

A man wearing safety glasses and a dark polo shirt is leaning over a machine, working on a series of parallel metal rods. The background is a blurred industrial environment with blue and white structures.

PHILIPS

Industry lighting



Lighting up the workspace

Lighting solutions for industrial environments

The importance of light at work



Philips shaver factory, the Netherlands



Apex, UK



Unilever

Light has a profound effect on how people feel. It influences energy levels, mood and wellbeing, making it vitally important in creating healthy workplaces. In this brochure, we explore and explain how to choose artificial lighting solutions for industrial environments and maintain the right lighting levels for positive, productive working.

There's no doubt that inadequate lighting affects wellbeing. It can cause eye strain, fatigue and poor performance, particularly in roles involving problem solving and concentration. Our innovative lighting solutions can address all of these issues, improving employee wellbeing while also saving energy and reducing operational running costs.

Introducing LED lighting

LED lights are leading the step change in the way businesses use light. Philips Lighting is the global market leader with recognized expertise in the development, manufacturing and application of innovative LED lighting solutions.

Upgrade to LED for a visible difference

Good lighting is about quality and comfort. It should be bright enough to perform visual tasks, but not so bright that it causes glare and discomfort. LED lights can be used to set the color temperature of workspaces, providing warm and cool light as needed.

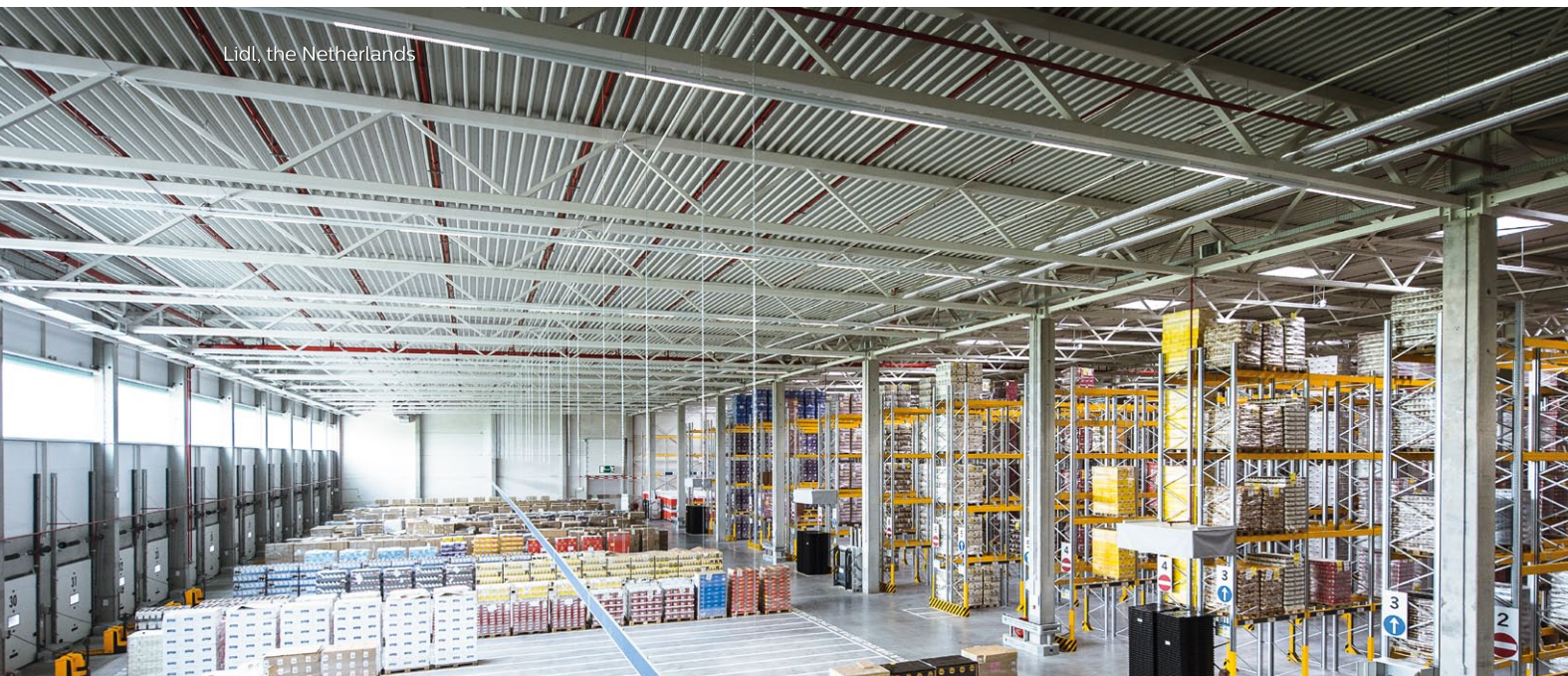
LED is highly energy efficient – less heat, more light, lower cost

Not just for industrial units that may be open 24 hours a day, but also for offices operating core working hours, the potential to waste energy is very real. LED lights are durable and energy efficient with an exceptionally long lifetime. They provide immediate, significant energy savings.

Energy bills and carbon footprints can also be dramatically reduced by adopting programmable lighting. This innovative solution dims automatically in response to bright daylight and switches off when premises are empty.

As well as offering energy and cost savings, energy efficient lighting and management systems can help businesses meet key legislative targets. Achieving a good BREEAM or LEED rating for building and meeting sustainability goals by reducing energy consumption, carbon emissions and the associated costs of carbon are yet another important by-product.

Creating productive, safer environments



Better light quality means increased comfort. When people feel better they work better, which means increased productivity, so everyone's happy. In addition to this, effective, uniform lighting offers important safety benefits too, reducing the margins for error with no dark patches and good color rendering.



“

Philips LED technology has enabled us to ensure efficiency in our lighting installation, not only in operational and maintenance cost savings, but by blowing a fresh wind into the production engineering floor.”

Pavol Šimkovič, CEO of PPS Group Inc.



One size doesn't fit all

We know we can help you achieve your business goals through effective lighting. We also appreciate that everyone's lighting requirements are unique, so we will always make sure we fully understand your needs before we recommend a solution. Our personal, consultancy approach ensures that we only ever specify what works best for you.

We're aware that adopting today's innovative, networked solutions can be a lot to take on so we strive to remove the complexity. Philips Lighting can implement comprehensive lighting solutions for you, delivering not only state-of-the-art products, but also installation, project management and maintenance services. When partnering with us, you can be assured of acquiring high-quality, high-impact lighting solutions that lead to truly enhanced environments with a minimum of hassle and risk.

Meeting challenges, anticipating trends

Warehousing and logistics are right at the center of the wider developments currently taking place in industry. Whether it's competition from new and emerging markets or the growth of multi-channel retail, the reality is that we're in an exciting era of change.

Consumers' expectations are growing all the time and everyone is getting used to the idea of shopping in a variety of different ways. Streamlined manufacturing and delivery processes are absolutely critical to success in the new era, as there's no getting away from the rising energy and transport costs associated with meeting the increased demands of customers.



Current industry trends



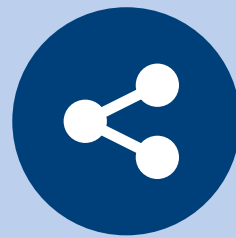
63%

E-commerce
+ multi-channel retail*



40%

Emerging
markets*



28%

New technology
implementation*

Current industry challenges



72%

Rising
transport costs†



47%

Pressure from shorter order
lead times from customers†



40%

Rising
energy costs†

* Percentage of respondents indicating their top 3 trends when surveyed.
Source: JLL report June 2014, European Logistic industrial occupier survey

† Percentage of respondents indicating their top 3 challenges when surveyed.
Source: JLL report June 2014, European Logistic industrial occupier survey.

A man in a blue work jacket is standing in a factory, holding a clipboard and a color calibration chart. He is looking down at the clipboard. In the background, another person in a blue work jacket is visible, and there are various industrial machines and equipment. The lighting is bright and even.

“

People who appraise their lighting as good will also appraise the room as more attractive, be in a more pleasant mood, be more satisfied with the work environment, and more engaged in their work.”

Extract from: “Linking Lighting Appraisals to Work Behaviors”

Contents

Customized lighting solutions

Lighting solutions can add value in many different ways throughout your building. Over the following pages you will find examples for eight typical industry areas. The product examples shown are just a small selection of what is available. As your lighting partner, it is our intention to understand the needs of your business and environment and develop customized solutions.

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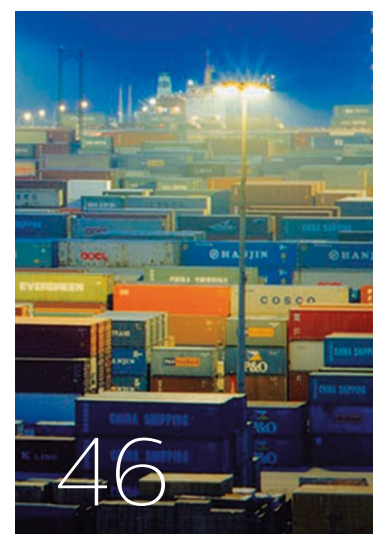
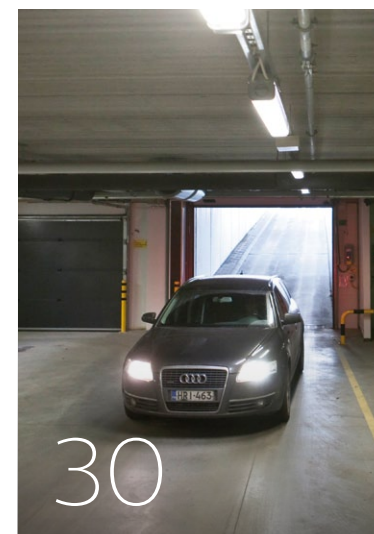
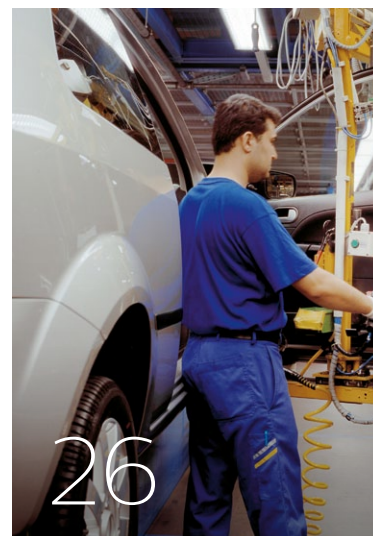
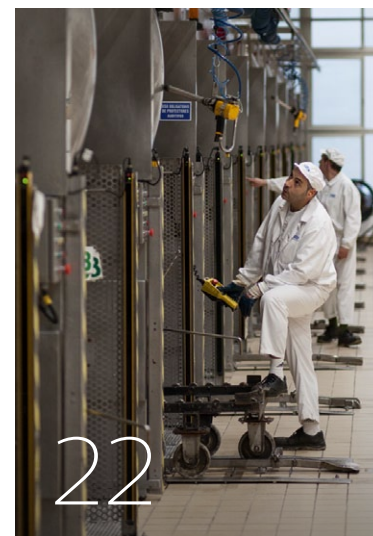
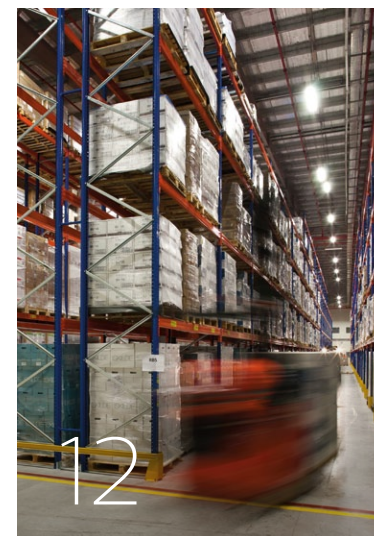
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Evaluating performance
of LED luminaires

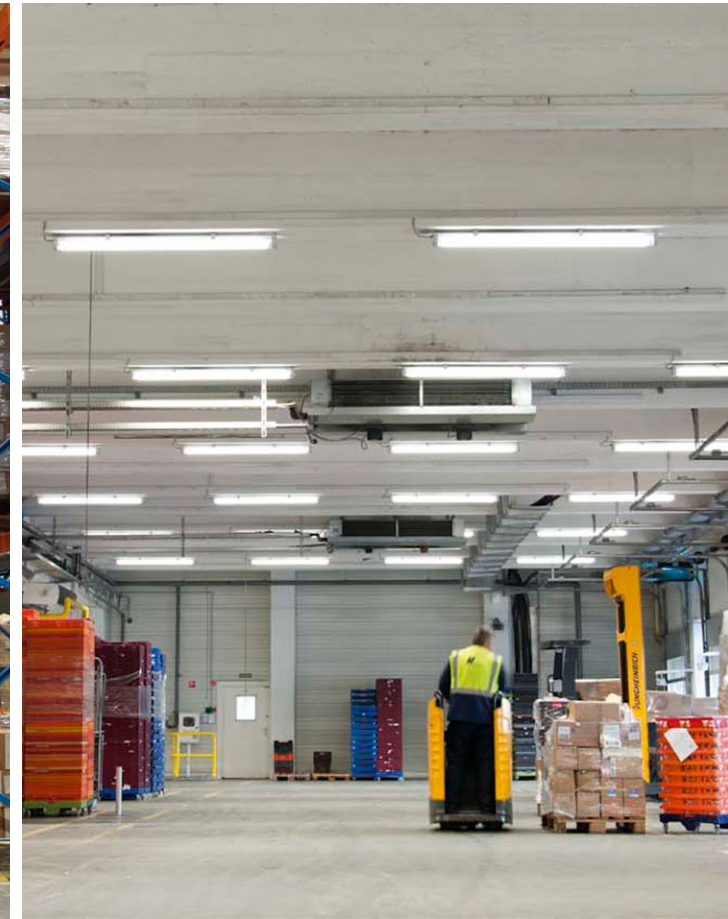


Safer spaces, more efficient picking

With businesses often operating 24 hours a day, good quality, uniform, energy efficient lighting plays an important role in ensuring operations run safely and efficiently.

