THORN

Lighting for Pedestrian Crossings

Identification Visibility Safety

The case for better pedestrian crossing lighting seems obvious. Simply ask yourself whether you would feel better walking across a dark crossing or a brightly lit one, and you've won the argument.

Yet despite improvements driven by EU directives and national regulations, and the overwhelming majority of public support, statistics show that more action is needed to reduce pedestrian crossing fatalities.

At a time when one in four pedestrian fatalities occur on crossings, a recent study across Europe* found that nearly one in five pedestrian crossings scored badly for night visibility. Furthermore, EU Traffic Safety Facts show that nighttime accidents on crossings account for 46% of the total, although we know that nighttime traffic flow is only 20-35% of the total traffic flow. Additionally, nighttime accidents are more severe, with the most vulnerable pedestrians being the elderly, disabled and mothers with small children.

Obviously, better lighting is not the sole answer to the question of what to do about pedestrian crossing fatalities and crippling injuries but it is one of the answers.

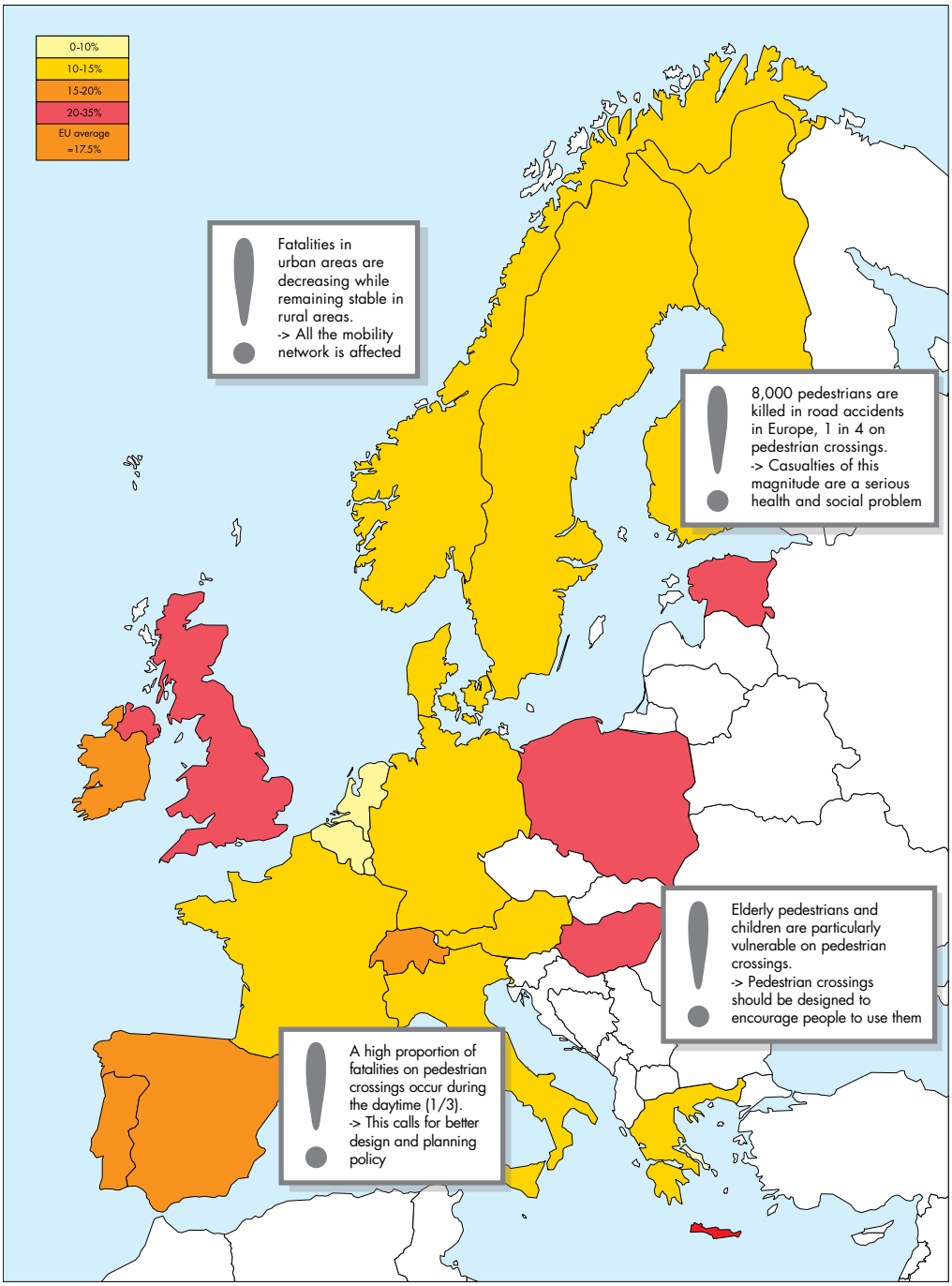
It's something the public can see, and appreciate the effects of immediately.

