



FRC Series 35mm Diameter Reflectors *for CREE MC-E LEDs*

- **High efficiency**
- **Faceted designs provide homogeneous focused spot *and* spilled/direct light**
- **34.5 mm diameter for MR-11 lamp applications**
- **3 beams available**

The FRC MCE reflectors are specifically designed for the XLamp 4-chip MC-E LEDs and from Cree.

A software-optimized aspheric profile combined with precision facets provides a homogeneous central spot as well as useful peripheral spilled light.

The high collection efficiency exceeds 90% of the total flux emitted by the LEDs.

Typical applications are:

- Flashlights/Torches
- General Illumination
- Reading Lamps
- Architectural Lighting



Cree® XLamp is a trademark of Cree, Inc. For technical information about these LEDs please refer to the Cree® XLamp datasheet or visit:

http://www.cree.com/products/xlamp_mce.asp

FRAEN CORPORATION

80 Newcrossing Road
Reading, MA 01867
Phone: 781.205.5300
Fax: 781.942.2426
optics@fraen.com

FRAEN S.r.l.

Via Stelvio, 12
20019 Settimo M. (MI) – Italy
Phone: +39-02-35.456.1
Fax: +39-02-335.456.239
info@fraen.com

Website: www.fraensrl.com

For ordering information, please contact:

NAFTA Countries	ARROW Telephone: 1-888-9LIGHT1 email: lightingsolutions@arrow.com
European Countries	Please contact Fraen S.r.l. for distributor's information Email: info@fraen.com



General Characteristics

Reflector Material: Polycarbonate, black color, with aluminum reflective coating.
Operating Temperature range: -40deg C / + 100 deg C
Storage Temperature range: -40deg C / + 100 deg C

Please note that small defects in the reflective coating, and flow lines and weld lines on the surfaces of the reflectors are acceptable if the optical performance of the reflector is within the specification described in the section "OPTICAL CHARACTERISTICS".

IMPORTANT NOTE – Reflector handling and cleaning:

- **Handling:** Always handle the reflectors by the outside surfaces or flange. Never touch the inside surfaces of the reflector with fingers; finger oils and contamination will absorb or refract light.
- **Cleaning:** Clean reflectors only if necessary. Use only soap and water to clean the surfaces and reflectors. **CAUTION** - Never expose the reflectors to alcohol or solvents, as they could damage the plastic.

Scope

This datasheet provides information about the following FRC series reflectors:

- FRC-N1-MCE-0R narrow beam reflector
- FRC-M1-MCE-0R medium beam reflector, with textured facets
- FRC-M2-MCE-0R medium beam reflector, with polished facets

Part Identification

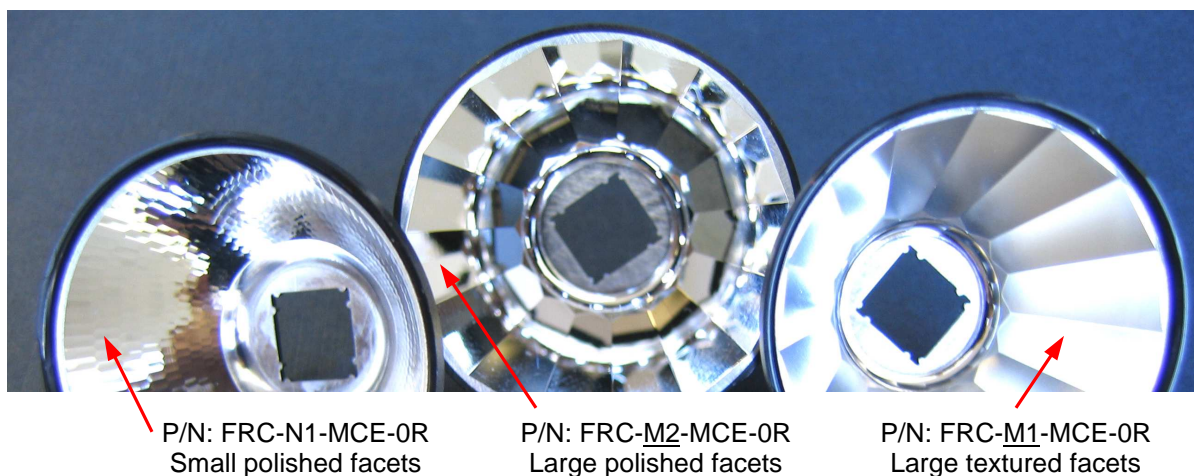


Figure 1. Visual appearance of reflectors, for differentiating between part numbers.

