THORN

StyLED

A breakthrough in the control of LEDs
for lighting major and minor roads

The new StyLED road lantern possesses a unique combination of design and technical innovation, including breakthroughs in optics, controls and aesthetics

The outstanding innovation, recognised with a "Label de l'Observeur du design" by the French Agency for the Promotion of Industrial Creation (APIC), is the optical and current control of high-output LEDs so engineers can now light, with precision, major roads as well as residential streets in compliance with international standards (EN 13201).

Dramatically improving light output and project flexibility, adding aesthetic value to the streetscape, and significantly reducing energy and maintenance costs, StyLED reflects the sophistication and future of LED technology.

- Available in two outlines and five luminaire-lumen packages - it caters for main roads (up to ME2 lighting classes) as well as residential streets
- Innovative optics offer 15 light distributions to suit the application
- Full lighting control via stand alone dimming or a remote monitoring system (wireless or powerline)
- Produces white light (4200K)
- Optical engine and heat dissipator sealed for reliability through life and easy cleaning
- Dedicated brackets help the designer to achieve a fully integrated design
- The gear and the optical engine are in two separate compartments for optimised thermal management

At Thorn we recognise our sustainability responsibilities, and with the **PEC** programme we have introduced a wide-ranging philosophy that underpins our approach to lighting design and implementation. The programme is based on the principle that performance, efficiency and comfort determine the visual effectiveness of lighting.

Performance: Providing the best visual effectiveness

Efficiency: Conserving energy and effort, reducing CO_2 emissions and waste, providing lighting that is practical and efficient to install, operate and maintain

Comfort: giving people satisfaction and stimulation

These key attributes are demonstrated throughout this brochure

Performance

Task Visibility: Available in two outlines and five output flux - from 2,900lm (39W) to 9,650lm (129W) – the range is ideally suited to major roads where speed and traffic level call for high luminance level and low threshold increment (up to EN13201, ME2 lighting classes). Equally, the solution is perfect for minor and residential roads and all social areas, where illuminance level and uniformity matter the most (EN13201, S & CE classes).

Multiple rows of LEDs, using a mixture of secondary symmetrical (S) and batwing lenses (B) (Fig.1) for direct and longitudinal light distribution respectively, are positioned within angled reflectors that boost transverse light distribution. The resulting layering effect also maintains the light distribution in the event of dimming or a premature LED failure and gives excellent glare control. As the LEDs produce directional light, they only light the areas that need to be lit, maximising luminaire efficiency and thus spacings between lanterns.

When combined with a dynamic electronic driver, StyLED with EQflux® is able to produce 15 light distributions (see page opposite). Thorn custom builds your lantern according to the project requirements from the intensive to extensive, to satisfy all fixed constraints.

Modelling and Colour: Precision optics ensure solid forms are fully revealed and with a colour rendition (CRI) of 70, higher than most traditional light sources, the lantern aids the visual task of drivers and pedestrians.

Glare Free: The units generate a layered distribution, so the eye of the observer receives light from various lighting points and not from direct high intensive beams, thus minimising glare (total Ti control).

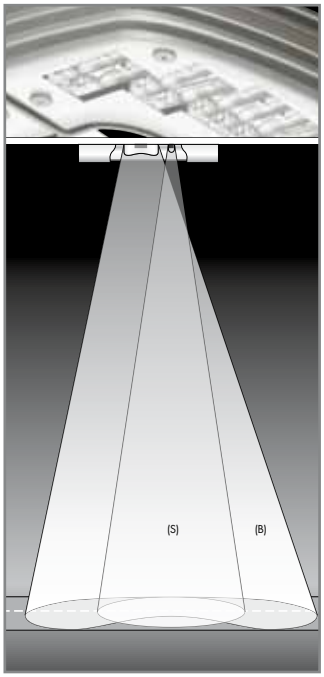


Fig. 1
The diagram shows the principle of the optic: The surface is lit by the entire optical engine and the overlapping of LEDs impedes dark spot effect.

