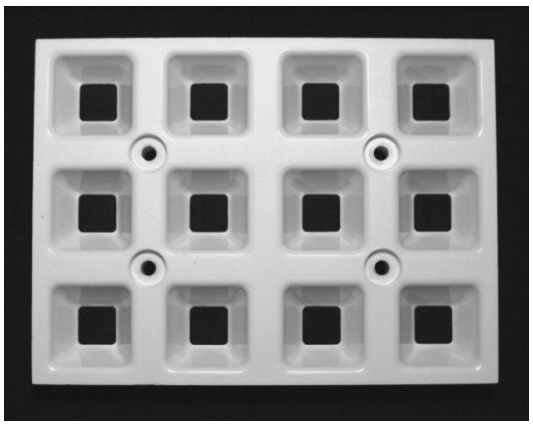
Twelve LED Troffer Reflector

F4A-3x4-1-RS

- **White diffuse reflector**
- **12 - up optic in a 3 x 4 array**
- **3-inch x 4-inch footprint**
- **Constructed of highly efficient white Makrolon**
- **Designed for use with Philips Lumileds LUXEON Rebel and Rebel ES[1] LEDs**
  (Please contact Fraen for suitability of this reflector with other LEDs)



Typical applications are:

- Troffer fixtures
- General interior lighting
- Low bay fixtures
- Commercial lighting
- Architectural lighting
- Retrofit lighting

(1) LUXEON® Rebel and Rebel ES are trademarks of Philips Lumileds. For technical specification on LEDs, please refer to the LUXEON® Rebel and Rebel ES datasheet or visit www.philipslumileds.com

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General Characteristics

Materials

Reflector Material	Bayer Makrolon 6265, White
Operating Temperature range	-40° C / + 95° C
Storage Temperature range	-40° C / + 95°C

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

Scope

This datasheet provides information about the 12-up F4A-3x4-1-RS diffuse white reflector.

Optical Characteristics – On-axis Intensity[1], Beam Angle[2], Field Angle[3]

LED	Beam Shape	On-axis Intensity (peak)	Beam Angle (FWHM)	Field Angle (FW10%)
Rebel Cool White	Square	0.84 cd/lm	84°	118°
Rebel ES Cool White	Square	0.60 cd/lm	85°	124°

(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 LED used. See "Illumination Calculations" below. Luminous intensity depends on the flux binning and tolerances of the LEDs. Please refer to the particular LED datasheets 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

Illumination Calculations

To calculate intensity (cd): Find the central spot "on-axis intensity" value in the table above, then multiply this value by the luminous flux (lm) from your LED (refer to the LED datasheet for nominal lumen values.) For a more accurate calculation, refer to the intensity "ranking" (binning) tables on the datasheet for the specific LED.

Example intensity calculations:
If the Fraen F4A-3x4-1-RS is used on an LED driven at 350 mA, a typical luminous flux of the LED might be 80 lumens:

The calculation is: (0.84 cd/lm) x (80 lumens) = 67.2 candela on-axis intensity (one LED).

For 12 LEDs with a F4A-3X4-1-RS reflector: 12 LEDs x 67.2 candela/LED = 806 candela peak on-axis intensity.

An explanation of illuminance and the effect of distance

One candela at 1-meter distance produces 1 Lux. This means the peak illuminance at 1 meter will be 806 lux. The illuminance decreases as a function of the distance squared, so at 2 meters the peak illuminance will be 806 / (2^2) = 202 lux. At 3 meters distance, the peak illuminance will be 806 / (3^2) = 90 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.

