



# Creating better workspaces

Lighting solutions for industrial environments



# PHILIPS





# See what light can do for you

Light has a profound effect on how we feel and plays a vital role in creating a healthy workplace. Daylight controls our natural biorhythms, influences our mood and creates a sense of wellbeing. But daylight alone is not sufficient in most work environments, artificial light is also needed to produce the right light levels.

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Inadequate lighting affects employees' wellbeing and can also result in eye strain, fatigue and poor performance, particularly in roles involving problem solving and concentration. Effective lighting tackles all of these issues.

In addition to helping create a sense of personal wellbeing amongst staff, our lighting solutions can also help them stay connected with the world outside the walls of their office, manufacturing or distribution centre – boosting vitality and improving performance.

## Upgrade to LED, make a visible difference

Good lighting is about quality and comfort – the lighting should be bright enough for staff to be able to perform visual tasks, but not so bright that it causes glare and discomfort. In addition to this, it's now clear that light has a biological effect and there are valuable emotional benefits gained by adjusting light in work environments.

## Work smarter, save energy

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. Energy bills and carbon footprint can be dramatically reduced by adopting programmable lighting that dims automatically in response to bright daylight and switches off when no-one is present at the beginning and end of the day. The use of presence detection with LED solutions is a way to reduce energy bills still further.

Energy efficient lighting and management systems can help towards businesses meeting legislation, achieving a good BREEAM or LEED rating for their building and meeting sustainability goals by reducing energy consumption, carbon emissions and the associated costs of carbon.

# Creating healthier, safer environments

Better light quality means increased comfort. When people feel better they work better, which means increased productivity, so everyone's happy. And when you have no room for error, you'll appreciate the health and safety benefits of lighting solutions that provide uniform light, no dark patches and good colour rendering. Employees and customers will feel better too, boosting productivity or smooth flow through your space.

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## Our personal, consultancy approach

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

We're aware that adopting today's innovative, networked solutions can seem somewhat challenging. Philips Lighting supports you in this process by removing all complexity. We 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 Philips Lighting, you're assured of acquiring high-quality, high-impact lighting solutions that lead to truly enhanced environments with a minimum of hassle and risk.

## Solutions overview

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 only a small selection of what is available. We aim to work with our customers as a lighting partner, to help create customised solutions that meet the needs of their individual application environments.







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# Warehousing and logistics



## Safer spaces and smarter picking

With businesses often operating 24 hours a day, well designed, energy efficient lighting plays an important role in ensuring operations take place safely and efficiently – providing good quality, uniform illumination throughout the workspace.

Gangways can benefit from presence detection technology, allowing just one single aisle or picking area to be lit if that's all that is required – LED's 'instant on' functionality ensuring safety. Open areas can also benefit from intelligent control systems, meaning spaces are only illuminated as and when needed.

A Philips lighting solution reduces energy costs and maintenance time, especially in hard to reach, high ceiling areas, due to dimmable, long life LEDs, which help your business cut costs and continue functioning day and night.

## Hisab Joker Company, Varberg, Sweden

### The project

Hisab Joker Company AB is a wholesaler and retailer of presents, costumes, jokes and home brew products. To increase storage space and centralise, the company built a totally new warehouse covering 5,000 m<sup>2</sup>.

### The challenge

Martin Kristensson, Project Manager at Bravida AB: "The tender specified traditional fluorescent lights of 2 x TL5 80W. We asked Hisab whether they were interested in looking at LED lighting, which they certainly were. We made a payback calculation, which showed that the extra cost of investing in LED lights instead of fluorescent would be paid back within five years." He adds: "Hisab wanted to have a warm white LED light, corresponding to fluorescent lighting with 830 light colour, which Philips was able to offer."

### The solution

220 Maxos LED lights, each with a dimmer switch for individual control, were installed in the new warehouse, mounted on rails in the ceiling.

### Key facts

- Energy-efficient, long-lasting lighting solution
- Estimated lifetime of between 20 and 25 years
- Energy costs cut by €6,270 p.a.
- CO<sub>2</sub> emissions cut by 19,301 kg p.a.

### The solutions

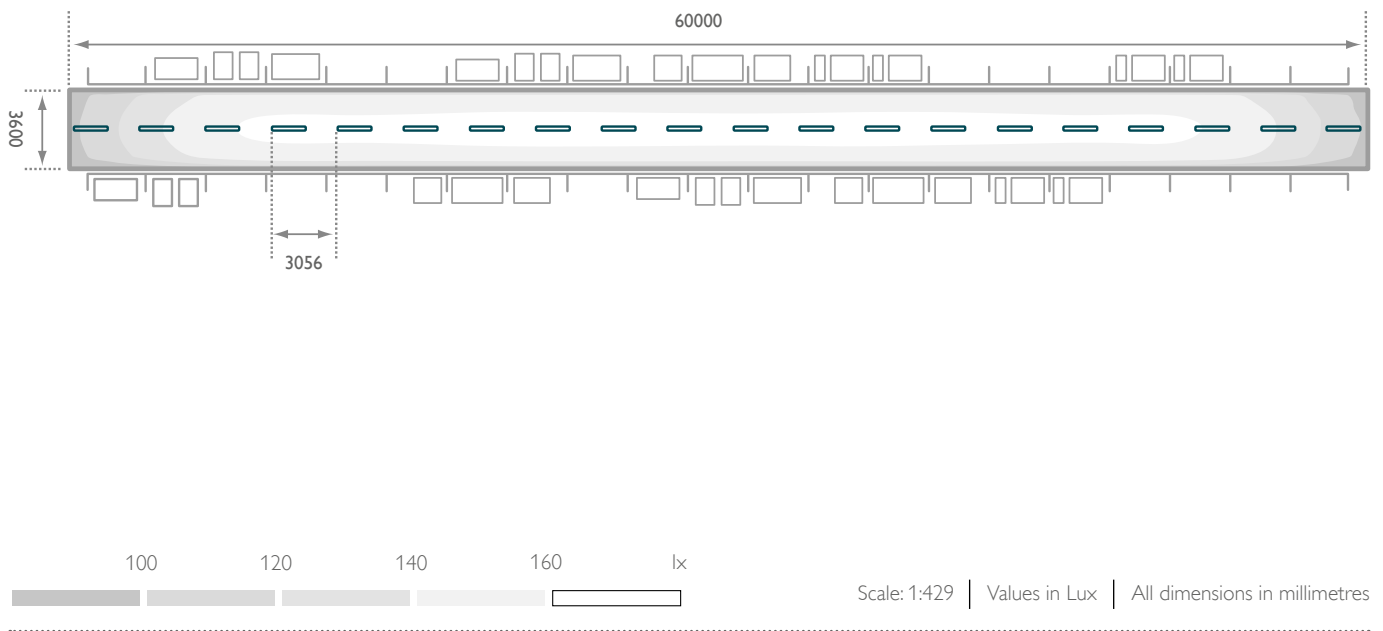
Maxos LED



# Warehouse: racking



Height: 12000. Luminaire mounting height: 11500



Luminaires used

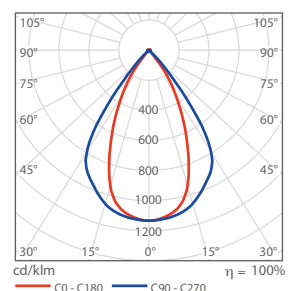
Suspended trunking system, with an array of 1 luminaire for each 2 spaces:

