

## FLP SERIES LENSES for LUXEON™ LEDs: LUXEON I, III, and V, STAR and EMITTER

- **High efficiency**
- **Available in 2 different beams**
- **Patent Pending**

The FLP series offers 2 lenses especially designed for the Lumileds (1) LUXEON™ Lambertian LEDs.

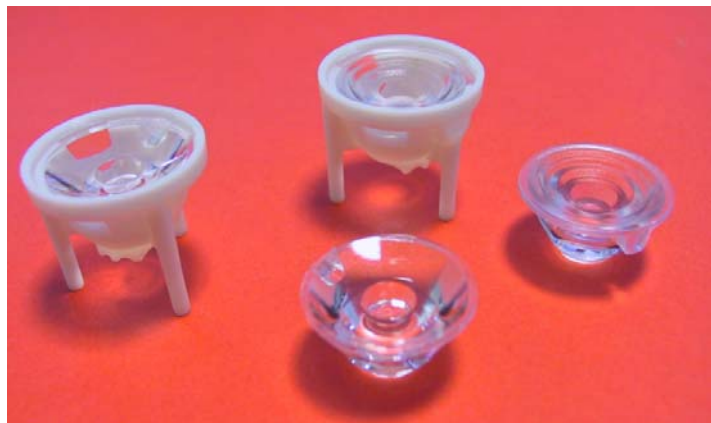
Software-optimized aspheric profile combined with a shaped front surface and a Fresnel profile, providing 2 different (narrow and medium beam) output patterns.

The high collection efficiency reaches 85% of the total flux emitted from the LED.

Each of these 2 lenses can be used alone on the Luxeon™ LEDs or with its specific holder. The holder assures the proper relative placement of the lens and the Luxeon™ LEDs. Heat staking the three legs of the holder to the customer's PCB or heat sink provides excellent optical and mechanical assembly (see Fraen Application Note FAN01-EN, at [www.fraen.com](http://www.fraen.com)).

Typical applications are:

- Reading lamps
- Signs
- Architectural Lighting
- Street lights
- Most application where a compact light source is required.



(1) LUXEON™ is a trademark of Lumileds Lighting, LLC. For technical specification on LEDs please refer to the LUXEON™ datasheet or visit <http://www.luxeon.com> or [www.lumileds.com](http://www.lumileds.com)

(2) Typical beam divergence may change with different color LEDs.

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**Americas: 1-888-LUXEON2**

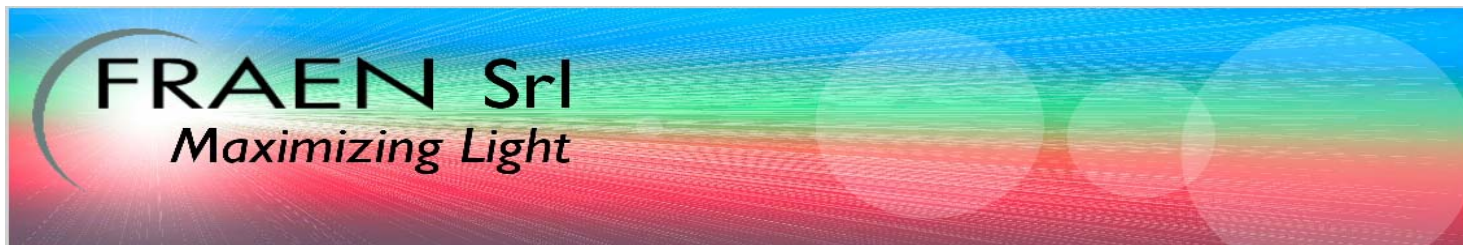
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## General Characteristics

