

## Combining Light Transmission and Diffusion for LED Lighting Applications

LED manufacturers and designers know how difficult it is to find a material that hides the LED source while permitting light to be transmitted at optimal levels. This is important not only to aesthetics, but it ensures optimal energy efficiency – a key goal of LED lighting technology. Trinseo has been focused on this challenge and offers a complete portfolio of resins to meet the needs of an assortment of LED Lighting applications. Available in CALIBRE<sup>TM</sup> Polycarbonate Resins and EMERGE<sup>TM</sup> Advanced Resins, Trinseo materials feature quality, consistency and reliability. Ask about customization too, for your most difficult applications.

### Advantages and Benefits

#### Balancing Light Transmission and Diffusion

Trinseo's proprietary light diffusion grades offer an outstanding balance of light transmission, light diffusion and whiteness to provide uniform light distribution while hiding LED "hot spots" across a wide range of thickness values for the fabricated lens or diffuser. Table I on the next page provides transmission at various thicknesses for our light diffusion/ignition resistant grades.

#### Excellent Toughness

High impact and heat resistance are necessary to provide the durability needed to protect costly LED light sources. Trinseo grades feature exceptional toughness which allows down gauging potential comparable to or better than acrylic.

#### Ignition Resistance

Trinseo light diffusion/ignition resistant grades are available in a wide range of performance levels. Table 1 indicates UL ratings at various thicknesses from HB to 5VA.

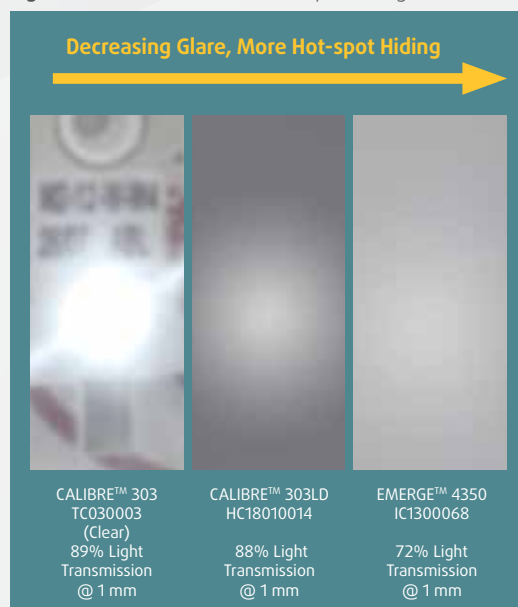
#### UV Stability

Trinseo resins offer various levels of ultraviolet (UV) light resistance to help reduce the potential for color shift, loss of surface gloss and property performance over time.

#### Attractive Appearance

With an opalescent white base color and the ability to help hide hot spots, all Trinseo resins produce aesthetically appealing lighting and signage. Materials are available in both white and custom colored applications.

Figure 1: Trinseo materials for improved light diffusion



Trinseo can customize light diffusion materials to provide different appearances in a single luminaire design. The three materials shown in Figure 1 show the improved hot spot hiding capability of EMERGE<sup>TM</sup> PC 4350 IC1300068 Advanced Resins compared to the other materials.



