we-ef

WE-EF LIGHTING

General Catalogue

Asia Pacific Edition

Technology

IOS® INNOVATIVE OPTICAL SYSTEM

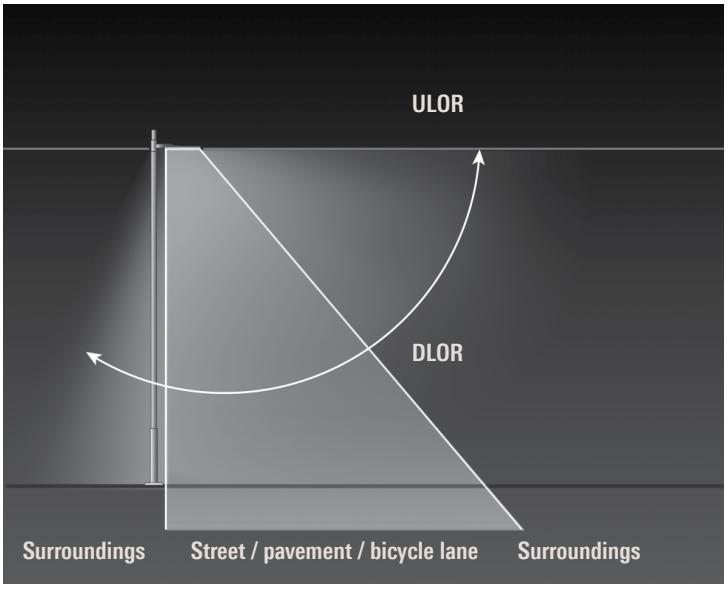
IOS® Innovative Optical System

The IOS® system is a fundamental part of the WE-EF development philosophy. The main features of the IOS® system are:

- In-house CAD design
- Tooling exclusive to WE-EF
- Precisely manufactured optical system exclusive to WE-EF
- High photometric performance, beam efficiency and control
- Superior glare control and visual comfort through appropriate shielding angles
- Optional optical accessory toolkit

In street and area lighting applications, IOS® features full cut-off light distribution incompliance with European standard EN 13201 (Class G3/G4/G5/G6):

- Zero light emission above the 90° horizontal
- Tightly controlled 'candela' intensities in the critical high-angle glare zone at 80°-90° (from nadir)
- Solutions to light trespass and dark skies concerns

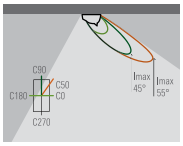


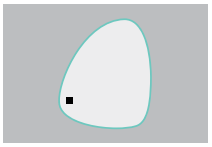
ULOR: The main purpose of an optical system is to direct light onto a specified target surface. Particularly in streetlighting applications, any amount of light that is emitted above the horizontal, must be considered not merely as being wasteful, but equally so as polluting the night sky. The Upward Light Output Ratio (ULOR) is a measure of how much light escapes from a luminaire into the sky. Obviously, a ULOR of zero per cent is desirable. The better the optical system, the lower the burden on our environment.

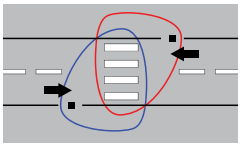
[P45R] and [P45L] Lenses – Pedestrian crossing distribution.

- Optimised for illuminance-based design work (maximum spacing), the '45' references the nominal angle of peak intensity from nadir (downward vertical).
- No light above the 90° horizontal (ILE Class E1/E0).

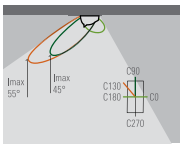
Ideal for the illumination of pedestrian crossing to EN DIN 13201, Class S2-S4.

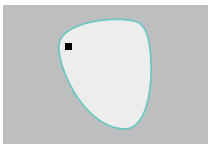


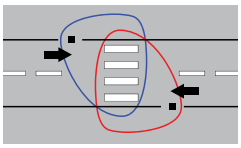




[P45R] right-hand traffic







[P45L] left-hand traffic

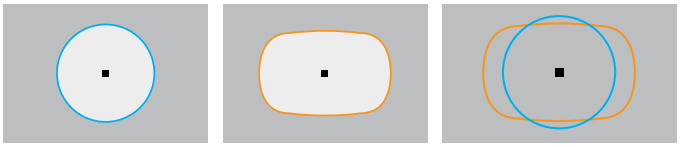
Shown in this example are two VFL540 with [P45L] pedestrian crossing, for left-hand traffic

IOS® INNOVATIVE OPTICAL SYSTEM

[C50] [C60] [C70] and [R] Lenses – Symmetric and Rectangular distribution.

- Optimised for illuminance-based design work (maximum spacing) with good visual comfort.
- For [C50] [C60] and [C70], maximum angle of peak intensity through C0 50° C0 60° and C0 70° respectively.
- For [R], maximum angle peak intensity through C0 65°, C90 45°. The [R] distribution has a forward to side ratio of 1:2.
- No light above the 90° horizontal (ILE Class E1/E0).

Ideal for lighting public spaces where both uniformity and visual comfort are critical factors.



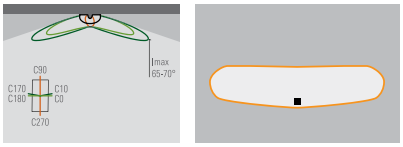
[C50] [C60] [C70] **[R]** **[C50] [R]**
Light distribution in comparison

Shown in this example are CFT540 with [R] Rectangular distribution

[P65] Lens – Pedestrian/bicycle lane distribution.

- Optimised for illuminance-based design work (maximum spacing).
  The 65-70 references the nominal angle of peak intensity from nadir (downward vertical).
- No light above the 90° horizontal (ILE Class E1/E0).

Ideal for pedestrian and bicycle lanes according to the criteria for illuminance EN DIN 13201, Class S2-S4.



[P65]

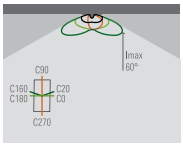
Shown in this example are PFL540 with [P65] Pedestrian/bicycle lane distribution.

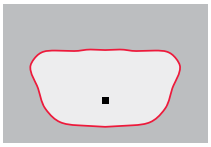
IOS® INNOVATIVE OPTICAL SYSTEM

[S60] and [S65] Lenses – Streetlighting distribution.

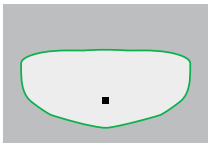
- Optimised for luminance-based design work (high visual comfort).
  The '60' references the nominal angle of peak intensity from nadir (downward vertical).
- No light above the 90° horizontal (ILE CLASS E1/E0).

Ideal for streetlighting according to the criteria for luminance EN DIN 13201,
Class ME3-ME6. For a one-sided arrangement, guaranteed spacing = 5-5.5 x MH UI ≥ 0.4,
Ti < 15 per cent.





[S60]



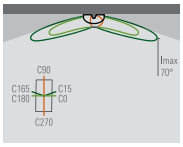
[S65]

Shown in this example are RMC320 [S60] Streetlighting distribution

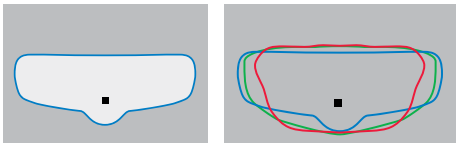
[S70] Lens – Streetlighting distribution.