## Maxos LED General Lighting

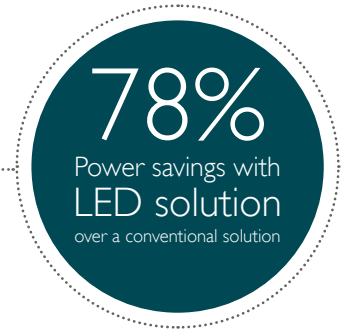
An ideal general lighting solution offering excellent payback for a limited investment, while meeting all relevant norms for industry applications. Maxos LED Industry offers best-in-class energy savings while delivering high lux levels at the required colour temperatures and glare factors. The compact 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 offers full payback in less than three years.



- 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



# Light, as and where it's needed



In warehouses applications most of the racks are never fully occupied but a good quality of light is needed when you want to pick your merchandise. In these spaces, our advanced optics will ensure you receive the right light in the right place, and the incorporation of controls will let you adapt the light to the needs of the moment, creating energy savings through the use of presence detection – allowing for dimming as standard, only increasing the light in an area when it become occupied.

A trunking solution will help you to achieve good uniformities in all directions, low power consumption and easy connection of the luminaires. There are different optics available to use, depending of the height and width of the gangway. Our solution for these areas uses a Narrow Beam (NB) optic that works for spaces of up to 12 metres in height – giving a good lighting level and uniformity along all shelves.

**Tip** 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 HRO.

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	1,85 W/m <sup>2</sup> /100lux	151	17	0,60	80	940	47
Standard Solution HF 2xTLD58w	7,11 W/m <sup>2</sup> /100 lux	179	24	0,61	80	4290 (continuous line)	110

## Controls



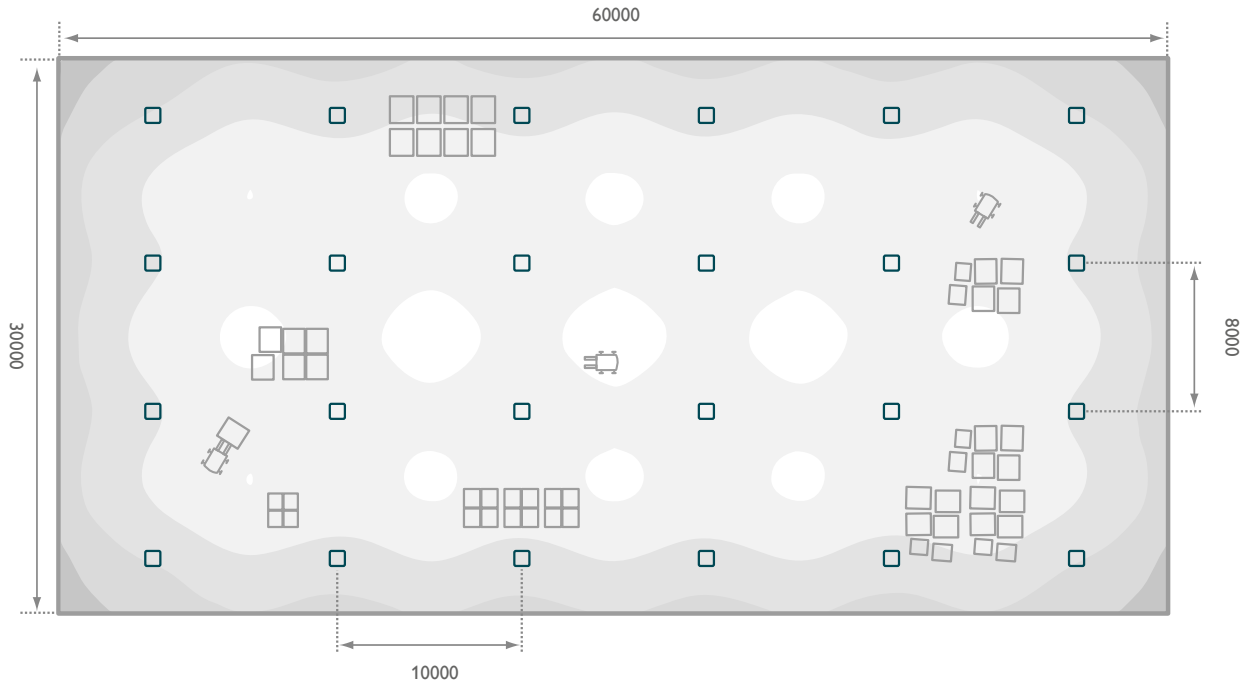
Solution: **LineSense DALI**

Linking Philips LineSense DALI with your warehouse or storage aisle lighting ensures that lights are only on where and when needed. The system detects occupancy in an aisle and then switches the lights on fully. After a set period of time, if no occupancy is sensed, the lights simply dim down in that aisle. LineSense is compatible with ceiling heights up to 15 metres and can help you realise up to an additional 80% saving on energy, maintenance and carbon costs.

# Logistics: open space



Height: 12000. Luminaire mounting height: 11500



Scale: 1:429 | Values in Lux | All dimensions in millimetres

Luminaires used 



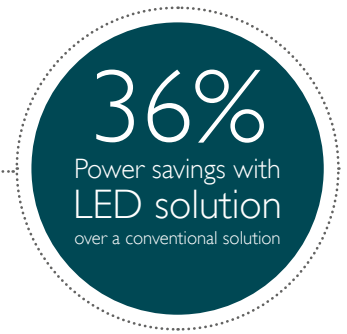
Suspended High Bay luminaires in general distribution over the area:

## GentleSpace

Customers in industrial and warehousing applications are constantly looking for ways to reduce the amount of energy required to light their facilities. GentleSpace is the first LED high-bay luminaire that can directly replace HID high-bays of up to 400W, enabling significant energy savings. GentleSpace 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.

- LEDGINE platform for instant light and long lifetime
- Neutral white colour 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

# Less luminaires, better results



Installations in high ceilings are often complicated, so a long life solution with good performance and lighting coverage lets you reduce number of light sources needed. Long lifetime saves the cost and disruption caused by replacement.

Our High Bay luminaires deliver substantial amounts of light from just one source, meaning a lot less luminaires are required compared to linear systems. Because of this, they are 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.

**Tip** 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.

GentleSpace BY461P 1xLED230S/840 MB

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 200	< 25	> 0,40	> 70		
LED Solution	1,75 W/m <sup>2</sup> /100	209	21	0,52	80	6600	275
Conventional Solution 400HPI	2,53 W/m <sup>2</sup> /100	226	21	0,49	70	10272	428

## Controls



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

Correctly managing the lighting in large open spaces such as logistics premises, can significantly reduce operational costs and enhance comfort for the occupants. By coupling daylight and presence detection with the lighting scheme, savings of up to 40% are possible. The Dynalite or LightMaster-KNX solution 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 in zones where no activity is detected – allowing for even further savings.



