



FGR Series 27mm Diameter Reflectors for Cree XP-E, XP-G, XM-L and XM-L2

- **High efficiency**
- **Faceted design provides a homogeneous beam with a focused spot *and* a uniform spill light**

The FGR XP reflectors are specifically designed for the XLamp XP-E, XP-G, XM-L and XM-L2 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
- Entertainment 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.asp>

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General Characteristics

Materials

Reflector Material	Black polycarbonate with vacuum deposited aluminum coating and a clear lacquer protective coating
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Operating Temperature range	-40° C / + 95° C
Storage Temperature range	-40° C / + 95°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. Never expose the reflectors to alcohol, as it will damage the plastic.

Scope

This datasheet provides information about the FGR reflector for Cree XLamp XP-E, XP-G, and XM-L2 LEDs (**FGR-N1-XP1-0R** narrow beam reflector).



Optical Characteristics – On-axis Intensity¹, Beam Angle², Field Angle³

LED	Beam Shape	On-axis Intensity (peak)	Beam Angle (FWHM)	Field Angle (FW10%)
XM-L, -L2 Cool White 	Narrow	12.0 cd/lm	10.5°	23°
XP-G Cool White 	Narrow	22.6 cd/lm	7°	16°
XP-E Cool White 	Narrow	46.2 cd/lm	4.5°	10°
XP-E Warm White 	Narrow	44.6 cd/lm	4.8°	9.8°
XP-E Red 	Narrow	36.6 cd/lm	5°	11.5°
XP-E Green 	Narrow	44.2 cd/lm	4.5°	10°
XP-E Standard Blue 	Narrow	36.5 cd/lm	5°	10.8°
XP-E Amber 	Narrow	37.3 cd/lm	5.5°	12°

- (1) To calculate the on-axis intensity (cd), multiply the on-axis value, above, of the lens (cd/lm) by the total flux (lm) of the Cree XLamp LED used. See “Example Calculations” below. Luminous intensity depends on the flux binning and tolerances of the LEDs. Please refer to the LED datasheet for more details on flux binning.
- (2) FWHM is the full angle where the beam intensity is half the on-axis peak intensity
- (3) Field angle is the full angle where the beam intensity is 10% of the on-axis peak intensity

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 $26460 \text{ lux} / (2\text{m})^2$ or 6615 lux. Moving the fixture three meters from the surface decreases the illuminance to $26460 \text{ lux} / (3\text{m})^2$ or 2940 lux.

Mechanical Characteristics

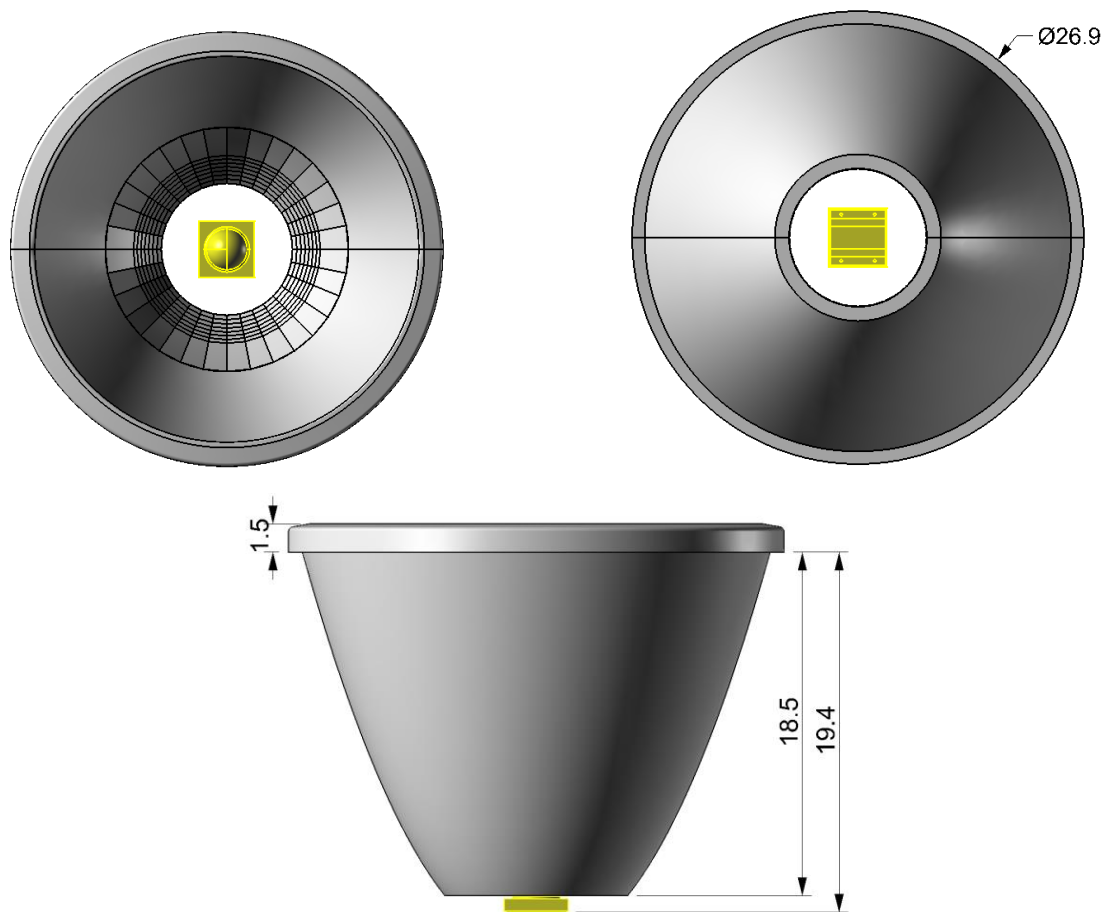


Figure 1. Front, side and rear views, with main dimensions (mm).

For best performance and beam appearance, the FGR reflector should be positioned so that the reflector's flange is 19.4mm from the bottom of the LED substrate as shown in Figure 1 above. This distance is the same for all XLamp LEDs listed in the Scope of this datasheet.

The FGR reflector does not have any mechanical mounting features. It is designed with a mounting flange, allowing the designer to properly align and secure the reflector in their assembly.



Ordering Part Numbers

FGR-N1-XP1-0R

(The last two characters are 'zero R')