Lighting tools

for cost-efficient, environmentally
friendly and future proof road lighting

Streetlight 10
with LED technology

office | industry | traffic | retail | public | sports

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Streetlight 10 LED

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Streetlight 10 mini I midi LED
Cost-effective for all applications

Innovative LED technology, embedded into an equally innovative and sustainable luminaire concept and coupled with an awareness for both costs and the environment sums up Streetlight 10 from Siteco. State-of-the-art LED technology meets outstanding photometrics, and a modular concept ensures that luminaires are upgradable and fit for the future. Streetlight 10 mini and midi: An outstanding solution for fully compliant and highly efficient illumination of main roads, residential streets and side streets.

Streetlight 10 mini LED
for service roads, collection roads and town squares

Streetlight 10 midi LED
for collection roads,
main roads, roundabouts
and town squares

The pledge: Streetlight 10 LED is the best of its class

- Rapid amortisation of capital cost via major energy savings
- Outstanding quality of light thanks to sophisticated lighting technology
- Convincing environmental protection via reduction of carbon dioxide and material preservation
- Additional savings potential with upgrade option to future LED generations
- Maximum future compatibility via modular design and repeat purchase guarantee

A strong double bill for all applications

One solution for all requirements thanks to mini and midi construction sizes. Streetlight 10 mini is designed for the standard-compliant illumination of service and collection roads as well as for parking lots and urban spaces. Streetlight 10 midi, equipped with two LED modules, illuminates main roads, collection roads, roundabouts and large squares. Also available: a special light module for the illumination of cycle paths (mini) and two light modules precisely matched for the lighting of pedestrian crossings (midi).

Streetlight 10 **mini**

- For service roads, collection roads and town squares
- Mounting heights: 4 to 6 m
- Mast distances: to 40 m
- Light colour: neutral white
- Mounting: post-top, side entry, with mast flange for spigot size 42, 60, 76 mm

Lighting classes	S1	S2	S3	S4	S6	ME1	ME2	ME3	ME4a	ME4b	ME5	ME6
Streetlight 10 mini		●	●	●	●						●	●
Streetlight 10 midi	●	●				●	●	●	●	●	●	●

Streetlight 10 complies with the standards of all lighting classes for technical road lighting.
A uniform lighting installation is guaranteed thanks to two construction sizes.

Streetlight 10 **midi**

- For collection roads, main roads, roundabouts and town squares
- Mounting heights: 7 to 10 m
- Mast distances: to 50 m
- Light colour: neutral white
- Mounting: post top, side entry, with mast flange for spigot size 42, 60, 76 mm

Maximum efficiency in every detail

Efficiency is for some merely a catchword. But with Streetlight 10 it's the constructional principle itself, from the luminaire's components, to its applications and the overall service life. This is why all Streetlight 10 components are optimised with regard to efficiency, which has made it possible to develop a luminaire with extremely low energy consumption. This means in turn that investments are rapidly amortised. The highly robust and low-maintenance system and extremely long-life LED modules (service life of approximately 12 to 14 years) reduce maintenance, servicing and personnel requirements.

Efficiency factors

LED quality
Only the latest LED technology with highest quality is sourced from brand manufacturers.

Lighting technology
Optimised lighting technology enables optimal current feed and ensures maximum light reaching the illuminated area.

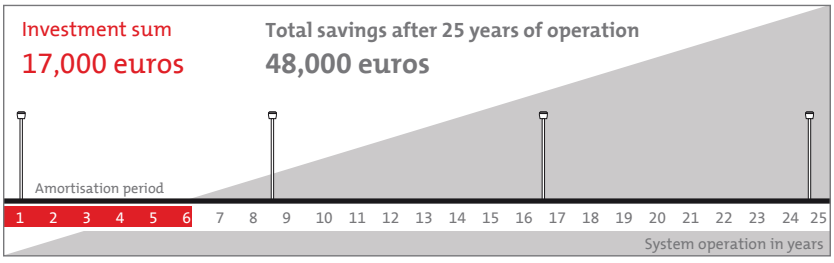
Thermal management
The sophisticated thermal management effectively dissipates heat from the LEDs, thus increasing diode efficiency.

Control options
The intelligent control system enables adaptation of luminous flux according to needs and lowers operating costs.

Design concept
The modular concept allows further increases in efficiency from future LED modules to be optimally exploited.

Rapid amortisation

Clever investments consider costs over the complete life cycle of a product. As well as purchasing costs, energy costs are decisive for road lighting. The comparative calculation demonstrates that Streetlight 10 is already amortised after a good six years. And with light complying to standards, a requirement that old systems often cannot achieve.



Refurbishment vs. continued operation
Basis for calculation: *static cost comparison, 1 km carriageway, 28 light points, 4000 operating hours/year, 0.17 euros per kW/h;* ***Obsolete system:*** *HME 125 W (137 W), 4000 hrs. with 100%*
New system: *Streetlight 10 mini, 1600 hrs. with 100% = 43 W; 2400 hrs. reduced mode = 20 W*
Calculate your system *with the Siteco Cost Efficiency Calculator.* *More on page 40*

Streetlight 10 for pedestrian crossings
Streetlight 10 midi features an LED module precisely matched for this purpose, illuminating this danger area highly precisely and in compliance with standards.

90%

Material preservation: if an LED module is replaced, 90% of the luminaire remains on the mast in the form of housing and gear tray. That's the best value on the luminaire market by a long way. Material preservation also means outstanding value preservation for the operator.

Only with Streetlight 10

Thanks to Siteco gear tray technology, the LED module and control unit can be replaced independently of each other. This means upgrading to higher performance, future LED modules is easily implemented.

A unique, future-fit ecological design

The perfect protection of resources: Streetlight 10 features outstanding material preservation of the luminaire. The housing of high quality diecast aluminium, once mounted, can stay fixed to the mast for decades. The LED modules according to operational state are replaced after 12 to 14 years. This is a decisive advantage compared to many other LED luminaires, as most models are not upgradable. Here the complete luminaire in some cases must be disposed of in less than ten years. Other luminaires with replaceable modules are designed so that housing components must be replaced along with the modules, and thus a large part of the luminaire itself. That consumes resources and also energy required for luminaire recycling. Streetlight 10 is different, and the value attached to the mast is preserved. In addition Siteco offers a repeat purchase guarantee for future LED modules.

10%

Flexible components: only 10% of the complete material of the luminaire is replaced when changing the Streetlight 10 LED module. Replacing the slender, lightweight module is achieved with just a few manual steps.

Specifications of the ecological design standard

The ErP 2009/125/EC ecological design standard sets rules for the energy consumption of products. The 244/2009 and 245/2009 directives resulting from this define minimal requirements for the energy efficiency of lamps, luminaires and ballasts.

Energy-wasters banned. The best-known example is the banning of the incandescent lamp. The manufacture of obsolete fluorescent tubes is also prohibited since 2010. This will follow in 2015 with the still popular high pressure mercury vapour lamps for road lighting.

High-end technology for a world class luminaire

The decisive difference between high and low quality LED road luminaires is to be found in their lighting technology. Here Streetlight 10 sets new standards with its innovative, efficient technical solutions. The LED module with its highly precise optical systems of LED arrays, HD reflectors and HD cover guides the light onto the road surface with a high degree of precision, achieved to an extent and in a quality that can hardly be matched. In contrast to the all-round light distribution of conventional lamps, LEDs radiate light exclusively into the lower hemisphere. Emitted light is guided with a great precision onto the road via the sophisticated facetted surfaces of each high definition reflector. The HD cover enables light to be emitted almost without reflection.

High Definition Reflector (HD-R)

The precisely calculated facetted reflectors split the rays of the high power LEDs into wide-area light. In this way they illuminate roads, paths and squares with a high level of uniformity. They also prevent glare distracting drivers, pedestrians and residents.

High Definition Cover (HD-C)

The wave-formed cover of the Streetlight 10 is adapted to the beam emission angle of the light rays. The luminaire head features an all-round frame into which the Streetlight 10 module flush fits. Light is only emitted into the lower hemisphere, making the Streetlight 10 luminaire dark-sky compatible to 100%.

Streetlight 10 module

The High Power LEDs are thermally coupled to the aluminium housing of the module, and the complete module is tightly screw-fastened to the luminaire housing. This gives a large contact surface via which the heat of the LEDs is dissipated with maximum efficiency.

Secure bonding

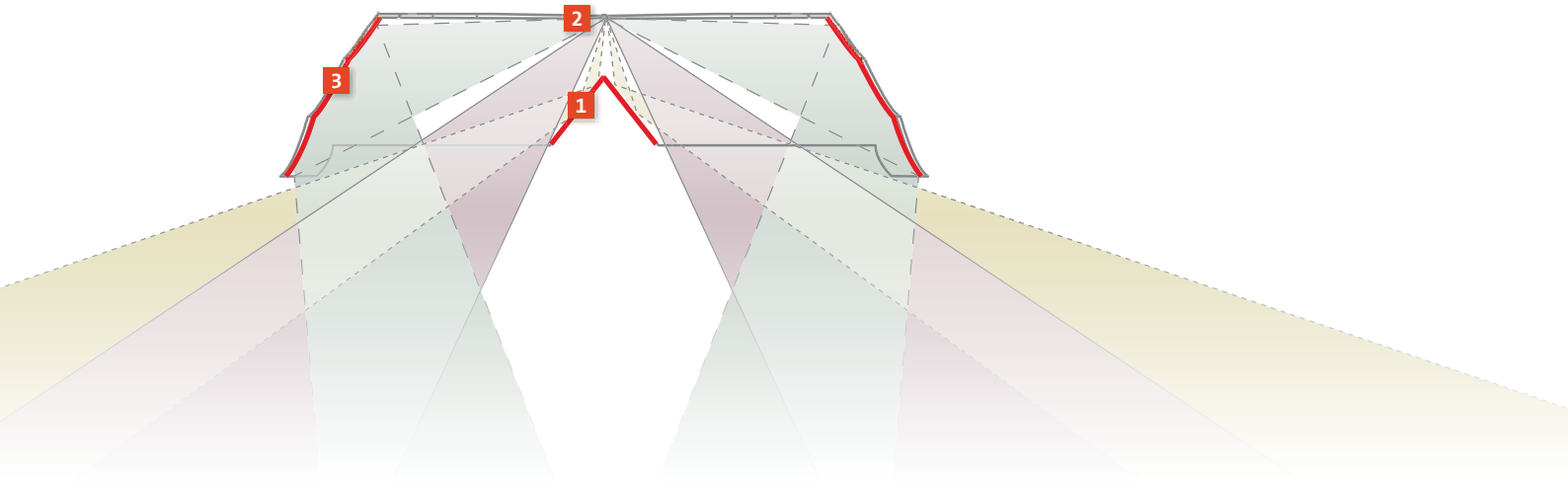
The High Definition cover is completely bonded with the module support all-round. Humidity, dirt particles and insects cannot enter to soil the optics, and quality of light is permanently safeguarded.

