

HIGH PERFORMANCE LED CURABLE DISPERSION FOR DIGITAL PRINTING

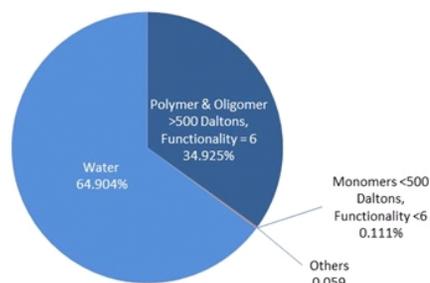
### INTRODUCTION

UCECOAT® 2804 is a low viscosity, high performance UV/EB energy curable polyurethane dispersion suitable for indirect food contact applications. The product is solvent-free, tin-free, BPA-free and APEO-free. Its polymer composition was optimized for high reactivity and low migration potential. Approximately 99.5% of the solid fraction is constituted by oligomers and polymers having a molecular weight above 500 Daltons, at the same time, an acrylic double bond functionality equal to or greater than 6. It is tack-free and water re-dispersible after water evaporation but before cure.

### PERFORMANCE HIGHLIGHTS

UCECOAT® 2804 has been developed as a binder for water-based overprint varnishes and inks where low viscosity and water re-dispersibility before cure are important. The low grits content ensures easy product filterability combined with a good colloidal stability. This product is very reactive and can be cured with mercury or with UV LED lamps. The cured coating is hard and exhibits outstanding mechanical and chemical resistance in clear or pigmented applications. Its regulatory compliance and low migration potential make it particularly suitable for indirect food contact packaging or label markets.

### TYPICAL COMPOSITION



### SUGGESTED APPLICATIONS

UCECOAT® 2804 can be applied by flexography and gravure printing techniques, although it is particularly recommended for digital printing applications. Alternatively, it can be applied by conventional spray, screen, curtain and immersion coating methods. It can be used to coat paper and paperboard, corrugated sheets as well as several plastic substrates including corona-treated polyethylene and polypropylene.

- Inkjet inks
- Overprint varnishes
- Flexographic inks
- Coatings for plastics and wood
- Clear coating on PVC floorings

### TYPICAL PROPERTIES

Appearance	white liquid
Grits >50 µm, mg/l	<10
Mean particle size, nm	~100
pH	~7.5
Minimum film formation temperature, °C	< 10
Solids content, %	~35
Stability 60°C, days	> 10
Surface tension, mN/m	43
Viscosity at 25°C, mPa.s	~75

### TYPICAL CURED PROPERTIES

Tensile strength, psi (MPa)	928 (6.4)
Elongation at break, %	0.5
Young's modulus, psi (MPa)	276000 (1900)
Glass transition temperature, °C	60; 220
Measured on a 80 µm EB cured film	

### SUGGESTED STARTING POINT FORMULATION

The final properties of UV cured formulations specifically depend on the selection of formulation components such as additives and photo initiators. A starting point formulation for a UV curable OPV is indicated below:

Component	%
UCECOAT 2804	85.00
Water	12.00
Substrate wetting additive (e.g. TEGO® Wet 270 <sup>(2)</sup> )	0.45
Rheology modifier (e.g. ADDITOL® VXW6360 <sup>(3)</sup> )	0.25
Photoinitiator <sup>(4)</sup>	2.30

UCECOAT® 2804 shows excellent reactivity under UV LED cure and a starting point formulation for a UV LED curable OPV is indicated below:

Component	%
UCECOAT® 2804	84.2
Water	11.9
Substrate wetting additive (e.g. TEGO Wet 270)	0.4
Rheology modifier (e.g. ADDITOL® VXW6360)	0.2
Silicone surfactant (e.g. BYK-349 <sup>(4)</sup> )	1.0
UV LED photo initiator <sup>(5)</sup>	2.3

<sup>(1)</sup> product of Evonik

<sup>(2)</sup> product of allnex

<sup>(3)</sup> an eutectic liquid mixture of 1-hydroxy-cyclohexylphenylketone and benzophenone dispersed at 45.5% by weight in water; % is for the photoinitiator amount

<sup>(4)</sup> product of BYK USA Inc.

<sup>(5)</sup> ethyl (2,4,6-trimethylbenzoyl) phenyl phosphinate (TPO-L) dispersed at 45.5% by weight in water; % is for the photoinitiator amount

### STORAGE AND HANDLING

The recommended storage temperature range for UCECOAT® 2804 is  $\geq 4^{\circ}\text{C}$  ( $39^{\circ}\text{F}$ ) to  $\leq 40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ). Protect the product from freezing. Care should be taken not to expose the product to high temperature conditions or direct sunlight. Containers should be kept closed and away from materials that react with water. Bacteriological contamination can occur if the product is stored for an extended period in a container which is not sufficiently sealed or clean. Storage and handling should be in stainless steel, amber glass, or amber polyethylene containers. After prolonged storage product can settle and may require agitation to re-disperse. This product is stable under normal conditions of handling and storage. Do not store this material under an oxygen free atmosphere. Wash thoroughly after handling. Use with adequate ventilation.

### PRECAUTIONS

Before using UCECOAT® 2804, see the Safety Data Sheet for information on the identified hazards of the material and the recommended personal protective equipment and procedures.