Product Bulletin/Technical Data Sheet

Release B, Effective October, 2012

Custom Formed Reflectors

Product Description

3M™ Custom Formed Reflectors ("CFR" or "Product") increase the optical efficiency of the light fixture by using precise specular mirror optics to raise the lumen output.

Each reflector is custom designed to your specifications for a variety of light control options including directing the light exactly where you want it. Made of a lightweight polymeric, multilayer optical mirror film, this reflector provides up to 98% specular reflectivity with greater than 97.5% average surface reflectivity in most applications.

This novel reflector can contribute to reduced energy use, and to reduce LED, lens, and reflector tooling costs.

Design Considerations

Please refer to the Product's Application Guide for an in-depth design consideration overview. Designers are encouraged to call your 3M customer service representative for a consultation.

Recommended End Uses

3M™ Custom Formed Reflectors are recommended for any LED applications requiring directed lighting.

- ✓ Architectural and retail lighting
- ✓ Task and specialty lighting

Key Attributes

- Impact resistant polycarbonate construction provides gouge and dent resistance and bulk rigidity
- 100% polymeric reflector provides electrical insulation
- Formable reflector allows for shapes unattainable with bent metal reflectors
- Can form most shapes and sizes required for lighting including parabolic to optimize optical efficiency

Product Characteristics

Contact your 3M representative for a custom specification, prototype quotation, or consultation. Below are typical values for the Product. These are based on test data deemed reliable but are not warranted, except for the Warranted Characteristics identified on Page 3.

	Characteristic	Value	Test
Optical	Photopic Reflectivity	> 97.5%	ASTM E1164/E308
	CIE a* & b* reflected color (D65, 2° Obs)	0 ± 2 unit	ASTM E1164/E308
Thermal	CTE	50 ppm/°C	ASTM D696
	Heat Deflection Temperature	140°C	ASTM D648
Physical	Pencil Hardness	b-hb	ASTM D3363

Thickness (2 available)	20.5 mils (0.52mm) 33.5 mils (0.85mm)	Micrometer
Material	Polycarbonate laminate	N/A

Forming Tolerances

Dimensions < 6 inch	+/- 0.015 inch (0.4 mm)	CMM
Dimensions 6 to 12 inches	+/- 0.025 inch (0.6 mm)	
Localized Thinning	Up to 60% of initial thickness	ASTM D5947
Key part radii[1]	0.020 inch to 0.040 inch	CMM

[1]. Minimum radii allowed, part design specific

Converting Tolerances

Dimensions < 6 inch	+/- 0.005 inch (0.12 mm)	CMM
Dimensions 6 to 12 inches	+/- 0.007 inch (0.18 mm)	CMM

Electrical

Breakdown Strength - normalized	59.1 kV/mm	ASTM D149

Certifications

UL Component Recognition, File E200486 - Vol 3, HB rated with 80°C RTI

UV & Environmental Durability

UV Stability

- After accelerated testing[2], samples exhibit change in CIE b* of less than 4 units.

[2] Accelerated dosage at UV sensitive wavebands was equivalent to that which occurs after 10 years at the surface of a 32 Watt T8 fluorescent bulb. This assumes the light is on 24 hours per day. Testing temperature was maintained at 35-40 deg C.

High Intensity Radiant Flux

- When using high intensity radiant light sources such as LED's, designs should be considered which minimize radiant flux density, time of exposure and heat. In high irradiance applications, 3M CFRs can begin to yellow and brown in time. Initial models estimate that the first onset of yellowing will occur after a blue radiant exposure of 50kJ/mm² at 50°C. For example, a CFR reflector placed 5 mm from the edge, and perpendicular to the base, of a typical 100 lm (4000K) LED, is estimated to remain colorless for at least 115K hours at 50°C. Higher operating temperatures are expected to shorten this lifetime.

Mechanical Integrity

- Engineered parts exposed to temperatures up to 120°C/ 248°F for 15 minutes retain their structural integrity.
- Long Term Environmental Testing
  - Cold -35°C, 1000 hrs
  - Hot-Dry 85°C , 1000 hrs
  - Hot-Humid 65°C/95% RH, 1000 hrs
  - Thermal Shock -35°C to 85°C, 100 cycles, 1 hour dwell

Optical properties stable under these test conditions.
Less than 3% shrinkage at the 85°C conditions

Warranted Characteristics

Property	Value	Test
Photopic Reflectivity[3]	> 97.5%	ASTM E1164/E308
CIE a* & b* reflected color (D65, 2° Obs)	0 ± 3 unit	ASTM E1164/E308

[3] Average total surface reflectivity. For designs with Aspect Ratios < 0.5 and an Areal Draw Ratio < 2.0

Limited Warranty & Limited Remedy

Limited Warranty

1. 3M warrants that the Product will have the Warranted Characteristics on the buyer's receipt of Product (the "3M Warranty"). EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, RIGHTS OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND THOSE ARISING FROM A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. THE BUYER IS RESPONSIBLE FOR DETERMINING IF A PRODUCT IS SUITABLE FOR ITS PARTICULAR PURPOSE AND APPLICATION METHODS.

2. For a buyer's convenience, 3M may provide engineering or technical information, recommendations, installation instructions, and other information or materials relating to Product ("Other Product Information"), but 3M makes only the 3M Warranty and does not warrant any Other Product Information.

3. 3M has no obligation under the 3M Warranty as to Product that has been: (a) modified, altered or processed in any manner; (b) stored, applied, installed, or used in a manner other than that 3M recommends in this Product Bulletin/Technical Data Sheet and in all Other Product Information; (c) damaged through contact with a person or thing, misuse, accident, neglect, or other action by anyone other than 3M; or (d) affected by environmental forces or stresses, including but not limited to, high intensity visible light, excessive heat, UV radiation, or water exposure.

Limited Remedy

If any Product is proven not to have met the 3M Warranty on the buyer's receipt, then **the buyer's exclusive remedy, and 3M's sole obligation, will be, at 3M's option, to replace that Product quantity or refund the applicable purchase price.**

Limitation of Liability

3M WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO A BUYER FOR DIRECT (other than the Limited Remedy stated above), SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS) IN ANY WAY RELATED TO A PRODUCT, THIS PRODUCT BULLETIN/TECHNICAL DATA SHEET, OR OTHER PRODUCT INFORMATION, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ON WHICH SUCH DAMAGES ARE SOUGHT.

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