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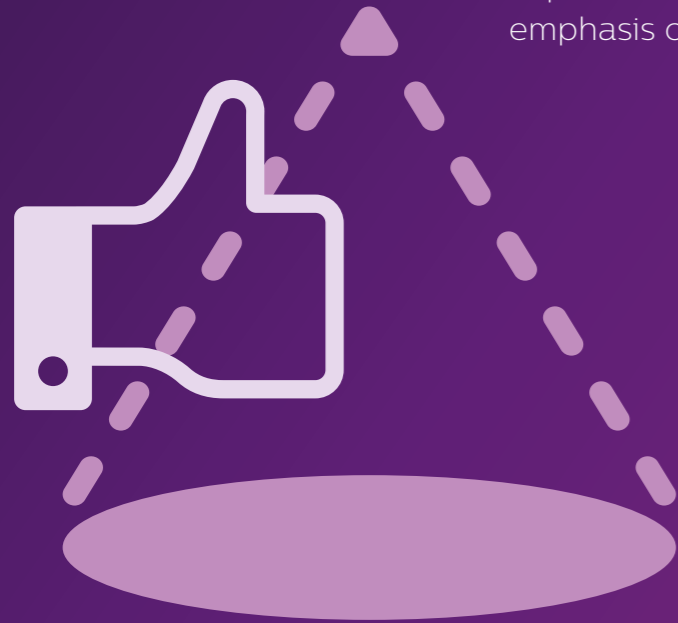
White paper

CULTURE & MULTIMÉDIA

OptiSuit
The optics solution
for superior lighting
in retail and industry

Introduction

There's no doubt that the energy-efficiency of LEDs has increased significantly since they were first introduced for general illumination. Aided by rapid improvements in efficacy, potential energy savings have largely dominated the conversation over the years. However, to be able to make informed decision, it is also important to bring other aspects of lighting into the discussion, such as quality of light. As the leader in this field with an ongoing commitment to improving quality standards, we are keen to share our expertise. Good lighting must offer visual acuity, so there are other parameters that, although harder to quantify, are equally as important. In this whitepaper, we discuss what impact this has on the decision matrix with particular emphasis on retail and industry applications.



What do shoppers want?

We know that shoppers are at their happiest when a store feels attractive, comfortable and a desirable place to shop. Lighting can guide them effortlessly from aisle to aisle, drawing them towards highlighted products and creating a real thrill when they find something irresistible to purchase. Lighting can also give merchandise on shelves great standout. With greater visibility, shoppers are more likely to engage with the products on display, increasing the likelihood that they will check out a higher value basket. And that sense of satisfaction also translates into repeat visits, which contributes to increased store turnover.



Lighting for industry

In industry environments, operators need safe and compliant workplaces with the right light levels and visual conditions, such as those specified in EN 12646-1, to help them work to the best of their ability. When lighting is optimized to their needs, it improves their productivity, reduces accidents, and boosts their overall job satisfaction. This in turn has a positive effect on a company's reputation as an employer, as well as their health and safety record, reducing staff turnover and boosting morale.



At Philips we understand the importance of developing the best light for these different applications. Our focus is on delivering high quality lighting with four key features: a light source with a smooth appearance, homogenous light with good color consistency, well-controlled glare, and the optimum beam shape for the application. Ultimately, it is the optics that will determine this quality, which is why we have developed Philips OptiSuit; an innovative portfolio of optics that provide the perfect solution for both retail and industry applications.

The OptiSuit portfolio

OptiSuit is a series of different optics that can be configured in electrical panel luminaires. The unique design provides precisely the right light, exactly where it is required, for retail and industry applications. That is important, given the very different needs that drive retail and industry customers. But crucially, the light is delivered with the highest quality and uniformity to create a consistent look whatever the application.



Designed for modularity

What makes the OptiSuit portfolio unique is its revolutionary concept. A series of precisely-designed lenses deliver and direct the light in the most efficient way possible, while maintaining consistent qualitative color parameters. This optical portfolio is used as a building block to develop linear panels for trunk mounting, or non-linear panels for track mounting. That means OptiSuit offers lighting designers and engineers a diverse range of luminaires with the same advantages, to create bespoke solutions that fulfil the exact requirements of retail or industrial applications. For example, OptiSuit can be used to create a linear LED panel of up to 2.3 meters in length. Or it can be used to create a rectangular panel of 200 x 600mm.