- Optimised for illuminance-based design work (maximum spacing).
  The '70' references the nominal angle of peak intensity from nadir (downward vertical).
- No light above the 90° horizontal (ILE CLASS E1/E0).

Ideal for streetlighting according to the criteria for illuminance EN DIN 13201, Class S1-S6. For a one-sided arrangement, guaranteed spacing = 7-9 MH Uniformity $U_0 \geq 0.2$-0.4, with good visual comfort (the norm does not provide specific values for glare limitation).



[S70]



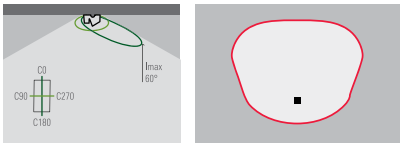
[S60] [S65] [S70]
Light distribution in comparison

Shown in this example are RMT320 [S60] Two-sided Streetlighting distribution

[A60] Lens – Asymmetric 'forward throw' distribution.

- Nominal angle of peak intensity through C0 60-65°.
- Rearward spill limited to an angle of 10°.
- No light above the 90° horizontal (ILE CLASS E1/E0).

Ideal for lighting public spaces where visual comfort (glare limitation) is a critical factor.



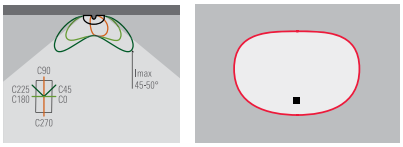
[A60]

Shown in this example are PLS420 [A60] Asymmetric 'forward throw' distribution

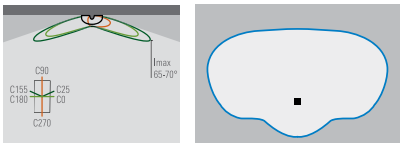
[R45] and [R65] Lenses – Rectangular 'side throw' distribution.

- Optimised for illuminance-based design work (maximum spacing).
  The '45' or '65' references the nominal angle of peak intensity from nadir (downward vertical).
- Rearward spill limited to an angle of 10°.
- No light above the 90° horizontal (ILE CLASS E1/E0).

Ideal for streetlighting according to the criteria for illuminance EN DIN 13201,
Class S1-S6. For a one-sided arrangement, guaranteed spacing = 4-5 MH Uniformity for [R45] and 7-9 MH Uniformity for [R65]
$U_0 \geq 0.2$-0.4, with good visual comfort (the norm does not provide specific values for glare limitation).



[R45]



[R65]

Shown in this example are QLS410 [R45] Rectangular 'side throw' distribution

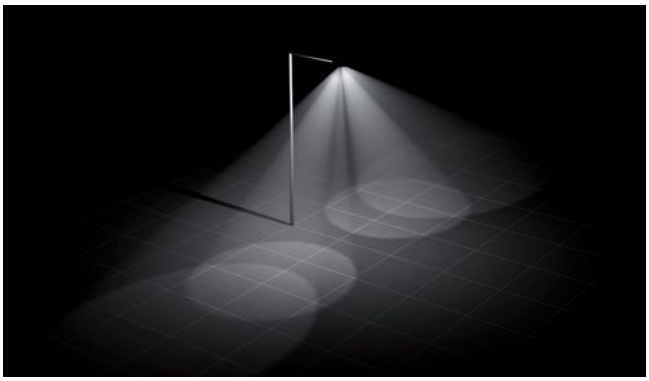
OLC® ONE LED CONCEPT

WE-EF LED lens systems follow the approach of the 'multi-layer' principle. Each individual LED illuminates the same area, thus creating so-called lighting layers. The sum of all these layers results in a uniform and efficient illumination.

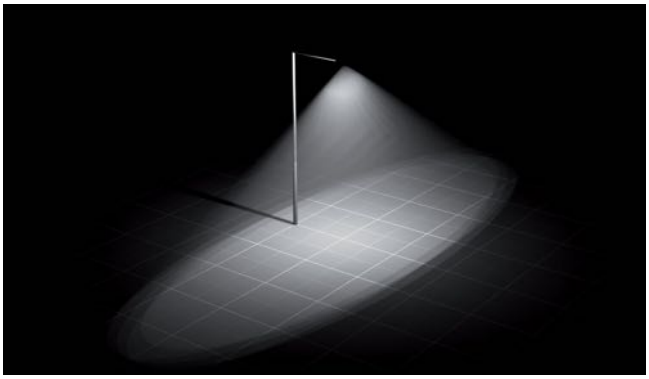
The multi-layer principle has five advantages:

- Light is strictly controlled, and any light pollution is kept to an absolute minimum through the exact aiming of the LEDs.
- The system ensures through modular engineering that groups of LEDs can be simply and quickly exchanged.
- If one LED fails and the light level drops, uniformity is retained.
- OLC® technology has been developed with the future in mind; when more efficient LEDs become available, they can simply be retrofitted.

The OLC® technology (multi-layer principle) is the ideal method for achieving a uniform and energy saving lighting solution, particularly for street and area lighting, providing the highest level of safety in ensuring that the failure of individual LEDs does not lead to an adverse effect in the lighting. It balances the needs for safety with visual comfort and energy savings.



WE-EF's multi-layer technique – 100% light



WE-EF's multi-layer technique – 70% light

RFC™ REFLECTION FREE CONTOUR

To further improve the efficiency of street and area lighting luminaires, WE-EF has developed the RFC™ technology. The conventional flat-glass panel or cover is replaced by a UV-stabilised panel that has a surface that is contoured in a way that imitates the shape of the OLC® lens; the goal is to minimise the loss of light that normally occurs due to internal reflection.

The RFC™ technology is available for the WE-EF lens system

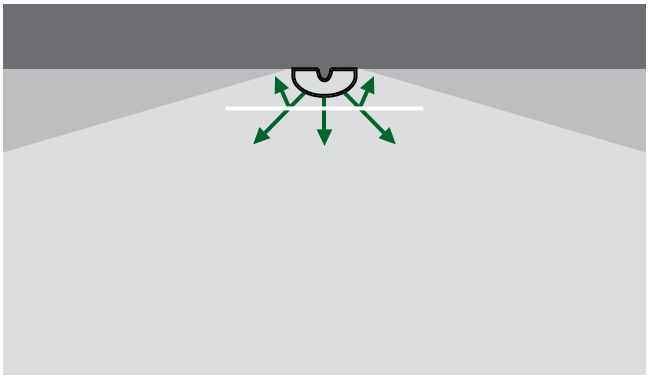
[P45R] [P45L] Pedestrian crossing distribution

[P65] Pedestrian/bicycle lane distribution

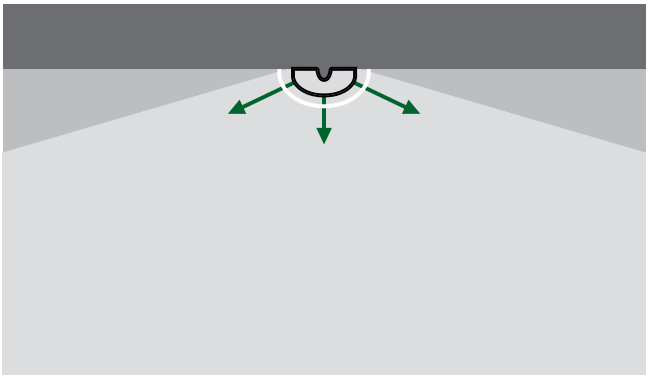
[S60] [S65] [S70] Streetlighting distribution

[A60] Asymmetric 'forward throw' distribution

[R65] [R45] Rectangular 'side throw' distribution



Internal reflection from conventional, flat main lens



RFC™ technology delivers high light transmission

The contour of the main lens follows the shape of the individual LED lens, thereby minimising internal reflections within the luminaire.