It's something authorities can afford to do, and serves a valuable purpose.

It's something where, from a technical point of view, Thorn can assist by using its application driven knowledge and optical expertise to devise a better lighting solution:
IVS: Identification Visibility Safety.

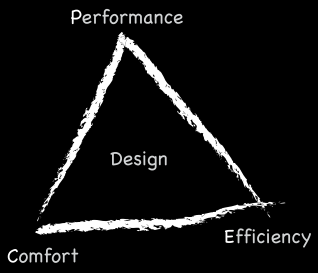
*The EuroTest 'Pedestrian Crossing Assessment Programme' conducted by Europe's motoring and touring organisations' tested 215 crossings between July and September 2008 in 17 major European cities. The study emphasised the need for good visibility and system maintenance and called for common traffic rules to be adopted Europe wide. (www.eurotestmobility.com)

Pedestrian fatalities as a percentage of total road fatalities (CARE database 10/07)



Performance, Efficiency and Comfort (PEC) – for a better lit environment

IVS evokes the spirit of Thorn Lighting's dynamic, results-orientated PEC programme



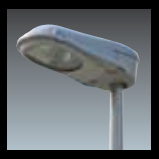
The programme is based on the principle that Performance, Efficiency and Comfort determine the effectiveness of lighting, its impact on the people using it, and its impact on the natural environment. IVS delivers the right light on the right place at the right time.

Decostreet

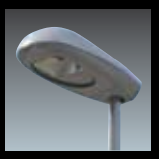
Dyana

Jet

Civic



Oracle



Areaflood

Performance: Providing the best visual effectiveness

- Precision optic significantly improves vertical illuminance for high levels of visibility
- Extreme cut-off for low glare enhances clarity of the lit scene
- Low level flat beam gives good modelling of objects
- Optimal lighting extended at the adjacent zones for enhanced detection

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

- The luminaire significantly reduces power consumption as the double asymmetric optic enables crossings to be lit more efficiently with minimal obtrusive/waste light
- Easy installation and maintenance from proven products reduce cost of ownership

Comfort: giving people satisfaction and stimulation

- White light with high colour rendering properties creates a reassuring ambience
- Broad choice of luminaire styles unifies the streetscape
- Extra signalling via the flashing LED indicator, enhancing safety

With the IVS system safety is enhanced by the development of a specialist optical system and the use of additional signalling

General lighting principles
The accepted dogma concerning the driver's visual tasks when approaching a crossing is that a pedestrian is revealed on the road surface by silhouette vision, the assumption being that the lit road surface allows a person to be seen in negative contrast as a 'shadow'. This, however, is an over-simplification of what really occurs. In practice car headlights provide competing positive contrast, which can at the point of transition (zero contrast) make a person appear almost invisible. For this reason the relevant standard EN 13201-2:2003, and national guidance documents, recommend additional local lighting to ensure positive contrast.

The lighting must alert drivers to the presence of the crossing and makes pedestrians as visible as possible on or at the crossing area (zones at either end of the crossing, where pedestrians wait to enter, should receive adequate illumination). When measured on a vertical plane, the lighting should be significantly higher than the horizontal illuminance produced by road lighting on the carriageway of the road. It must also prevent glare reaching the approaching driver.

One solution is to use luminaires with asymmetric light output, positioned a short distance before the crossing in the direction of approaching traffic, directing the light onto the side of pedestrians facing the drivers of this traffic.

Adoption of IVS
IVS introduces 'crossing' options on six existing street lighting luminaire ranges. Signalling is added via the rapid flashing LED indicator. This option gives a double asymmetric light distribution, with enhanced vertical illuminance (Fig.1) and good glare control to ensure drivers are not dazzled, and effectively brings pedestrians and drivers into the lighting equation.

Adequate lighting of the surrounds to the crossing, termed accident-prone areas, is necessary to serve the needs of the driver and the pedestrian. IVS adopts a dual zone approach (See Fig. 2) with light directed at the centre of the crossing and area surrounding the 'zebra' stripes. This ensures safety and adequate visual acuity making it easy for drivers to see pedestrians on the footway and kerb from a distance, while pedestrians are able to clearly view the footway surface, obstructions and other pedestrians.