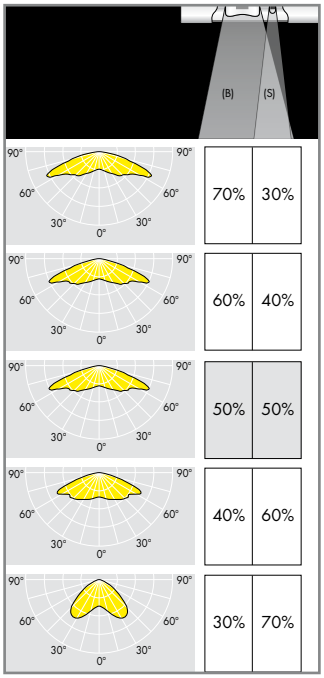


Fig. 2
The EQflux® system with intelligent driver, enables the factory to offer 15 pre-set light distributions by dynamically reconfiguring the LEDs. The standard pre-set settings of 50-50 is suitable for most applications.

Scheme examples

Traffic route for ME2 EN13201 requirement using StyLED 129W

Road width (m)	Road type	Luminaire Tilt	Overhang (m)	MF
4x3.5	R3	0°	0	0.8
Height (m)	**Spacings (m)**	**Lave (cd/m²)**	**Uo**	**Ti (%)**
8	32	1.53	0.58	9.7

MF = 0.8 with 72% dimming of the annual time at 66% of the power, 10°C annual average night temperature, low polluted area and 4 years cleaning interval. Compared with conventional lighting from Thorn Triumph 2 150W HST lanterns the project has improved spacings, from 29m to 32m, while maintaining the required light levels. The result: four less lanterns per Km.

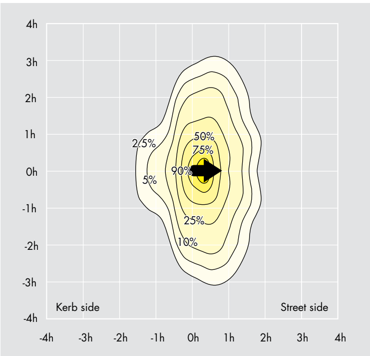
Residential cycle route for S2 EN13201 requirement using StyLED 52W

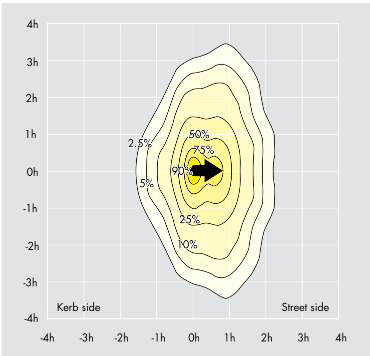
Road width (m)	Road type	Luminaire Tilt	Overhang (m)	MF
7m	R3	0°	1	0.8
Height (m)	**Spacings (m)**	**Eave (Lx)**	**Emin (Lx)**	
6	30	10	3.15	

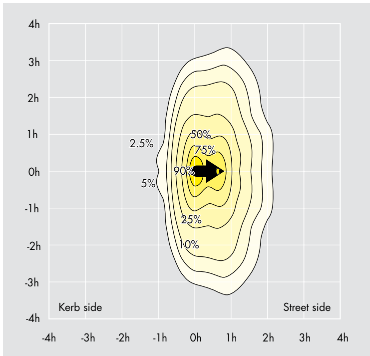
MF = 0.8 with 90% dimming of the annual time at 50% of the power, 10°C annual average night temperature, low polluted area and 4 years cleaning interval. Compared with conventional lighting from Thorn Lemnis 70W HIT lanterns the project improves illuminance uniformity (Emin/Eave), while maintaining spacings.

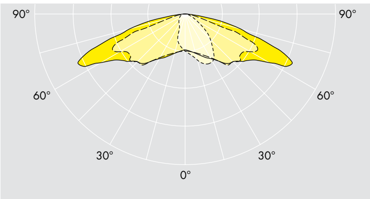
See page 9 for environmental/sustainability data

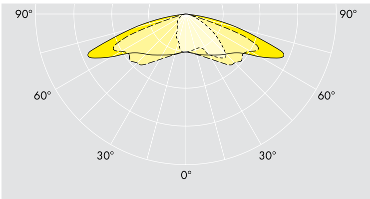
StyLED allows to adjust transversal distribution for narrow (intensive) and wide (extensive) roads with a back cut-off position for facade mounting or where back light is not needed