The benefits for warehouse operations and logistics are clear. Lighting presence detection technology and instant-on LEDs can transform passageways, allowing for just one single aisle or picking area to be lit if that's all that is required.

Open areas can utilize intelligent control systems. Spaces need only be illuminated as and when needed, delivering fully functioning light solutions day and night. Furthermore, dimmable, long life LEDs located in hard to reach, high ceiling areas offer energy efficient lighting but also reduce maintenance costs.



HAVI Logistics

Gyál, Hungary

A complete service with no downtime

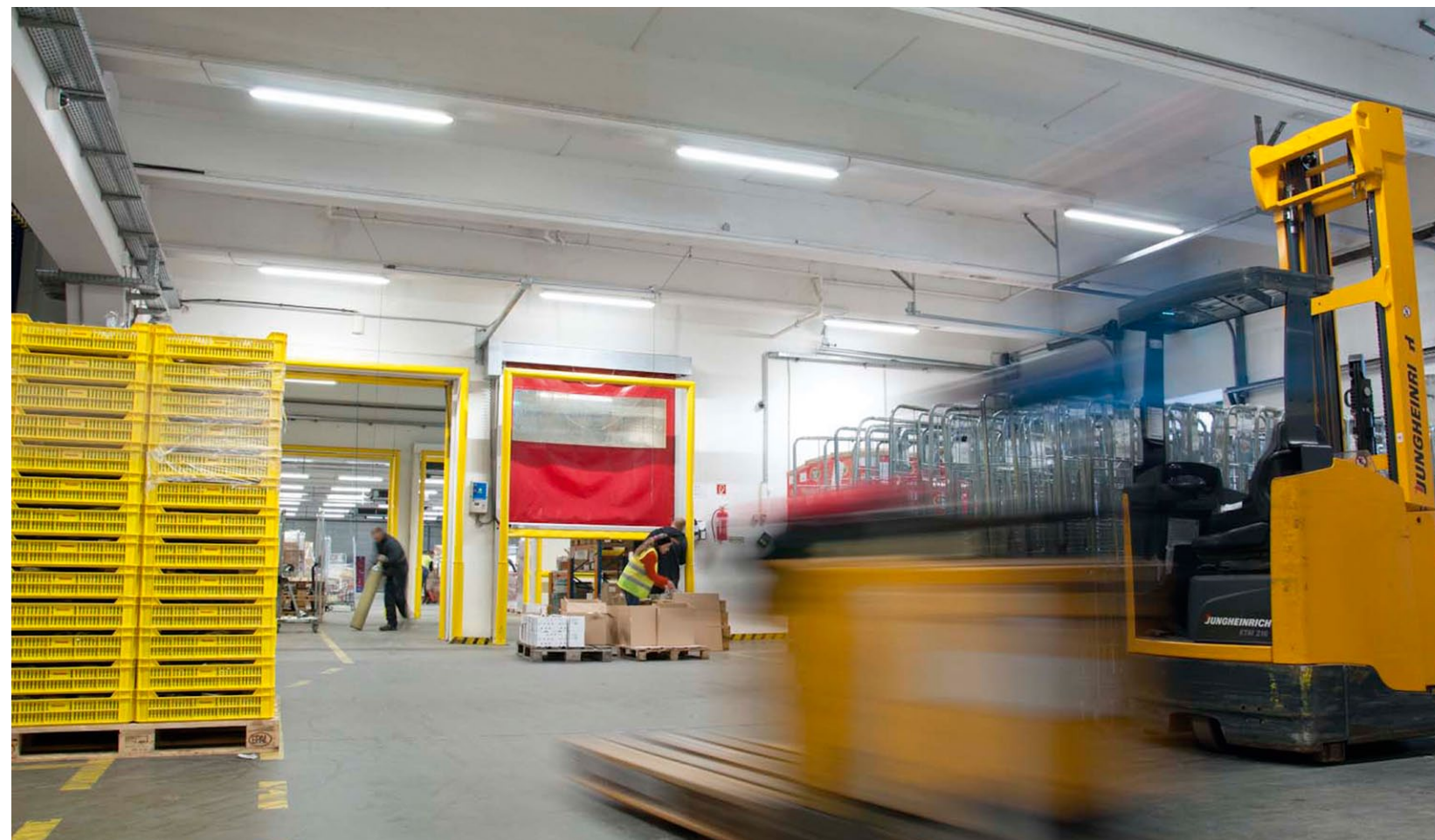
The project

HAVI Logistics works with clients in the food industry to provide a high-quality logistical service. As part of the company's commitment to sustainability, they wanted to switch to an innovative lighting system across Europe, which would significantly decrease their annual electricity consumption of 293 MWh.

The challenge

HAVI's HID-based highbay and TL luminaires needed replacing. The company was also looking for a partner who could not only provide quality products, but also plan and manage the project and guarantee return on investment within three years.

It was agreed that a 'one-to-one' swap-over would not be an appropriate solution and that a complete system redesign was necessary. The biggest challenge was to achieve the goal in a logistics center which operates 24 hours a day, six days a week. Philips Lighting needed to respect work processes and safety rules and there was no way that freezers could be turned off, even temporarily.



Key facts

- Energy reduced from 293 MWh to 80 MWh p.a
- 73% energy savings p.a
- 123 tons CO₂ emissions saved p.a
- 3 year payback time

The solution

We created a detailed design plan for the complete area and recommended a range of LED solutions including Maxos lightlines, Pacific and CoreLine waterproof luminaires and GentleSpace gen2 highbays. The refurbishment was completed to the customer's satisfaction, without disruption to the operation. The three-year ROI is on target to be achieved and there are zero maintenance requirements over the period.

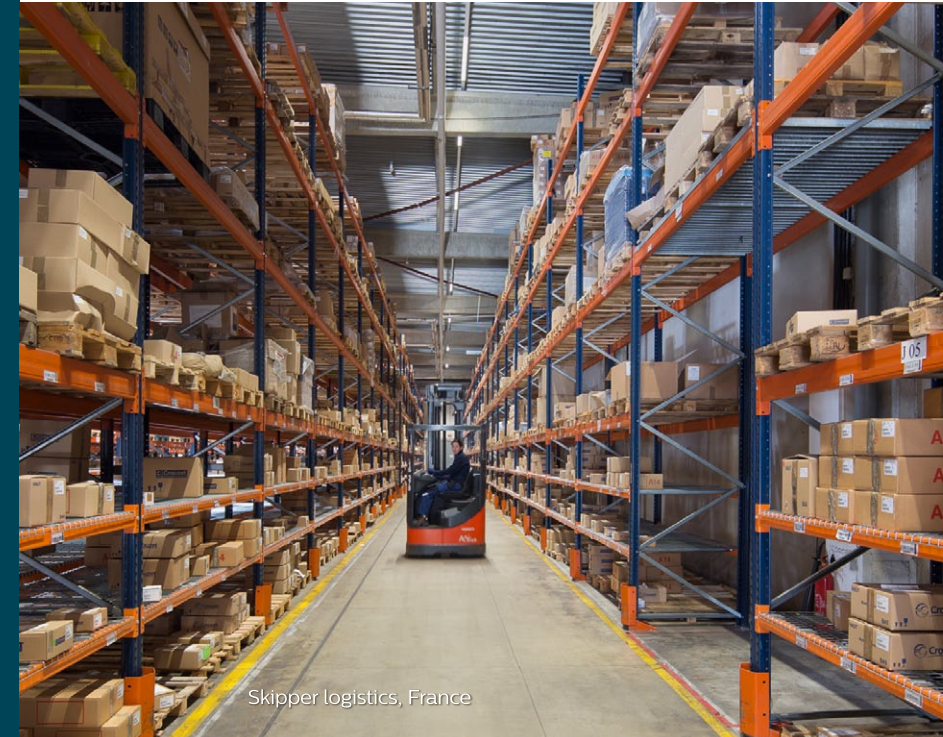
Maxos LED



Racking up power savings

In most warehouse operations, many racks are never fully occupied and yet a good quality of light is needed for picking. In these spaces, our advanced optics ensure the right light in the right place, every time. They also allow for light to be adapted to the needs of the moment, creating energy savings.

Uniform light is also a must. Trunking solutions will help you to achieve good uniformities in all directions, low power consumption plus easy connection of luminaires. Different optics are available for use, depending on the height and width of the gangway. The Philips Lighting solution for these areas uses a Narrow Beam (NB) optic that works for spaces of up to 12 metres in height – offering good lighting levels and uniformity along all shelves.

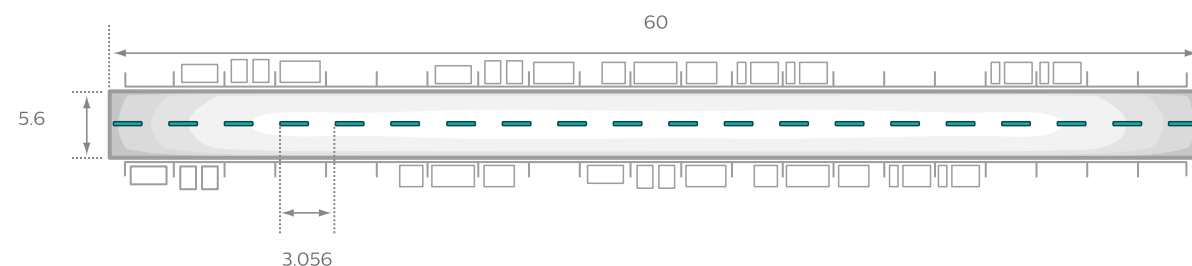


70%
power savings

with LED solution over
a conventional solution

Example floor plan layout

Height: 12. Luminaire mounting height: 11.5



Scale: 1:429
Values in Lux
All dimensions in meters

— = Maxos 4MX850 581 1xLED55S/840 NB

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 150	< 22	> 0.40	> 60		
LED Solution	1.52 W/m ² /100lux	150	22	0.60	80	770	38.5
Standard Solution HF 2xTLD58w + NB reflector	4.77 W/m ² /100 lux	178	26	0.60	80	2860 (2u/3)	110

Suspended trunking system, with an array
of 1 luminaire for each 2 spaces =

Maxos LED General Lighting

An ideal general lighting solution offering excellent payback for a limited investment, Maxos LED Industry meets all relevant standards and specifications for industry applications. It offers best-in-class energy savings while delivering high lux levels at the required color temperatures and glare factors. The compact Maxos LED Industry system comprises exchangeable mid-power LED boards mounted on a standard Maxos trunking rail and comes in a choice of wide and medium-beam lenses. This highly efficient LED solution will deliver full payback in less than three years.

Intelligent controls

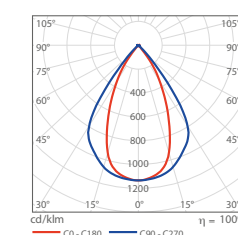
See GreenWarehouse system on pages 20/21



Did you know?