Optical Characteristics: Beam Divergence and On-axis Efficiency

	Central Spot		Spilled Light / Halo	
	On-axis intensity (candela/lumen)	Beam Angle (degrees)	~ Intensity (candela/lumen)	Beam Angle (degrees)
Narrow Beam (P/N: FRC-N1-MCE-0R)	14	10	0.35	90
Medium Beam, Textured Facets (P/N: FRC-M1-MCE-0R)	1.8	30	0.35	90
Medium Beam, Polished Facets (P/N: FRC-M2-MCE-0R)	2.3	29	0.35	90

* The “Beam Angle” for the central spot is measured at the full-width at half-maximum (FWHM); the “Beam Angle” for the spilled light is measured at the Full Beam at 5% of center spot maximum (FWHM). Spilled light intensity is typical, as measured at ~30° half-angle location.

** Preliminary data and subject to change; MC-E results may be better due to smaller LED chip size.

Table 1. Beam angles and intensity values.

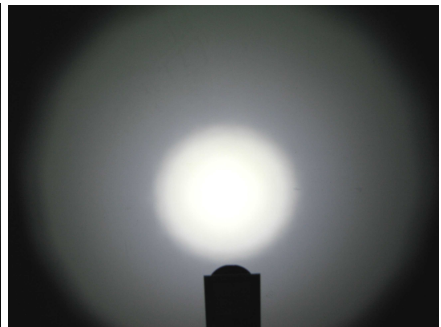
Beam photographs and beam profiles



Narrow Beam
(P/N: FRC-N1-MCE-0R)



Medium Beam, Textured Facets
(P/N: FRC-M1-MCE-0R)



Medium Beam, Polished Facets
(P/N: FRC-M2-MCE-0R)

Figure 2. Beam photographs

See next page for beam profiles.

