

Healthcare

Lighting application guide



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Your trusted
partner in
healthcare
lighting



Introduction

For over 80 years, Thorlux Lighting has manufactured increasingly sophisticated luminaires in the Birmingham region. Over the last 20 years, the company has focused on high technology products, including the development of its first electronic energy-saving lighting control system in the mid-1990s. Huge investment in design and testing facilities in Worcestershire has now put Thorlux at the forefront of its market sector.

Innovating sustainable lighting solutions
for a brighter future.

Check out our
social media





Made in the UK

Thorlux Lighting, the largest company in the FW Thorpe Plc group, is proud that around 90% of its products are manufactured in the UK.



Lighting management

The SmartScan lighting management system incorporates building management functions including occupancy profiling and air quality sensing. The addition of Built Environment Analytics also gives users a greater understanding of how their facility performs in operation.



Building safety & compliance

The Thorlux SmartScan wireless emergency testing system ensures full compliance and peace of mind.

Delivering full energy performance reports, emergency lighting status, luminaire status and management of emergency lighting testing dates/times.



Ease of maintenance

SmartScan (see page 36) allows the user to view full luminaire status. LED PCBs and modules are replaceable should a failure occur.



Five year warranty

A genuine warranty with genuine value. A long and stable history reassures Thorlux customers that its warranty is meaningful.



Low total cost of ownership

Thorlux luminaires are rapid to install, energy efficient, low maintenance and have a long lifespan resulting in a truly cost effective solution over the lifetime of the installation.



Quality & reliability

Rigorous product testing is essential in maintaining our reputation for reliability and quality. All Thorlux materials, components, subassemblies and finished products are subject to stringent quality control, as demonstrated by the company's BS EN ISO 9001:2015 (Quality management systems) certification.



Energy saving

Thorlux lighting controls combine maintained illuminance, daylight dimming and presence detection to maximise energy savings, in some instances in excess of 70%. SmartScan allows users to monitor their energy performance data and complete operational information for all SmartScan standard and emergency luminaires. This information is displayed on the SmartScan website which can be accessed from anywhere using a computer, laptop, tablet or smartphone.



Environmentally friendly

Thorlux and the FW Thorpe Group Plc have an SBTi-validated target of achieving net-zero emissions by 2040. Thorlux has been carbon neutral since 2012, using woodland in Monmouthshire to offset CO₂ generated from its activities.

Solar photovoltaic units on the roof of the Thorlux manufacturing facility produce 1 million kWh of electricity per annum.

The company has ISO 14001:2015 environmental certification.

LIGHTING RECOMMENDATIONS

Ward areas

Lighting within ward areas has to carefully balance between function, aesthetics and energy efficiency. Lighting levels need to be high enough to allow nursing staff to provide care, but not so high as to impact on the comfort of patients trying to rest. SLL LG2 Lighting for Healthcare Premises (2019) provides detailed guidance on the lighting performance required in these applications.

Lighting requirements within ward areas can generally be divided into four parts: general lighting, patient lighting, night lighting and watch lighting.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)	Notes
General lighting	100	Luminaires to use lamps with a colour rendering capability of RA80
Patient reading	300	To be controlled by the patient and to be provided over the patient activity/reading area
General nursing care	300	To be provided over the general bed area with a uniformity of ≥ 0.5
Night light	5	To be provided at the general ward area with a maximum of 0.5 lux over the pillow
Watch lighting	15-20	To be provided at the bed head pillow position
Examination or treatment at bed position	1000	It is rare to require this level of lighting but, if required, a portable examination light must be used

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)



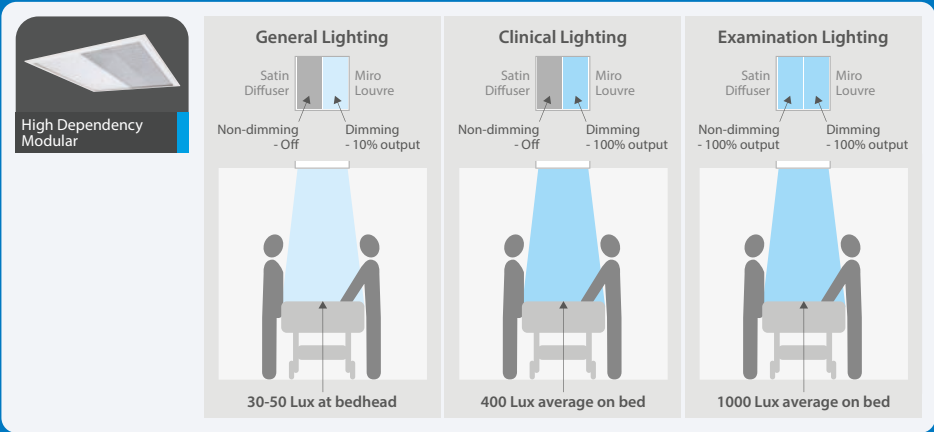
LIGHTING RECOMMENDATIONS

HDU/ICU areas

In critical care areas such as intensive care units and high-dependency units, lighting needs to minimise the disturbance to patients while providing sufficiently high illuminance for close observation and treatment by the staff. Although nursing procedures and the monitoring regime in a high-dependency unit or coronary care unit are not as rigorous as in an intensive care unit, adopting similar solutions for these areas satisfies the lighting requirements.

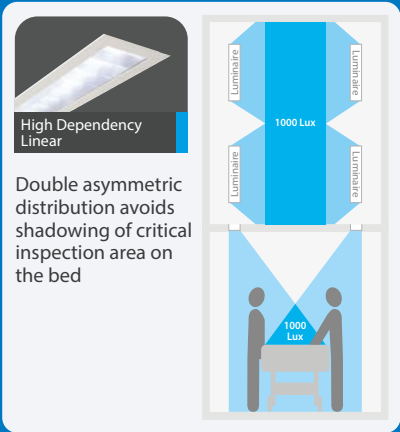
For example, the capability to switch between lighting levels for general use (30-50 lux at the bedhead), clinical use (400 lux average on the bed) and examination use (1000 lux average on the bed). Both the High Dependency Linear and the High Dependency Modular deliver these features, with the unique design of the High Dependency Linear providing an even distribution across the whole bed, and a solution that minimises shadowing when clinical staff are performing their duties.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)	Location	Maintained illuminance (lux)
Bed head observation (watch)	10 to 20	Bed, clinical	400
Bed head	30 to 50	Bed, examination	1000

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)





LIGHTING RECOMMENDATIONS

Operating theatre and cleanrooms

Operating theatres and their associated clinical areas are probably the most important and specialised areas within a hospital. The function of an operating theatre is clearly understood by most people; however, fewer can define a clinical area. SLL LG2 Lighting for Healthcare Premises (2019) defines clinical areas as areas or rooms where surgical, clinical or medical procedures are carried out, usually by a surgeon or doctor.

In areas hosting operative procedures, dedicated surgical LED task lighting, usually ceiling-mounted, will provide the required lighting quota. All other installed luminaires only need to provide general or room ambient lighting. This lighting should be sufficient to enable the critical examination of patients, support operative procedures, and use life support apparatus. LG2 states that 1000 lux is required for the main operating theatre background lighting.