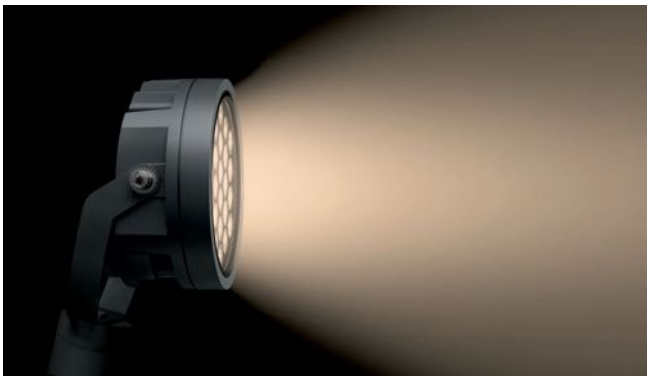
- In the case of the [S60] lens, at the critical 60° (downwards vertical), 20% of the light with a conventional flat glass cover is reflected internally. With the [S70] lens, at the critical 70°, it is 30%. These losses are virtually eliminated by the RFC™ technology.
- With the [S60] lens, this means a slight increase in the spacing (0.25 x mounting height) in the case of the [S70] lens, spacing has increased significantly (0.5 to 1.0 x mounting height).

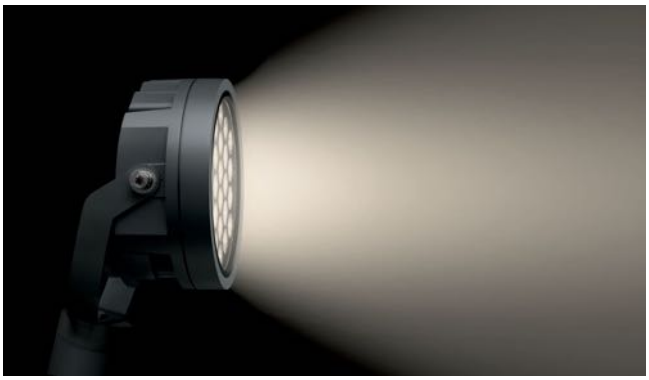
TUNABLE WHITE TECHNOLOGY

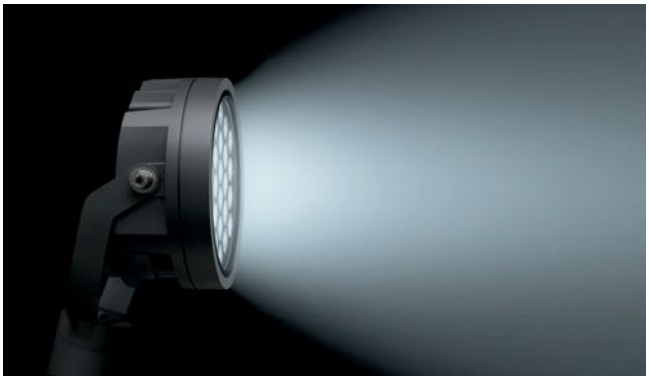
For optimum photometric performance, multiple arrays of white LEDs of different colour temperatures are joined into one optical system. Tuning these different types of LEDs through separate control channels allows infinite variation from warm to neutral to cool white light as well as smooth dimming at any chosen colour temperature.

As a consequence of higher luminous efficacy (i.e., lumens per watt) of cool white LEDs over their warm white counterparts, conventional systems typically display a noticeable drop or increase in brightness when the colour temperature is being adjusted. WE-EF Tunable White Technology masters this problem through smart control circuitry that stabilises the luminous flux throughout the entire 2700 K - 6000 K tuning range.

Illuminated with different colour temperatures, the colours and textures of surfaces, vegetation and other media are perceived differently. Tunable white luminaires can be used to showcase private and public spaces, architecture and landscapes, in ever-changing ways – be it for special events, during the course of a night or with the change of seasons.







COLOUR BOOST TECHNOLOGY

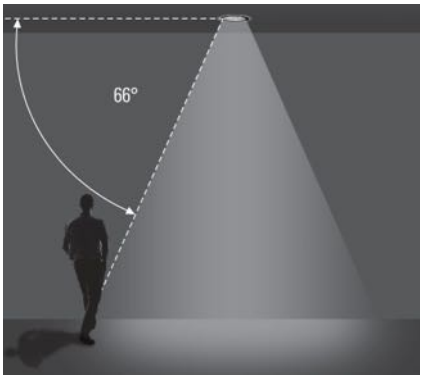
WE-EF's proprietary Colour Boost Technology Technology significantly enhances dynamic lighting effects. By selectively controlling each individual colour channel, overall luminous flux is increased by up to 40%.

Conventional RGBW and RGBA systems typically distribute the maximum permissible electrical load evenly over the four available channels, with each receiving no more than 25% (4 x 25% = 100%). Generally, however, in most colour mixing scenarios just three of the four channels get actively used. Consequently, one quarter of the available electrical power would go unused – this is where the WE-EF Colour Boost Technology comes in: Maximum power given to each of the active channels increases from 25% to 33% (3 x 33% ~ 100%). While the luminaire's electronics safeguard the LEDs against overload, the overall luminous flux – depending on the colours used – is boosted by up to 40%.

DARKLIGHT TECHNOLOGY

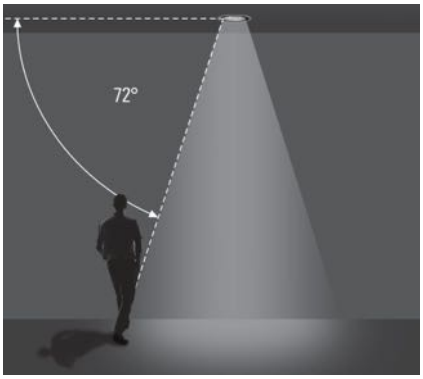
DARKLIGHT

For all applications where visual tasks place particularly high demands on lighting quality, WE-EF has developed the DOC100 Darklight downlights. A two-part reflector combination ensures that no direct light is emitted within the cut-off angle, and prevents people from looking directly into the light source. The result is consistent and effective limitation of both direct glare and reflected glare on smooth surfaces such as displays and monitors. Seen from below, part of the luminaire's reflector appears as a luminous ring with moderate luminance.



