Sports Floodlighting
High performance lighting ideal for sports fields and stadiums
Thorn floodlighting can be one of your best supporters

Floodlighting can really help your club by being there on the sidelines projecting the required amount of light from the most economical source just where and when you need it.

**More playing time**
Darkness robs of you of a third of the time that you could be using your club’s most valuable asset - the pitch or court. With Thorn’s silent supporters – precision floodlights - you can arrange your schedule to suit your pleasure and not the sun’s. And it can be achieved without disturbing your neighbours.

**Social functions**
But playing and training aren’t the only club functions to benefit. It also gets dark in the summer so think of the barbecues and events you run to raise funds. They can benefit from outdoor lighting too. And what about a well lit car park with no more crunched wings and crumpled tempers? Remember, all the time your ground is lying dark and idle it could be bursting with life and activity. And that’s what a club’s for isn’t it?
Planning and preparation

- You’ll be wanting to light the pitch, car park and possibly the changing rooms. So our lighting engineers can help you with your planning of the floodlights and columns. Floodlights are normally mounted as high as possible to ensure optimum performance at the lowest installation cost. The choice of support, whether stand roof, columns or masts, will be influenced by site conditions, access for maintenance and the sport(s) involved. Columns, which can be lowered to the ground by means of a hydraulic jack are popular for smaller schemes. All columns will need to be ordered separately and, again, our sales engineers can help you with this.

- Contact your electrical contractor and discuss the cabling and installation of columns, floodlights, switching and control gear.

- Check the legal requirements. Your local authority planning services will usually have views on planning issues and restricting obtrusive light, and will often refer to documents published by national lighting bodies. In the UK reference is made to the Institution of Lighting Engineers guidance notes (www.ile.org.uk). Detailed plans will have to be submitted so take a look at the lighting equipment and “standard” layouts specified overleaf. Additionally, Thorn can provide specific data to illustrate just what the obtrusive light contribution will be from your particular project.

Lighting experience

Thorn has the experience to provide the equipment and skill to design the best and most suitable lighting solution for you whether you need it for a single tennis court or a complete Olympic complex.

You see, Thorn has systems for everyone, everywhere. Ask the people at Super Bowl XLI in Miami; or look around you next time you’re at Croke Park in Dublin. Take an evening stroll around Eastleigh Skateboard Park; it’s floodlit by Thorn, of course, with just four floodlights.

With the help of Thorn not only are the competitors winning but you win in several ways also, with economical lighting that lifts illumination levels while reducing obtrusive light and running costs.

Better lighting improves safety standards, encourages better performances and lets the crowd see more of what it wants to see. Which, of course, is rather good for business. So contact Thorn today. And stay ahead of the competition.
**Mundial**

This powerful linear metal halide floodlight combines very high light output – 220,000 lumens from the 2kW lamp – with a pure white light the colour temperature of which makes it suitable for colour television broadcasts. Ideal for major stadiums.

**Champion**

Number one solution to floodlighting small sports stadia where the control of obtrusive light is critical. Instead of having a ‘flat glass’ construction Champion’s front glass enclosure is inclined inside the floodlight. The front of the body acts as a cowl for full cut-off and provides a ‘virtual’ light emitting surface, which is aimed parallel (flat) to the ground. Furthermore, each lamp option has a minimum of 3 lamp positions to provide different photometries from just one installed position. As a result illuminance and uniformity of floodlighting projects can be optimised without the need to tilt the floodlight, thus reducing obtrusive light.

**Troika**

A popular “flat-glass” floodlight with adjustable lampholder giving a good quality of light for smaller sports. Troika uses various discharge lamps and the range is from 250 to 600W.

---

**Essentials of getting it right**

So far we have discussed the lighting on the playing area. But we also have to consider the effects this lighting might have on the surrounding environment. Sports lighting has been criticised because it uses high powered projectors, often mounted high up, and therefore visible from a great distance, and also because there is a lot of poor sports lighting still in use. This is usually the result of poor equipment, allied to poor layout design and poor set up.

So what do we do about obtrusive light?

- Use a professional lighting design service to develop a scheme, taking into account the need to restrict obtrusive light.
- Select floodlights which do not give upward light when they are mounted in their normal configuration.
- The lighting design should ensure a “cut-off” very near the boundary so that spillage (trespass) is minimal.
- If possible select playing services of lower reflectance to minimise upward reflected light.
- Light only to the required level, and no more.
- Ensure the floodlights are installed and aimed as planned.
- And, when the job is finished maintain the system.

Thorn has responded to the challenges with improved floodlights having optical systems and distribution characteristics designed to satisfy the sports players as well as the neighbours and authorities.

Because of the wide range of sporting activities it is necessary to analyse the visual requirements of each and choose the floodlights carefully in order to produce the best results. Here are some of the floodlights Thorn manufacture.
Floodlighting optical characteristics

The light distribution from floodlights is for convenience classified into three groups. The general shape of the intensity contours on a graph identifies these. Shown here are the general shapes of the three groups that are described as symmetrical, asymmetrical, and double asymmetrical.