EXAMPLES OF LUMINAIRES:



Operative or clinical procedures carried out within the ophthalmic, ear, nose and throat (ENT) areas, and micro-surgery units may require much lower levels of general illuminance because of remote operative procedures. Typically values of between 10 and 50 lux are recommended and this should be provided by the main lighting system operating in a dimmed mode. Dimming also provides a degree of flexibility that is increasingly required in these clinical areas allowing multifunctional use. It is also important to note that the general lighting is required to provide both horizontal and vertical illuminance. Vertical light provides good visibility of swab count racks and other wall-mounted equipment. Like cleanrooms, clinical areas are controlled environments where medical procedures are carried out. It is therefore important that the concentration of airborne particles is controlled to within specified limits. Luminaires designed for use within these areas should be IP65 or IP54. Effective IP seals should be employed between the luminaires and the room's internal surface.

Location	Maintained illuminance (lux)	Notes
Operating table (directed locally)	10000 to 160000	Local switching (auto/manual)
Operating theatre (general lighting)	1000	Dimming (auto/manual)
All other places where work is carried out	≥ 500 but ≤ 1000	Dimming (auto/manual)



LIGHTING RECOMMENDATIONS

Corridors and circulation areas

Hospitals are usually large and complex. Internal transitory routes form the operational backbone of any hospital. Unfortunately, the lighting requirement within these transitory corridors is often not recognised, and they are treated purely as functional afterthoughts.

It is essential to light these routes correctly. Trolley-borne patients may experience glare and visual disturbances due to alternating high and low brightness patterns, especially on the ceiling. These issues can be reduced or avoided by optimising lighting design and selecting the correct luminaires.

LG2 recommends that the installed lighting provides a uniform illumination level of 200 lux at floor level. The lighting design must, further, be capable of providing the distribution characteristics that meet LG2 performance and glare requirements. Dimming or switching systems should be included and capable of operating at reduced levels; for example, providing around 50 lux while maintaining a (min/average) uniformity level of 50% or better. Such systems will also allow reductions in energy consumption at night or during periods of low occupancy. The incorporation of photocells will provide further energy savings in corridors with windows.

Location	Maintained illuminance (lux)	Notes
Circulation (floor)	200 (day) 50 (night)	Uniform illumination levels should be provided to avoid bright and dark patches to walls and floors. The installation should also be capable of operating at a reduced level (50 lux with 0.4 uniformity) at night for comfort and energy efficiency. Avoid the setting out of lights such that they cause nuisance levels of brightness into corridors in the evening.
Corridors (floor)	150	Uniform illumination levels using low glare luminaires positioned to avoid alternating brightness patterns being viewed by trolley-borne patients. The installation should also be capable of operating at a reduced level (50 lux with 0.4 uniformity) at night for comfort and energy efficiency.
Stairs (landings and treads)		150 lux on landings/half landings and the first step from each landing or half landing; 100 lux on all other steps. Consider access for maintenance and avoid wall luminaires that expose the lamps when ascending or descending the stairs.

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)

EXAMPLES OF LUMINAIRES:



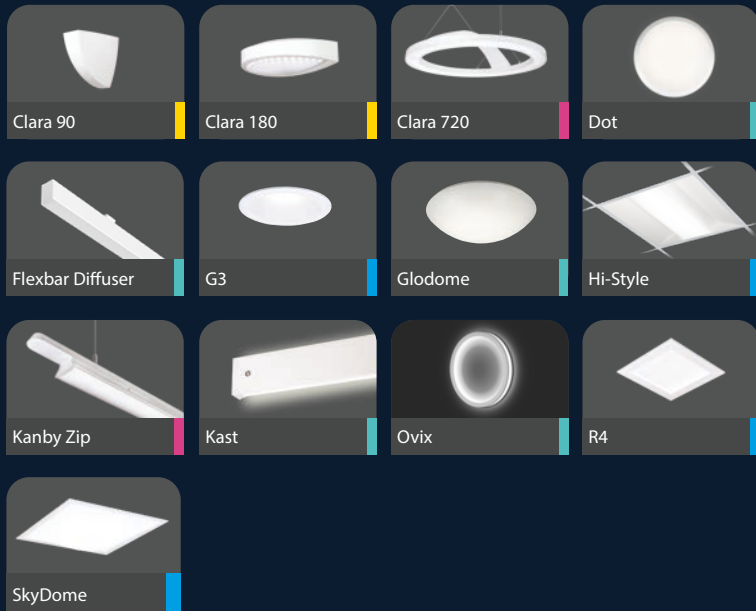


LIGHTING RECOMMENDATIONS

Reception and waiting areas

The first impression of a building must give the user a feeling of safety and security. Sharp contrasts should be avoided adjacent to the reception desk and the use of indirect lighting is recommended to avoid facial shadowing.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)	Notes
Floor	200	The lighting while being functional should mirror the efficiency and drama created at the reception areas of major commercial buildings.
Reception (floor)	300	A measure of retail lighting philosophy should be employed to create a welcoming and impressionable ambience.
Enquiry desk (task area)	500	Comfortable accent lighting techniques should be employed to make the desk visually stand out from the general surroundings.

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)



LIGHTING RECOMMENDATIONS

Imaging rooms

Thanks to technological advances, many varieties of imaging rooms are found in hospitals. Most of these rooms (except those housing MRI scanners) do not require special lighting other than that described in LG2. Patients who use these facilities will almost certainly be anxious or even frightened, so the lighting should be pleasant and create a reassuring atmosphere.

In X-ray, ultrasound and fluoroscopy rooms, general lighting is required to transfer the patient to the couch and to set up equipment. Ceiling-mounted luminaires are usually suitable for this application. The system chosen will need a two-way switching system with one switch at the entry door and another within the control room area, preferably on or near the control desk.

The lighting level for imaging rooms suggested in LG2 is 300 lux for the entry and settling of patients, with a reduction to around 50 lux for the duration of the scanning procedure by using dimming luminaires or switching to a different group of luminaires. Use the latter if a dimming system might interfere with scanning equipment; cross-check with equipment suppliers to establish if this is a known issue.

EXAMPLES OF LUMINAIRES:



Magnetic Resonating Imaging (MRI) scanner rooms have more demanding requirements, and the luminaires and lighting systems must not interfere with medical imaging procedures. Preferably, luminaires should be constructed from non-ferrous materials and not employ induction, wave rectification, signal generating or voltage-reducing equipment unless that equipment employs comprehensive radio frequency (RF) suppression.

Location	Maintained illuminance (lux)	Notes
General lighting (1m above floor)	300	To be provided by ceiling fixed or recessed luminaires co-ordinated around any equipment. Two-way switching and control required.
Trolley and equipment	500	Luminaire selection and positioning is important to avoid visual discomfort to patients.

