Kingfisher Lighting

Part of the LUCECO plc group of companies

kingfisherlighting.com

Technical Handbook

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Welcome

Built on a foundation of quality product design that encapsulates performance, efficiency and style, Kingfisher Lighting focus on bespoke end-to-end solutions to perfectly serve the specification of clients and surrounding environments.

Wrap-around services combine comprehensive project design and management, as well as offering technical support throughout. This together with 3D visualisations, BIM data, return on investment and energy calculations, ensures that projects are delivered to the highest standard.

This handbook offers practical guidance through the technical considerations necessary for a successful lighting scheme. Drawing from the knowledge and experience of the expert Kingfisher Team, let us guide you through the world of standards, optical packages, and electrical detail.

Accreditations

Kingfisher Lighting

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Contents

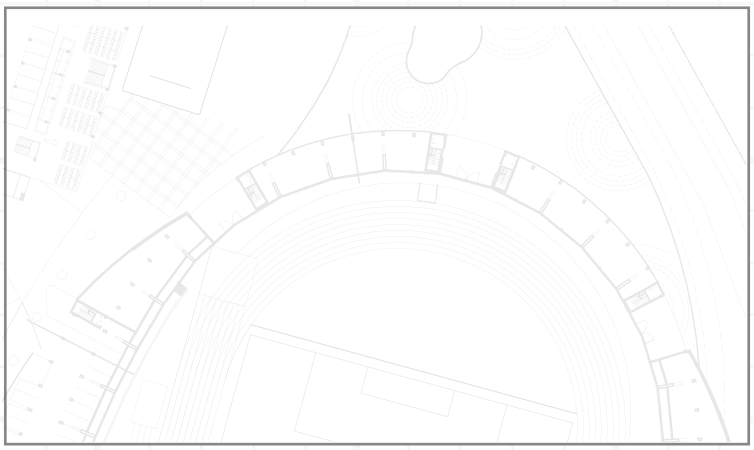
Environmental

Minimising the impact of LED lighting on the wider environment is at the heart Kingfisher Lighting practices. As part of the wider Luceco Group, we are working towards exceeding our target of being Net Zero by 2025 with careful attention paid to product design, manufacturing processes, product packaging, all the way through to lighting design techniques.

Circular Economy

A defining factor that sets the Kingfisher product range apart from other fittings on the market is the key focus on sustainability and the philosophy of 'reduce, reuse and recycle'. Our luminaires are specifically designed to ensure almost all parts are repairable or replaceable, extending the life of your lighting system.

Lighting Design



Good lighting design practices are of vital importance in creating the best, most sustainable schemes with minimal impact to the environment. Whether that be light pollution, wildlife habitats or human centricity.

The Kingfisher Lighting Design Team have a wealth of experience in exterior schemes and are dedicated to fulfilling not only the highest client requirements but exceeding expectations when it comes to environmental responsibility.

Colour Temperature

Colour temperature can have a huge impact on the areas surrounding any lighting scheme. The Kingfisher product range offers a variety of colour temperature options to perfectly tailor schemes ensuring minimal disruption.

Warmer temperatures such as 2700K have lesser effects on wildlife habitats and residential areas, and can be used alongside cooler colours to create the perfect scenes.

Kingfisher offer a range of colour temperature, dimming and single spectrum options to ensure the protection of local environments without compromising on scheme design.

Dark Sky Friendly Lighting

IDA Accredited

The International Dark Skies Association (IDA) have made it their mission to reduce the amount of light pollution across the world. They educate the public on the consequences of light pollution and provide useful insights and resources in their campaign.

The IDA is an internationally recognised organisation dedicated to reducing the impact of excessive use of artificial light on the night sky. They recommend reputable manufacturers who can meet their strict criteria and award the 'IDA Seal of Approval'. The criteria includes reduced back spill, flat to ground illumination, and 0% ULOR.

In order to meet these requirements, we ensure the amount of blue light within a scheme is lower and light is focused on the task area reducing disturbances for both humans and wildlife alike.

Our IDA approved luminaires are all designed and engineered in the UK and use innovative technology to increase efficiency, reduce glare and of course, light pollution. We have a range of approved flood, street, and wall mounted fixtures to ensure visual comfort as well as compliance for dark sky areas.

Design Philosophy

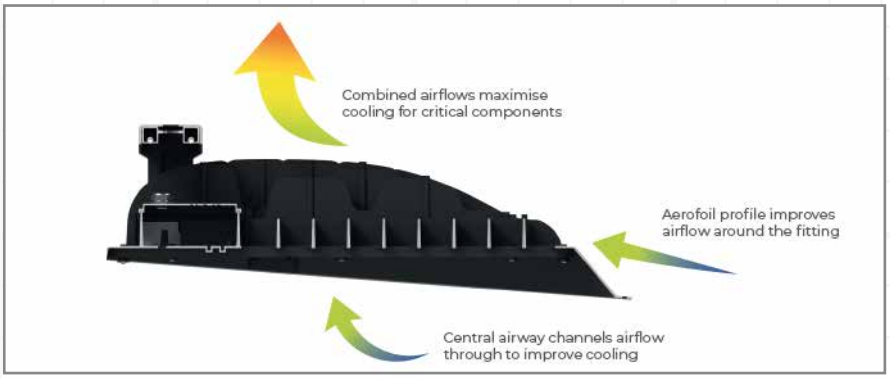
Build quality, spill light, glare and efficiency are the principal priorities for luminaires to ensure optimum performance whilst limiting the impact on the wider environment.

Our products are designed to last, utilising the strength and durability of die-cast aluminium bodies with tier one components and the purpose built optical and thermal systems.

Aerofoil Heatsink Technology

Our range incorporates a thermal air gap between the optic modules and through the heatsink fins, increasing airflow through the body of the fitting. This ensures that the luminaire and the inner components are kept at optimum temperatures, as well as reducing air pressure on the underside and sides of each fin which improves the overall stability at height.

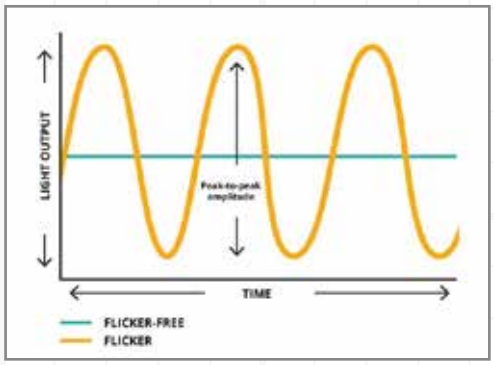
This unique design feature limits the movement of the fittings mounted on the mast, creating a safer, more efficient environment without additional stresses on the bracketry and column itself.



Flicker-Free

Many sites now require flicker-free illumination to support slow-motion and HD televised viewing, as well as both professional and amateur photography and videography.

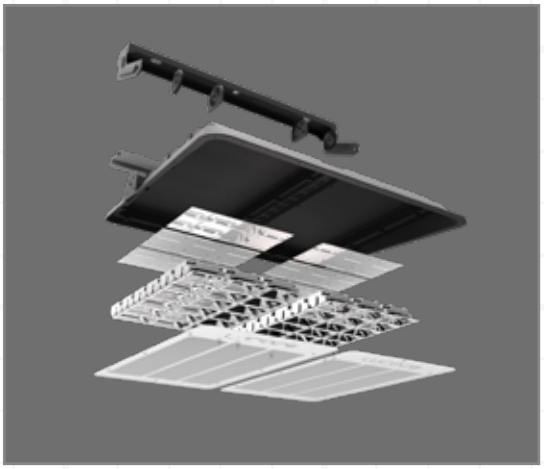
Our range of lighting has been specifically designed with a flicker index of 0.12% in accordance with the professional guidance notes by CIBSE which states that any luminaire with a flicker index <1% is classed as flicker-free, alleviating the risk of on-screen flicker and distorted imagery.

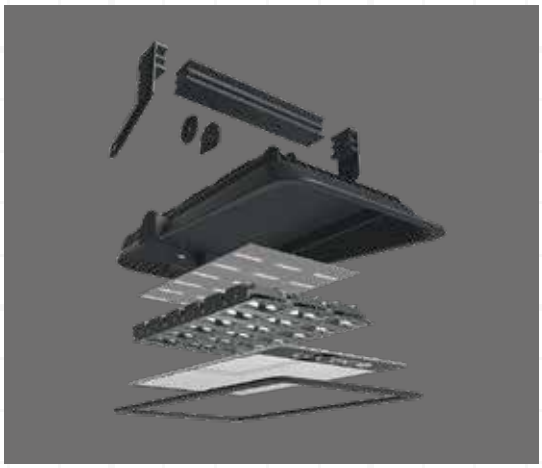


Reflector Technology

Reflector Technology Explained

Our product array offers superior build quality including being designed to use reflector technology which provides an efficient, low glare output. Using high-reflectance surfaces, this technology allows us to redirect incident light back to the front of the fitting, producing a comfortable output and allowing the light to be directed exactly where it's needed.

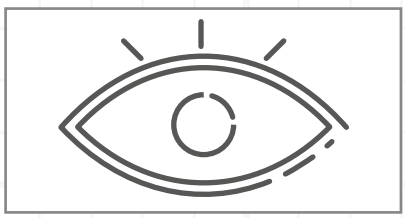




The Benefits

Reduced Obtrusive Light
Offering both excellent horizontal and vertical cut off due to the advanced reflector system, our luminaires work seamlessly with recognised guidance notes.

Low Glare
Glare poses concern with all lighting for both pedestrians and road users alike. Glare is drastically cut, with levels on the target illumination area being far lower than the British Standard limits outline.



IDA Accredited Range
With ULOR at 0%, our flat-to-ground fittings safeguard against sky glow and have achieved dark sky friendly status, carrying the 'Fixed Seal of Approval' from the International Dark Skies Association. With a strict assessment process, this coveted accreditation is testament to this highly developed system. Look for the IDA symbol for more information.

Efficiency
The reflector-based system allows the light to be directed to the task area meaning no light wastage occurs, making it one of the most efficient and high performing systems on the market. All our optical packages offer a reduced energy consumption, saving money and extending the lifetime of the fitting.

Professional Lighting Standards

Lighting standards are developed by industry experts in technical committees and published by groups such as BSI (British Standard Institute) and CIE (International Commission on Illumination).

These standards are normalised across Britain and Europe (BS EN) and have become the main guide to which lighting designers turn to. Even though the standards aren't legally binding, adhering to them demonstrates competency and that a duty of care has been given to the user.

ILP GN01

The Institution of Lighting Professionals (ILP) have created guidance notes to contribute to and encourage the active reduction of obtrusive light. As active members of the ILP, we work to these guidelines and action them within all designs wherever possible and produce innovative solutions to combat light pollution.

The full document can be accessed through the ILP, however read on for a snapshot of the new guidance on topics such as environmental zoning, lighting design and luminaire selection.

Guidance Notes on Obtrusive Lighting

Keeping within Environmental Zones

The guidance surrounding environmental zones has been adjusted to give further detail and clarity. This gives greater understanding of how each area should be approached.

Zone	Surrounding	Lighting Enviroment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

The Best Lighting Results are Produced from an Even Better Lighting Design

GN01 is clear to stress the importance of using competent lighting designers with proven experience. This ensures that lighting installations mitigate against all aspects of obtrusive light.

Designers must take into consideration a whole host of factors in order to achieve compliance including the performance of the luminaire, mounting heights, surrounding environments and installation methods.

Making the Right Choice - Fittings and Installation

Due to the increased awareness and more stringent requirements surrounding the performance and effects of luminaires within ecterior lighting, it is more important than ever to choose the right fittings.

GN01 recommends that exterior lighting should now be flat-to-ground and/or have a beam angle of less that 70°, as well as close consideration being paid to mounting positions. Placing luminaires at higher levels can often give more flexibility with aiming, while still reducing the risk and impact of obtrusive light on residential and wildlife environments in the surrounding areas.

Values for the Control of Obtrusive

Light Intrusion

The guidance to specify light levels and limits used to be 'design only'. The requirements have now changed with base level checks needed to meet defined light limits. This will determine the total light allowed over the entire design including the total light on windows.

Limitation of Bright Luminaires in the Field View

The limitations of luminaires should be considered in designs that are based on viewing distances and projected areas from surfaces causing a nuisance for the occupants of adjacent premises.

When more than one lantern is located close to each other, the observer should see them as one light source. As a result, the bright luminaire surfaces facing the observer are assessed.

Luminaire Intensity

The luminaires used to be assessed for luminaire intensity per unit. Now, this is measured from a factor of the light source size and observer distance, and we need to group fittings that are close together.

Regulations

Light Pollution is now classed as a statutory nuisance just like noise or industrial pollution. If schemes are inadequate, it could result in sites being prosecuted, fined, or visited by environmental planning – even after the planning stage. It is imperative that this guidance is taken seriously throughout the industry to avoid obtrusive light wherever possible.

Impact on Calculation

All designers must consider ULOR, UFR, Vertical Illuminance and Glare.

ULOR – Upward Light Output Ratio

The standard parameters still apply which limit direct upward light but additional considerations have been added, such as Sky Glow and UFR.

UFR - Upward Flux Ratio

Upward Flux Ratio considers reflected light and splits areas into lit zones and spill areas, moving the focus onto the control of light. The contributing factors are lux levels, reflectance values, utilisation of light and environmental zones.

What's Next

Please take the time to read the full guidance notes and talk to our experienced designers to alleviate the risk of a non-compliant lighting scheme.

British Standards

All lighting designers work to the British Standards as laid out in the BSI documentation, unless instructed in the specification. There are other guides available, however these reference British Standards. The main sections of the standard which need to be considered are laid out below.

BS5489-1:2020
Lighting Of Roads & Public Amenity Areas

Outdoor Car Parks

For lighting purposes, both surface car parks and the open roof level of multi-storey car parks should be regarded as outdoor car parks.
In many instances, surface car parks are close to properties and roads. Lighting from these can contribute to the illumination of the car parking area, but, as this lighting cannot be assured in terms of quality and duration, surface car parks should have independent lighting provisions.

Luminaires in outdoor car parks should be selected and mounted such as to avoid obtrusive lighting, following the guidance in 4.2.3.

The design, orientation and location of luminaires in the motorist's line of sight should be arranged such that glare is minimised. In order to limit glare, an appropriate intensity class should be selected from BS EN 13201-2:2015, Table A.1.

The appropriate lighting level should be selected from Table 4, taking into account the type and location of the car park, and should be provided and maintained through all the night-time hours of use.

NOTE 1 A different level may be selected at periods of night when the usage is significantly different to normal usage.

NOTE 2 Table 4 is taken from BS EN 12464-2:2014, Table 5.9.

Table 4 - Maintained Lighting Levels for Outdoor Car Parks

Type of Area and Usage	Values in lux $\bar{E}$	U_o
Light traffic, e.g. parking area of shops, terraced and apartment houses: cycle parks	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25
Heavy traffic, e.g. parking areas of major shopping centres, major sports, multipurpose sports and building complexes	20	0.25

In areas with low ambient luminance or environmental sensitivity areas, car park lighting levels should be appropriate to the adjacent highway lighting levels.

Lighting for open roof level car parks should be planned to avoid visual domination of the skyline by the components used to mount the luminaires during the day and by the light sources at night.

NOTE 3 Further information is given in ILP GNO1 [N2].

The boundary of open roof level car parks should be well defined by illumination of the perimeter and rails. When selecting the location of luminaires and mounting components, the need for access for maintenance should be taken into account.

*Exatract from BS 5489-1:2020

BS EN 12464-2
Outdoor Work Places

Table 5.7 - Industrial Sites and Storage Area

Ref. no.	Types of Area, Task or Activity	$\bar{E}m$ lx	U_o —	R_{GL} —	Ra —	Specific Requirements
5.7.1	Short-term handling of large units and raw materials, loading and unloading of solid bulk items	20	0,25	55	20	
5.7.2	Continuous handling of large units and raw materials, loading and unloading of freight, lifting and descending location of crane, open loading platforms	50	0,40	50	20	
5.7.3	Reading of addresses, covered loading platforms, use of tools, ordinary reinforcement and casting tasks in concrete plants	100	0,50	45	20	
5.7.4	Demanding electrical, machine and piping installations, inspection	200	0,50	45	60	Use local lighting

Table 5.9 - Parking Areas

Ref. no.	Types of Area, Task or Activity	$\bar{E}m$ lx	U_o —	R_{GL} —	Ra —	Specific Requirements
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	45	40	

*Extract from BS EN12464-2:2014

BS EN 13201
Road Lighting

5 Requirements for conflict areas

The C classes in Table 2 are intended for drivers of motorised vehicles, and other road users, on conflict areas such as shopping streets, road intersections of some complexity, roundabouts, queuing areas, etc.

NOTE 1
Guidance on the application of these classes is given in CEN/TR 13201-1.

C classes can also be applied to areas used by pedestrians and pedal cyclists, e.g. underpasses.

The average illuminance (E) and the overall uniformity of the illuminance (U.) are to be calculated and measured in accordance with EN 13201-3 and EN 13201-4.

The road area for which the requirements of Table 2 apply can include the carriageway only, when applying separate requirements for the adequate lighting of other road areas for pedestrian and cyclists, or it can include also other road areas.

NOTE 2
Limitation of disability glare can be demonstrated by evaluating fn values for all relevant combinations of observation directions and observer positions (see Annex C) or achieved by the selection of luminaires according to the classes G*1, G*2, G*3, G*4, G*5 or G*6 (see A.1).

