

# THORN

## Orus

Advanced road lighting with innovative Flat Beam® technology for low-level mounting



## North Star Lighting

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# Low height lighting needs

As engineers and specifiers know, there are a number of cases where conventional lanterns do not provide the best solution to road lighting problems.

Mounting heights may be restricted by structures or local regulations; obtrusive light may be an issue; or maintenance may have to be completed at very high speeds – for example, to reduce operators' exposure to fast-moving traffic, or where downtime for service has to be reduced to the absolute minimum. In situations such as these, conventional lighting is often deficient.

Thorn has applied its legendary expertise to addressing these issues and the result is Orus, the first luminaire with Flat Beam® technology. Designed to satisfy standard lighting criteria in a low height format, it offers engineers an exciting new resource in road lighting.



Innovation is often driven by observation of the world around us – and Orus is a prime example of this

# Introducing Orus



A new road lighting luminaire with a special bi-directional optic, resulting in a unique light distribution; excellent uniformity with no glare; low energy and above all a mounting height of 0.9m

As well as the usual Thorn benefits of low energy consumption, sustainability and easy maintenance, Orus uses Flat Beam® technology to exceed requirement levels at mounting heights of 0.9m. Where the use of columns or other structures is an issue, Orus delivers optimised performance without glare for road users, in an attractive package with a choice of mounting options.

Furthermore Orus delivers quality in a lighting installation through three distinct attributes: Performance, Efficiency and Comfort (PEC).



**Performance:** Visual Effectiveness

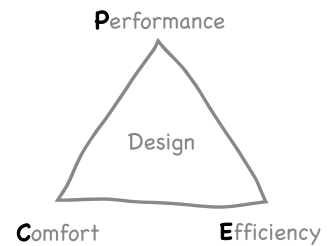
- High Utilisation Factor > Good task luminance
- Smaller burner lamps > Good task visibility

**Efficiency:** Minimising the use of energy

- 70W maximum wattage > Use less energy
- Electronic control gear > Longer Life

**Comfort:** People satisfaction and stimulation

- Street/road optic > Selective ambience
- Optic design > Glare free light
- Lower height > Visual Guidance



# Flat Beam® Concept

Flat Beam® technology addresses two issues unique to low-level mounting:

- By positioning the optical light engine below the driver's eye line, it reduces the risk of direct glare
- Thorn research on road surfaces of all types ensures that Orus delivers optimum luminance

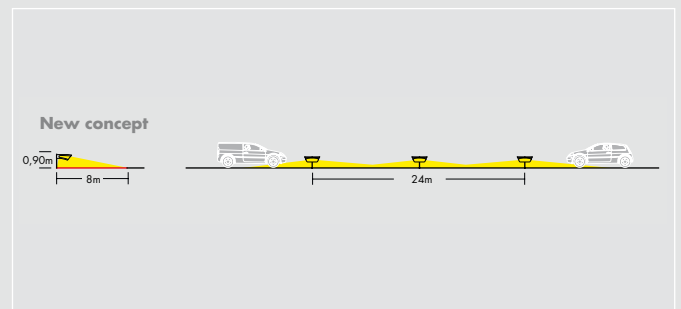
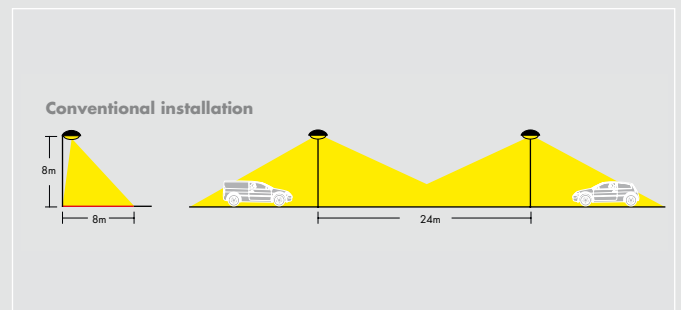
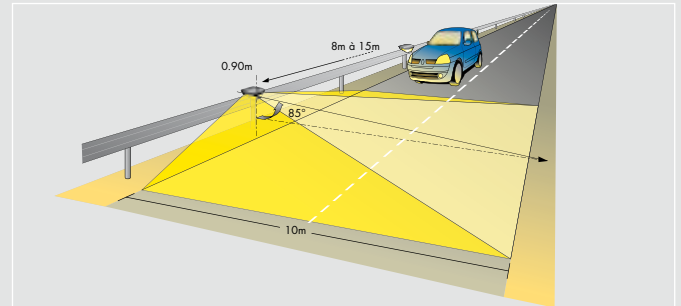
The optical system offers a very sharp and controlled light distribution while optimising the efficiency of the lamp. The use of ceramic metal halide lamps with small burners, between 35W and 70W, is the best choice in terms of light control, driver comfort and power consumption.

