



Food & Specialty Packaging

Creating a new and distinctive matte look & feel for packaging and labels – OPULUX™ Optical Finishes



Acrylic Bead Technology for Matte Coatings



Today's savvy shoppers are increasingly focusing on organic and natural products. As a result, brand owners are looking to differentiate their products by emphasizing the perception of quality, natural ingredients. Matte packaging is increasingly being associated with this perception of natural-ingredients-based products.

OPULUX™ Optical Finishes from Dow delivers this matte finish, while maintaining a high degree of color retention and offering several additional features and benefits.



OPULUX™ Optical Finishes offers highly engineered uniform acrylic beads which impart reduced gloss and a soft, luxurious touch while still maintaining a high degree of color retention.

This innovative use of acrylic bead technology and polymer design can help package makers and brand owners create not only distinctive, luxurious finishes for packaging and labels that provide a rich matte look, and a soft touch, but also pursue important “natural” aesthetic trends while protecting brand integrity.

As will be demonstrated on the following pages, the matte coating technology employed by OPULUX™ Optical Finishes offers differentiated performance compared to existing matte coating alternatives in the marketplace.

Typical properties for these distinctive finishes are listed in Table 1. These physical properties promote a number of features and benefits valuable to converters, packagers, and brand owners, including:

- Low gloss
- Excellent opacity
- Matting is consistent from all angles when viewing a package
- Pleasant aesthetics/soft feel
- Heat-resistant coating suitable for use in further packaging assembly/processing
- Good UV resistance
- Supplied in aqueous form with extremely low VOC
- Approved for indirect food contact in the United States (21CFR175.105)

Table 1: OPULUX™ Optical Finishes, Physical Properties^(1, 2)

Property	Value
Appearance	Milky, Translucent Liquid
Solids Content, %	34-36
pH	8.0-9.5
Specific Gravity	1.06
Density, gram/liter	1.054
Ionic Charge	Anionic
Viscosity, cP	200-600
Coating Weight, gsm	1.6-3.2



⁽¹⁾Typical properties, not to be construed as product specifications

⁽²⁾The full properties of OPULUX™ Optical Finishes are achieved when formulated with an external crosslinker, such as CR-901A (a product of The Dow Chemical Company) for optimal abrasion and heat resistance. The recommended use level of CR-901A is a minimum of 2.5% of the total formulation (wet/wet) to achieve heat seal above 350°F. Similarly, as with many waterborne coatings, it is best to stir the product prior to use and to minimize extended storage conditions.

A New Technology



OPULUX™ Optical Finishes represents new technology delivered in coating form through the design of highly engineered uniform acrylic beads in combination with acrylic-based carrier emulsion technology. Designed for excellent wear and abrasion resistance on packaging films and label surfaces, these engineered acrylic beads are delivered in aqueous form for coating using conventional application technologies and equipment.

Dow's OPULUX™ Optical Finishes can be applied at a low coat weight and can be applied to printed substrates in either spot or complete package coverage. OPULUX™ Optical Finishes offers excellent adhesion to ink, with excellent print definition with a lasting impression.

OPULUX™ Optical Finishes is applicable to numerous packaging markets and could be an attractive alternative to several existing options, including:

- Matte films (embossed and silica-filled polyolefins)
- Matte lacquers (silica based)
- Matte inks
- Polyurethane coatings
- Gloss packaging

The microphotography illustrates the technology behind OPULUX™ Optical Finishes. High-quality, acrylic beads flow to create a coated surface designed to offer “uniform surface roughness.” This enables a matte appearance without a loss of image clarity.

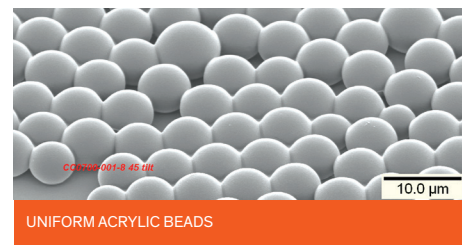


Table 2: OPULUX™ Optical Finishes, Application Data

Dow Product	Polymer Type	Solids %	Application	Adherence to Substrates
OPULUX™ 5001 ⁽¹⁾	Acrylic	34%-36%	Gravure	PET, Nylon, BOPP, Paper
OPULUX™ 5000 ⁽²⁾	Acrylic	34%-36%	Flexographic	PET, Nylon, BOPP, Paper

* Typical properties, not to be construed as product specifications

⁽¹⁾ Samples now available for trial (formulation being optimized) ⁽²⁾ Formulation being optimized, samples expected for trials 2015

Note: A component version for ink companies will be launched at a later date

All product and comparative data per Dow testing based on Dow and/or ASTM standards (unless otherwise noted); complete protocols and additional information upon request; typical properties, not to be construed as product specifications.