The light source used is ceramic metal halide for superior colour rendering.

For a standard 2-lane carriageway, two IVS luminaires are installed in a staggered arrangement; the optimum is to provide two columns at equal distances of not more than 4m from the centre of the crossing. The column on the left-hand side of the road should be beyond the crossing as seen by an approaching driver. Particularly, a column should not be placed adjacent to a pedestrian crossing.

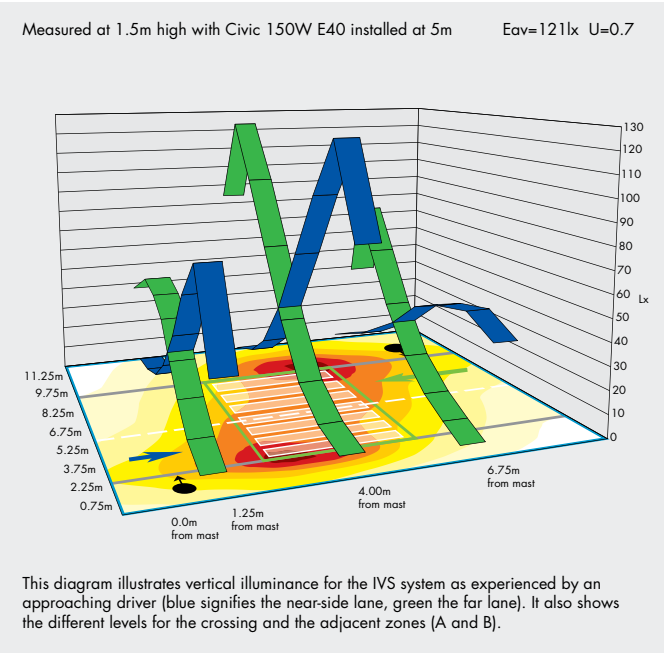


Figure 1 – Vertical illumination levels at 3 positions

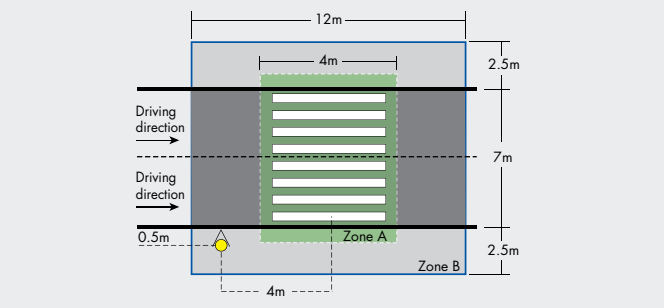


Figure 2 – typical IVS layout and dual zones concept

Type of road	70W	100W	150W	250W	400W
One-way 1 lane (Fig.3)		✔	✔	✔	
Two-way 2 lanes (Fig.4)	✔	✔	✔	✔	
Two-way 3 lanes (Fig.5)		✔	✔	✔	
One-way 3 lanes					✔
Two-way 4 lanes					✔

✔ - Best choice, ✔ - Acceptable

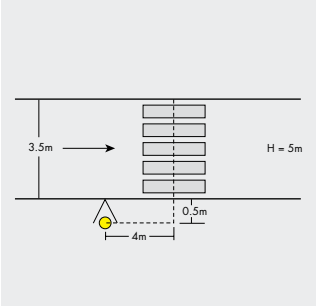


Figure 3 one lane - one way

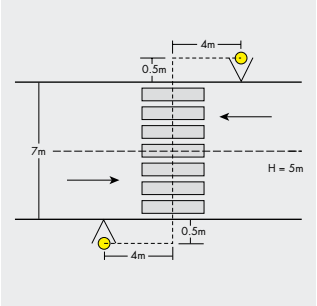


Figure 4 2 lanes - two ways

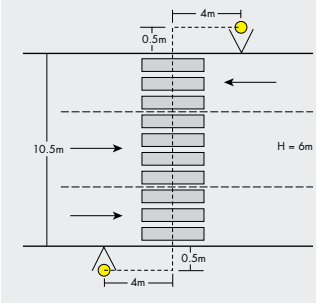


Figure 5 3 lanes - 2 ways

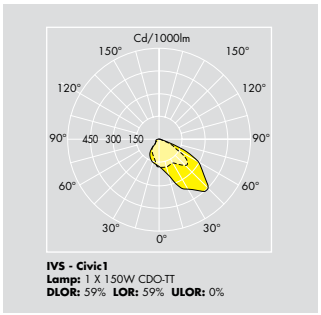
Mounting height of the luminaires varies from 4m to 6m, which overcomes the deficiency problems associated with high vehicles in low-level lighting schemes.

