



## LIGHT DIFFUSER FROM FREUDENBERG

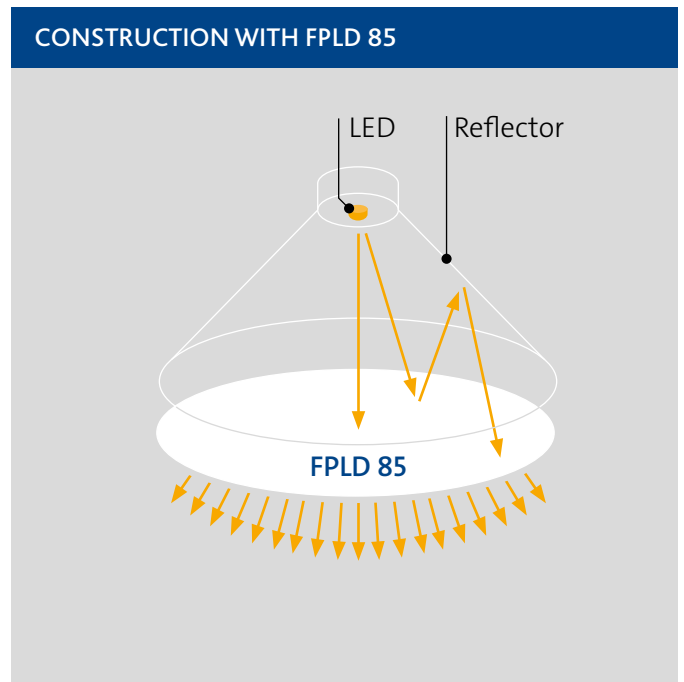
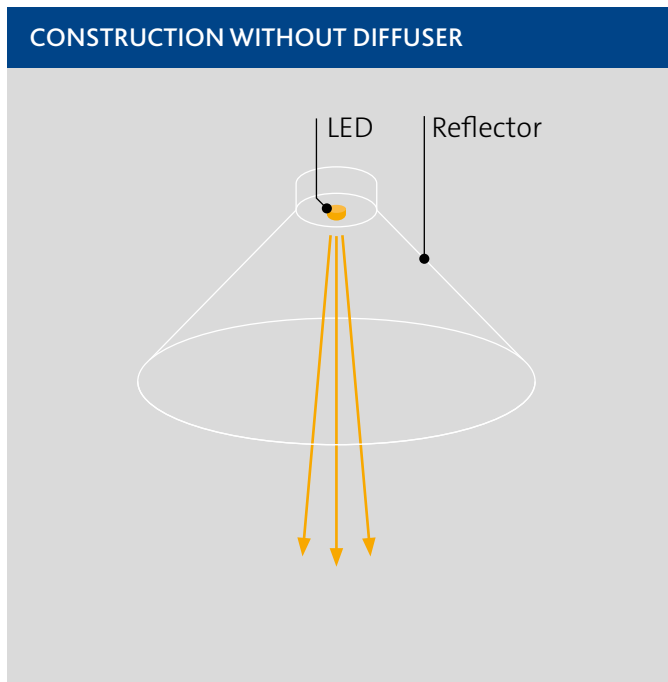
The Light Diffuser from Freudenberg is an efficient surface and volume diffuser with low area weight and material thickness. In contrast to conventional light diffuser films and plates, our special process overlays very fine polyester fibers in a crossing pattern creating a highly-uniform, multi-layer diffuser. Due to this innovative construction, collimated or irregular incoming

light is refracted by individual fibers which spreads the light over the material's surface. In cases where there is a short distance to a light source the Light Diffuser from Freudenberg is able to hide unwanted hotspots effectively. The result is a homogeneously lit surface which is needed to achieve a high quality luminaire system.