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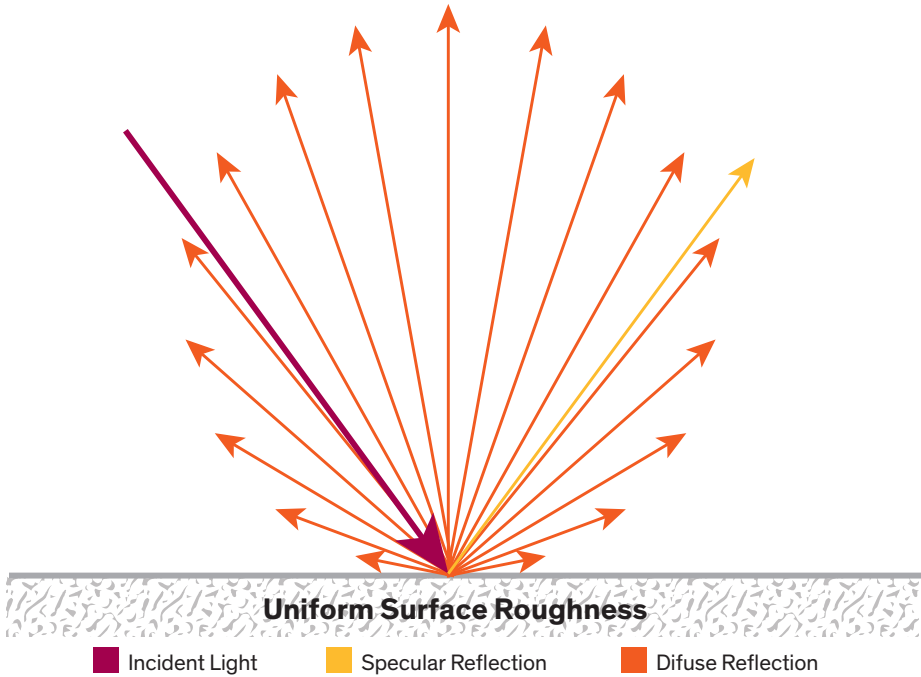
Reduced Glare & Enhanced Color Retention

Low glare, matte-like appearance and opacity enhancements found in coatings made with OPULUX™ Optical Finishes are enabled by particles with designed gradient in refractive index (GRIN). OPULUX™ Optical Finishes offer uniform surface “roughness,” imparting diffuse reflection (reduced gloss) on packaging films and labels (see Figure 1).

OPULUX™ Optical Finishes imparts reduced gloss on polyester (PET) and biaxially oriented polypropylene (BOPP) packaging films while still maintaining a high degree of color intensity.

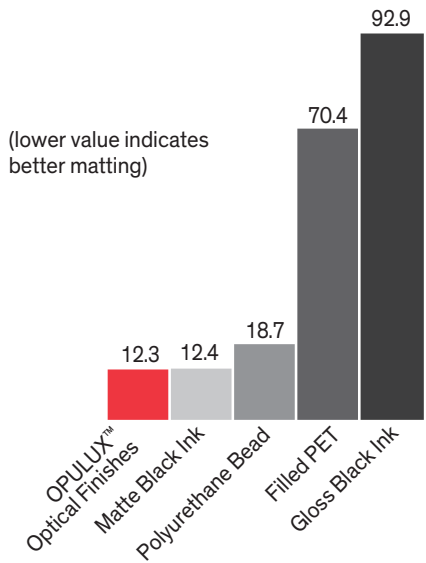
Figure 2 presents comparative gloss and Figure 3 shows color retention data for OPULUX™ Optical Finishes and selected competitive technologies. As can be seen, OPULUX™ Optical Finishes offers excellent matting with a high degree of color retention.

Figure 1: Optics (Diffuse Reflection)



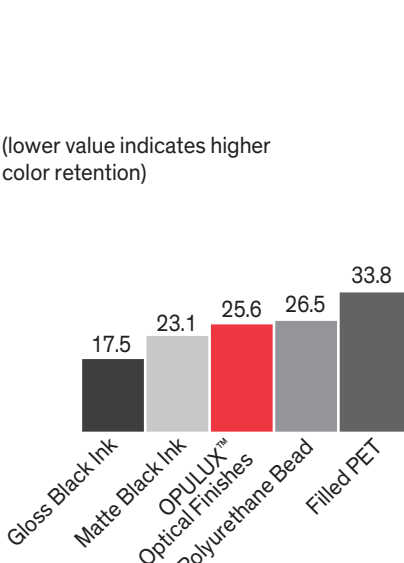
The “uniform surface roughness” of OPULUX™ Optical Finishes imparts diffuse reflection (reduced gloss) on coated surfaces

Figure 2: Comparative Gloss Performance (85° Gloss Test)



Coatings applied to 2-mil PET. Data per Dow tests; typical values, not to be construed as specification; additional information available upon request.

Figure 3: Comparative Color Retention (L Color Retention Test)



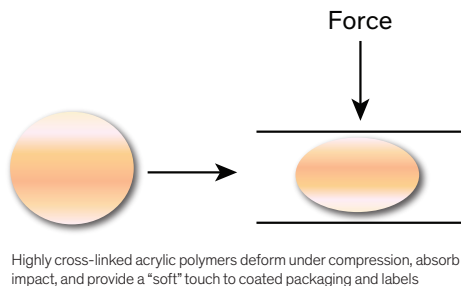
Coatings applied to 2-mil PET. Data per Dow tests; typical values, not to be construed as specification; additional information available upon request.

Distinctive Haptics



The highly cross-linked, “soft” acrylic polymers that compose OPULUX™ Optical Finishes are compressible and survive exposure to extreme temperatures. As shown in Figure 4, the polymers deform under compression and absorb impact. The result is a “soft, luxurious” touch to the package or label surface wherever the OPULUX™ Optical Finishes coating is used. What’s more, OPULUX™ Optical Finishes offers this better sensation of touch without having to use more expensive or specialized packaging materials.

Figure 4: Polymer Deformation



Seeing is Believing!

Untreated

OPULUX™ Optical Finishes

The samples above represent identical films treated and not treated with OPULUX™ Optical Finishes. See the difference! Your Dow representatives are ready to help you trial OPULUX™ and collaborate with your development teams to explore the potential for OPULUX™ Optical Finishes in your packaging.

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