IVS is a classic example of the advantage of selecting a lamp and optic combination to suit the requirements of a specific application. Due to the more controlled beam area lighting loads and obtrusive (wasted) light can be reduced compared to conventional fittings. For instance a 150W or 250W unit can replace a 250W or 400W luminaire respectively. The reward is a more economical and environmental solution. There is no excuse for lighting which wastes energy.

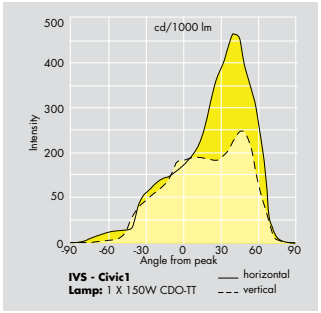
Luminaire tilt is 0° or 5° and the orientation is perpendicular to the road which ensures again no obtrusive light and better comfort.

It is worth noting that by adapting standard lanterns, IVS brings the proven advantages of easy installation and maintenance.

Finally, it should be appreciated that while efficient lighting for traffic and pedestrian safety is essential, consideration of the effective lighting of the whole visual streetscape at night is highly desirable for many reasons. With IVS the choice of lantern style can be matched to the overall lighting scheme.



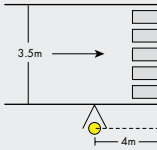
Polar intensity curve for the system optic

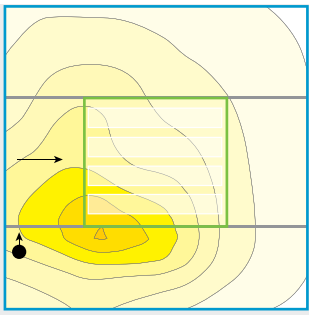


The solid line denotes the intensity in the horizontal plane. The dashed line denotes the intensity in the vertical plane.

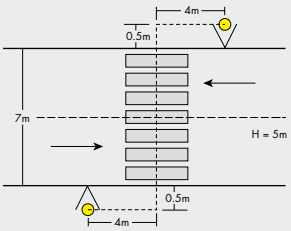
Typical schemes

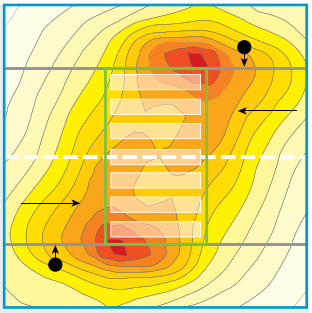
Whatever luminaire design is selected from the IVS portfolio the optical performance for each lamp type is as follows:



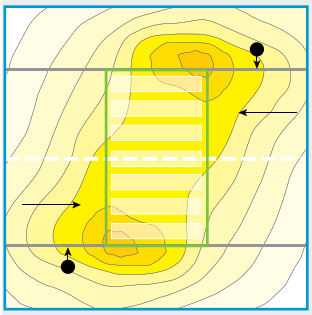


One way, 1 lane — 150W HIT 13500 lm — Eav=85lx, U=0.6

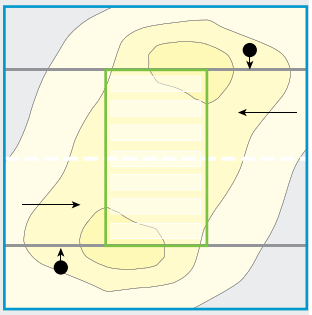




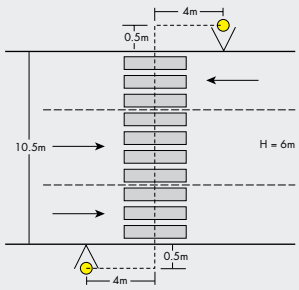
Two way, 2 lane — 250W HIT 19000 lm — Eav=181lx, U=0.7