Table 2 - C Lighting classes based on road surface

Class	Horizontal Illuminance	
	$\bar{E}$	U_o
C0	50	0,40
C1	30	0,40
C2	20,0	0,40
C3	15,0	0,40
C4	10,0	0,40
C5	7,50	0,40

NOTE 3
The C classes are mainly intended for use when the conventions for road surface luminance calculations do not apply or are impracticable. This can occur when the viewing distances are less than 60 m and when several observer positions are relevant. The C classes are simultaneously intended for other road users on the conflict area. The C classes have further application for pedestrian and pedal cyclists in such cases, where P and HS classes defined in 6.1 are not adequate.

6 Requirements for pedestrians, pedal cyclists, road & highways
6.1 General requirements

The P classes in Table 3 or the HS classes in Table 4 are intended for pedestrians and pedal cyclists on footways, cycleways, emergency lanes and other road areas lying separately or along the carriageway of a traffic route, and for residential roads, pedestrian streets, parking places, schoolyards, etc.

NOTE 1
Guidance on the application of the above-mentioned classes is given CEN/TR 13201-1.

The average illuminance (E), the minimum illuminance (Emin), the average hemispherical illuminance (Ehs) and the overall uniformity of the hemispherical illuminance (Us) are to be calculated and measured
according to EN 13201-3 and EN 13201-4.

The road area for which the requirements of Tables 3 and 4 apply can include all the road area such as carriageways on residential roads and reserves between carriageways, footways and cycleways.

NOTE 2
Limitation of disability glare can be demonstrated by evaluating fn values for all relevant combinations of observation directions and observer positions (see Annex C) or achieved by the selection of luminaires according to the classes G*1, G*2, G*3, G*4, G*5 or G+6 (see A.1).

NOTE 3
'Limitation of discomfort glare can be achieved by the selection of luminaires according to the classes D1, D2, D3, D4, D5 or D6 of Annex A (see A.2). For the HS classes of Table 4, only the classes D5 or D6 are relevant.

Table 3

Class	Horizontal Illuminance		Additional requirements if facial recognition is necessary	
	$\overline{E}$ [a] [minimum maintained] lx	E_{min} [maintained] lx	$E_{v,min}$ [maintained] lx	$E_{sc,min}$ [maintained] lx
P1	15,0	3,00	5,0	5,0
P2	10,0	2,00	3,0	2,0
P3	7,50	1,50	2,5	1,5
P4	5,00	1,00	1,5	1,0
P5	3,00	0,60	1,0	0,6
P6	2,00	0,40	0,6	0,2
P7	Performance not determined	Performance not determined		

* To provide for uniformity, the actual value of the maintained average illuminance shall not exceed 1,5 times the minimum E value indicated for the class.

*Extracts from BS EN13201-2:2015

Secured by Design

Secured by Design (SDB) is the official police security initiative that is owned by the UK Police Service with the specific aim to reduce crime and help people live more safely. The extracts below outline the guidance on external commercial lighting.

SDB for Street Lighting

19.1 – All street lighting for both adopted highways and footpaths, private estate roads and footpaths and car parks must comply with BS 5489-1:2020. Where conflict with other statutory provisions occurs, such as developments within conservation areas, requirements should be discussed with the CPDA and the local authority lighting engineer (Note 19.1). Note 19.1: It is recognised that some local authorities have dark sky' policies and deliberately light some of their rural, low crime areas to very low levels of illumination and that others are currently experimenting with switching off street lamps in low crime areas between certain hours of the night in order to save energy costs and reduce CO2 emissions. If such policies exist, then these must be brought to the attention of the CPDA at the time of application.

19.2- Landscaping, tree planting and lighting schemes shall not be in conflict with each other

19.3 - The Overall Uniformity of light for an SBD development is expected to achieve a rating of 0.40 Uo and should never fall below 0.25Uo (Note 19.3). Note 19.3: The evenness of light distribution is almost always more important than the levels of illumination being achieved by the system (the levels are determined by BS 5489). The British Standards Institute have issued an advisory note stating that they recommend that Uo be at least 0.25 or 25%. A 0.4 Uo value is the ideal standard for an SBD lighting system, but where technical reasons prevent this, we will still require the very best levels possible and under no circumstances may the rating fall below 0.25 Uo.

19.4 - The Colour Rendering qualities of lamps used in an SD development should achieve a minimum of at least 60Ra (60%) on the Colour Rendering Index

SDB for Schools

- Lighting provided to all entrances, movement routes car parks and cycle storage areas
- External lighting levels to be to BS 5489 1992 standard Light fittings shall be vandal resistant and easily maintained
- Lighting mounted at a height, which allows best spread of light (no shadows) and reduces vulnerability to vandalism (5m high standards preferred)
- Lighting compatible with landscaping lighting compatible with CCTV system

SDB for Security Lighting

139.1 – The need for lighting will be determined by local circumstances. For example, in an inner city environment the lighting of a footpath is generally only effective in reducing crime levels if it is matched with a high degree of natural surveillance from surrounding buildings, where reaction to an identified incident can be expected. The lighting of an underused footpath may give the user a false sense of security and should be avoided. If there is a history of crime along an existing footpath, or where the additional connectivity due to the development could attract criminal or anti-social behaviour, consideration should be given to closing the path at night rather than lighting it. It is accepted that this would only be an option in exceptional circumstances.

39.2 - In terms of security, the objective of lighting commercial units after dark is to deter or detect an intruder (See Section 2 paragraphs 48 for standards and values).

39.3 - Lighting design should be co-ordinated with a CCTV installation (when specified) and the landscape designed to avoid any conflicts and to ensure that the lighting is sufficient to support a CCTV system. Light fittings should be protected where vulnerable to vandalism.

39.4 - A lighting scheme should provide uniform lighting levels with good colour rendition and be sufficient to cater for lawful after dark activity around the industrial or warehouse unit and site. It should not cause glare or light pollution and should support both formal and informal surveillance of the site.

39.5 - External illumination when the building is unoccupied is recommended for entrance gates and routes to the main entrance and doors, car parks (if occupied by vehicles) and observable building elevations.

39.6 - In some circumstances, and especially where security guards are monitoring the building from outside, it may be useful to direct lighting at the building to aid intruder detection.

39.7 - The use of bollard lights may be useful for way finding, however bollard lights fail to properly model the facial features of pedestrians and are vulnerable to vandalism and vehicle collision. Therefore, their use for security purposes is discouraged.

SDB for Hospitals

- Lighting provided to all entrances, recesses, movement routes and car parks.
- External lighting levels to be to BS 5489 Part 9.
- Light fittings shall be vandal resistant and easily maintained
- Lighting mounted at a height that allows best spread of light, without shadows and reduces vulnerability to vandalism.
- Lighting to be compatible with landscaping

*Extracts from Secured by Design (SBD)

BREEAM Requirements

There are only a few requirements for external lighting detailed within BREEAM, which are as follows:

- Reference to the CIBSE Guide for light levels (Credit Reference HW05).
- Compliance with the guidance notes for the reduction of obtrusive light pollution by the ILE (Credit Reference P12).
- One credit where evidence provided demonstrates that energy efficient external luminaires are specified and all light fittings controlled for the presence

Table 1 - Environmental Zones

Zone	Surrounding	Lighting Enviroment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 2 - Obtrusive Light Limitations for Exerior Lighting Installations - General Observers

Zone	Sky Glow ULOR (Max %)	Light Intrusion (into windows EV (LUX)		Luminaire Intensity I (candelas)		Building Luminance Pre-curfew
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L (cd/m2)
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2500	0	0
E2	2.5	5	1	7500	500	5
E3	5.0	10	2	10000	1000	10
E4	15	25	5	15000	2500	25

The requirement has been relaxed and luminaires must now achieve:

- All external lighting for the building, access ways and pathways to be a minimum of 50 lamp lumens/circuit watt
- All lighting to car parking areas and associated roads, where provided, to have a minimum of 70 luminaire lumens/circuit watt
- All flood lighting and sign lighting, where provided, to have a minimum of 70 luminaire lumens/ circuit watt.

The fitting types that would comply with the BREEAM guide with regards to light pollution are those with an asymmetrical type reflector, which is standard in our floodlight range. Some symmetrical fittings would comply providing they have the appropriate cover/hood, which will prevent stray upward and light trespass on the surrounding areas.

0% ULOR Examples

The table below shows examples of 0% ULOR luminaires in the Kingfisher Lighting range

Product Name	ULOR (%)
NAVAR Series	0
AMNIS Series	0
VIVA-CITY Family	0
SEMITA Series	0
QUARTO 2.0	0
KLOU-IK	0
ZACTIS	0
ITALO	0

BREEAM Requirements

The following are extracts from BREEAM 2018

Pol 04 - Reduction Of Night Time Light Pollution

Number Of Credits Available: 1 Minimum Standards: No

Aim

To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, thereby reducing unnecessary light pollution, energy consumption and nuisance light to neighbouring properties.

Assessment Criteria

1 External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users.

OR alternatively, where the building does have external lighting, one credit can be awarded as follows:

2 The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ""Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011."

3 All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.

4 If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes.

5 Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements.

BREEAM®

Ene 03 - External Lighting

Number Of Credits Available: 1 Minimum Standards: No

Aim

To recognise and encourage the specification of energy efficient light fittings for external areas of the development.

Assessment Criteria

The following demonstrates compliance:

1 The building has been designed to operate without the need for external lighting (which includes on the building, signs and at entrances).

OR

2 The average initial luminous efficacy of all the external light fittings within the construction zone at least 70 luminaire lumens per circuit watt.

3 All external light fittings are automatically controlled for prevention of operation during daylight hours and fitted with presence detection in areas of intermittent pedestrian traffic.

HEA 01 - Visual Comfort

Number Of Credits Available: 1 Minimum Standards: No

Aim

To encourage best practice in visual performance and comfort by ensuring daylighting, artificial lighting and occupant controls are considered.

Assessment Criteria

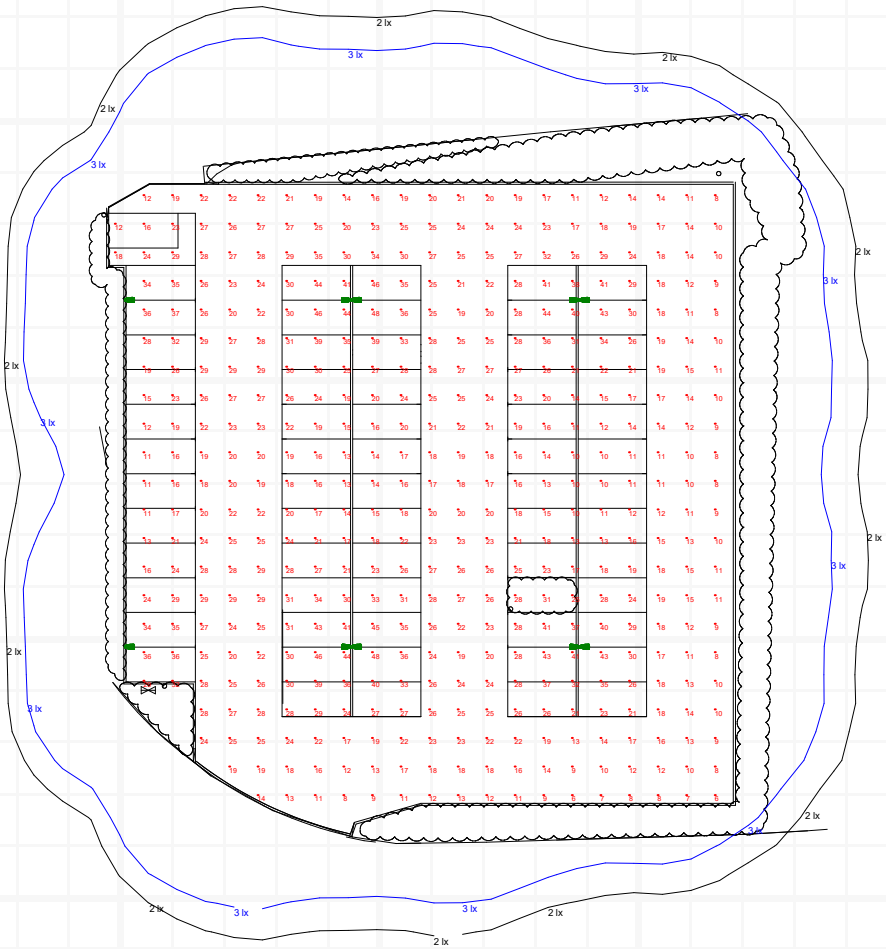
1 All external lighting located within the construction zone is specified in accordance with BS 5489 1:2013 Code for the practice for the design of road lighting. Lighting of roads and public amenity areas and BS EN 12464 2:2014. Light and lighting - Lighting of work places - Part 2: Outdoor work places. External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night.

2 Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with criteria 8-9.c.

Sample Spacings

The consideration of luminaires spacing is, in essence, striking a balance between mounting height, optical performance and lighting level; in theory the higher you go the better the spacings. Increased spacings reduce the number of fittings needed on site and therefore reduce installation, running and maintenance costs.

The following pages show example spacings from our optical range within the application they were designed for.



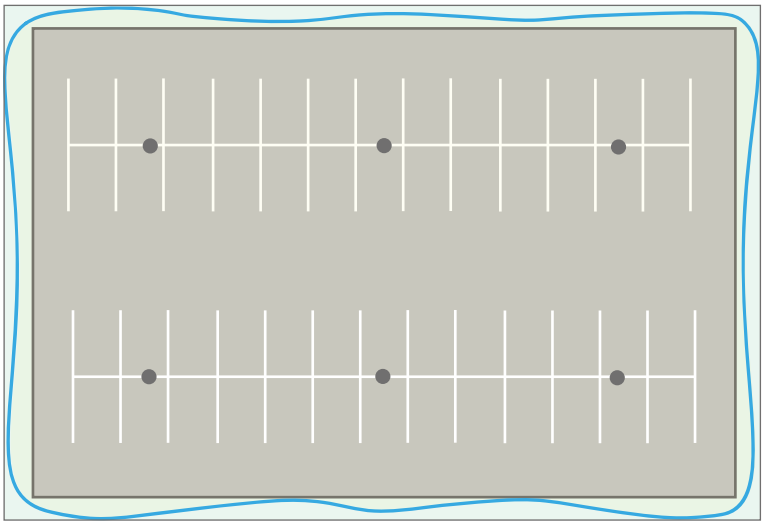
NAVAR Optical Packages

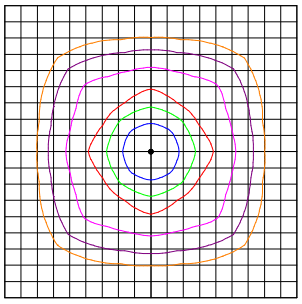
The NAVAR optical packages have been specially designed to cater for the growing needs of our client base. Built using high efficiency LUMILEDS 50/50 LED chip sets, these optics offer best in class performance and uniformity.

The Kingfisher range has been designed with versatility in mind offering colour temperature options, full control capabilities and retrofit features to maximise future opportunities.

SQ70 - Carparks/ Large Area Optic

This symmetrical optic produces a square distribution and is best placed in car parks and large area sites. This package has a peak intensity at 70° and offers a low glare, yet powerful performance.





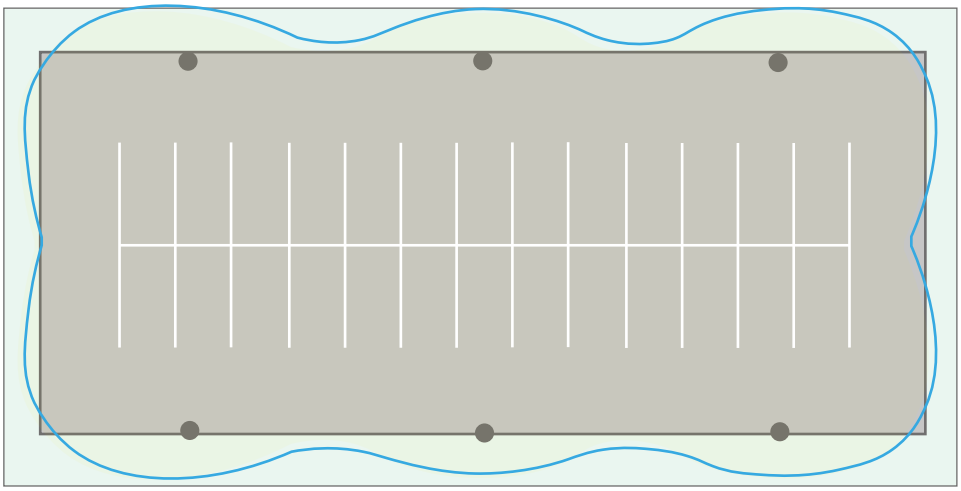
Additional Info

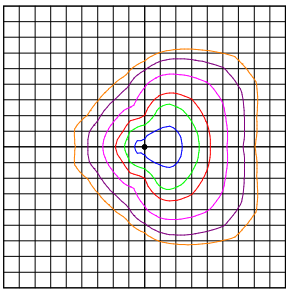
- Typical spacing to height ratio
  6m 10 lux with 25% = 6:1
  8m 20 lux with 25% = 6:1
  8m 20 lux with 40% = 5:1

* Other optical packages are available

FW70 - Road Optic

Perfect for wide areas and perimeter lighting this optic offers versatility and efficiency as standard. The asymmetric forward throw distribution has a peak intensity of 70° and offers a dark sky friendly illumination with 0% ULOR.