FAQs

1. What is a lumen?
Lumen is the measurement of the rate of flow of the luminous energy, or luminous flux as it is often called.

2. What is illumination?
When a ray of light hits a solid surface, the process is known as illumination.

3. What is luminous intensity?
The luminous intensity is a measure of how much flux is emitted within a small conical angle in the direction of the surface and the unit is the candela.

4. What are Lux levels?
Lux is the basic SI unit of illuminance, equal to one lumen per square metre (lm/m²).

5. What is peak intensity?
Peak intensity is data used to cover the optical characteristics of floodlights and is usually evaluated in candelas per thousand lamp lumens.

6. What is maintenance factor?
All lighting systems need to be serviced, i.e. failed lamps replaced, equipment faults rectified, and lamps and luminaires cleaned. Lamp flux will also depreciate over the age of an installation. Data is produced which enable a maintenance factor to be estimated for an installation with a particular cleaning and maintenance interval.

7. What is uniformity?
This describes the measurement of light levels to ensure the light is evenly spread across the playing surface and “looks uniform” to the eye with no obvious variation. Average Uniformity would be calculated by dividing the average lux level by the maximum lux level.

8. What is Glare and how must it be considered?
Glare can be described as uncomfortable light, as perceived by players or spectators when viewed at certain angles from the playing surface or viewing area. It’s a temporary blinding effect or discomfort. Glare is measured as a figure and should not exceed a certain level. Column placement, column and fitting count and fitting mounting heights are crucial to minimize glare, both at the design and installation stages.

9. What is spill light?
Spill or obtrusive light is light which spills out of the playing surface and into surrounding areas, such as residential zones. This is a natural phenomenon, which cannot be avoided but can be minimized by the use of a professional lighting design and the appropriate location and aiming of fittings.certain level. Column placement, column and fitting count and fitting mounting heights are crucial to minimize glare, both at the design and installation stages.
Champion

Our number one solution to floodlighting small sports stadia and general areas where the control of obtrusive light is critical.

- Asymmetric floodlight for 1 and 2 kW lamps, incorporating an innovative design concept which takes the performance of asymmetric floodlights to the next level.
- Champion combines many of the performance features of classic ‘projectors’ (high levels of light output) with those of ‘flat glass’ projectors (control of obtrusive light).
- Instead of having a true ‘flat glass’ construction, which can limit the efficiency of a flood light, Champion’s front glass is inclined inside the floodlight.
- The front of the body acts as a cowl for full-cut-off and provides a ‘virtual’ light emitting surface which remains parallel to the ground.
- The optical design of Champion is unique and sets new standards for providing ‘on-pitch’ performance whilst minimising the number of flood lights required and the contributions to obtrusive light.
- Each lamp option has a minimum of 4 lamp positions, adjustable on-site, to provide different photometries from just one installed position.

Excellent colour appearance and colour rendering can be achieved through the use of Metal Halide lamps.
- Excellent glare control is provided through Champion’s unique optical construction.
- Additional accessories for increased control of obtrusive light available.
- The inherent design features of Champion make installation and maintenance both simple and safe.
- A simple ‘aiming sight’ is supplied with each floodlight to enable aiming in azimuth.

Cross-sectional view

Accessories/Attachments
- Adjustable visor (front and sides)
- Adjustable visor (rear)
- Wire guard
- Reverse mounting Stirrup (required for certain mounting positions)

Materials/Finish
Body: die-cast aluminium (ENAB 44300), unpainted.
Glass: 4mm toughened.
Wiring/ignitor box: polyamide (66 V0 Black: 20% glass fibre reinforced).
Screws: stainless steel.

Installation/Mounting
Rear access to lamp.
Automatic power interruption on opening of rear access door.
Stirrup fixed by M20 bolt through 22mm diameter hole, or through 15mm diameter holes.
Ballast and capacitors to be mounted separately.
Cable gland for 7.5-13mm cable.

Specification
To specify state:
Die cast aluminium asymmetric floodlight for 1/2kW lamps, IP66 rated, rear lamp access, adjustable lamp position with internally inclined front glass and integral front cowl.
As Thorn Champion.
A high specification, high performance discharge floodlight ideal for sports field and stadium lighting, both indoor and outdoor, illumination versions available.

- Choice of lamps giving flexibility in lumen package, Ra index and colour temperature
- Computer optimised optical systems - choice of asymmetric distribution for side lighting (S/S versions), or circular reflector giving a symmetric distribution for long-throw applications (R/S versions)
- Asymmetric version (S/S) available in standard and “extensive” extra wide distribution. Symmetric (R/S) available in intensive, and also optional 2 x 8° and 2 x 10° distribution
- Low glare, spill and upward light preventing light pollution
- Easy installation and maintenance with rear access and automatic power interruption
- IP65 dust tight and waterproof
- Hot restrike (HR) versions available for sports field stadium lighting and any applications where prolonged lack of lighting is not permitted
- Variable lampholder positions enable choice of distribution