Instant luminous flux

The LED module provides full luminous flux immediately after switching on. This means standard-compliant light from the beginning, without losses from start-up times as with conventional lamps.

Secure mounting

Keyhole suspension means easy replacement of the module: the screws only need to be loosened by a few turns. The screw head still holds the module during mounting.



High Definition reflector: light distribution across three zones

1 Far field: the central, V-shaped facetted reflector guides most of the emitted light specifically into the far field. Excessive, uncontrolled radiation to the ground below the luminaire is prevented. LEDs cannot be viewed directly from the typical observer position.

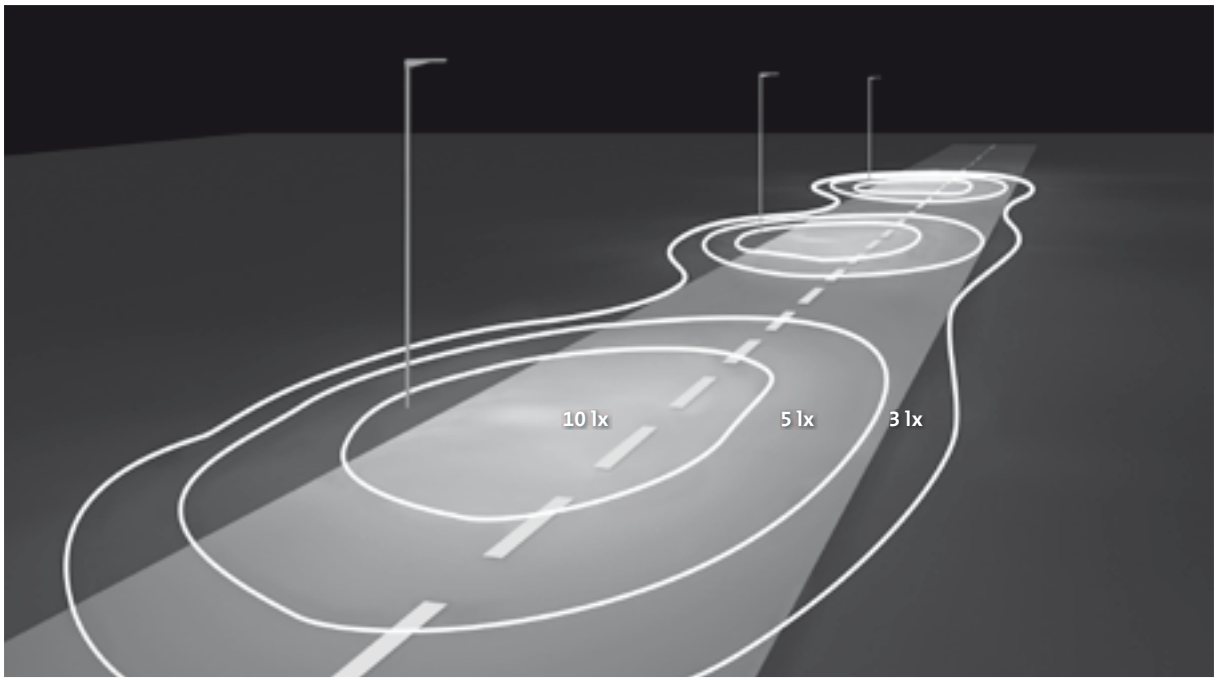
2 Centre field: light is emitted without deflection and highly efficiently directly from the luminaire. The position of the LEDs is specified so that the diodes cannot be viewed from the typical observer position, thus avoiding direct glare.

3 Near field: the lateral facetted reflector guides the light to the area directly below the luminaire. Light distribution guarantees best possible glare restriction.

High Definition Reflector (HD-R)

Greater safety from optimal light distribution

Highly homogeneous illumination along the carriageway even with wide mast distances - Streetlight 10 LED sets new standards in terms of light distribution. This means greater safety in traffic situations, because the vision of drivers need not be adapted to alternating brightness levels, meaning that drivers are able to more rapidly detect sudden obstacles. Objects and people are even clearly visible behind approaching vehicles with dazzling headlights. The basis for this technological progress is the efficient high definition reflector, a consistent continuation of the renowned Siteco radial facetted optics for conventional lamp technologies.



Perfect visibility

Streetlight 10 mini in residential streets for example achieves perfect visual conditions. The high quality of light with neutral white light supports well-being and the sense of security for residents, and thus improves quality of life. Optimal contrast and colour vision ensure a pleasant atmosphere.

Streetlight 10 midi for collection roads
With collection roads, uniform lighting increases visual performance, improves the response times of drivers and in this way reduces the risk of accidents.

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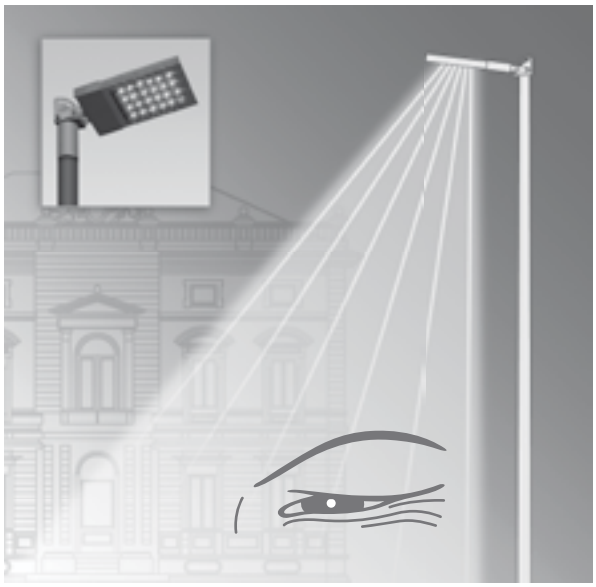
Maximum visual comfort due to glare reduction

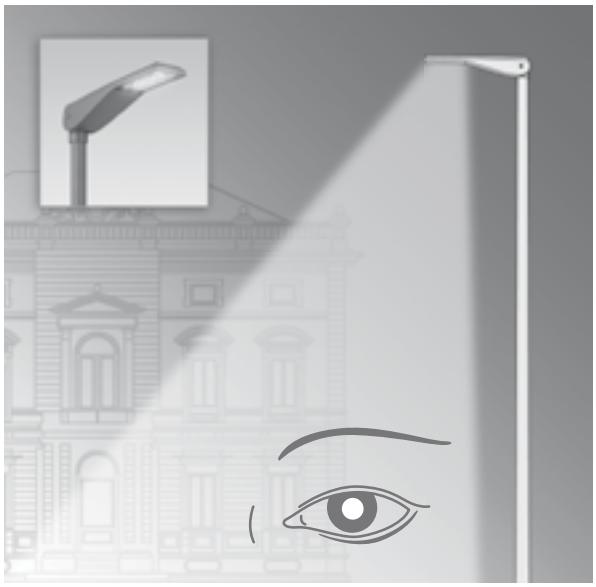
In contrast to LED luminaires with open diodes or diodes equipped with lenses, the risk of glare with Streetlight 10 LED is minimised. The high definition reflectors distribute the light homogeneously over the light emission surface of the luminaire head. The result is low-glare light that in the functional road lighting sector can hardly be matched. From the typical observer position the luminaire is subjectively not experienced as producing glare, and the glare as evaluated by standards is significantly below stipulated limit values. At the same time, traffic routes are uniformly illuminated.

Statistical evaluations prove that these factors in particular significantly reduce risks of accident, and the severity of accidents is measurably lessened.



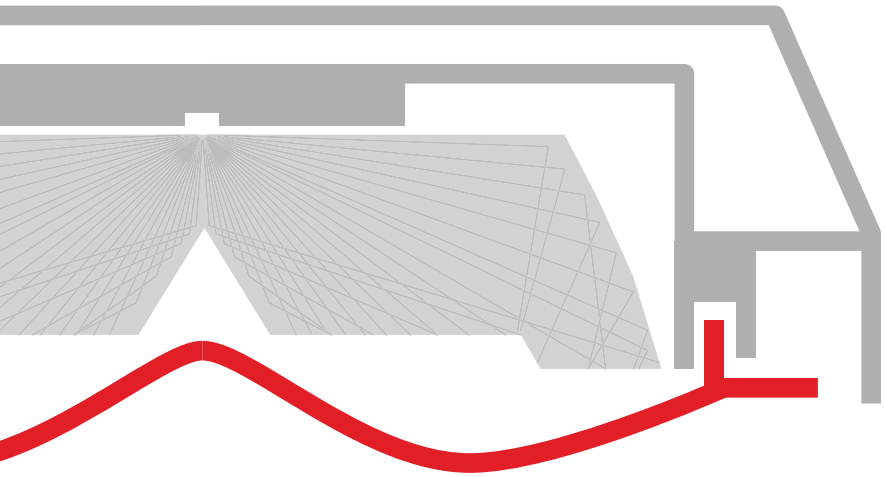
Glare from LEDs with lens optics

LED luminaires with individual lenses may be dangerous for road traffic. The individual light points produce extremely high luminance values, and with direct viewing cause strong glare. This danger will increase with the higher performance of LEDs in the future.



Glare-free due to HD-R with Streetlight 10

The facets of the high definition reflectors split the LED light into many small glare-free light points. The high luminance of the individual diodes is distributed across a larger, glare-free surface and emitted light is guided with the maximum possible angle onto the carriageway.



Compliance with dark sky directives*
Light pollution is a growing problem. Luminaires emitting light into the sky hamper star gazing and attract night-active insects. Streetlight 10 is different, fulfilling the most stringent dark sky directives, avoiding light pollution and ensuring optimal lighting conditions on the ground, and only on the ground.

