

UV coating systems: a real alternative!

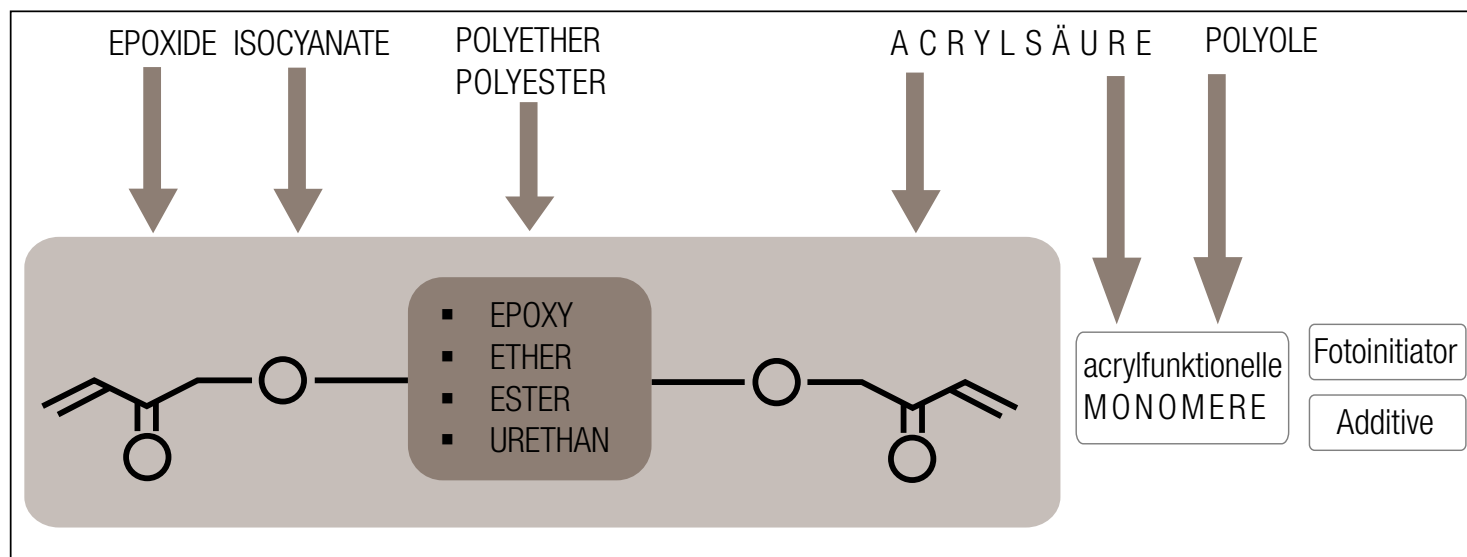
The pressure that legislation is placing on users of solvent-based coating systems is always on the rise, which is why the use of environmentally friendly coating systems is increasingly coming to the fore. UV coating systems are a great alternative here. They are distinguished by very short curing times combined with very high productivity, fewer emissions and excellent mechanical resistance.

Radiation sources that emit ultraviolet light are used to dry the coatings. After a short burst of high-energy radiation, the UV coating systems are cured and the coated substrates can be further processed, packaged and stacked.

UV-curable coating systems largely consist of oligomers (binding agents) and monomers (reactive thinners). They are primarily responsible for film formation and give the coating system its basic properties. Monomers are also used to reduce viscosity. It is essential that the formulation contains photoinitiators in order to initiate radical polymerisation. Fillers and pigments can be used for the purposes of colouring, matting and reducing prices. Classic additives improve defoaming, flow, wetting and light protection.



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UV coating systems

Very short curing times combined with very high productivity

Overcoating UV inkjet inks

UV clear coat systems for overcoating UV inkjet inks

Digitally printed surfaces require a finishing coat to protect them against both the elements and mechanical loads. The excellent adhesion of the overcoated coating system to individual inkjet inks, as well as to substrates and primers, poses the greatest challenge here. We have specifically adapted FREODUR UV- Clearcoat ES1939GRA999 to this requirement.