**Materials/Finish**

- Body and frame: die-cast aluminium
- Front glass: thermal resistant 4mm clear glass
- Stirrup: unpainted galvanised steel
- Hood and louvre: black aluminium
- Wiring box for electrical connection: polyamid
- For Hot Restrike item version ignitor box including timer unit: Polyester Cable protection for cables used to connect the HR Ignitor on Mundial: rigid black PVC in spiral

**Installation/Mounting**

- Stirrup fixed by single M20 bolt through 22mm Ø central hole, or twin bolts through 15mm Ø holes.
- Cable clamp supplied for 7.5-13mm Ø flexible cable.
- Ignitor mounted on floodlight. Control gear to be selected and mounted remotely.
- Hood accessory fixes via 4 screws. Remote gear tray and lamp to be ordered separately

**Specification**

To specify state:

- Standard/Hot restrike/floodlight for 1/1.5/2/kW linear metal halide lamps, in die-cast aluminium with asymmetric/ symmetric optical system with three lamp positions (narrow, medium and wide photometric distribution). Rear access to the lamp with automatic power interruption. IP65. Class II insulation, Class I for HR version. As Thorn Mundial.
Troika

An asymmetric ‘flat glass’ floodlight for 250-600W discharge lamps, using adjustable lampholder

Materials/Finish
Body: recyclable pressure die-cast aluminium LM2, powder coat painted in grey. Standard finish close to RAL 9007.
Gear tray cover: recyclable technopolymer (Polyamide reinforced with 20% glass fibre).
Glass: toughened, 5mm thick
Stirrup: galvanised steel, painted in grey.
Bolts and screws: stainless steel.
Glass fixing toggles: recyclable technopolymer (Polyamide reinforced with 20% glass fibre).
Reflector: ultra specular pre-anodised high grade aluminium.
Accessories frame: aluminium.

Installation/Mounting
Access to lamp via hinged glass released by four retained Allen screws and sliding toggles. Lamp replacement possible without removing attachments. Installation of gear tray and access to gear compartment via removable gear cover released by four retained Allen screws. Cable gland for 7.5 - 13mm diameter cable. Additional knock out provided for through wiring. Aiming is simplified by indicator on floodlight body. Stirrup fixed by bolts through central 22mm diameter hole and two further 15mm diameter holes positioned 100mm either side of the central hole.

Troika Variable (60°-70°) uses a reflector in conjunction with a variable position lampholder, providing three distributions varying in intensity, beam width and peak angle intensity (I peak). Ideal for tennis courts, sports applications and car parks.
Troika Fixed has a fixed lamp position with a nominal 45° I peak angle. Ideal for swimming pools and uplighting.

Troika

Specification
To specify state:
‘Flat glass’ asymmetric floodlight in die-cast aluminium with high grade technopolymer gear tray cover and adjustable lamp holder mechanism, sealed to IP65 (optical and gear compartment). Access to lamp via hinged glass with four retained fixing points. Installation of, and access to, gear tray via removable cover with integral respirator. Suitable for 250-600W HST/250-400W HIT/250-400W HST-DE/250-400W HIT-DE.
As Thorn Troika.

Troika

Accessories
All accessories are mounted in a common aluminium frame which fixes to the face of the floodlight and is hinged along one side to ease lamp maintenance. Access to the lamp can be achieved without the need to fully remove the accessories.

Troika Variable 60 -70
**Application**

**Football/Rugby Pitch (Standard used: Sports England Class II)**

<table>
<thead>
<tr>
<th>Pitch dimensions</th>
<th>50m x 40m</th>
<th>Lamp type</th>
<th>Required</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial lamp</td>
<td>225000</td>
<td>MHN-4200K</td>
<td>200 lux</td>
<td>245 lux</td>
</tr>
<tr>
<td>No of floodlights</td>
<td>8</td>
<td></td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>No of columns</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting height</td>
<td>12m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Court Dimensions**: 100m x 65m

**Lamp Type**: 2KW

**Initial lamp**: 225000 lumens

**Maintained Average**: 200 lux

**Required**: 223 lux

**Achieved**: 245 lux

**Uniformity**: 0.6

---

**Singles Tennis Court (Standard used: LTA)**

<table>
<thead>
<tr>
<th>Pitch dimensions</th>
<th>23.8m x 11m</th>
<th>Lamp type</th>
<th>Required</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial lamp</td>
<td>220000</td>
<td>MHN-4200K</td>
<td>150 lux</td>
<td>200 lux</td>
</tr>
<tr>
<td>No of floodlights</td>
<td>8</td>
<td></td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>No of columns</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting height</td>
<td>10m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Principal Playing Area**: 23.8m x 11m

**Total Playing Area**: 36.6m x 17.4m

**Maintained Average**: 400 lux

**Required**: 532 lux

**Achieved**: 200 lux

**Uniformity**: 0.7

---

**Singles Tennis Court (Standard used: LTA)**

<table>
<thead>
<tr>
<th>Pitch dimensions</th>
<th>65m x 55m</th>
<th>Lamp type</th>
<th>Required</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial lamp</td>
<td>225000</td>
<td>MHN-4200K</td>
<td>200 lux</td>
<td>245 lux</td>
</tr>
<tr>
<td>No of floodlights</td>
<td>20</td>
<td></td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>No of columns</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting height</td>
<td>15m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maintained Average**: 354 lux