# Manufacturing



## Keep on producing

Philips sustainable lighting solutions can create a more efficient and productive workplace by providing better lighting that ensures task areas are well lit and have high visual comfort, helping to reduce mistakes and boost production – especially helpful for an ageing workforce. Operational costs are reduced by using less energy, minimising lighting maintenance in hard to reach areas and reducing the carbon footprint of manufacturing in the supply chain. Flexible and energy efficient, our products can provide high quality, uniform illumination to workspaces ensuring optimum visibility for quality control and safety for your workforce.

## 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.

#### 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 insert for TTX400 with warmer light has been chosen for office spaces
- DynaLite lighting control system automatically dims lighting when offices are empty
- In the showroom, GentleSpace lights the innovative installations with bright LEDs

### The solutions

Maxos LED insert  
for TTX400

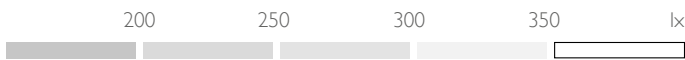
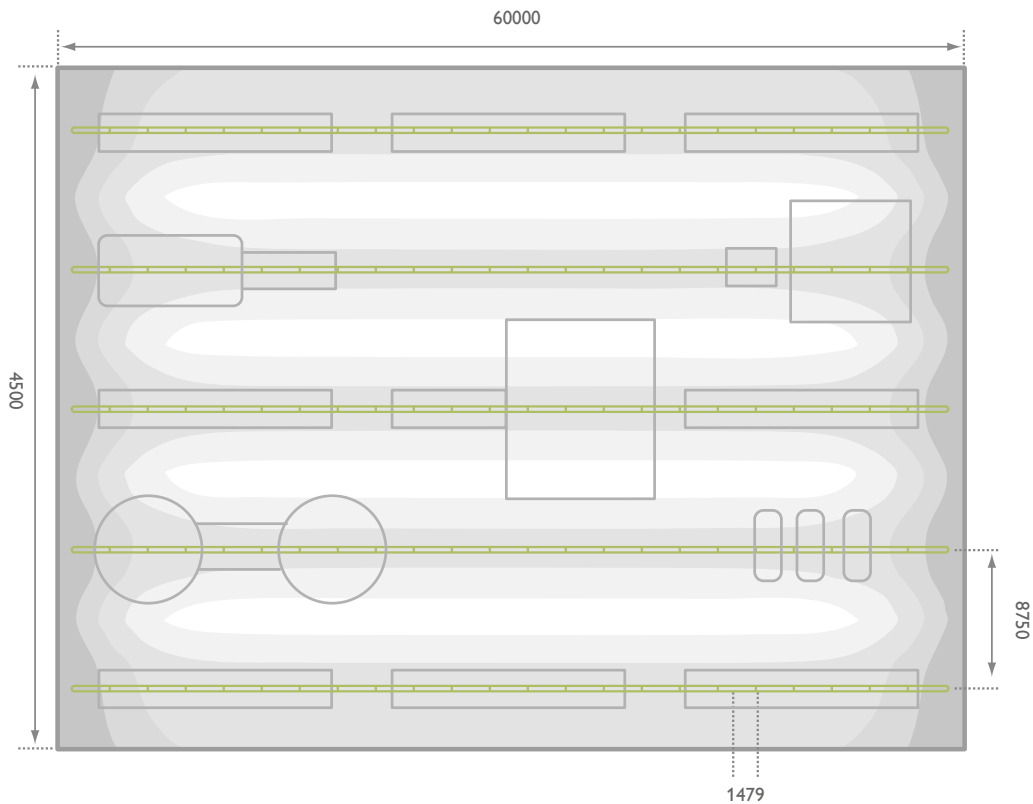


GentleSpace





Height: 7000



Scale: 1:429 | Values in Lux | All dimensions in millimetres

Luminaires used



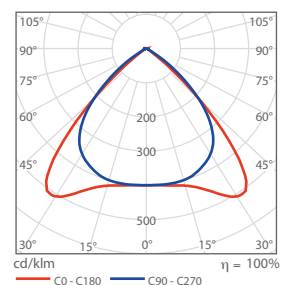
Suspended trunking system with a continuous array of luminaires for an optimal uniform level of light:

## Maxos LED General Lighting

An ideal general lighting solution offering excellent payback for a limited investment, while meeting all relevant norms for industry applications. Maxos LED Industry offers best-in-class energy savings while delivering high lux levels at the required colour 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 offers full payback in less than three years.

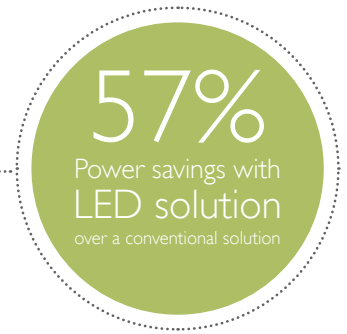


- Substantial energy savings for a limited investment
- Comfortable light, long lifetime
- Compatibility with proven Maxos and TTX400 trunking system
- LED engine platform makes Maxos LED Industry a truly future-proof solution





# Safe, reliable solutions



In manufacturing environments that involve a variety of different task situations, luminaires must be robust and have a low index of failure. LEDs are ideally suited for environments that suffer from vibration because of the solid materials used in their construction. Safety is always critical, so with solid state LED, potentially dangerous situations caused by flickering or glass particles from broken lamps are completely avoided.

For every manufacturing activity and area, it's important that a good level of lighting and uniformity are achieved. Trunking luminaires can be distributed as necessary to suit the individual task focus. Our Wide Beam (WB) optic will help you to space trunking lines as much as possible, reducing the amount of luminaires needed, while ensuring you still meet your lighting requirements comfortably.

Maxos 4MX850 581 1xLED55S/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	1,08 W/m <sup>2</sup> /100 lux	305	21	0,60	80	8930	47
Standard Solution HF 2xTLD58w	1,88 W/m <sup>2</sup> /100 lux	412	24	0,61	80	20900	110





# Work benches



## Staying in control of quality

Providing the right kind of light is essential to ensure detailed tasks are completed effectively and that any imperfections are spotted – especially important in a quality control environment. Our work bench solutions offer excellent quality of light with minimum glare, making these key factory areas more comfortable and relaxing to work in, which in turn helps workers to concentrate and maintain standards.

## Suitable for the task in hand

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. LED also gives less shadowing, which means a clearer and more comfortable working environment.