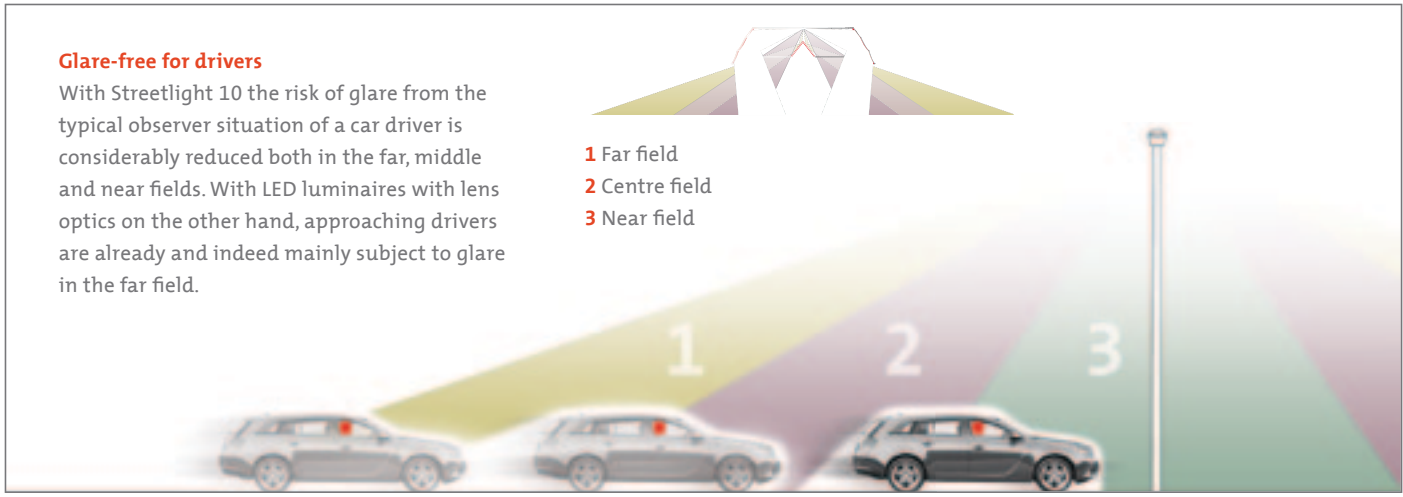
* More on page 42

High Definition Cover (HD-C)

Light on the road, not in the sky

The high definition cover unites the advantages of both convex and flat luminaire covers. Its wave form allows light to be emitted almost without reflection. Efficiency losses are prevented, and at the same time the almost flat basic construction guarantees that light from Streetlight 10 is exclusively directed onto the road. The luminaire frame completely prevents light immission into the sky. A further advantage of the construction is the low level of soiling. The cover is mostly removed from the effects of weather and the surface of the high definition cover consists of high quality, specially coated PMMA, with a permanently high level of transparency and minimal soiling.

Glare-free for drivers
With Streetlight 10 the risk of glare from the typical observer situation of a car driver is considerably reduced both in the far, middle and near fields. With LED luminaires with lens optics on the other hand, approaching drivers are already and indeed mainly subject to glare in the far field.



Streetlight 10 mini for residential streets authentically illuminates the colours of the surroundings and as such achieves outstanding light comfort. This improves safety and also increases well-being and therefore also the quality of life in the vicinity.

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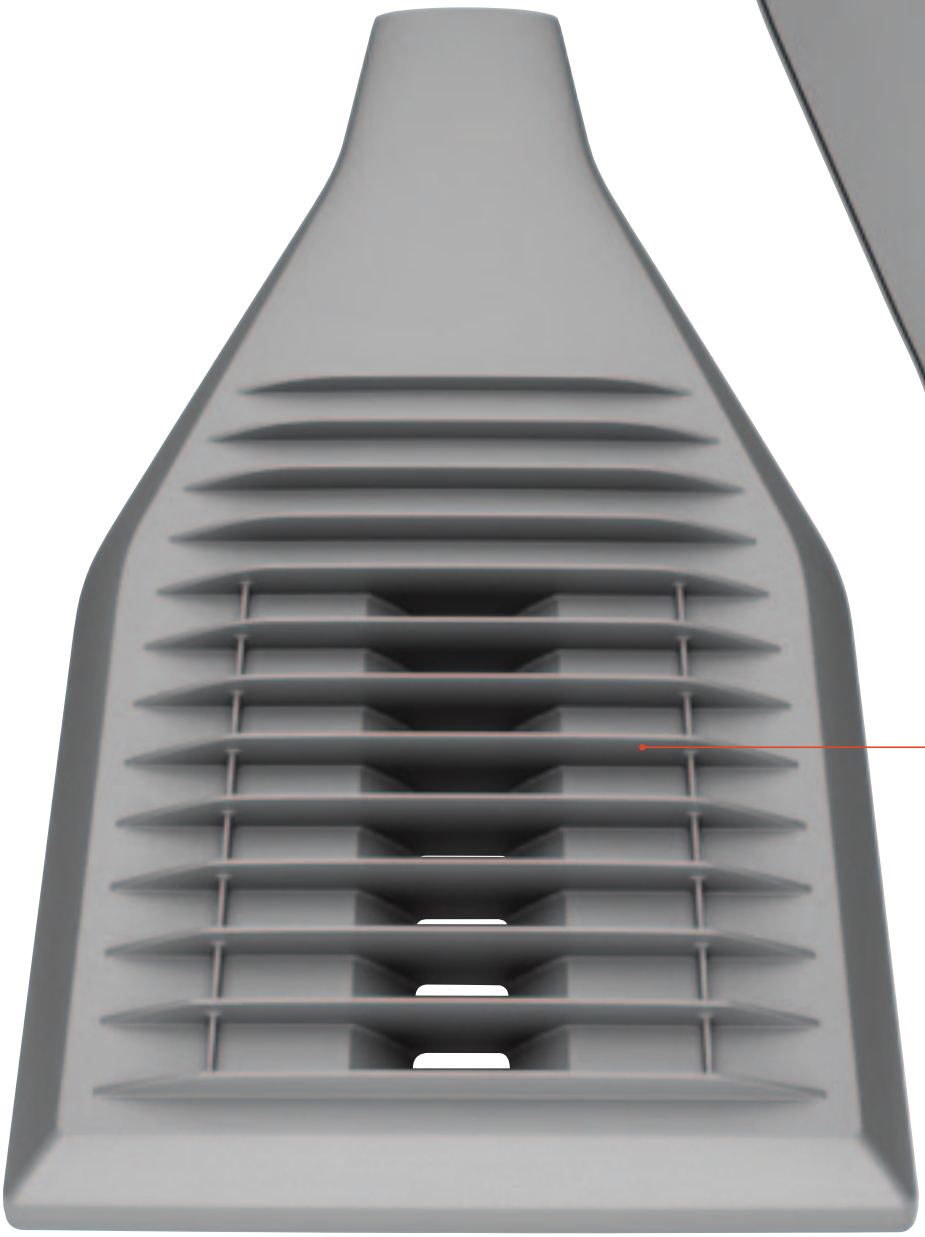
Air apertures
The unique cooling system of Streetlight 10 midi: vertical air apertures ensure constant dissipation of heat and prevent heat build-up.
The individual modules are fixed in the housing, protected from the influences of weather.



Cooling ribs
The cooling ribs expand the surface area of the housing and thus improve heat exchange. The rib distance is designed so that no leaves are caught between them. The diecast aluminium housing has a flat surface, allowing dirt particles to be washed away with the rain.

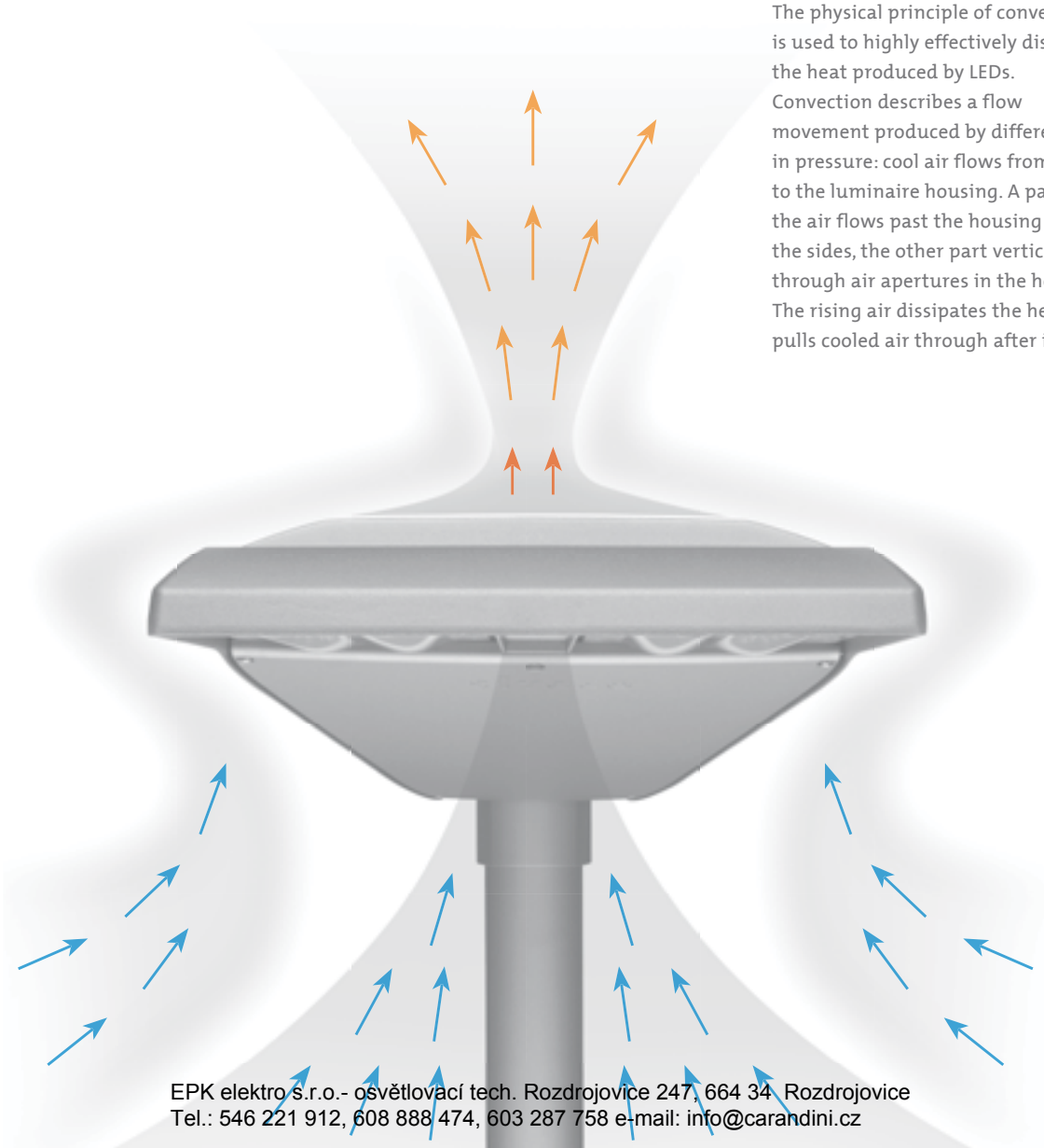
An efficient cooling system for a long service life

Streetlight 10 mini and midi are characterised by long-life and low maintenance. The decisive factors in this regard are the high performance thermal management systems. These defend against heat, the gravest enemy of the luminaire. In both versions the LED modules are screw-fastened to the luminaire housings, and the metal support of each module effectively dissipates the heat typical of LEDs over the luminaire housing. With Streetlight 10 mini, development of heat is low.