Optimized for a wide range of applications

The OptiSuit portfolio is suitable for a wide range of applications, from high bay and low bay areas, to small narrow corridors and large open spaces. Due to the unique shape of the lenses, the light emitted by each LED is transformed in such a way that, collectively, they provide high quality light that is directed for a specific purpose. For example, some OptiSuit optics are dedicated to back office and general lighting requirements. Others are especially designed for retail aisles, directing light to shelves and displays to attract more attention to the merchandise. And some are intended to optimize the routing of people and products in factory or warehouse environments.

OptiSuit lens plates are also designed to optimize the:

- sleek appearance of the fixture
- consistency of light color in all directions
- glare limitation
- accent factor
- beam characteristics

Sleek lens plate design

OptiSuit lens plates are designed with a sleek outer surface and flat lens plate that hides the individual LEDs so well, they are hardly discernible. The optical plates are also specially treated to soften bright peak illuminances, while creating a smooth aesthetic that is easy on the eye.



Figure 1: The LED panel has sleek, transparent sides

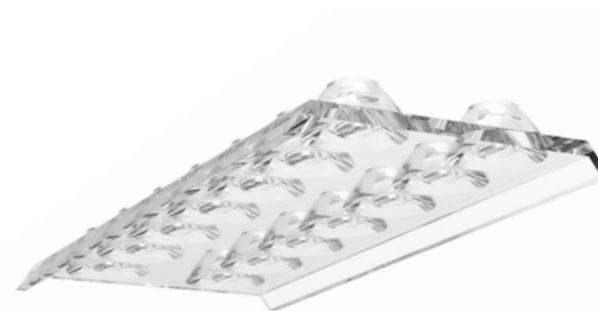


Figure 2: The OptiSuit flat lens plate hides the LEDs



Image 1: The LED panels fit seamlessly together to create a truly continuous line of light.

The effect is just as pleasant when OptiSuit lens plates are combined to create longer lines of light. As can be seen in Image 1, thanks to the design of the LED panels that have transparent sides and no visible interruptions, they create a truly seamless line of light. Not only does this provide an attractive way to guide people around the store or workplace; the sleek appearance of the lens plates enhances the visual quality of the interior, which is reflected on the merchandise on display.

Color consistent light

One of the key challenges in combining LEDs with optics is achieving a beam that has no color artefacts. Due to the characteristics of all LEDs, when applying simple optics, a small shift may be seen between the blue and yellow color values in the beam. Therefore, it is important that the light that is distributed from the lens plates has a uniform color appearance across the full spread of the beam.

The advanced OptiSuit optics address this problem in two ways. Firstly, they use a combination of total internal reflections and direct refractions to shape the beam, thanks to the unique design of each individual lens. This is demonstrated in Figures 4 and 5 below, where the blue rays represent direct refractions and the red rays represent total internal reflections. Secondly, the specially-designed lens treatments optimize color mixing. Together these innovations result in a uniform beam with superb color consistency and excellent color quality.