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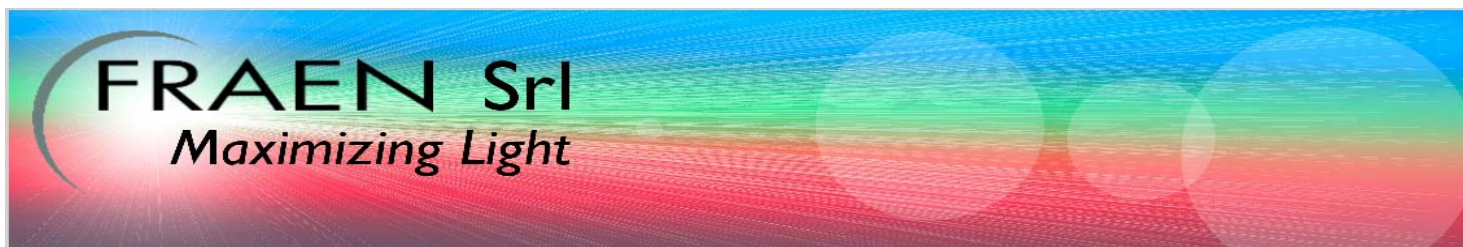
|                             |                          |
|-----------------------------|--------------------------|
| Lens Material               | Optical Grade PMMA       |
| Holder Material             | PC ABS or Transparent PC |
| Operating Temperature range | -40deg C / + 80 deg C    |
| Storage 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 use gloves to handle lenses and/or handle the lenses only by the flange. 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.



## Optical Characteristics:

| Lens Part Number | Type of lens | Typical total beam divergence (deg) (3) |                                 |                 |
|------------------|--------------|-----------------------------------------|---------------------------------|-----------------|
|                  |              | Red, Orange, Amber LEDs<br>● ● ●        | Blue, Cyan, Green LEDs<br>● ● ● | White LEDs<br>○ |
| FLP-HNB3-LL01-0  | Narrow beam  | 10                                      | 12                              | 12              |
| FLP-HMB3-LL01-0  | Medium beam  | 25                                      | 30                              | 30              |

- (3) The typical divergence varies with LED color due to different chip size and chip position tolerance.  
The typical total divergence is the full angle measured where the luminous intensity is half of the peak value.

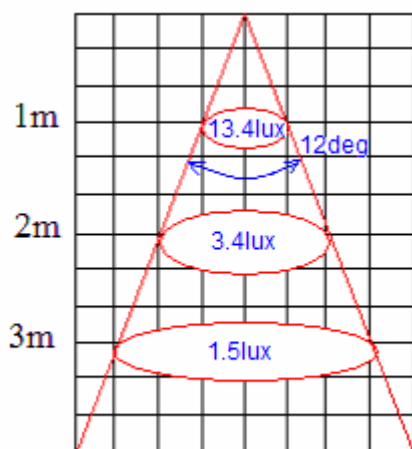
| Lens Part Number | Type of lens | Typical on-axis efficiency (cd/lm) (4)(5) |                |                 |                                  |                 |
|------------------|--------------|-------------------------------------------|----------------|-----------------|----------------------------------|-----------------|
|                  |              | Blue LEDs<br>●                            | Cyan LEDs<br>● | Green LEDs<br>● | Red, Orange, Amber LEDs<br>● ● ● | White LEDs<br>○ |
| FLP-HNB3-LL01-0  | Narrow beam  | 14.2                                      | 15.5           | 15.5            | 10.9                             | 13.4            |
| FLP-HMB3-LL01-0  | Medium beam  | 5.0                                       | 5.0            | 5.0             | 5.1                              | 4.9             |

- (4) To calculate the on-axis intensity, multiply the on-axis efficiency of the lens (cd/lm) by the total flux of the Luxeon LED used. For more detail on flux binning please check the Luxeon LED datasheet at <http://www.luxeon.com/>
- (5) Luminous intensity depends on the flux binning and tolerances of the LEDs. Please refer to the Luxeon datasheet for more details on flux binning and mechanical tolerances.

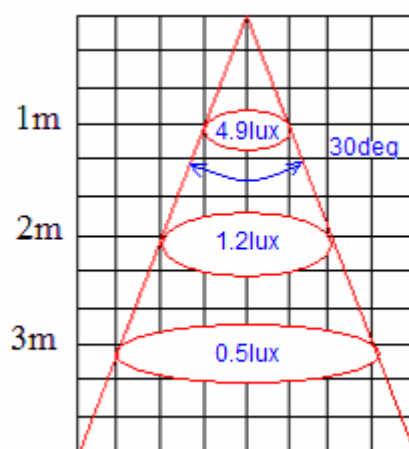
## Illumination Chart <sup>(5,8)</sup> for white Lambertian LUXEON™ LEDs

(8) Typical illuminance measured in lux per lumen (E) with typical Luxeon™ LEDs.  
To estimate the illuminance in lux, multiply the typical illuminance E by the flux in lumen of the LED used.