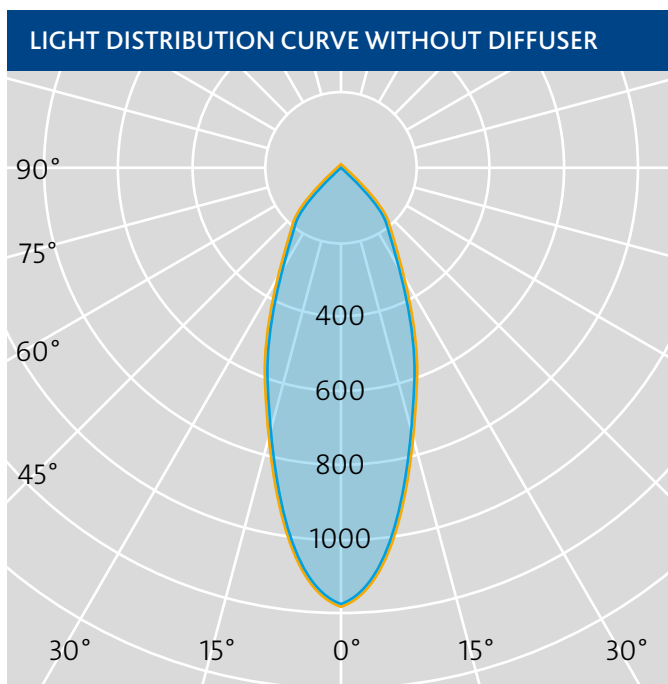
FPLD 85	DATA	PROPERTIES
Weight	<b>85 g/m<sup>2</sup></b>	Low area weight
Thickness	<b>0,12 mm</b>	Low thickness
Achievable system efficiency (direct-lit systems)	<b>&gt;80%*</b>	High system efficiency due to light recycling effect
Achievable system efficiency (edge-lit systems)	<b>&gt;90%*</b>	
Haze	<b>100%**</b>	Outstanding diffusion performance
Product width	<b>Up to 2.000 mm</b>	High flexibility due to availability of roll good and sheets

\* according to EN 13032-1:2012-06 \*\*according to ASTM D1003

Application of **Light Diffuser from Freudenberg** in direct-lit systems  
 (on example of a typical LED-Downlight)

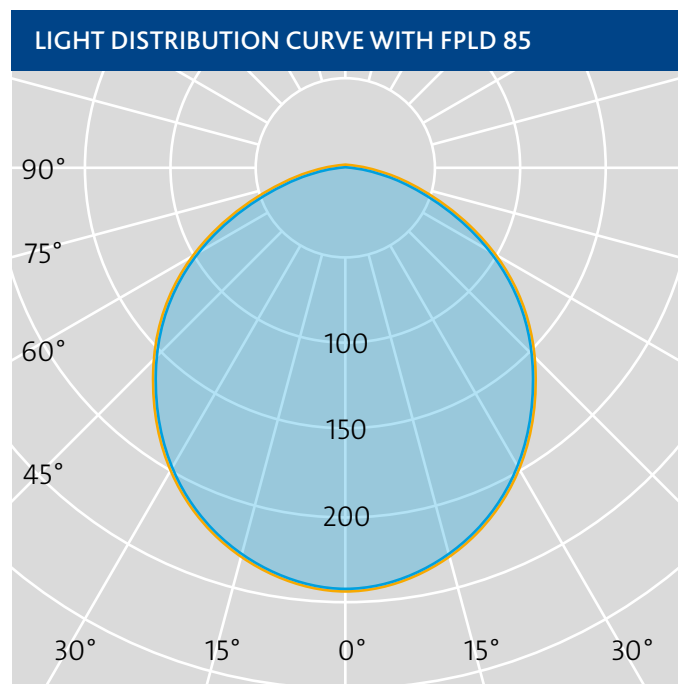


System efficiency in a typical LED-Downlight: **81%**



— Vertical axis (0°-180°)  
 — Horizontal axis (90°-270°)