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)



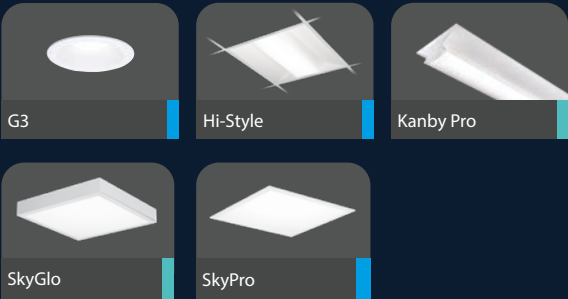


LIGHTING RECOMMENDATIONS

Examination and consulting rooms

Examination and consulting rooms demand good colour rendering and a high level of general illuminance to ensure sufficient light for examinations.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)	Notes
Working plane	500	Luminaire selection and positioning is important to avoid visual discomfort to patients
Couch or chair (local)	15000 to 30000	To be provided by a local examination luminaire

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)



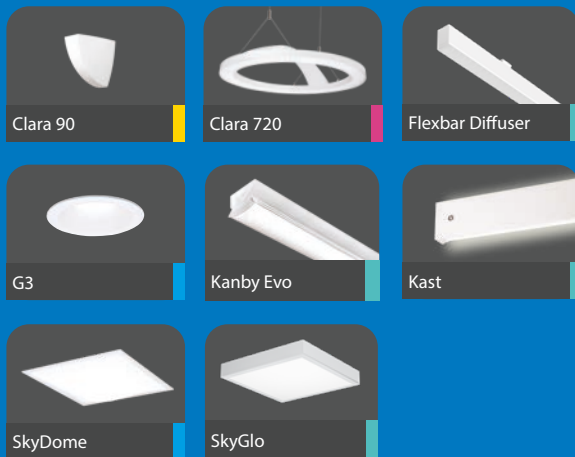


LIGHTING RECOMMENDATIONS

Canteens and dining rooms

The lighting in canteen areas should be inviting and comfortable, yet provide the required illuminance for high activity levels.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)	Notes
Whole floor	50	Separately provided and switched will allow for a cleaning, security and maintenance level.
Tables	200	Accented for function and atmosphere and dimmable to cater for the social event and time of day.
Serving counter	300	Comfortable accent lighting techniques should be employed for safety reasons and to provide a focal point for users of the facility.

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)



LIGHTING RECOMMENDATIONS

Ancillary areas

There are three objectives for the lighting of ancillary areas: to facilitate quick and accurate work, to keep workers safe, and to create a comfortable and clear visual environment.

Plant and switch rooms should be lit to an average of 200 lux maintained illuminance.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)	Notes
Working plane	500	Luminaire selection and positioning is important to avoid visual discomfort to patients
Couch or chair (local)	15000 to 30000	To be provided by a local examination luminaire

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)





LIGHTING RECOMMENDATIONS

Exterior lighting

External lighting should create a welcoming appearance for entrances, access routes and car parks, plus provide a sense of safety for pedestrians and vehicle users. Lighting designers should also consider colour rendering, installation efficacies, maintenance issues relative to CCTV use, and minimising light nuisance.

EXAMPLES OF LUMINAIRES:



BS EN 12464-2:2014 / EN 12464-2:2014 (E)

Parking areas

Ref. No.	Type of area, task or activity	– Em lx	U _o –	R _{GL} –	R _a –
5.9.1	Light traffic, e.g. parking areas of shops, terraced and apartment houses, cycle parks	5	0.25	55	20
5.9.2	Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25	50	20
5.9.3	Heavy traffic, e.g. parking areas of major shopping centres, major sports and multipurpose building complexes	20	0.25	50	20

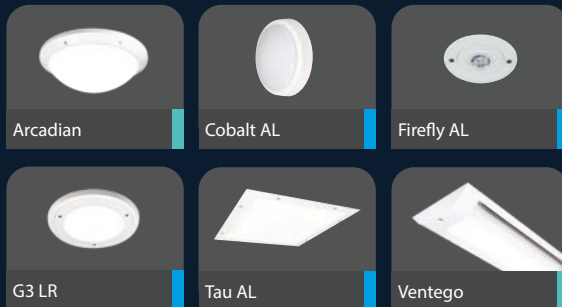


LIGHTING RECOMMENDATIONS

Mental health

Historically, the principal requirement for mental healthcare lighting has been the provision of safe, secure, ligature-resistant luminaires. Nowadays, lighting designers must combine this with schemes that provide domestic qualities and create an ambience promoting rehabilitation and recovery while heeding the need for energy efficiency.

EXAMPLES OF LUMINAIRES:



Location	Maintained illuminance (lux)*	Notes
Acute mental health facility	300	The lighting should be designed according to the activity, most areas will be staffed constantly
Psychiatric intensive care units (PICUs)	300/100/50	Robust anti-ligature fittings required with manual switches operated by the staff. Levels to be provided by dimming or switching.
High dependency rehabilitation units (HDRUs)	300/150/50	HDRUs can be categorised as low, medium or high risk. See chapter text to determine the specific lighting requirements.
Child and adult mental health services (CAMHS)	300/100/50/5	Designer to be mindful that patients could be children or young adults. Different levels required in different areas. Comfortable, low glare, homely but robust schemes are required.
Dementia assessment areas	300/100/50	Only very low-glare fittings should be used, and luminaires should not be installed in a regular pattern. Design should include for discrete but robust luminaires to give a calming homely feel.
Places of safety	300/100/50/5	These spaces are designed to provide a safe and secure environment. See chapter text to determine the specific lighting requirements.
Quality of life spaces	300/100/50	Residential lighting, see chapter text.
Common spaces (visiting areas)	300/150	Warm, homely lighting required.
Single bedroom suites	150/50/5	Warm, homely lighting required.
Ensuites/bathrooms	500	Good uniformity with excellent vertical (facial) illumination in front of the mirror(s).
Day rooms/sitting areas	300/100	Comfortable, homely lighting required.

* 5 lux is a night-light requirement

Extract from CIBSE: SLL Lighting Guide 2: Lighting for Healthcare Premises (2019)



LIGHTING RECOMMENDATIONS

Emergency lighting

BS 5266-1:2016 is the British Standards Code of Practice that provides detailed guidance on emergency lighting which is a requirement by law. These recommendations encourage uniformity of application based on providing adequate safety if ordinary lighting is interrupted. The person(s) responsible for control of the hospital and healthcare buildings have a legal obligation to ensure compliance. The legislation covers all aspects of emergency lighting provision, including:

- Design
- Installation
- Regular testing: All emergency luminaires must undergo a short test monthly and a full-duration test once a year. The responsible person must ensure comprehensive test records are maintained.
- Maintenance: Replace failures quickly. As with tests, keep maintenance records. Under the Regulatory Reform (Fire Safety) Order, failure to provide a compliant system or regularly test and maintain it can result in prosecution for the employer or building owner, who may face fines and imprisonment if convicted.

EXAMPLES OF LUMINAIRES:



LIGHTING RECOMMENDATIONS

High-risk area emergency lighting

The objective of high-risk task area emergency lighting is to ensure the safety of those involved in a potentially dangerous process or situation, enabling the performance of proper shutdown procedures for the security of other occupants of the location or the building.

EXAMPLES OF LUMINAIRES:



LIGHTING RECOMMENDATIONS

Medical signage

EXAMPLES OF LUMINAIRES:





Sustainability



On a journey to net-zero by 2040

For the last two decades, Thorlux Lighting, as part of the FW Thorpe Plc Group, has worked hard to reduce its environmental impact, and we are proud of the progress made.

But, recognising that there is still much to do to safeguard the environment and avoid the worst effects of climate change, Thorlux and the FW Thorpe Plc Group have set a target to reach net-zero greenhouse gas (GHG) emissions by 2040, ten years before the UK government's 2050 net-zero target.



A validated net-zero target

FW Thorpe Plc has committed to reaching net-zero greenhouse gas emissions across the value chain by 2040.

The Science Based Targets initiative (SBTi) has validated these science-aligned targets:

Near-term target

FW Thorpe Plc commits to reducing absolute scope 1 and 2 GHG emissions by 57.5% by FY2030 from a FY2021 base year. FW Thorpe Plc also commits to reducing absolute scope 3 GHG emissions by 25% within the same timeframe.