### 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

- Minimises 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





Scale: 1:78 | Values in Lux | All dimensions in millimetres

Luminaires used

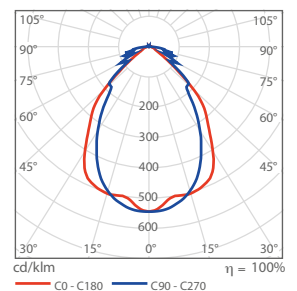


Individual luminaire suspended or surface mounted over task area:

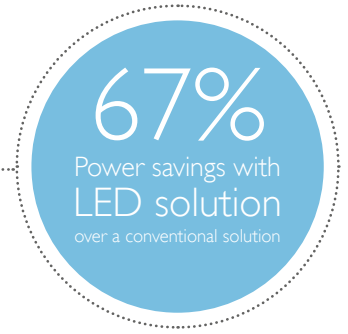
## Maxos LED Panel

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 colours – as a new installation and as a retrofit to existing conventional installations.

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



# Effective task lighting



Typically factories are large buildings where we apply 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 you can easily install into the production infrastructure. The ideal solution is a flexible luminaire, that will allow you to unify models and will give you adaptability in different processes and locations by choosing the beam you need.

For workstations, the task area is under the luminaire, so a 10° beam angle is usually 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.

Maxos Panel 4MX800 L600 2xLED10-4000

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
<b>Norm 12464-1 Requirements</b>		> 500	< 25	> 0,60	> 80		
<b>LED Solution</b>	n.a.	<b>706</b>	<b>21</b>	<b>0,69</b>	<b>80</b>	<b>192</b>	<b>24</b>
<b>Standard Solution HF 2xPL-L36w</b>	n.a.	600	21	0,79	80	576	72

## Controls



Solution: [Dyalite Networked system – small movement multi-sensor](#)

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





## Smoother running

Philips sustainable lighting solutions are ideal for production lines, painting booths and quality control departments – delivering exceptional levels of visual clarity, resulting in an easier and safer environment, and optimal conditions 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 being more energy and carbon efficient helps to enhance your sustainability credentials.

## 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 minimises 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.

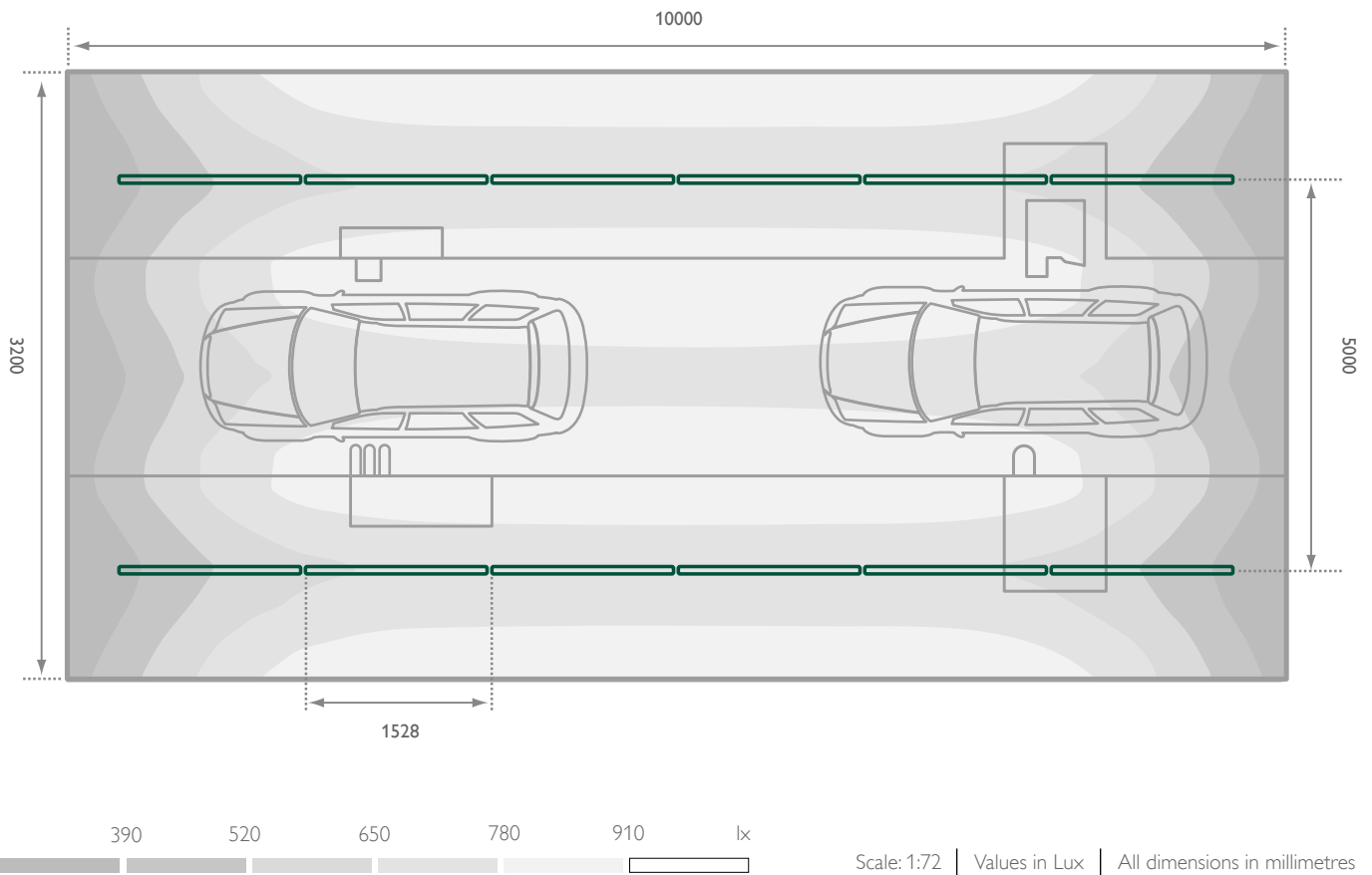
### Up to 60% less energy

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.

### 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
- Optimised light quality above production lines through system interchangeability



Luminaires used 

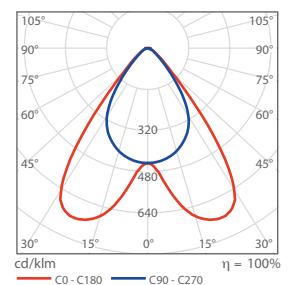


Parallel trunking system lines with a continuous array of luminaires:

## Maxos LED Performer

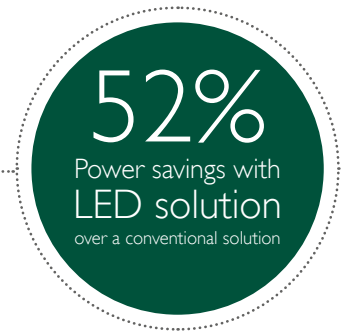
Maxos LED Performer is an extremely flexible solution that delivers low energy consumption and excellent beam shaping at an attractive investment level. Perfect for customers who want to save energy and reduce cost compared to what they are used to with conventional lighting. Excellent lighting is essential 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.

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





# Driving safety and precision



On automotive assembly lines, vehicles are constantly moving – so lighting becomes a critical factor in achieving safety and quality. Continuous lines of luminaires parallel to the vehicles allow you to concentrate the lighting level 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.