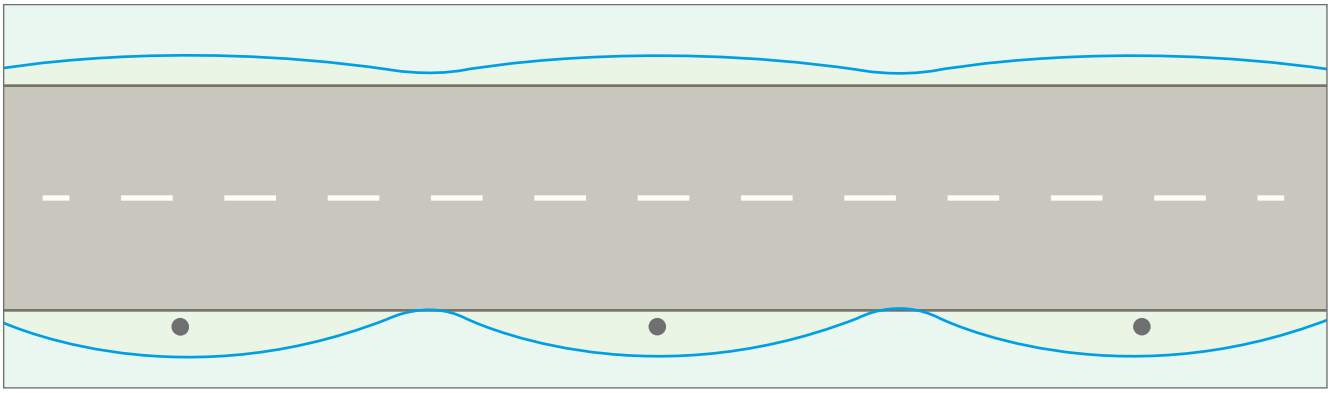


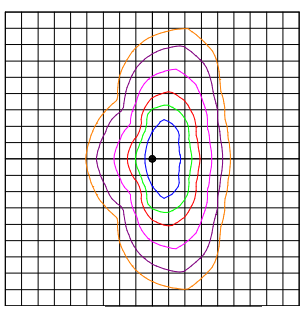
Additional Info

- Typical spacing to height ratio
  6m 10 lux with 25% = 4:8:1
  8m 20 lux with 25% = 4:6:1
  8m 20 lux with 40% = 4:1

AY70 - Street/ Roadways

The AY optic produces low levels of back spill, making it the perfect option for street and roadways. Again, with a peak intensity of 70°, low glare illumination and 0% ULOR.





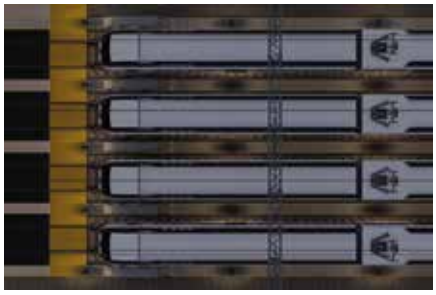
Additional Info

- Typical spacing to height ratio
  6m 10 lux with 25% = 6:8:1
  8m 20 lux with 25% = 5:8:1
  8m 20 lux with 40% = 4:5:1

* Other optical packages are available

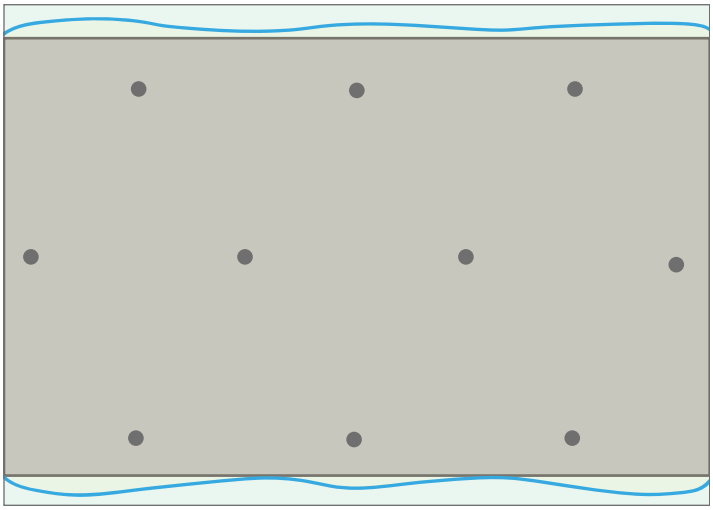
VAILO Optical Packages

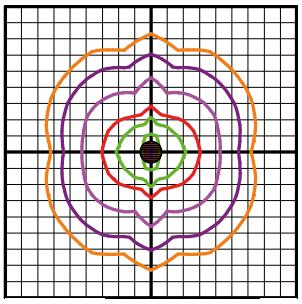
The VAILO optical system has been specially designed to give maximum spacings, saving money project wide. This versatile package can produce up to 8m spacing from the area optic but also offers specific pathway optics to create the perfect scene while limiting spill light and reducing waste illumination.



AY - Area Optic

This optic offers best in class spacing of up to 8m as standard, reducing the number of fittings needed in any project. Offering a low glare illumination, this optical system is ideal for roadways, plazas and rail sidings.

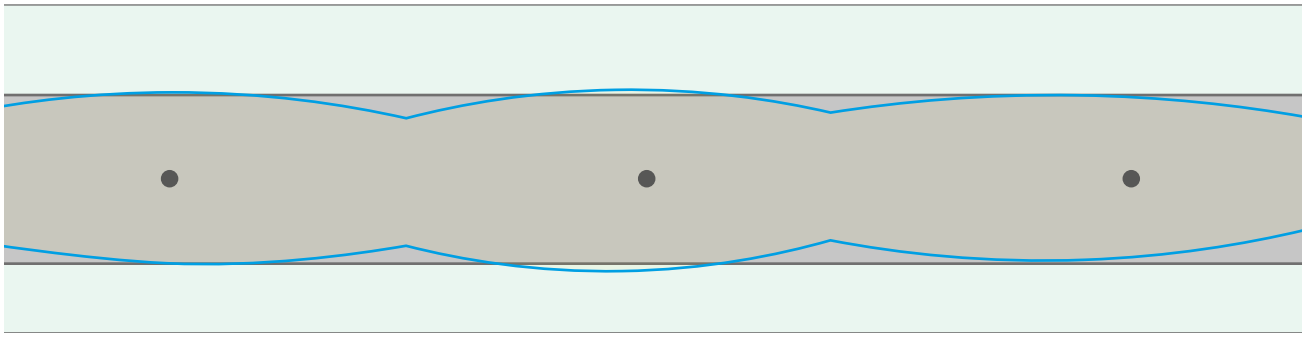


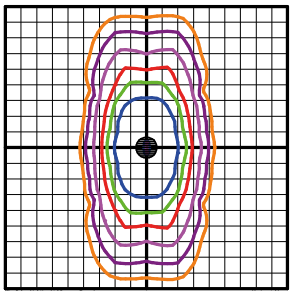


* Other optical packages are available

SY - Twin Pathway Optic

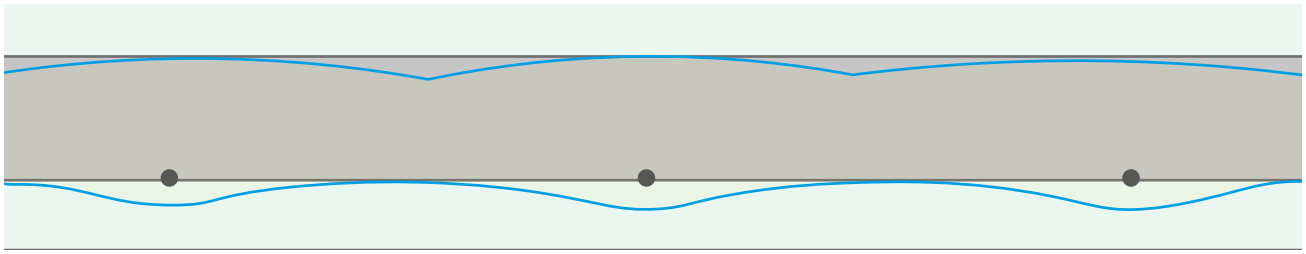
Using the adjustable output feature, this system has been created to give a two way illumination ideal for pathways. As with the other optics, the SY twin way, delivers a low glare solution and reduced ULOR.

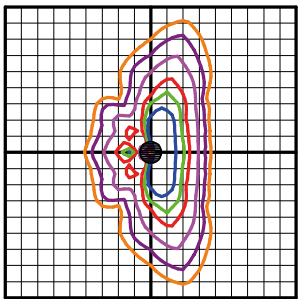




SY - Single Pathway Optic

The symmetrical single way optic is the perfect fit for narrow pathways using the onsite adjustable feature. As with all optical systems in the Kingfisher range, a low glare illumination comes as standard.





* Other optical packages are available

AEC Optical Packages

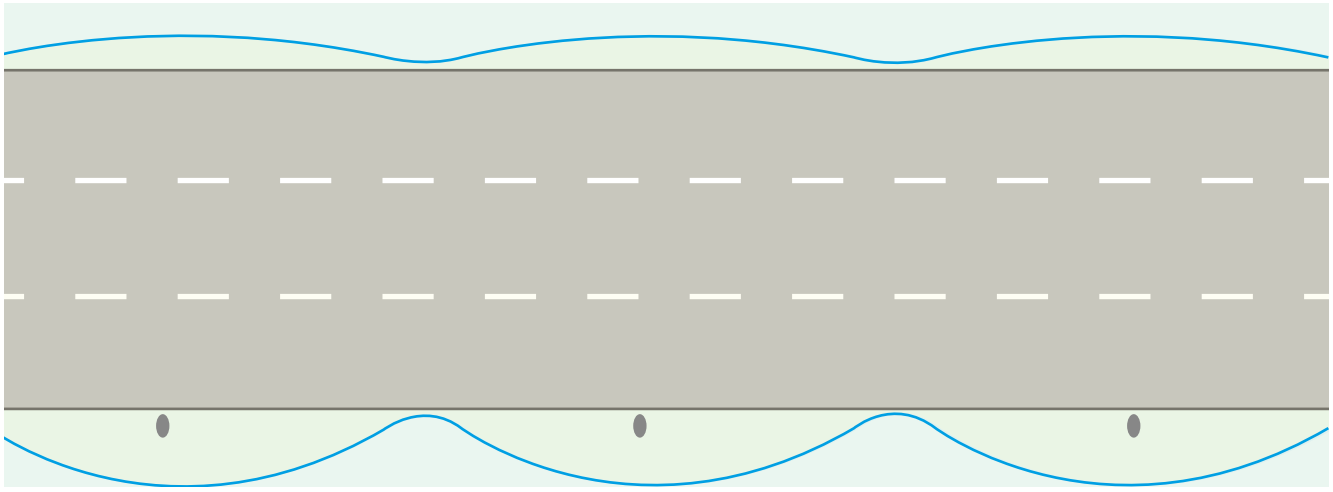
The PENTHA optic has been designed to guarantee even better performance and reliability. Better management of the Color Shift Angles and high quality materials create the perfect mix between performance and efficiency.

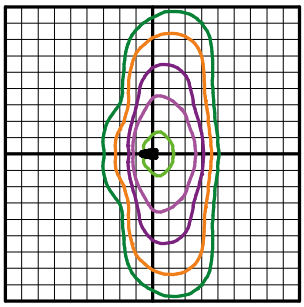
Developed by expert lighting engineers in their Italian facility, the PENTHA Optical system is AEC's innovative reflector system developed using aluminium housings alongside tempered glass screens to ensure the quality of the light is of the highest standard.

PENTHA
ALUMINIUM REFLECTOR TECHNOLOGY

STW - Wide Roadways/ Area Optic

This asymmetrical optic produces a wide distribution perfect for lighting multi-lane roadways and wide areas. The optic has a peak intensity of 63° with a low glare output, creating a safe environment for road users.





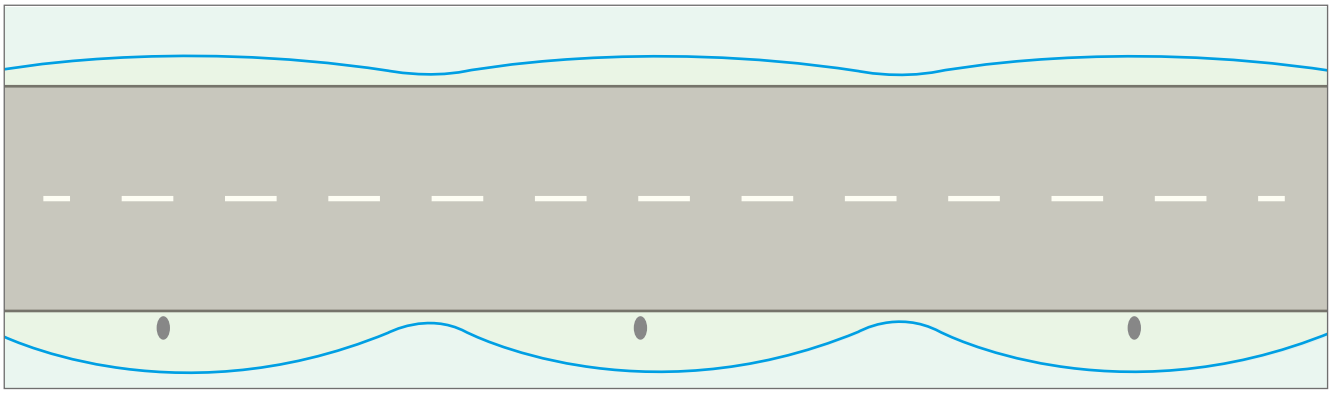
Additional Info

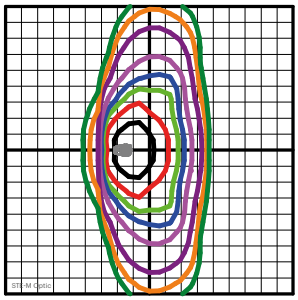
- Typical spacing to height ratio of 6:1

* Other optical packages are available

STE-M - Road Optic

This asymmetrical optic produces a medium distribution perfect for illuminating standard road widths. The optic has a peak intensity of 60° and creates a comfortable environment for all site users due to its innovative system.



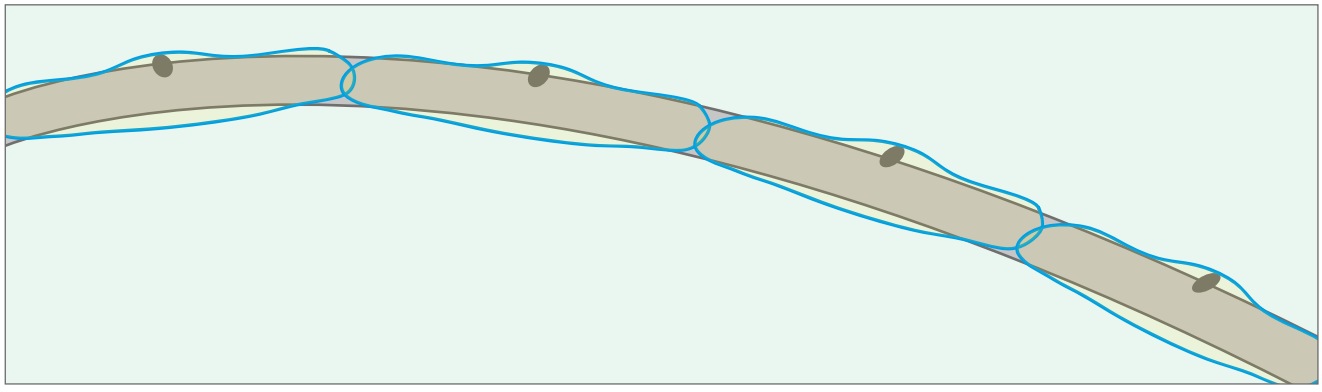


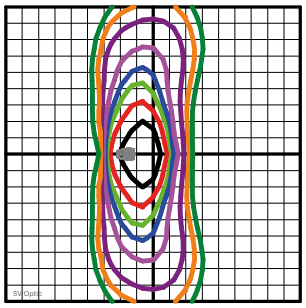
Additional Info

- Typical spacing to height ratio of 6:1

SV - Narrow Roadways/ Pathways

This narrow optic provides an asymmetric distribution ideal for narrow pathways and roadways. The SV optics have a peak intensity of 60° and when paired with its advanced internal system creates the perfect illumination for many areas





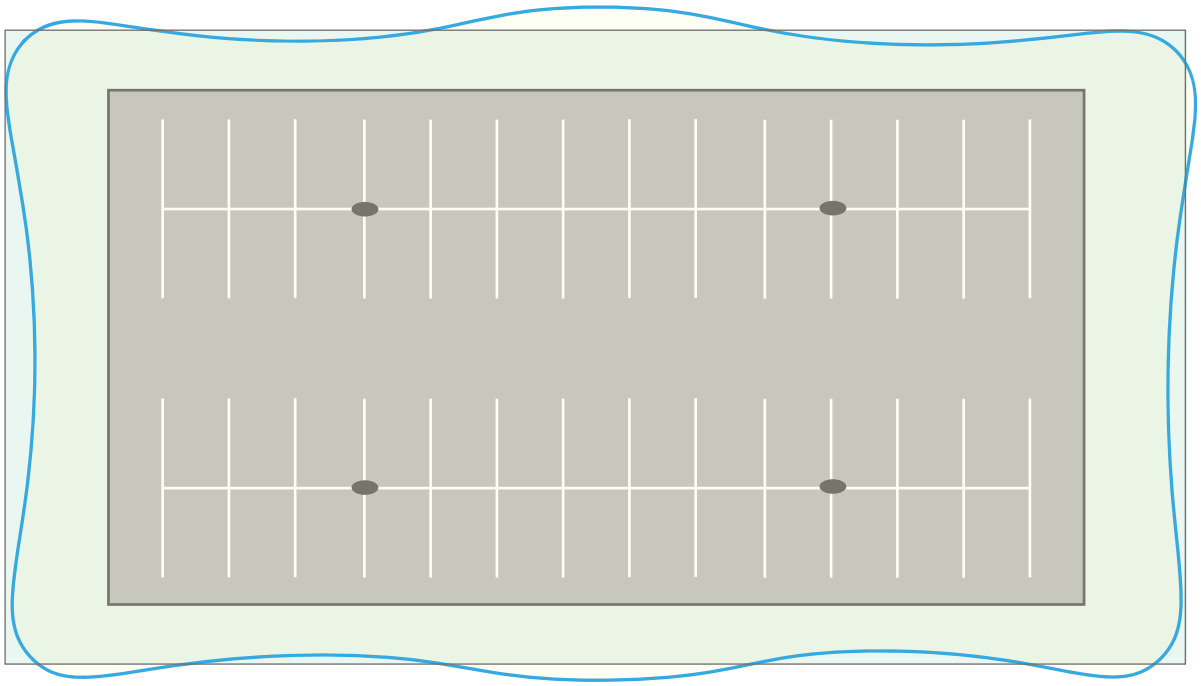
Additional Info

- Typical spacing to height ratio of 6:1

* Other optical packages are available

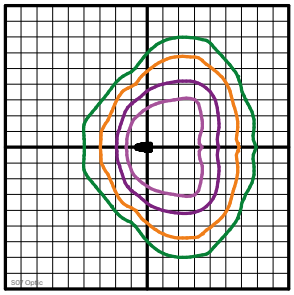
SO7 - Car Parks/ Area Optic

The SO7 optic is perfect for large open area applications. The asymmetrical distribution lends itself perfectly to large car parks, service yards and open area sites. With a peak intensity of 60°, the SO7 uses the patented PENTHA reflector-based system offering a powerful performance and low glare output.