**Required**: 350 lux

**Achieved**: 354 lux

**Uniformity**: 0.7

---

**Hockey Pitch (Standard used: Sports England)**

<table>
<thead>
<tr>
<th>Pitch dimensions</th>
<th>92m x 55m</th>
<th>Lamp type</th>
<th>Required</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial lamp</td>
<td>250000</td>
<td>MHN-4200K</td>
<td>200 lux</td>
<td>245 lux</td>
</tr>
<tr>
<td>No of floodlights</td>
<td>40</td>
<td></td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>No of columns</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting height</td>
<td>15m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maintained Average**: 200 lux

**Required**: 254 lux

**Achieved**: 245 lux

**Uniformity**: 0.7
**Typical GAA Pitch Standard used Gaelic Athletics Association**

<table>
<thead>
<tr>
<th>Pitch Dimensions</th>
<th>LED x 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width (m)</td>
<td>140</td>
</tr>
<tr>
<td>Length (m)</td>
<td>90</td>
</tr>
<tr>
<td>Lamp Type</td>
<td>2KW</td>
</tr>
<tr>
<td>Required MHN-LA</td>
<td>4200K</td>
</tr>
<tr>
<td>Initial Lumens</td>
<td>220000</td>
</tr>
<tr>
<td>Maintained</td>
<td>400 lux</td>
</tr>
<tr>
<td>No of Floodlights</td>
<td>60</td>
</tr>
<tr>
<td>Uniformity</td>
<td>0.7</td>
</tr>
<tr>
<td>No of Columns</td>
<td>8</td>
</tr>
<tr>
<td>Mounting Height</td>
<td>20m</td>
</tr>
</tbody>
</table>
### Ordering Guide

Lamps (from others) and control gear (trays, boxes or loose) to be ordered separately.

<table>
<thead>
<tr>
<th>Description</th>
<th>Lamp manufacturer</th>
<th>Ilco Code</th>
<th>Weight (kg)</th>
<th>SAP Code</th>
<th>Old Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Champion floodlight with internal ignitor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHAMPION 1KW HQI - TSS OS WI</td>
<td>ALL</td>
<td>ST</td>
<td>20.6</td>
<td>96012471</td>
<td>CHAMP1HPS</td>
</tr>
<tr>
<td>CHAMPION 1KW MHN - LA PH WI</td>
<td>FOR OSRAM (SHORT ARC) LAMP</td>
<td>MD</td>
<td>20.6</td>
<td>96012473</td>
<td>CHAMP1SSA</td>
</tr>
<tr>
<td>CHAMPION 2KW HQI - TSS OS WI</td>
<td>FOR OSRAM (LONG ARC) LAMP</td>
<td>MD</td>
<td>20.6</td>
<td>96012474</td>
<td>CHAMP1PLA</td>
</tr>
<tr>
<td>CHAMPION 2KW MHN - LA PH WI</td>
<td>FOR OSRAM (SHORT ARC) LAMP</td>
<td>MD</td>
<td>20.6</td>
<td>96012475</td>
<td>CHAMP2SSA</td>
</tr>
<tr>
<td><strong>Champion hot restart floodlight with internal ignitor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHAMPION HR 1KW HQI - TSS OS WI</td>
<td>FOR OSRAM (SHORT ARC) LAMP</td>
<td>MD</td>
<td>24.6</td>
<td>96012478</td>
<td>CHAMP1SSAHR</td>
</tr>
<tr>
<td>CHAMPION HR 2KW HQI - TSS OS WI</td>
<td>FOR OSRAM (SHORT ARC) LAMP</td>
<td>MD</td>
<td>24.6</td>
<td>96012479</td>
<td>CHAMP2SSAHR</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHAMPION WG</td>
<td>WIRE GUARD</td>
<td></td>
<td>1.8</td>
<td>96012480</td>
<td>CHAMPWG</td>
</tr>
<tr>
<td>CHAMPION REVERSE STIRRUP</td>
<td>REVERSE STIRRUP ACCESSORY</td>
<td></td>
<td>4.4</td>
<td>96012481</td>
<td>CHAMPREV</td>
</tr>
<tr>
<td>CHAMPION A)V S FRONT</td>
<td>ADJUSTABLE FRONT AND SIDE VISOR</td>
<td></td>
<td>1.7</td>
<td>96012482</td>
<td>CHAMPFSW</td>
</tr>
<tr>
<td>CHAMPION A)V S REAR</td>
<td>ADJUSTABLE REAR VISOR</td>
<td></td>
<td>0.9</td>
<td>96012483</td>
<td>CHAMPRV</td>
</tr>
</tbody>
</table>

### Ordering Guide

Select from pre-wired gear trays or gear boxes complete with gear or loose gear.