With FLP-HNB3-LL01-0 lens:  
Low Profile Narrow Beam lens for Lambertian Luxeon LEDs



With FLP-HMB3-LL01-0 lens:  
Low Profile Medium Beam lens for Lambertian Luxeon LEDs



These values have been calculated using the efficiency values of the lens listed above and the formula  $E = I / d^2$ , where **E** is the irradiance in lux, **I** the intensity in cd, and **d** the distance between the lens output and the measured point.

## Mechanical Characteristics

The FLP series of lenses has been designed specifically for the Luxeon Lambertian LEDs. They can be used with any non SMT Lambertian Luxeon LED:

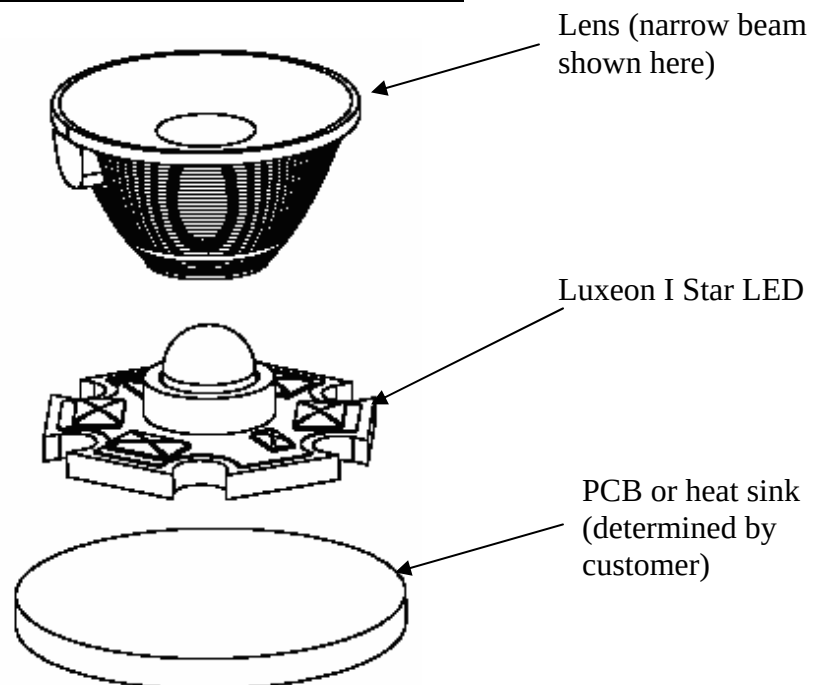
- Either Luxeon I), Luxeon III, or Luxeon V.
- Either Emitter or Star.

The FLP lenses can be used either **alone** or **with holder**.