Here cooling via the slender luminaire housing is sufficient. Streetlight 10 midi with its higher lumen yield takes advantage of the sophisticated cooling system with special air apertures and cooling ribs. In this way a service life of more than 50,000 operating hours is ensured with all modules. And in addition, effective thermal management helps to save energy, because the better an LED luminaire is cooled the better is the ratio of luminous efficacy per watt.

The convection principle

The physical principle of convection is used to highly effectively dissipate the heat produced by LEDs. Convection describes a flow movement produced by differences in pressure: cool air flows from below to the luminaire housing. A part of the air flows past the housing on the sides, the other part vertically through air apertures in the housing. The rising air dissipates the heat and pulls cooled air through after it.



Streetlight 10 for cycle paths and paths in parks
Streetlight 10 with its slender, modern design blends successfully with park areas as well. Intelligent electronics ensure control of light according to needs.

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Energy optimisation via intelligent control

Only as much light as is necessary, for specific traffic situations, the time of day or the weather should be used to comply with the relevant road lighting standards: this is not achieved by conventional lamps and ballasts, but most certainly with LED technology.

LED light can be dimmed and switched without loss and controlled with supplementary electronic components.
Streetlight 10 is equipped as standard with such LED operating electronics.

Three functional packages are available:

The functions in detail*

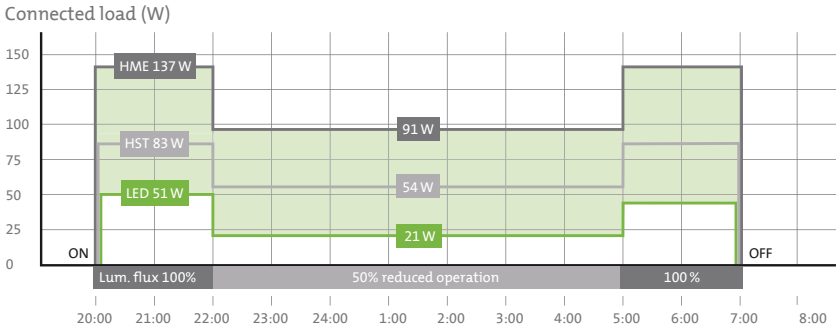
Functional packages	Standard		Efficiency			Communication	
	Overheat protection	Power reduction	Flexible setting of luminous flux	Time-dependent luminous flux control	Constant luminous flux control	Digital communi-cation interface	Siteco Light Control
Premium	●	●	●	●	●		●
Plus	●	●	●	●	●	●	
Basic	●	●					

* More information on page 38

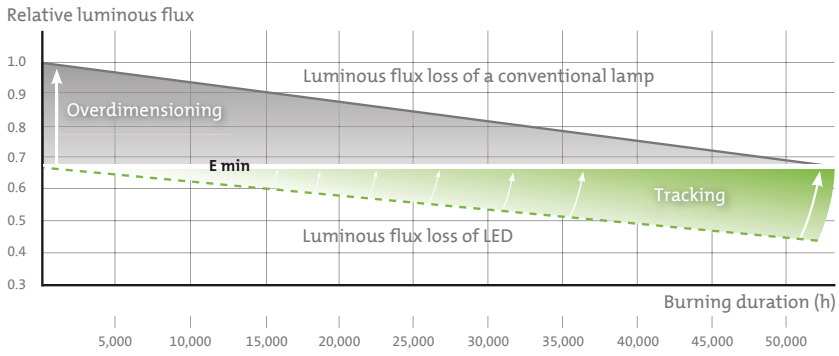
LED – already today the most efficient technology

Making the most of every savings potential: the basis for this is the mature and intelligent Streetlight 10 LED technology, which in itself is highly efficient. Its unbeatable advantage is its stepless and loss-free reduced mode. Conventional luminaires of course can also be reduced, although for 50 % luminous flux, 60 % of energy is required even with a modern HST luminaire. In comparison, Streetlight 10 achieves 50 % luminous flux with 40 % energy. All light sources lose luminous flux over the years. For this reason, when planning with conventional lamps the luminous flux is set to exceed the standard-compliant requirement. The disadvantage of this is that in the beginning more energy is consumed than is needed. Constant luminous flux control with Streetlight 10 Plus is different: its luminous flux is set from the start to the individually required level and this is automatically maintained over the complete service life. Energy waste becomes a thing of the past.

Step 2:
Saving energy via reduced operation: luminous flux reduction of 50 % with HME and HST lamps means significantly less energy savings than with Streetlight 10.



Step 3:
Constant luminous flux control compensates the reduction of luminous flux resulting from ageing. Over-dimensioning is no longer necessary, meaning minimisation of the power consumption/road surface with constant lighting level. The effect is a further 16 % in savings compared to step 2 and maximisation of the service life.



ENERGY OPTIMIZED TECHNOLOGY $<CO_2$ siteco

80.6 %

less energy consumption and CO_2 savings possible compared to conventional HME lamp technology.

Advantage of Streetlight 10 **Basic:**

Best values due to best light control

Advantage of Streetlight 10 **Basic:**

Power reduction with efficiency bonus

Advantage of Streetlight 10 **Plus:**

Intelligent efficiency as a 'plus'

Save efficiently in three steps!

1 100 % operation
Disadvantage of HME and HST: in terms of luminous efficacy and optical efficiency these are inferior to LED technology.
Advantage of Streetlight 10 Basic: achieves best values due to optimal light control of the Siteco LED technology.

2 Night-time reduction to 50 %
Disadvantage of HME and HST: reduction to 50 % luminous flux saves only 40 % energy.
Advantage of Streetlight 10 Basic: the less LEDs are fed with current the more efficient they function. With a reduction to 50 % luminous flux approximately 60 % energy is saved.

3 Dimming without a control wire
Disadvantage of HME and HST: must be retrofitted with a control unit.
Advantage of Streetlight 10 Plus: luminous flux can be set according to requirements. The setting for maximum operating level and two reduction levels can be freely defined and programmed with the Servicebox.

Basis for calculation: *1 km road; light points: 28; lighting class: ME 6; mounting height: 6.5 m; mast spacing 36 m; 4000 operating hours/year; with reduced operation: 1600 h at 100 % operation, 2400 h at 50 % operation; CO_2 factor: 0.6 kg CO_2/kWh. All luminaires fulfill the same photometric task.*
Connected load: *HME: 125 W, power consumption 137 W (50 %: 91 W); HST: 70 W, power consumption 83 W (50 %: 54 W); Streetlight 10 Basic: power consumption 51 W (50 %: 21 W); Streetlight 10 Plus: power consumption 35 W (50 %: 16 W).*

Streetlight 10 – pleasant, neutral white light for good colour rendering.
Ra>70

HST – road and vicinity have a yellow tinge. Colour rendering is poor.
Ra<40

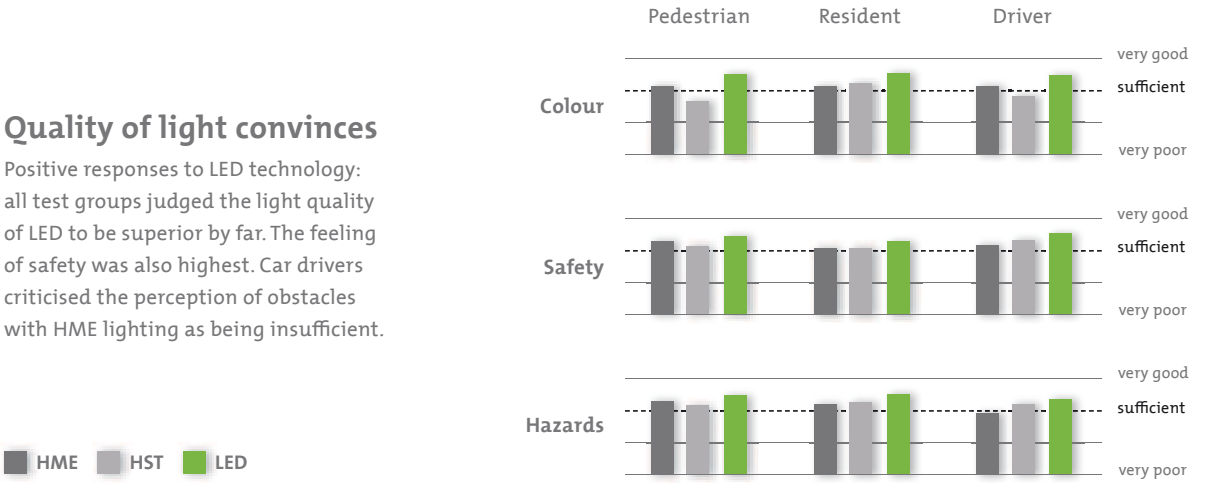
HME – road and vicinity have a blue-green tinge. Colour rendering is limited.
Ra 45–60

Research proves a wide acceptance for LED

Reservations with LED solutions are unfounded. This is backed up by an extensive comparative survey by Germany's Darmstadt technical university which analysed the acceptance of LED road luminaires compared to conventional luminaires equipped with metal halide lamps and high pressure sodium lamps. In the survey luminaires with HME lamps (high pressure mercury vapour), HST lamps (high pressure sodium vapour) and LED technology were installed on a 500 metre-long residential street with identical mast distances. The researchers then queried residents, pedestrians and drivers on their visual perception. The concrete result was that test persons always positively evaluated the LED luminaires whether in terms of road brightness, recognition of pavement edges, impediments and people with warning vests, personal feeling of safety, colour rendition and light colour. And significantly higher than the comparative luminaires.