<table>
<thead>
<tr>
<th>Lamp type and rating</th>
<th>Lamp manufacturer</th>
<th>Weight (Kg)</th>
<th>Pre-wired gear tray</th>
<th>Old Cat. No.</th>
<th>Supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>13.9</td>
<td>96012078 P1M000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>2KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>14.1</td>
<td>96002281 P2M000</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>2KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>13.9</td>
<td>96002291 P1M000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>2KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>13.7</td>
<td>96002379 MUNA52 T</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>1KW HPS E40 CAP</td>
<td>ALL</td>
<td>13.9</td>
<td>96012078 P1M000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>IP 65 Boxed gear</td>
<td></td>
<td></td>
<td>MUNBG1000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>1KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>14</td>
<td>96012191 MUNBG1000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>2KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>18</td>
<td>96012190 MUNBG2000</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>2KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>14</td>
<td>96012191 MUNBG1000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>2KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>18</td>
<td>96012190 MUNBG2000</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>1KW HPS E40 CAP</td>
<td>ALL</td>
<td>14</td>
<td>96012191 MUNBG1000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>Loose components – Ballast</td>
<td></td>
<td></td>
<td>OGLI 1000 [SM]</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>1KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>11.7</td>
<td>20566616 OGU 2000 180</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>2KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>11.7</td>
<td>20566616 OGU 2000 180</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>1KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>11.7</td>
<td>20566616 OGU 2000 180</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>1KW HPS E40 CAP</td>
<td>ALL</td>
<td>11.7</td>
<td>96216320 [S&amp;N] OGIS 1000 PC023W</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>Loose components – Capacitor</td>
<td></td>
<td></td>
<td>MUNBG1000</td>
<td>230/240</td>
<td></td>
</tr>
<tr>
<td>1KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>0.3</td>
<td>96007449 CAP16/420 X 4</td>
<td>380/400/4152KW</td>
<td></td>
</tr>
<tr>
<td>2KW HQI TS (SHORT ARC)</td>
<td>OSRAM</td>
<td>0.3</td>
<td>96007449 CAP16/420 X 4</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>1KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>0.3</td>
<td>96007449 CAP16/420 X 4</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>2KW MHN L (LONG ARC)</td>
<td>PHILIPS</td>
<td>0.3</td>
<td>96007449 CAP16/420 X 4</td>
<td>380/400/415</td>
<td></td>
</tr>
<tr>
<td>1KW HPS E40 CAP</td>
<td>ALL</td>
<td>0.3</td>
<td>96216340 CAP50</td>
<td>380/400/415</td>
<td></td>
</tr>
</tbody>
</table>

*Packages (floodlight, gear and lamp available upon request)*
Ordering Guide

Order floodlight plus gear tray for complete luminaire. Lamps to be ordered separately from others.

<table>
<thead>
<tr>
<th>Description</th>
<th>Lamp and lamp holder/manufacturer</th>
<th>Items Code</th>
<th>Weight (Kg)</th>
<th>SAP Code</th>
<th>Old Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floodlight</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TROIKA 250/400 W HST HIT 60/70D</td>
<td>VARIABLE LAMPHOLDER</td>
<td>ST/MT</td>
<td>15.4</td>
<td>96007508</td>
<td>QTKA2540MSE40</td>
</tr>
<tr>
<td>TROIKA 250/400 W HIT DE 60/70D</td>
<td>FIXED POSITION LAMPHOLDER</td>
<td>ST/MT</td>
<td>15.4</td>
<td>96008490</td>
<td>QTKB2540MSE40</td>
</tr>
<tr>
<td>TROIKA 250/400 W HIT DE 60/70D</td>
<td>VARIABLE LAMPHOLDER</td>
<td>MT</td>
<td>15.4</td>
<td>96008493</td>
<td>QTKA2540MSFC2</td>
</tr>
<tr>
<td>TROIKA 250/400 W HIT DE 60/70D</td>
<td>FIXED POSITION LAMPHOLDER</td>
<td>MT</td>
<td>15.4</td>
<td>96008494</td>
<td>QTKB2540MSFC2</td>
</tr>
<tr>
<td>TROIKA 250W HIT DE/OS 60/70D</td>
<td>OSRAM LAMP - VARIABLE LAMPHOLDER</td>
<td>MT</td>
<td>15.4</td>
<td>96008495</td>
<td>QTKA2540MFC2</td>
</tr>
<tr>
<td>TROIKA 250W HIT DE/OS 45D</td>
<td>OSRAM LAMP - FIXED POSITION LAMPHOLDER</td>
<td>MT</td>
<td>15.4</td>
<td>96008492</td>
<td>QTKB2540MFC2</td>
</tr>
<tr>
<td>TROIKA 400W HST 60/70D</td>
<td>VARIABLE LAMPHOLDER</td>
<td>ST</td>
<td>15.4</td>
<td>96008496</td>
<td>QTKA6005SE40</td>
</tr>
<tr>
<td>TROIKA 400W HST 45D</td>
<td>FIXED POSITION LAMPHOLDER</td>
<td>ST</td>
<td>15.4</td>
<td>96008497</td>
<td>QTKA6004SE40</td>
</tr>
</tbody>
</table>

