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)
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.

**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 CO2 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.

**Table of road types**

<table>
<thead>
<tr>
<th>Type of road</th>
<th>70W</th>
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<th>150W</th>
<th>250W</th>
<th>400W</th>
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<td>Two-way 4 lanes</td>
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<td></td>
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</table>

✓ - Best choice, ✓ - Acceptable
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.
Typical schemes
Whatever luminaire design is selected from the IVS portfolio the optical performance for each lamp type is as follows:
**Case Study:**
Pedestrian Crossing two-way, two lanes

**Using the same colour temperature lamps: 4000°K**

<table>
<thead>
<tr>
<th>The Predecessor Solution CP400</th>
<th>IVS</th>
<th>IVS</th>
<th>Traditional Technique</th>
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<tbody>
<tr>
<td>2 x HIT 250W 19000lm Height: 5m</td>
<td>2 x HIT 250W 19000lm Height: 5m</td>
<td>2 x HIT 150W 12500lm Height: 5m</td>
<td>2 x HIT 150W 12500lm Height: 5m</td>
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<tr>
<td><strong>Uave</strong></td>
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<td>0.7</td>
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<tr>
<td><strong>Eave</strong></td>
<td>136lx</td>
<td>181lx</td>
<td>160lx</td>
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<tr>
<td><strong>W</strong>*</td>
<td>500</td>
<td>500</td>
<td>300</td>
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</table>

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 = 0.91! Eave = 99lx

* excluding gear losses

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 = 0.91! Eave = 99lx

*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
- To 25° (-20°/+35°)
- IP66: Ingress protection
- IK10: Shock resistance

**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.

**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.

**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.

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<tr>
<th>Height (m)</th>
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<th>Light Grey</th>
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**Signalling accessory Ordering guide**

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<th>Description</th>
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<td>IVS FLASH NODE 6W 2 X 3LED</td>
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**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
Reactor: 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 To 25° [20°/+35°] ❇ IP66: Ingress protection IK08: Shock resistance

**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

**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
Reactor: 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 To 25° [20°/+35°] ❇ IP66: Ingress protection IK10: Shock resistance

**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**

<table>
<thead>
<tr>
<th>Size</th>
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<th>Icos code</th>
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**Dyana Ordering guide**

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<td>250MT</td>
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</table>
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 x 100mm 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, 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

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.

Jet Ordering guide

<table>
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Ø60mm posttop accessory 96219232

Civic Ordering guide

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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

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.
**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.

**Specification**
- 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 I electrical Ta 25° (-20°/+35°).
- IP66: Ingress protection
- IK08: Shock resistance

**Oracle Ordering guide**

<table>
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**Areaflood**

**Lamps**
- **Size 1:**
  - 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 9006)
- Enclosure: toughened glass
- Reflector: high reflective anisotropic anodised aluminium
- Screw fixings: stainless steel
- Hinges and Finger Grips: polymay glass fibre 20%

**Installation/Mounting**
- Post-top mounting: Ø60x100mm long spigot.
- Cable gland for Ø8mm to 13mm cable.

**Specification**
- 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.

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

**Areaflood Ordering guide**

<table>
<thead>
<tr>
<th>Size</th>
<th>W</th>
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Thorn Lighting Main Offices

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