Long-term target

FW Thorpe Plc commits to reducing absolute scope 1 and 2 GHG emissions by 90% by FY2040 from a FY2021 base year. FW Thorpe Plc also commits to reducing absolute scope 3 GHG emissions by 90% within the same timeframe.

Thorlux Lighting has been carbon neutral since 2012 through a combination of measures. Company-wide initiatives such as energy use minimisation, self-generation through solar photovoltaic (PV) units, and renewable energy procurement have reduced Thorlux's carbon footprint, whilst trees in our award-winning carbon offsetting afforestation project sequester the remaining carbon dioxide produced.

Our carbon-neutral status is independently verified as per ISO 14064-1.



Scan here
to view
Sustainability
at Thorlux

Sustainability at Thorlux

Our commitment to sustainability and the environment

Sustainability and the environment have been at the core of Thorlux for many years and we have always been committed to doing the right thing for both people and the planet.

We have worked hard to reduce our environmental impact of our manufacturing and selling activities, and consider carefully the implications our products have during their life and at the end of their life. Through our environmental monitoring programme, which is independently certified to the environmental management standard ISO 14001, we continually measure and improve our environmental credentials.

“Thorlux has a long-standing commitment to tackling global environmental challenges, principally through its core business of manufacturing energy efficient lighting equipment. The company has a genuine desire to become a more sustainable business.

“Over the last two decades, at Thorlux we have sought to address our carbon impact by working towards carbon neutrality for our manufacturing and distribution operations. It gives me huge pleasure that our hard work and ambitions have paid off in achieving our carbon neutral status both now and historically.

“But our work doesn’t stop here. By assessing our carbon impact right across our manufacturing and value chain then setting science-based targets in line with the Paris Agreement on climate change, our goal is ultimately to reach zero carbon status well before the UK’s target for achieving net zero carbon emissions by 2050. Watch this space.”

FW Thorpe Group Chairman



Lighting management systems

Thorlux offers a comprehensive range of lighting management systems from basic presence detection, through to full wireless control and monitoring systems.





SMARTSCAN



SMARTSCAN INTERNAL

Integrated intelligent lighting management maximising energy savings for internal applications through movement detection and daylight sensing with convenient user control.



SMARTSCAN EXTERNAL

Integrated intelligent lighting management maximising energy savings for external applications through movement detection and daylight switching with timed override via the SmartScan Website.



SMARTSCAN RADAR

High frequency sensor technology built onto the LED light engine for applications where the luminaire aesthetics and impact rating are important factors. Maximising energy saving through presence detection, photocell control and user control timed override via the SmartScan Website.



SMARTSCAN EMERGENCY

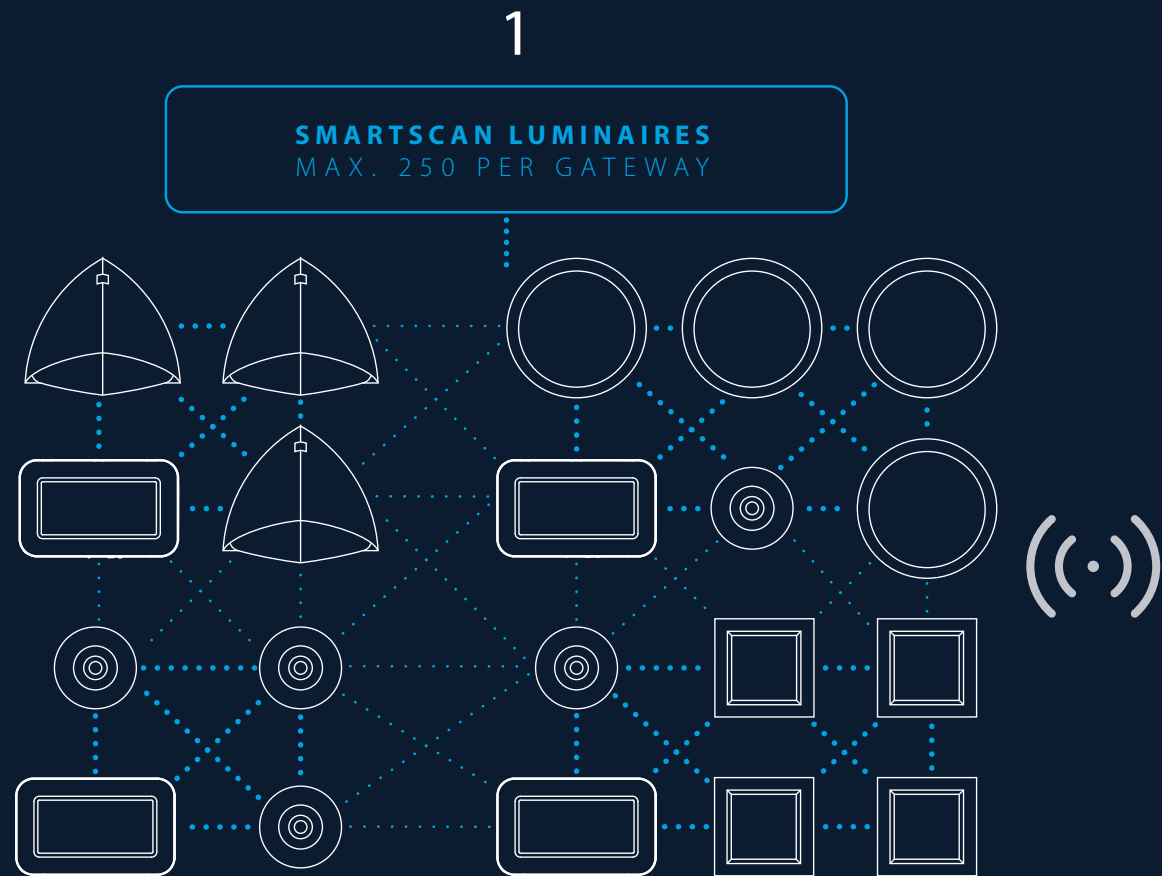
Self-testing emergency luminaires with centralised, web-based testing and reporting options to ensure compliance with local standards.