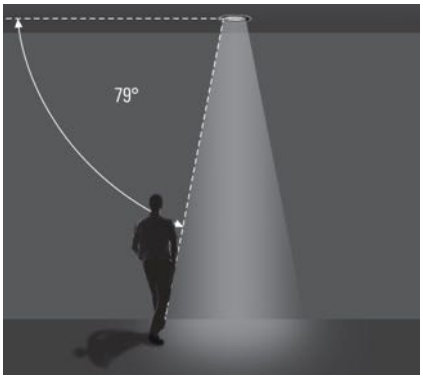
[B] Wide beam

66° shielding angle



[M] Medium beam

72° shielding angle

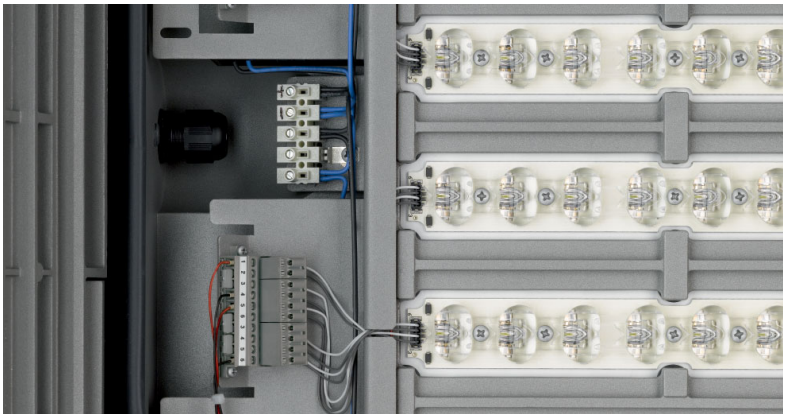


[E] Narrow beam

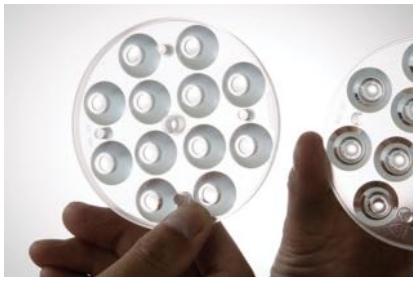
79° shielding angle

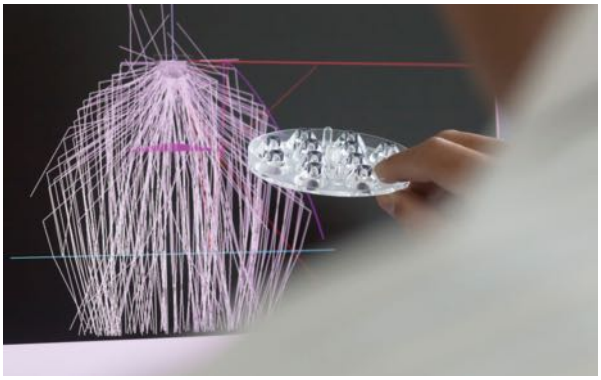
LED ENGINEERING

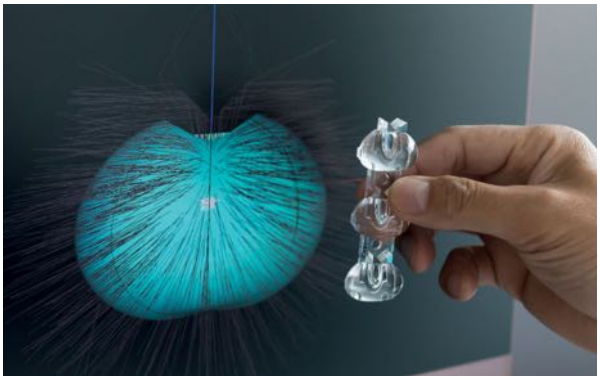
The development of high-quality and efficient LED lenses is one of WE-EF's core competencies. WE-EF possesses the expertise for design, engineering and production. WE-EF is able to apply its expertise gained from long experience in the development and operation of LEDs. For example, at the SONY Center in Berlin, in 2004, WE-EF was involved in one of the first major LED projects. It was an invaluable advantage, both in understanding today's possible LED technology and in converting this knowledge into innovative lighting solutions.



CAD design, optical simulations, prototypes, verification and injection moulding tooling are all used in WE-EF's development and production facilities. A prototype is prepared in WE-EF's tooling shop for every LED lens type, which is then measured and optimised. WE-EF LED boards fitted with high-quality LEDs, which have narrowly-defined binning tolerances, guarantee high visual comfort.







Thermal management

Long service life and maximum efficiency can only be achieved with perfectly co-ordinated thermal management. WE-EF products discharge the heat generated by the LEDs through the enclosure that contains a built-in heat sink. As part of a first development step, thermal conditions are simulated with the relevant computer programs and optimised at a theoretical level. Once this optimisation process is complete, prototypes are produced for each luminaire, which are then subjected to intensive testing until they provide results that meet the requirements for optimised heat discharge with maximum service life and minimal reduction in luminous flux.

LED – Light Emitting Diodes

As a luminaire manufacturer, WE-EF aims to shape the thermal conditions in the luminaires to ensure that the LEDs are operated at the optimum working point and that overloads can be avoided. The product data sheets of the LED manufacturers, which are based on the results of tests and mathematical calculations, form the foundation for ensuring that these tasks can be performed successfully. An assessment of whether an LED in a luminaire is being operated in an optimum manner, and the effects on service life and reduction in luminous flux, is much more complex than for conventional lamps. Such an assessment therefore requires more attention. WE-EF started its first tests in 2008. New luminaires with new LEDs are constantly being added. That is why WE-EF can fall back on empirical values of more than 60,000 hours of operation.
The findings from the test series are the basis for further innovations.

Definitions

The terms and definitions used in this section are based on the document entitled 'Guidelines for project design safety in LED lighting' (Leitfaden Planungssicherheit in der LED-Beleuchtung), published by the German Electrical and Electronic. Manufacturers' Association (ZVEI) in March 2020

Rated input power P (W): The effective input of a luminaire, comprising the power consumption of all components integrated in the luminaire.

Rated luminous flux ϕ_v (lm): The total radiant flux of a luminaire in its visible range, also known as the initial luminous flux.

Luminaire efficacy η_v (lm/W): The quotient of the rated luminous flux and the rated input power.

Rated ambient operating temperature T_a (°C): The ambient temperature at which a luminaire can be operated whilst still maintaining all safety-relevant parameters. In this catalogue, T_a = 25°C. However, please note that the majority of the luminaires listed have a significantly higher rated temperature (T_a). Contact WE-EF to request data for a particular luminaire.

Rated ambient performance temperature T_q (°C): The ambient temperature at which a luminaire reaches the specified values for luminous flux and service life, for example. All of the data in this catalogue are based on a rated ambient temperature T_q of 25°C.

Rated service life L_xB_y (h): The number of hours after which:
(a) A group of LED luminaires have dropped to a luminous flux of x (%); and
(b) A number y (%) of LED luminaires have dropped below the specified luminous flux.

Example:

Requirement $L_{70}B_{10}$ – 60,000 h means that after 60,000 hours the group of LED luminaires in question must still provide 70% of the initial luminous flux, whereby 10% of the LED luminaires in question are permitted to provide less than 70% of the initial luminous flux.

