



Color Mixing FRC Reflector for Cree XM-L™ LEDs

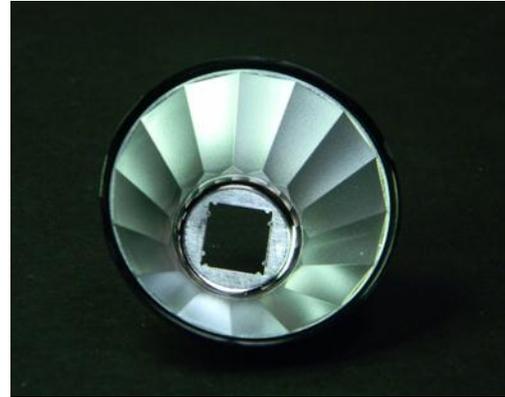
- High efficiency
- Excellent color mixing
- Central Medium beam with useful spill illumination

The FRC reflector delivers a medium beam illumination with excellent color mixing when used with the Cree XM-L RGBW LED. The FRC reflector also works well with the XM-L Standard (single die) and XM-L EZ White (four die) LEDs.

The excellent uniformity of the color mixing enables the FRC reflector to be used in a variety of applications.

Target applications are:

- Architectural lighting
- Entertainment lighting
- RGB Lighting
- General illumination
- Retail and decorative illumination



XM-L is a trademark of Cree Inc. For technical specification on LEDs please refer to the datasheet or visit <http://www.cree.com/>

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Example Calculations

To calculate intensity (cd): Find the central spot on-axis intensity (cd/lm) for the reflector and then multiply this value by the luminous flux (lm) of the LED. Refer to the LED's datasheet for typical flux values; drive current versus flux ratios; color temperature and binning characteristics.

Example intensity calculations:

If a Fraen reflector with an on-axis intensity of 21 candela per lumen (cd/lm) is used with an LED that produces 105 lumens of flux, the calculations are as follows:

On-axis intensity = (21 cd/lm) x (105 lumens) = 2205 candela on-axis intensity (one LED).

If 12 LEDs are used in a fixture, then the on-axis intensity = 12 LEDs x 2205 candela/LED
= 26460 cd (on-axis – 12 LEDs)

An explanation of illuminance and the effect of distance

One candela at 1-meter distance produces 1 lux. In the above example, the 12 LED fixture produced 26460 candela. If that fixture is illuminating a surface one meter distant, then the *illuminance* on that surface is 26460 lux.

Illuminance decreases with the square of the distance. If you move the fixture so that it is two meters from the surface, then the illuminance falls to 26460 lux/ (2m)² or 6615 lux. Moving the fixture three meters from the surface decreases the illuminance to 26460 lux/(3m)² or 2940 lux.

Beam and Field Angles

Beam and Field Angles are methods of describing the light distribution of a reflector. The Beam Angle is expressed as a FWHM value (Full angular Width of the beam where it reaches Half the Maximum intensity). The Field Angle is a similar concept, sometimes expressed as FW10%, and represents the Full Width angle where the beam reaches 10% of maximum intensity.

If the reflectors in our example fixture, above, have a Beam Angle of 10° and an on-axis intensity of 26460 cd, then at ± 5° (half of 10°) the intensity will drop to half of 26460 or 13230 cd. If the Field Angle for the fixture is 19°, then at ± 9.5° (half of 19°) the intensity should be 10% of 26460 or 2646 cd.

Most reflectors have Beam and Field Angles that are rotationally symmetrical about the center axis of the reflector. Reflectors with an elliptical beam profile or optics with specifically shaped beam profiles are the exception.

Intensity, illuminance, Beam and Field Angle are all important factors to be considered in a fixture design. Some applications may require specific ratios between the Beam and Field Angle values.

Mechanical Characteristics

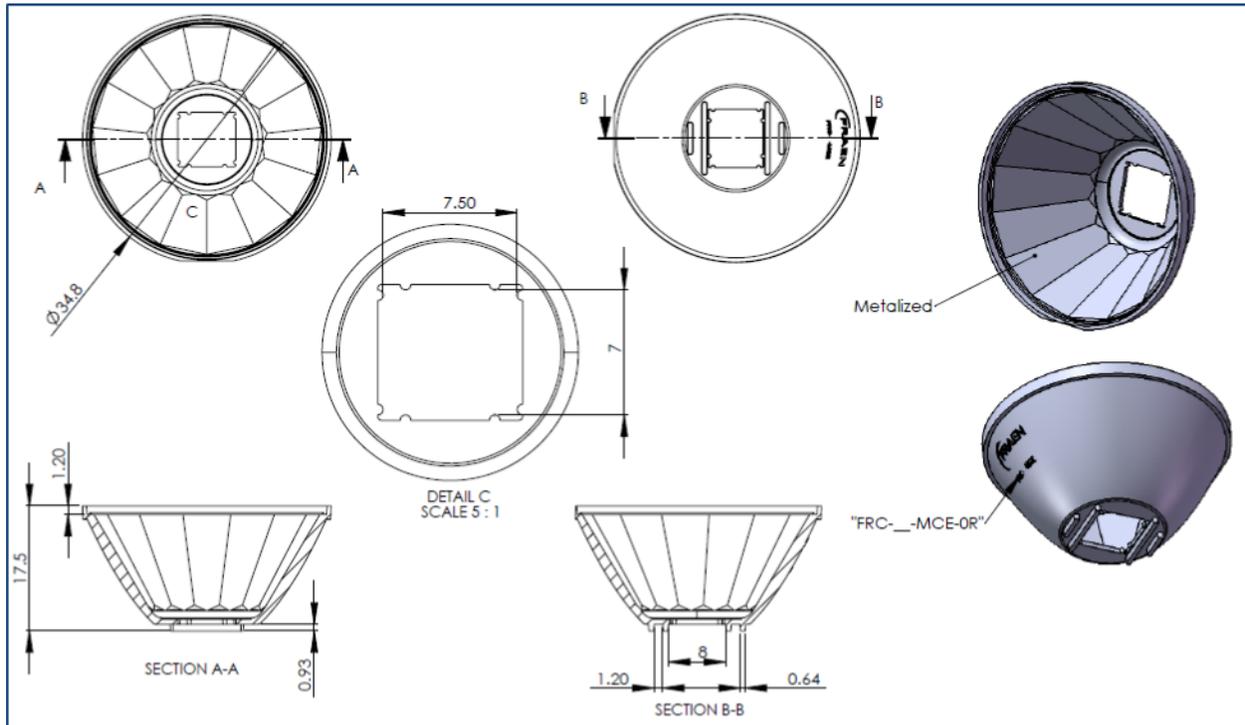


Figure 1: General views and dimensions of the FRC-M1-35-RIB reflector
(All dimensions in millimeters – Mechanical CAD files available upon request)

Ordering Part Numbers

FRC-M1-35-RIB