| **Gear Trays*** | | | | | |
| CONTRAST C2 E40 HIT 250W | HIT 250W (PHILIPS HP-1) | MT | 4.2 | 96061253 | CON2HP1250.4 |
| CONTRAST 2 GT 250W HIT DE | HIT DE 250W (OSRAM) | MT | 5.0 | 96011254 | CON2HP1250.4 |
| CONTRAST C2 E40 HIT 400W | HIT 400W (PHILIPS HP-1) | MT | 4.0 | 96011250 | CON2HP1400.4 |
| CONTRAST 2 GT 400W HIT DE | HIT DE 400W (OSRAM HP-1) | MT | 5.9 | 96011252 | CON2HP1400.4 |
| CONTRAST 2 GT 400W HIT DE/FC2 CL2 | HIT DE 400W (PHILIPS HP-1) | MT | 5.9 | 96011254 | CON2HP1400.4 |
| TROIKA GT 600W HST | (PHILIPS) 600W | ST | 7.8 | 96008490 | QTKG600HP5 |

| **Accessories** | | | | | |
| TROIKA CL1 KIT | CLASS 1 KIT (TO BE FITTED TO THE GEAR TRAY ON SITE) | | 0.1 | 96009507 | QTKEL |
| TROIKA VS | LUX GUILLOTINE AND ACCESSORY FRAME | | 3.3 | 96008494 | QTKG3 |
| TROIKA AGS (X2) | BARN DOORS | | 1.1 | 96008495 | QTKBD1 |
| TROIKA WG | WIRE GUARD | | 2.0 | 96008496 | QTKW1 |
| TROIKA LV | LOUVRE | | 1.0 | 96008497 | QTKL1 |
| TROIKA FILTER BLU | FILTER (BLUE) | | 1.6 | 96008498 | QTKF1/B |
| TROIKA FILTER RED | FILTER (RED) | | 1.6 | 96008499 | QTKF1/R |

*Please ensure compatibility between gear tray and fitting based on lamp manufacturer.

Windage: 0.12m

**Beams data**

- Peak intensity (l) cd/klm: 1240
- Beam factor to 10% peak (l): 0.51
- Beam angle to 10% of peak (l) Horizontal: 2 x 56°
- Beam angle to 50% of peak (l) Horizontal: 2 x 34°
- Beam angle to 1% of peak (l) Horizontal: 2 x 68°

- Beam angle to 10% peak (l) Vertical: 5°/5°
- Beam angle to 50% of peak (l) Vertical: 5°/5°
- Beam angle to 1% of peak (l) Vertical: 23°/112°

Lamp: 250W HST
Position: 3
Mounting Height: 8m
**Ordering Guide** For complete package order floodlight and gear set. Lamps to be ordered separately from others.

<table>
<thead>
<tr>
<th>Description</th>
<th>Lamp manufacturer/beam angle</th>
<th>Projected Area (m²)</th>
<th>Ilocos Code</th>
<th>Socket</th>
<th>Weight (Kg)</th>
<th>SAP Code</th>
<th>Old Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUNDIAL 2KW 5/5 WB WI MIN-HA</td>
<td>FOR PHILIPS LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>Cable connections</td>
<td>16.8</td>
<td>96000980 MD</td>
<td>MUND2000DEPMD</td>
</tr>
<tr>
<td>MUNDIAL 2KW 5/5 WB WI MIN-HB</td>
<td>FOR GE SPIK OR VENTURE LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>Cable connections</td>
<td>16.6</td>
<td>96001194 MD</td>
<td>MUND2000DESTM</td>
</tr>
<tr>
<td>MUNDIAL 2KW 5/5 WB WI HQTS</td>
<td>FOR OSRAM OR SYLVANIA (H/S/TD) LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>Cable connections</td>
<td>16.1</td>
<td>96002378 MD</td>
<td>MUND2000DESMD</td>
</tr>
<tr>
<td>MUNDIAL 2KW 5/5 EXT WB WI MIN-HA</td>
<td>WITH EXTENSIVE DISTRIBUTION FOR PHILIPS LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>Cable connections</td>
<td>16.8</td>
<td>96012046 MD</td>
<td>MUNCK2000DEPMD</td>
</tr>
<tr>
<td>MUNDIAL HR 2KW 5/5 WB HQTS</td>
<td>WITH HOT RE-STRIKE IGNITOR FOR OSRAM OR SYLVANIA (H/S/TD) LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>Cable connections</td>
<td>23.0</td>
<td>96012168 MD</td>
<td>MUND2000DEEHR</td>
</tr>
<tr>
<td>MUNDIAL 1.5KW 5/5 WB WI MBIL/H</td>
<td>FOR GE SPIK OR VENTURE LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>K075</td>
<td>12.0</td>
<td>96011344 MD</td>
<td>MUND1500DESHD</td>
</tr>
<tr>
<td>MUNDIAL 1KW 5/5 WB E40 WB HST</td>
<td>FOR PHILIPS LAMP</td>
<td>0.26</td>
<td>MT</td>
<td>E40</td>
<td>15.8</td>
<td>96101232 MD</td>
<td>MUND1000DE40PM</td>
</tr>
<tr>
<td>MUNDIAL 1KW 5/5 WB E40 NF/15M</td>
<td>FOR PHILIPS (HPI-T) LAMP</td>
<td>0.26</td>
<td>ST</td>
<td>E40</td>
<td>15.6</td>
<td>96002377 MD</td>
<td>MUND1000E40PM/15</td>
</tr>
<tr>
<td>MUNDIAL 1KW 5/5 WB WI HQTS</td>
<td>FOR OSRAM LAMP</td>
<td>0.26</td>
<td>MD</td>
<td>Cable connections</td>
<td>15.3</td>
<td>96010429 MD</td>
<td>MUND1000DESM</td>
</tr>
</tbody>
</table>