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

Maxos Performer 4MX900 481 1xLED50S/840 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	1,83 W/m <sup>2</sup> /100 lux	831	18	0,81	80	636	53
Standard Solution HF 2xTLD58w	3,05 W/m <sup>2</sup> /100 lux	997	24	0,83	80	1320	110







## Be safe, be sure

In the food industry, safety isn't just important, it's critical. Our 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 – which 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.

## 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 CO<sub>2</sub> 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 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 CO<sub>2</sub> emissions by 55%, without compromising on the lighting levels and quality achieved by the previous lights. This meets Hero's energy efficiency objective.

### Key facts

- Pacific LED waterproof luminaires replace the previous 2xTL-D 58 W solution
- Energy consumption savings of 50% achieved by adopting an LED solution
- CO<sub>2</sub> 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 5 years
- Hero's energy efficiency objective has been achieved

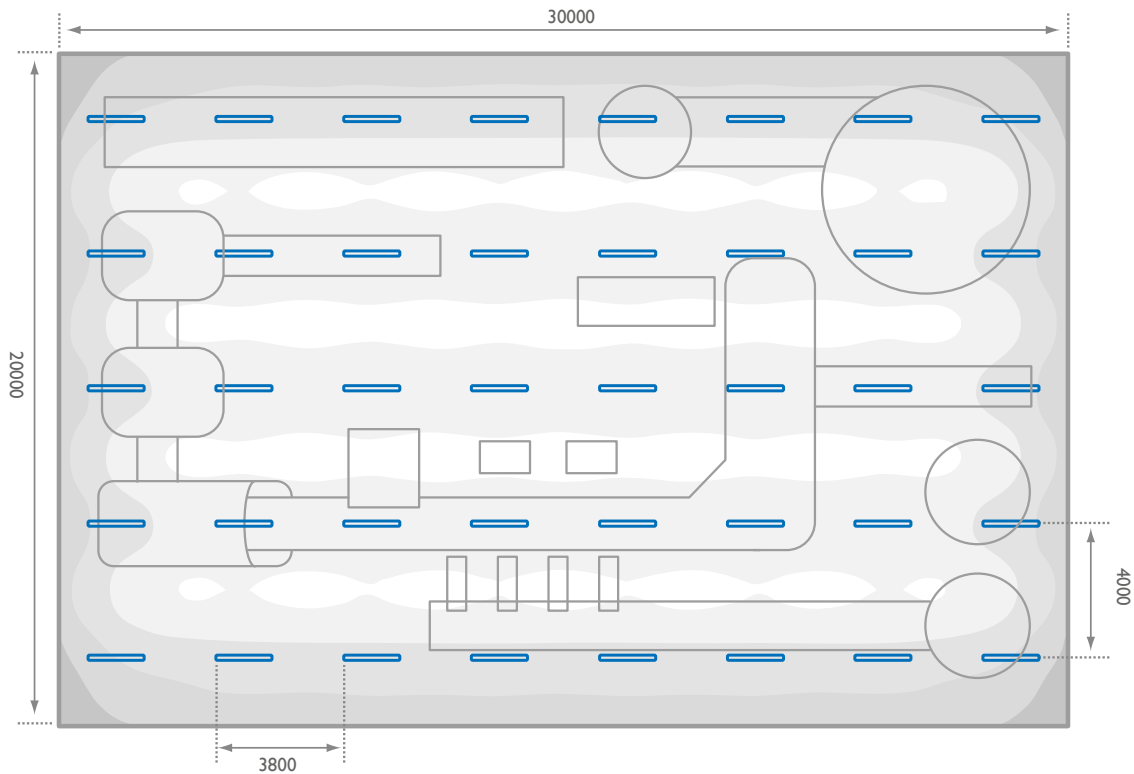
### The solution

Pacific LED





Height: 4000



Scale: 1:215 | Values in Lux | All dimensions in millimetres

Luminaires used

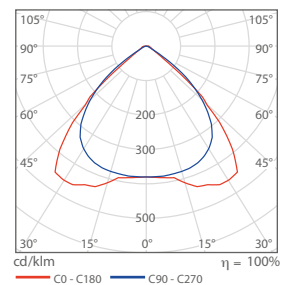


General surface mounting distribution:

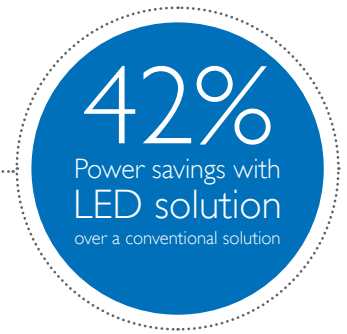
## Pacific LED Gen 3

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.

- 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/upgradeable
- Excellent glare control



# 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.

Pacific LED gen3 WT460C L1600 1xLED64S/840/WB

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
<b>Norm 12464-1 Requirements</b>		> 300	< 25	> 0,60	> 80		
<b>LED Solution</b>	1,16 W/m <sup>2</sup> /100 lux	367	20	0,65	80	2560	64
<b>Standard Solution HF 2xTLD58w</b>	2,37 W/m <sup>2</sup> /100 lux	309	26	0,73	80	4400	110

## Controls



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

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.



# Cleanroom



## Ensuring integrity

Achieving optimum light conditions has long been a goal for the pharmaceutical industry. We fully understand the strict controls that affect product integrity, hygiene, safety and security. Our products are specifically designed to operate within controlled clean room 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.

## 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 ambience 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 customised

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.