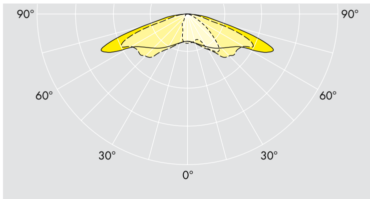


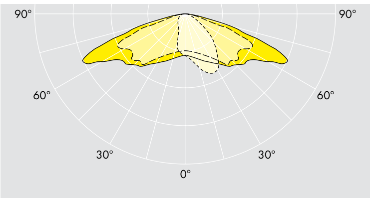


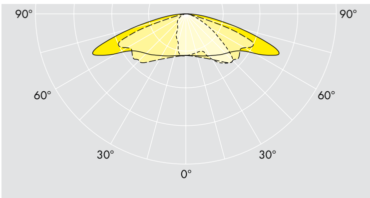


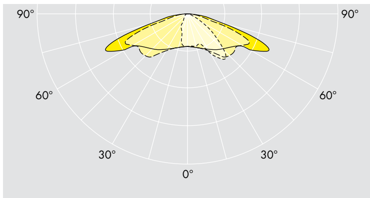


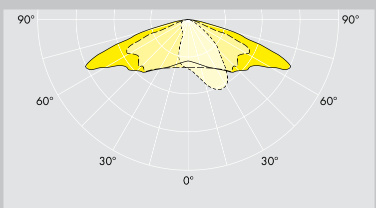


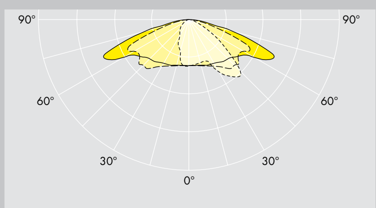


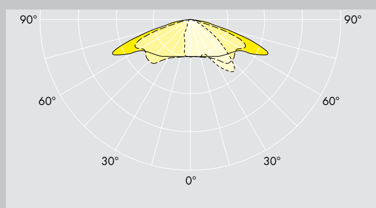




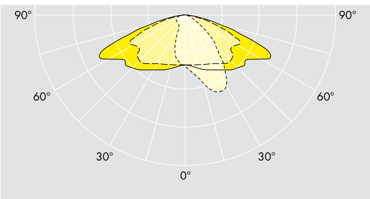


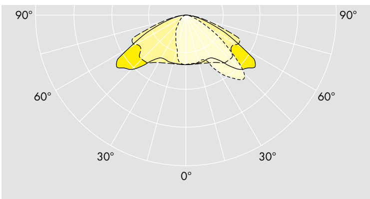


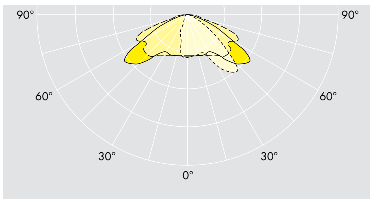


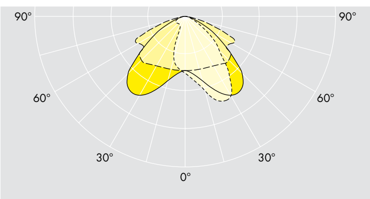


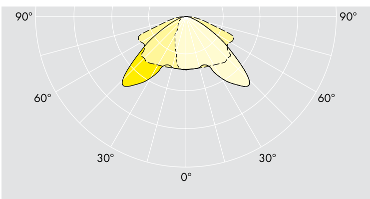
Items on page 11 are delivered with this standard pre-set distribution (50/50)– others are factory set depending upon photometric reference