If you need to use high bay luminaires, rack optics will help you to achieve longer distances between luminaires and more uniformity along the racks. Example: GentleSpace gen2 HRO.

Polar Intensity



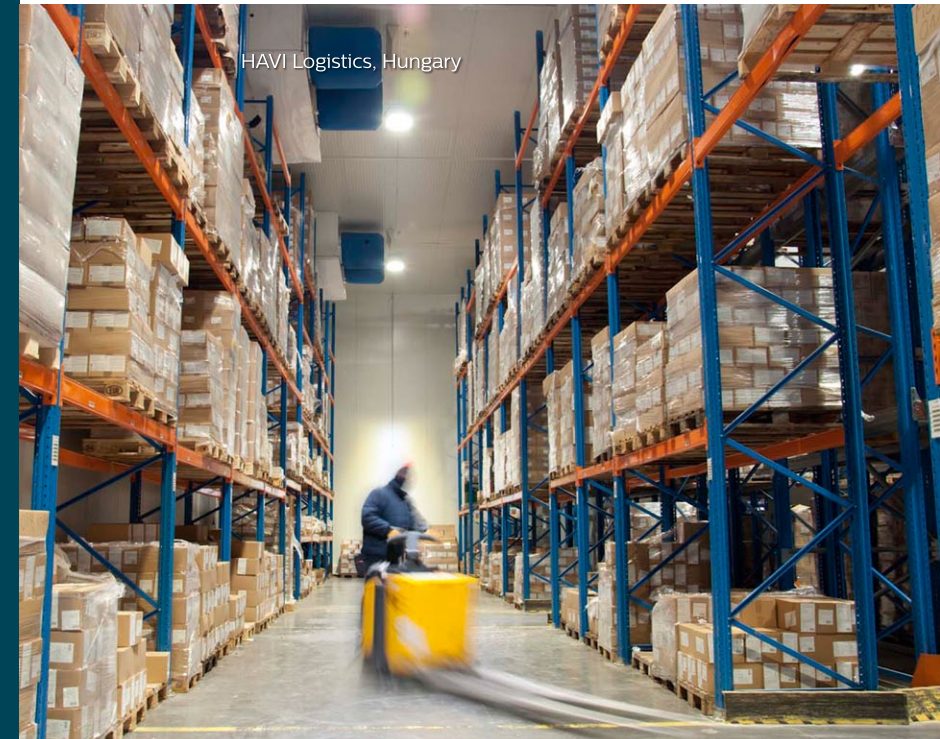
Key features

- Substantial energy savings for a limited investment
- Comfortable light with long lifetimes
- Compatibility with proven Maxos and TTX400 trunking system
- LED engine platform makes Maxos LED Industry a truly future-proof solution

Making light work of logistics

Installations in high ceilings are often complicated and expensive. Opting for a long life solution with good performance and lighting coverage reduces the number of light sources needed and saves the cost and disruption caused by replacement.

Philips Lighting high-bay luminaires deliver substantial amounts of light from just one source. Fewer luminaires are required compared to linear systems. As a result, this solution is not suitable for very low ceilings where lower lumen packages are needed. The optical beam should be chosen based on the height of the space and the suspension distance – narrower as it increases and wider as it decreases. For this situation, Medium Beam (MB) optics are perfect for achieving longer inter-distances and good lighting uniformity.

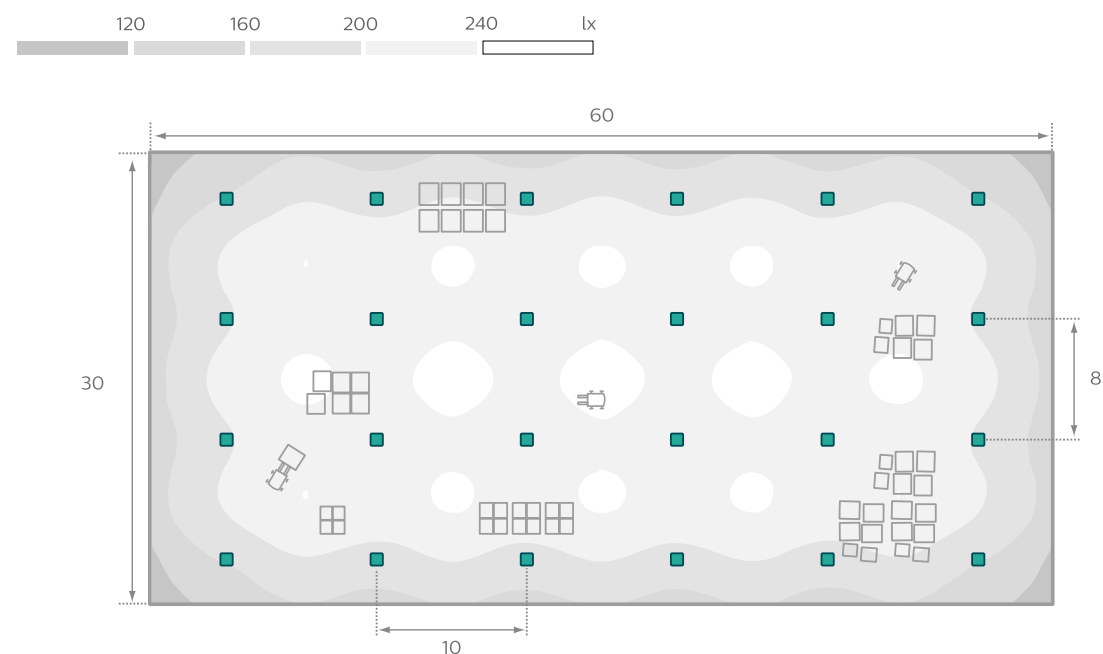


HAVI Logistics, Hungary

70%
power savings
with LED solution over
a conventional solution

Example floor plan layout

Height: 12. Luminaire mounting height: 11.5



Scale: 1:429

Values in Lux

All dimensions in meters

■ = GentleSpace2 BY471P 1xLED250S/840 MB GC

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 200	< 25	> 0.40	> 70		
LED Solution	1.22 W/m ² /100	226	22	0.47	80	4967	200
Conventional Solution 400HPI	2.53 W/m ² /100	226	22	0.50	70	10272	428

Suspended high-bay luminaires in general distribution over the area = ■

GentleSpace gen2

GentleSpace gen2 is the first LED high-bay luminaire that can directly replace HID high-bays of up to 400W, enabling significant energy savings. GentleSpace gen2 offers excellent light quality and is DALI-dimmable, so even more energy can be saved by dimming when appropriate. Available in two sizes and offering a choice of dedicated high quality optics, which fill the space with a gentle, comfortable light

Intelligent controls

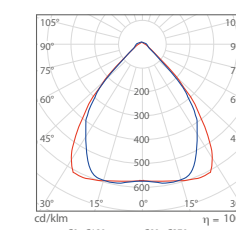
See GreenWarehouse system on pages 20/21



Did you know?

If you need to achieve a lower Unified Glare Rating (UGR); Medium Beam (MB) and Narrow Beam (NB) optics will give you values under 22. Also it's worth considering that uniformity could be sacrificed if narrower beams are used.

Polar Intensity



RAF Benson, UK

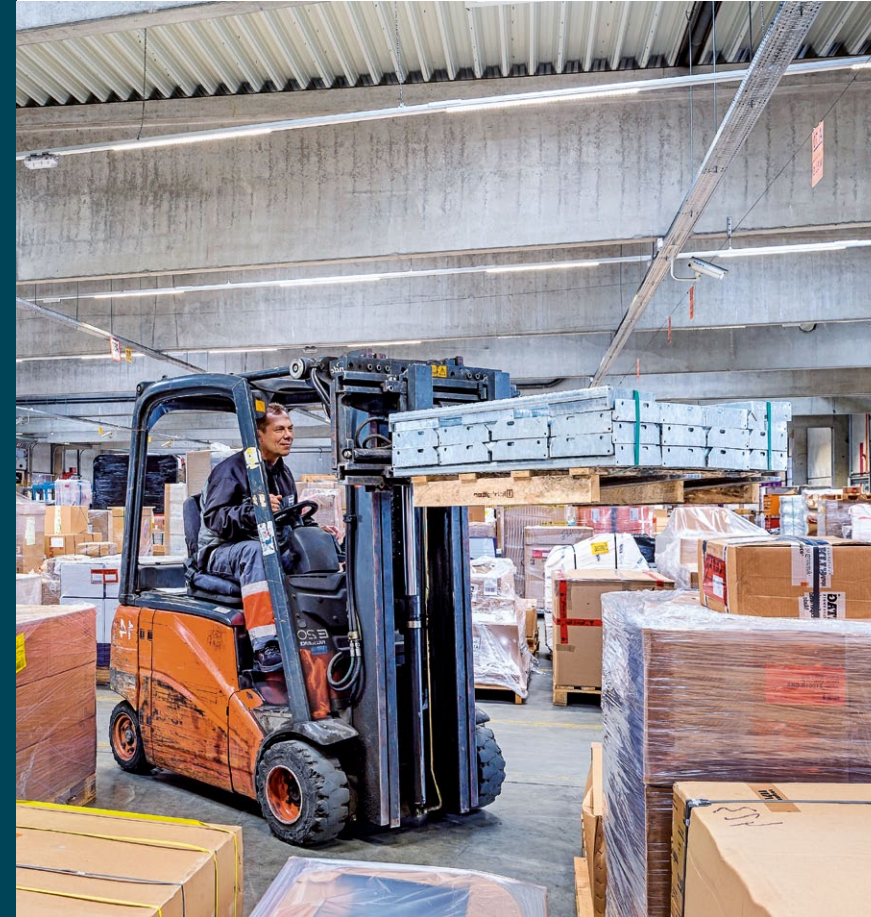


Key features

- Mid-power LEDs for instant light and long lifetime
- Neutral white color temperature
- Space saving flat design allowing for other installations such as sprinklers etc
- Gripple Y-fit hangers that can carry up to 45kg for easy and secure installation
- Thermally toughened extra-white glass cover for high transluence

Super effective, and energy efficient

Lighting needs to be powerful and effective in any industrial setting, but there's increasing pressure to save energy too. Reducing consumption and cutting CO₂ emissions isn't just good for the environment. It saves money and marks your business out as a green trailblazer.



“

This is how I see the future. Everything around me reacts to me, including the light.”

Robert Donev
Facility, Safety and
Environmental Management



Key facts

- Savings of nearly €42,000 p.a.
- CO₂ emissions reduced by 201 tonnes p.a.

DB Schenker Linz, Austria

Managing light in the warehouse

The project

DB Schenker is the transportation and logistics arm of Deutsche Bahn, with a global network built on customer service, quality and sustainability. The business was already in the process of improving its energy consumption in four warehouses, as part of a large range of initiatives to reduce CO₂ emissions. Working with Philips project partner Siemens, they agreed to move ahead even more radically through the implementation of our GreenWarehouse solution.

The challenge

Under DB Schenker's 2020 climate protection program, CO₂ emissions had to be reduced by 20% between 2006 and the end of the current decade. In the company's warehouses, lighting accounts for up to 60% of total energy costs. It was imperative to reduce this figure, while at the same time acting flexibly and respecting the requirements of the business at every stage of the operation.



The solution

GreenWarehouse combines energy-efficient lighting (in this case, Maxos LEDs), with an interactive light management system. All the lights are equipped with a control unit which has a movement sensor and wireless controller, ensuring that lights are dimmed when they are not needed.

A 2,200-meter busbar system was easily installed, as no cables had to be laid, meaning there was minimal disruption to DB Schenker's daily operations. The new technology was also seamlessly linked with the existing Siemens daylight control system.