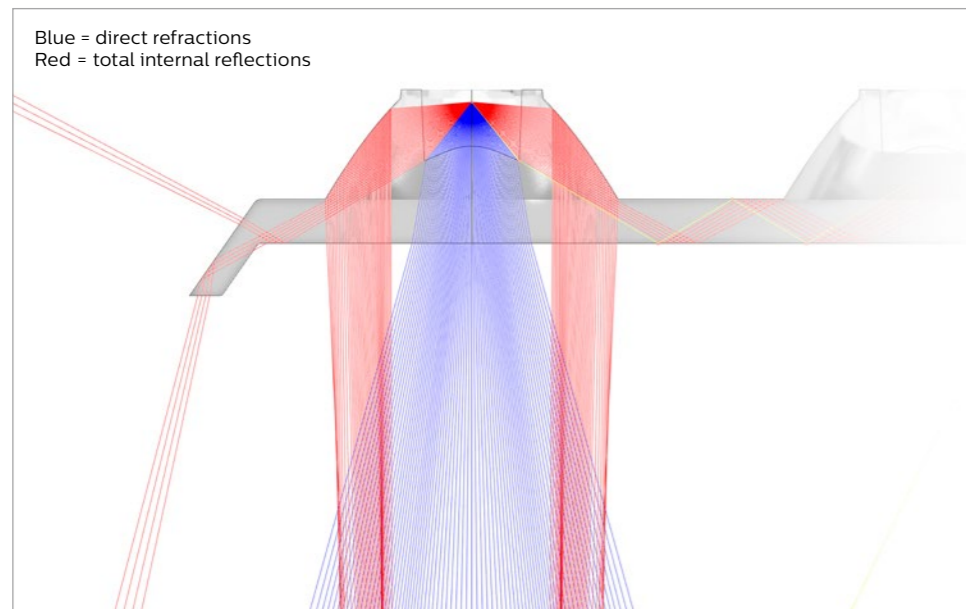


Figure 4: OptiSuit Narrow Beam

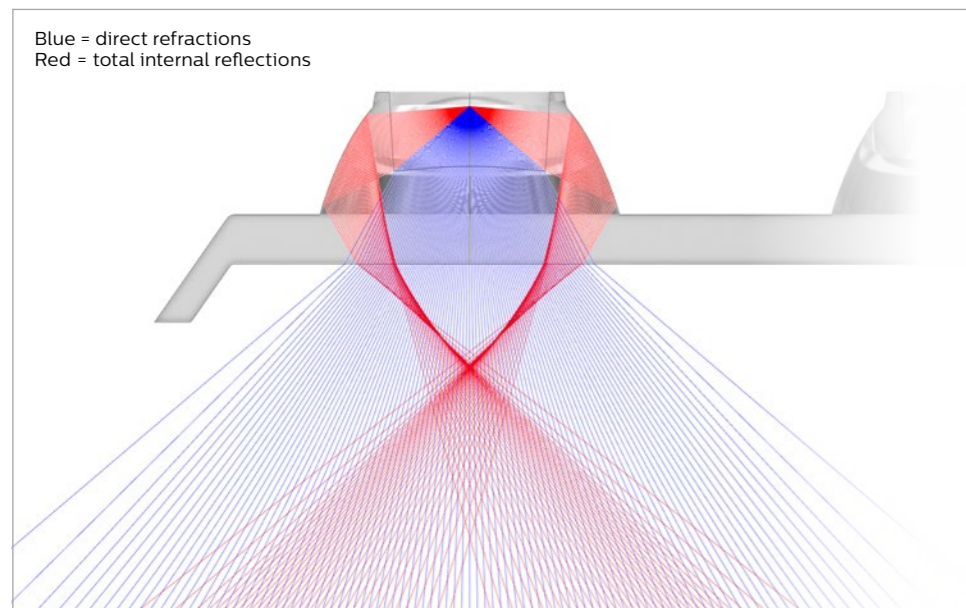


Figure 5: OptiSuit Wide Beam

No glare or discomfort

When it comes to visual comfort, this is determined by the amount and direction of light that falls on the eye. Here too, the design of a luminaire's optics plays a central role in how that light is perceived. But visual comfort is also subject to mandatory legislation with European norms like EN 12646-1 in place for defined glare limits for a variety of activities and workplaces.

The degree of discomfort glare can be estimated by calculating the glare index using the Unified Glare Rating (UGR)² method. Any discomfort glare that is noted can be reduced by increasing the luminosity on walls and ceilings using up lighting, positioning luminaires closer to walls, or by lighting walls separately.

However, this puts constraints on the freedom of the lighting designer and can present a technical challenge in retail and industry environments.

In contrast, OptiSuit uses the optics to soften the very high brightness of the LEDs and limit discomfort glare to UGR-class levels that conform with EN 12646-1. At the same time, it offers the ultimate freedom to configure a layout that optimizes the lighting for any given space, while still preventing glare.