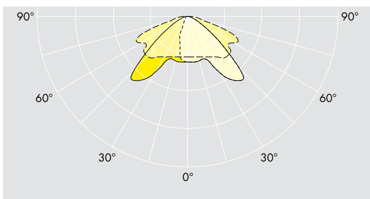












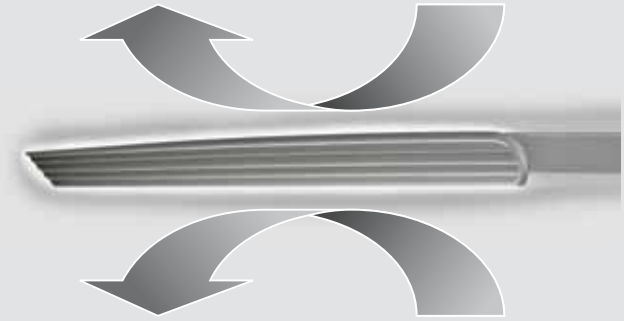
Key

----- C180/C0
– – – C270/C90
—— Cmax 165

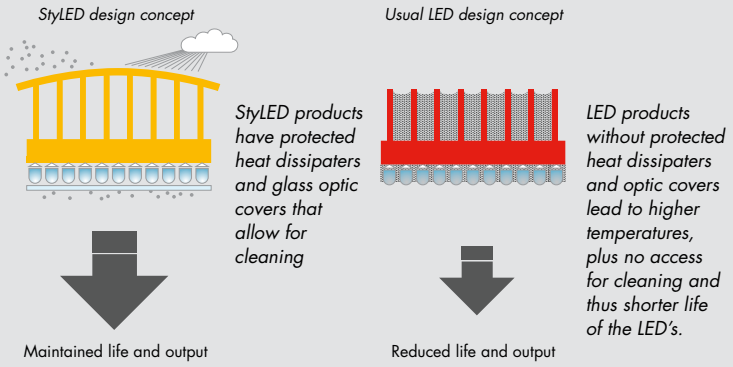
Efficiency

Energy utilisation: LEDs can reduce energy consumption as they require low power to operate. StyLED has a high luminaire efficacy (up to 75lm/W). Lighting control is via stand alone dimming or remote monitoring system (wireless or powerline)

Reliable: A traditional road lantern using discharge lamps will typically last four years. StyLED lasts 80,000 hours (L70 @ Ta 25°C), that's equivalent to 20 years under warm night-time street lighting conditions of 4,000 hours usage per annum. Should an LED fail, it will slowly degrade in light output over time rather than cycle on and off, or turn off completely; hence there are no re-strike issues, which can affect lifetimes.

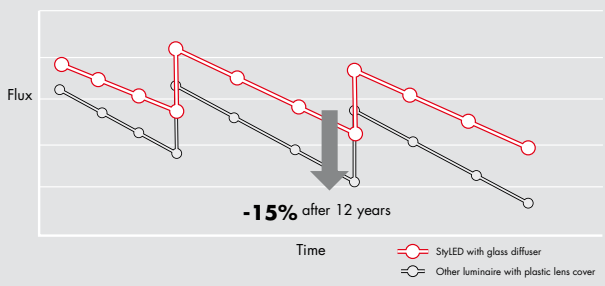


Optical engine and heat dissipater are anti dust collector to keep performances over time



Managed: With sealed optic and heat dissipater only the glass cover needs regular cleaning so less frequent maintenance visits are needed, thereby reducing labour, vehicle and fuel usage, so the carbon footprint on the environment is reduced.

Low environmental impact: Precise light control reduces obtrusive light (ULOR 0%) and LEDs have no mercury or chemical components.



Comparison of the maintained flux characteristics of different enclosure materials: plastic is ageing while glass is steady

Comfort

Atmosphere and ambience: All too often, obtaining high performance means compromising on appeal. Conversely, a poor appearance may lead the prospective user to deduce that they can expect inferior performance. LEDs provide the opportunity to design sleeker, more radical shaped road lanterns, which not only blend better with their surroundings, but also combine with brackets for a more slender and therefore more elegant mounting arrangement. StyLED has a strong visual identity, the emphasis being placed on function. Installed at 4m to 8m heights, on a single or double arm, on a façade or mid-pole, it maintains the feel and appearance of a single, coherently designed environment. StyLED has been added to Thorn's on-line City Visualisation programme, designed as an aid to imagining the appearance of the column, bracket and lantern combination in its surroundings.

Download at:
www.thornlighting.co.uk/road_lighting/UK/download/CityVisualisation.zip

The option of different lumen packages including 'extensive' distributions that give a softer cut-off of light, with a little more light reaching off-road areas, effectively brings householders and residents into the road lighting equation. Distribution is also available with back cut-off when light is undesired behind the column.

White light: Comfortable white light (4200K) is provided so that at night the lighting comes into its own, adding a feeling of safety and well being.

Satisfaction: LEDs turn on and off instantly and do not flicker. The use of control options can provide remote management for event dependent settings.

Matching the LED system to the application

LED performance data should not be used to judge the performance of a luminaire as there are so many other factors to consider:

Even using highest quality LEDs, performance could be impaired by inadequate thermal management, optical control, driver current, ambient temperatures and even cleaning cycles.