Because Orus is a radical departure from standard luminaires, its characteristics are equally innovative:

- It projects light transversally to the road (up to 11m) in a single-sided arrangement
- The optimised mounting height is 0.9m to ensure that no direct light enters the vehicle
- Optimum spacing is between 8m and 15m

With conventional luminaires, the ratio of spacing to mounting height is between 3.5 and 5; with Orus the figure is between 10 and 18. Taking the ratio of lit width to mounting height, conventional luminaires produce a figure between 0.8 and 1.2; with Orus the figure is between 8 and 13.

Orus delivers uncompromised excellence. When observing road surfaces lit at 'grazing' incidence it can be seen that drivers perceive higher levels of road lighting because the peak of the reflected beam is roughly in the direction of the eye. This does not mean higher glare because light distribution is sharply reduced – practically nil when Orus is installed at optimum height. In fact, the Orus beam angle can reach 88° to the vertical where as standard luminaires are restricted to 85°. This additional 3° underpin the exceptional performance of Flat Beam® technology, which gives road users the benefits of increased perceived 'brightness' and visibility.

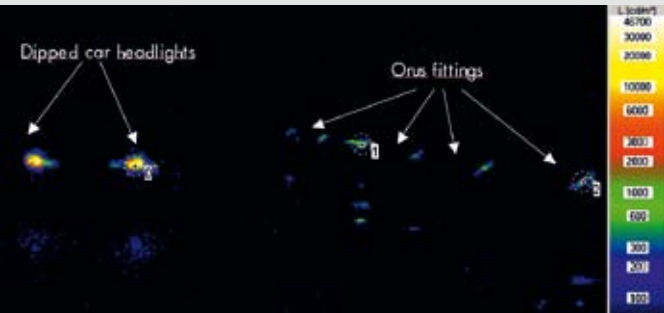
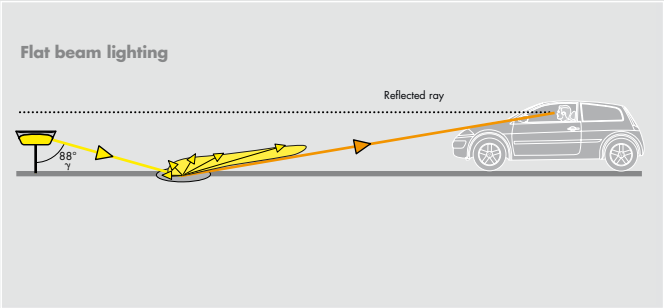
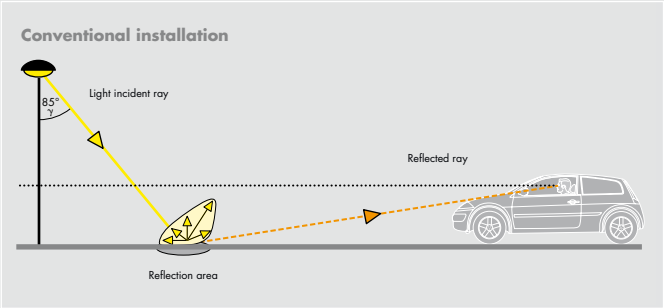


Flat Beam® technology is a product of extensive Thorn research involving optical design, theoretical and simulated photometry and road testing of prototypes

It improves the optical efficiency of luminaires at reduced mounting heights, ensuring uniform light distribution with minimal glare.