Lighting management systems

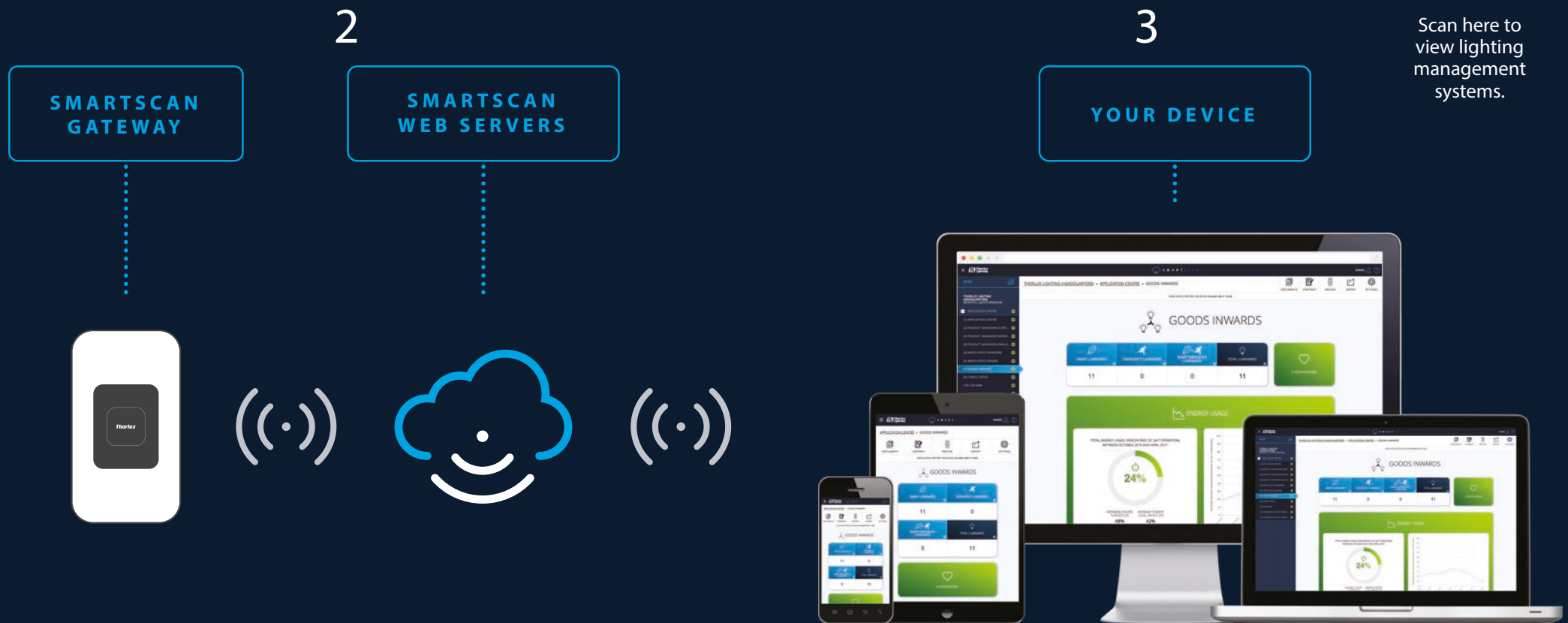
Lighting energy consumption within production and warehouse areas can be significant. The SmartScan lighting management system makes the most of maintained illuminance, daylight dimming and presence detection to ensure optimum energy savings, often measured in real applications to exceed 70%. SmartScan also monitors the performance of all luminaires so any fault can be reported promptly to the maintenance teams.

- 1 Compatible SmartScan Internal, SmartScan Radar, SmartScan External and SmartScan Emergency luminaires wirelessly communicate with each other.
- 2 The Gateway transmits energy performance and status reports for standard and emergency luminaires to the SmartScan web server.
- 3 Users can view status and operational information on any Internet enabled device.





Scan here to
view lighting
management
systems.



Complete turnkey service

Thorlux Lighting offers its customers a complete, full-life turnkey operations and installation solution for new and refurbished lighting system projects. Thorlux provides a professional one-stop-shop service that takes all the work out of your hands, from planning to installation and beyond.



Product shown - Solow XLED



Planning and surveying

The process begins with a thorough on-site survey by a lighting engineer and an energy analyst. These surveyors carefully record all current luminaire types and locations, diffusers, emergency lighting, existing lighting controls, average operating hours, and more.



Lighting design

With this information, the award-winning Thorlux design team develops a comprehensive lighting plan. Luminaires and controls are selected based on each area's usage and the required light levels defined in current standards. Thorlux can then propose options for new lighting systems, prioritising cost effectiveness, low cost of ownership and user comfort. Some customers wish to produce their lighting schemes; for this reason, Thorlux is a partner of both DIALux and Relux. These lighting design software packages and the Thorlux luminaire database are freely downloadable from the Thorlux website.



Supply

When the plan is agreed, Thorlux will build the new fittings. Making luminaires to order ensures that waste is kept to a minimum, reducing embodied carbon. 90% of all Thorlux products are designed and manufactured in its UK factory in Redditch, Worcestershire. This provides Thorlux with the flexibility to fast-track orders and supply products to meet important deadlines.



Installation

Thorlux has an integrated installation and commissioning capability using a combination of in-house teams and a network of specialist partners who are trained on all aspects of Thorlux products. We ensure a rigorous selection process and ongoing quality control and training methods to ensure our specialist partners are of the highest standard.



Commissioning

Thorlux offers a professional on-site commissioning service to ensure that products are configured to provide the desired performance and return on investment. Commissioning begins with identifying the end-user's project requirements and ends with ensuring that the installed systems satisfy these requirements. Commissioning of lighting is now an integral part of the requirements for new buildings and major refurbishments under Building Regulations Part L.



User training

The final step of the process is to train all applicable personnel to operate, maintain and monitor the new lighting system. This includes using the SmartScan web platform, diagnosing issues, and customising functionality. This protects against attempted overrides or bypasses and helps ensure buy-in from all relevant parties.



Technical support

The Thorlux Technical Services department is available to answer all queries regarding Thorlux products and their use in specific applications.



Thorlux lighting
manufacturing section

Five year warranty

A genuine warranty with genuine value

The Thorlux range of luminaires is designed, manufactured and distributed by Thorlux, a division of the FW Thorpe PLC group. FW Thorpe PLC is listed on the London Stock Exchange. See the corporate website at www.fwthorpe.co.uk

Thorlux luminaires have been manufactured continuously in the UK since 1936, the year Frederick William Thorpe founded the company.

In 2022-23, the revenue of FW Thorpe PLC was £176.7m, of which £92.7m was generated by Thorlux luminaires and control systems.

The Thorlux product warranty offered to customers covers a period of five years, with no get-out clauses concerning the number of burning hours or maintenance requirements, and no convoluted registration process.



This warranty is enhanced by the following key factors:

- FW Thorpe PLC has a robust balance sheet, with net assets in excess of £175m (2024)
- More than £50m in cash reserves provide the ability for Thorlux to support any future warranty liabilities
- FW Thorpe PLC has a stable ownership structure, with over 50% of the business owned by founding family members and management
- Investment in product research and development is continual - £2m invested per annum
- Thorlux product failure rates are consistently below 0.2%, with over 2,000 luminaires individually tested and shipped every day
- Critical components are supplied by market-leading global suppliers

- A dedicated team of our own employed local service engineers respond to any customer issues quickly and effectively, not only in the UK but overseas too
- Around 90% of Thorlux products are manufactured in the UK, therefore spares are readily available
- As Thorlux is a listed company, stringent conditions require it to be fully audited by a third party. In recent years this has been PricewaterhouseCoopers LLP (PwC), one of the top four audit and advisory firms globally. Auditors of listed companies follow rigorous international guidelines, ensuring that the financial details such companies publish (such as those above) are accurate and can be relied upon.

Thorlux must prove that it will be able to pay any claims made according to its warranty conditions during the warranty period. Provision is made in each year's accounts, effectively putting aside profit from current orders for use in the future if required.

While all companies are required to provide for expected future warranty costs, Thorlux comes under more scrutiny as a listed business. Financial strength enables us to stand behind our warranty; some competitors may not have this advantage. At Thorlux, we are capable of meeting our obligations.

Some other companies offer long warranties but do not have the financial assets to withstand a sizeable warranty claim. Thorlux encourages customers to consider this scenario when purchasing other companies' products with extended warranty offers.

Michael Allcock - Non-Executive Chairman

A handwritten signature in black ink that reads 'Michael Allcock'.

Please refer to www.thorlux.co.uk/terms for full details of our terms and conditions of sale.