Maxos LED



Smarter energy saving systems

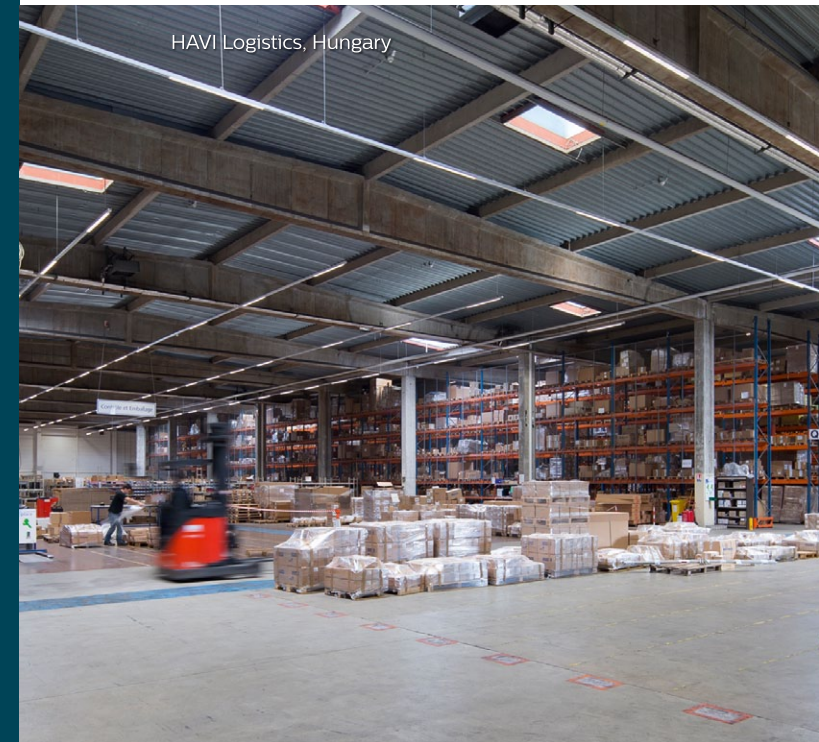
Creating the 'green' warehouse

Warehouse lighting has evolved.

Philips Lighting's GreenWarehouse system is a simple, bundled solution that is the complete package for warehouses looking to transform their green credentials.

Featuring three types of dimmable LED luminaires – GentleSpace gen2 for general open space lighting and Maxos LED and Pacific LED for racking, plus wireless controls, it is suitable and scalable for warehouses of all sizes and works across both open spaces and racking areas.

And because it's wireless, it's easy to configure into zones and reconfigure at any time, aiding flexibility, reducing maintenance costs and ensuring a future-proofed investment.



Here are just some of the benefits and efficiencies you can expect:

One lighting and controls bundle

Our simple warehouse system is easy to order, install and commission. Designed to enhance light quality and safety, it helps reduce cost and your carbon footprint, through flexible, programmable zoning that can be adapted easily as needed. It is suitable for fast implementation and easy installation, whether you have a new development or need to refurbish an existing space.

Brighter spaces, smart zones

Lighting everywhere all the time is inefficient and costly. The presence detection and smart zoning solutions included set lighting at a comfortable, dimmed background level, which then automatically switches to 100% when movement is detected. Daylight harvesting can also be used to save up to an additional 20% in energy – the sensors in the luminaires adjusting the dimming automatically, based on ambient light levels.

Reliable LEDs, reduced maintenance

The LED luminaires used in our GreenWarehouse system have a reputation for reliability. With the addition of zoning, occupancy detection and controls that extend their lifetime further, even greater energy and cost reductions are possible ensuring a significantly lower cost of ownership versus traditional lighting systems.

Controls without complexity

The dimmable nature of LEDs means that wireless controls are a natural partner. While the cost and complexity associated with installing wired controls

can be off-putting, our wireless system makes it easy. Everything is combined together in one bundle and all complexity is minimized, from easy installation to commissioning and day-to-day operation.

Reduced carbon footprint

Our efficient GreenWarehouse lighting system offers energy savings of up to 50% – proof that lighting can make a valuable contribution to reducing both costs and carbon.

Built – and proofed – for the future

Our approach to development is 'future proof', so you can be confident that the digital LED solutions available to you now will be a platform for growth and continue to meet your business needs as lighting technology and data management evolves.

Delivers against business goals

Our pedigree in lighting means we're uniquely placed to keep innovating and we invest more than any other lighting company on research and development. You can be assured that our focus is firmly on enhancing your business efficiency and performance.

Fast return on investment – just three years as standard

Typical payback time for the GreenWarehouse system is just three years, as the combined efficiency of LED plus controls and zoning results in up to 50% energy and cost savings. Constant Light Output – adjusting over-lighting by dimming down to the correct lumen level from installation can create up to 10% additional energy savings.

Serving up

safety and hygiene

In the food industry, safety isn't just important, it's critical. Philips Lighting robust and waterproof luminaires protect lamps from moisture and, as no glass is used in LED lamps and luminaires, there is no danger of glass breakage or contamination.

Not only does this maintain hygiene and safety standards, it also creates a safer environment for staff. The reliability and long life of our LED solutions reduce the hassle, risk and cost involved in stopping production to replace lamps that have failed prematurely.



Key facts

- Pacific LED waterproof luminaires replace the previous 2xTL-D 58 W solution
- Energy consumption savings of 50% achieved by adopting a LED solution
- CO₂ emissions reduced by 55%, without compromising on the lighting levels and quality achieved by the previous lights
- With 6,000 hour per year usage, Hero expects the new installation to be maintenance free for at least 10 years
- Hero's energy efficiency objective has been achieved

Hero

Alcantarilla, Spain

The project

In December 2012, the Hero factory at Alcantarilla, famous for producing essential household foodstuffs, drinks and baby food, celebrated its 90th birthday. Back in 2008, it set up an internal energy efficiency committee to investigate opportunities for improving its energy consumption in accordance with the group's social responsibility policy and, in particular, its commitment to the environment.

The challenge

While the main objective for Francisco Aleo, Head of the Technical Department at the Hero factory in Alcantarilla, was to improve energy efficiency and, as a result, reduce CO₂ emissions as much as possible, for Peter Beuth, Electronic Maintenance Manager for the area, the objective had to reach even further: "The lights that we have had up until now, fluorescent lamps with electromagnetic ballasts, required continuous repair, and in these types of installations with machinery below, it is sometimes difficult to reach the screens with elevation systems. So, as a minimum, we need to be able to get to the installations more easily."

“

The envisaged savings have been met to the letter, we recorded consumption before and after, and the new solution works perfectly.”

Francisco Aleo, Head of the Technical Department, Hero factory, Alcantarilla



The solution

In the initial phase of changing to LED lighting, 44 Pacific LED waterproof luminaires replaced the 2xTL-D 58 W waterproof luminaires with electromagnetic ballasts. "The experience is very positive. We measured consumption before and after and the new wattage works perfectly," reports Francisco Aleo. As a result of using Philips LED technology, Hero has made energy consumption savings of 50% or 2.6 kW in the installation and consequently reduced its CO₂ emissions by 55%, without compromising on the lighting levels and quality achieved by the previous lights. This meets Hero's energy efficiency objective.

Pacific LED



High quality as standard

In the food industry every small element is critical. Good quality of light is a 'must have' in terms of achieving quality products. The solid-state nature of LED construction also eliminates the potential danger of glass contamination caused by the replacement of broken lamps.

High IP rated luminaires with high lumen output contribute to a clean and heat free lighting solution. Surface luminaires with performer optics are perfect for areas where a protected environment and good quality of light is needed. Wide Beam (WB) optics will achieve good uniformity over the whole space. If you have higher ceilings you could also use a Narrow Beam (NB) for a good effect.



Hero, Spain

60%

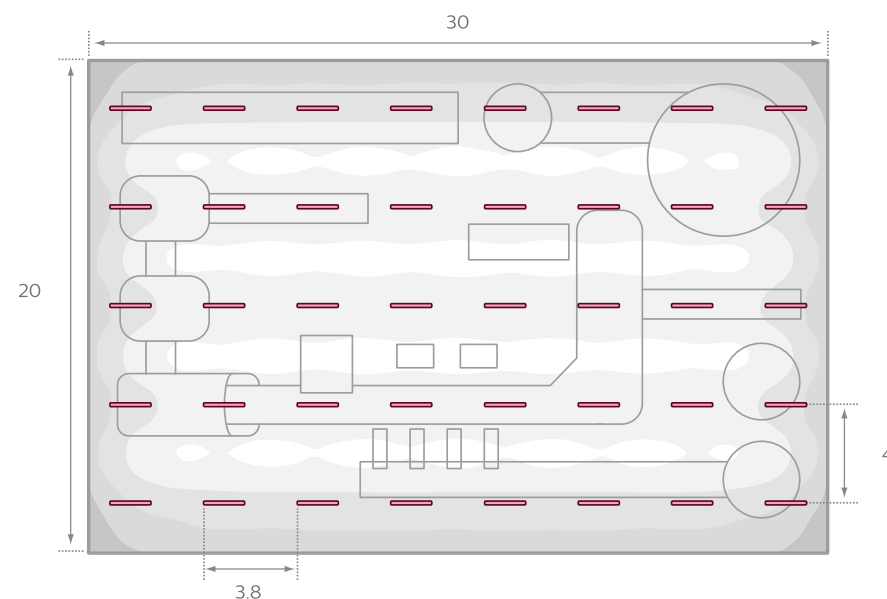
power savings

with LED solution over
a conventional solution



Example floor plan layout

Height: 4



Scale: 1:215
Values in Lux
All dimensions in meters

— = Pacific LED WT460C L1600 1xLED64S/840 WB

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 300	< 25	> 0.60	> 80		
LED Solution	0.98W/m ² /100	368	19	0.66	80	2160	52
Standard Solution HF 2xTLD58w	2.37 W/m ² /100	309	27	0.77	80	4400	110

General surface mounting distribution = —

Pacific LED Gen 3

Featuring a fresh new design, a highly efficient optical system and modules with the latest mid-flux LEDs, the robust, waterproof Pacific LED delivers high-quality, bright white light with excellent beam control to minimise glare – important in applications like food processing. What's more, installation is quick and easy, thanks to the smart end-caps. And the light engine can be serviced, enabling future LED upgrades without having to replace the entire luminaire.



Did you know?

For high ceilings, we have the option of HB GentleSpace gen2 with suitable covers for environments subject to HACCP.

Intelligent controls

Managing the lighting in manufacturing and processing environments can significantly reduce costs and increase comfort and safety for the occupants. By coupling daylight and presence detection with the lighting scheme, savings of up to 40% are possible. Our networked solutions can dim the lighting when natural light is available and increase the lighting levels when natural levels drop, such as bad weather or through winter months. Daylight dimming can be coupled with presence detection through this solution, meaning lighting can also be dimmed down, or indeed switched off, in zones where no activity is detected – allowing for even further savings.

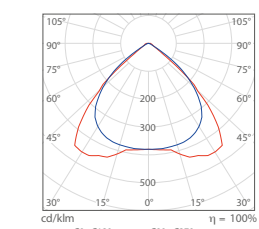
Solution: Dynalite or LightMaster-KNX Networked system – Presence and Daylight



Key features

- New modules with mid-flux LEDs: high lumen packages and improved efficiency
- Low maintenance costs due to long lifetime of LEDs
- Light source is serviceable/upgradable
- Excellent glare control

Polar Intensity



Finely tuned for performance

Philips Lighting sustainable solutions are ideal for production lines, painting booths and quality control departments.

They deliver exceptional levels of visual clarity, resulting in an easier and safer environments and ensuring the conditions required for observation and inspection. The flexibility of our products also means that lighting can be easily adapted to accommodate changes in production processes and layouts. And, of course, improved energy and carbon efficiencies are an important consideration as plants look to maximize sustainability credentials.



Key facts

- Helps ensure safety, high quality output and consistent brand promise
- Dramatically reduced operational lighting costs
- Reduced carbon footprint, enhancing your sustainability credentials
- Minimal maintenance requirements due to long lifetime of LED lighting
- Optimized light quality above production lines through system interchangeability
- Tunable brightness to create optimal viewing conditions for employees.

Driving improvements and savings

Endless possibilities

Philips Automotive Lighting is the world's leading car lighting innovator – famous for superior technology, high quality products and innovation leadership. We apply the same exacting standards to workspace solutions. By adopting our LED lighting you'll see a significantly brighter workplace and you'll feel the benefit of dramatically reduced energy use.

Welcome Philips to your assembly arena and you'll experience not just the brilliance of our pioneering LED range, but also the benefits of Philips as a lighting partner.

Perfect for automotive

Ideal for production lines, painting booths and quality control departments, Philips' new generation of LED lighting delivers exceptional levels of visual clarity, resulting in an easier and safer environment, and optimal conditions for observation and inspection. The flexibility of Philips LED light lines also means the lighting can be easily adapted to accommodate changes in production processes and layouts. What's more, LEDs last up to three

times longer than conventional fluorescent technology, meaning a longer service life and a significantly reduced need for time-consuming maintenance. This in turn minimizes costly downtime and ensures uninterrupted productivity – a huge advantage, especially on 24/7 production lines and at the last minute we were able to add in some of the very latest innovations.