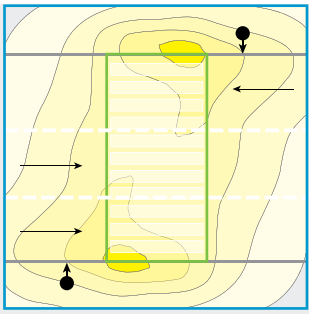


150W HIT 12500 lm — Eav=121lx, U=0.7



70W HIT 6300 lm — Eav=61lx, U=0.7

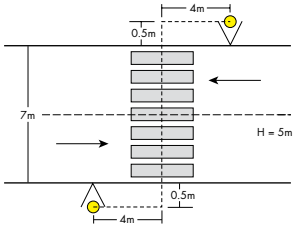




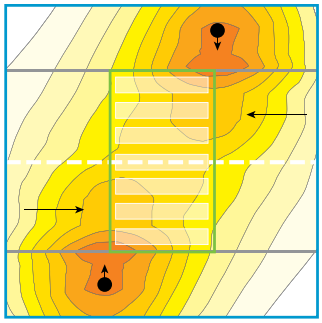
Two way, 3 lane — 150W HIT 13500 lm — Eav=85lx, U=0.8

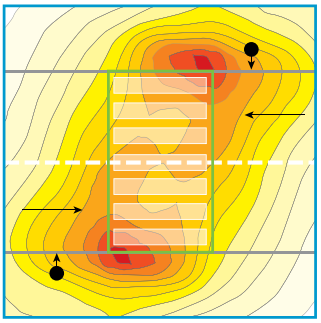
180,0-200,0
160,0-180,0
140,0-160,0
120,0-140,0
100,0-120,0
80,0-100,0
60,0-80,0
40,0-60,0
20,0-40,0
0,0-20,0
Green – zone A
Blue – zone B

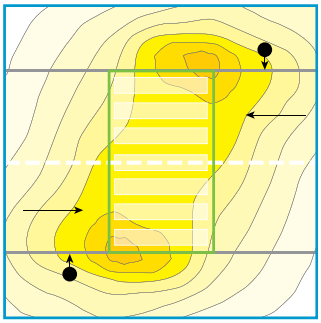
Case Study:
Pedestrian Crossing two-way, two lanes

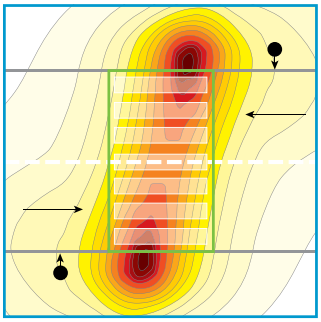


Using the same colour temperature lamps: 4000°K









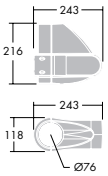
	The Predecessor Solution CP400 2 x HIT 250W 19000lm Height: 5m	**IVS** 2 x HIT 250W 19000lm Height: 5m	**IVS** 2 x HIT 150W 12500lm Height: 5m	**Traditional Technique** 2 x HIT 150W 12500lm Height: 5m
Uave	0.7	0.7	0.7	0.4
Eave	136lx	181lx	121lx	160lx
W*	500	500	300	300
	Complies with standards, albeit rather power hungry in usage	Compared to its predecessor in terms of lamp type and rating, IVS improves the illuminance by 33%. However, this exceeds required levels and a more efficient optical solution is proposed.	Thanks to its purpose made, highly efficient, 150W optic, IVS maintains excellent uniformity and illuminance levels, **while reducing the installed power by 40%** NB: At 6m high: Uave = 0.9! Eave = 99lx	Given the same parameters a traditional pedestrian crossing luminaire, with optimised settings, achieves too much illuminance and, more critically, poor uniformity, resulting in unsatisfactory visibility of people within the area.

180,0-200,0
160,0-180,0
140,0-160,0
120,0-140,0
100,0-120,0
80,0-100,0
60,0-80,0
40,0-60,0
20,0-40,0
0,0-20,0
Green – zone A
Blue – zone B

*excluding gear losses

Product features

Signalling accessory



Using the latest advances in LED technology, the IVS system aims to complement road signal legislation by offering highway authorities an additional safety feature: a rapid flashing indicator accessory to further warn road users to yield sooner when approaching the crossing.

Mounted on the lighting column, separate from the luminaire for better visibility yet beyond the reach of vandals, the knuckle shaped unit consists of two circular amber LEDs aligned horizontally, one on each side. The lights flash at a predetermined rate to achieve optimum driver recognition and operate separately from the lantern, being visible during the day as well as nighttime hours. A further benefit is to attract and encourage pedestrians to cross the road inside the identified zone, where they are more visible.

Together with the selection of lanterns and columns this creates not only the complete pedestrian crossing lighting package from a single, dedicated source of supply, but also an authoritative body of design advice, too.