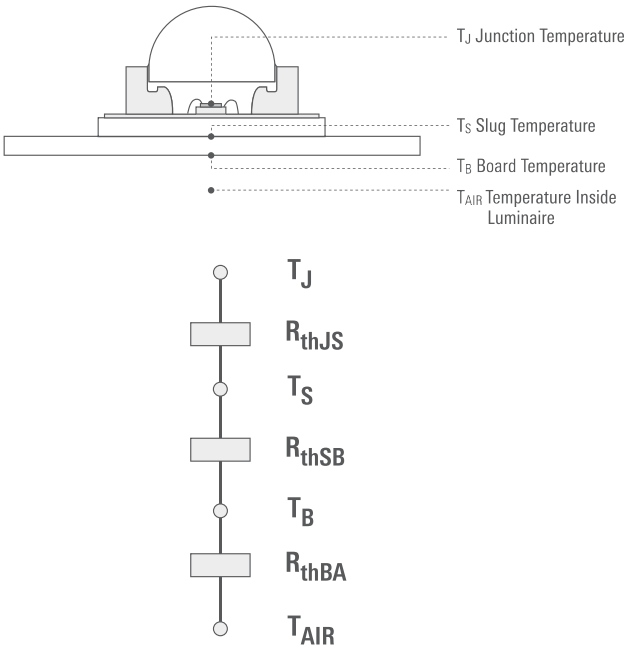
Luminous flux

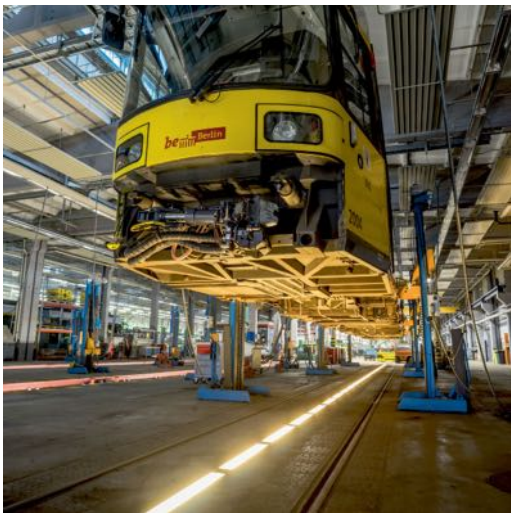
The luminous flux values listed in this catalogue refer to so-called rated luminous flux levels. The junction temperature increases differently once the LEDs are in operation inside a luminaire. Depending on the LED used the LED manufacturers state maximum junction temperature T_J of approx. 125°C to 150°C. This temperature is set at a maximum 95°C at a rated ambient performance T_q of 25°C for the WE-EF luminaires shown in this catalogue.

This heating up of the LEDs leads to a change in luminous flux, hence a decrease in the luminous flux which must be recorded when the luminaire is measured in the lighting laboratory. All of the technical lighting data published by WE-EF take this context into account.
It means that technical lighting computer calculations using original WE-EF technical lighting data, such as data that are available worldwide via DIALUX, also render these correlations correctly. Current information regarding the luminous flux that can be achieved during the operation of the luminaire can be obtained from www.we-ef.com.

Thermal resistance (R_{th})

One of the main focus areas of LED developments in recent years has been, and still is the reduction in thermal resistance $R_{th} = R_{thJS} + R_{thSB} + R_{thBA}$ (resistance between an LED's junction temperature and the ambient temperature). The lower the resistance, the smaller the LED's thermal load. This leads to higher luminous flux and reduced ageing, and hence to a longer service life. A luminaire manufacturer can influence thermal resistance by: (a) developing optimised cooling elements for specific applications, guaranteeing clean and level contact surfaces between the LED circuit board and the heat sink; and (b) selecting materials with very high thermal conductivity for the LED circuit boards (for example, aluminium.) Circuit boards made of plastics are not suitable in this context.





5CE Superior Corrosion Protection

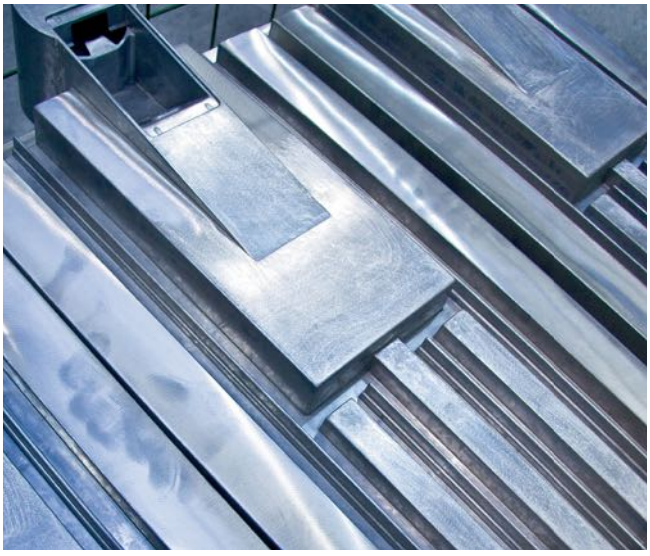
A decisive quality feature for exterior luminaires is their resistance to corrosion. Outstanding and long-lasting anti-corrosion properties can only be achieved by a comprehensive, integrated approach. The result of many years of research and development, hands-on testing and experience, WE-EF's unique 5CE system encompasses five critical elements:

1. Substrate
2. Conversion coating
3. Powder
4. PCS hardware
5. Process control

1. Substrate

A marine grade, low copper content aluminium alloy is used for all WE-EF above-ground luminaires. Typical alloy composition is:

Cu	≤	0.1 %	Zn	≤	0.1 %
Mg	≤	0.1 %	Pb	≤	0.1 %
Si	=	10.0-13.5 %	Sn	≤	0.05 %
Fe	≤	1.0 %	Ti	≤	0.2 %
Mn	≤	0.5 %	Al	=	Balance
Ni	≤	0.1 %			



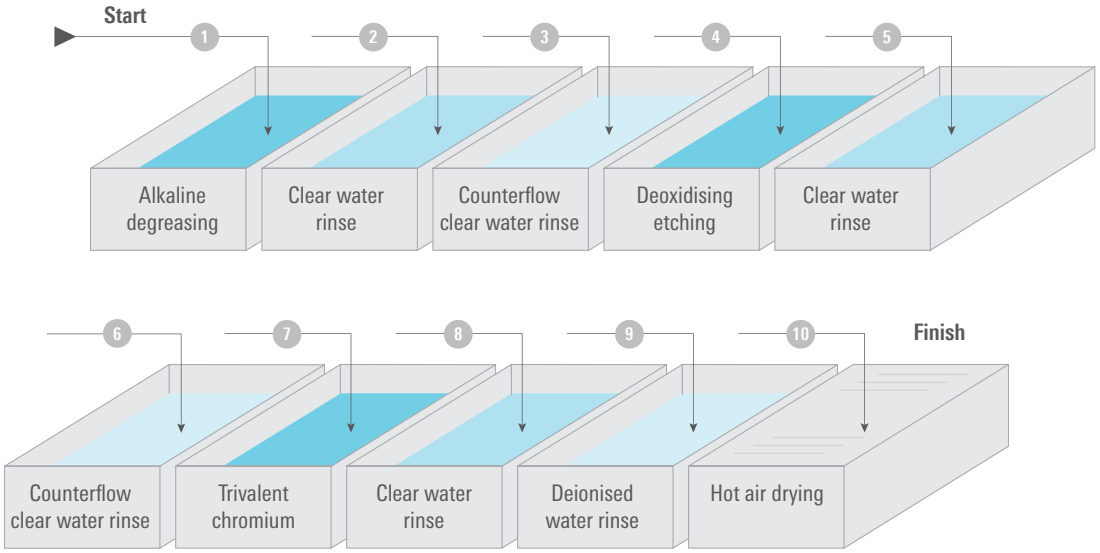
2. Conversion Coating

The multi-step pre-treatment and conversion coating process includes degreasing, deoxidising, etching and depending on product, non-hazardous trivalent chromium or zirconium conversion coating. Both are considered the most effective conversion coats available for aluminium substrates.