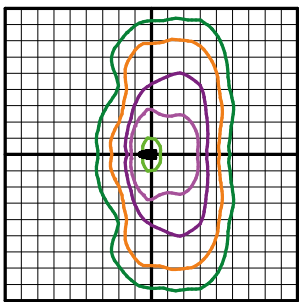
Additional Info

- Max recommended tilt 10° as per ILP recommendations
- Typical spacing to height ratio of 5:1



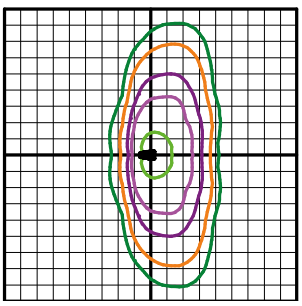
Other AEC Optics

STA



Typically used for:
Roadways

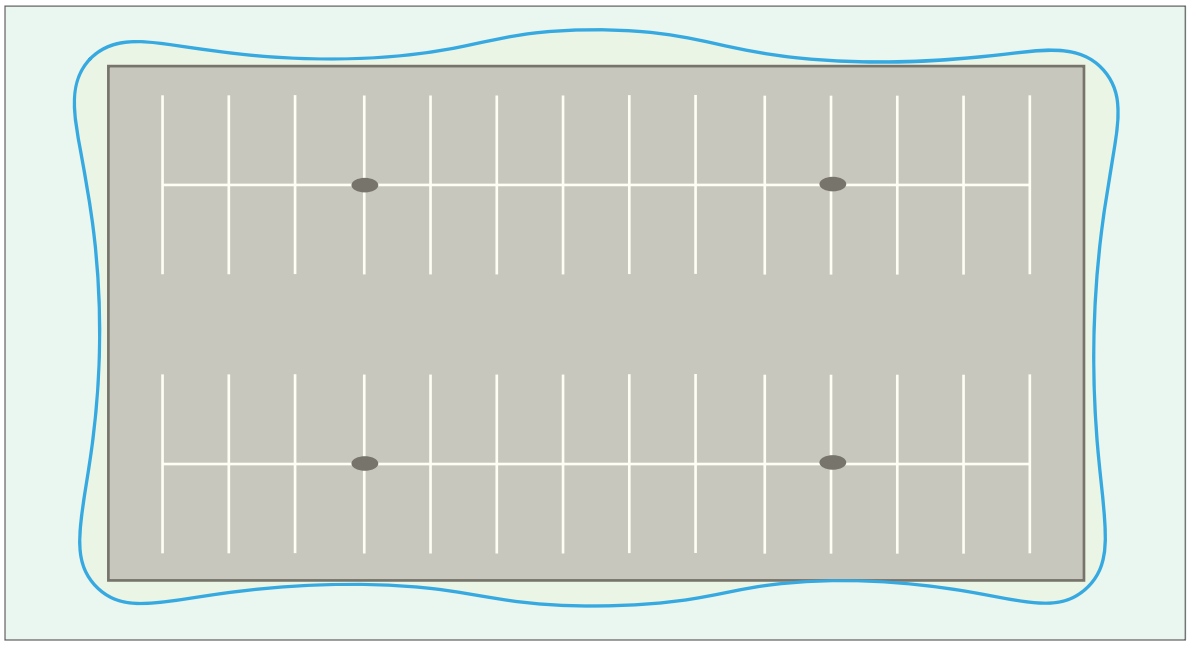
STE-S



Typically used for:
Pathways & building perimeters

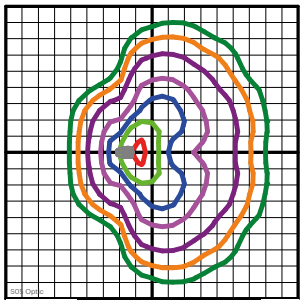
SO5 - Car Parks/ Area Optic

This area optic produces an asymmetrical output ideal for illuminating car parks and service yards as well as other street and urban areas. With a peak intensity of 60°, the SO5 has a reflector-based system and provides a low glare comfortable output whilst maintaining a powerful performance.



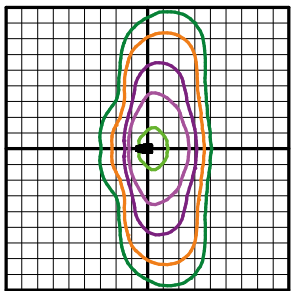
Additional Info

- Max recommended tilt 10° as per ILP recommendations
- Typical spacing to height ratio of 5:1



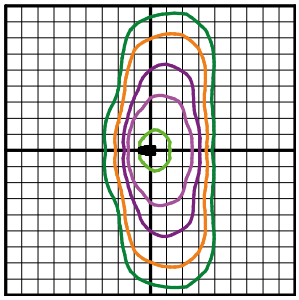
Other AEC Optics

STU-S



Typically used for:
Narrow pathways & building perimeters

STU-M

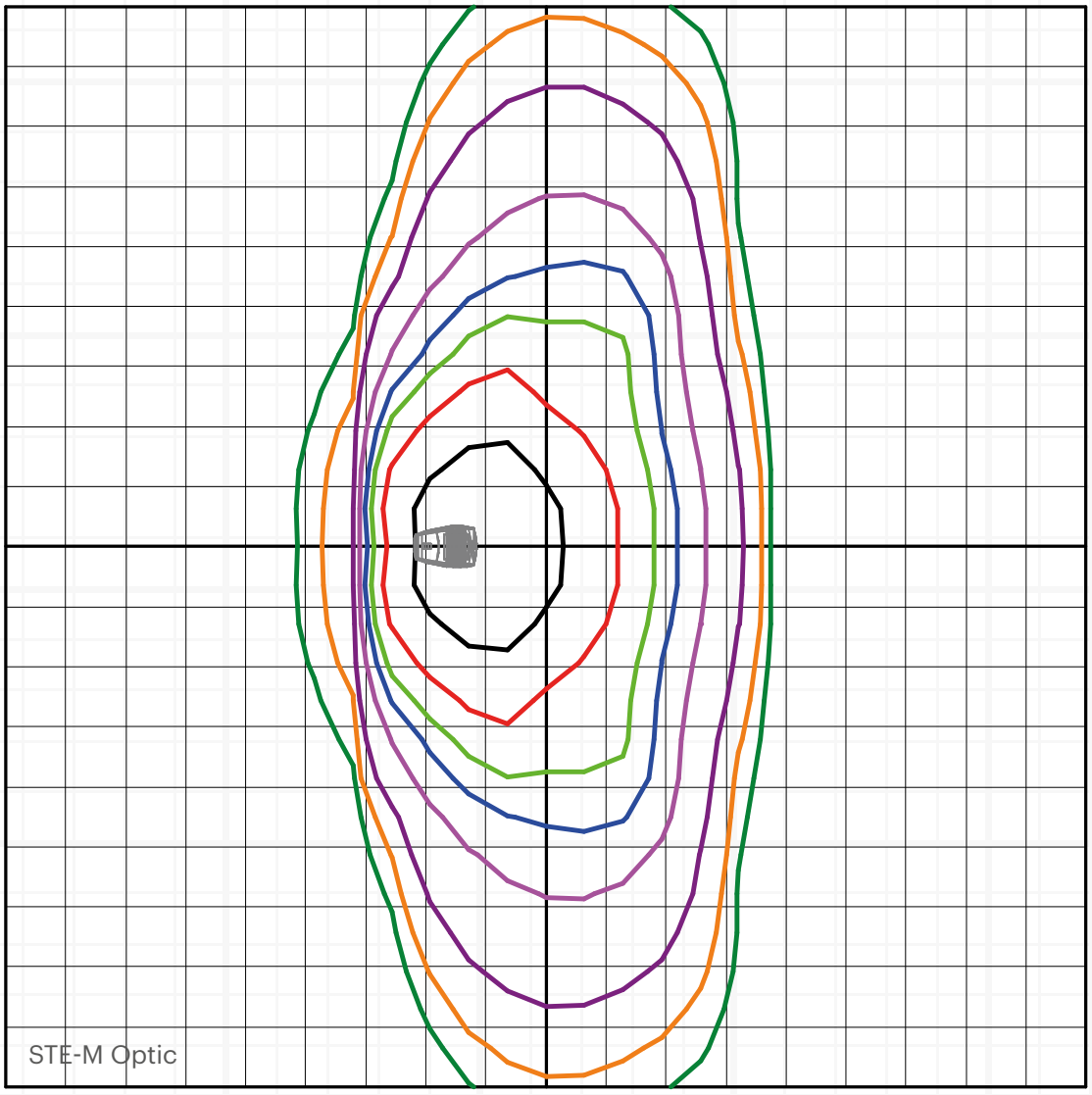


Typically used for:
Pathways & narrow roadways

Sample Plots

With every optical package meticulously designed to perfectly service specific application types, our comprehensive product selection when paired with a competent lighting designer should create a uniform and minimal intrusion illumination for any exterior application.

We have gathered key product information including representative imagery to show the distribution of light generated by different optical packages.



STE-M Optic

NAVAR Series

Scan for datasheet

The NAVAR Series bring together powerful performance with a sleek aesthetic, guaranteed to exceed expectations. With over 280 configurations as standard, NAVAR offers an impressive array of mounting options.

The flat-to-ground orientation and 2700K options allow this luminaire to perfectly lend itself to dark sky areas, ensuring a reduction in obtrusive light known to hinder residential and wildlife areas.

	Urban	Pro	Urban Pro
Cantilever Bracket			
Post Top/ Side Entry Bracket			
Central Post Top Bracket			
Catenary Bracket			

Scan for datasheet

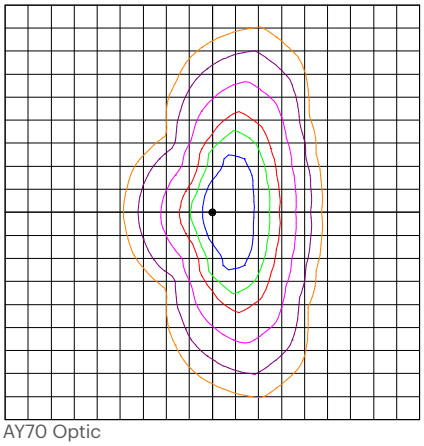
NAVAR Urban

This versatile luminaire brings excellent power and performance with 4 bespoke optical packages and 4 standard bracketry options to give the perfect mount for your site.

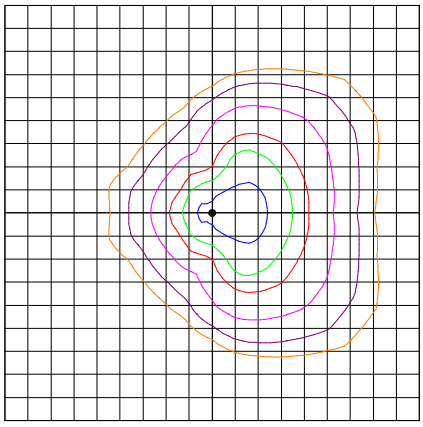
Key Features

- 62.0 - 158.0W
- 7,429 - 18,501 Luminaire Lumens
- Efficacy up to 139 lm/W
- 300-750mA
- 2700K, 4000K
- CRI >70
- Max Windage - 0.08m²
- Lifetime >100,000hr L80, B10

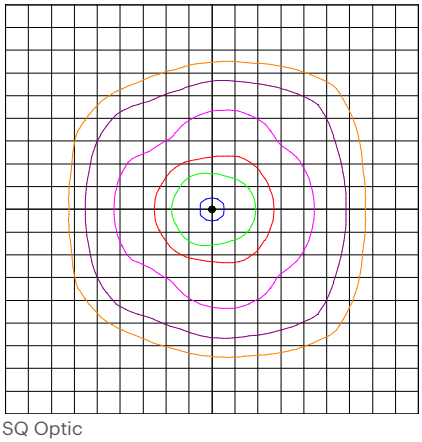
IP66 | IK10 | Colour Temperature | EM | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



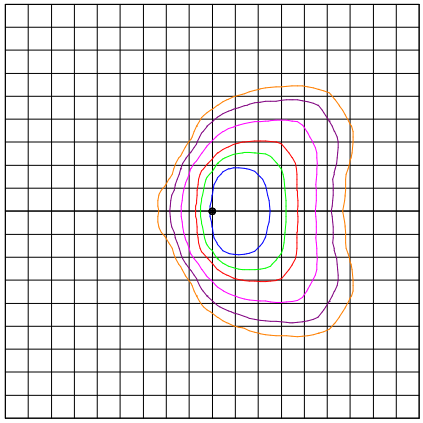
AY70 Optic



FW70 Optic



SQ Optic



FWB70 Optic

Additional Info

- Available Optics:
  Street - Wide 70° (AY70)
  Forward Throw - 70° (FW70)
  Square - 70° (SQ70)
  Forward Throw Back Spill - 70° (FWB70)
- Typical Mounting Heights:
  3 - 8m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Roadways, car parks, pathways, urban environments, public realm

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

NAVAR Pro

Scan for datasheet

Sleek with outstanding performance, the NAVAR Pro is our circular amenity luminaire guaranteed to bring a modern aesthetic to your site.