LED guide

Thorlux designs, manufactures, and tests the vast majority of its own LED electronic systems, including lenses for precise optical control. By carefully considering end-of-life scenarios, such as LED failures, solder joint breakages, and isolated component failures, Thorlux ensures new designs have ongoing system reliability even when individual components fail.

The company's history of over 80 years, running into thousands of years of combined employee experience, ensures the careful consideration of every aspect of lighting a space - which is important as LED lifetimes now reach 50,000 to 100,000 hours or even more.

The benefits of LEDs

The light-emitting diode (LED) has revolutionised the lighting industry, bringing significant advantages over conventional light sources such as fluorescent.

LEDs operate in an entirely different way to conventional lamps and offer the following advantages:

Increased energy efficacy

LEDs are significantly more efficient, typically producing over 200 lumens per watt of energy consumed compared with the very best fluorescent lamp which produces 100 lumens per watt. This means LED fixtures produce more light for less energy making them highly energy efficient resulting in lower running costs.

Increased life

LEDs have a far greater life than conventional lamps. A well designed LED luminaire can last up to 100,000 hours compared with a fluorescent lamp which typically fails after approx. 20,000 hours. This not only provides a more reliable lighting solution, but also significantly reduces maintenance costs over life.

Enhanced optical control

Due to its small size and directional nature, the light from an LED can be better controlled with higher optical efficiency. This results in less light being wasted and the usable light being efficiently delivered into the space. This can mean fewer light fittings being used and better-illuminated spaces.

Instant light

LEDs use a semiconductor to convert electricity into light. As soon as an LED is energised it reaches full light output instantly, whereas many conventional lamp types take a few minutes to "warm up" and reach full brightness. Another benefit of semiconductor technology is that LEDs can be switched on and off rapidly. They can also be dimmed with no degradation in lifetime, making them ideal for energy-saving lighting control systems.

These benefits make LED technology an obvious choice. Installing LED lighting is not only an investment in the latest lighting technology but a commitment to sustainability through reduced energy consumption, concurrently saving costs and reducing maintenance. LED luminaires also offer improved reliability, robustness, and usability.

LEDs are now the first choice for lighting, with performance and lifetimes exceeding alternative light sources. However, not all LED solutions are the same, so Thorlux has introduced a simple marking code into its literature to identify the key performance characteristics of its LED-based luminaires. An example is shown to the right.

LED characteristics are available on web catalogue download pages, showing the best performance expected within the range. Please check photometric data for specific model types which may be less than the optimum figure tabulated.

CRI

Indicates colour rendering index (colour quality). A minimum of 80 CRI is recommended for working areas.

Colour temperature

The approximate colour temperature of the light source. There is a tolerance for a specific chosen colour temperature. More accurate information, for specialist applications, is available upon request.

Rated life (hours)

These figures illustrate the target life expectancy of the LED (for example 60K = 60,000 hour life expectancy) which is a combination of light output degradation (L70 = when the light output has reduced to 70% of its initial level, L80 = 80%) and lamp performance expectation (B10 = when 10% of the LEDs have failed to meet operational expectations).

Protection

Some LED PCBs comprise a number of LEDs connected in series or in a series/parallel group. If the system is unprotected failure of one LED will cause others in the group to extinguish. If the system is protected with **LED PROTECT** (PLEDs) then failure of a single LED will not affect others in the group. If the system is protected with patented **LUX GUARD**, other LEDs in close proximity will brighten slightly to compensate.

Driver efficiency

This figure illustrates the LED driver efficiency.

Replaceable

Indicates whether the LED PCB or module is replaceable should a failure occur.

Power factor

Indicates LED driver power factor.

LL/CW

Luminaire lumens per circuit watt, the luminaire efficiency including ALL optical and gear losses. It is very important to compare this figure correctly - other manufacturers may state LED efficiency, for example, which does not include all losses within the system and could therefore be a misleading, much higher figure.

This figure is always the "best in class" for the luminaire range, for specific ratings for each available luminaire please refer to the photometric data or contact the Thorlux Technical Services department.



Example:

LED CHARACTERISTICS

CRI	80+
COLOUR TEMPERATURE	4000K
RATED LIFE (HOURS)	100K - L70/B10
PROTECTION	LUX GUARD
DRIVER EFFICIENCY	>92%
REPLACEABLE	YES
POWER FACTOR	>0.95
LL/CW	148.7

For LED characteristics explanation see www.thorlux.com/led-guide

LED system protection

LEDs are a very efficient light source and are resilient to many conditions that can be detrimental to traditional lamps.

For example, LEDs are largely unaffected by frequent switching, shock, or vibration. However, LEDs or their solder joints can infrequently fail. In such circumstances, it would be inconvenient if the failure caused significant loss of light or if the luminaire extinguished completely.

In many luminaires LEDs are linked in series, whereby a current flows through each LED in turn. Should an LED or solder joint fail, a whole row of LEDs may extinguish - this may even affect all LEDs in the luminaire. Thorlux has designed specific protective measures to prevent such a condition.

There are two methods of LED system protection used by Thorlux:

- 1 **LED Protect**
For high power LEDs



- 2 **LUX Guard**
For medium power LEDs

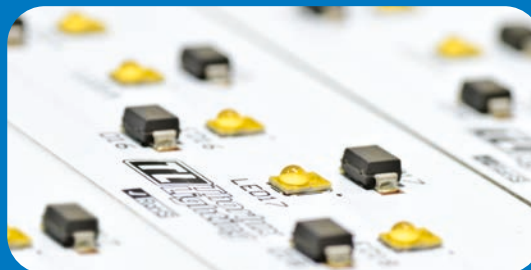


LED protect

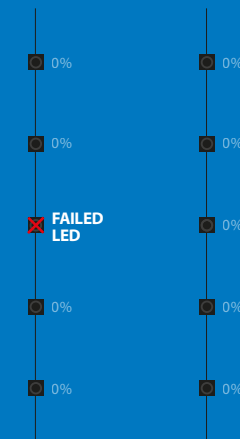
Some high-lumen output Thorlux luminaires, such as the Starbeam floodlight, use high-power LEDs.

In this type of luminaire LEDs are connected in a series string. Failure of an LED or its solder joint can cause an open circuit, and all LEDs in the string will extinguish. Thorlux adds PLED protectors to most of these luminaire types (see the LED characteristics data on each product page).

PLED protectors provide an alternative electronic path for the current to flow in the case of LED or solder joint failure, ensuring all remaining LEDs stay illuminated at the correct power. This invaluable feature guarantees that a luminaire continues to provide light, even in the case of nuisance LED failures. It also reduces the maintenance costs of a project.