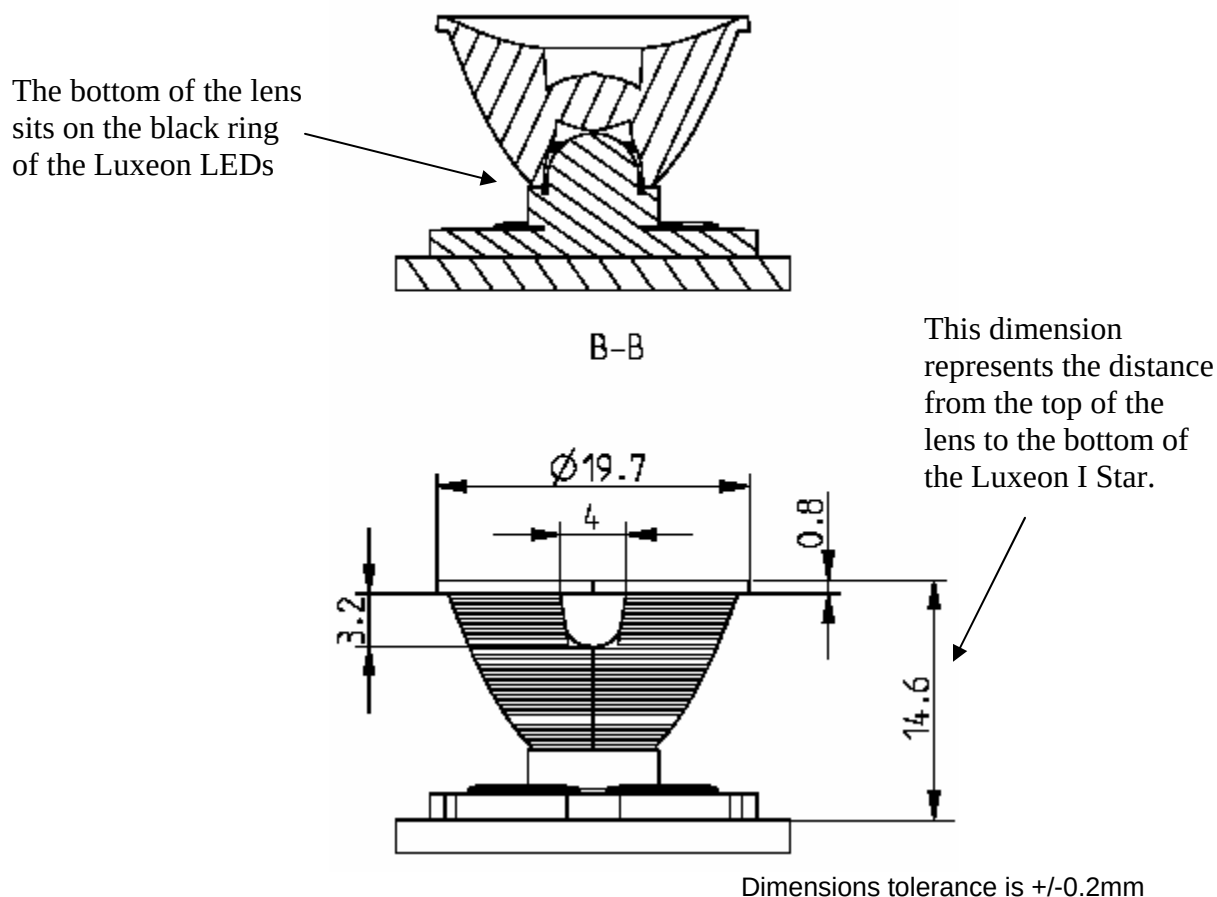
The lenses holder provides mounting legs for heat staking the lens assembly to a printed circuit-board or heat sink, and also helps to center the lens to the LED. To order a lens assembly (with holder), please change the last character of the part number from -0 to -H.

*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".*

### **View of the assembly with the lens (if no holder is used):**



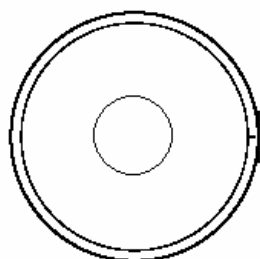
## Drawing of the assembly with the lens (if no holder is used):



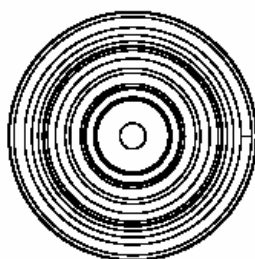
The outside mechanical dimensions of the lenses (Narrow and Medium beam) are the same, except the top of the lens. The lens can be recognized by the top view:

