



COLORED ORMOCER® – COATINGS FOR GLASS SURFACES

Motivation

Traditionally, the coloration of glass is achieved by the incorporation of transition metal oxides or colloidal metal sulfides and selenides to the glass batch. The exact predetermination of the colors is difficult because of the many variables and in some instances toxic heavy metal compounds have to be handled during the production process. This conventional way of glass staining is uneconomic if small batches or different colors are to be produced.

The coloring of originally colorless glass by gas phase techniques implies costly production facilities. Inorganic sol-gel layers and enamels have to be cured at very high temperatures (> 450 °C). Enamel varnishes possess an additional disadvantage in their toxic components (PbO, CdO). Commercial organic colored coatings often are unsatisfactory regarding their abrasion resistance, corrosion resistance and photostability.

Our solution:

Colored ORMOCER® layers

ORMOCER®s are hybrid polymer materials synthesized by the sol-gel process through controlled hydrolysis and condensation of organically modified Si alkoxides. Cocondensation with other metal alkoxides (Ti, Zr, Al alkoxides) is also possible. In a subsequent step the polymerizable groups which are fixed to the inorganic network react with each other in a thermal or UV-initiated process. Coloration to the ORMOCER® matrix is feasible by the application of commercial dyes or pigments resulting in transparent, translucent or opaque coatings.

Possible applications

- Industrial glass
- Packaging glass
- Glass sheets for furniture and sanitary appliances
- Glass in architecture and building industry
- Glazing in the automotive sector

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The advantages

- Good adhesion to various glass surfaces
- Unlimited color range
- Easily reproducible colors
- Finishing by conventional wet painting procedures
- Low curing temperatures (< 200 °C)
- Economic even for smaller batches
- Toxicologically safe
- Additional decorative effects (color gradients, partial coloration)

Other areas of application

- Color coatings on mineral surfaces
- Color coatings on metal surfaces

PROPERTY	RANGE	METHOD
viscosity DIN EN ISO 4892-3	10.5 - 12.0 mm ² /s	Ubbelohde
Feststoffgehalt	42 - 45 %	DIN 52316-A
density	1.002 kg/m ³	Pycnometer
flashpoint	301 K	DIN-ISO 3676
spraying conditions	spray noozles diameter 0.2 ... 1.4 mm pressure 1.5 - 3 bar	
curing	433 K/2 h - 473 K/600 s	
coating thickness	8 - 12 µm	Profilometer
adhesion	GT0-1	ISO 2409
abrasion resistance	1.3 - 2.3 % (clear coat	ASTM D 1044
refractive index	1.503 - 1.534	Abbé-Refractometer
lead release	0.002 mg Pb/l	DIN 51031
dishwashing resistance	> 200 cycles	Europ. standard procedure CEN/TC 194 N 107