Up to 60% less energy

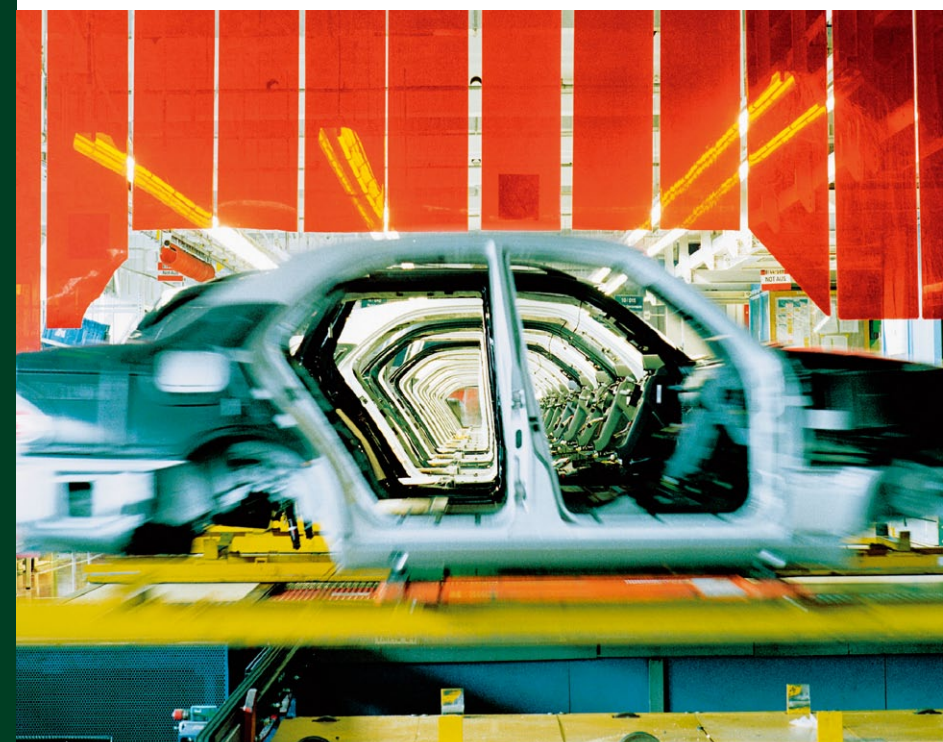
LED lighting uses up to 60% less energy than traditional lighting, which means on-going cost savings for your business. It can also contribute to reducing your carbon footprint and the taxation costs associated with it for years to come. Furthermore, by implementing Philips LED lighting controls – such as presence detection and daylight linking, you can ensure that lighting is provided only where and when required in your automotive assembly plant. This cuts energy usage and associated costs, as well as lowering your carbon footprint – all of which benefits your bottom line.



Gearing up for safety and precision

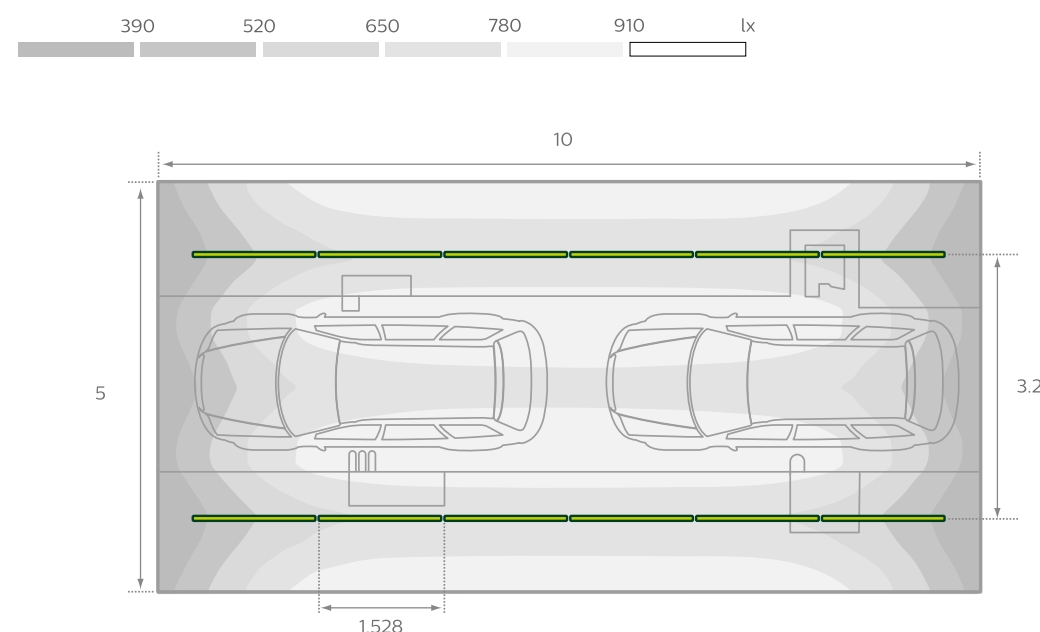
On automotive assembly lines, vehicles are constantly moving so lighting becomes a critical factor in ensuring safety and quality.

Continuous lines of luminaires parallel to vehicles make it possible to concentrate lighting levels on the assembly activity along the entire production line. Double Asymmetric (DA) beams help to concentrate the light in a vertical plane (where most activities are performed) instead of on to the floor beneath the luminaires.



60%
power savings
with LED solution over
a conventional solution

Example floor plan layout



Scale: 1:72
Values in Lux
All dimensions in meters

— = Maxos Performer 4MX900 G3 581 1xLED50S/840 PSU DA20

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 500	< 22	> 0.60	> 80		
LED Solution	1.37W/m²/100	831	19	0.83	80	474	39.5
Standard Solution HF 2xTLD58w	3.05 W/m²/100	997	24	0.83	80	1320	110

Parallel trunking system lines with a continuous array of luminaires = —

Maxos LED Performer

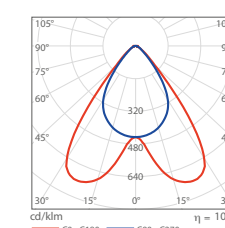
Maxos LED Performer is an extremely flexible solution that delivers low energy consumption and excellent beam shaping at an attractive investment level. Perfect for customers who want to save energy and reduce cost compared to what they are used to with conventional lighting. Excellent lighting is essential in industrial environments, to guarantee safety and productivity. The Performer, with its sleek look and feel is the ideal solution, designed to create a smooth, continuous line effect.



Did you know?

In case you need to work between vehicles, transversal luminaires might be needed.

Polar Intensity



Key features

- Precision beam shaping with a breakthrough optical concept
- Continuous smooth line effect
- Flexible, with many options available
- Suitable for demanding applications

Brighter underground

With most parking facilities operating 24 hours a day, sustainable, energy efficient lighting solutions are essential to help reduce carbon emissions and reduce costs.

Our products are tough and durable, both indoors and outdoors, delivering high quality light, optimum visibility and safety, especially important in covered parking areas, where both drivers and pedestrians need to see and be seen. Used with controls and presence detection systems, our lighting solutions provide illumination only when and where it is needed for increased energy efficiency.



Key facts

- Uniform light distribution with 'no dark corners'
- Presence detection controls ensure safety and energy efficiency
- ZigBee wireless communication works with low power devices to transmit data over long distances
- Pacific LED and Gondola LED solutions are robust and vandal-resistant
- Optimum sense of safety created through the flexible dimming system
- Up to 80% saving on energy and reduced maintenance costs

The solution

A survey of the existing lighting systems indicated that the smart Pacific LED GreenParking system, which includes zoned dimming, would deliver significant cost and environmental benefits.

The existing lighting has now been replaced with LED lighting throughout, using 1,141 Philips Pacific LED fittings. As well as providing energy efficient performance with a high lumen output, the Pacific LED fittings have excellent glare control to ensure good visibility for drivers.

ExCeL Car Park

Royal Docks, London

The project

The ExCeL exhibition space in London's docklands welcomes over 4 million visitors and exhibitors a year into its halls.

Following the success of an earlier project to upgrade lighting in the halls to Philips GentleSpace gen2 high bay LED luminaires, ExCeL saw an opportunity to achieve further energy and carbon savings by upgrading to LED lighting in its two car parks – located directly beneath the exhibition halls. These cover an area of 90,000m², providing 2,100 parking spaces.

Since construction, the car parks had been extended in phases, resulting in varying light levels from a mix of different light fittings and light sources. These included 250W metal halide, 58W T8 fluorescent and 2D compact fluorescent fittings – 1,817 fittings in total.

“

Our calculations showed that upgrading the car park lighting would deliver a payback within 1.5 years through energy savings, so this was clearly a very worthwhile investment.”

Brian Cole, Operations Director, ExCeL



GreenParking system



Be safe, be seen

In indoor parking places, good visibility is key to avoid accidents involving both other vehicles and pedestrians. Light levels should also be functionally high enough to allow easy tracking of a parked vehicle and give good facial recognition to help pedestrians feel secure.

Waterproof luminaires are easy to clean and are well protected against dust and car emissions. Usually, car parks have very low ceilings (2m-3m) so uniformity becomes hard work. The OPAL lens optic is specially designed for these situations and allows you to achieve more spacing between luminaires while maintaining good lighting uniformity values.



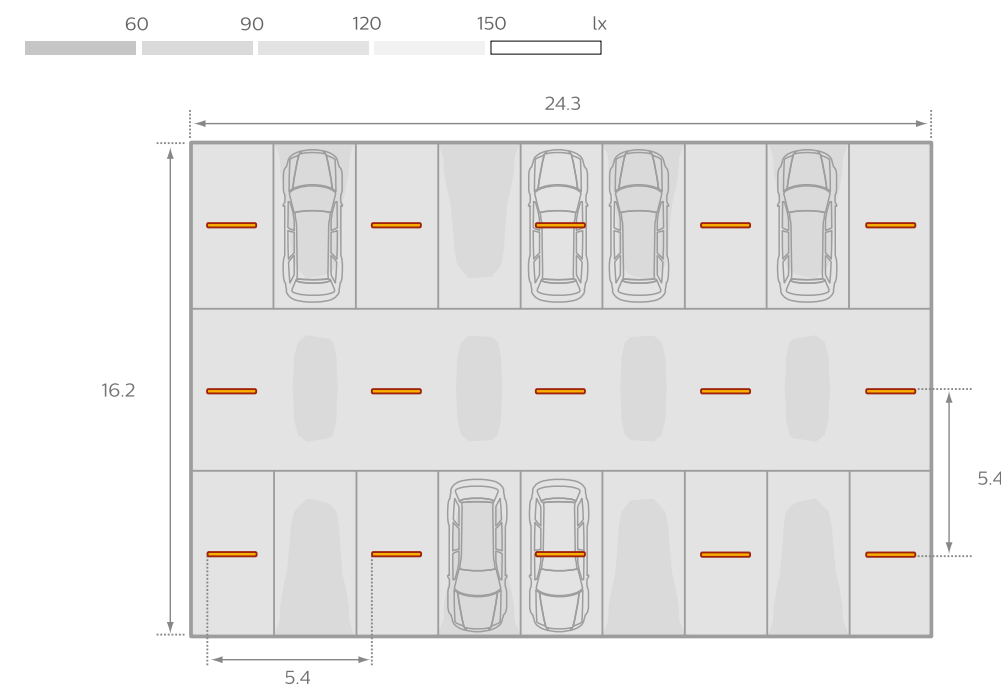
57%
power savings

with LED solution over
a conventional solution

80% additional
power savings
with GreenParking system

Example floor plan layout

Height: 2.5



Scale: 1:174
Values in Lux
All dimensions in meters

— = Pacific LED gen3 WT460C L1500 1xLED35S 840 OPAL

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 75	< 25	> 0.40	> 40		
LED Solution	1.12 W/m²/100lux	92	25	0.52	80	405	27
Standard Solution HF 2xTLD58w + NB reflector	2.81 W/m²/100 lux	75	25	0.57	80	825	55

General surface mounting distribution = —

Pacific LED Gen 3

Featuring a fresh new design, a highly efficient optical system and modules with the latest mid-flux LEDs, the robust, waterproof Pacific LED delivers high-quality, bright white light with excellent beam control to minimise glare – important in applications like parking garages. What's more, installation is quick and easy, thanks to the smart end-caps. And the light engine can be serviced, enabling future LED upgrades without having to replace the entire luminaire.



Did you know?