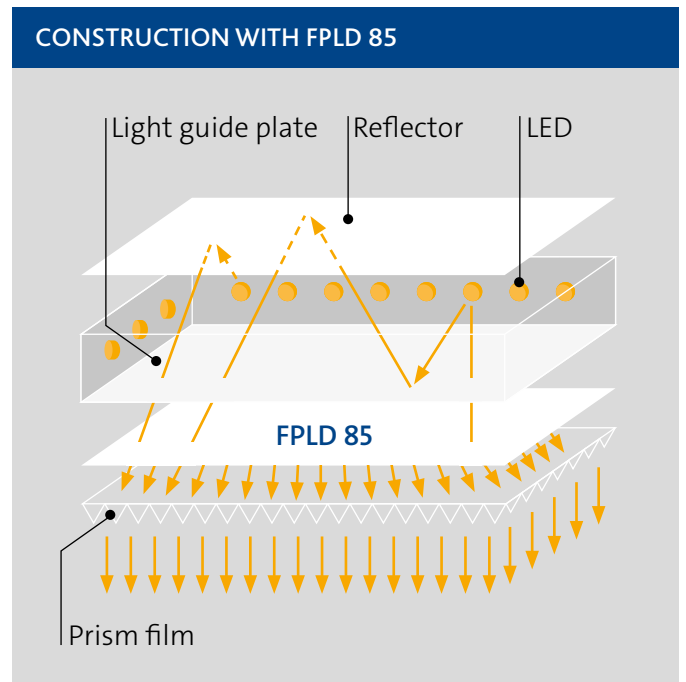
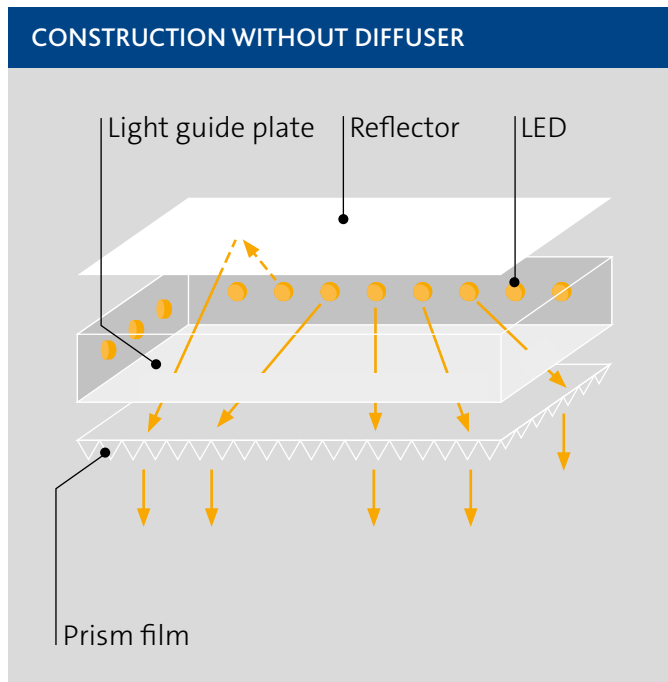
**775 lm**



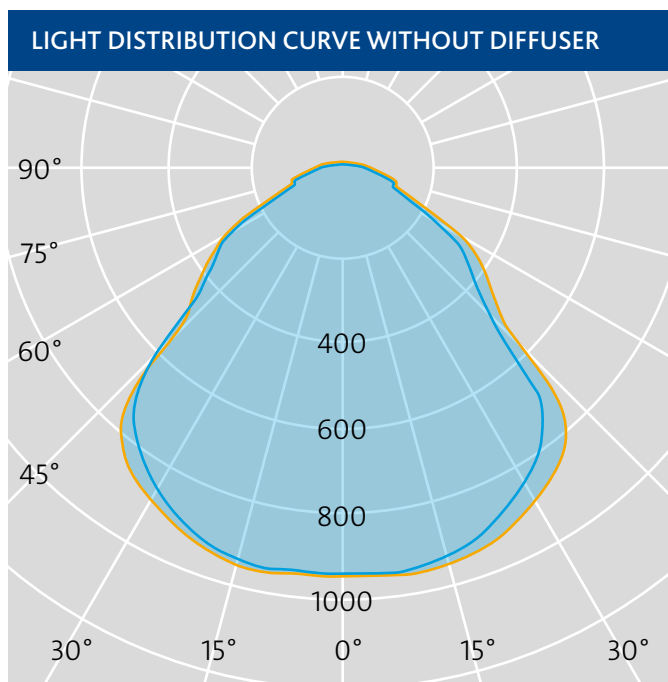
— Vertical axis (0°-180°)  
 — Horizontal axis (90°-270°)