Primarily created for road lighting, the Flat Beam® concept satisfies the most demanding standards for safety, helping drivers to:

- Detect static or moving obstacles on the carriageway
- Confirm the road configuration comfortably
- Perceive the entire road surface and any issues at all speeds



We have extensively tested Flat Beam® technology for glare, luminance and flicker. A comprehensive Research and Development programme has surveyed Flat Beam® performance with a representative range of road surfaces in different weather and lighting conditions. The test programme included comparisons of the system against reference luminaires in traffic-intensive conditions.

The Research and Development team's findings, show that for carriageway luminance of about 1.5cd/m<sup>2</sup>, Orus luminaires deliver between 227 and 3507cd/m<sup>2</sup> while dipped car headlights emit between 4521 and 46770cd/m<sup>2</sup>. This means that Orus is a tenth the brightness of car headlights, hence no glare.

Because Orus luminaires can be installed with spacing between 8m and 15m, this flexibility allows the eyes to adjust dependent on speed, meaning that the flicker effect is maintained below 4Hz and in most cases less than 2.5Hz, keeping driver discomfort to an acceptable minimum.



# Applications

The system can be used where traditional road lighting using columns or façade mounting is not feasible, for reasons such as:

- Ease of access
- Extreme weather
- Structural fragility
- Maintenance difficulties
- In the vicinity of airfields or other sensitive areas
- Risk of obtrusive light
- Other environmental or resource issues

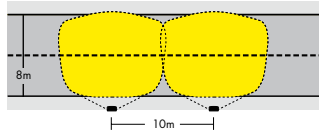
Orus is not simply an ideal solution in such applications, it may even be the only solution. Yet it still conforms to – and may even exceed – industry standards and other operating requirements:

- The unique flat beam of light produced by Orus can help to reduce light 'leakage' while still providing comfortable lighting for all road users
- Orus places light exactly where it is required
- Orus combines optimum performance and energy efficiency with safe and easy installation

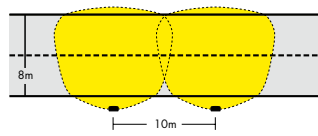


Orus delivers all the unique benefits of Flat Beam<sup>®</sup> technology in a modern, easy to integrate design





Orus 'Road' optic



Orus 'Street' optic



Orus can be specified for use on roads with or without pedestrian traffic. Without pedestrians, the optical design directs light entirely onto the road. Where pedestrians are present, Orus is available with an alternative optical design which creates a 'circle' of light around the luminaire, enabling drivers to detect a pedestrian's entire body. This option also allows for facial recognition by other pedestrians.