Lamps
Flashing Node:
6 X 1W LEDs (3 each side)

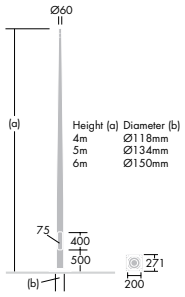
Materials/Finish
Body: ABS, finished in light grey (RAL9006) or powder coated texturised grey (Akzo 900)
Diffuser: toughened glass
Screw fixings: stainless steel

Installation/Mounting
Mounting at 1120mm from the top of a conical Ø60 column or Ø76mm cylindrical column with a Ø22mm go through hole (as per Thorn IVS column)
Cable gland for Ø8mm to 13mm cable.
Screw fixings: stainless steel
Delivered ready to install, complete with factory fitted integral gear prewired with 5m of HO7RNF 2x1mm² cable all supplied in a single carton.

Standards
Designed and manufactured to comply with EN 60598-2-3
Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK10: Shock resistance CE

Specification
To specify state:
Warning LED flashing node dedicated to pedestrian crossings. IP66 and made of vandal resistant material to be installed on the section of the column. To be installed together with Thorn pedestrian crossings luminaire and column packages.
As Thorn IVS flash node.

Column



Materials/Finish
Tubular galvanized steel finished in light grey (RAL9006) or powder coated texturised grey (Akzo 900)

Installation/Mounting
Flange mounting via 4 anchoring bolts J16/14x300 (supplied)
Delivered ready to install and to be fitted with the IVS flashing node.

Standards
Designed and manufactured to comply with EN40
Standard range calculated for a wind velocity 2 and terrain category 1. For any other area or terrain, please contact us. CE

Specification
To specify state:
Tubular galvanised steel columns in 4/5/6m, dedicated to Thorn pedestrian crossings luminaire range. To be installed together with Thorn pedestrian crossings luminaire and LED flashing node.
As Thorn IVS columns.

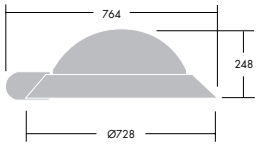
Signalling accessory Ordering guide

Description	Gear	Finish	
		Texturised Grey	Light Grey
IVS FLASH NODE 6W 2 X 3LED	Integral	96256654	96256655

Column Ordering guide

Height (m)	Description	Texturised Grey	Light Grey
4	IVS COL 4M D60 MPL FAI	96256860	96256859
5	IVS COL 5M D60 MPL FAI	96256862	96256861
6	IVS COL 6M D60 MPL FAI	96256864	96256863

Decostreet



Lamps
Size 2:
150-250W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Materials/Finish
Body and spigot: die cast aluminium
Canopy: spun aluminium powder coated RAL7001
Enclosures: toughened flat glass
Reflector: high reflective anisotropic anodised aluminium
Ring and spigot cover: polypropylene RAL7031

Installation/Mounting
Side entry mounting: Ø60x100mm long spigot tilted to 0°.
Post top mounting: Ø60x90mm deep spigot tilted to 5°.
Spigot secured by 2 screws with safety bolts.

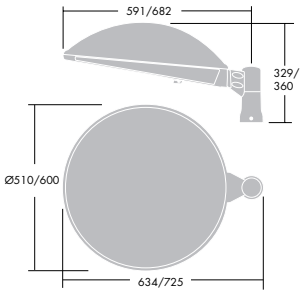
Cable gland for 8 to 13mm cable.
Tool-free access to lamp and gear after opening the optical housing via 1 locker

The gear is tool-free removable with retained screws.
All connections are plug and socket.
Delivered ready to install, complete with factory fitted integral gear and ring all supplied in a single carton (without lamp).

Standards
Designed and manufactured to comply with EN 60598-2-3
Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK08: Shock resistance
CE

Specification
To specify state:
Dedicated to pedestrian crossings optic into a spherical decorative street lantern able for easy customisation of shape and/or colour (canopy and ring). Tool-free maintenance of gear and lamp. With option for warning LED flashing node to be fixed onto the column.
As Thorn Decostreet 2 A/A.

Dyana



Lamps
Size 1:
100-150W HIT-CE (MT) metal halide. Cap:E40
150W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Lamps
Size 2:
150-250W HIT-CE (MT) metal halide. Cap: E40
150W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Materials/Finish
Body and spigot: die-cast aluminium powder coated texturised grey (Akzo 900)
Canopy: spun aluminium powder coated texturised grey (Akzo 900)
Enclosure: toughened glass
Reflector: high reflective anisotropic anodised aluminium
Gear tray: galvanised steel
Gasket: silicon

Installation/Mounting
Post top mounting: Ø60x100mm deep spigot tilted to 10°.
Secured by 4 screws.

