FCM-series Lenses
for Luminus Devices SST-50 and SST-90 LEDs

- **Highly efficient TIR collimation lenses**
- **Homogeneous beam**
- **Bright central spot with minimal halo**

The FCM-series lenses are specifically designed to produce a round homogeneous beam from multi-chip LED sources such as the Luminus PhlatLight™ SST-50 and SST-90.

A software-optimized aspheric profile combined with front shaped micro-lens arrays and a proprietary texture provides an efficient homogeneous optical solution.

The high collection efficiency reaches 80% of the total flux emitted from the LED.

Typical applications are:

- Architectural lighting
- Entertainment lighting
- Wall washing
- Portable lighting
- Applications requiring excellent uniformity

PhlatLight is a trademark of Luminus Devices. For technical specifications on the LED please refer to the SST-50 LED datasheet: http://www.luminus.com/content1044.

For ordering instructions, please contact

FRAEN CORPORATION
80 Newcrossing Road
Reading MA 01867

Phone: 781.205.5300
Fax: 781.942.2426
optics@fraen.com

FRAEN Srl
Via Stelvio, 12
20019 Settimo M. (MI)
ITALY

Phone: +39-02-35.456.1
Fax: +39-02-335.456.239
info@fraen.com

To find a local distributor, check the Fraen website.

Website: www.FraenOMG.com

General Characteristics

Lens Material	Optical Grade PMMA
Operating Temperature range	-40deg C / + 80 deg C
Storage Temperature range	-40deg C / + 80 deg C

Average transmittance in visible spectrum (400 – 700nm) >90%, as measured using 3mm thick Optical Grade PMMA.

Please note that flow lines and weld lines on the external surfaces of the lenses are acceptable if the optical performance of the lens is within the specification described in the section "OPTICAL CHARACTERISTICS"

IMPORTANT NOTE – Lenses handling and cleaning*:*
Handling: Always handle the lenses only by the flange and/or use gloves. Never touch the outside surfaces of the lenses with fingers; finger oils and contamination will absorb or refract light.
Cleaning: Clean lenses only if necessary. Use only soap and water to clean the surfaces and lenses. Never expose the lenses to alcohol, as it will damage the plastic.

Scope

This datasheet provides information about the FCM-N1-ST50-0 narrow beam lens and FCM-M2-ST50-0 medium beam lens, when used on Luminus Devices SST-50-W or SST-50-W white LEDs.

Optical Characteristics – Beam Angle (degrees, Full Angle)

Lens Part Number	Type of lens	Beam Angle (Degrees, FWHM)	
		SST-50-W LED	SST-90-W LED
FCM-N1-ST50-0	Narrow beam	15	20
FCM-M2-ST50-0	Medium beam	25	27

Optical Characteristics – On-Axis Intensity (candela/lumen)

Lens Part Number	Type of lens	Peak Intensity (Candela/lumen)	
		SST-50-W LED	SST-90-W LED
FCM-N1-ST50-0	Narrow beam	8.0	5.4
FCM-M2-ST50-0	Medium beam	4.3	3.5

Notes referring to data on previous page:
(1) Full-width half-maximum (FWHM) beam angle is a measurement of the full angle of the beam where the intensity is ½ of the peak intensity.
(2) To calculate the on-axis intensity, multiply the on-axis efficiency of the lens (candela/lumen) by the total flux of the Luminus LED used. See "Illumination Calculations" below.

Illumination Calculations

To calculate peak candela: Find the central spot "on-axis intensity" value in the table above, then multiply this value by the lumens output from your LED (refer to the Luminus SST-50 LED datasheet at http://www.luminus.com/ for nominal lumens values.

Example calculations:
If the Fraen narrow beam lens FCM-N1-SSP5-0 is used on Luminus SST-50 LED running at 1.7 Amps, the typical luminous flux of the LED is 550 lumens:
The calculation is: (8.0 candela/lumen) x (550 lumens) = 4400 candela peak on-axis.
The beam angle specified in the table above is 14 degrees full beam-width measured at half-peak. This means at 7-1/2 degrees off-axis (half of 15 degrees), the intensity should be half of 4400 candela, or 2200 candelas.
Since 1 candela at 1-meter distance produces 1 Lux, the peak intensity at 1 meter will be 4400 lux. The intensity decreases as a function of the distance squared, so at 2 meters the peak intensity will be 4400 / (2^2) = 1100 lux. At 3 meters distance, the peak intensity will be 4400 / (3^2) = 489 lux.