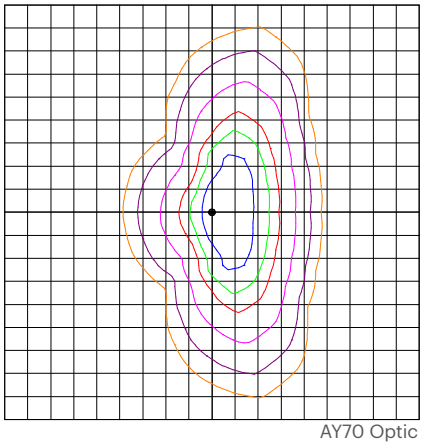
Key Features

- 118.0 - 315.0W
- 15,307 - 35,638 Luminaire Lumens
- Efficacy up to 139 lm/W
- 300-750mA
- 2700K, 4000K,
- CRI >70
- Max Windage - 0.18m²
- Lifetime >100,000hr L80

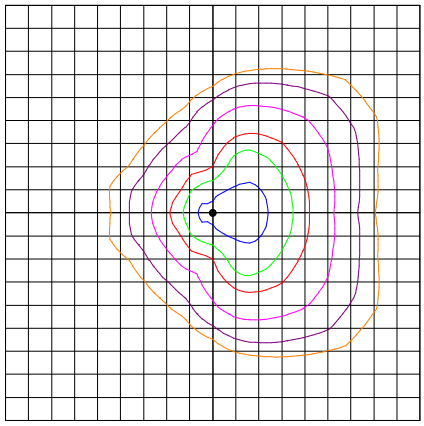
IP66 | IK10 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK

Additional Info

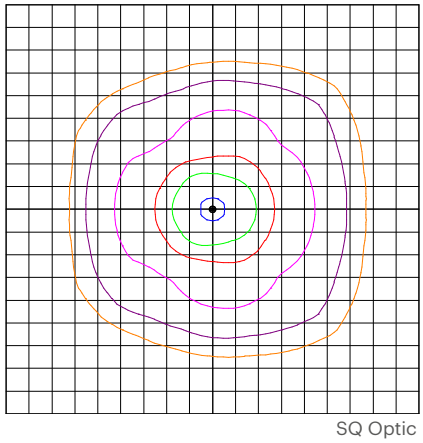
- Available Optics:
  Street - Wide 70° (AY70)
  Forward Throw - 70° (FW70)
  Square - 70° (SQ70)
  Forward Throw Back Spill - 70° (FWB70)
- Typical Mounting Heights:
  5 - 8m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Roadways, car parks, pathways, urban environments, public realm



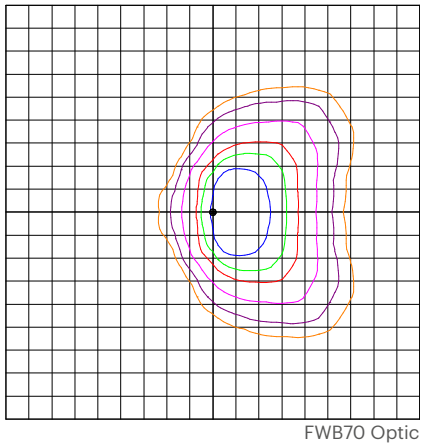
AY70 Optic



FW70 Optic



SQ Optic



FWB70 Optic

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

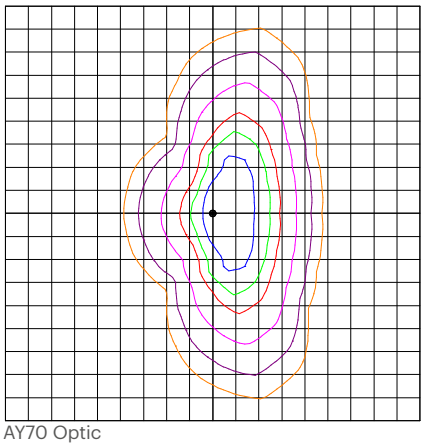
NAVAR Urban Pro

The largest of the NAVAR series, the Urban Pro variant has an extremely powerful distribution and provides superior spacings for any open area projects. This luminaire also has 3 mounting options available as standard.

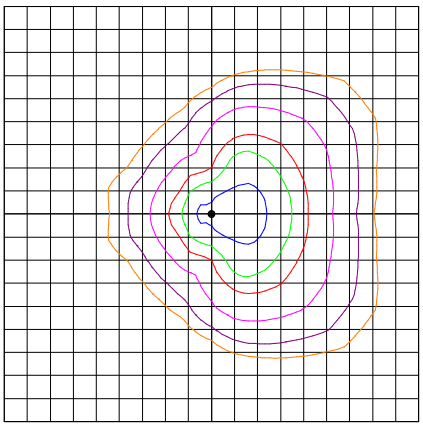
Key Features

- 180.0 - 473.0W
- 22,934 - 56,038 Luminaire Lumens
- Efficacy up to 144 lm/W
- 300-750mA
- 2700K, 4000K
- CRI >70
- Windage - 0.18m²
- Lifetime >100,000hr L80

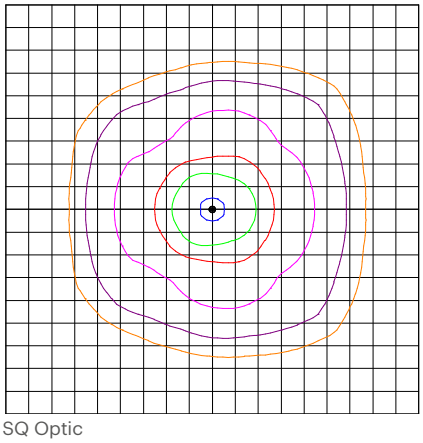
IP66 | IK10 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



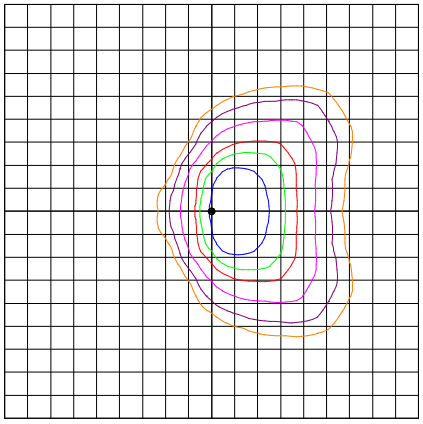
AY70 Optic



FW70 Optic



SQ Optic



FWB70 Optic

Additional Info

- Available Optics:
  Street - Wide 70° (AY70)
  Forward Throw - 70° (FW70)
  Square - 70° (SQ70)
  Forward Throw Back Spill - 70° (FWB70)
- Typical Mounting Heights:
  5 - 8m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Roadways, car parks, pathways, urban environments, public realm

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

LUNIO

Scan for datasheet

Lunio is an elegant amenity luminaire, which can be column or wall–mounted. It comes with a radial or 3-way distribution which makes it ideal for paths and parks as well as urban areas.

Key Features

- 41.0 - 80.0W
- 2,200 - 7,100 Luminaire Lumens
- Efficacy up to 91 lm/W
- 4000K
- CRI >80
- Max Windage - 0.16m²
- Lifetime >60,000hr L80

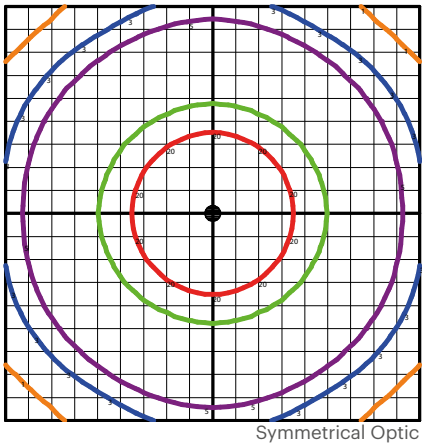
Additional Info

- Available Optics:
  Symmetrical Type V
  Asymmetrical Type IV

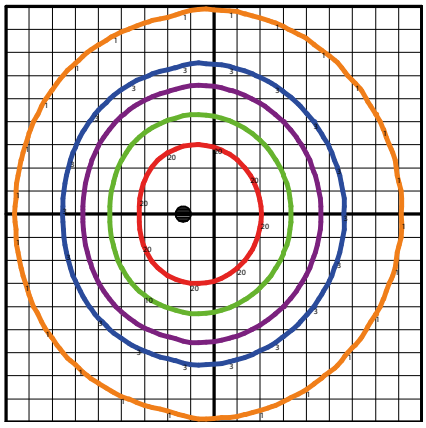
Typical Mounting Heights:
- 3-8m

To be installed flat-to-ground
- to comply with ILP guidance

Recommended Applications:
- Public realm, urban environments, walkways



Symmetrical Optic



Aymmetrical Optic

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

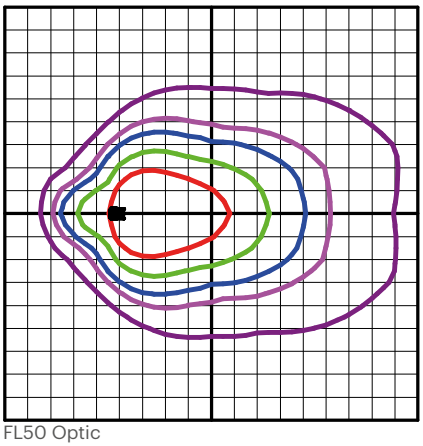
VIVA-CITY Pro

A modular, slimline, performance street lantern with improved efficacy and output. Viva-City Pro offers a choice of optics with asymmetrical distribution including an area optic.

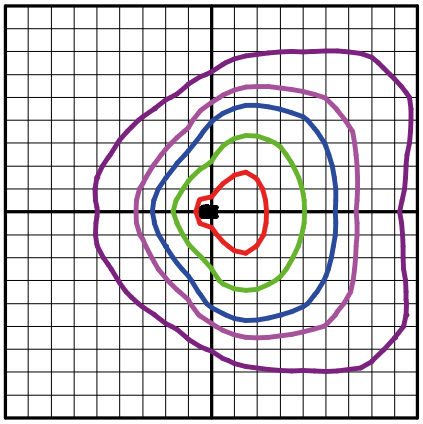
Key Features

- 15.0 - 180.0W
- 2,250 - 24,660 Luminaire Lumens
- Efficacy up to 150 lm/W
- 610 - 1050mA
- 2700K, 4000K
- CRI >70
- Max Windage - 0.09m²
- Lifetime >100,000hr L80

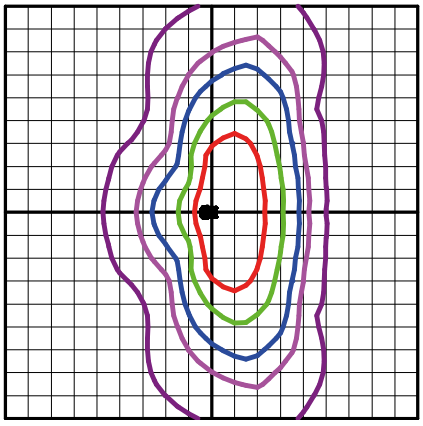
IP66 | IK08 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



FL50 Optic



FW70 Optic



AY Optic

Additional Info

- Available Optics:
  Forward Throw - 70° (FW70)
  Street - Wide 70° (AY70)
  Flood - 50° (FL50)
  Forward Throw Back Spill - 70° (FWB70)
- Typical Mounting Heights:
  3-12m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Roadways, car parks, pathways, urban environments

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

SEMITA Arc

Scan for datasheet

Bring style and functionality to your schemes with Semita Arc. Available with a range of optics to offer superior illumination with no upward light.

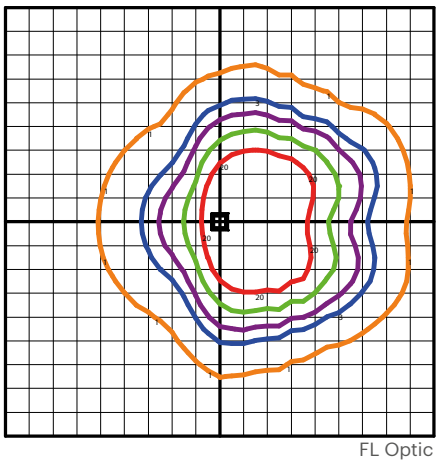
Key Features

- 7.5 - 13.2W
- 755 - 1,615Luminaire Lumens
- Efficacy up to 122 lm/W
- 250 - 500mA
- 2700K, 4000K
- CRI >70
- 0% ULOR
- Lifetime >100,000hr L80

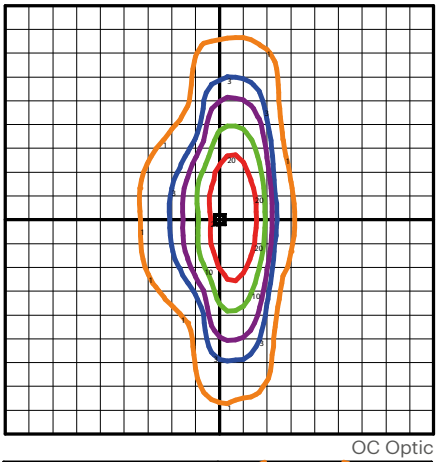
IP66 | IK09 | EM | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK | ida DARK SKY APPROVED

Additional Info

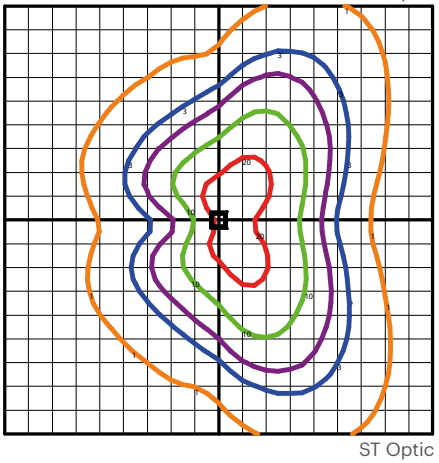
- Available Optics:
  Flood (FL)
  Path (OC)
  Street (ST)
- Wall Mounted
- Recommended Applications:
  Perimeter, entrace ways, pathways



FL Optic



OC Optic



ST Optic

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

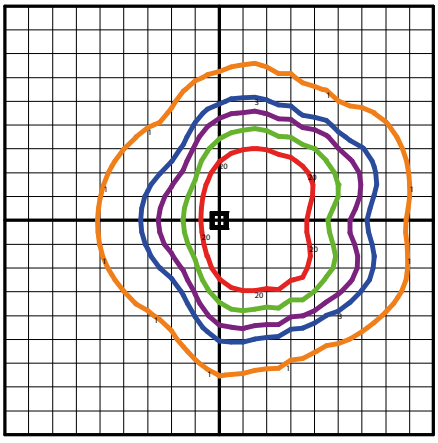
SEMITA Urban

Designed and engineered in the UK, Semita Urban is a contemporary, slimline wallpack. Available with street, path or flood optics and comes equipped with an optional 'click on' comfort diffuser for a softer output.

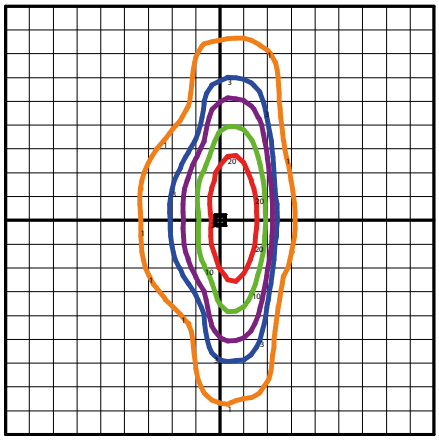
Key Features

- 6.0 - 11.0W
- 783 - 3,000 Luminaire Lumens
- Efficacy up to 146 lm/W
- 205-410mA
- 2700K, 4000K
- CRI >70
- 0% ULOR
- Comfort diffuser option
- Lifetime >100,000hr L80

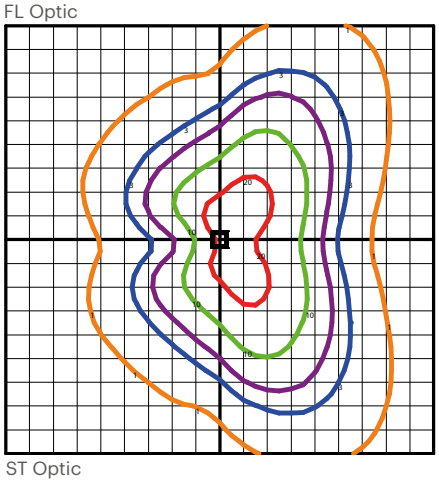
IP66 | IK10 | EM | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



FL Optic



OC Optic



ST Optic

Additional Info

- Available Optics:
  Flood (FL)
  Path (OC)
  Street (ST)
- Wall mounted
- Recommended Applications:
  Perimeter, entrace ways, pathways

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

ALFRESCO Urban

Scan for datasheet

The design for ALFRESCO Urban is simple and classic and it will suit most wall mounted applications.

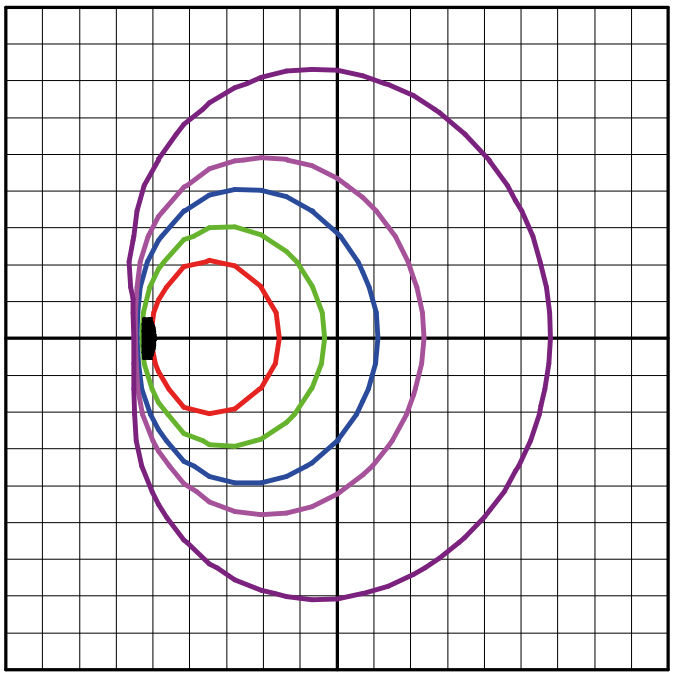
Key Features

- 20W
- 2,147 Luminaire Lumens
- Efficacy up to 107 lm/W
- 500mA
- 4000K
- CRI >80
- Lifetime >50,000hr L70

IP65 | IK08 | EM | Marine Grade Finish | 50,000 hrs LIFETIME

Additional Info

- Available Optics: Asymmetrical 180 x 90°
- Wall mounted
- Recommended Applications: Perimeter, entraNce ways, pathways



Asymmetrical 180 x 90°

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

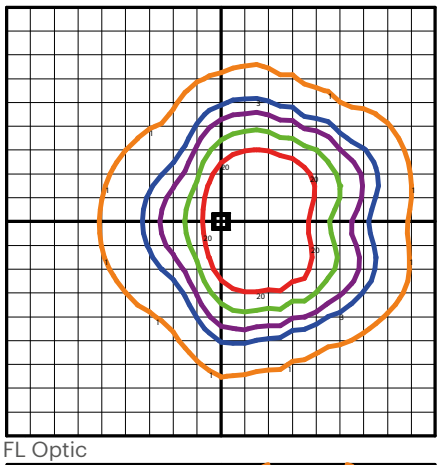
QUARTO 2.0

A stylish, modern bulkhead available with LED emergency and photocell. QUARTO 2.0 is suited to building and perimeter lighting.