To increase the comfort of light in a car park, Pacific LED Opal offers soft transitions and a convenient up-lighting effect.

Controls: GreenParking

Indoor car park lighting is essential for safety and security reasons, which means that lighting is usually left on 24/7. But imagine if an indoor car parking space could be lit when needed, but the level dimmed down when no movement is detected – whether people or moving cars? The revolutionary Philips Pacific LED GreenParking solution is the answer. This is how indoor parking areas of the future will be lit. It allows the LED lighting to be put into 'zones', reducing the amount of wasted light.

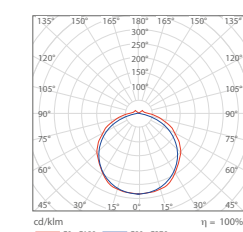
Each zone is programmed to come on when movement is detected nearby, but dimmed down to a lower level when there's no activity. The system can be easily retrofitted into traditional installations, and as the system is fully wireless too, it's hassle free. What's more, by only turning lighting on 100% when and where needed, the potential for energy and maintenance savings is huge. With Pacific LED GreenParking you can realize up to 80% energy savings compared with a traditional covered parking lighting solution, while still allowing people to feel safe.



Key features

- New modules with mid-flux LEDs: high lumen packages and improved efficiency
- Low maintenance costs due to long lifetime of LEDs
- Light source is serviceable/upgradable
- Excellent glare control
- Soft brightness transitions by OPAL lenses

Polar Intensity



Up the production levels

Philips Lighting sustainable solutions can significantly contribute to the creation of a more efficient and productive workplace.

By ensuring task areas are well lit and have high visual comfort, mistakes can be reduced, safety enhanced and productivity maximized. Operational costs are reduced by using less energy, minimizing lighting maintenance in hard to reach areas and reducing the carbon footprint of manufacturing in the supply chain. Flexible, cost effective and energy efficient, Philips Lighting products provide high quality, uniform illumination to workspaces ensuring optimum visibility for quality control and safety.



“It looks great and the responses have been positive.”

Cor van de Ven, owner of Vencomatic

Key facts

- Maxos LED insert for TTX400 gives a bright and pleasant light in production and warehouse spaces
- Maxos LED insert for TTX400 creates ideal conditions for production line assembly
- Maxos LED equipped with warmer LED color for office atmosphere
- DynaLite lighting control system automatically dims lighting when offices are empty
- In the showroom, GentleSpace gen2 lights the innovative installations with bright LEDs

Venco Campus

Eersel, the Netherlands

The project

The new Vencomatic building in Eersel is remarkable for its size (30,000 square metres) and its unique egg shape. This gives an indication of the core business of the company – the development, production and sale of poultry systems. Most importantly, the Venco Campus is the height of sustainability, innovation and flexibility. This sustainable, energy-neutral building was also looking for innovative lighting solutions.

The challenge

Energy-efficient LED lighting is starting to be used in the industry. “It was therefore logical to start using LEDs in our own company,” says Cor van de Ven, owner of Vencomatic. “We are an innovative company and that needs to be visible in everything we do, especially in our lighting. Above all we believe that LEDs add to sustainable living.” There was a conscious decision to fit the whole complex with LED lighting – offices, production spaces, warehouses and outside spaces. Vencomatic asked Philips Lighting to complete the entire plan within a short timescale and at the last minute we were able to add in some of the very latest innovations.



The solution

The Venco Campus now features a range of LED solutions. For the production spaces and warehouses the latest industry lighting system has been chosen.

GentleSpace gen2



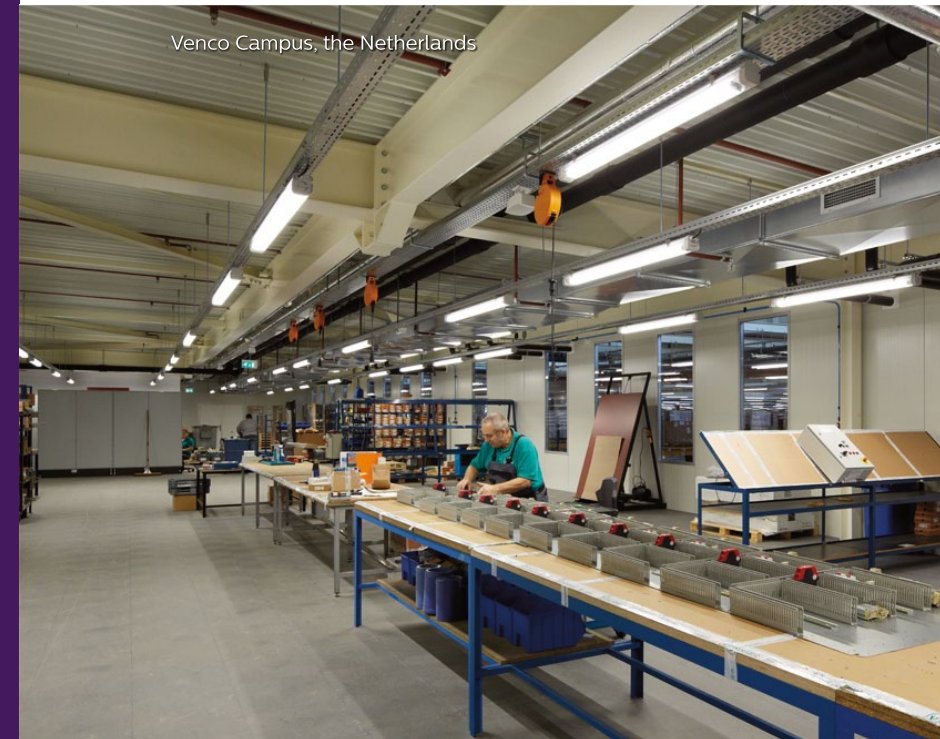
Maxos 4MX850 G3 insert for TTX400



Safety first and failure not an option

Manufacturing environments tend to comprise a variety of different task situations so luminaires must be robust and unlikely to fail. LEDs are ideally suited for environments that suffer from vibration due to the solid materials used in their construction.

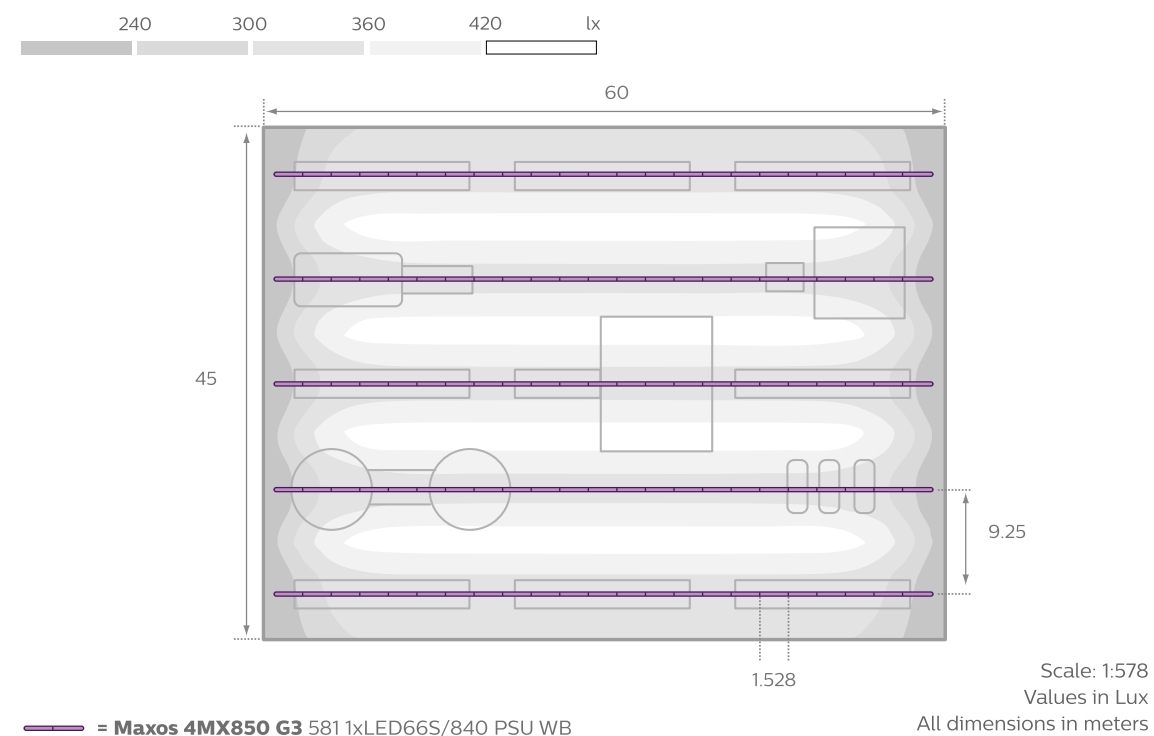
In fact, switching to solid state LEDs means that potentially dangerous situations caused by flickering or glass particles from broken lamps can be completely avoided. For every manufacturing activity and area, it's important that a good level of lighting and uniformity can be achieved. Trunking luminaires can be distributed as necessary to suit the individual task focus. Philips Lighting Wide Beam (WB) optic will help to space trunking lines, reducing the amount of luminaires needed yet ensuring optimum light.



45%
power savings
with LED solution over
a conventional solution

Example floor plan layout

Height: 7



	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 300	< 25	> 0.60	> 80		
LED Solution	0.92 W/m ² /100	366	22	0.60	80	9120	48
Standard Solution HF 2xTLD58w	188 W/m ² /100	412	25	0.61	80	20900	110

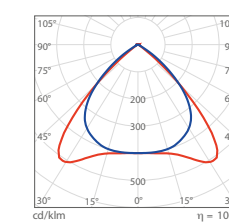


Suspended trunking system with a continuous array of luminaires for optimal uniform level = —

Maxos LED General Lighting

An ideal general lighting solution offering excellent payback for a limited investment, Maxos LED Industry meets all relevant standards and specifications for industry applications. It offers best-in-class energy savings while delivering high lux levels at the required color temperatures and glare factors. The compact Maxos LED Industry system comprises exchangeable mid-power LED boards mounted on a standard Maxos trunking rail and comes in a choice of wide and narrow-beam lenses. This highly efficient LED solution will deliver full payback in less than three years.

Polar Intensity



Key features

- Substantial energy savings for a limited investment
- Comfortable light, long lifetime
- Compatibility with proven Maxos and TTX400 trunking system
- LED engine platform makes Maxos LED Industry a truly future-proof solution

Focusing on the details

Providing targeted light is essential to ensure detailed tasks are completed effectively and that any imperfections are spotted.

This is especially important in a quality control environments where employee concentration levels are key. Our work bench solutions offer excellent quality of light with minimum glare and help to ensure that these key work areas operate comfortably yet efficiently.

Factories will often have specialist or detailed tasks that are best performed at work benches, so effective task lighting is essential to ensure a high quality output and identify any inconsistencies or defects. Philips' new generation LED lighting provides exceptional levels of visual clarity, resulting in an easier and safer environment, and optimal conditions for observation and inspection. Advanced optics in combination with LEDs result in appropriate viewing conditions and more comfortable working environments.

Ideal for factories

Philips' LED lighting is perfect for specialist task areas and quality control departments – saving up to 60% energy and lasting up to three times longer than conventional fluorescent technology, which means a significantly reduced need for time-consuming, disruptive and expensive maintenance. So you can reduce your energy bills and carbon footprint as well as continuing to work efficiently. Coupled with presence detection and controls, it delivers the correct light levels only as and when it is needed, offering further energy savings.

Key facts

- Minimizes shadowing
- Comfortable to work under, no glare
- Maximum visibility and clarity – ideal for quality control
- Ensures brand consistency and high quality output
- Light only where and when you need it
- Energy savings of up to 60% when coupled with controls



Philips shaver factory, the Netherlands

Effective task lighting

Typically factories operate a general illumination scheme. However for specific tasks that require high standards and specific requirements, it is necessary to apply an independent lighting solution that can be easily installed within the production infrastructure.

The ideal solution is a flexible luminaire because it allows for unified models and offers adaptability across different processes and locations by choosing the beam required. For workstations, the task area is under the luminaire, so a 10° beam angle will tend to be enough. If the size of the task area increases we can specify a wider beam. The finishing of the luminaire it's also very important as it will be close to the operator. It must be a comfortable experience for the user and give effective lighting whilst meeting glare requirements.