(*) this unit is supplied without integral ignitor (requires ignitor on gear tray)

Gear set must be within stated max distance of projector

For use with projectors which require a remote ignitor, Gear set must be within stated max distance of projector

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Lamp Manufacturer</th>
<th>Pre-wired SAP Code</th>
<th>gear tray*</th>
<th>Supply voltage</th>
<th>SAP Code</th>
<th>Old Cat No.</th>
<th>Supply voltage</th>
<th>SAP Code</th>
<th>Old Cat No.</th>
<th>Supply voltage</th>
</tr>
</thead>
</table>

* All gear tray dimensions are 520mm (L) x 128mm (W) x 130mm (H) (excluding hot restrike)
**Mundial asymmetric Lamp: 2000W MVHS**

**Intensity**

- **Beam data**
  - **Peak intensity (I) cd/1000 lm**: 1800
  - **Beam factor to 10% peak (I)**: 0.67
  - **Beam angle to 10% of peak (I)**: Horizontal 2 x 42°
    - Vertical 6°/53°
  - **Beam angle to 50% of peak (I)**: Horizontal 2 x 29°
    - Vertical 3°/20°
  - **Beam angle to 1% of peak (I)**: Horizontal 2 x 55°
    - Vertical 69°/66°

---

**Mundial with intensive beam Lamp: 2000W MVHS**

**Intensity**

- **Beam data**
  - **Peak intensity (I) cd/1000 lm**: 15600
  - **Beam factor to 10% peak (I)**: 0.41
  - **Beam angle to 10% of peak (I)**: Horizontal 2 x 15°
    - Vertical 8°/9°
  - **Beam angle to 50% of peak (I)**: Horizontal 2 x 4°
    - Vertical 3°/3°
  - **Beam angle to 1% of peak (I)**: Horizontal 2 x 31°
    - Vertical 22°/47°

---

**Mundial C asymmetric Lamp: 2000W MVHS**

- **Beam data**
  - **Peak intensity (I) cd/1000 lm**: 1800
  - **Beam factor to 10% peak (I)**: 0.67
  - **Beam angle to 10% of peak (I)**: Horizontal 2 x 25°
    - Vertical 6°/53°
  - **Beam angle to 50% of peak (I)**: Horizontal 2 x 29°
    - Vertical 3°/20°
  - **Beam angle to 1% of peak (I)**: Horizontal 2 x 31°
    - Vertical 22°/47°

---

**Windage**: 0.25m²

© A.M. Oberlé
Thorn Lighting Main Offices

Australia
Thorn Lighting Pty Limited
43 Newton Road,
Westmeall Park NSW 2164
Tel: (02) 9604 4300
Fax: (02) 9604 4588
Email: info@thorncom.au
Website: www.thorncom.com.au

Austria
Thorn Licht GmbH
Donau-Citystraße 11, 1200 Wien, Austria
Tel: (43) 1 202 66 11
Fax: (43) 1 202 66 11 12
Email: office@thorn.at

China
Thorn Lighting (Guangzhou) Operations Ltd
No.12 Jian Yen Road, Eastern Section, GETDD,
Guangzhou 510760, China
Tel: (86) 20 3228 2706
Fax: (86) 20 3228 1777
Email: sales@thorn.com.cn
Thorn Lighting (Tianjin) Co. Ltd
322 Hing Fong Road, Tianjin 300190, China
Tel: (86) 22 8369 2302
Fax: (86) 22 8369 2302
Email: marketing@thorn.com.cn

Czech Republic
Thorn Lighting CS spol. s r.o.,
Na Brance 6/930, 150 00 Praha 5
Tel: (420) 224 315 252
Fax: (420) 224 326 313
Email: thorn@thorn.cz
Website: www.thorn.cz

Denmark
Thorn Lighting A/S
 Alibaba 44, 6000 Kolding, Denmark
Tel: (46) 79 79 79 79
Fax: (46) 79 69 69 69
Website: www.thornlight.dk

France
Thorn Eclairage SA
156 Boulevard Haussmann,
Cedex 08, Paris 75379, France
Tel: (33) 1 49 53 6240
Fax: (33) 1 49 53 6240
Website: www.thorn.fr

Hong Kong
Thorn Lighting (Hong Kong) Limited
Unit 4301, Level 43, Tower 1, Metropolis,
223 Hing Fong Road, Kwai Chung, N.T., Hong Kong, China
Tel: (852) 2578 4303
Fax: (852) 2887 0247
Email: info@thorn.com.hk
Website: www.thorn.com.hk