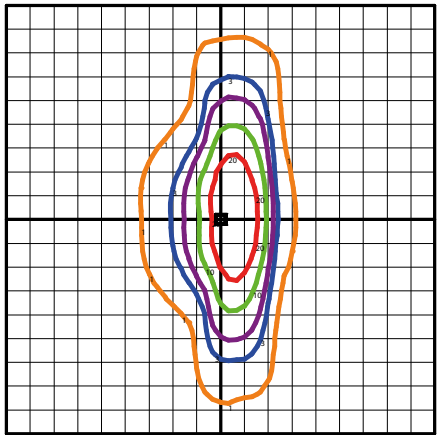
Key Features

- 7.5 - 14.2W
- 790 - 1,720 Luminaire Lumens
- Efficacy up to 121 lm/W
- 200-500mA
- 2700K, 4000K
- CRI >70
- 0% ULOR
- Lifetime >100,000hr L80

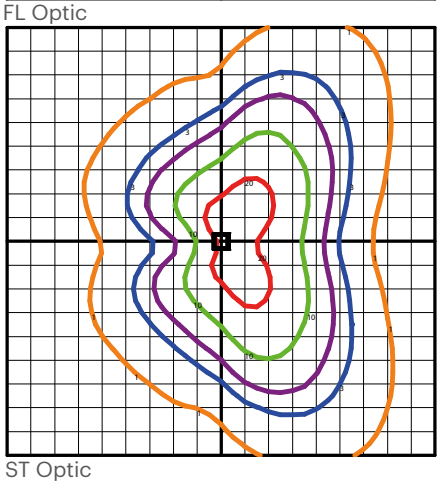
IP66 | IK10 | EM | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



FL Optic



OC Optic



ST Optic

Additional Info

- Available Optics:
  Flood (FL)
  Path (OC)
  Street (ST)
- Wall mounted
- Recommended Applications:
  Perimeter, entrance ways, pathways

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

KLOU Series

Scan for datasheet

KLOU IK

KLOU 180

The KLOU and KLOU-IK offer a powerful, yet comfortable illumination in a range of optical packages. The quality bollard series by Arcluce offers a range of options to create the perfect scheme.

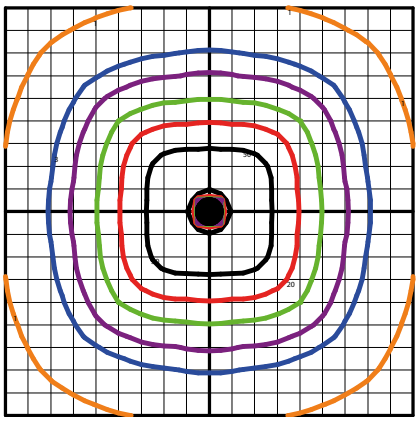
Key Features

- 19.0W - 25.0W
- 700 - 1650 Luminaire Lumens
- Efficacy up to 87 lm/W
- 4000K, 3000K CRI >80
- Lifetime >60,000hrs L80
- Radial, One or Two Way Illumination
- 250mm, 500mm, 1000mm options
- ULOR 0% Option

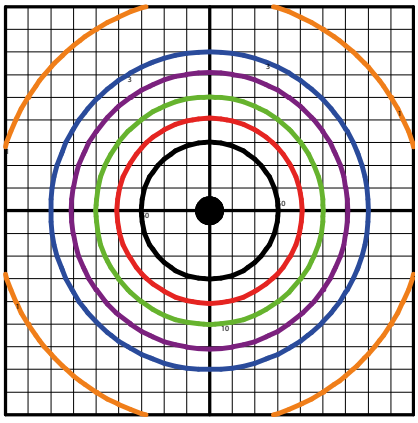
IP65 | IK09 (KLOU 180) | IK10 (KLOU-IK 180) | EM | Colour Temperature | ASTRO DIM | CLO | 60,000 hrs LIFETIME

Additional Info

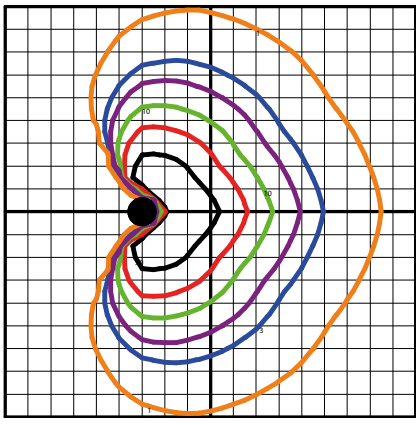
- Available Optics:
  Radial (SYR)
  Single Illumination (1W)
  Twin Illumination (2W)
- Flange plate mounted
- Recommended Applications:
  Pathways, parks, retail, urban environments



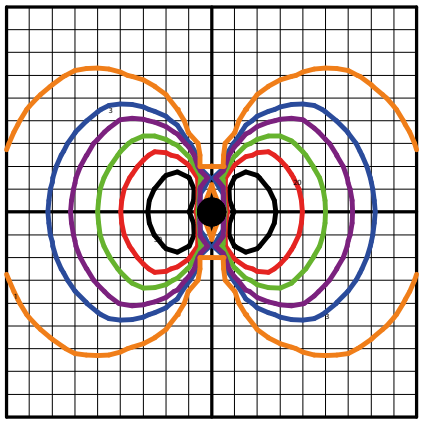
KLOU IK - SYR Optic



KLOU 180 - SYR Optic



KLOU IK - 1W Optic



KLOU IK - 2W Optic

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

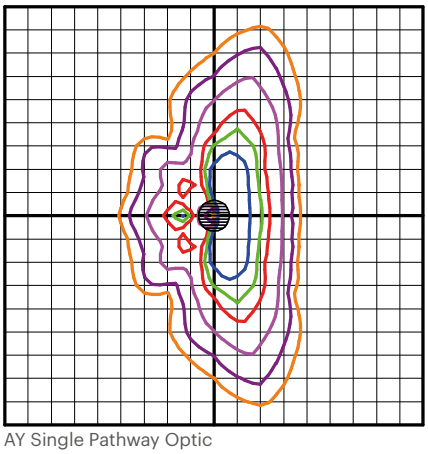
VAILO

Vailo is a sleek, low glare bollard offering a best-in-class optical system. Available with an array of lumen packages, as well as single or twin sided illumination and adjustable alignment on site.

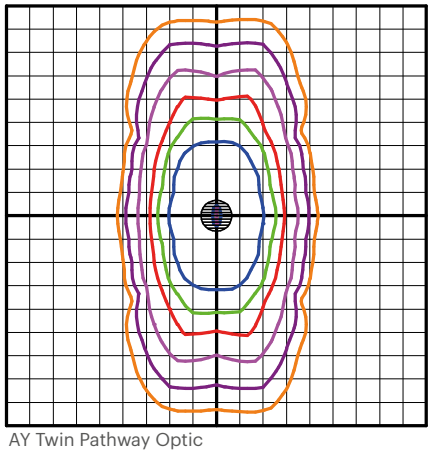
Key Features

- 4.0W - 25.0W
- Up to 2,282 Luminaire Lumens
- Efficacy up to 91 lm/W
- 8m - 10m Spacings
- Single or Twin Sided Illumination
- High Grade GRP
- 2700K, 4000K CRI >70
- Lifetime 100,000 Hours, L70, B50
- Damage-Free Opening Tool

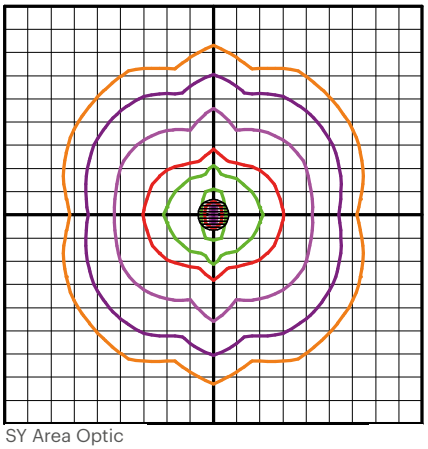
IP66 | IK10 | EM | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



AY Single Pathway Optic



AY Twin Pathway Optic



SY Area Optic

Additional Info

- Available Optics:
  Area (SY)
  Single/Twin Pathway (AY)
- Flane or Root mounted
- Recommended Applications:
  Pathways, sidings

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

HELVELLYN 2.0

Scan for datasheet

This sleek, stainless steel bollard has an on site adjustable output for optimum performance.

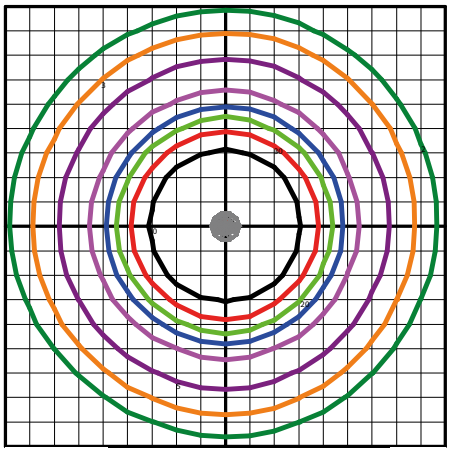
Key Features

- 7.5 - 15.0W
- 930 - 1,860 Luminaire Lumens
- Efficacy up to 124lm/W
- 3000K, 4000K CRI >80
- Stainless Steel Finish
- Adjustable Output
- Low Glare
- Lifetime >50,000hrs L70
- 180° Glare Shield Option

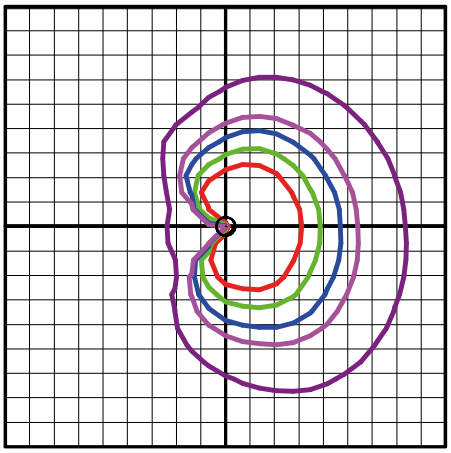
IP65 | IK08 | EM | PEC | 50,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK

Additional Info

- Available Optics:
  Radial (SYR)
  180° Glare Shield (GS)
- Flange plate mounted
- Recommended Applications:
  Pathways, parks, retail, urban environments



Radial Optic



180° Glare Shield Optic

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

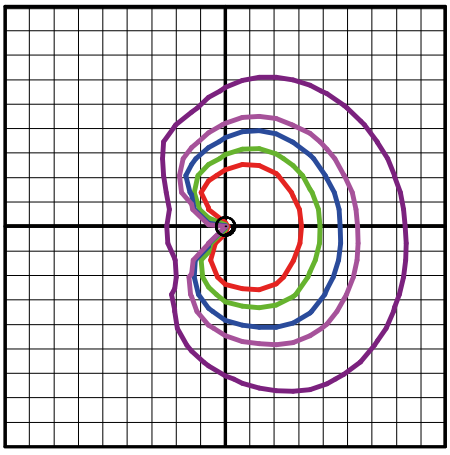
DECO 2.0

Deco 2.0 is a robust bollard with a classic look, offering adjustable output and both emergency and photocell options. The effect is a comfortable, low-glare light output tailored for your site.

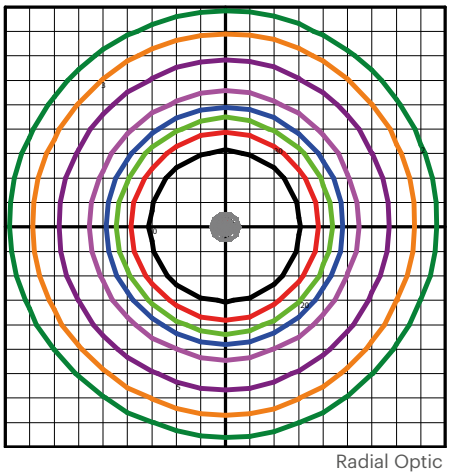
Key Features

- 7.5 - 15.0W
- 930 - 1,860 Luminaire Lumens
- Efficacy up to 124lm/W
- 2700K, 4000K CRI >80
- Adjustable Output
- Low Glare
- Lifetime >50,000hrs L70
- 180° Spill Glare Option

IP65 IK08 EM PEC 50,000 hrs LIFETIME DESIGNED & ENGINEERED IN THE UK



180° Glare Shield Optic



Radial Optic

Additional Info

- Available Optics:
  Radial (SYR)
  180° Glare Shield (GS)
- Flange plate mounted
- Recommended Applications:
  Pathways, parks, retail, urban environments

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

ZACTIS

Scan for datasheet

ZACTIS is a high-performance flat-to-ground flood light perfect for area applications. As well as facilitating easy installation and maintenance, the sleek, low-profile design, reduces the load together with decreasing windage.

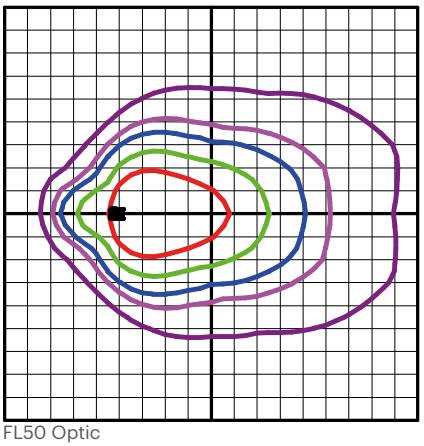
Key Features

- 125.0 - 320.0W
- 17,125 - 44,156 Luminaire Lumens
- Efficacy up to 134 lm/W
- 640-808mA
- 2700K, 4000K
- CRI >70
- Windage - 0.04m²
- 0% ULOR
- Lifetime >100,000hr L70

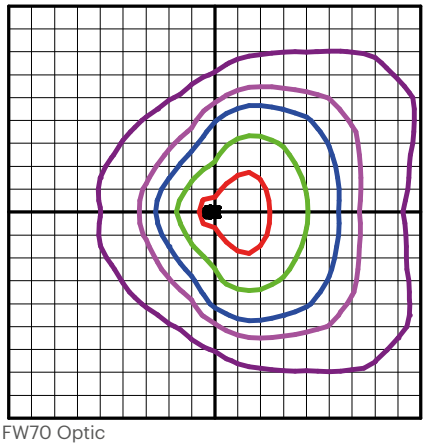
IP65 | IK08 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK

Additional Info

- Available Optics:
  Flood - 50° (FL50)
  Forward Throw - 70° (FW70)
- Typical Mounting Heights:
  8-12m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Area Lighting & Service Yards



FL50 Optic



FW70 Optic

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

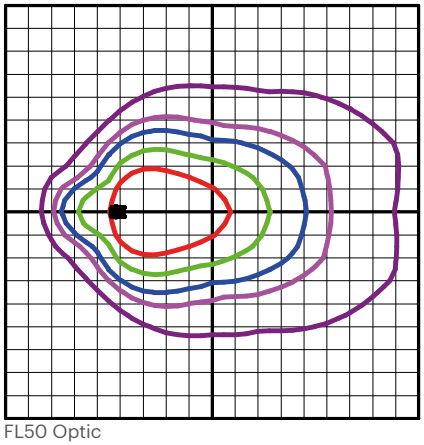
VIVA-CITY Flood

The VIVA-CITY Flood is a sleek, powerful luminaire with asymmetrical distribution. It is part of the VIVA-CITY family.

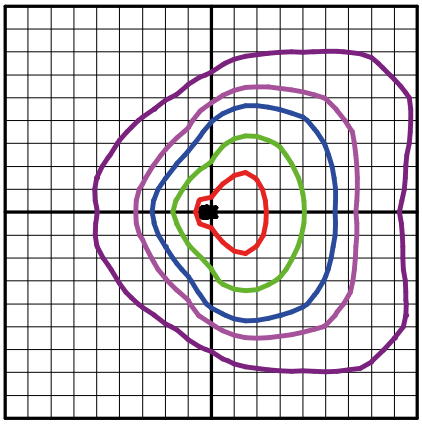
Key Features

- 60.0 - 120.0W
- 8,390 - 16,780 Luminaire Lumens
- Efficacy up to 140 lm/W
- 610-810mA
- 2700K, 4000K
- CRI >70
- Windage - 0.03m²
- 0% ULOR
- Lifetime >100,000hr L70

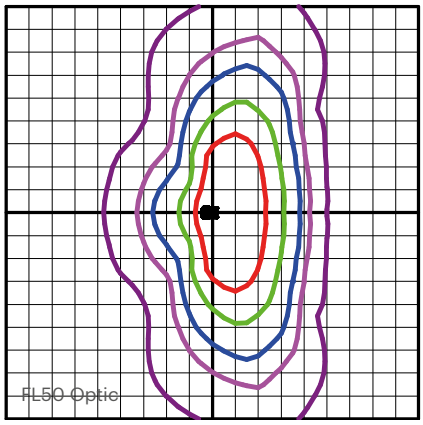
IP66 | IK09 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



FL50 Optic



FW70 Optic



AY Optic

Additional Info

- Available Optics:
  Flood - 50° (FL50)
  Forward Throw - 70° (FW70)
  Street - 70° (AY)
- Typical Mounting Heights:
  6-12m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  area lighting, service yards, perimetre, security

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

AMNIS Flood

Scan for datasheet

Designed and engineered in the UK the AMNIS Flood offers the best possible performance and efficiency as standard. Using bespoke reflector and heatsink technology, this luminaire is ideal for large area lighting applications.