Output of LEDs fades over time and whilst some manufacturers quote 70% of initial light output (L70) as a marker of the effective lifespan, in applications where performance is critical (e.g a strategic traffic junction) 80% (L80) should be considered.

Temperature and current
Two decisive factors contribute to the life and light output of an LED luminaire: temperature and current.

The primary cause of lumen depreciation is heat generated at the LED junction (Tj), which is affected by three factors: ambient temperature, drive current and thermal path.

The data chart for StyLED (Fig. 1) shows that, at a 5°C ambient temperature and 70% of the maintained flux, the life of the lantern is >110,000hrs! Yet, it also shows, at 15°C and using 80% maintained flux, that life drops dramatically to 60,000hrs. Both are correct statements, each relating to a specific operating environment, but do not aid the general user. For this reason Thorn publishes StyLED luminaire data at a standard laboratory value of 25°C: L70 @25°C = 80, 000hrs and supplies the necessary support to match the performance according to the local average night ambient temperature.

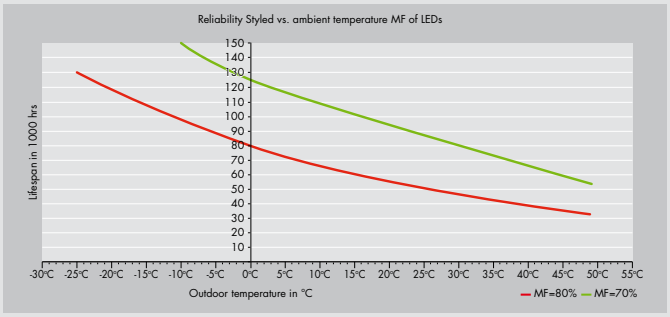


Fig. 1. Graph showing how the ambient temperature impacts on lantern life

Driving the LED at a higher current will increase light output, but there is a trade-off: heat increases, thus reducing life expectancy. StyLED operates at an optimum 500 mA (milliamps) based on its own technical design.

As LEDs do not emit heat as infrared radiation (IR), the heat must be removed from the device by conduction or convection. Without adequate heat sinking or ventilation, the device temperature will rise, and continuous high temperature operation will cause permanent reduction in light output and premature lifetimes.

StyLED uses a superior heat sink design to dissipate heat, maintain a low junction temperature 65°C and provide expected light output, life and colour.

Maintenance Regime
There is also general confusion in the marketplace that LEDs are 'maintenance free' and thus don't need attention during service. However, a 'maintenance free' LED doesn't tell the whole story. A poorly designed luminaire using even the finest LEDs may need as much maintenance as a conventional road lantern.

When designing road lighting it is common to define a maintenance cycle for the installation. Three main factors influence the loss of lighting performance through life for an installation: the cleanliness of the environment; the luminaire specified and the light source and control technologies used.

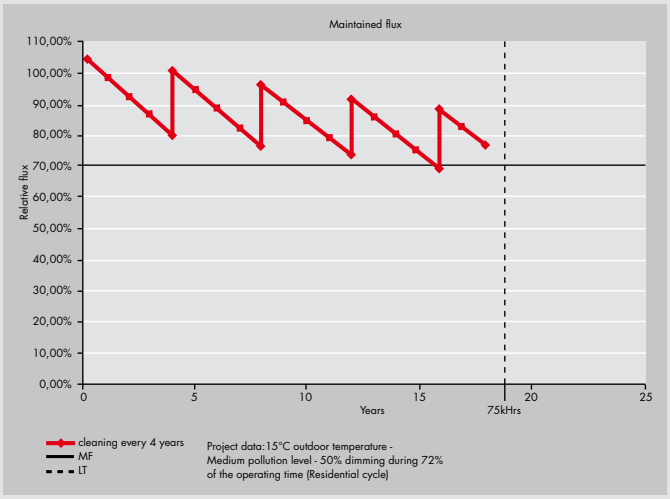


Fig. 2. Example of StyLED maintained flux vs. maintenance factor

In dirty traffic environments an upward finned heat sink design and/or open LED optic will allow dirt deposition that is difficult to clean. StyLED uses a sealed glass optic (plastic degrades over time) and slim heat sink, which prevents dirt from entering the lantern and therefore only the external surfaces require cleaning and may be cleaned more vigorously.