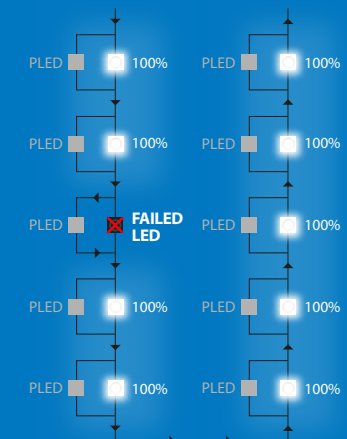


CONVENTIONAL CIRCUIT



0%
OUTPUT

CIRCUIT



90%
OUTPUT

★ PATENTED ★



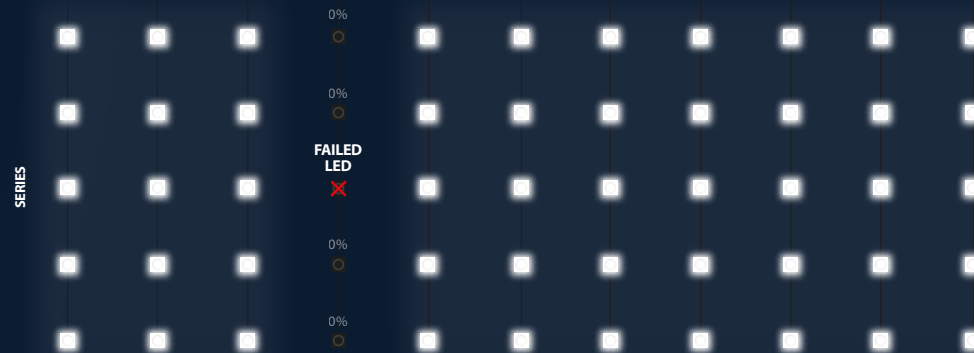
LUX Guard

Thorlux LUX Guard is a patented current-sharing PCB and circuit design philosophy. If an LED fails then its current is shared via neighbouring circuits, with each LED's brightness increasing slightly to compensate. LUX Guard ensures that a luminaire continues to provide its designed lumen performance, even in the case of nuisance LED failures, and reduces the maintenance costs of a project.

CONVENTIONAL
CIRCUIT

5 IN SERIES 11 IN PARALLEL
PARALLEL

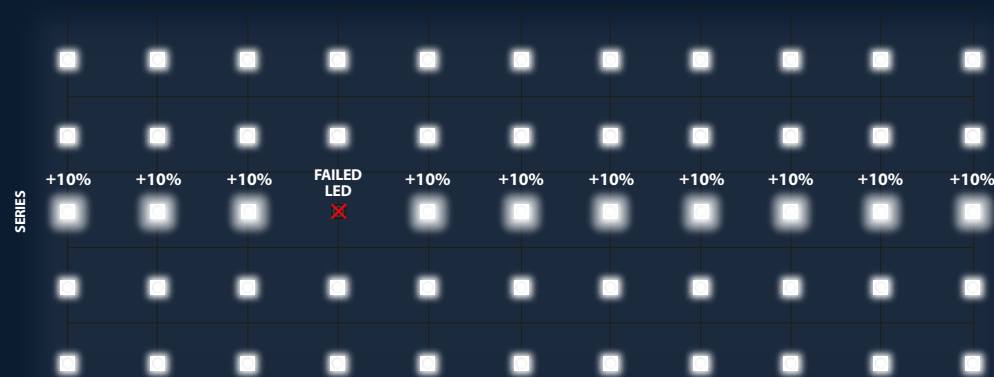
91%
OUTPUT



CIRCUIT

5 IN SERIES 11 IN PARALLEL
PARALLEL

100%
OUTPUT





How to specify your lighting supplier

1. The supplier shall be independently assessed and certified to ISO 9001 (Quality Management Systems).
2. The supplier shall be responsible for its environmental activities and demonstrate genuine concern, as proven by independent assessment and certification to ISO 14001 (Environmental Management Systems).
3. The supplier shall prioritise the welfare of the workforce and site visitors, as proven by independent assessment and certification to ISO 45001 (Occupational Health and Safety Management Systems).
4. The supplier shall prioritise the protection of sensitive data, as proven by independent assessment and certification to ISO 27001 (Information Security).
5. The supplier shall provide Certificates of Conformity demonstrating compliance with European legislation directives 2006/95/EC, 2004/108/EC and 2011/65/EU.5. Photometric test information shall be available using independently assessed equipment.
6. The supplier shall offer a commissioning service using in-house, trained technicians and then provide a commissioning certificate.
7. All products will be tested before despatch, including safety earth circuit continuity, high-voltage electrical strength testing, full circuit functionality including dimming, and checks on current drawn.
8. Products and services shall be backed by a comprehensive 5-year warranty - the supplier will have an established history and track record.
9. The supplier will have an established plan for achieving net-zero greenhouse gas (GHG) emissions in line with the Paris Agreement on Climate Change. This plan will be assessed and validated to SBTi standards.

Thorlux product testing

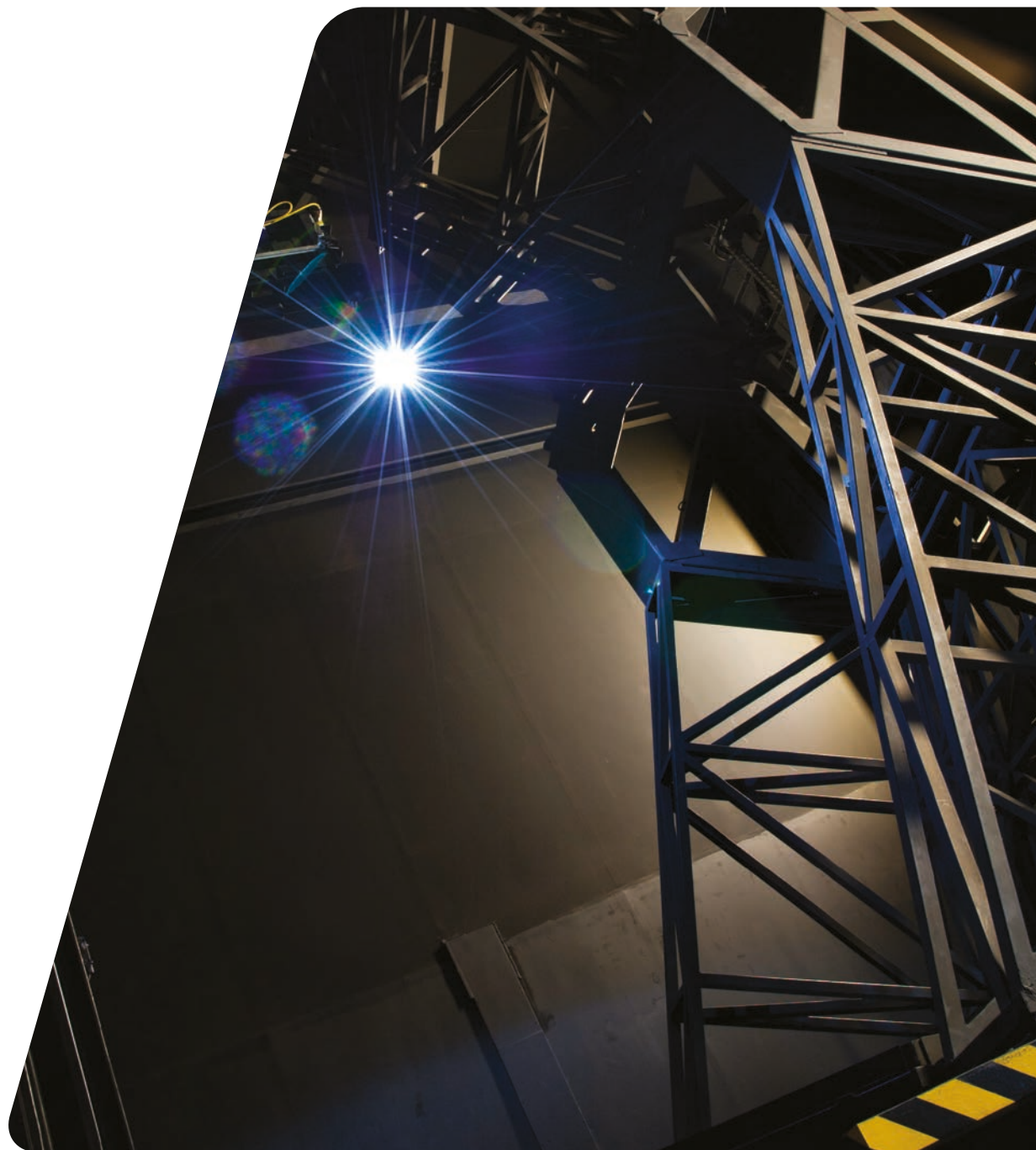
Rigorous product testing is essential in maintaining a reputation for reliability and quality.