### 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

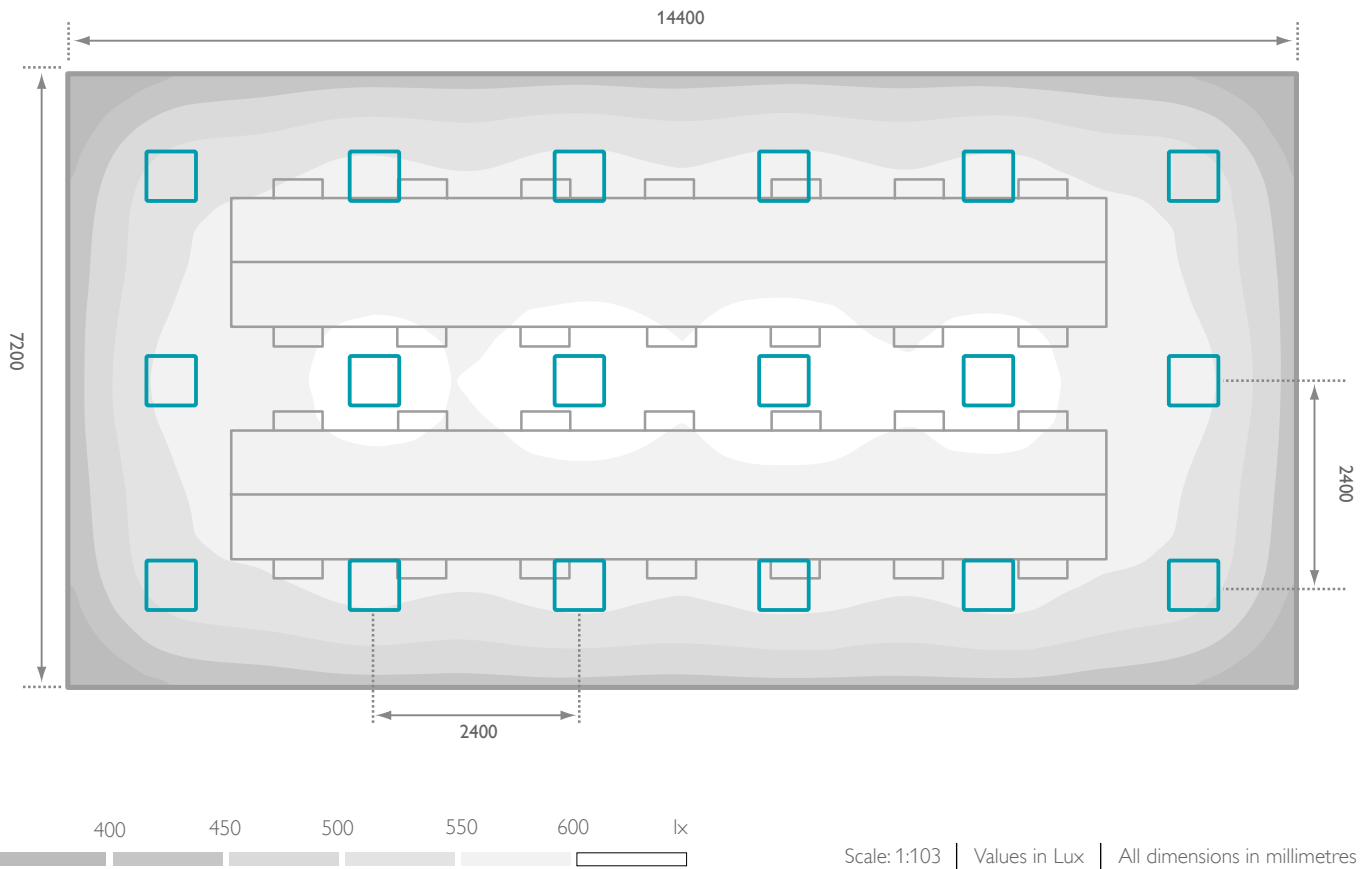
## The solution

CleanRoom LED





Height: 3000



Luminaires used

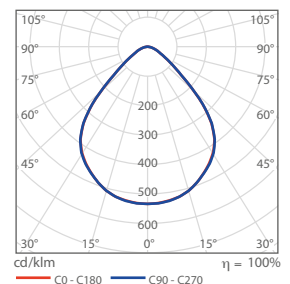


Recessed luminaires with modular distribution (60cm x 60cm):

## CleanRoom LED

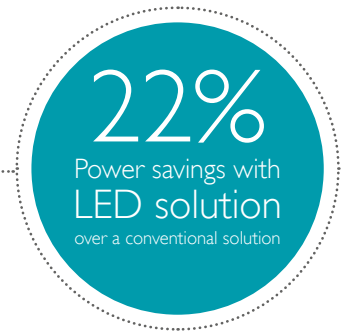
Customers operating highly hygienic facilities require special IP65, easy-to-clean, dust-free luminaires that meet all lighting requirements and norms. With the latest LED engine on board, this LED CleanRoom luminaire represents the ideal solution, delivering market leading energy performance – far beyond 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.

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





# Hygienic and safe



In the pharmaceutical industry, highly hygienic facilities require special IP65, easy-to-clean, dust-free luminaires that meet all lighting requirements and norms. 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.

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

## CleanRoom LED CR434B W60L60 1xLED48/840 ACMLO

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 500	< 19	> 0,60	> 80		
LED Solution	1,54 W/m <sup>2</sup> /100 lux	554	16	0,69	80	882	49
Standard Solution HF 4xTL5 14w	2,07 W/m <sup>2</sup> /100 lux	529	17	0,66	80	1134	63





# Covered parking



## Be safe, be seen

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.

## Eiteren underground parking garage, IJsselstein, the Netherlands

### The project

Following its motto 'Improve the Town Centre' the municipality of IJsselstein wanted to upgrade its facilities whilst maintaining and strengthening the historic centre. An important step was the phased redevelopment and expansion of the IJsselwaerde residential care centre. Phase one was reserved for the renovation of this historic building. Phase two for new build, including the construction of the Eiteren underground parking garage. This is situated partly under the new complex and includes 208 parking spaces. 45 of these are intended for visitors to IJsselwaerde and the rest for visitors to the town.

### The solution

Robust, waterproof Pacific LED2 was used for the main ceiling lighting. Due to their perfect beam control, high luminous flux of white light, simple installation and optimal dimming system, these are an ideal solution for parking garages. The same is true of the 'directional' LuxSpace, which ensures a uniform distribution when used in combination with the 'Pacific'. The bright, vandal-resistant LED Gondolas on the entrance hall ceiling complete the picture.

### Key facts

- Uniform light distribution with 'no dark corners'
- Presence detection controls ensure safety and energy efficiency
- Pacific LED2 and Gondola LED solutions are robust and vandal-resistant
- Optimum sense of safety created through the flexible dimming system
- 50-60% saving on energy and reduced maintenance costs