Energy/Dimming CO_2

Selecting a dimming program will prevent over lighting and increase LED life. Unlike conventional high intensity discharge (HID) lamps, where dimming is confined to a narrow range of light output, LEDs allow more flexibility in terms of lower levels, step less operation, the use of more advanced control technologies, whilst maintaining colour and efficiency. With LEDs energy use is reduced roughly in the same proportion as the dimming percentage, unlike step dimming an HID lamp, where under running the lamp is energy inefficient.

Over time the additional savings generated by dimming LEDs can offset the higher capital cost for the project, giving a viable alternative solution to conventional light sources. As energy costs rise, so will the savings. Reducing road lighting levels also has environmental benefits in curbing carbon emissions and further reducing obtrusive light.

StyLED lanterns are equipped with an autonomous dimming system, making it a possible to reduce energy consumption while maintaining colour performance and efficiency. The various dimming levels are handled daily and automatically depending on the length of the night.

As many traffic routes only have peak traffic flow for a short period of time the opportunity arises to reduce the lighting level during the remainder of the night when the traffic flow is low, without compromising safety. Lighting levels can be reduced by one or more lighting classes depending upon application. For instance, on a major road (class ME2), lighting levels can be reduced by one lighting class when traffic flow is low, but a reduction of two classes compromises the requirements of EN13201. For a residential road with S2 class requirements calculations show that one or two class reduction can be achieved. Consequently, StyLED is offered with several pre-set cycles that match the application to the optimised power reduction period and level (fig 1).

This is a quick guide to show the ability of the product. For each individual project, our team will assess the precise needs and recommend either a ready-to-use or dedicated program.

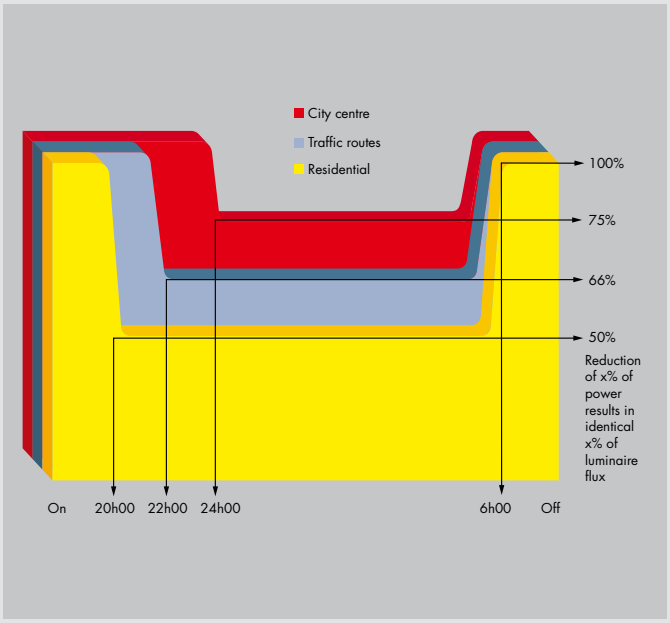


Fig1: StyLED dimming cycles according to application

Residential route for S2 EN13201 requirement using StyLED 52W

1 kilometer of road – yearly average figures	Full set (100%)	10h at -50% reduction	Savings
W/lx/m²	0.02	0.01	-50%
CO_2 emission/year	96kg	52kg	-46%
Energy consumption/year (system)	209kWh	114kWh	-45%
Lifetime of the system L80	50kHrs	65kHrs	+30%

With conventional lanterns (Thorn Lemnis HIT 70W) the energy consumption per lantern p.a. is 359kW, but with StyLED the figure is 114kW - 68% lower. Similarly the w/lx/m² figure to achieve S2 is 0.04 - four times the figure for StyLED (0.01), plus the lifetime of the light source is more than quadrupled with StyLED.

Traffic route for ME2 EN13201 requirement using StyLED 129W

Yearly average figures for this project	Full set (100%)	Dim Cycle 8h at -34% reduction	Savings
W/cd.m²/m²	0.38	0.29	-24%
CO_2 emission/year of 1 StyLED	238kg	206kg	-13%
Energy consumption/year of 1 StyLED	518kW	448kW	-14%
Lifetime of the system L80	50kHrs	70kHrs	+29%

With conventional lanterns (Thorn Triumph HST 150W) the energy consumption per lantern p.a. is 748kW, but with StyLED the figure is 448kW - 40% lower. Similarly the w/cd/m² figure to achieve Me2 is 0.51 - almost double the figure for StyLED (0.29), plus the lifetime of the light source is more than quadrupled with StyLED.