The accent factor

In supermarkets, one of the key considerations for visual merchandising is developing displays that will attract, engage and triggers customers to make a purchase. By using light distributions that are dedicated to this purpose, either asymmetric or double-asymmetric, full attention will be given to the items on display. For example, the high accent factor in the vertical plane gives the merchandise a real 'pop' so it stands out from its surroundings. And the higher the accent factor at eye level, the greater the visual impact. There are various double-asymmetric beams or fully diffused light distributions in the OptiSuit portfolio that will satisfy the demands of retail customers.

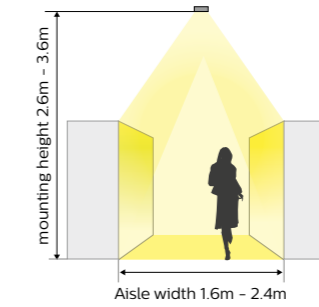
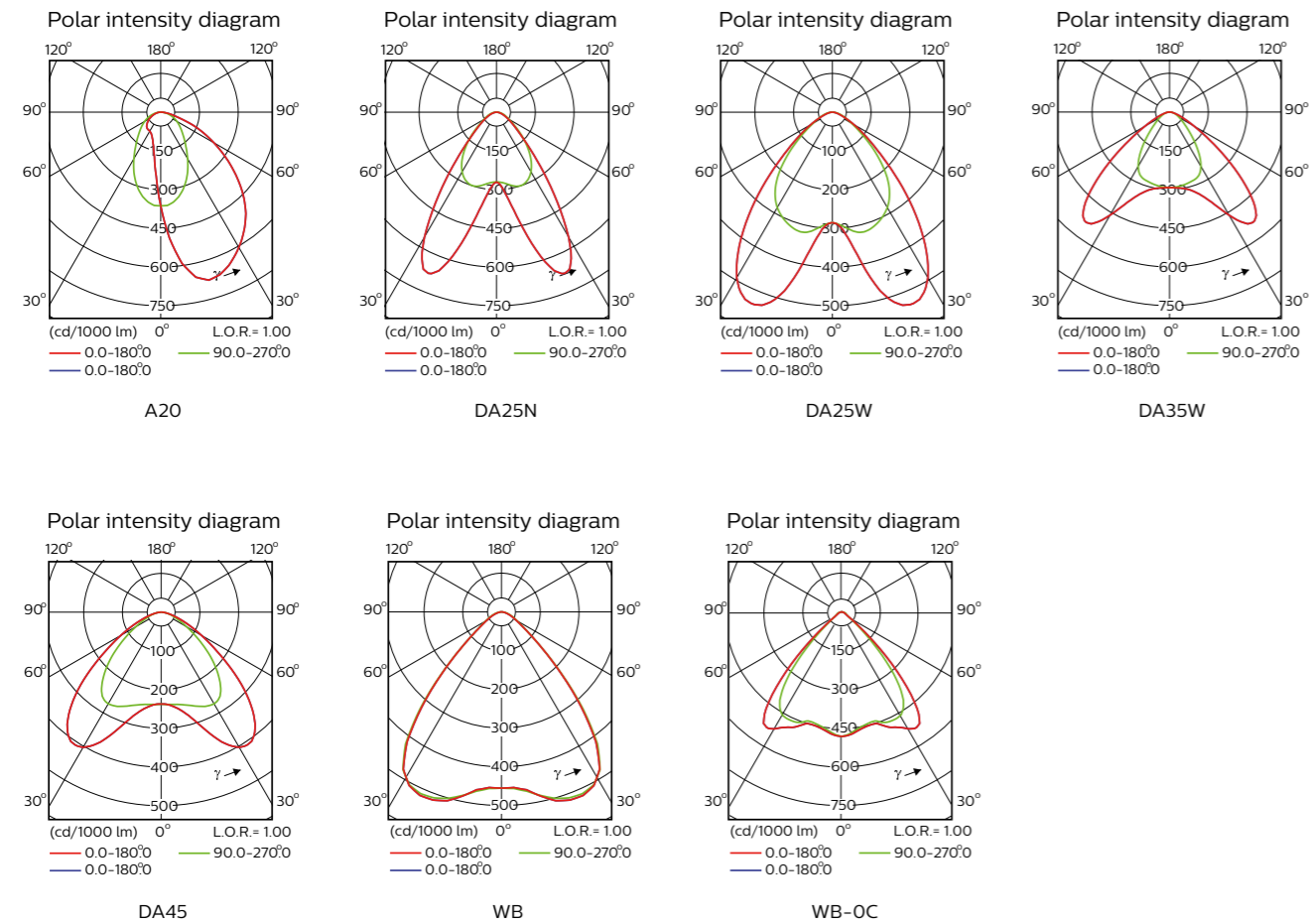