# Fast Facts

**Table 1:** Available Trinseo Light Diffusion Series Resins

Product Name	Applications	TAT% (mm)	Degree of Light Dispersion (DLD) (T=2mm)	UL-94 Flammability Rating	UL746C Outdoor Suitability	Molding/Processing Methods
<b>UL 94 V2 Diffusion Series</b>						
EMERGE™ PC 4350-22 IC1300069	Half bulb cover, Troffer diffuser, Ceiling light cover	93 (1 mm)	20	V-2 @ 0.5 mm	f1	Injection molding
		81 (2 mm)		V-2 @ 1.6 mm		
EMERGE™ PC 4350-7 IC1300105	Globe bulb cover	89 (1 mm)	-	V-2 @ 0.5 mm	f1	Injection-blow molding, Injection molding
		75 (2 mm)		V-2 @ 1.6 mm		
EMERGE™ PC 4350-22 IC1300100	Half bulb cover, Troffer diffuser, Ceiling light cover	86 (1 mm)	37	V-2 @ 0.5 mm	f1	Injection molding
		70 (2 mm)		V-2 @ 1.6 mm		
EMERGE™ PC 4350-7 IC1300068	Globe bulb cover, LED lenses	72 (1 mm)	56	V-2 @ 0.5 mm	f1	Injection-blow molding, Extrusion, Injection molding
		57 (2 mm)		V-2 @ 1.6 mm		
EMERGE™ PC 4350-15 IC1300068	Globe & Half bulb cover	72 (1 mm)	56	V-2 @ 0.5 mm	f1	Injection-blow molding & Injection molding
		57 (2 mm)		V-2 @ 1.6 mm		
EMERGE™ PC 4350-7 IC1300106	Globe bulb cover & Tube cover	59 (1 mm)	59	V-2 @ 0.5 mm	f1	Injection-blow molding & extrusion
		46 (2 mm)		V-2 @ 1.6 mm		
CALIBRE™ 302V-6 LD HC1801009	Signage	25-50 (3 mm)	-	V-2 @ 1.5 mm	-	Extrusion
CALIBRE™ 303-15 LD HC1801014	Lens cover	86 (1 mm)	-	HB @ 1.5 mm	-	Injection molding
<b>UL 94 V0 @ 1.5 mm Diffusion Series</b>						
EMERGE™ PC 8430-7 LT IC1300094	Globe bulb cover & LED lens covers	92 (1.5 mm)	-	V0 @ 1.5 mm	f1	Injection-blow molding & extrusion
		82 (2 mm)				
EMERGE™ PC 8430-7 LT HC18010016	Globe bulb cover & LED lens covers	80.7 (1.5 mm)	-	V0 @ 1.5 mm	f1	Injection-blow molding & extrusion
EMERGE™ PC8430-7 LT HC18010017	Globe bulb cover & LED lens covers	77 (1.5 mm)	-	V0 @ 1.5 mm	f1	Injection-blow molding & extrusion
EMERGE™ PC8430-7 LT HC18010018	Globe bulb cover & LED lens covers	73 (1.5 mm)	-	V0 @ 1.5 mm	f1	Injection-blow molding & extrusion
EMERGE™ PC8430-7 LT HC18010019	Globe bulb cover & LED lens covers	64 (1.5 mm)	-	V0 @ 1.5 mm	f1	Injection-blow molding & extrusion
EMERGE™ PC8230-10	Globe bulb cover & LED lens covers	86.5 (1.5 mm)	-	V0 @ 1.5 mm	f1	Injection-blow molding, Injection molding
<b>UL 94 V0 @ 1.0 mm Diffusion Series</b>						
EMERGE™ PC 8830-5 LT	Tube covers & LED lens covers	75 (1 mm)	-	V0 @ 1.0	f1	Extrusion
<b>UL 94 V0 @ 0.8 mm Diffusion Series</b>						
EMERGE™ PC 8130-6 IC1300136	Bulb cover, Tube cover	70 (0.8 mm)	-	V0 @ 0.8 mm	f1	Injection-blow molding, Extrusion
		66 (1 mm)				
EMERGE™ PC 8130-6 IC1300080	Bulb cover, Tube cover	68 (1 mm)	56	V0 @ 0.8 mm	f1	Injection-blow molding, Extrusion
EMERGE™ PC 8130-6 IC1300102E	Bulb cover, Tube cover	70 (0.8 mm)	58	V0 @ 0.8 mm	f1	Injection-blow molding, Extrusion
		66 (1 mm)				
EMERGE™ PC 8130-6 IC1300096	Bulb cover, Tube cover	67 (0.8 mm)	53 (1 mm)	V0 @ 0.8 mm	f1	Injection-blow molding, Extrusion
		60 (1 mm)				

Degree of light dispersion measured with an optical goniophotometer. DLD or half gain angle  $D_{50}$  determines angle at which 50% of the light intensity value of the zero angle light intensity is reached. Theoretical best is 60.

### Applications

LED tube lamp covers, A-lamp bulbs, lenses, troffers and signage.

### Processing Methods

Injection Molding, injection blow molding and sheet/profile extrusion.

### Focused on Meeting Your Needs

Trinseo CALIBRE™ Polycarbonate Resins and EMERGE™ Advanced Resins are specifically designed for applications that balance light transmission and diffusion. Custom formulations are no problem. Trinseo collaborates with customers in the Lighting industry to ensure that the materials selected meet the specific needs of each application including property performance, part design, manufacturing and regulatory requirements.

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**Committed to the electrical and lighting industry.** In addition to its light diffusion/ignition resistant grades, Trinseo offers a full portfolio of CALIBRE™ Polycarbonate Resins and EMERGE™ Advanced Resins for use in LED Lighting and other electrical applications.

For more information contact us at 1-855-TRINSEO (+1-855-874-6736) or visit us online at <http://www.trinseo.com/industries/plastics/electrical-lighting/led>.

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