See page 4 for the lighting data.

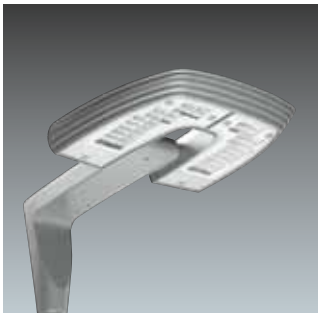
Product features

StyLED - luminaire data

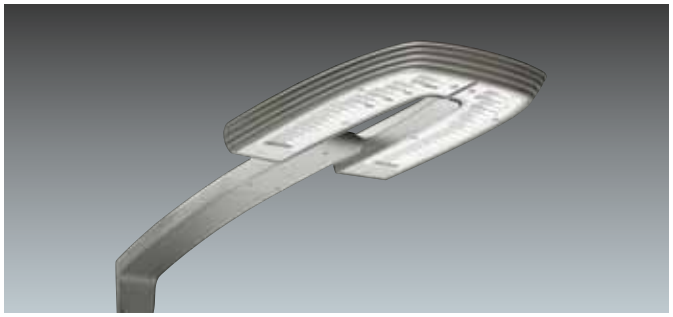
Luminaire output	System Power
2900lm	39W
3850lm	52W
5800lm	77W
7700lm	103W
9650lm	129W

Data is subject to change due to the continuous progress of LED characteristics. To check the effect on StyLED luminaires, please contact us or visit our website.

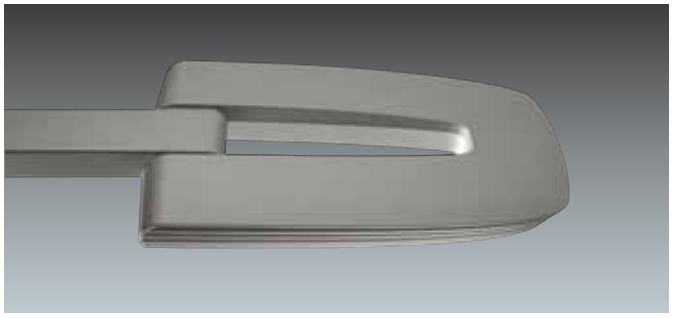
Luminaire Service life > 50,000 hours at 25°C Ta and 80% flux remaining (L70: 80,000 hours)
Colour temperature: 4200K with CRI = 70
Drive current: 500mA.



StyLED short on post-top bracket



StyLED long on simple arm bracket



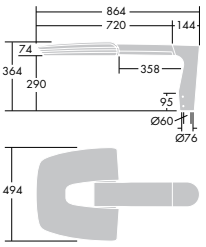
Materials/Finish
Body and bracket: die-cast aluminium, powder coated texturised light grey (Akzo 150)
Enclosure: toughened glass, self-cleaning treatment available on request

Installation/Mounting
Luminaire mounts to bracket (short or long) via 2 screws inside the arm.
Bracket (short or long) mounts to Ø60x 90mm long spigot.
Junction secured by 2 rows of 3 screws at 120°
Cable gland for Ø8 to 13mm cable
Access to gear possible on site after screw release.
Access to optic system possible at the workshop after screw release.
Delivered ready to install with pre-set light distribution.
Luminaire and bracket arm delivered in separate boxes.