### The solutions

Pacific LED2



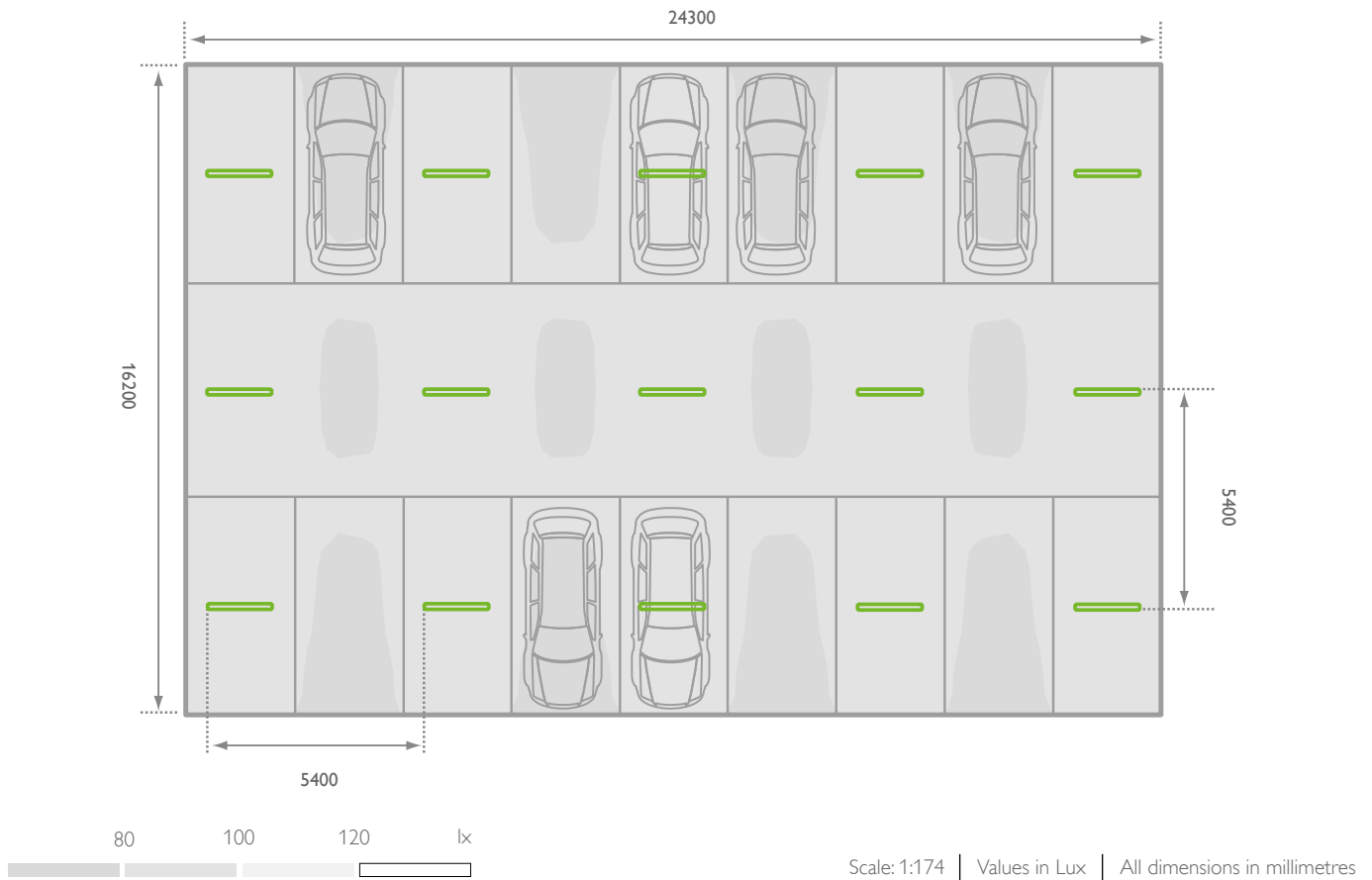
Gondola LED



# Covered parking



Height: 2500



Luminaires used

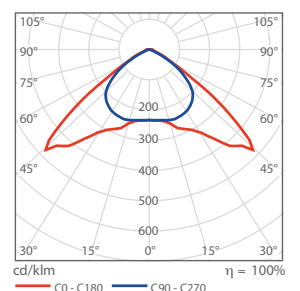


General surface mounting distribution:

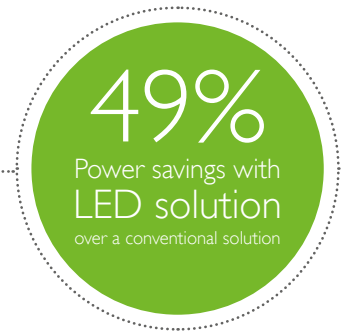
## Pacific LED Gen 3

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.

- 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/upgradeable
- Excellent glare control



# See and 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 Very Wide Beam (VWB) optic is specially designed for these situations and allows you to achieve more spacing between luminaires while maintaining good lighting uniformity values.

Pacific LED Gen3 WT460C L1600 1xLED35S/840/VWB

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 75	< 25	> 0,40	> 40		
LED Solution	1,08 W/m <sup>2</sup> /100 lux	99	21	0,61	80	420	28
Standard Solution HF 1xTLD58w	2,07 W/m <sup>2</sup> /100 lux	75	25	0,57	80	825	55

# Controls



Solution: **Pacific LED Green Parking**

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 Green Parking 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'. 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 Green Parking you can realise up to 80% energy savings compared with a traditional covered parking lighting solution, but safety and security requirements are still maintained.





## Feel welcome, feel 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, 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.

### The solution

The three most important zones requiring lighting were the storage area for containers, the mooring quays for the vessels and the roads around the harbour, which are primarily used by commercial vehicles.

### The solutions



Comfort Vision



Mini 300



MHN-lamps

### Key facts

#### Storage area

- ComfortVision light fittings with 1kW SON-T bulbs
- Positioned at variable distances from 180 - 240 metres
- Minimum impact on the storage area, which is reserved for containers

#### Quays

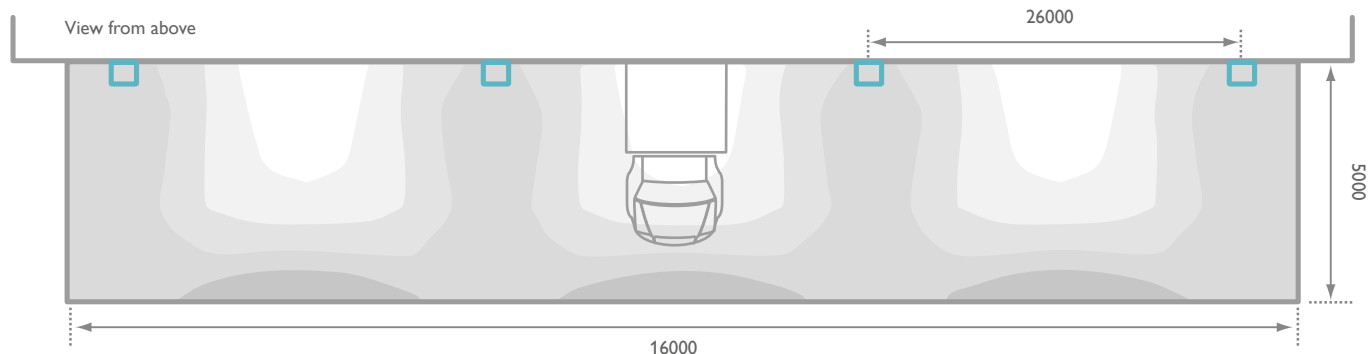
- Asymmetric Tempo light fittings with 400W SON-T Plus bulbs
- Mounted on 15 metre masts in height placed 20 metres apart
- High lighting levels, of more than 60 lux achieved with minimal glare
- Ideal work environment created for nighttime loading and unloading