A choice of beam characteristics

In terms of lighting design, light distribution is just as important as visual comfort and should be dedicated to illuminating the space according to how it is used. With a portfolio of 10, well-balanced beam options from extra narrow to very wide beam, OptiSuit can optimize the lighting in every application (See Figure 6). All beams are characterized by very smooth, continuous beam shape, ensuring there are no visible luminance discontinuity transitions on the illuminated surfaces.

For dedicated retail lighting ranges, OptiSuit has a full complement of options from wide beam to double-asymmetric and an additional asymmetric beam. This means the portfolio covers virtually all aisle geometries with a choice of seven suitable beam characteristics, seven lumen packages and two energy choices.

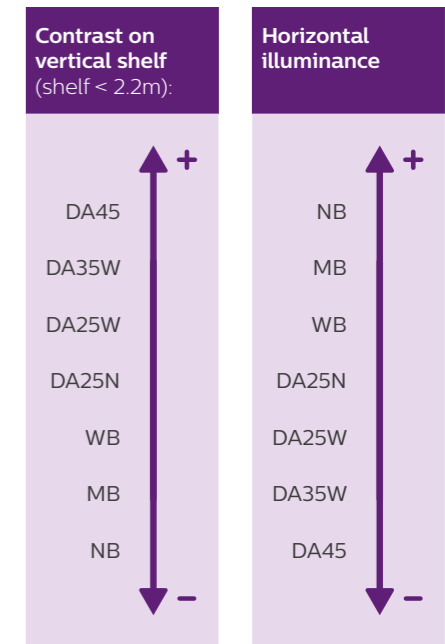
Figure 6: The complete OptiSuit beam portfolio for retail lighting applications



The balance between contrast on the vertical shelf and horizontal illuminance can be determined by varying the beam choice.

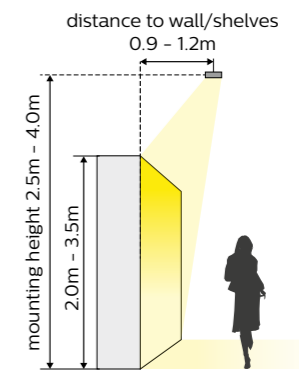
Retail aisles

Recommended optics in retail stores	Aisle width [m]					
	1.6	1.8	2.0	2.2	2.4	
Mounting height [m]	4.8	NB	NB	MB	DA25N	DA25N
	3.6	DA25N WB	DA25N WB	DA25N WB	DA25N	DA25N
	3.2	WB	DA25W DA25N WB	DA25W DA25N WB	DA35W DA25N	DA25W DA25N
	2.8	DA25W DA25N WB	DA25W DA25N WB	DA45 DA35W DA25W	DA45 DA35W	DA45 DA35W
	2.6	DA25W WB	DA35W DA25W WB	DA45 DA35W WB	DA45	DA45



Retail walls

Recommended optics in retail stores	Aisle width [m]					
	1.6	1.8	2.0	2.2	2.4	
Mounting height [m]	3.6			A20	A20	
	3.4			A20	A20	
	3.2			A20	A20	
	3.0			A20	A20	
	2.8	A20	A20	A20	A20	A20
	2.6	A20	A20	A20	A20	A20