Quality of light convinces

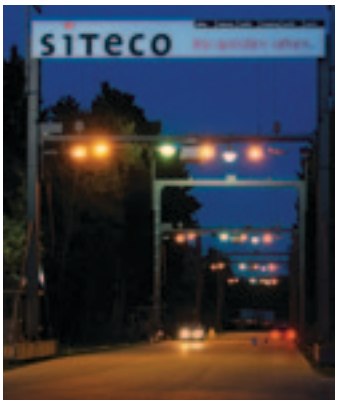
Positive responses to LED technology: all test groups judged the light quality of LED to be superior by far. The feeling of safety was also highest. Car drivers criticised the perception of obstacles with HME lighting as being insufficient.



Siteco luminaire test road

Scientific surveys are one thing, but personal experience counts for more. Interested parties can directly experience a comparison between Streetlight 10 and conventional luminaire systems on the luminaire test road at the Siteco company premises in Traunreut, Germany, and a wide range of application situations can be simulated. Various mounting heights, mast spacing distances and luminaire technologies can be specified to achieve realistic situations.

Interested? Then simply contact your personal Siteco sales representative.

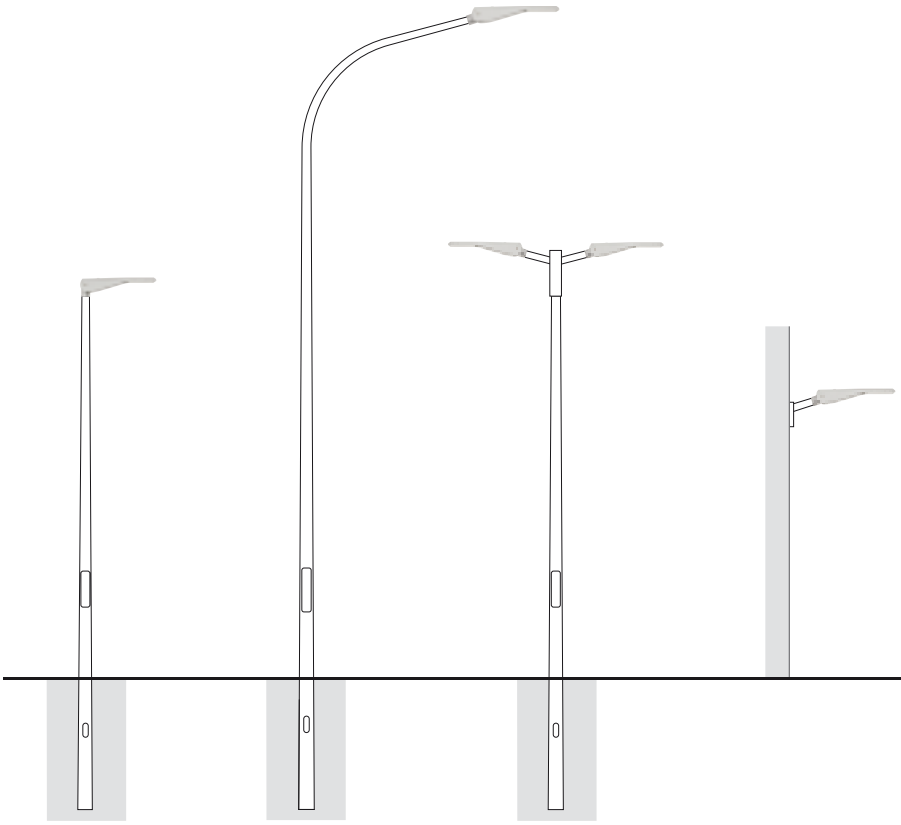


Various lighting situations on the Siteco test road

Perfect for new systems and modernisation...

Technically thought out to the last detail for maximum flexibility: Streetlight 10 can be used both as a post-top and side entry luminaire, and the inclination of the luminaire head can be adjusted according to needs. In this way Streetlight 10 is able to adapt to nearly any lighting situation. With three sizes of mast flange the innovative LED luminaire can be fixed to all standard masts.

A major advantage with refurbishments is that existing masts can still be used. Costs are saved, and with new systems Streetlight 10 has a further big plus: its extremely high performance lighting technology enables wide mast distances and therefore the use of less light points per mile.
Streetlight 10 constructed with high quality diecast aluminium offers typical Siteco quality over decades.



One luminaire for all masts and mounting methods
The inclination of Streetlight 10 can be adjusted without using special tools. For mast spigots 42, 60 and 76 mm.

Maximum flexibility

Suitable for various carriageway widths, mounting heights and positions: optimal luminaire alignment is achieved for all lighting requirements with just a few turns of the hand.

Streetlight 10 mini LV
The low voltage variant emits light far away from cabling.

... and off-grid installations
Streetlight 10 mini LV

Outdoor luminaires source their electrical operating energy from the public electricity grid, and in order to illuminate roads, paths, town squares and building peripheries, electrical cables need to be routed.

What happens though when light is required away from the power network and the effort needed for routing cables is excessive?
The solution is the establishment of an energy grid-independent lighting system. The energy for night-time operation of the luminaires is produced for example by solar modules or wind generators and battery-stored. Intelligent charging and load management ensures high availability of artificial light.

Streetlight 10 mini LV (low voltage) has been especially developed for supply via a low voltage direct current system, and instead of mains voltage the luminaire can be operated with 12 to 48 V DC voltage. The highly efficient, microprocessor-operated ballast ensures attaining of the same photometric values as those achieved by the version operated via the mains network[1]. The extensive control functionality in the Basic and Plus packages represents the optimal matching of luminous flux and power consumption in compliance with both the specific lighting requirements and the quantity of stored electrical energy. The SDI interface (Siteco Digital Interface) also with the low voltage version conveniently manages integration of Streetlight 10 mini LV in a power grid-independent lighting system.

Sustainable, grid-independent lighting systems are not available as standard products. The design of components (e.g. solar modules, batteries etc.) is fundamentally dependent upon the geographical situation, installation situation, lighting requirements and other factors. Siteco works together with experienced partners in this regard.

Lighting tools for security lighting

For security purposes and other tasks demanding a high availability of artificial light, the spontaneous availability of complete luminous flux following switching on is decisive. Such characteristics of LED technology are just as welcome for security lighting as their inherent insensibility to mechanical influences. Streetlight 10 both with its mains operated version and low voltage version offers maximum availability of artificial light in combination with a buffer battery system for example.

[1] Equipping of Siteco LED outdoor luminaire families MUSHROOM, LANTERN, CITY LIGHT, Module 520, DL® 20, SiCOMPACT A2 MINI for low voltage DC supply is available on request.

The cover is hinged downwards.
The space offers room for supplementary components such as the controller for lighting control systems.

The dependable gear tray technology is equipped with all electrical and electronic components.

Maximum quality in practice

Streetlight 10 is characterised by a quality that convinces when it comes to practical use. The luminaire head can be simply and quickly mounted and connected with a few turns of the hand and special tools are not required. Relamping as required by conventional lamps every four or even every two years is no longer required due to the long service life of the LED modules. Additional maintenance work after connecting the module is not necessary. And the luminaire housing and encapsulated LED module both comply with IP66 protection.

Streetlight 10 has an extremely weather-resistant Siteco® metallic grey coating. An additional maintenance advantage of this high quality surface treatment is that the smooth surface lessens the deposition of dirt particles. In addition LED light hardly attracts insects that are otherwise an additional soiling factor for luminaires. The optical cover of tough PMMA is flat and embedded into the luminaire housing, meaning that the surface exposed to adverse weather effects is minimised.

All electrical components are accommodated on a removable gear tray. The LED module is designed ready for connection.

Download the installation sequence
On the internet at **www.streetlight10.com/mounting-video** or simply read in the QR code with the SmartPhone.

i LED luminaires in permanent operation

Theoretical models are one thing, but proof in practice is something else. This is why Siteco continuously works on the optimisation and further development of LED technology according to the factors of fitness for everyday duty and practical reliability. As such, the first LED road luminaire from Siteco, the DL® 10, is currently undergoing a long-term test. It has been operating continuously for more than 25,000 hours at the company headquarters in Traunreut, Germany. And it's running and running and running...

The right luminaire for any application

Streetlight 10 **mini**

- For service roads, collection roads and town squares
- Mounting heights: 4 to 6 m
- Mast distances: to 40 m
- Light colour: neutral white
- Mounting: post-top, side entry
  mast flange for spigot size: 42, 60, 76 mm

Lighting classes	S2	S3	S4	S6	ME5	ME6	ME4b	ME5	ME6
Streetlight 10 mini	●	●	●	●	●	●	●	●	●

Task | Luminaire type | Functional packages

Premium
Plus
Basic

Three packages are available for light according to specific requirements: Basic, Plus and Premium. Further information about these functional packages can be found in the glossary on page 38.