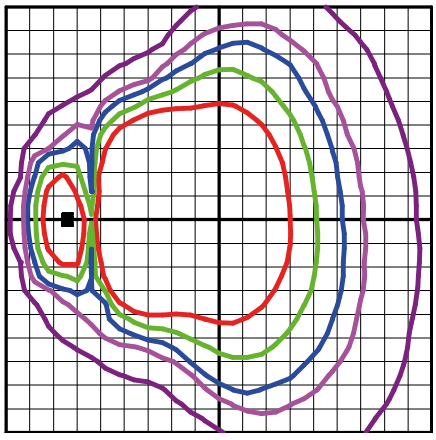
Key Features

- 900W - 1300W
- 118,000 - 187,000 Luminaire Lumens
- Efficacy up to 139 lm/W
- 700-1400mA
- 2700K, 4000K
- CRI >70
- Windage: 0.19m²
- Flicker Index 0.12%
- Lifetime >100,000hr L70

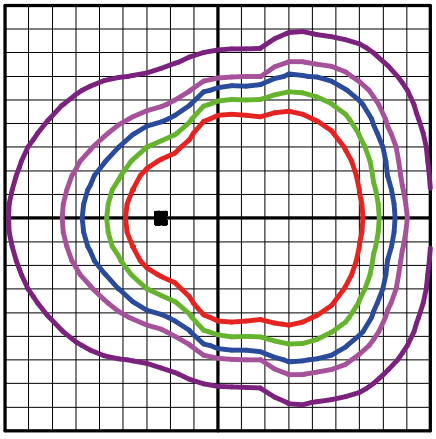
IP66 | IK08 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK

Additional Info

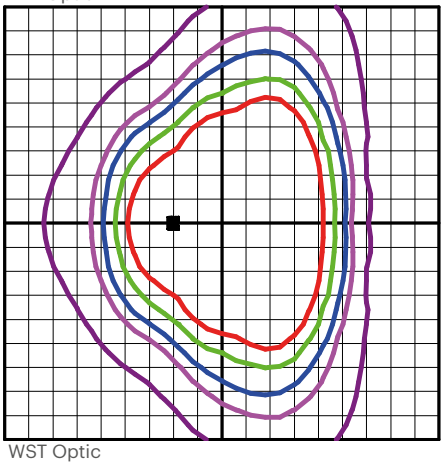
- Available Optics:
  Narrow Short Throw (NST)
  Wide Short Throw (WST)
  Narrow Forward Throw (NFT)
  Spill shield options available
- Typical Mounting Heights:
  12-30m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Large area lighting, service yards, sports stadiums



NFT Optic



NST Optic



WST Optic

- 1 Lux
- 3 Lux
- 5 Lux
- 10 Lux
- 20 Lux

* Other optical, dimming and mounting options are available

Scan for datasheet

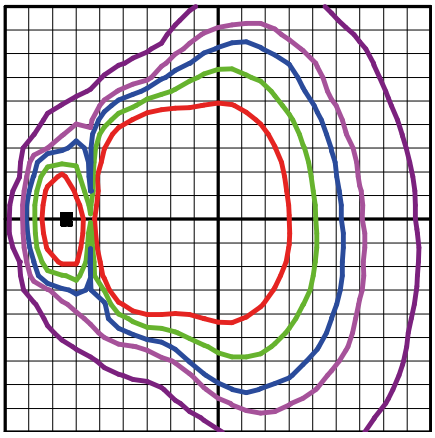
AMNIS Match

Experience power and performance with the Amnis Match flood light. This flat-to-ground fitting is the perfect solution, with its powerful performance, low glare output and compact design.

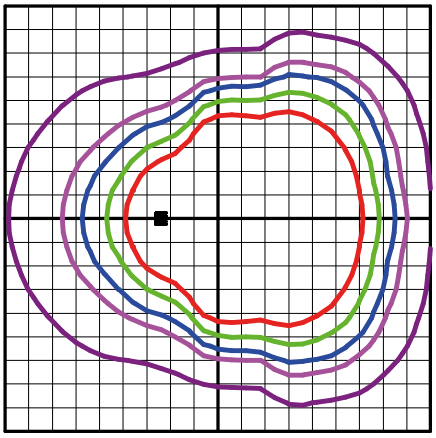
Key Features

- 450W - 665W
- 59,000 - 94,000 Luminaire Lumens
- Efficacy up to 141 lm/W
- 700mA
- 2700K, 4000K,
- CRI >70
- Windage - 0.1m²
- Flicker Index 0.12%
- Lifetime >100,000hr L70

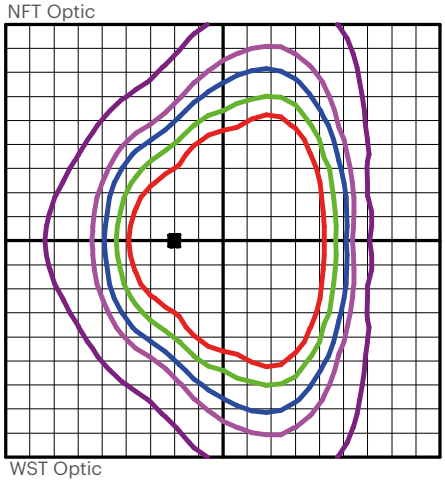
IP66 | IK08 | Colour Temperature | Marine Grade Finish | ASTRO DIM | CLO | 100,000 hrs LIFETIME | DESIGNED & ENGINEERED IN THE UK



NFT Optic



NST Optic



WST Optic

Additional Info

- Available Optics:
  Narrow Short Throw(NST)
  Wide Short Throw(WST)
  Narrow Forward Throw(NFT)
  Spill shield options available
- typical Mounting Heights:
  8-12m
- To be installed flat-to-ground to comply with ILP guidance
- Recommended Applications:
  Area lighting, service yards, sports lighting

1 Lux
3 Lux
5 Lux
10 Lux
20 Lux

* Other optical, dimming and mounting options are available

Kingfisher Controls

Part of the LUCECO group of companies

Whether it be simple dimming profiles, scene setting or fully bespoke schemes, getting the right control system for your site will save both energy and money. The Kingfisher Control system affords the ability to design the right package to take full advantage of cost saving technology that is built to last.

Key Features & Benefits

- Wireless or wired control capabilities
- Bespoke system design
- Simple installation
- Dim lighting by DALI or 1-10V
- Switch lighting on or off via Relay, PIR or Daylight sensor
- Scene setting
- Ease of use
- Energy & cost savings

The System

Controllers

Kingfisher Control System starts with the controller, this forms the basis of all systems. These devices can be pre-fitted into each luminaire and give the ability to link, dim and control luminaires when integrated with dimmable drivers and sensors.

Scene Switch

Scene setting is an important aspect of lighting control, but some systems are over complicated. Our scene switches are simple to use and install and take little or even no training to operate. Simply pre-programme the numbered switches to your desired command and the system does the rest for you! Scene switches with 2, 4 or 6 buttons can be supplied for use with the 230V or battery powered controllers.

Web Connected or Wired Solutions

Our controllers offer the perfect bespoke solution for wireless controls and scene setting. The controllers are installed into each luminaire and communicate directly to the scene switch.
For locations without internet access, our wired system allows you to have the same functionality through access points.

Controller

Switch Panel

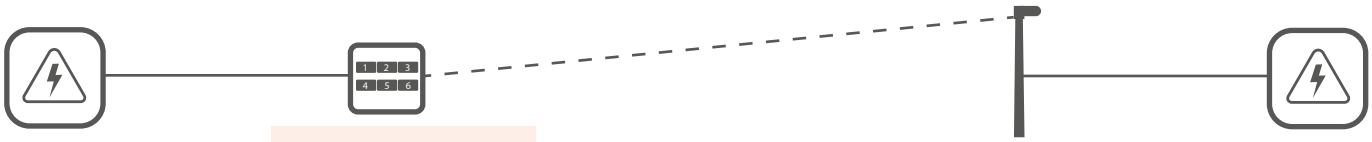
Collator

How the Systems Works

Switch System

The push button system hosts preconfigured scenes defined by the user. This is a perfect control method for sports lighting as it allows users to easily switch between training and match day levels at the press of a button. Another of the system's principal functions is the ability to set level specific zonal commands to incorporate the entire site.

This is a closed system, meaning that gateways, internet access and external devices are not needed. This is a particular advantage for remote sites or areas with limited internet access.



The switch controller is wired directly to the mains power and pre-programmed with lighting commands

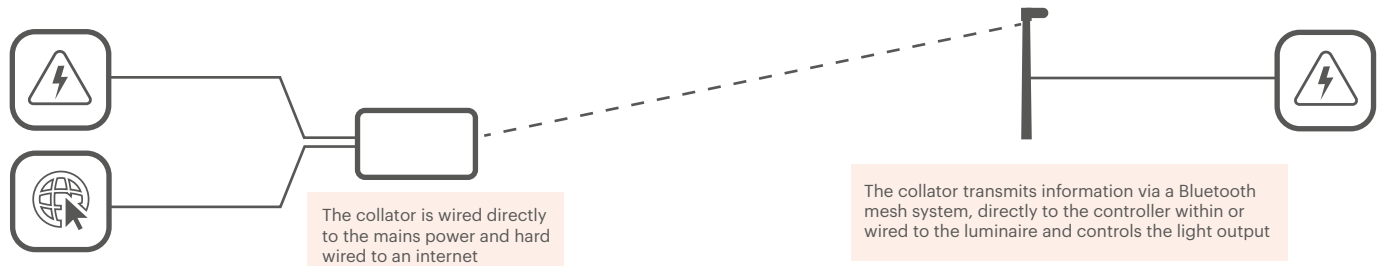
The switch controller transmits programmed information via a Bluetooth mesh system, directly to the controller within or wired to the luminaire and controls the light output

Web-Based Interface

This option is capable of a more comprehensive scheduling system, meaning specific parameters can be set. The web-based portal is accessed using a unique login via any web-enabled device and can be pre-programmed to suit the needs of the site.

For example, time based events can be predetermined, while instant events can be easily triggered via the web portal.

This system uses a collator to communicate directly with the light source and can either be hard wired in or use a wireless connection to the server.



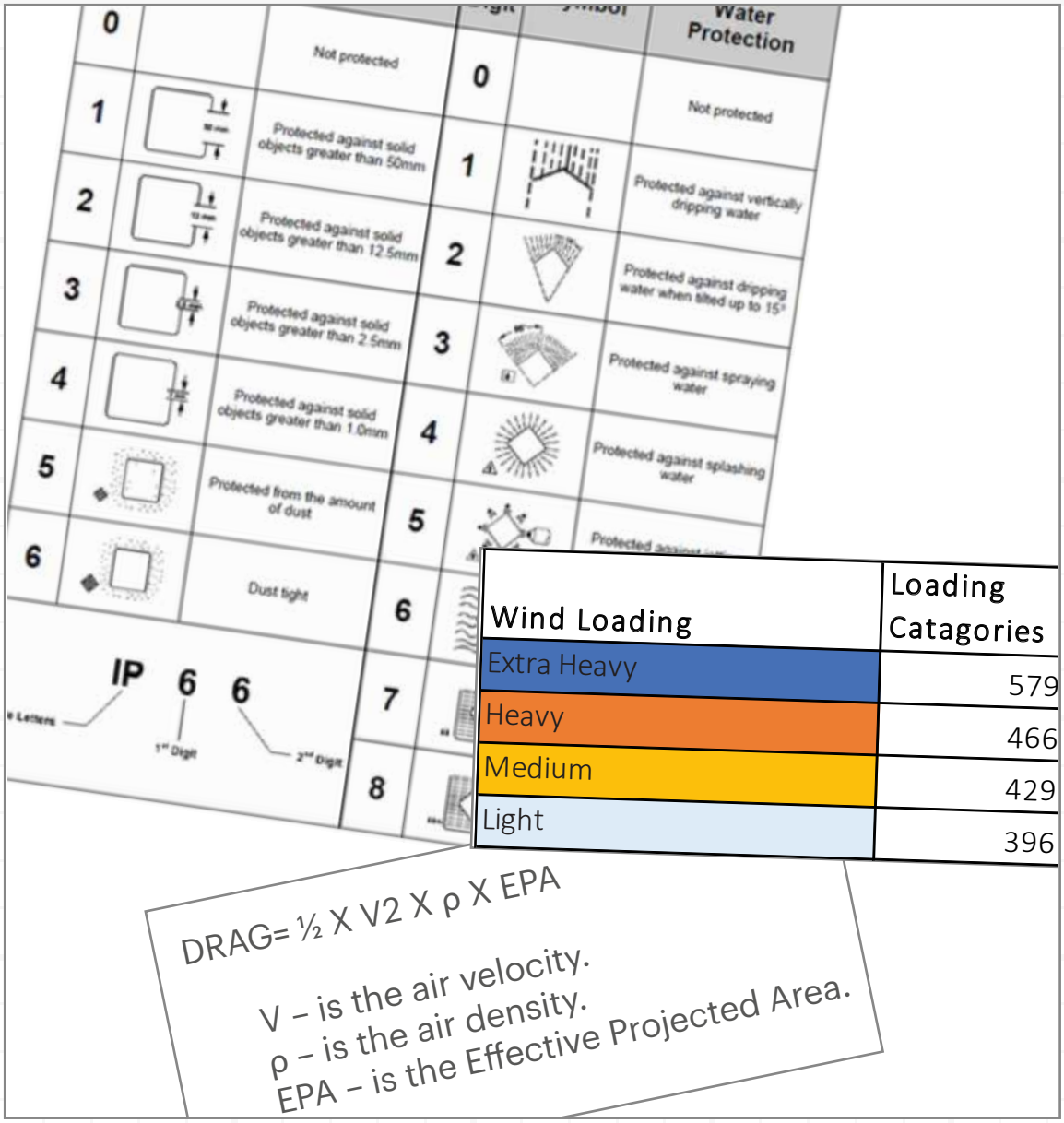
Luminaire commands are inputted online via a secure portal

The collator is wired directly to the mains power and hard wired to an internet connection

The collator transmits information via a Bluetooth mesh system, directly to the controller within or wired to the luminaire and controls the light output

Technical Information

We have compiled key technical information to assist with the planning and specification of your sports lighting scheme. Included in this section are weight and windage guides, maintenance factor calculations, vital electrical data, as well as a glossary of terms for reference.



Wind Loading	Loading Catagories
Extra Heavy	579
Heavy	466
Medium	429
Light	396

Weight & Windage

Windage Explained

In terms of lighting, windage simply refers the force of the wind on a stationary object. When a luminaire is mounted on a column or building, the windage is calculated to assess how much pressure will be added to the fitting by the wind conditions. In order to ensure the column or mast, bracketry and luminaire itself can withstand these pressures and remain steadfast in its installed position without fear of sway, calculating the correct windage is vitally important.

Windage & Drag Calculation

Calculating the drag force is key to ensuring masts and luminaires remain where they are supposed to be.

Drag force is calculated using this formula:

$$DRAG = \tfrac{1}{2} \times V2 \times \rho \times EPA$$

V – is the air velocity.
ρ – is the air density.
EPA – is the Effective Projected Area.

EPA is calculated with this formula:

$$EPA = Cd \times FPA$$

Windage & Drag Calculation

EPA 'Effective Projected Area' is used to determine how much force a luminaire will apply to the mounting brackets or pole at a given wind velocity. (this is different to FPA in that different shaped surfaces have less drag than a simple 2D flat surface. A sphere has less drag than a flat circular plate of the same diameter)

FPA – Frontal Projected Area.