### Top views:

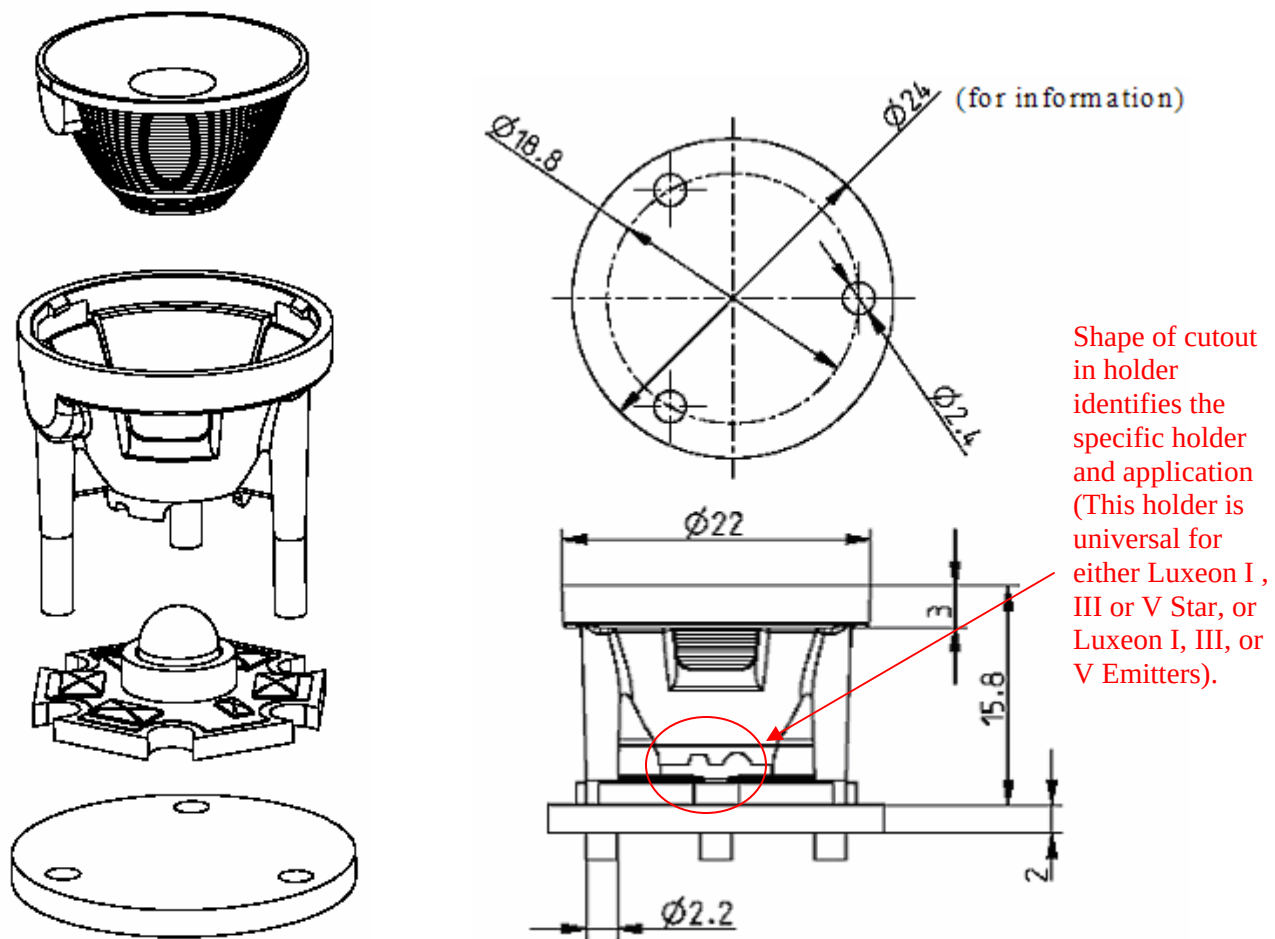
Narrow beam lens



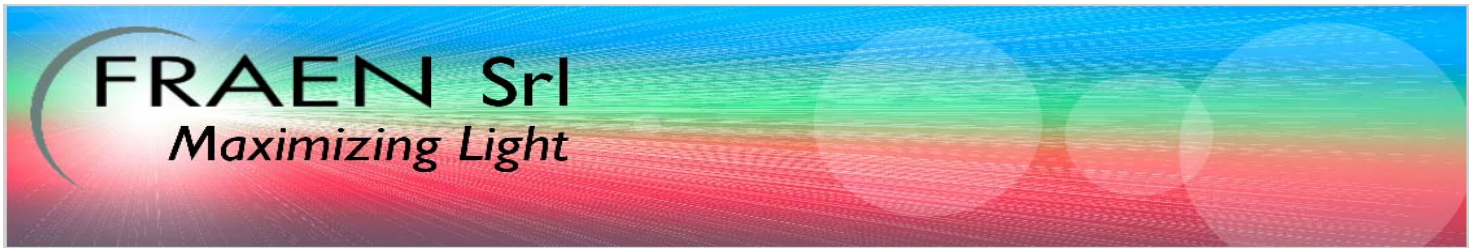
Medium beam lens (*light texture on the top lens*)



**Lens + holder assembly view and dimensions:**



Dimensions tolerance is +/-0.2mm



## Ordering part numbers

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FLP-H\_B3-LL01-\_\_

**OPTIONS:**

0 = without holder (lens only)  
H = with holder (lens heat staked into lens holder)

**LENS TYPE:**

N = Narrow beam lens  
M = Medium beam lens

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### Document Revision Record

| Rev | Date        | Author      | Description                     |
|-----|-------------|-------------|---------------------------------|
| 00  | 10 March 05 | M Thorailer | Initial Release                 |
| 01  | 01 April 05 | M Thorailer | Additional data and text added. |
| 02  | 14 March 07 | C Jones     | Part number errors fixed.       |