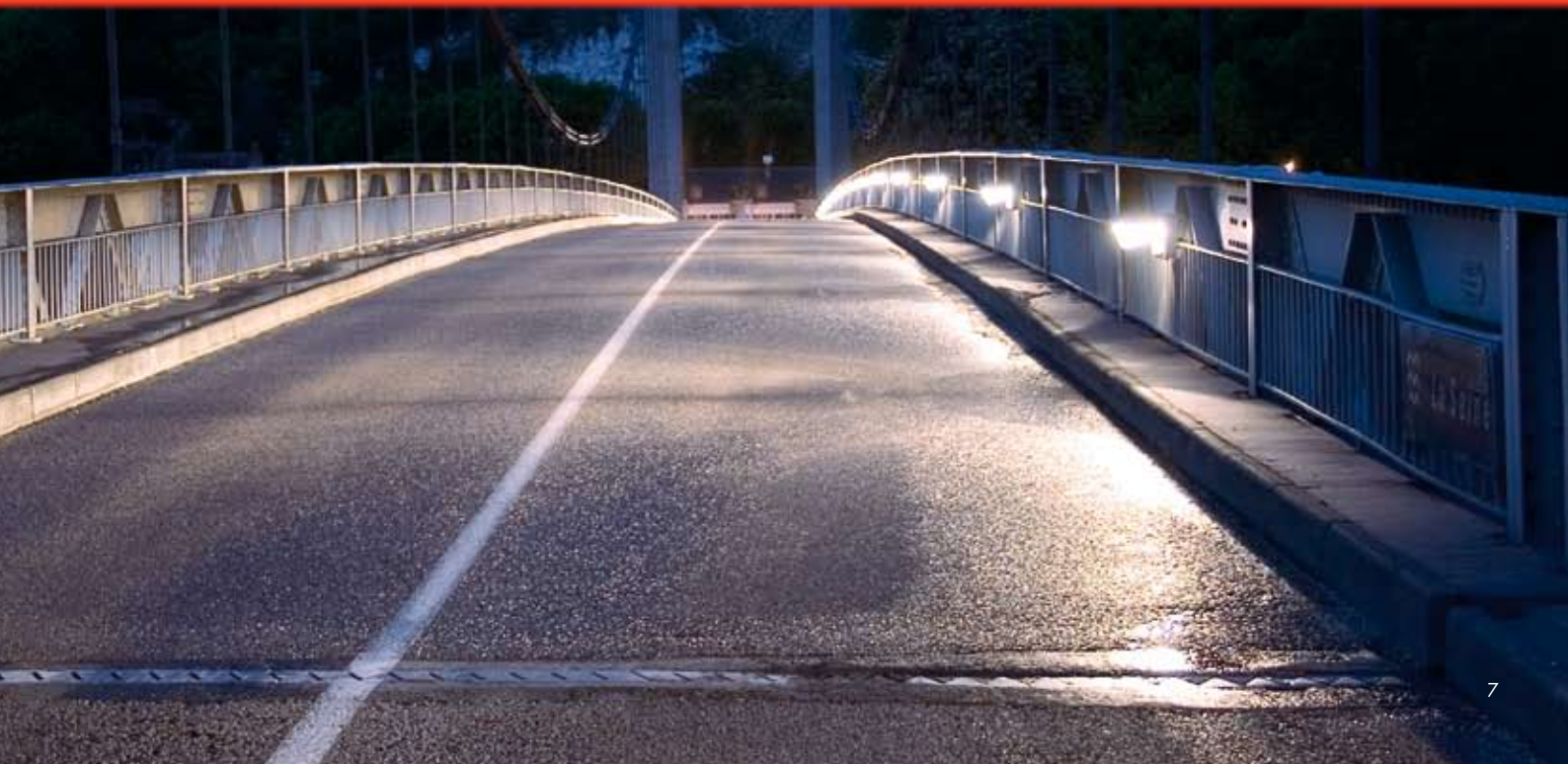
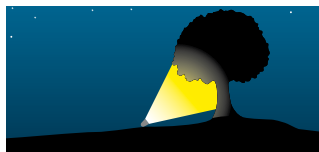
Orus is also an excellent solution where obtrusive light has to be reduced. For example, it can be specified in certain residential areas, or in areas where the surrounding buildings are illuminated and road lighting should therefore be unobtrusive.

The Flat Beam® technology used in Orus also makes the system suitable for use in parks and gardens. Here the luminaires can spread light at low level without distracting attention from other illuminated features.

**Classic**



**Orus**



# The Orus Range

## Road safety

Orus ensures better hazard and pedestrian visibility as well as improved driver comfort. This unique luminaire combines luminance and uniformity with limited glare, revealing obstacles and road surface irregularities. At the same time the low mounting height acts as a good optical and visual guide to the road layout.

## Durability block

Orus is constructed from high quality materials and engineered for low maintenance and a long operating life. Metal components are either die-cast aluminium or stainless steel, and the visor is made from strong, UV stabilised and scratch protected polycarbonate. To withstand the additional rigours of its low mounting height, the entire Orus structure incorporates an IK10/40 joules rating to defend it against harsh road usage as well as vandalism. Tamper-resistant screws combine protection with easy maintenance. Both optic and gear comply with IP66.

## Easy installation and maintenance

In areas where access is hard or maintenance time is restricted, Orus is the perfect solution. It is light, easy to handle, and is delivered complete and ready to install in one box.

## Versatility

The lighting head can be top or side mounted or suspended, enabling Orus to be integrated into most existing infrastructures. As standard the system comes with stirrup or bollard, but other mounting options can be developed.

## Energy saving

With a range of lamp options from 35 to 70W, Orus simply delivers high performance with low energy consumption. The use of electronic ballast enhances these energy savings and also increases lamp life expectancy.

