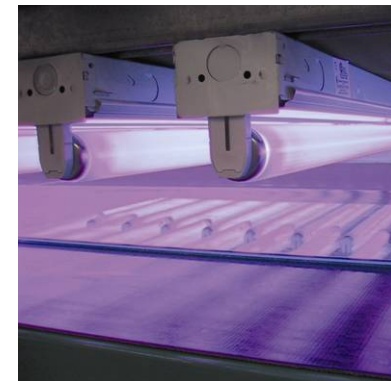
Sealing



Filling



UV Curing



New UVEKOL® range for Fire Resistant Glass : **UVEKOL® FR-C and UVEKOL® FR**

→ **Fire Resistance + Safety Impact Resistance**



UVEKOL[®] FR-C

- UVEKOL® FR-C is a **mono-component** acrylic resin designed for glass lamination especially developed to confer safety impact resistance to fire resistant **ceramic glass**.
- UVEKOL® FR-C laminates are cured under UV light for 20 minutes.

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 acrylate oligomer, UVEKOL® FR-C interlayers confer high level impact resistance.
- 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

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 ³	1.38
Shore A hardness after 15" - 21°C	-	35
shrinkage during polymerization	%	10

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 -35°C and +80°C	DIN 52344	100 cycles no defects (delaminating, 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 $\Delta E = 1.4$

(°) ΔE is a measure for a difference in colour = colour after ageing minus colour before ageing (in L*, a*, b*)

PACKAGING

- UVEKOL® FR-C is available in polyethylene drums containing 180 L, and Schütz containers with 1,000 L.
- 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 L correspond to 248 kg net weight,
 - 1,000 L correspond to 1,380 kg net weight.

UVEKOL[®] FR

- UVEKOL® FR is a **mono-component** acrylic resin designed for glass lamination and especially developed to confer safety impact resistance to fire resistant **borosilicate glass**.
- The laminates made of UVEKOL® FR are cured under UV light for 20 minutes.
- UVEKOL® FR is halogen-free.

HEAT AND FIRE RESISTANCE OF UVEKOL® FR BASED GLASS LAMINATES

- UVEKOL® FR was developed to confer safety impact resistance to fire resistant borosilicate glass.
- UVEKOL® FR laminates have successfully been tested in fire tests according to EN1363.

IMPACT PROPERTIES OF UVEKOL® FR BASED GLASS LAMINATES

- Thanks to the use of appropriate acrylate oligomer, UVEKOL® FR interlayers confer high level impact resistance.
- As a consequence, UVEKOL® FR in 5 / 1 / 4 and 5 / 1 / 5 composition passes the pendulum test according to the EN12600 for the highest category 1B1.

PHYSICAL PROPERTIES : Typical values:

refractive Index - 25°C	-	1.4597
colour Lovibond	Apha	< 50
dynamic viscosity, cone & plate - 25°C	mPa.s	30
density – 23°C	g / cm ³	1.06
Shore A hardness after 15" - 21 °C	-	30
shrinkage during polymerization	%	10

AGEING OF UVEKOL® FR BASED GLASS LAMINATES

UVEKOL® FR laminates resist heat, UV light and humidity. They have been tested under natural conditions.

RESISTANCE	TEST	STANDARD	PERFORMANCE
HEAT	temperature stability test oven ageing – 60°C		5 / 1 / 4 laminate after 1,100 hours: $\Delta E = 0.5$ (°) no defects (delaminations, other)
	resistance to temperature changes - Klima test cycles between –30°C and +80°C	DIN 52344	4 / 1 / 4 laminate 100 cycles passed - no defects
HEAT + MOISTURE	durability test = high temperature test (hot boiling test)	EN 12543-4	4 / 1 / 4 laminate 2 mm white border no defects
UV	Q-panel ageing - 351 nm continuous UV irradiation	ASTM G53	4 / 1 / 4 laminate, float after 1080 hours: $\Delta E = 0.7$ after 2350 hours: $\Delta E = 1.5$ no defects

PACKAGING

- UVEKOL® FR 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 slightly different (1.06) from that of the standard grades, the weight of the resin is different too:
- 180 litres correspond to 191 kilogram's,
- 1,000 litres correspond to 1,060 kilogram's.