The zirconium conversion coating process comprises:

- Acid degreasing/etching.
- Clear water rinse.
- Counterflow clear water rinse.
- Deionised water rinse.
- Zirconium (+polymer) conversion coating (3-10 mg/m^2).
- Hot air drying.

Strict controls are constantly maintained over the parameters of every step in each process, such as purity, pH, chemical concentrations, temperature etc. This ensures the best achievable substrate penetration and uniformity of the conversion coat, thereby ensuring optimum corrosion resistance and powdercoat adhesion.



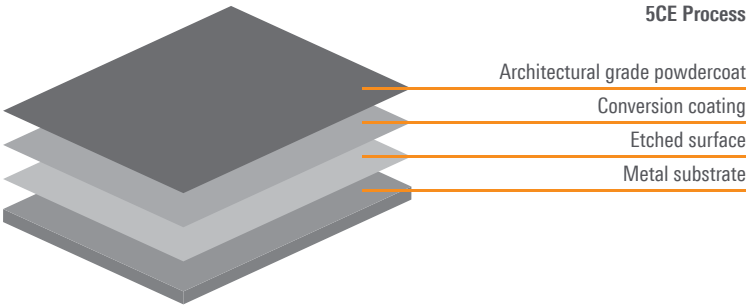
3. Powder

WE-EF uses special UV-stabilised, architectural grade polyester powder, which is electrostatically bonded (60-100 µm) and oven cured at ~ 200°C. The grade of polyester powder applied is based on saturated polyester resins. Combined with UV-resistant cross-linking agents and selected pigments, it features outstanding resistance to atmospheric ageing and UV light exposure. Properly applied to a suitable metal substrate, the resulting powdercoat finish exhibits excellent outdoor durability, and complies with German GSB and European QUALICOAT standards.

4. PCS Hardware

In the context of 5CE, WE-EF only uses hardware made from austenitic stainless steel, and additionally sealed with a tough, impregnated polymer coat that fulfills two functions:

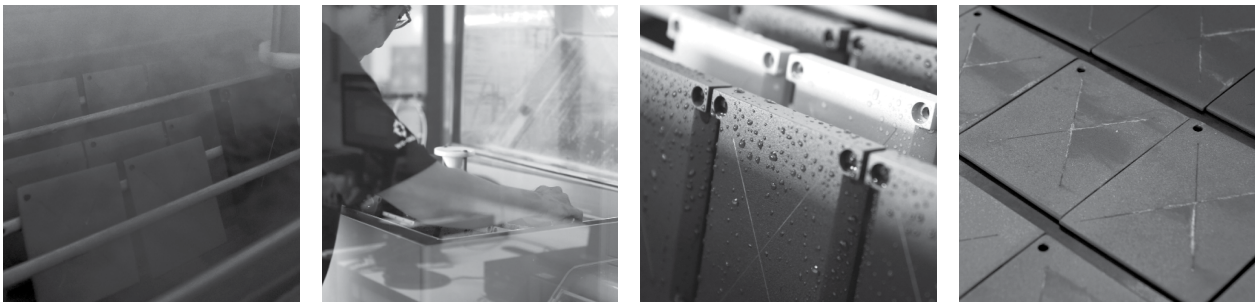
- Reduced friction between male and female thread causes tighter fit between connected parts.
- Non-metallic barrier between the two metals, aluminium and steel, prevents galvanic corrosion that otherwise occurs when metals of dissimilar electro-negativities are in contact.



5. Process Control

All materials and production steps at WE-EF are part of a tightly controlled process under ISO 9001 quality assurance. It includes ongoing spectrometer analysis of aluminium alloy used, daily checks of chemical concentration in the pre-treatment phase, quality control checks on finished parts, up to 3,000 hours salt spray exposure tests etc.

Salt spray testing



The Final Product

Customers and users of WE-EF products can count on the final result being a quality commodity of excellent corrosion resistance that can be serviced after years of operation, and features a powdercoat finish of outstanding adhesion and colour stability.

5CE + Primer

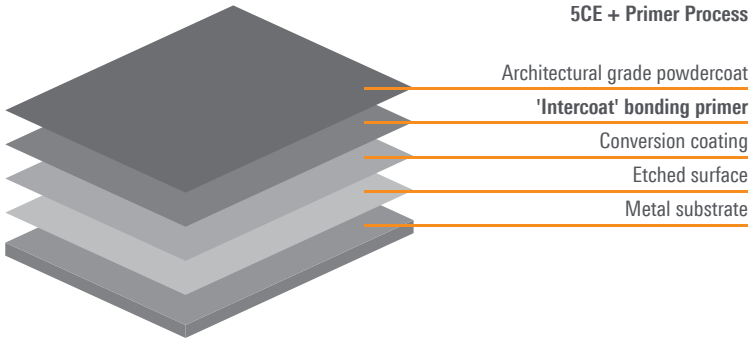
+Primer

For installations where corrosion protection over and above the 5CE system is required, 5CE + Primer introduces an additional element to the process:

1. Substrate
2. Conversion coating + Primer
3. Powder top coat
4. PCS hardware
5. Process control

Primer

Immediately after conversion coating, a specially formulated 'intercoat' bonding, epoxy primer is electrostatically bonded (80-100 µm), and initially semi-cured in a 180°C oven. Following the subsequent application of the polyester powder top coat, full curing and essential 'intercoat' bond is achieved at 200°C. Top coat and primer are perfectly merged.
The 5CE + Primer anti-corrosion technology is available on request for most luminaires from the WE-EF range.



ASC® Anti-Slip Coating for Inground Uplights

A translucent, tough and highly abrasion resistant ceramic material is fused into the surface of the luminaire's safety glass lens.
Slip resistance, as required in pedestrian traffic and wet environments, conforms with DIN 51130 (class R10) and AS/NZS4586:1999 (class V).
Corresponding tests were performed at the German BIA and the Australian CSIRO institutes.

ETC100/300-GB series (gimbal) with ASC®

ETC100/300-FS series (fixed optics) with ASC®

EVC100/300-FS series (fixed optics) with ASC®

Arranged in a stochastic (irregular) pattern, the ASC® Anti-Slip Coating has only a moderate effect on the luminaire's light distribution and LOR (light output ratio).

Lenses and Diffusers

Toughened safety glass, borosilicate glass, ceramic glass, acrylic (PMMA), UV-stabilised polycarbonate (PC) and polyethylene (HDPE) are used throughout the WE-EF product range.

Gasketing

Weatherproof and non-ageing silicone rubber is used extensively, thereby providing excellent sealing qualities in corrosive and high temperature environments.
A number of luminaires are also designed with CCG® (Controlled Compression Gasket) technology for a maintained protection rating.

Voltage

WE-EF luminaires and electrical accessories are supplied ready for connection to a 230 V 50 Hz supply. Control gear for other voltages and frequencies is available on request.