Streetlight 10 **midi**

- For collection roads, main roads, roundabouts and town squares
- Mounting heights: 7 to 10 m
- Mast distances: to 50 m
- Light colour: neutral white
- Mounting: post-top, side entry
  mast flange for spigot size: 42, 60, 76 mm

Lighting classes	S1	S2	ME1	ME2	ME3	ME4a	ME4b	ME5	ME6
Streetlight 10 midi	●	●	●	●	●	●	●	●	●

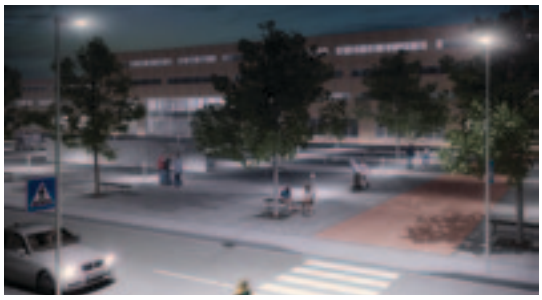
LED module for standard-compliant road lighting with high uniformity

LED module for cycle path illumination with wide light point distances

Module specification

LED module for standard-compliant road lighting with high uniformity and wide light point distances

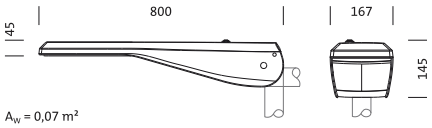
LED module for pedestrian crossings with standard-compliant light



EPK elektro s.r.o.- osvětlovací tech. Rozdrojovice 247, 664 34 Rozdrojovice
Tel.: 546 221 912, 608 888 474, 603 287 758 e-mail: info@carandini.cz

LED

Streetlight 10 mini LED | for post-top or side-entry mounting | asymmetric distribution



Streetlight 10 mini LED mast luminaire for post-top or side-entry mounting | with white LED with reflectors, asymmetric light with homogeneous, wide distribution; with flat, formed cover | with microprocessor-controlled LED operating electronics; with control functionality for lighting management and monitoring* | housing and mast flange of diecast aluminium, Siteco® metallic grey (DB 702S); cover of PMMA

Protection rating: IP66
Insulation class: II
Mast spigot with post-top mounting: d_a= 60/76 x 100mm
Mast spigot with side-entry mounting: d_a= 42/60 x 100mm
Recommended mounting height: MH= 4..6m
(Luminaire can be tilted at 0°, 5°, 10° or 15° via mast flange)

* all versions with temperature monitoring for protection of LEDs from thermal overload
Basic version: with power reduction via 230V control voltage | no luminous flux constancy |
Plus version: with luminous flux constancy over complete service life | with integrated, programmable timer for luminous flux reduction at two levels | settable luminous flux for max. operation and for both reduction levels | all parameters settable via Service Box | on request: can be integrated via SDI into existing digital control systems and controlled from a central control point | alternative luminous flux reduction via 230V control voltage
Premium version: functional range as with Plus version, but for individual monitoring and control of the luminaire from a central control point from any distance via LON-PowerLine without supplementary control wire (instead of SDI)

Luminaire can be operated with factory pre-setting. The pre-setting with the Plus and Premium versions can be modified with the mounted and dismantled luminaire

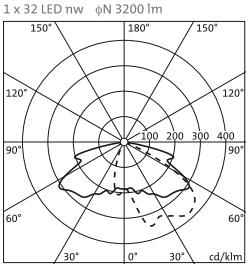
IP 66

Lamps	P_{nom} begin service life	P_{nom} end service life	P_{red} at 50% lumin. flux	Wt. (kg)	Order No.
with ECG Basic					
1x LED-module nw	51	51	21	5,9	5XA5811A1A08
1x 12-48V LED-module nw	51	51	21	5,9	5XA5811A1D08
with ECG Plus					
1x LED-module nw	35	51	20	5,9	5XA5811A1B08
1x 12-48V LED-module nw	35	51	20	5,9	5XA5811A1E08
with ECG Premium, with luminaire controller					
1x LED-module nw	35	51	20	6,1	5XA5811A1C08

- please order the 'mast cable set' separately for configuration of the Plus version with installed luminaire
- please order SLC lighting management components for the Premium version separately if required
- please order mast flange according to spigot diameter separately

Accessories (mast flange, cable set and Servicebox) see following page

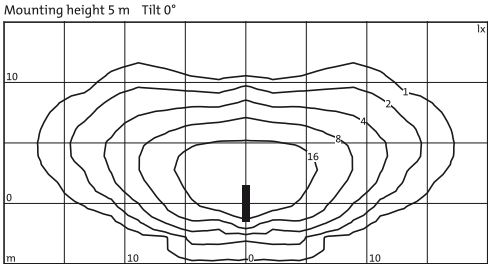
5XA5811A1B08
1 x 32 LED nw ϕN 3200 lm



C 0/180 C 90/270

Luminous intensity class according to EN13201-2: G3

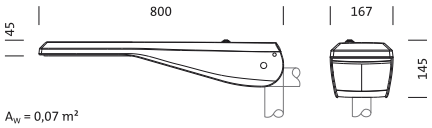
Mounting height 5 m Tilt 0°



Please note: LED technology is subject to continuous dynamic development.
Please consult our electronic catalogue for the latest technical data at **www.siteco.com/products.**

LED

Streetlight 10 mini LED | for post-top or side-entry mounting | asymmetric distribution, for cycle paths



Streetlight 10 mini LED mast luminaire for post-top or side-entry mounting | with white LED with reflectors, asymmetric light with homogeneous, extremely wide distribution; with flat, formed cover | with microprocessor-controlled LED operating electronics; with control functionality for lighting management and monitoring* | housing and mast flange of diecast aluminium, Siteco® metallic grey (DB 702S); cover of PMMA

Protection rating: IP66
Insulation class: II
Mast spigot with post-top mounting: d_a= 60/76 x100mm
Mast spigot with side-entry mounting: d_a= 42/60 x100mm
Recommended mounting height: MH= 4..6m
(Luminaire can be tilted at 0°, 5°, 10° or 15° via mast flange)

* all versions with temperature monitoring for protection of LEDs from thermal overload
Basic version: with power reduction via 230V control voltage | no luminous flux constancy |
Plus version: with luminous flux constancy over complete service life | with integrated, programmable timer for luminous flux reduction at two levels | settable luminous flux for max. operation and for both reduction levels | all parameters settable via Service Box | on request: can be integrated via SDI into existing digital control systems and controlled from a central control point | alternative luminous flux reduction via 230V control voltage
Premium version: functional range as with Plus version, but for individual monitoring and control of the luminaire from a central control point from any distance via LON-PowerLine without supplementary control wire (instead of SDI)

Luminaire can be operated with factory pre-setting. The pre-setting with the Plus and Premium versions can be modified with the mounted and dismantled luminaire

IP 66

Lamps	P_{nom} begin service life	P_{nom} end service life	P_{red} at 50% lumin. flux	Wt. (kg)	Order No.
with ECG Basic					
1x LED-module nw	38	38	14	5,9	5XA5811B1A08
1x 12-48V LED-module nw	38	38	14	5,9	5XA5811B1D08
with ECG Plus					
1x LED-module nw	26	38	14	5,9	5XA5811B1B08
1x 12-48V LED-module nw	26	38	14	5,9	5XA5811B1E08
with ECG Premium, with luminaire controller					
1x LED-module nw	26	38	14	6,1	5XA5811B1C08

- please order the 'mast cable set' separately for configuration of the Plus version with installed luminaire
- please order SLC lighting management components for the Premium version separately if required
- please order mast flange according to spigot diameter separately

Mandatory accessories

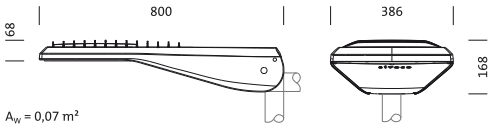
Article	Wt. (kg)	Order No.
mast flange, spigot size: 42mm	1.4	5XA58100XM4
mast flange, spigot size: 60mm	1.4	5XA58100XM2
mast flange, spigot size: 76mm	1.5	5XA58100XM1

Accessories

Article	Wt. (kg)	Order No.
cable set, for mast, L= 4 m, for Plus version	1.0	5EA6Y00L02
cable set, for mast, L= 5 m, for Plus version	1.0	5EA6Y00L03
cable set, for mast, L= 6 m, for Plus version	1.0	5EA6Y00L08
Service Box, for Plus version	1.6	5EA6TEF01

LED

Streetlight 10 midi LED | for post-top or side-entry mounting | asymmetric distribution



Streetlight 10 midi LED mast luminaire for post-top or side-entry mounting | with white LED with reflectors, asymmetric light with homogeneous, wide distribution; with flat, formed cover | with microprocessor-controlled LED operating electronics; with control functionality for lighting management and monitoring* | housing and mast flange of diecast aluminium, Siteco® metallic grey (DB 702S); cover of PMMA

Protection rating: IP66
Insulation class: II
Mast spigot with post-top mounting: d_a= 60/76 x 100mm
Mast spigot with side-entry mounting: d_a= 42/60 x 100mm
Recommended mounting height: MH= 6..10m
(Luminaire can be tilted at 0°, 5°, 10° or 15° via mast flange)

* all versions with temperature monitoring for protection of LEDs from thermal overload
Basic version: with power reduction via 230V control voltage | no luminous flux constancy |
Plus version: with luminous flux constancy over complete service life | with integrated, programmable timer for luminous flux reduction at two levels | settable luminous flux for max. operation and for both reduction levels | all parameters settable via Service Box | on request: can be integrated via SDI into existing digital control systems and controlled from a central control point | alternative luminous flux reduction via 230V control voltage
Premium version: functional range as with Plus version, but for individual monitoring and control of the luminaire from a central control point from any distance via LON-PowerLine without supplementary control wire (instead of SDI)

Luminaire can be operated with factory pre-setting. The pre-setting with the Plus and Premium versions can be modified with the mounted and dismantled luminaire

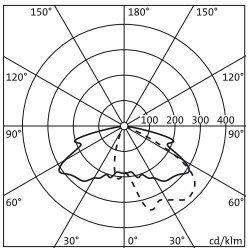
IP 66

Lamps	P_{nom} begin service life	P_{nom} end service life	P_{red} at 50% lumin. flux	Wt. (kg)	Order No.
with ECG Basic					
2x LED module nw	159	159	64	11.4	5XA5821A1A08
with ECG Plus					
2x LED module nw	111	159	62	11.4	5XA5821A1B08
with ECG Premium, with luminaire controller					
2x LED module nw	111	159	62	11.4	5XA5821A1C08

- please order the 'mast cable set' separately for configuration of the Plus version with installed luminaire
- please order SLC lighting management components for the Premium version separately if required
- please order mast flange according to spigot diameter separately