Philips shaver factory, the Netherlands

35%
power savings
with LED solution over
a conventional solution



Example floor plan layout



Scale: 1:78
Values in Lux
All dimensions in meters

 = Maxos LED Panel 4MX800 L600 2xLED10-4000

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 500	< 25	> 0.60	> 80		
LED Solution	n.a	721	21	0.72	80	47	23.5
Standard Solution HF 1xTLD36w	n.a	515	21	0.79	80	72	36

Individual luminaire suspended or surface mounted over task area = 

Maxos LED Panel

The movable panel offers flexible and efficient LED lighting, outperforming conventional trunking systems in terms of energy efficiency and lighting design possibilities (adjustable beam shapes). Thanks to its high-efficiency LED light engines and innovative optical system, Maxos LED panel delivers excellent work bench lighting, meeting light-level and glare norms. It is available – in a choice of colors – as a new installation and as a retrofit to existing conventional installations.

In use sensors

Work bench task lighting need only be on when the work benches are occupied. Leaving the lighting on when they are vacant is costly and unnecessary. By simply combining the task lighting over the work bench with a narrow area presence detector, the lighting over that work bench will detect when someone is there and switch the light on. Once that person leaves the work bench, after a set time, the lighting will be switched off completely, allowing savings related to energy, maintenance and carbon emissions to be realized.

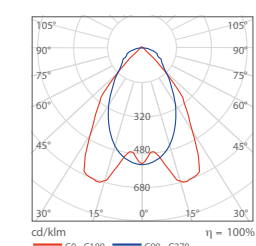
Solution: Dynalite Networked system – small movement multi-sensor



Key features

- Efficiently directing light where it is needed
- Innovative look, adjustable panels
- High lumen output
- Easy installation, no hazardous materials, and no maintenance

Polar Intensity



Preserving integrity

Achieving optimum light conditions has long been a goal for the pharmaceutical industry. Strict controls that ensure product integrity, hygiene, safety and security are vital.

Philips Lighting products are specifically designed to operate within controlled cleanroom environments, removing the risk of contamination from lighting units and resulting in minimal disruption to laboratory and production work. The energy efficiencies our solutions offer help reduce costs and contribute significantly to your sustainability programme.



Key facts

- LED solutions used throughout the factory, offices and outside parking
- Solutions: LUXEON LED CleanRoom®, DayZone, LuxSpace, DayWave, Strip II+ LED, ClearLine
- Lobby area features 3 by 5 meter pixel wall
- 30% energy savings as compared to the old facility
- Total saving of over US \$22,000 per year in maintenance and replacement costs

Philips Lumileds Malaysia, Penang, Malaysia

The project

Philips Lumileds Lighting Company is the world's leading manufacturer of high-power LEDs and a pioneer in the use of solid-state lighting solutions for everyday purposes, including automotive lighting, computer displays, LCD televisions, signage and signalling and general lighting. Their goal was to become the first factory in the world to be entirely lit by LED.

The challenge

The objectives were that only energy-efficient lighting solutions were to be used, and that the lighting conditions would provide a comfortable ambiance in the offices and production areas. The lighting fixtures should also be consistent with the company's Environmental, Health, and Safety (EHS) policy, to reduce environmental impact and provide safe working conditions for employees.



The solution

Integral to the project was the lighting of the production area. The Philips Lighting team used a minimum of 500 customized LUXEON® LED lights CleanRoom fixtures that provided excellent functional clean room performance to achieve hygienic, clean room facility standards, while offering low maintenance and energy efficiency. Philips state-of-the-art LED products were also used in the office area to help provide high quality of light for a comfortable and conducive work environment.

CleanRoom LED



Hygienic and safe for the duration

In the pharmaceutical industry, highly hygienic facilities require special IP65, easy-to-clean, dust-free luminaires that meet all lighting requirements and standards. Because of this, maintenance activities can become a risk.

To ensure the integrity of these areas you also need to minimise costly downtime and maintenance. LED technology represents a great solution, delivering market-leading energy performance and long lifetimes, with typically over 50,000 hours of maintenance-free operation. Our luminaires for modular ceilings can be adapted and installed perfectly to ensure the integrity of the clean room environment. If you don't have a modular ceiling we have other suitable options for recessed luminaires. AC-MLO optics give a comfortable light experience, reducing glare and providing good uniformity.



Philips Lumileds, Malaysia

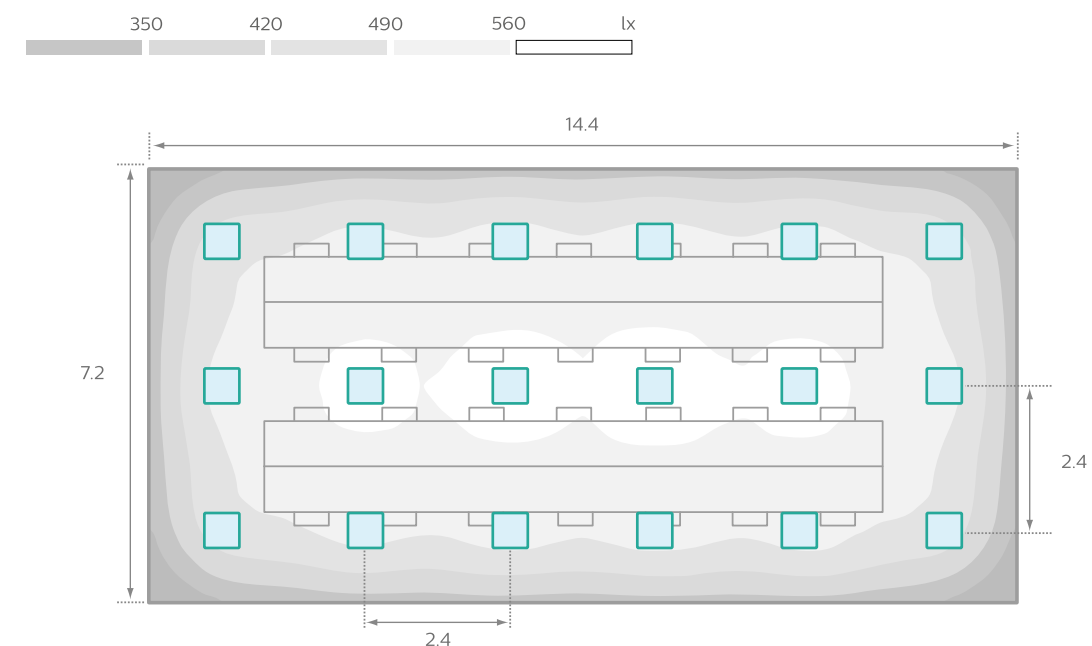
33%

power savings

with LED solution over
a conventional solution

Example floor plan layout

Height: 3



Scale: 1:103
Values in Lux
All dimensions in meters

= CleanRoom LED CR434B W60L60 1xLED48/840 ACML0

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 500	< 19	> 0.60	> 80		
LED Solution	1.38 W/m²/100lx	553	16	0.69	80	792	44
Standard Solution HF 4xTLD 14w	2.07 W/m²/100lx	529	17	0.66	80	1134	63

Recessed luminaires with modular distribution
(600 x 600mm) =

CleanRoom LED

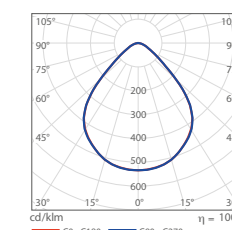
Customers operating highly hygienic facilities require special IP65, easy-to-clean, dust-free luminaires that meet all lighting requirements and norms. With the latest LED engine on board, this LED CleanRoom luminaire represents the ideal solution, delivering market leading energy performance – far beyond fluorescent solutions – over 50,000 hours of maintenance-free operation. This means extremely low operational cost over the total lifetime of the luminaire, so an excellent financial return on investment.



Did you know?

If you have higher ceilings or you need more level, a LED version equivalent to 4xTL5 24W is available.

Polar Intensity



Key features

- Latest LED engine IP65
- ISO class 2-9 Fraunhofer-certified
- Push-in connector: connection without opening the luminaire



Welcoming and safe

The driveways and external areas of your premises need to feel safe and welcoming for employees and visitors. But illuminating them for 24 hours a day isn't just costly, it's also a waste of precious resources.

The right lighting should provide good visibility and no pockets of shade. Our solutions are designed to control light distribution, illuminate large areas and provide a smooth, indirect light to guide people to your door. All without creating unnecessary glare or light spillage. Our energy-efficient lighting solutions will also make a big difference to your bills – and your green credentials.



Waigaoqiao Container port

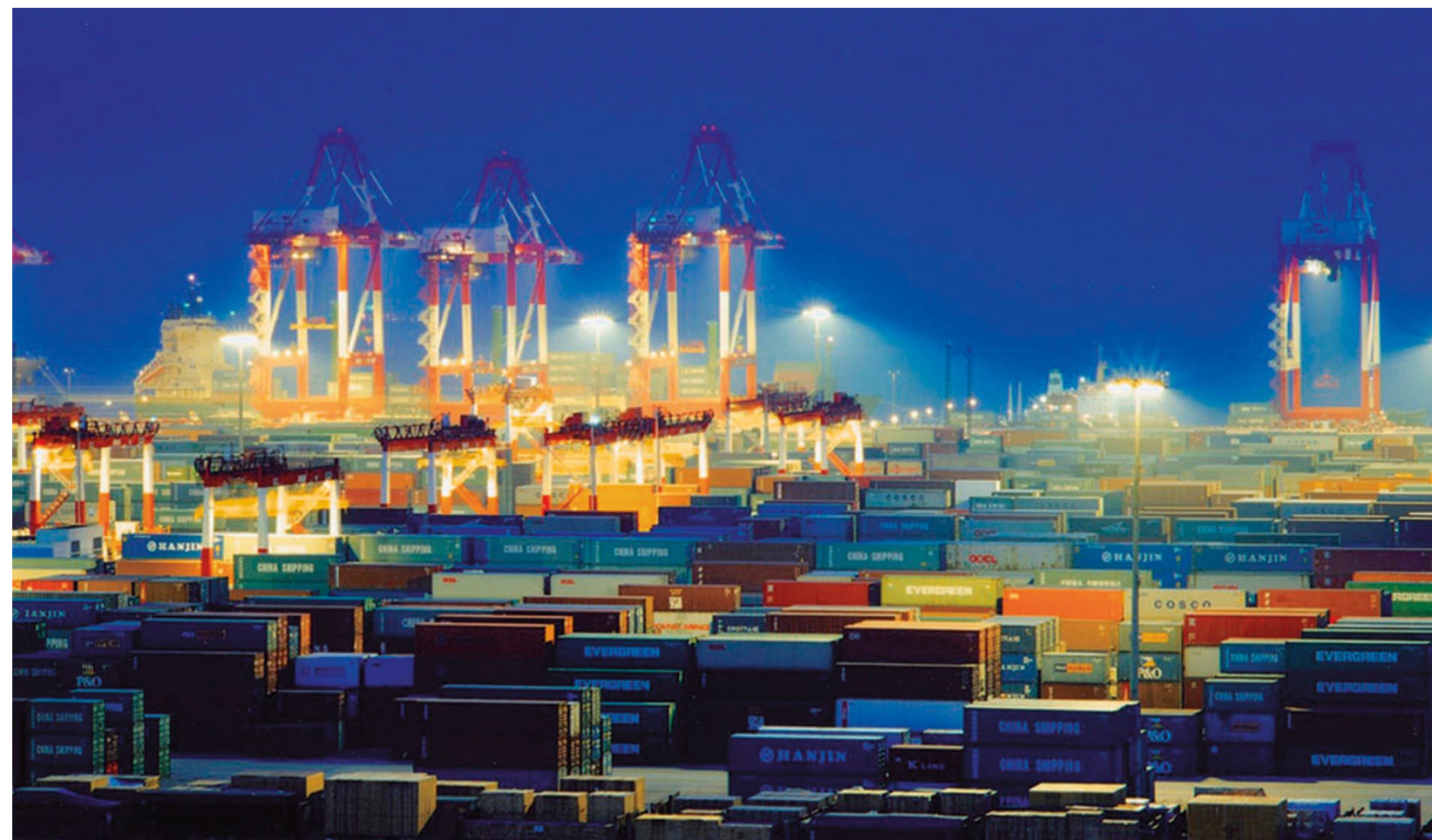
Shanghai, China

The project

The container port in Shanghai is the second largest in the world. For this project the lighting had to increase the efficiency of operations during the night-time cargo handling and also contribute to the image of the container terminal, which was keen to promote itself as one of the most modern in the entire Asia Pacific region.