Electrical Protection

German and European industrial standards DIN EN 60598, specify electrical protection and IP classification of luminaires. WE-EF products comply with these standards as well as with equivalent international standards. WE-EF luminaires conform to electrical protection class I. The compulsory earthing terminal is marked with the symbol ⏚. In the event of a fault, a correctly installed luminaire will cause the circuit protection device to trip. Special luminaire versions with protection according to Class II are available on request.

Ambient Temperatures

WE-EF's range of products is generally designed for operation at 25°C. For installations where excessive ambient temperatures exist, special luminaires and equipment can be supplied on request.

Standards

WE-EF luminaires, floodlights and lighting columns are designed to conform with present IEC/DIN/EN and VDE standards. Furthermore, all luminaires manufactured for the European market bear the CE standards conformity mark. WE-EF is constantly developing and improving its products. The technical information given, including data and designs, can be subject to change without prior notice. The dimensions and weights stated are approximate values, subject to manufacturing tolerances. Special finishing, execution and construction are available on request.

As with all components, electronic converters (drivers) are engineered for reliability and longevity.

IP Classification

The international Protection Code (IP) classifies luminaires according to their protection against the ingress of dust, solid foreign bodies and water.

IP1X Protection against solid objects of diameter greater than 50 mm.

IP2X Protection against finger touch and solid objects of diameter greater than 12 mm.

IP3X Protection against solid objects of diameter greater than 2.5 mm.

IP4X Protection against solid objects of diameter greater than 1.0 mm.

IP5X Complete protection against solid objects and harmful dust deposits (dust-proof).

IP6X Total protection against dust (dust-tight).

IPX1 Protection against vertically dripping water (drip-proof).

IPX2 Protection against dripping water up to 15° from the vertical.

IPX3 Protection against spraying water or falling rain up to 60° from the vertical (rain-proof).

IPX4 Protection against splashing water from any direction (splash-proof).

IPX5 Protection against water jets from any direction (jet-proof).

IPX6* Protection against heavy seas or powerful water jets.

IPX7* Protection against the effects of immersion (watertight-immersible).

IPX8* Protection against submersion (pressure watertight-submersible).

The combination of both numerals describes the IP classification of a luminaire.

All WE-EF luminaires are marked accordingly, e.g., IP66 (dust-and water jet-tight).

* WE-EF luminaires that comply with IPX7 and/or IPX8 are always additionally tested to meet IPX6 requirements under DIN EN 60598. This is because the test conditions and procedures for IPX7 and IPX8 differ significantly from those for IPX6, and compliance for all is not automatically assured.

IK-Classification

DIN EN 50102 classifies the degrees of protection that luminaires provide against external mechanical impacts.

IK01 Protection against 0.14 J (joules) impact energy (equivalent to specified impact from 0.2 kg polyamide hammer).

IK02 Protection against 0.20 J (joules) impact energy (equivalent to specified impact from 0.2 kg polyamide hammer).

IK03 Protection against 0.35 J (joules) impact energy (equivalent to specified impact from 0.2 kg polyamide hammer).

IK04 Protection against 0.50 J (joules) impact energy (equivalent to specified impact from 0.2 kg polyamide hammer).

IK05 Protection against 0.70 J (joules) impact energy (equivalent to specified impact from 0.2 kg polyamide hammer).

IK06 Protection against 1 J (joules) impact energy (equivalent to specified impact from 0.5 kg polyamide hammer).

IK07 Protection against 2 J (joules) impact energy (equivalent to impact of 0.5 kg steel weight dropped from 400 mm height).

IK08 Protection against 5 J (joules) impact energy (equivalent to impact of 1.7 kg steel weight dropped from 300 mm height).

IK09 Protection against 10 J (joules) impact energy (equivalent to impact of 5.0 kg steel weight dropped from 200 mm height).

IK10 Protection against 20 J (joules) impact energy (equivalent to impact of 5.0 kg steel weight dropped from 400 mm height).

Factory-sealed

FS
FACTORY
SEALED

Faster, safer, easier: If you are looking for a way to save money and nerves during installation, WE-EF's factory-sealed luminaires are a boon – for customers, planners and installers alike. Genuine ease of installation and maintenance always starts with design – an area profoundly affected by the paradigm shift in exterior lighting brought about by LED technology.

Today, accessibility for lamp replacement is no longer required. High-quality LED technology ensures maintenance-free operation over many years, as long as the housings are up to their job – keeping optical and electronic components safe in all conditions. With WE-EF, they are safe. Part of WE-EF's luminaires are delivered factory-sealed and do not need to be opened for installation.

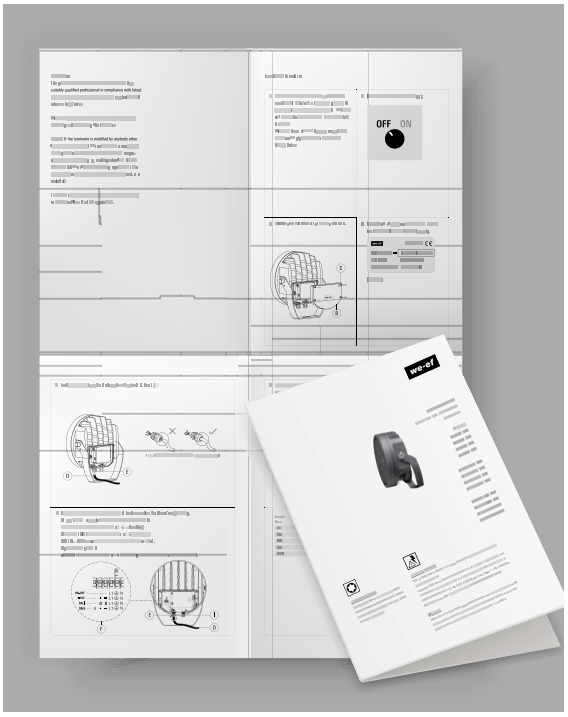
Their seal is permanently maintained, ensuring optimum compliance with the specified protection class (IP).