Cd – Drag Co-efficient

Windage Calculated by Region

Administrative Area	Maximum Altitude m	10 Min Mean Wind Velocity m/sec	Rationalised Wind Loading Region
Aberdeen	141	25.2	Heavy
Aberdeenshire	117	25.73	Heavy
Angus	250	25.2	Extra Heavy
Antrim	217	26.25	Extra Heavy
Argyll and Bute	170	27.3	Extra Heavy
Armagh	250	24.68	Extra Heavy
Bath and North East Somerset	250	22.05	Medium
Bedfordshire	147	23.1	Light
Blackburn and Darwen	142	24.15	Medium
Blackpool	98	24.15	Light
Blaenau Gwent	250	22.05	Medium
Bournemouth	98	24.15	Light
Bracknell Forest	250	21	Light
Bridgend	221	22.58	Medium
Brighton and Hove	147	23.1	Light
Bristol	231	21.53	Light
Buckinghamshire	202	22.05	Light
Caerphilly	250	22.05	Medium
Carmarthenshire	250	25.2	Extra Heavy
Cambridgeshire	117	24.68	Medium
Cardiff	250	22.05	Medium
Ceredigion	142	24.15	Medium
Channel Islands	141	25.2	Heavy
Cheshire	193	23.1	Medium
Clackmannanshire	190	24.15	Heavy
Conwy	250	24.15	Extra Heavy
Cornwall	141	25.2	Heavy
Cumbria	242	25.73	Extra Heavy
Darlington	72	25.73	Medium
Denbighshire	244	23.1	Heavy
Derby	174	22.58	Light
Derbyshire	193	23.1	Medium
Devon	142	24.15	Medium
Dorset	193	23.1	Medium
Down	250	25.2	Extra Heavy
Dumfries and Galloway	117	25.73	Heavy
Dundee	242	25.73	Extra Heavy
Durham	217	26.25	Extra Heavy
East Ayrshire	117	25.73	Heavy
East Dunbartonshire	165	24.68	Heavy
East Lothian	141	25.2	Heavy
East Renfrewshire	250	25.2	Extra Heavy
East Riding of Yorkshire	217	26.25	Extra Heavy
East Sussex	147	23.1	Light
Edinburgh	165	24.68	Heavy
Essex	167	23.63	Medium
Falkirk	190	24.15	Heavy
Fermanagh	250	25.2	Extra Heavy
Fife	141	25.2	Heavy
Flintshire	193	23.1	Medium
Glasgow	165	24.68	Heavy
Gloucestershire	231	21.53	Light
Greater London	174	22.58	Light
Greater Manchester	167	23.63	Medium
Gwynedd	250	25.2	Extra Heavy
Halton	147	23.1	Light
Hampshire	147	23.1	Light
Hartlepool	95	26.25	Heavy
Herefordshire	202	22.05	Light
Hertfordshire	147	23.1	Light
Highland	127	28.35	Extra Heavy
Inverclyde	242	25.73	Extra Heavy
Isle of Anglesey	94	25.2	Medium
Isle of Man	94	25.2	Medium
Isle of Wight	147	23.1	Light
Isles of Scilly	52	25.2	Light
Kent	167	23.63	Medium
Kingston upon Hull	52	25.2	Light
Lancashire	141	25.2	Heavy
Leeds City	250	24.68	Extra Heavy
Leicester	174	22.58	Light
Leicestershire	193	23.1	Medium
Lincolnshire	94	25.2	Medium
Londonderry	217	26.25	Extra Heavy
Luton	202	22.05	Light
Medway	174	22.58	Light

Administrative Area	Maximum Altitude m	10 Min Mean Wind Velocity m/sec	Rationalised Wind Loading Region
Merseyside	142	24.15	Medium
Merthyr Tydfil	250	22.58	Heavy
Mid Lothian	141	25.2	Heavy
Middlesbrough	95	26.25	Heavy
Milton Keynes	202	22.05	Light
Monmouthshire and Newport	202	22.05	Light
Moray	250	25.2	Extra Heavy
Neath Port Talbot	193	23.1	Medium
Norfolk	95	26.25	Heavy
North Ayrshire	217	26.25	Extra Heavy
North East Lincs	52	25.2	Light
North Lanarkshire	190	24.15	Heavy
North Lincs	94	25.2	Medium
North West Somerset	202	22.05	Light
North Yorkshire	95	26.25	Heavy
Northamptonshire	147	23.1	Light
Northumberland	50	26.25	Medium
Nottingham	147	23.1	Light
Nottinghamshire	142	24.15	Medium
Orkney	87	29.4	Extra Heavy
Oxfordshire	250	21	Light
Pembrokeshire	142	24.15	Medium
Perth and Kinross	165	24.68	Heavy
Peterborough	98	24.15	Light
Plymouth	142	24.15	Medium
Poole	147	23.1	Light
Portsmouth	147	23.1	Light
Powys	193	23.1	Medium
Reading	250	21	Light
Redcar and Cleveland	95	26.25	Heavy
Renfrewshire	250	25.2	Extra Heavy
Rhondda Cynon Taff	250	22.58	Heavy
Rutland	122	23.63	Light
Scottish Borders	117	25.73	Heavy
Shropshire	250	22.58	Heavy
Slough	250	21	Light
Somerset	193	23.1	Medium
South Ayrshire	117	25.73	Heavy
South Gloucester	231	21.53	Light
South Lanarkshire	165	24.68	Heavy
South Yorkshire	142	24.15	Medium
Southampton	174	22.58	Light
Southend	147	23.1	Light
Staffordshire	221	22.58	Medium
Stirling	250	25.2	Extra Heavy
Stockton on Tees	72	25.73	Medium
Stoke on Trent	221	22.58	Medium
Suffolk	94	25.2	Medium
Surrey	250	22.58	Heavy
Swansea	167	23.63	Medium
Swindon	250	21	Light
Telford and Wrekin	202	22.05	Light
Thurrock	174	22.58	Light
Torbay	122	23.63	Light
Torfaen	250	22.05	Medium
Tyne and Wear	217	26.25	Extra Heavy
Tyrone	250	25.2	Extra Heavy
Vale of Glamorgan	221	22.58	Medium
Warrington	147	23.1	Light
Warwickshire and Coventry	250	22.05	Medium
West Berkshire and Newbury	250	21	Light
West Dunbartonshire	141	25.2	Heavy
West Lothian	190	24.15	Heavy
West Midlands	231	21.53	Light
West Sussex	147	23.1	Light
West Yorkshire	250	24.68	Extra Heavy
Western Isles	87	29.4	Extra Heavy
Wiltshire	202	22.05	Light
Windsor and Maidenhead	250	21	Light
Wokingham	250	21	Light
Worcestershire	231	21.53	Light
Wrexham	221	22.58	Medium
York	52	25.2	Light
Shetland	Ask for details	31.50	Ask for details

Wind Loading	Loading Catagories
Extra Heavy	579
Heavy	466
Medium	429
Light	396

Terrain Category I:
Seasides. At the edge of a lake with a length exposed to the wind of at least 5km. Flat even land without obstacles.

Terrain Category II:
Fenced off cultivated land, some small agricultural buildings, houses or trees.

Terrain Category III:
Industrial or suburban zones and forest.

Terrain Category VI:
Urban perimeters with at least 15% of the surface built on, and/or on which the average heights of buildings exceed 15m.

Maintenance Factors

Maintenance Factors Explained

In short, the maintenance factor in lighting installations refers to the loss of light over time. During the operating time of luminaire, there can be a decrease in the lumen output due to degradation of the system.

Other factors must be taken into consideration including the localised environment surounding the luminaire such as dust, moisture or other pollutants which can decrease light output.

These factors should be calculated at the planning stage of any project by a qualified Lighting Designer to ensure accurate results.

The following calculations show the maintenance factor and lifetime curve of the Amnis Flood using differing operating hours.

Example Calculations - Amnis Flood

In order to calculate the depreciation over the design life, we use the following formula:

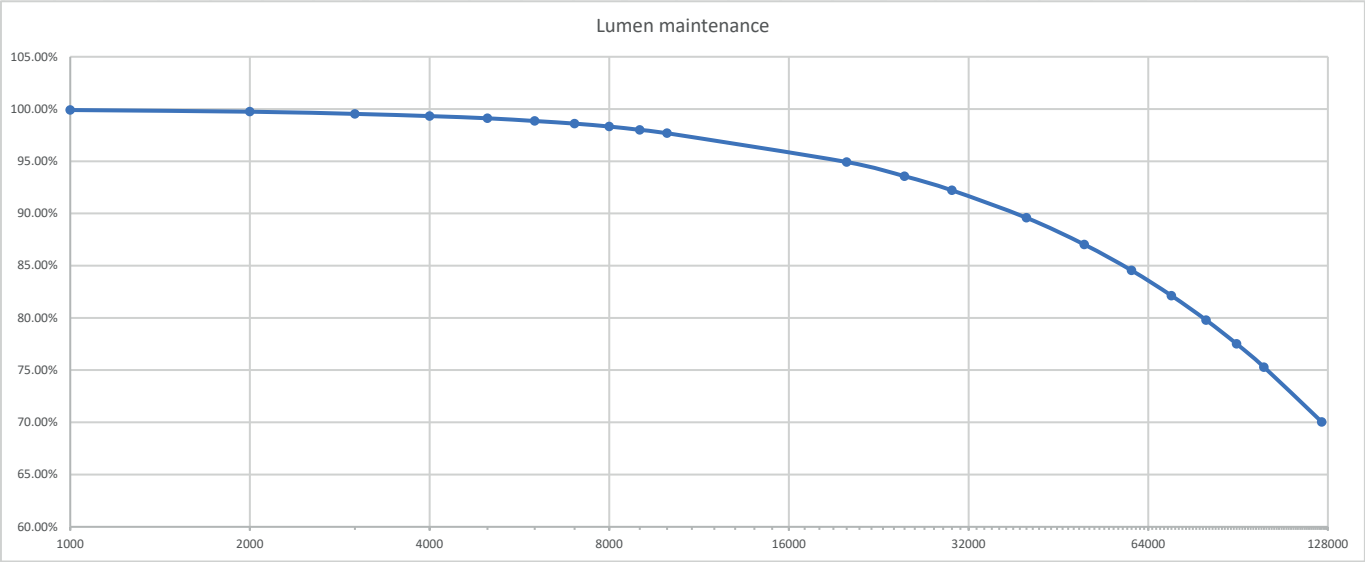
Maintenance Factor Calculation	
Design Life	5000
Lumen Maintenance (LLMF)	0.9912
Cleaning Cycle	24
LMF	0.96
Failure Factor (F)	1%
MF	0.951457

$$MF = \frac{X}{100} \times \frac{(100-Y)}{100} \times LMF$$

$$MF = LLMF \times \frac{(100-F)}{100} \times LMF$$

Maintenance Curve

The maintenance curve for Amnis shows results for different design life times.



Hours	Lumen Maintenance
1000	99.91%
2000	99.75%
3000	99.54%
4000	99.33%
5000	99.12%
6000	98.86%
7000	98.61%
8000	98.33%
9000	98.01%
10000	97.69%
20000	94.93%
25000	93.57%
30000	92.22%
40000	89.59%
50000	87.03%
60000	84.55%
70000	82.13%
80000	79.79%
90000	77.51%
100000	75.29%
125000	70.03%

Cleaning Frequency (Months)	MF
12	0.96
24	0.96
36	0.95
48	0.94
60	0.93
72	0.92

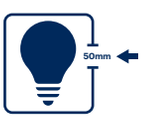
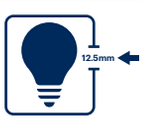
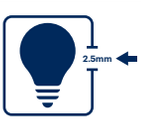
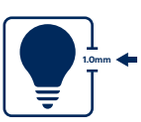
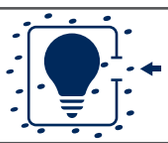
Design Hours	MF (to 2 D.P.)
5000	0.95
10000	0.94
25000	0.90
50000	0.84
100000	0.72

Protection Rating

IP Ratings

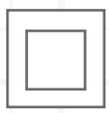
EN 60529 outlines an international classification system for the sealing effectiveness of enclosures of electrical equipment against foreign bodies and moisture.

This classification system uses the letters 'IP' (ingress protection) followed by one, two or three digits. An 'X' is used if there is only one class of protection: ie IPX4 which addresses moisture resistance only.

1st Digit	Symbol	Solid Object Protection	2nd Digit	Symbol	Water Protection
0		Not protected	0		Not protected
1		Projected against solid objects greater than 50mm	1		Projected against vertically dripping water
2		Projected against solid objects greater than 12.5mm	2		Projected against dripping water when tilted up to 15°
3		Projected against solid objects greater than 2.5mm	3		Projected against spraying water
4		Projected against solid objects greater than 1.0mm	4		Projected against splashing water
5		Projected against dust. Limited ingress of dust permitted	5		Projected against jets of water
6		Dust tight. No ingress of dust	6		Projected against powerful jets of water
IP 6 6 Code Letter — 1st Digit — 2nd Digit			7		Projected against temporary immersion in water
			8		Projected against continuous immersion in water

Electrical Insulation Classes

CLASS I
Lighting fittings with all accessible metal parts connected to the earth.



CLASS II
Light fittings where all accessible metals parts are insulated from voltage in case of failure. The light fitting does not require an earth device.

CLASS III
Light fittings working with low voltage.

UKCA - UK Conformity Assessed
The conformity mark that indicates compliance with the applicable requirements for products sold within Great Britain

CE – Conformite Europeenne
The CE mark states conformity of products to the essential requirements of the European Community Directives.

Inrush Data

This refers to the power being drawn when a circuit is first energised. The following data shows the inrush currents and duration that apply to the Kingfisher core range and can be used to calculate which breakers are needed for a safe installation.

Actual values may differ due to used circuit breaker types and installation environments.

Wattage (W)	Inrush Current (A)	Inrush Duration (µS)	Max. Fittings per MCB B-Type 10A / 16A
20	14.88	226	19 / 30
40	24.88	236	12 / 20
60	32.00	355	6 / 10
80	41.60	238	6 / 10
100 / 120	65.00	268	3 / 5
160 / 180	80.00	250	3 / 5
250 / 320	160.00	250	1 / 2

Glossary of Terms

Amp - A measurement of the flow of electrical current. One amp is equal to the electric force of one volt acting across the resistance of one ohm.

Ballast – Device connected between the supply and one or more discharge lamps which serves mainly to limit the current of the lamps to the required value.

Beam Angle - Measures the spread of a light source. Lighting with a wider beam angle is more suitable for general purpose. Narrower beam angles are good for highlighting specific objects or areas.

Candela - The unit of measure for the intensity of light at the source roughly equal to the amount of light in any direction from the flame of a candle.

Colour Rendering Index (CRI) - is a measure of the ability of a light source to reproduce the colours of various objects being lit by the source

Colour Temperature - A measure of how warm or cold a white light source appears. Warm light sources offer a softer, yellower light, while cool light sources emit a bluer, more intense light. Colour temperature is measured in Kelvins (K), and the lower the number, the warmer the light.

Driver – A driver is a device which controls the amount of power to an LED board or fitting, protecting it from sudden increases in voltage. Drivers are required to use low voltage LEDs and they can improve the performance and lifespan of LED light bulbs.

Efficacy - This refers to the amount of light produced per watt of electricity (comparable to efficiency). It is the rate at which a lamp is able to convert electrical power (watts) into light (lumens), expressed in terms of lumens per watt (LPW)

Emergency Lighting - Lighting that is designed to activate when a mains power outage occurs, usually powered by a rechargeable battery. Emergency lighting is useful when normal power may be cut off, and it is a health and safety requirement for areas around fire exits.

Flicker – Light flicker refers to rapid or quick and, repeated changes in the brightness of light over time – light that appears to flutter and be unsteady. It is caused when the voltage supplied to a light source changes or when the power line voltage itself fluctuates.

Glare - This occurs when the contrast between dark and light is accentuated. This can cause discomfort for people using spaces near the luminaire.

Heat Sink - A heat sink is used to draw heat away from certain parts of an electronic circuit. Because LEDs are sensitive to heat, a heat sink is often an important part of a luminaire. Heat sinks help to preserve the lifespan of LED lights.

IP Rating – An IP rating is a way of showing how effective an item is at blocking out foreign bodies. The IP stands for Ingress Protection and the following numbers (i.e. IP67, IP56, etc) refer to the protection an item offers against the intrusion of the two categories of foreign bodies, i.e. solid (e.g. dust) and liquid (water).

IK Rating - The IK rating is an international standard that indicates how resistant a product is to impact. The standard BS EN 62262 relates to IK ratings, to identify the degree of protection provided by enclosures for electrical equipment against external mechanical impacts.

Ignitor – A device intended, either by itself or in combination with other components in the circuit, to generate voltage pulses to start a discharge lamp without providing preheating of the electrodes.

Lumen - The quantity of luminous flux emitted within a unit solid angle (one steradian) by a point source with one candela intensity in all directions.

Lux - The amount of visible light per square meter incident on a surface. 1 lux = 1 lumen/square meter

Maintenance Factor - A lighting system's maintenance factor indicates how much of the initial luminous flux remains available at the end of its service life. The maintenance factor must be determined by the lighting designer and the new value of the luminous flux multiplied by it.

Obtrusive Light – This is any unwanted light that is illumination areas near a light source. For example, a luminaire that shines light onto a nearby residential areas or wildlife habitat.

PIR - Stands for Passive Infrared detection device. In lighting, it is connected to a luminaire. A PIR detection device turns the light on or off when there is a large change in infrared activity, usually when someone enters or exits a room. This helps to save energy. PIRs are frequently used in security lighting.

Photocell – These are sensors that change resistance depending on the amount of light it detects. Simply put, a photocell with allow the light source to activate when little to no light is detected, meaning the luminaires is activated when natural light deteriorates.

Power Factor - This is the ratio of power actually used in an electric circuit, the real power (expressed in kW), to the power that is apparently being drawn from the power source, the apparent power (expressed in kVA).

Reflector Technology – This solution is precisely designed to concentrate the light from the LED chips and project a focused beam pattern to put the light where you need it using a serious of 'reflectors'. This technology is used to reduce glare, obtrusive light and promote comfort.

Uniformity (min/ave) – This is the ratio of the minimum lighting level to the average lighting level in a specified area. It's a quality parameter for the overall illuminance distribution.

Upward Light Output Ratio (ULOR) - The effectiveness of a luminaire in transmitting the light from the light source upward and out into the environment.

Volt - The unit of electrical potential, or difference in electrical pressure, expressing the difference between two electrical charges.

Watt - A standard unit of power defined as one Joule of energy transferred or dissipated in one second.

Wind Area / Windage - A general term describing the amount of exposure of an object to the force of the wind.

Kingfisher Lighting

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