## Environmentally friendly

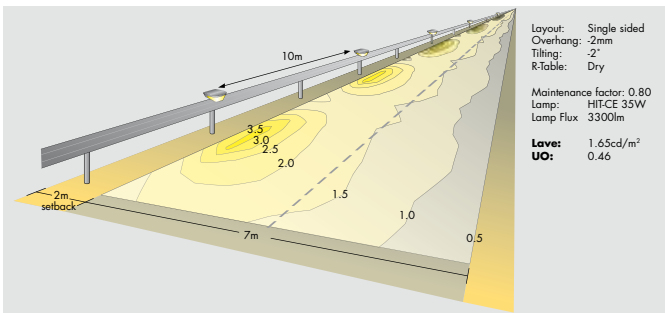
All parts of Orus can be recycled, and its very precise light distribution minimises 'spill' and obtrusive light.



Orus offers a number of benefits which make it suitable for local authorities, engineers and lighting designers alike



# Lighting data



When Flat Beam® technology was integrated into Orus, priority was given to the limitation of glare. Calculations show that TI is considerably below 10% while, luminance and uniformity exceed relevant standards.

The system is designed with a specific lamp burner cap so that direct light cannot reach the eyes of a driver or the rear mirrors of a car when installed at compulsory height of 0.9m. In a complete installation, Orus offers drivers a unique 'guidance' effect which tracks the contours of the road, ahead and behind.

Orus can be installed either single-sided, with luminaire spacing between 8 and 15m, or on both sides of the road with the same spacing. In the latter configuration it will cover roads up to 20m wide, giving ample coverage for roads with multiple lanes including cycle lanes and central reservations.

The wide choice of lamps – from 35 to 70W HIT-CE G12, or 60W HIT-CE PGZ12 Cosmowhite – gives planners ample scope to adjust Orus to any project.

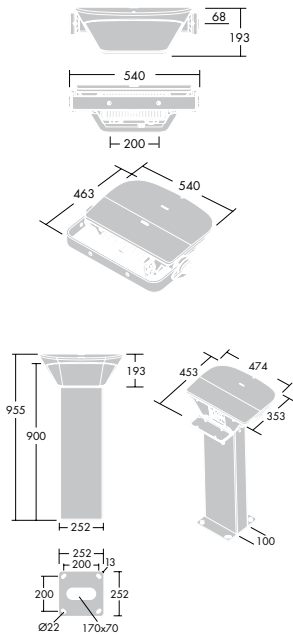
Light output from Orus luminaires is surprisingly resistant to obstruction by queues of traffic. Tests have shown that there is no occultation nor distracting shadows, while light emitted from the system is distributed ahead of, behind and beneath vehicles. It is also reflected by the road surface. Spacing options between 8 and 15m also reduce any 'pools' of darkness, while lighting from vehicles further maintains lighting levels.

Orus luminaires mix perfectly with classic column mounted systems. Because they use white light they can be used to highlight sections of the highway where care is required, as in a hazard black spot or area of restricted speed.



# Ordering Guide

## Dimensions



### Lamps

☛ 35-70W HIT-CE (MT) metal halide. Cap: G12  
 ☛ 60W HIT-CE (MT) cosmowhite. Cap: PGZ12

### Materials/Finish

Bollard: 3mm steel powder coated grey (RAL 9006)  
 Enclosure: UV stabilised polycarbonate protected against graffiti and with extra scratch resistant treatment  
 Reflector: pure aluminium with high reflectance coating  
 Tamper-proof screws and bolts: stainless steel  
 Gaskets: silicon  
 Stirrup: die-cast aluminium

### Standards

Designed and manufactured to comply with EN60598-2-3  
 ⚡ Class I electrical  
 ⚡ Class II electrical  
 Ta -20/+35  
 IK10/40 joules shock resistance  
 ♦ IP66 ⚡ CE

### Specification

To specify state:  
 Innovative road lighting luminaire for 35-70W HIT-CE lamps, incorporating Flat Beam® technology, in die-cast aluminium reaching lighting standards at 0.9m high. Sealed to IP66 with unique lighting distribution and choice of mounting options.  
 As Thorn Orus.