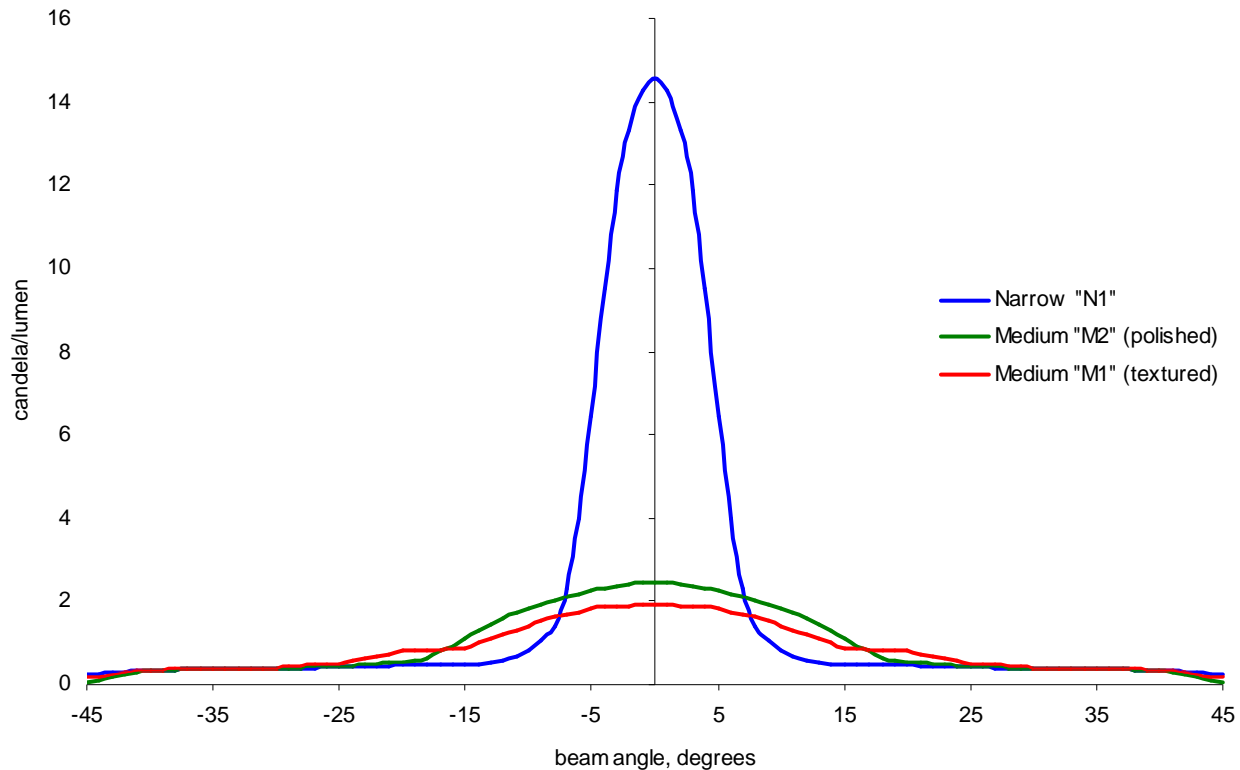


Figure 3. Beam profiles (reference)

Illumination Calculations

To calculate peak candela: Find the central spot “on-axis intensity” value in Table 1, then multiply this value by the lumens output from your LED (refer to the MC-E LED datasheet <http://www.cree.com/products/pdf/XLampMC-E.pdf> for nominal lumens values). Or for a more accurate value, refer to Cree’s .pdf specification for intensity binning.

Example calculation:

If the Fraen narrow reflector FRC-N1-MCE-0R is used on a cool white MC-E LED at 350 mA, the typical luminous flux of the “Group M” LED is 430 lumens:

The calculation is: (14 candela/lumen) x (430 lumens) = 6020 candela peak on-axis.

The beam angle specified in Table 1 above is 10 degrees full beam-width measured at half-peak. This means at 5 degrees off-axis (half of 10 degrees), the intensity should be half of 6020 candela, or 3010 candelas.

1 candela at 1-meter distance produces 1 Lux. This means the peak intensity at 1 meter will be 6020 lux. The intensity decreases as a function of the distance squared, so at 2 meters the peak intensity will be $6020 / (2^2) = 1505$ lux. At 3 meters distance, the peak intensity will be $6020 / (3^2) = 670$ lux.