Thorlux has an on-site Lighting Industry Association-certified photometric laboratory, enabling the company to obtain the best optical performance from its luminaires. Customers can be sure that the photometric data provided by Thorlux is accurate.

In the photometric test laboratory, a sophisticated goniophotometer gives fast and reliable measurements of the light distribution from luminaires. An integrating sphere equipped with a spectral analyser accurately measures light quality, efficiency and colour temperature.

Other in-house testing covers environmental and electrical parameters including extreme ambient temperatures, dust/water ingress, electromagnetic compatibility and current harmonics, per relevant British and European standards.

All test equipment is subject to regular in-house maintenance and calibration, with external third-party calibration at regular intervals to ensure the accuracy of data.



CASE STUDY

Ashford and St. Peter's Hospitals



Client background

Ashford and St Peter's Hospitals NHS Foundation Trust operates from two sites: St Peter's Hospital in Chertsey, Surrey, and Ashford Hospital in Middlesex. The Trust is the largest provider of acute hospital services in Surrey, serving a population of more than 380,000 people in the boroughs of Runnymede, Spelthorne, Woking, and parts of Elmbridge, Hounslow, Surrey Heath, and beyond.

The challenge

The Trust had four key objectives for its lighting improvements:

1. Benefit patients: to provide an environment that aids recovery.
2. Benefit staff: to provide an environment that enables staff to carry out visual tasks correctly.
3. Benefit the environment: to reduce carbon emissions.
4. Benefit the trust: to reduce the cost of operating the hospitals.

The Trust's project team took great care in the lighting design to provide an appropriate, effective scheme. By doing this, they ensured that the lighting levels and colour rendering were in line with the Trust's objectives for patients and staff.



The solution

Thorlux Lighting has been involved in several installations at Ashford and St Peter's Hospitals NHS Foundation Trust. These include:

Reception:

20W LED circular Dot luminaires were installed to promote a more positive atmosphere and achieve significant efficiencies. The result was a reduction in the electrical load from 1468 watts to 345 watts (76%).

Pathology department:

The pathology department reduced its lighting load by 22 kW (51%) by installing a mix of Jubilee-XL Smart and Jubilee Smart fittings as appropriate for each room. The addition of lighting controls gave an overall reduction of 68%.

Theatre corridors:

Controlled, efficient Jubilee luminaires were installed and positioned off-centre along the corridor. The positioning ensured that patients on trolleys were not subjected to glare or distressing stroboscopic effects.

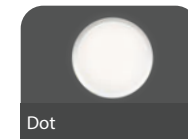
Client testimonial

"Good quality lighting design assists in providing a high quality aesthetically pleasing visual environment for patients and staff. There is no contradiction between this primary objective and low energy design."

RICHARD EGERTON

Project Manager Capital Projects.

Featured products



76%

ENERGY SAVINGS



RECEPTION AREA -
76% REDUCTION
IN ELECTRICAL LOAD



PATHOLOGY DEPT.
- **68%** OVERALL
REDUCTION IN
LIGHTING LOAD

CASE STUDY

United Lincolnshire Hospitals NHS Trust



Client background

United Lincolnshire Hospitals NHS Trust is one of England's biggest acute hospital trusts, serving a local population of 720,000 people. The Trust has worked with sustainability consultant ETL on an Energy Performance Contract (EPC) to procure and appoint an energy supplier. It has installed Thorlux SmartScan standard and emergency luminaires across its main hospital sites – Lincoln County, Grantham Hospital, and Pilgrim Hospital in Boston. The programme aims to build long-term energy resilience and make lasting enhancements to the patient care environment at the three hospitals.

The challenge

The primary aims of the new lighting scheme were to improve lighting levels and minimise energy usage through smart controls while providing a safe and comfortable environment for the public and staff. The ULHT expects to cut annual carbon emissions by 7,712 tonnes across the three principal hospitals.

Claire Hall, Associate Director of Strategic Business Planning at ULHT, said, "Sustainability, energy efficiency, and carbon reduction are at the heart of our management policy. We have already made great strides in reducing our carbon footprint. By upgrading and investing in sustainable technologies, it is our ambition to reduce this by 28% by 2021."



The solution

Thorlux Lighting proposed a new installation providing the required energy savings with improved lighting quality throughout the building. This proposal involved installing the Thorlux SmartScan monitoring and management system with intelligent lighting controls. Integral SmartScan sensors monitor ambient light and presence, control output to the correct level, dim and switch when there is sufficient daylight and illuminate the area only when occupied. Thorlux SmartScan luminaires have delivered a 91% energy saving compared to the previous lighting installation, resulting in electrical operating savings of £398,570 per annum.

Claire Hall said, "The Trust received a grant from the National Energy Efficiency Fund for £2.6 million, enabling the replacement of around 12,000 light fittings with modern LED fittings with smart technology. This technology means lights turn off after a period of inactivity, saving energy and money for the Trust."

91%

ENERGY SAVINGS



LIGHTING ENERGY
USAGE REDUCED BY
4,522,344 KWH
PER ANNUM

ROI

5.50
YEARS

SmartScan automatically controls the emergency lighting test regime, monitoring the status of each luminaire and reporting daily to the SmartScan website. Smartscan emergency luminaires test according to the schedule specified in BS EN 62034:2012 and display the current status via a bi-colour LED. Users of the SmartScan website can view current status information and complete archival data when required. Hospital managers recognised that removing the task of manually testing thousands of emergency luminaires every month can achieve significant savings.

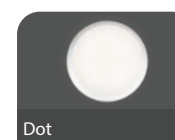
Featured products



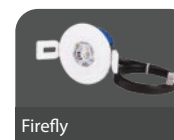
Cleanline



Cobalt



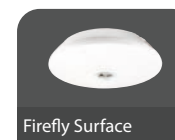
Dot



Firefly



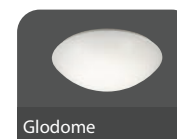
Firefly Plus



Firefly Surface



G3



Glodome



Kanby LED Controller



Kanby Pro



Lexi



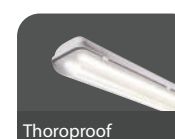
Radiance



Radiance Surface



Tau



Thoroproof



Designers, manufacturers and suppliers
of professional lighting systems

INDUSTRIAL LUMINAIRES
COMMERCIAL LUMINAIRES
FLOODLIGHTING LUMINAIRES
ARCHITECTURAL LUMINAIRES
HEALTHCARE LUMINAIRES
HAZARDOUS AREA LUMINAIRES
RETAIL AND DISPLAY LUMINAIRES
CONTROLS AND SYSTEMS

A DIVISION OF FW THORPE PLC

Thorlux Carbon Offsetting Project:
www.thorlux.com/trees

The information given in this catalogue is typical and must not be interpreted as a guarantee of individual product performance and/or characteristics. We reserve the right to alter specifications and designs without prior notice.

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