**627 lm**

# Application of **Light Diffuser from Freudenberg** in edge-lit systems (on example of a typical LED-panel)

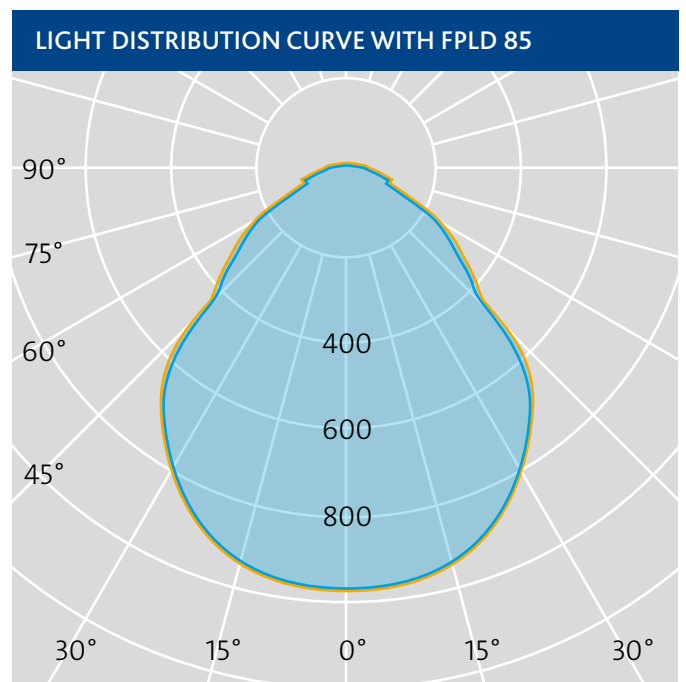


System efficiency  
in a typical LED-panel: **91%**



— Vertical axis (0°-180°)  
— Horizontal axis (90°-270°)

**2201 lm**



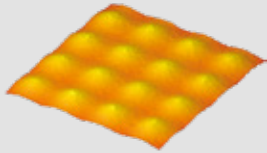
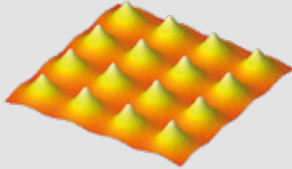
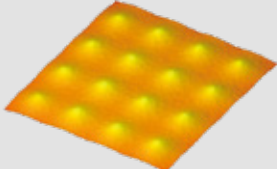

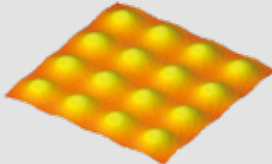
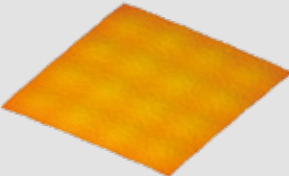
— Vertical axis (0°-180°)  
— Horizontal axis (90°-270°)

**1999 lm**

## Comparison of light diffusion performance of FPLD 85 and conventional diffusers

In the table below you will find false color images taken with a luminance camera in our laboratory. The images show the light-emitting surface of a direct-lit LED light box in combination with FPLD 85, a conventional light diffuser film and plate. The

distance of the LEDs to each other (=LED pitch) in each case is 33 mm while distance from LED to the diffuser (construction depth) is 16,5 mm (Ratio 1:0,5) and 33 mm (ratio 1:1).

COMPARISON	FPLD 85	PMMA DIFFUSER FILM	PMMA LIGHT DIFFUSER PLATE
Thickness	<b>0,12 mm</b>	<b>0,5 mm</b>	<b>3 mm</b>
LED pitch: 33 mm Constr. depth: 16,5 mm (ratio 1:0,5)			
LED pitch: 33 mm Constr. depth: 33 mm (ratio 1:1)			

### FPLD 85 – Solution in several luminaire systems

#### Direct-lit luminaire systems (e.g. LED downlights):

- Challenge: Most diffuser films and plates need a relatively large distance to the light source to eliminate hotspots
- Solution: FPLD 85 eliminates the hotspots at minimum distance due to its high diffusion performance
- Result: Slim luminaire design and saving in material of frame and reflector

#### Edge-lit luminaire systems (e.g. LED panels):

- Challenge: Light is typically decoupled asymmetrically and irregularly from light guide plates
- Solution: FPLD 85 homogenizes the light output effectively and facilitates system efficiencies of > 90% compared to systems without diffuser
- Result: Slim luminaires with high optical quality and even light distribution curve

#### Luminaire systems with light management films (e.g. prism films):

- Challenge: Microstructured films need an evenly lit surface to create an uniformly collimated light output
- Solution: FPLD 85 spreads irregularly incoming light evenly on the whole light surface and ensures a smooth coupling of light into the structured film
- Result: Effective and homogeneous light management for sophisticated luminaire systems

All information in this brochure are based on experience and present the current status of our knowledge. The technical data provided are mean values. All previous issues will be replaced by this version. All previous issues are invalid.

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