#### Roads

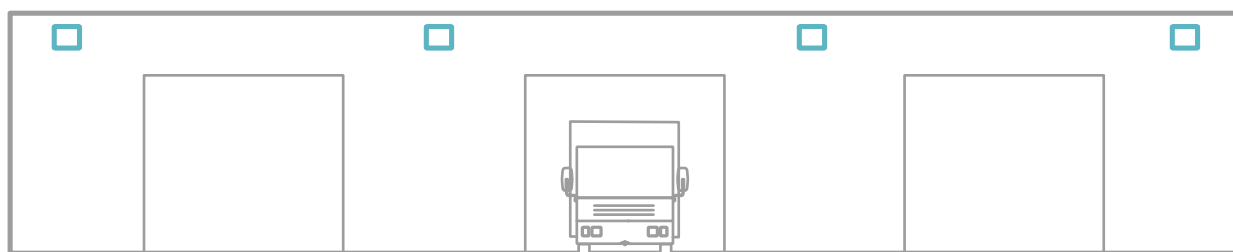
- Safety and uniform light distribution essential
- High lighting levels, greater than 2 cd/m<sup>2</sup> needed
- SRP826/SGP338 light fittings with SON-T Plus bulbs of 400W



Height: 5000



View from front



Scale: 1:372 | Values in Lux | All dimensions in millimetres

Luminaires used

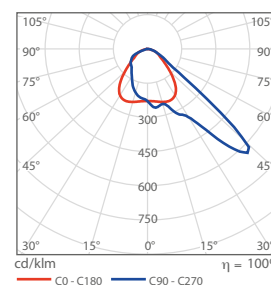


Wall mounted luminaire with universal bracket at 10m height:

## ClearFlood

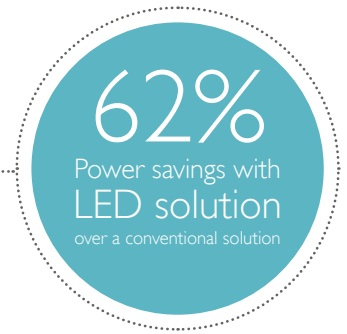
The Philips ClearFlood is a dedicated LED floodlight delivering economical white light solutions for recreational sports and outside area applications. Designed around state-of-the-art LEDs and high-efficiency optics, this very competitive solution offers energy savings compared to traditional HID solutions.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

- 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





# 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.

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

ClearFlood BVP650 ECO12K-740 A

	Energy Efficiency	Em (lux)	UGR	Uo	Ra	Total P(W)	P(W)/unit
Norm 12464-1 Requirements		> 20	< 55	> 0,25	> 20		
LED Solution	Class A	32	30	0,69	75	416	104
Conventional Solution 250HPI	Class B	28	23	0,44	60	1096	274

## Controls



Solution: [OccuSwitch IP55](#)

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 metres and has a 12 metre 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.

# Top tips for specifying LEDs

## Standardising the performance criteria for LED luminaires

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The rise of LED lighting is driving a significant transformation of our lighting industry – offering flexibility, creativity, programmability and energy efficiency.

But standards vary tremendously. In recent years the lighting market has been flooded by a vast number of new and unproven entrants. Some making claims about their products' performance that don't stand up to scrutiny, while established manufacturers stand by their track records. Who to believe? As things stand, it can be difficult to know whom to trust to deliver on their promises, which potentially undermines the whole LED lighting industry.

A CELMA guiding paper published in November 2011 aims to help bring clarity by introducing a universal set of quality criteria described in two IEC/ PAS documents. As a user of

LED luminaires it is important to apply the same set of standardised, comparable quality criteria when evaluating manufacturers' claims. LED luminaire specifications should always be measured against these.

There are three elements that can be standardised: technical definitions, measurement methods and limiting values. The IEC/PAS performance requirement documents describe the definition of quality criteria and the way to measure them. This means you will now be able to judge claims on an equal, like-for-like basis – creating a 'level playing field' that truly serves the interests of end-users, specifiers, designers and manufacturers.



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The IEC/PAS documents suggest the following list of quality criteria to be considered when evaluating manufacturer's claims:

- a) Rated input power
- b) Rated luminous flux
- c) LED luminaire efficacy
- d) Luminous intensity distribution
- e) Photometric code
- f) Correlated Colour Temperature (CCT)
- g) Rated Colour Rendering Index (CRI)
- h) Rated chromaticity co-ordinate values both initial and maintained
- i) Lumen maintenance code
- j) Rated life (in h) of the LED module and the associated rated lumen maintenance (Lx)
- k) Failure fraction (Fy), corresponding to the rated life of the LED module in the luminaire
- l) Ambient temperature (tq) for a luminaire.

**A brief summary of the different quality criteria:**

**a) Rated input power**

The rated input power shows the amount of energy consumed by a luminaire, including its power supply. It is expressed in watts.

**b) Rated luminous flux**

It corresponds to the light emitted by the luminaire which is expressed in lumen (unit of light output). It is expressed in lumens.

**c) LED luminaire efficacy**

The measured initial luminous flux divided by the measured initial input power of the same individual LED luminaire. It is expressed in lumens per watt.

**d) Luminous intensity distribution**

The spatial distribution of the luminous flux graphically depicted in a luminous intensity distribution curve, which is usually expressed in a polar coordinate diagram representing the light intensity as a function of angle about a light source. It is expressed in  $\text{cd} = \text{lm} \times \text{sr}^{-1}$ .

**e) Photometric code**

A six digit photometric code that displays the important 'quality of light' parameters: CRI, CCT, chromaticity co-ordinates and luminous flux.

**f) Rated Colour Rendering Index (CRI)**

The colour rendering of a LED module giving white light is the effect on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under a reference illuminant.

**g) Correlated Colour Temperature (CCT)**

The colour temperature of a LED module giving white light is determined by comparing the light emitted by the LED module with light of an ideal black-body radiator at the given temperature. It is expressed in Kelvin.

**h) Rated chromaticity co-ordinate values both initial and maintained.**

The behaviour of the chromaticity co-ordinates of a LED module expressed in two measurement results of both initial and maintained chromaticity co-ordinates.

**i) Lumen maintenance code**

The measured initial luminous flux (initial value) is normalised to 100% and used as the first data point for determining the LED module life. The maintained luminous flux (maintained value) is measured at 25% of rated life time up to a maximum of 6000 hours and expressed as percentage of the initial value.

The maintained value determines the lumen maintenance code.

**j) Rated life of the LED module and the associated rated lumen maintenance (Lx).**

The length of time during which a population of LED modules provides more than the claimed percentage (x) of the initial luminous flux always published in combination with the failure fraction.

It is expressed in hours.

**k) Failure fraction (Fy), corresponding to the rated life of the LED module in the luminaire.**

The percentage (y) of a number of LED modules of the same type at their rated life designates the percentage (fraction) of failures. This failure fraction expresses the combined effect of all components of a module including mechanical, as far as the light output is concerned.

The effect of the LED could either be less light than claimed or no light at all.

**l) Ambient temperature (tq) for a luminaire.**

The ambient temperature around the luminaire related to the specified performance. For a given performance claim the ambient temperature (tq) is a fixed value. It is possible to specify performance claims at different ambient temperatures. It is expressed in degrees Celsius.

Note: please be aware that you have to make sure that the tq shall be in accordance with the actual application where the LED luminaire will be used.

For more information see: 'Apples and pears – a CELMA guiding paper: why standardisation of performance criteria for LED luminaires is important'.



For more information:

[www.philips.com/industrylighting](http://www.philips.com/industrylighting)



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