Cable gland for ø8mm to 13mm cable.
Tool-free access to lamp after opening the optical housing via 2 x 1/4 turn lockers.
Tool-free access to gear after release of the retaining strut.
Gear is tool-free removable with retained screws.
All connections are plug and socket.
Delivered ready to install, complete with factory fitted integral gear and adjusted lamp settings, all supplied in a single carton (without lamp).

Standards
Designed and manufactured to comply with EN 60598-2-3
Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK10: Shock resistance
CE

Specification
To specify state:
Dedicated to pedestrian crossings optic into a round and slim full aluminium IP66 body. Tool-free maintenance of gear and lamp. With option for warning LED flashing node to be fixed onto the column. As Thorn Dyana 1 and Dyana 2 A/A.

Decostreet Ordering guide

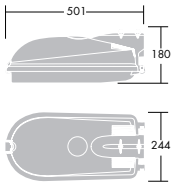
Size	W	Ilcos code	Socket	CLII	
				Conventional	Electronic
2	150	MT	G12		96256481
	250	MT	G12	96256656	
	140	MT	PGZ12		96256460

Dyana Ordering guide

Size	W	Ilcos code	Socket	CLII	
				Conventional	Electronic
1	100	MT	E40	96256425	96256426
	140	MT	PGZ12		96256427
	150	MT	E40	96256428	96256429
			G12		96256476
2	140	MT	PGZ12		96256430
	150	MT	E40	96256431	96256432
			G12		96256477
	250	MT	E40	96256433	

Product features

Jet



Lamps
Size 2:
100-150W HIT-CE (MT) metal halide. Cap:E40

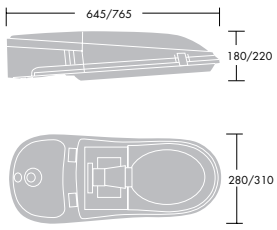
Materials/Finish
Body: die cast aluminium, powder coated finish (RAL 9006)
Enclosure: toughened glass
Reflector: high reflective anisotropic anodised aluminium
Screw fixings and clip: stainless steel

Installation/Mounting
Side entry mounting: Ø60 x100mm long spigot tilted to 0°.
Mounting accessory post top Ø60mm to be ordered separately: 96219232.
Cable gland for 8mm to 13mm diameter cable.
Tool-free access and replacement of lamp after opening the hinged enclosure.
Tool-free access to integral gear tray via hinged enclosure. Gear tray secured to body by two screws.
Delivered ready to install in lateral, complete with factory-fitted integral gear tray, all supplied in a single carton (without lamp).

Standards
Designed and manufactured to comply with EN 60598-2-3
Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK08: Shock resistance
CE

Specification
To specify state:
Dedicated to pedestrian crossings optic into a compact full aluminium IP66 lantern. Tool-free access to gear and lamp. With option for warning LED flashing node to be fixed onto the column.
As Thorn Jet 2 A/A.

Civic



Lamps
Size 1:
70-150W HIT-CE (MT) metal halide. Cap E27/40
150W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Lamps
Size 2:
150-250W HIT-CE (MT) metal halide. Cap E40
150W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Materials/Finish
Body, canopy, spigot: die-cast aluminium
powder coated RAL9006
Enclosure: toughened glass
Reflector: high reflective anisotropic anodised aluminium
Screw fixings and clips: stainless steel

Installation/Mounting
Integral tool-free rotating spigot secured by 2 screws with safety bolts.
Side entry mounting: Ø49/60x120mm long spigot. Tilted to 0°.
Post-top mounting: Ø60/76x80mm long spigot. Tilted to 5°.
Cable gland for Ø8mm to 13mm cable.
Tool-free access and replacement of lamp after opening the hinged enclosure.
Tool-free access to Tool-free removable gear tray via hinged canopy.
All connections are socket type with springs.
Delivered ready to install, complete with factory fitted integral gear, all supplied in a single carton (without lamp).