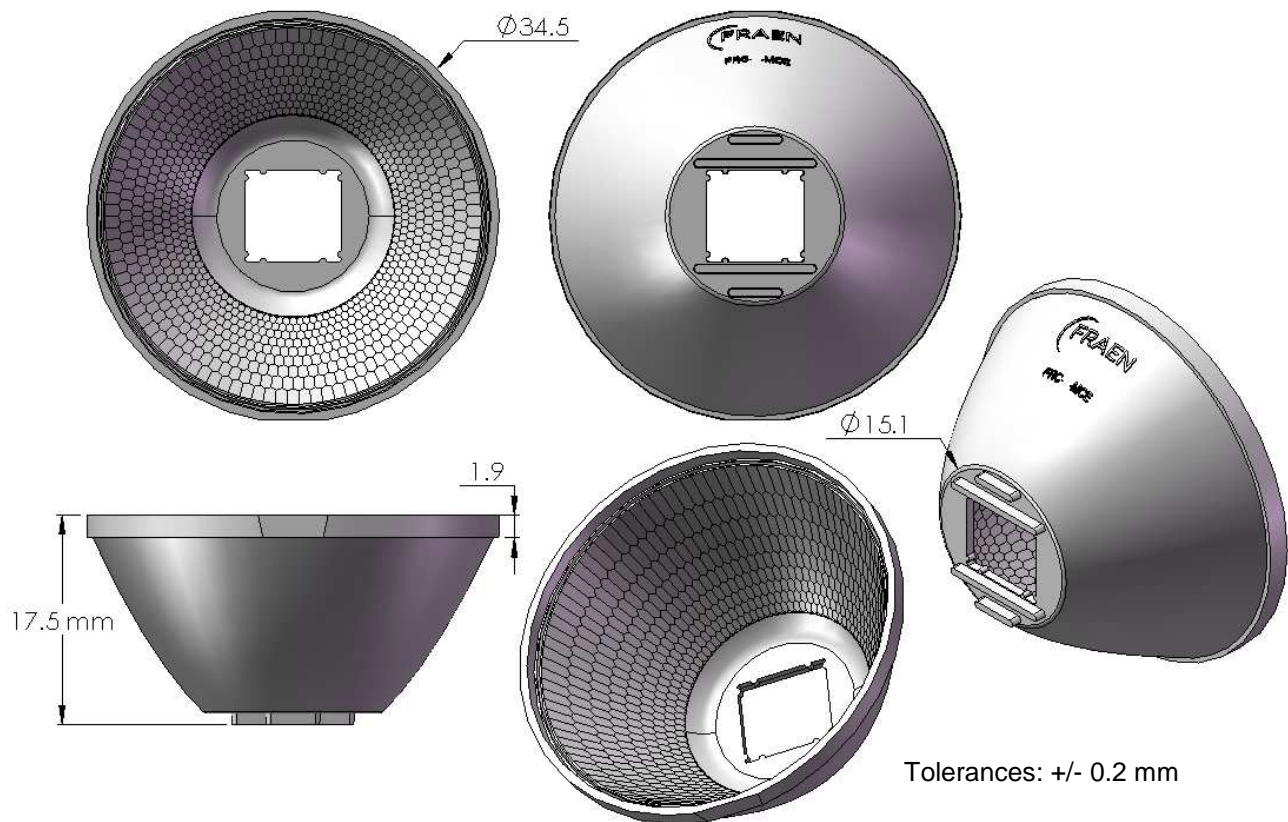


Figure 4. Front, side, rear and isometric views, with main dimensions.

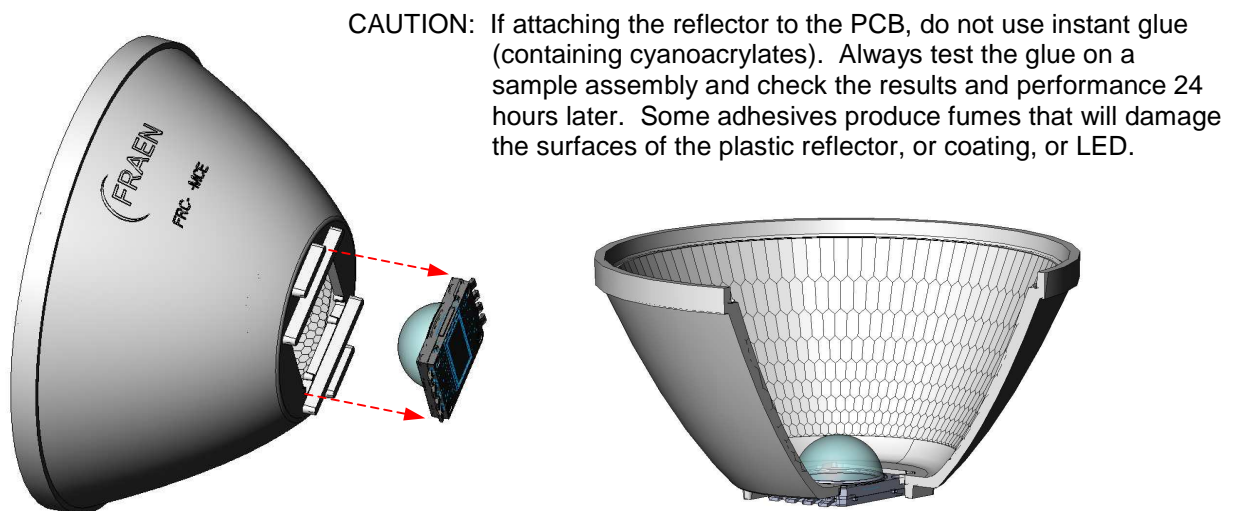


Figure 5. The reflector touches the PCB, and is self-centered on the LED, by 8 small crush-ribs inside the rectangular hole thru the reflector.



Ordering part numbers

FRC-__-MCE-0R

0 (number zero), not letter O

- FRC-N1-MCE-0R narrow beam reflector
- FRC-M1-MCE-0R medium beam reflector, with textured facets
- FRC-M2-MCE-0R medium beam reflector, with polished facets

Published by Fraen Corporation.

All data contained in this document is the property of Fraen Corporation and may change without notice.

Rev	Date	Author	Description
03	17-November-09	C. Jones	Part numbering change: M1 was polished, M2 was textured.
02	03-September-09	C. Jones	Added 5 pages. Data re-measured. "-M2" version added.
01	18-September-08	C. Jones	Initial Release