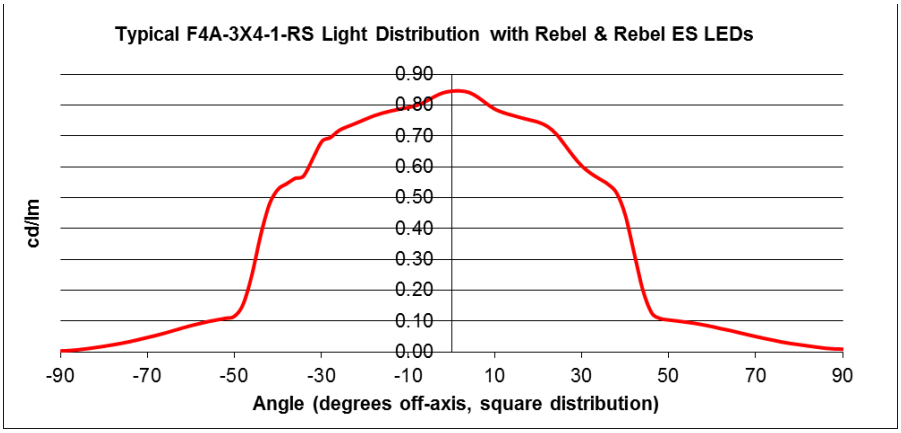
Beam and Field Angles

Beam and Field Angles are methods of describing the light distribution of a lens. 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.

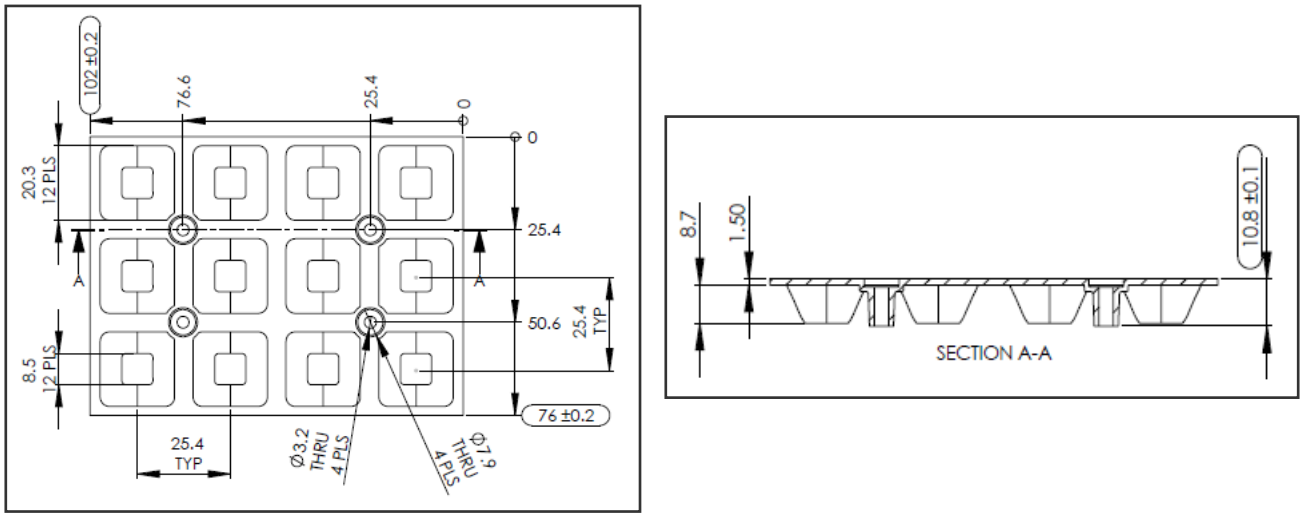
If the reflector in our example fixture, above, has a Beam Angle of 84° and an on-axis intensity of 806 cd, then at ± 42° (half of 84°) the intensity will drop to half of 806 or 403 cd. If the Field Angle for the fixture is 118°, then at ± 59° (half of 118°) the intensity should be 10% of 806 or 80.6 cd.

Most lenses have Beam and Field Angles that are rotationally symmetrical about the center axis of the lens. Lenses 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



F4A-3x4-1-RS – Front and Section Views

Ordering Part Numbers

F4A-3x4-1-RS