Standards
Designed and manufactured to comply with EN 60598-2-3
Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK08: Shock resistance
CE

Specifications
To specify state:
Dedicated to pedestrian crossings optic into a full aluminium IP66 lantern. Tool-free access to and maintenance of gear and lamp. Integral spigot for side or top mounting. With option for warning LED flashing node to be fixed onto the column. As Thorn Civic 1 and Civic 2 A/A

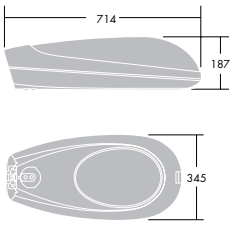
Jet Ordering guide

Size	W	Ilcos code	Socket	CLII Conventional
2	100	MT	E40	96256451
	150	MT	E40	96256452
Ø60mm post-top accessory				96219232

Civic Ordering guide

Size	W	Ilcos code	Socket	CLII	
				Conventional	Electronic
1	70	MT	E27	96256436	96256441
	100	MT	E40	96256435	96256438
	140	MT	PGZ12		96256442
	150	MT	E40	96256443	96256444
			G12		96256478
2	140	MT	PGZ12		96256445
	150	MT	E40	96256446	96256447
			G12		96256479
	250	MT	E40	96256448	

Oracle



Lamps
Size 1:
100-150W HIT-CE (MT) metal halide. Cap: E40
150-250W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Materials/Finish
Body and spigot: die-cast aluminium, powder coated grey (RAL 9006)
Enclosure: toughened glass
Reflector: high reflective anisotropic anodised aluminium
Screw fixings and clips: stainless steel

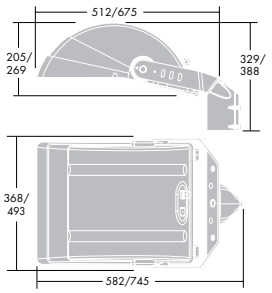
Installation/Mounting
Integral tool-free rotating spigot secured by 2 screws with safety bolts.
Side entry mounting: Ø49/60x120mm long spigot. Tilted to 0°.
Post-top mounting: Ø60/76x80mm long spigot . Tilted to 5°.
Cable gland for Ø8mm to 13mm cable.

Tool-free access and replacement of lamp and gear after opening of the hinged canopy.
All connections are plug and socket type.
Delivered ready to install, complete with factory fitted integral gear, all supplied in a single carton (without lamp).

Standards
Designed and manufactured to comply with EN 60598-2-3
Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK08: Shock resistance
CE

Specification
To specify state:
Dedicated to pedestrian crossings optic into a full aluminium IP66 lantern. Tool-free access to and maintenance of gear and lamp from above. Integral spigot for side or top mounting. With option for warning LED flashing node to be fixed onto the column.
As Thorn Oracle 1 A/A.

Areaflood



Lamps
Size 1:
150W HIT-CE (MT) metal halide. Cap: G12
140W HIT-CE (MT) cosmowhite. Cap: PGZ12

Lamps
Size 2:
150-400W HIT-CE (MT) metal halide. Cap: E40

Materials/Finish
Body and spigot: die-cast aluminium powder coated texturised grey (Akzo 900)
Enclosure: toughened glass
Reflector: high reflective anisotropic anodised aluminium
Screw fixings: stainless steel
Hinges and Finger Grips: polyamid glass fibre 20%

Installation/Mounting
Post-top mounting: Ø60x100mm long spigot.
Cable gland for Ø8mm to 13mm cable.
Access to lamp and gear via drop front glass.
Screw fixings: stainless steel
All connections are socket type with springs.

Delivered ready to install, complete with factory fitted integral gear, all supplied in a single carton (without lamp).

Standards
Designed and manufactured to comply with EN 60598-2-3
Class I or Class II electrical
Ta 25° (-20°/+35°)
IP66: Ingress protection
IK08: Shock resistance
CE

Specification
To specify state:
Dedicated to pedestrian crossings optic into a full aluminium IP66 floodlight ready for top mounting. With option for warning LED flashing node to be fixed onto the column. As Thorn Areaflood 1 and Areaflood 2 A/A.

Oracle Ordering guide

Size	W	Ilcos code	Socket	CLII	
				Conventional	Electronic
1	100	MT	E40	96256453	96256454
	140	MT	PGZ12		96256455
	150	MT	E40	96256456	96256457
			G12		96256480
	250	MT	G12	96256459	

Areaflood Ordering guide

Size	W	Ilcos code	Socket	Gear	CLII		CLI
					Conventional	Electronic	Electronic
1	140	MT	PGZ12	Integral		96256464	96256463
	150	MT	G12	Integral	96256916	96256483	96256482
2	150	MT	E40	Integral	96256465	96256467	96256466
	250	MT	E40	Integral	96256468		
	400	MT	E40	Integral	96256469		
		No gear	E40	No gear		96256472	96256473
		MT	Gear	Remote			96252475

THORN

Lighting people and places

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