The challenge

The lighting installation had to comply with strict requirements, especially in terms of horizontal and vertical light strength and uniformity. The lighting had to be strong enough for the images from a high-definition closed circuit television circuit to be assessed without excessive glare – which could distract truck drivers or other workers. The choice had to be in favour of products with a long lifecycle, with high light output and minimal light hindrance. Due to the proximity of the sea, the light fittings also had to be watertight and resistant to corrosion. Because space is restricted in container terminals, optimum lighting had to be achieved using the minimum number of masts.



Outdoor LED solutions

OptiVision LED BVP520



Mini 300 LED



Secure and brand-enhancing

Security and safety are vital factors to consider for outdoor areas. Lighting is important for operational reasons like the loading bay and the perimeter security.

Another important aspect to consider is that area floodlights installed over the façade should not become obstacles for the activities performed around the building, so choosing the right solution is key. Asymmetric Beam (A) optics are ideal for this application, as they distribute the light efficiently reducing the light towards the façade and decrease glare as they don't need high orientation angles. As well as the functional aspects of façade lighting, effective lighting can help to create a safe and welcoming atmosphere for visitors.



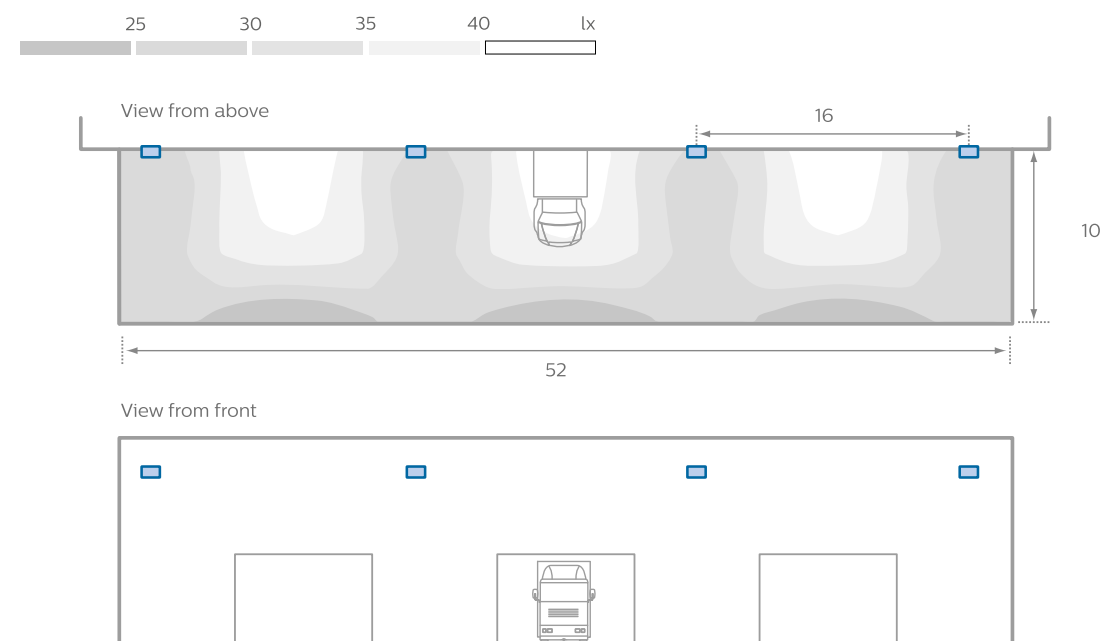
62%

power savings

with LED solution over a conventional solution

Example floor plan layout

Height: 12. Luminaire mounting height: 10



Scale: 1:372
Values in Lux
All dimensions in meters

☐ = ClearFlood BVP650 12K 1xECO/740 A

	Energy Efficiency	Em (lux)	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 20	> 0.25	> 20		
LED Solution	Class A	32	0.69	75	416	104
Standard Solution Traditional floodlight	Class C	28	0.44	60	1096	274

Wall mounted luminaire with universal bracket at 10m height = ☐

ClearFlood

The Philips ClearFlood is a dedicated LED floodlight delivering economical white light solutions for recreational sports and outside area applications. Designed around state-of-the-art LEDs and high-efficiency optics, this very competitive solution offers energy savings compared to traditional HID solutions. ClearFlood is easy to install and perfect for replacing conventional light points as it uses the same electrical installation, columns and types of fixation.



Did you know?

Enhance your building's appeal and your company's brand with architectural lighting.

Intelligent controls

Ensuring there is lighting outside is critical for industrial applications, however not all lighting needs to be on at all times. By pairing the Philips OccuSwitch IP55 outdoor presence detector with the lighting at entrances or loading bays, lighting will always be switched on when required and switched off when not, saving energy and costs. The sensor can be mounted to a height of 12 meters and has a 12 meter range over 240 degrees, so is suitable in many areas. OccuSwitch IP55 can also detect daylight, and won't switch lights on when sufficient natural light is available, enabling further savings.

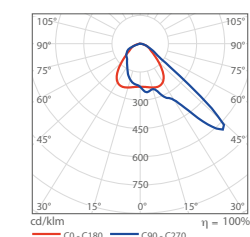
Solution: OccuSwitch IP55



Key features

- Energy savings up to 40% compared to HPI-P systems
- Point-to-point replacement from 70W and 250W HID floodlight
- Dimmable (DALI, 1-10V, CLO) for even more energy savings
- More light control. Light where it's needed
- Instant light, long lifetime
- One shape for multipurpose applications

Polar Intensity



Evaluating performance of LED luminaires

If you're going to have confidence in the performance of your LED luminaires, you need to be able to evaluate them – not only at the outset, but over time. How can you be sure they will retain their rated characteristics?

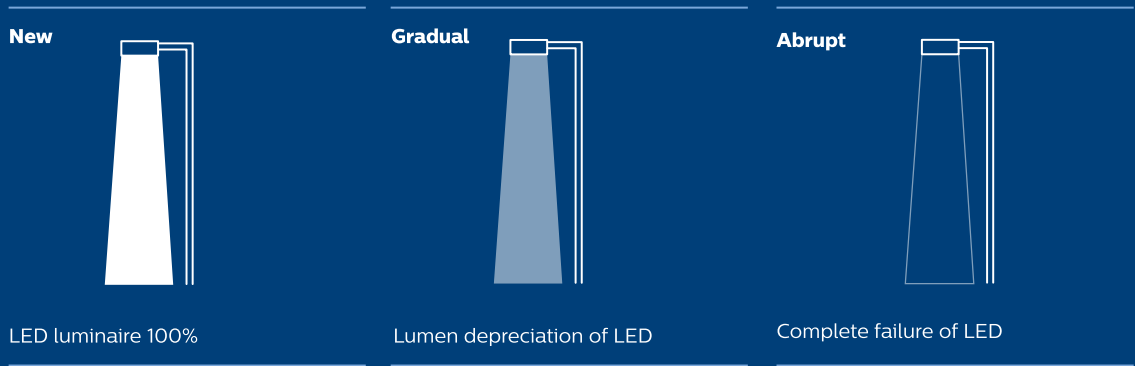


Figure 1 – Over time performance

Gradual light output degradation relates to the lumen maintenance of a luminaire over time and tells you how much of the initial lumen output is maintained. The lumen depreciation can be the result of optical elements degrading, as well as individual LEDs providing less light or giving no light at all.

Abrupt light output degradation describes the situation in which the LED luminaire no longer gives any light at all because the system, or one of the critical components, has failed.

LED luminaires and modules are sophisticated products consisting of many components. System reliability is important parameter to consider in relation to expected long life. The luminaire will last as long as the component used with the shortest life. There are several critical components of a luminaire that influence the system reliability.

The IEC lifetime metric therefore also specifies 'Time to Abrupt Failure', which takes into account failure modes of critical components in the LED luminaire design.

The abrupt light output degradation of a population of LED lighting products at a certain point in time is called Time to Abrupt Failure and is expressed as L_0C_y . Time to Abrupt Failure describes the situation in which the luminaire no longer gives any light at all. Abrupt failure, denoted by L_0C_y , is the lifetime where light output is 0% for y% of the population. Abrupt failure of the luminaire has taken place.

' L_x ' describes the lumen maintenance: L_0 means that the LED luminaires of this certain type give 0% of their initial light output. ' C_y ' describes the percentage of the population for which this is true.

The example L_0C_{10} reflects the age (in hours) at which 10% of the population have failed abruptly.

Unfortunately, the industry has not yet reached consensus on what critical components have to be taken into account when calculating Time to Abrupt Failure. Therefore, Philips Lighting has decided not to publish this value as long as there is a risk of apple-to-pears comparison.

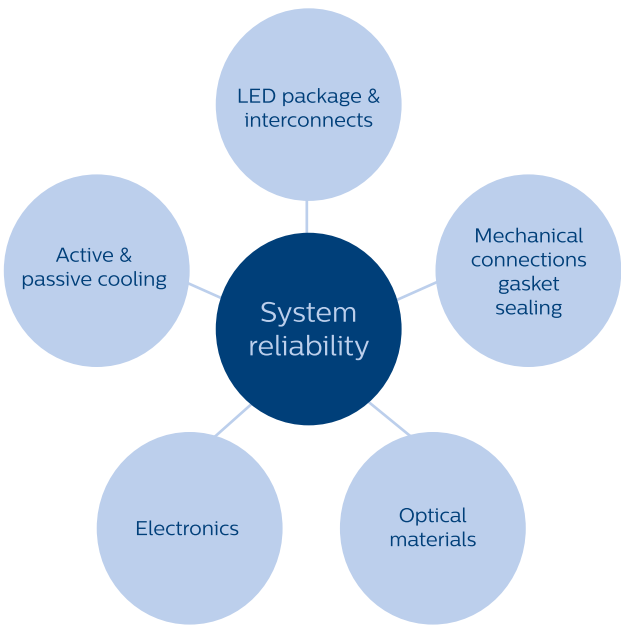


Figure 2 – Critical components LED based luminaire

The IEC lifetime metric for LED luminaires is based on 'Useful Life' and 'Time to Abrupt Failure':

1. Gradual light output degradation / Useful Life

The gradual light output degradation of a population of LED lighting products at a certain point in time is called 'Useful Life'. It is generally expressed as L_xB_y – the length of time during which y% of a population of operating LED luminaires of the same type fail to provide at least x% of the initial luminous flux.

' L_x ' describes the lumen maintenance: L_{80} means that the luminaires of this specific type still give 80% of their initial light output. ' B_y ' describes the percentage of the population for which this is true.

The example $L_{80}B_{50}$ reflects the age (in hours) at which 50% of the population have failed parametrically (producing less light than 80% of initial flux, but still operating).

2. Abrupt light output degradation/ Time to Abrupt Failure

Besides lumen maintenance (Useful Life), there are other factors to consider when evaluating performance over life.



What Philips Lighting publishes on 'initial' performance

To benefit from our standard development work in the IEC, initial performance specifications for all our general LED lighting luminaires are measured in compliance with the appropriate performance standards.

1. Initial rated input power (in W)
2. Initial rated luminous flux (in lm)
3. Initial LED luminaire efficacy (in lm/W)
4. Luminous intensity distribution
5. Initial Correlated Color Temperature (CCT) in K
6. Initial rated Color Rendering Index (CRI)
7. Initial rated chromaticity co-ordinate value and expected tolerance (x,y) < x SDCM

Initial specifications of all LED luminaires are specified at an ambient temperature of 25°C.

What Philips Lighting publishes on performance over time

The 'Over Time' performance specifications of Philips LED luminaires are calculated using the IEC lifetime metric for LED lighting products.

For indoor LED luminaires, Philips Lighting will publish two IEC-compliant quality criteria:

1. number of hours that correspond to the Median Useful Life values $L_{90}B_{50}$, $L_{80}B_{50}$ and $L_{70}B_{50}$;
2. the driver failure rate* at 5000 hours.

For outdoor LED based luminaires Philips Lighting will publish two IEC-compliant quality criteria:

1. number of hours that correspond to the Useful Life value $L_{80}B_{10}$;
2. the driver failure* rate at 5000 hours.

Over Time' life claims are specified at an ambient temperature of 25°C with 12 burning hours per day and a number of switches in line with the main application.

* NOTE: As soon as there is industry consensus on what failure modes of critical components to include in the calculations, Philips Lighting will publish the Abrupt Failure Value belonging to the number of hours specified for the (Median) Useful Life values mentioned above. For specific projects, tailor-made L_xB_y and L_0C_y calculations are available upon request.