### Installation/Mounting

Mounting height has to be 0.9m while offset should be 2m for optimum results. Plug and socket connections.  
 Rear access to lamp via 2 tamper proof Allen screws.  
 Cable glands for Ø8 to 13mm cable  
 Adjustment at 0° through spirit level. Tolerance of 5° is allowed.  
 Delivered complete, ready to install.  
 Stirrup version: Rear access to gear components.  
 Ready for through wiring via 2 cable glands.  
 180° rotating stirrup.  
 Stirrup fixed through 2 x M10 tempered bolts.  
 Bollard version: Inside bollard access to gear components  
 Flange mounting.  
 Head fixed to bollard through

### Ordering Guide

Lamps to be ordered separately

Description	Ilcos Code	Socket	Wt (kg)	SAP Code		Class II	
				Class I Road	Street	Road	Street
<b>Stirrup version</b>							
ORUS 35W HIT DGE	MT	G12	8.8	96231244	96250912	96231245	96250913
ORUS 70W HIT DGE	MT	G12	8.8	96231242	96250914	96231243	96250915
<b>Bollard version</b>							
ORUS 35W HIT DGE	MT	G12	23.7	96250919	96250921	96250920	96250922
ORUS 70W HIT DGE	MT	G12	23.9	96250923	96250925	96250924	96250926
ORUS 60W CPO-TW	MT	PGZ12	24.1	96250927	96250929	96250928	96250930
<b>Accessory</b>							
ORUS BRAID 1M			0.4	96251381			
ORUS ANTIVANDAL KEY SET			0.05	96251374			



1.



2.



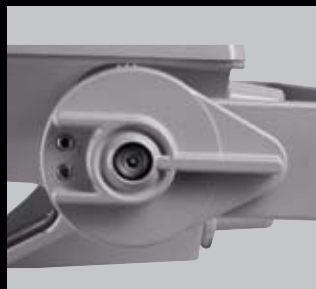
3.



4.



8.



9.



10.



11a.

# Installation/Maintenance

Orus combines simple, safe installation with easy maintenance

## Safety

Safety is assured through Class I or Class II electrical rating, with automatic power disconnection when the rear access door is opened. All external screws are tamper-proof Allen type, restricting access to contractors only. Bollard versions are equipped with breakable anchoring bolts which collapse in case of accident. Stirrup version wires can be fitted with extra strong sleeves to resist cutting. The lantern is engineered to IK10/40 joules impact resistance to prevent damage from vandals and ensure that up-times remain long. The surface temperature of the fitting is always below 50°C.

## Lamp position setting

Orus optics are optimised around a single setting which is maintained by 2 springs and does not need complicated adjustment. All lamp access is via the rear compartment which is secured by two tamper-proof Allen screws.

## Fitting position setting

The mounting position of Orus models with the stirrup fitting can easily be adjusted. Bollard versions require adjustment at the flange. The top of the lantern has to be parallel to the road surface and a 0° tilt of the unit can easily be assured by using a spirit level. Orus includes a built-in aiming guide which helps installers to achieve the perfect horizontal setting. When the exact angle has been selected, the secondary stirrup locking device ensures that the setting will not be altered by wind pressure or vibration.

## Gear tray installation and maintenance

Orus has been designed to house G12/PGZ12 lamp cap control gear, either integrally on the rear section, or remotely. The lamp is always accessible from the rear compartment. Gear trays are supplied with the lantern and are ready to be installed. All connections are plug and socket and the gear box can be easily removed and replaced on site.

## Lantern maintenance

Orus has been designed to perform under a wide range of conditions. The lantern (including the gear box) is IP66 rated and the enclosure will withstand dust, high-pressure cleaning and soft detergents. The lighting head can be easily removed and replaced so that damaged lanterns can be maintained at the workshop. The visor and canopy can be replaced on site. The body is supplied as standard with powder coating. On request it can be supplied unpainted or with special treatments (for example, against graffiti) to match the user's requirements.

1. Easy and safe wiring
- 2/3. Class 1 plug and socket connections
- 4/5. Class II plug and socket connections
- 6/7. Easy and safe lamp replacement
8. Easy and safe adjustment
9. Stirrup with tempered proof screws and setting marks
10. Armoured cable protection can be ordered as attachment
11. Bollard gear access and protection



5.



6.



7.



11b.



11c.

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