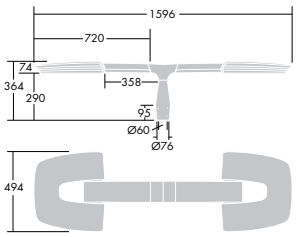
Gears and Controls
⏚ Class I electrical versions.
Electronic ballasts.
Fix or Stepdim stand-alone.
Option for minicell.
Telea compatible, Power Line (PL) on request, or Radio Frequency (RF) as option

Standards
Designed and manufactured to comply with EN 60598-2-3; EN 13-201; EN-40
Ta -25°C/+35°C
Weight: Max 17kg (luminaire)
Maximum windage: 0.14m²
IK08
❖ IP66 optic
❖ IP66 gear

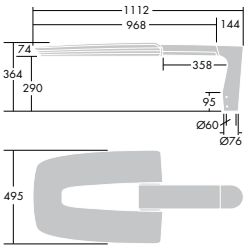
Specification
To specify state:
An LED road-lighting luminaire for lighting classes up to Me2.
Available in 2 outlines with slim surfaces, performance longevity through optimised heat dissipation. With options for photocells, dimming and lighting management system.
As Thorn StyLED



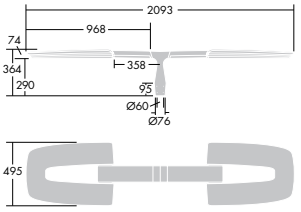
Scx 0.08m²
Single post top bracket

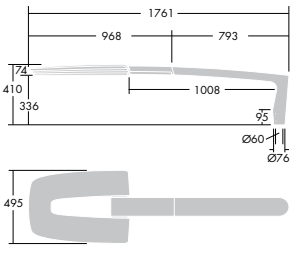


Double post top bracket

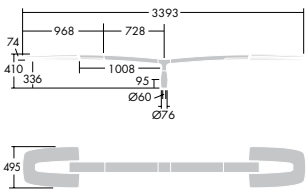


Scx 0.09m²





Scx 0.14m²
Single arm bracket



Double arm bracket

Ordering guides

Below luminaires have a distribution set 50/50 (see page 5)

Lighting Controls

e-Control is Thorns initiative to increase the use of dimming and lighting control in products and lighting solutions.

Power control | PowerLine | Radio Frequency

The continuing importance of efficient energy use (on both cost and environmental grounds), together with a need for more flexible application of lighting, has led to a reassessment of lighting techniques and given a fresh impetus to the drive for more efficient controls.

StyLED CL1 Ordering Guide

Luminaires to be ordered with complementary bracket

Outline	W	Optic	SAP Codes		
			100% Output	100% Output with Minicell	Telea RF
Short	39	Intensive	96258220	96258221	96258724
		Extensive	96258215	96258216	96258722
		Ext. Baffle	96258210	96258211	96258720
	52	Intensive	96258205	96258206	96258718
		Extensive	96258200	96258201	96258716
		Ext. Baffle	96258195	96258196	96258714
Long	77	Intensive	96258191	96258192	96258241
		Extensive	96258187	96258188	96258239
		Ext. Baffle	96258183	96258184	96258237
	103	Intensive	96258179	96258180	96258235
		Extensive	96258175	96258176	96258233
		Ext. Baffle	96258171	96258172	96258231
	129	Intensive	96258167	96258168	96258229
		Extensive	96258163	96258164	96258227
		Ext. Baffle	96258159	96258160	96258225

StyLED bracket range Ordering guide

Description	SAP Code
StyLED single post top bracket	96258737
StyLED single arm bracket	96258739
StyLED double post top bracket	96258738
StyLED double arm bracket	96258740
StyLED mid-pole bracket	96258746
StyLED wall bracket	96258744

THORN

Lighting people and places

Thorn Lighting Limited

UK
Durhamgate, Spennymoor,
County Durham, DL16 6HL

UK Project Pricing Quotations
Tel: 0844 391 2300
Fax: 0844 391 2301
E-mail: quotations.uk@thornlighting.com

UK Sales desk -
Orders/Stock Enquiries
Tel: 0844 855 4810
Fax: 0844 855 4811

Ireland
Thorn Lighting (Ireland) Limited
Century House
Harolds Cross Road
Dublin 6W
Tel: (353) 1 4922 877
Fax: (353) 1 4922 724
E-mail: dublinsales@thornlighting.com

Spare Parts
Tel: 0191 301 3131
Fax: 0191 301 3038
E-mail: spares@thornlighting.com

Technical Support
Tel: 0844 855 4812
Fax: 0191 301 3907
E-mail: technical@thornlighting.com

Brochureline Answering Service
Brochures on specific products/ranges
Tel: 020 8732 9898
Fax: 020 8732 9899
E-mail: brochures.uk@thornlighting.com

www.thornlighting.co.uk

Publication No: 494 (GB) Publication Date: 1/11