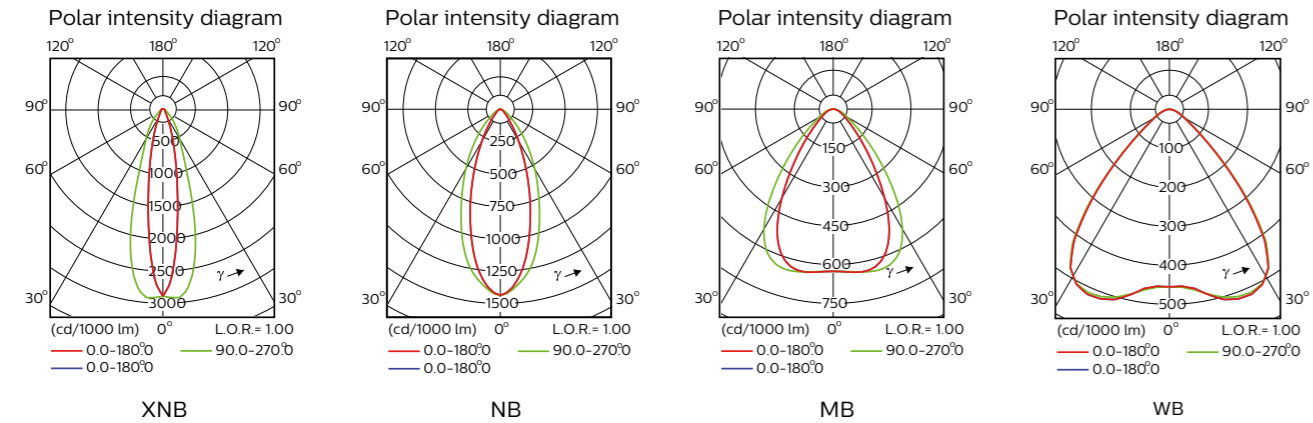
The asymmetric OptiSuit optic has a very wide application coverage.

*Height of wall is mounting height - 0.5m

For industrial lighting ranges, OptiSuit offers four suitable beam characteristics, six lumen packages and two energy choices. From a normal downward beam to wide beam options, you can select the right optics and choose how best to install them based on their light distribution curve.

In retail and industry lighting applications, functional lighting for back room offices, control rooms and cash areas that require a low direct UGR can be optimized by specifying the WB-OC optic.

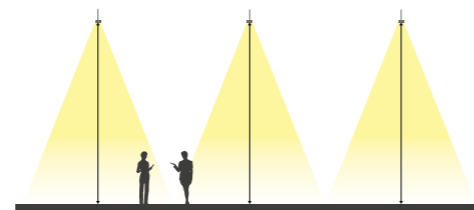
Figure 7: The complete OptiSuit beam portfolio for industry lighting applications



Open spaces

Recommended optics in open spaces*		Mounting height of light line [m]				
		3	6	9	12	15
Illuminance [lux]	750	WB	MB	MB	NB	NB
	500	WB	MB	MB	NB	NB
	300	WB	WB	MB	MB	NB
	200	WB	WB	WB	MB	NB

*Depending on space dimensions

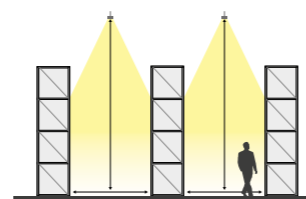


Wide, medium and narrow beam OptiSuit optics are recommended for open spaces.

Industry warehouses

Recommended optics in warehouses*		Mounting height of light line [m]				
		3	6	9	12	15
Illuminance [lux]	300	WB	MB	NB	NB	XNB
	200	WB	MB	NB	NB	XNB
	150	WB	MB	NB	NB	XNB

*Depending on space dimensions



A combination of wide, medium and narrow beam OptiSuit optics are suitable for warehouses.

A superior choice

Quality of light promises significant benefits in retail and industry applications, from greater levels of satisfaction to fewer accidents. Whatever your chosen lighting solution, the optics will play a central role in how effectively that light is delivered and will ultimately affect its overall performance. OptiSuit optics are designed to deliver homogenous light with accuracy, consistency, exceptional color and superb visual comfort. They can be found in a range of Philips commercial product families, including Maxos fusion and StoreSet for retail and industry applications. For more information on the benefits of OptiSuit, contact your local Signify representative or go to www.philips.com/optisuit



Figure 8: StoreSet with OptiSuit



Figure 7: Maxos fusion with OptiSuit

Reference

- EN-12646-1. Light and lighting - Lighting of work places.
- Sekulovski, Dragan & Perz, Malgorzata & Vissenberg, Michel. (2019). Exploring the pleasant side of glare in the LED era. 276-281. 10.25039/X46.2019.OP39.



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