Accessories (mast flange, cable set and Servicebox) see following page

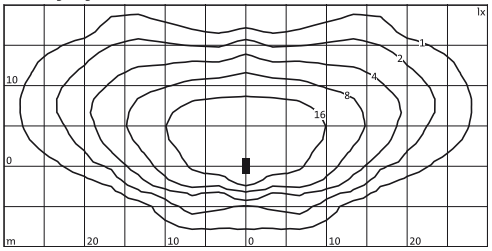
5XA5821A1B08
2 x 32 LED nw ϕN 8800 lm



C 0/180 C 90/270

Luminous intensity class according to EN13201-2: G3

Mounting height 8 m Tilt 0°

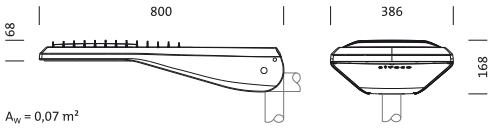


Please note: LED technology is subject to continuous dynamic development.
Please consult our electronic catalogue for the latest technical data at **www.siteco.com/products.**

LED

Streetlight 10 midi LED | for post-top or side-entry mounting | for pedestrian crossings

Streetlight 10 midi LED mast luminaire for post-top or side-entry mounting | with white LED with reflectors, asymmetric left or right light with homogeneous distribution; with flat, formed cover | microprocessor-controlled LED operating electronics; with control functionality for lighting management and monitoring* | housing and mast flange of diecast aluminium, Siteco® metallic grey (DB 702S); cover of PMMA



Protection rating: IP66
Insulation class: II
Mast spigot with post-top mounting: d_a= 60/76 x 100mm
Mast spigot with side-entry mounting: d_a= 42/60 x 100mm
Recommended mounting height: MH= 6..8m
(Luminaire can be tilted at 0°, 5°, 10° or 15° via mast flange)

* all versions with temperature monitoring for protection of LEDs from thermal overload
Basic version: with power reduction via 230V control voltage | no luminous flux constancy |
Plus version: with luminous flux constancy over complete service life | with integrated, programmable timer for luminous flux reduction at two levels | settable luminous flux for max. operation and for both reduction levels | all parameters settable via Service Box | on request: can be integrated via SDI into existing digital control systems and controlled from a central control point | alternative luminous flux reduction via 230V control voltage
Premium version: functional range as with Plus version, but for individual monitoring and control of the luminaire from a central control point from any distance via LON-PowerLine without supplementary control wire (instead of SDI)

Luminaire can be operated with factory pre-setting. The pre-setting with the Plus and Premium versions can be modified with the mounted and dismantled luminaire

IP 66

Lamps	P_{nom} begin service life	P_{nom} end service life	P_{red} at 50% lumin. flux	Light distribution	Wt. (kg)	Order No.
with ECG Basic						
2x LED module nw	159	159	64	asymmetric, left	11.4	5XA5821C1A08
2x LED module nw	159	159	64	asymmetric, right	11.4	5XA5821D1A08
with ECG Plus						
2x LED module nw	111	159	62	asymmetric, left	11.4	5XA5821C1B08
2x LED module nw	111	159	62	asymmetric, right	11.4	5XA5821D1B08
with ECG Premium, with luminaire controller						
2x LED module nw	111	159	62	asymmetric, left	11.4	5XA5821C1C08
2x LED module nw	111	159	62	asymmetric, right	11.4	5XA5821D1C08

• please order the 'mast cable set' separately for configuration of the Plus version with installed luminaire
• please order SLC lighting management components for the Premium version separately if required
• please order mast flange according to spigot diameter separately

Mandatory accessories

Article	Wt. (kg)	Order No.
mast flange, spigot size: 42mm	1.4	5XA58100XM4
mast flange, spigot size: 60mm	1.4	5XA58100XM2
mast flange, spigot size: 76mm	1.5	5XA58100XM1

Accessories

Article	Wt. (kg)	Order No.
cable set, for mast, L= 6 m, for Plus version	1.0	5EA6Y00L08
cable set, for mast, L= 7 m, for Plus version	1.0	5EA6Y00L07
cable set, for mast, L= 8 m, for Plus version	1.0	5EA6Y00L09
Service Box, for Plus version	1.6	5EA6TEF01

Siteco® Servicebox electronic accessories

Siteco® Servicebox
for parameterising the operating electronics of all Siteco LED 'Plus' version road luminaires | maximum energy efficiency via individual adaptation of lighting level, switching time and reduction level | setting of static colours and dynamic colour sequences with corresponding luminaires | Servicebox includes software * | with plug-in coupling for connection of Y-cable | housing of plastic; plug-in coupling with IP54 protection cap | insulation class II

Type	Weight (kg)	Order No.
Siteco® Servicebox	2.4	5EA6TEF01

- incl. Y-cable for looping the Servicebox into luminaire supply cable | incl. 'workshop' cable set for parameterising the unmounted luminaire in the workshop; safety plug on one end

* adoption of complete colour sequences and software updates possible via PC | incl. mini USB interface for connection to PC

Light according to needs via intelligent control

Intelligent control functions are a part of all Siteco LED outdoor luminaires. With such intelligence integrated into the LED operating electronics the efficiency potential of LEDs can be exploited even more. The control functions make use of the outstanding feature of LED light sources to reduce luminous flux without loss in order to increase energy and cost savings. The control functions of Streetlight 10 are summarised in three different functional packages: Basic, Plus and Premium. The values for luminous flux are either factory-set (Basic), can be individually set with the Siteco Servicebox (Plus) or centrally set via Siteco Light Control (Premium). The Plus and Premium versions offer the widest spectrum of efficient control of LED luminaires according to specific requirements.

Basic functional package
Power reduction, overheat protection

The advantages:
- wired power reduction (twilight switching)
- two illuminance levels factory-set (complete darkness / twilight)

Plus functional package
Power reduction, overheat protection, constant luminous flux control, flexible luminous flux parameterisation, time-dependent luminous flux control, digital communication interface

The advantages:
- precise parameterisation of the luminaire to the ambient conditions or application is possible
- additional functions for optimising light points can be set
- can be activated via the Siteco Servicebox
- no additional control components required

Premium functional package
Power reduction, overheat protection, constant luminous flux control, flexible luminous flux parameterisation, time-dependent luminous flux control, Siteco Light Control

The advantages:
- central control and automatic monitoring of each light point is possible
- no additional cabling required
- reduction of maintenance paths and costs
- improved security via adaptation of lighting according to needs

Power reduction

All Siteco LED luminaires are equipped with intelligent connection for detection of power reduction via a switched control wire (230 V).

Factory setting with power reduction via control wire:

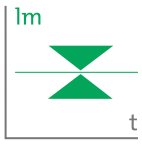
L_{st} = 230 V > 100% luminous flux (complete darkness)

L_{st} = 0 V > 50% luminous flux (twilight)

The switching logic can be reversed with the Service-box for luminaires in the Plus version. If no control wire exists the luminaire emits 100% luminous flux (connection remains free).

Overheat protection

The temperature of the LED module and operating electronics is permanently monitored. With excessive temperature the lighting level and consumption are automatically reduced and the luminaire can cool down. When a lower temperature threshold is attained the luminaire returns to the original lighting and consumption level. This function is purely a protective function to secure the long service life despite possible operating errors (e.g. unintended daytime switching with very high ambient temperatures or with direct sunlight). During operation within the predefined specifications, luminaire temperatures remain safe.

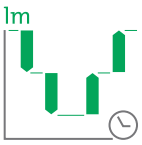


Constant luminous flux control

All light sources, including LEDs, are subject to luminous flux degradation with the progression of service life. This must be taken into account in the planning phase and the system must be correspondingly over-planned. This leads to excessive illuminance and energy waste. The Siteco constant luminous flux control counteracts this degradation, and continuously adds to the output of the LEDs. Luminous flux remains constant over the service life. The light source degradation factor is 1, the maintenance factor is increased. In this way, over-planning is no longer necessary. This means energy-optimised and standard-compliant lighting at all times.

Flexible luminous flux parameterisation

By the binding to fixed wattages with conventional lamps (e.g. 70 W, 100 W, 150 W) only in rare cases is the calculated result of a lighting installation achieved. The next higher wattage must be specified, the system is overlit, energy is wasted. With flexible luminous flux setting the light level can be adapted individually and precisely to the calculated result. Both activation value (complete darkness) and reduction values (twilight) can be adapted according to needs.

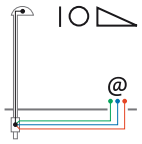


Time-dependent luminous flux control

Siteco LED Plus luminaires allow reducing the light and therefore energy consumption automatically and without external control components in the late evening hours.

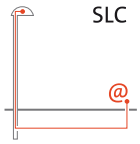
Based on the nominal burning period of the previous five days the luminaire calculates an artificial (virtual) midnight. On the basis of this midnight value, time periods can be defined in which the luminaire is reduced in one or two steps to freely settable lighting levels.

Because of constant internal updating of the nocturnal burning hours the luminaire adapts automatically to the seasonally varied burning durations.



Digital communication interface

This function represents the interface between the luminaire and the external world. It enables all required parameters such as lighting level, reduction control and automatic night-time reduction to be modified according to needs via the Siteco Servicebox. Connection to higher-level control systems is also via this interface (on request).



Siteco Light Control

Connection to Siteco Light Control enables connecting luminaires to our modern, future-fit control system. Without additional cabling, each light point can be individually triggered from a central control point and controlled and monitored according to needs and with maximum flexibility and energy efficiency. Data transmission is via the existing power network with a standard LON protocol. By integrating additional sensors the system can also be expanded according to requirements. Consumption values are recorded and logged, and any luminaire faults are registered automatically via e-mail or SMS. Maintenance plans can be set up as desired and maintenance work optimised.

Tools for the calculation of outdoor lighting systems

The modernisation of obsolete streetlighting systems pays off. Around 2.7 billion kWh of energy, 1.6 million tons of CO_2 and therefore 400 million euros are available for this in Germany alone. The quickest way to implement this is the refurbishment of old lighting installations with new, energy-efficient luminaires and lighting technologies. With Siteco's online calculation programme you can easily find out which energetic savings potential exists. Our website has tools such as the cost efficiency calculator for just such purposes:

Cost Efficiency Calculator

The Siteco Cost Efficiency Calculator is a web application for evaluating the cost efficiency of two outdoor lighting installations. The installations (comparison installation and new installation) can be compared to each other over a variable service life in terms of investment costs and operating costs. For evaluating cost efficiency the amortisation of an investment over the service life is calculated both statically and dynamically and displayed in figures and tables.