Beam Appearance

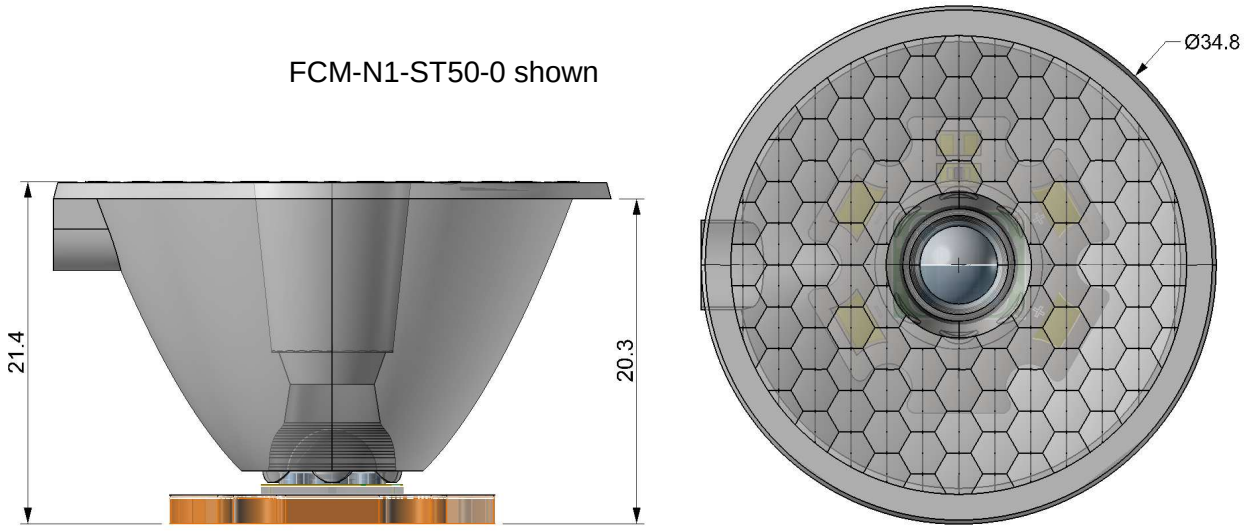
FRC-N1-ST50-0 lens on SST-50-W LED FRC-M2-ST50-0 lens on SST-50-W LED

Figure 1. Beam appearance photos.

Mechanical Characteristics

NOTE: The user must provide a mechanical method to set the correct position of the FCM lens on the LED. For example, the lens flange can be located in the lamp housing to center the lens to the LED and establish 21.0mm from the lens flange to the user's PC board. When the lens is positioned correctly, the bottom of the lens touches the LED. There are features on the lens that help to center the lens to the LED.

FCM-N1-ST50-0 shown



Tolerances: +/- 0.2 mm (based on nominal LED dimensions)

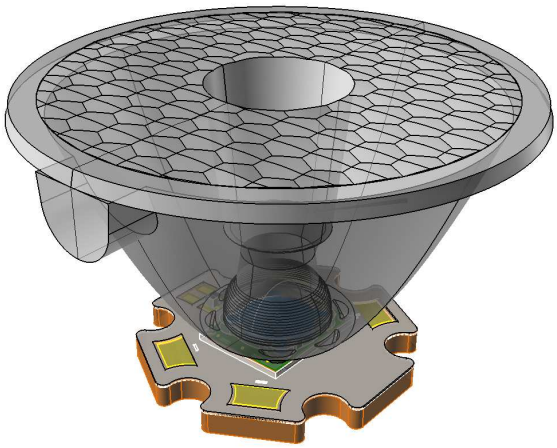
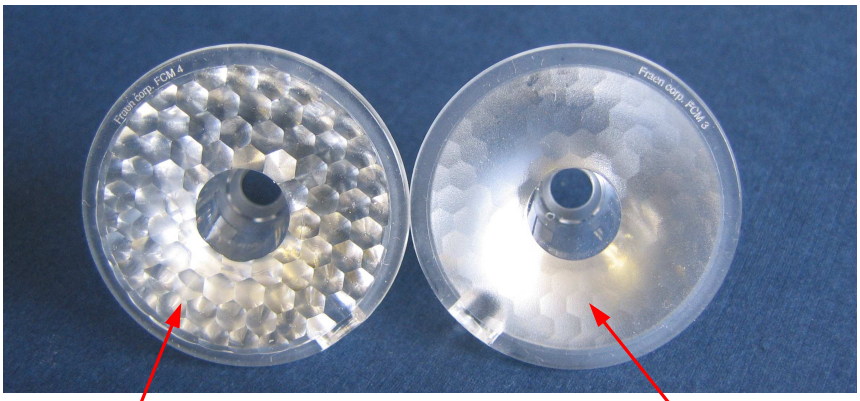


Figure 2. Dimensions of lens on SST-50-W Star LED. Bottom of Fraen lens touches flat perimeter of LED lens.

Identification of Lenses by Appearance

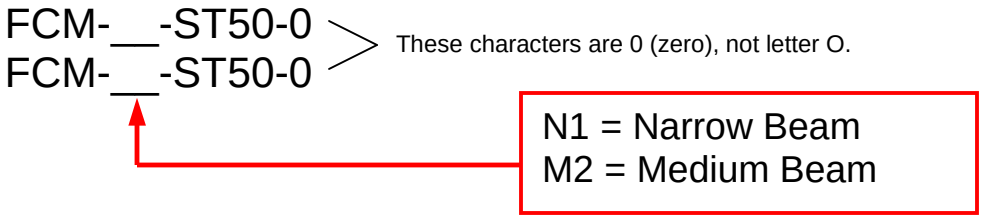


The FCM-M2-ST50-0 medium beam lens has higher hexagonal microlenses and less texture.

The FCM-N1-ST50-0 narrow beam lens has lower hexagonal microlenses and more texture.

Figure 3. Identification of lenses by front appearance.

Ordering part numbers



Document Revision Record

Rev	Date	Author	Description
01	01-March-2010	C. Jones	M2 part added. N1 part number was SSP5.
00	27-April-2009	C. Jones	Initial Release