FREODUR UV-Clearcoat ES1939GRA999	
Binding agent basis	Urethane acrylate
Monomer	Monofunctional and difunctional
Photoinitiators	Long and short wave
Viscosity	500 mPas
Application	Automatic spray-coating machine Hot-spray process at 60 °C Air-assisted nozzle 0.12 mm
Dry film thickness	50 - 60 µm
UV curing	Ga-doped and Hg-emitter 120 W/cm each Belt speed = 4 m/min. Radiation dose UVA 1,300 mJ/cm ² UVB 1,470 mJ/cm ² UVC 370 mJ/cm ² UVV 2,500 J/cm ²

FREODUR UV-Clearcoat ES1939GRA999 can be applied on top of metal surfaces that have been primed in various ways. IT has excellent adhesion properties on the following substrates:

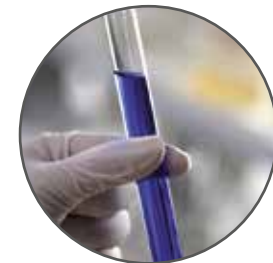
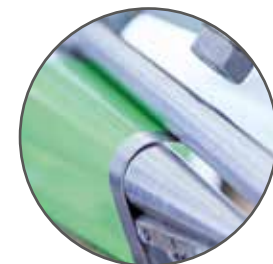
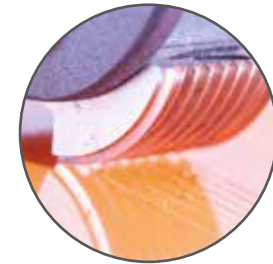
- FREOPOX powder coating PB1204ARA910
- FREODUR UV primer ES1919
- Aluminium, pretreated and coil coating
- UV inkjet ink

Excellent properties offered by our UV coating systems

Chemical and mechanical properties

UV-cured coating systems have a very high crosslink density, resulting in excellent mechanical and chemical properties. The properties of FREODUR UV-Clearcoat ES1939GRA999 are shown in the following table:

Tests	Standard I Conditions	Primer	ER1939GRA999
Scratch hardness test	DIN EN ISO 438-2	ES1919	Diamond: 0.5 N ISO 1580 1 mm ball: 5N
Taber abraser test	CS10 wheel 300 rounds 500 g load	ES1919	1.9 mg
T-bend test	0.5 mm aluminium sheet	Coil coating	1.5 T
Climate change test	DIN EN ISO 11997-1 process B 20 cycles	ES1919	Adhesion: Gt1 Bubble formation: 0 (S0)
		Powder coating	Adhesion: GT0 Bubble formation: 0 (S0)
Salt spray test	DIN EN ISO 9227 NSS	ES1919	Adhesion: GT0 Bubble formation: 0 (S0) Creepage: 2 mm
		Powder coating	Adhesion: Gt0 Bubble formation: 0 (S0) Creepage: 0 mm
Condensed water constant climate test	DIN EN ISO 6270-2 CH	Powder coating	Adhesion: Gt0-1 Bubble formation: 0 (S0)
WOM test	DIN EN ISO 11341 process 1A	Coil coating	2,000 h: Delta E 1.05 Residual gloss 60%
QUV-B313	DIN EN ISO 11507 process 1A	Coil coating	2,000 h: Delta E 1.12 Residual gloss 90 %
Chemical resistance	DIN EN ISO 2812-3 Loading 24 h RT	ES1919	Ecolab MikroBac III 1% sol.:0 Ecolab Sanichlor 60 ppm chlorine:0
Crockmeter	100 double strokes	ES1919	MEK: 0 Ecolab MicroBac III 1% sol.:0 Ecolab Sanichlor 60 ppm chlorine:0
Sunscreen resistance	DIN EN ISO 2812-3 Loading 5 days RT	ES1919	Bübchen Kids 50+:0 Nivea Sun SPF 30:0-1 Ladival SPF 25:0-1 dm Sundance Kids SPF 50:0



Areas of application for UV coating systems

Anwendungsgebiete

Optimum properties for the overall system coating structure are achieved by precisely matching every coating and inkjet ink. A great deal of attention should be paid to choosing the right UV inkjet inks here.

Areas of application for our UV-curable coatings span all areas of two-dimensional metal panel coating, e.g. wall and display coating.



The coatings are applied using a spray gun or roller. UV coating systems offer users various advantages:

- Low emissions, 100% solids content
- Short curing times, high productivity
- Low energy consumption
- High mechanical resistance
- Recyclability: no pot life, no evaporation of water or solvents
- Coating of temperature-sensitive materials