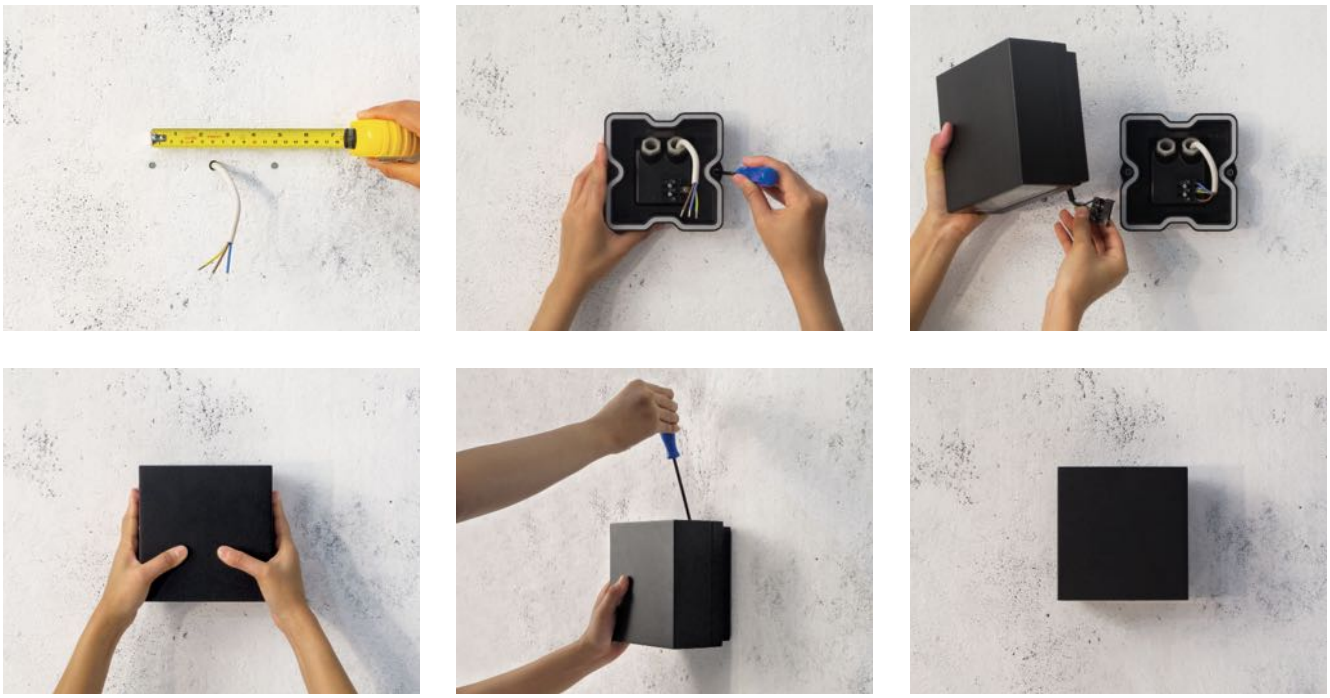
When it comes to electrical connection, flexibility is the rule with WE-EF's ready-to-connect luminaires. Pre-installed connecting cables with a free end are just as possible as plug connectors or discrete connection boxes. The bottom line: No matter what your application is, WE-EF luminaires are optimised for quick, easy and safe installation, allowing technicians to work much more efficiently – and easing the minds of planners and operators alike.

Luminaires to rely on provided by WE-EF – full performance, trouble-free. Permanently. Should there ever be the need for maintenance, sophisticated parts such as PCS-coated, stainless-steel fasteners ensure easy loosening of mounting connections – even after many years and in the harshest weather, e.g., in coastal conditions.– even after many years and in the harshest weather, e.g., in coastal conditions.

Installation

Installation instructions are provided with all WE-EF products. Suitably qualified personnel must be engaged for the installation and maintenance in compliance with the latest applicable regulations and relevant legislation.





Shown in this example is a step-by-step installation of a factory-sealed product – QLS410.

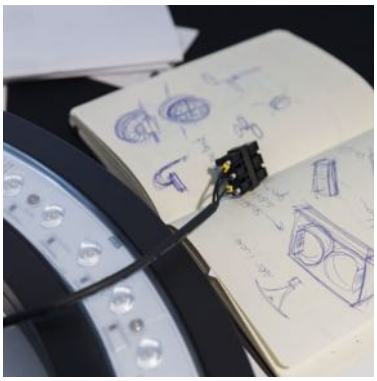
Shown in this example is a step-by-step installation of a factory-sealed product – RMT320.

ENVIRONMENT

The longevity of our products is a major asset for our customers – and, at the same time, a significant contribution to the protection of our environment: Durable products need to be replaced and recycled far less often, saving energy and resources.

Design and engineering

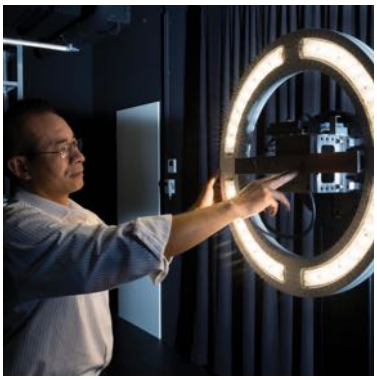
The timeless design of WE-EF luminaires is a reflection of their longevity. The way we see it, environmentally-friendly engineering that accepts and masters the challenges of our times involves selecting materials and processes according to ecological criteria, high IP protection classes, efficient thermal management and IOS® Innovative Optical Systems. The development of high-quality, efficient reflector and lens technologies meeting these standards – IOS® – is one of WE-EF's core competences.



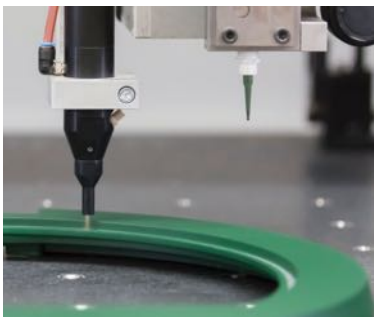
Meeting international lighting and safety standards comes as naturally to our luminaires as matching the requirements of the Dark Sky organisations. It is one of the reasons why we constantly invest in research and development.

Production

"Made by WE-EF" is more than just a phrase – it is the summation of the philosophy behind our high production depth. Our means of manufacturing range from tool-making for die-casting and injection moulding equipment to aluminium die-casting, CNC production, CNC sheet metal working, powder coating and pole production to pre- and end-assembly.



To meet our high-quality standards, we continuously invest in tools, production facilities and the training of our staff.



Application

By using innovative light sources in combination with appropriately adapted optics, we achieve the optimum product characteristics for any given application.

In street and area lighting, for example, high light output ratios and wide beam angles minimise the number of light points required – while at the same time ensuring the compliance with relevant glare limitation requirements.

The result is significantly reduced costs for installation and maintenance, less CO_2 due to reduced energy and resource consumption, and greater lighting comfort.

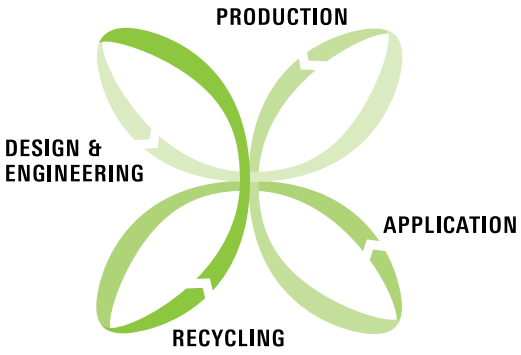
Recycling

More than 90% of the materials used for WE-EF luminaires can be recycled.

Our luminaire housings are made of high-grade, recycled aluminium alloy that can be recycled repeatedly without loss of quality.

Life cycle assessment

WE-EF was one of the first organisations in the lighting industry to provide EPDs (Environmental Product Declarations) in accordance with ISO 14025 and EN 15804 standards. These EPDs entail detailed documentation on the environmental footprint of our outdoor luminaires over all phases of their life cycle. To compile the required information, we collaborate closely with external specialists in life-cycle analysis.



EPDs are product-specific data sheets that contain verifiable and easily comparable information on the environmental impact of any given product. They document this impact not only for the time in which the product is actively used, but across its entire life cycle, from raw material extraction to recycling. For investors, operators and designers who care for the sustainability of their projects, this information is vital for sourcing decisions.

Prime concern of this life-cycle assessment are luminaires for street and area lighting. The EPDs for these luminaires as well as detailed additional information and environmental performance statements are available online at our website.

WE-EF LIGHTING Co Ltd
57 Moo 5 Kingkaew Road
Bangplee, Samutprakarn 10540
Thailand
Tel +66 2 738 9610
Fax +66 2 175 2174
www.we-ef.com