India
Thorn Lighting India Pvt. Ltd
RH2 Nirav CHS, 636A, 90 Ft. D.P. Road,
Near Thakur Polyclinic, 400 101 Mumbai, India
Tel: (91) 22 2285 4105
Fax: (91) 22 2285 1120
Email: international_sales@thornlight.com
Website: www.thornlighting.com

Ireland
Thorn Lighting (Ireland) Limited
320 Harold’s Cross Road, Dublin 6W, Ireland
Tel: (353) 1 4922 877
Fax: (353) 1 4922 724
Email: enq.dublin@thornlight.com

Italy
Thorn Lighting AS
Via G Di Vittorio, 2, Cadorino di Granarolo,
Bologna 40057, Italy
Tel: (39) 051 763391
Fax: (39) 051 763088
Email: info@thornlighting.it
Website: www.thornlighting.it

New Zealand
Thorn Lighting NZ Ltd
399 Rosebank Road, P O Box 71134, Rosebank,
Auckland 7, New Zealand
Tel: (64) 9 828 7155
Fax: (64) 9 828 7391

Norway
Thorn Lighting AS
Strandsveien 344, 1081 Oslo, Norway
Tel: (47) 22 82 07 00
Fax: (47) 22 82 07 01

Poland
Thorn Lighting Polska Sp. z o.o.,
Ul. Gazowa 26A, Wrocław 50-513, Poland
Tel: (48) 71 7833 740
Fax: (48) 71 3366 029
Email: thornlighting.pl
Website: www.thornlighting.pl

Russia
Thorn Lighting
Novoslobodskaya Str., 21, office 406 Business Center
"Novoslobodskaya Str. 21", Moscow 127030, Russia
Tel: (7) 495 981 35 42
Email: office.moscow@thornlight.com
Website: www.thornlighting.ru

Singapore
Thorn Lighting (Singapore) Pte Ltd
5 Kaki Bukit Crescent, 04/02 Koyotech Building,
416238 Singapore
Tel: (65) 6844 5800
Fax: (65) 6745 7707
Email: info@thornlight.com.sg
Website: www.thornlighting.com.sg

Sweden
Thorn Lighting AB
Industrigatan, Box 305,
SE-261 23 Landskrona, Sweden
Tel: (46) 418 520 00
Fax: (46) 418 265 74
Email: thorn@thornlight.se
Website: www.thornlight.se

United Arab Emirates
Thorn Lighting Ltd Dubai
Al Shoaib Building, Office 301, Block E,
Airport road, P.O. Box 1200,
Deira, Dubai, UAE
Tel: (971) 4 294081
Fax: (971) 4 2948838
Email: ffluos@emirates.net.ae

Thorn Gulf LLC
Al Shoaib Building, Office 301/2, Block E,
Airport road, P. O. Box 22672,
Deira, Dubai, UAE
Tel: (971) 4 294083
Fax: (971) 4 2948838
Email: thorn@emirates.net.ae

United Kingdom
Thorn Lighting Limited
Silver Screens, Elstree Way,
Borehamwood, Hertfordshire, WD6 1FE, UK
Tel: (44) 20 8732 9800
Fax: (44) 20 8732 9801
Email: brochures@thornlighting.com
Website: www.thornlighting.co.uk

Thorn Olympics Sports Lighting Team
Tel: 07794 303175
Email: olympicsteamuk@thornlighting.com
Website: www.thornlighting.co.uk

Thorn Lighting (Singapore) Pte Ltd
5 Kaki Bukit Crescent, 04/02 Koyotech Building,
416238 Singapore
Tel: (65) 6844 5800
Fax: (65) 6745 7707
Email: info@thornlight.com.sg
Website: www.thornlighting.com.sg

Thorn Gulf LLC
Al Shoaib Building, Office 301, Block E,
Airport road, P.O. Box 1200,
Deira, Dubai, UAE
Tel: (971) 4 294081
Fax: (971) 4 2948838
Email: ffluos@emirates.net.ae

United Kingdom
Thorn Lighting Limited
Silver Screens, Elstree Way,
Borehamwood, Hertfordshire, WD6 1FE, UK
Tel: (44) 20 8732 9800
Fax: (44) 20 8732 9801
Email: brochures@thornlighting.com
Website: www.thornlighting.co.uk

Thorn Olympics Sports Lighting Team
Tel: 07794 303175
Email: olympicsteamuk@thornlighting.com
Website: www.thornlighting.co.uk

Thorn Lighting Limited
Silver Screens, Elstree Way,
Borehamwood, Hertfordshire, WD6 1FE, UK
Tel: (44) 20 8732 1915
Fax: (44) 20 8732 9801
Email: international_sales@thornlighting.com

www.thornlighting.com

Thorn Lighting is constantly developing and improving its products. All descriptions, illustrations, drawings and specifications in this publication present only general particulars and shall not form part of any contract. The right is reserved to change specifications without prior notification or public announcement. All goods supplied by the company are supplied subject to the company’s General Conditions of Sale, a copy of which is available on request. All measurements are in millimetres and weights in kilograms unless otherwise stated.

Publication No: 415 Publication Date: 08/07