The cost efficiency calculator makes available the following information and services:

- a clear comparison of the old and new system
- precise data for investment, operating and energy costs
- reliable amortisation calculations
- tabular and graphical display of results
- simple step-for-step user guidance
- creation and saving of individual projects
- documentation and download of results as PDF files

Further information or direct to the cost efficiency calculator at
http://www.siteco.com/en/products/planning-tools/profitability-calculation.html

Maintenance factor with Siteco LED outdoor luminaires

The technological transformation caused by LED technology has also caused a change in consideration of the maintenance factor. Until now, luminaire manufacturers only had to bear in mind the luminaire maintenance factor (LMF).

Maintenance factor until now (conventional lamp):

MF	=	LLMF	x	LSF	x	LMF
Maintenance factor		Lamp luminous flux maintenance factor		Lamp service life factor		Luminaire maintenance factor
		Lamp manufacturer				Luminaire manufacturer

With the use of LED technology, a luminaire manufacturer must now take into account all three elements of the maintenance factor, as LEDs have become an integral part of the complete concept of a luminaire.

Maintenance factor with LED luminaires:

MF	=	LLMF	x	LSF	x	LMF
Maintenance factor		Lamp luminous flux maintenance factor		Lamp service life factor		Luminaire maintenance factor
		Luminaire manufacturer				

Because the functionality and capabilities of LEDs differ fundamentally from conventional light sources, there are now new features to be considered with the specific characteristics of this maintenance factor comparison. It must also be considered how different manufacturers handle the technical possibilities and potential of LEDs and take these into account.

About the specific factors:

1. LLMF (lamp luminous flux maintenance factor)

This considers the physically-dependent luminous flux decrease of a lamp over the complete lamp service life (degradation). LEDs are also subject to this ageing process, and here as well there is an age-dependent reduction in luminous flux. How this reduction in luminous flux is specified is dependent upon a wide variety of factors such as the quality of LEDs, their current feed and also thermal management.
This is why with Siteco luminaires there is no fixed LLMF value but a value individually specified according to the LEDs used in the luminaire. This value is taken from the characteristic curve of the manufacturer. All LLMF values refer though to an operating life of 50,000 hours and a nominal ambient temperature of 25° C. In Central Europe the average outdoor temperature during luminaire operating hours is +5° C. This temperature, 20 K less than ambient temperatures in laboratory conditions, leads in practice to improvements in efficiency and service life.

The factor is
- 0.88 with Streetlight 10 mini Basic
- 0.83 with Streetlight 10 midi Basic

Improvement of LLMF via intelligent control (with Plus and Premium)
Because Siteco cleverly exploits the electronic control capabilities of LEDs for increasing efficiency, the age-dependent reduction in luminous flux of LEDs is compensated for by power tracking. This ensures constant luminous flux over the complete service life of 50,000 hours. This function for constant luminous flux control is available with the Streetlight 10 Plus and Premium versions.

LLMF is therefore
- 1.0 with Streetlight 10 mini Plus and Premium
- 1.0 with Streetlight 10 midi Plus and Premium

2. LSF (lamp service life factor)

This considers premature failing of lamps. Because of the high demand for quality when selecting LEDs for Siteco outdoor luminaires, the probability of failure of an LED is very low. The failure rate is between 0 and 2%. The LSF is therefore 0.98 with all Siteco LED outdoor luminaires.

3. LMF (luminaire maintenance factor)

The LMF considers the following factors:
1. protection rating in the lamp compartment
2. cleaning interval
3. air impurities in the luminaire vicinity

The protection rating with Siteco outdoor luminaires is always IP5x or IP6x. The cleaning interval and air impurities are criteria that need to be specified individually according to situation and on-site conditions.

The factor is specified for the protection rating in relation to the cleaning interval (1, 2, 3, 4 years) and soiling from the vicinity (low, middle, high). The values can be seen in the table expanded for the special features of Siteco LED luminaires.

Table for defining the LMF for Siteco LED luminaires (1.7.2010)

Cleaning interval (in years)	1.0			2.0			3.0			4.0		
Air pollution	L	M	H	L	M	H	L	M	H	L	M	H
Protection rating of lamp compartment												
IP 5X	0.99	0.96	0.96	0.97	0.92	0.91	0.95	0.88	0.82	0.94	0.85	0.75
IP6X	1.00	0.98	0.98	0.98	0.95	0.95	0.97	0.93	0.90	0.96	0.92	0.86

Air pollution: L=low; M=middle; H=high

Further information about the maintenance factor for Siteco LED outdoor luminaires on the internet at **http://www.siteco.com/uploads/tx_usersitecodownloads/Maintenance_Factor_LED_Outdoor_Luminaires.pdf**

Light and environmental protection

What is light immission?

Immission is the admittance of particles or radiation into a system.

Light immission specifies the ingress of electro-magnetic radiation of the visible wavelength range into a system. This can be natural light (daylight/ moonlight/light from stars) or artificial light (electric lamps). Visible in this sense means visible for people or animals. UV radiation appears as light to animals but cannot be seen by humans.

The phrase light immission is used in particular in connection with the emittance of artificial light into the environment, whereby light is in this sense considered a 'pollutant'. Light pollution is an often-used term. But in contrast to other pollutants that collect and therefore have a long-term effect, light pollution only exists as long as light is existent. Long-term consequences for the environment are therefore not caused by light itself but indirectly by changes from the effects of light.

During the day the influence of artificial light for the environment is low, as daylight in contrast is much more intensive.

By night the opposite is true. Artificial light sources then dominate, for example road lighting, car head-lights and building illumination. This then influences specific processes in the environment that would other be implemented in darkness. Towns and cities are covered by 'domes of light', meaning the sky is brightened by scattered artificial light.

A conflict exists between the desired effect of lighting (the recognition of objects) and the undesired effects on the environment.

What are the short-term and long-term effects of light immission?

Effects on animals and people:

- The behaviour of nocturnal animals is disrupted by artificial light, especially by the blue and UV components in the spectrum of lamps: the light from road luminaires attracts insects such as moths and beetles. These become easy prey and can no longer breed. Surveys from the year 2000 show that in Germany in a single Summer night an average of 150 insects died at each road luminaire. If this is calculated up for the approx. 9 million road luminaires on German roads then that is over one billion insects each night.
- Artificial light represents a problem for the navigation and orientation of migrating birds. Light sources and domes at night lead birds to fly in the wrong direction. The animals often pay for this with their life.
- Nocturnally active animals need darkness for searching for food and some also for procreation. Negative effects from artificial light are also known with water-fleas, fish, amphibians and tortoises.
- Animals active during the day need darkness for sleeping, relaxing and for regenerating.

Effects on flora:

- Plants need the day/night rhythm for photosyn-thesis and are influenced in their growth cycle by artificially brightened surroundings. That which is desired for cultivated plants in garden centres can become a problem for sensitive natural plants when they bloom earlier than according to their natural cycle for example and are thus attacked by frost.

Cultural effects:

- Brightening of the night sky makes it appear almost devoid of stars. In this way a source of inspiration for people for thousands of years is lost and modern professional astronomy is hindered.
- Outdoor areas that are too brightly illuminated strongly limit lighting design. The design-based use of artificial light presumes a dark environment; otherwise contrast is lacking

What is Dark Sky?

Dark Sky is an initiative that has been organised in particular by astronomers to limit the quantity of light immissions. They have founded various organisations, including the International Dark Sky Association (IDA).

Which solution approaches exist and how can Siteco support you with these?

Lighting installations in outdoor applications are set up for specific purposes, the importance of which should be appraised in each case:

- Recognition of carriageways, vehicles and people for preventing accidents and violence (road lighting)
- Recognition/presenting of architecture and advertising surfaces for orientation, for town planning and for advertising purposes
- Illumination of sports facilities
- Signal systems (traffic lights)

Planning:
Light should in general be economically handled when planning and designing lighting systems. Lighting should only be planned where it is necessary, with only sufficient intensity for fulfilling the lighting task (illuminance or luminance). Our sales representatives would be glad to offer you professional support with planning.

Lighting technology:
Suitable optics enable only desired surfaces to be illuminated. In particular, useless direct radiation of lighting into the sky can be limited in this way.

Siteco luminaires with minimised light immission (luminous flux into the upper hemisphere < 3%) are designated with the following symbols in the catalogue:

Conventional lamp technology:
Luminaires with conventional lamp technology attract nocturnally active insects via the spectral combination of their emitted light. The higher the UV component, the greater is the attraction for insects. Mercury vapour lamps (HME) with their green-yellow light are particularly attractive to insects. Sodium vapour lamps (HST) also emit light with a UV component that endangers insects.

LED technology:
LEDs emit light without an ultraviolet component and therefore do not attract insects. In addition, with the use of intelligent control the level of illuminance can be adapted according to needs. Dimming of luminous flux as with the Streetlight 10 Plus for example reduces even further the attraction of the luminaires for nocturnal insects, because the lower the illuminance, the less interest the insects have.

What is the importance of light immission in various countries?

Germany
In Germany the Federal Immission Protection Regulation (BImSchG) bears validity. The commission for immission protection has drawn up a directive for the measurement and evaluation of light immission for greater specification purposes. Similar directives (although without technical guidelines) exist in Czechia, Great Britain and Lichtenstein.

Slovenia
Since 22. September 2007 Slovenia is the first EU country with legislation against light pollution.
Information in Slovenian at www.temnonebo.org

Italy
Legislation has been adopted in various regions.
The Lombardy regulation (2000, 2004) can be seen as a pioneer, which is why Italians are suggesting it as the basis for European legislation.

United Kingdom
In the UK, outdoor lighting must comply with the documents - ILE Guidance Notes For The Reduction Of Obtrusive Light 2005 and BSEN12464-2

Technology and Design Center

The Technology and Design Centre from Siteco offers scope for technology, know-how, dialogue and inspiration – the experience of light and transfer of knowledge under one roof.
Let yourself be inspired by our lighting forum. Just speak to your sales representative. We can organise your personal training programme selected from our wide spectrum of training components, and can also organise your entire planning, from arrival until departure.
Ergonomics, cost efficiency and environmental compatibility are the focus of our activities and also of course of our seminars. You can experience lighting in our lighting laboratory at first hand and experience more about

- energy-efficient solutions for indoors and outdoors with the aid of innovative lighting systems
- the contribution of daylight systems, lighting control and LED for ergonomics, safety and environmental compatibility
- lighting solutions for special applications such as offices, retail spaces, industry, roads and public squares
- design possibilities with light
- current standards and their consequences for lighting design