



# HIGH-MAST LIGHTNING

Ghm

ECLATEC

## Lighting Large Spaces requires a special approach.

This programme is a product of years of pooling different specialised resources, experience and knowledge to create high-mast solutions.

These efforts have yielded a product line that is consistent, optimised, complete and compliant with the regulations in force.

### **Consistent:**

It all starts with the photometric study.

The parameters from the study determine the type, number and orientation of the lights. These results set precise limits on height, dimensioning, weight and sales price.

Traditionally, photometric studies were conducted independently of mechanical studies. Taking the opposite approach, GHM and ECLATEC work in close collaboration to harness their potential, resources and programmes.

### **Optimisation:**

Each individual component of the High-Mast solution has undergone optimisation and a thorough value analysis.

These components (lights, brackets, accessories) have been harmonised to guarantee compatibility and performance for these special applications geared towards High-Mast lighting.

### **A complete catalogue:**

The GHM/ECLATEC programme covers all equipment and materials (pole, brackets, lights and accessories).

We can also provide quotations for optional services, ranging from support, installation and commissioning to illuminance measurements and maintenance (such as for mobile luminaire rings).

### **Regulatory compliance:**

This is central to our approach.

This is first and foremost because you cannot put a price on worker safety: who would not be concerned to work at heights of over 20 metres, in potentially sensitive conditions? It is essential that we respect our operators.

Another reason is that the profusion of texts, guidelines and standards poses a challenge to project managers and principals in terms of responsibility.



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## 1. ECLATEC, GHM AND HIGH-MAST LIGHTING



## Definition

The term 'High-Mast' covers lighting solutions at heights of 15 metres or more.

The ECLATEC and GHM catalogue includes the following equipment and services:

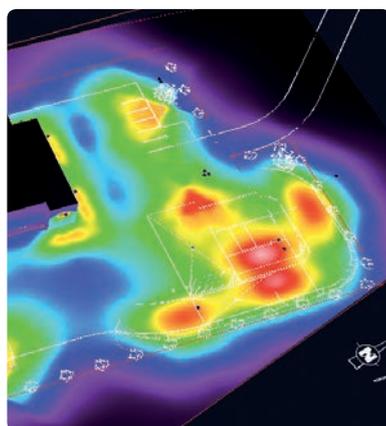
- Fixed luminaire rings, headframes, poles, ladders and walkways
- Mobile luminaire rings
- Lights
- Various accessories
- Services

## Applications

'High-Mast' solutions are mainly used for sports fields, car parks, industrial storage and handling areas and transport, but also for interchanges, intersections, roundabouts and road and motorway toll booths, as well as sorting centres and railway stations.

## Resources and competencies

Specialised research methods determine the right solution for you. Multiple engineers at research firms in different locations have access to databases, design software and dedicated laboratories in the various areas of expertise required (structural calculations, photometric studies). For industrial applications, the means of production, assembly, finishing and control within the group provide total control over the manufacturing process, from design to delivery.



## Service

Specialised equipment plays a role at every stage in the service life of an installation:

- In the definition stage, in order to optimise solution based on the situation at hand
- During commissioning, on quotation, for installation of the masts or for fine calibration
- During operation, to maintain required performance levels
- During maintenance work, particularly on mobile luminaire rings

## Les références

Plus de 3000 installations, dans tous les domaines d'application, traduisent un savoir-faire reconnu.

Quelques références :

- Autoroutes parisiennes (FRANCE)
- Palais omnisports de Paris Bercy (FRANCE)
- Aéroport de Roissy CDG (FRANCE)
- Stade de Furiani (FRANCE)
- Vélodrome de Vincennes (FRANCE)
- Aéroport St Exupéry - Lyon (FRANCE)
- Tunnel sous Fourvière - Echangeurs - Lyon (FRANCE)
- Aéroport Marseille Provence - Marseille (FRANCE)
- Places des Nations Unies - Casablanca (MAROC)
- Stade Houphouët Boigny - Abidjan (COTE D'IVOIRE)
- Résidence du Chef de l'état - Brazzaville (CONGO)
- Université Shuwaikh - Koweït City (KOWEIT)
- Foire internationale de Bagdad (IRAK)
- Parking - Hôtel Mandarin (TAIWAN)



## Recommended maintenance on our mobile high-mast systems

It is highly recommended, in the interests of safety, to perform regular inspections and required maintenance.

Similarly, it is also recommended to use only original parts for replacements, particularly for mobile luminaire rings.

For further information, please contact us:

Mobile solutions: [thierry.valentin@eclatec.com](mailto:thierry.valentin@eclatec.com)

Fixed solutions: [contact@ghm.fr](mailto:contact@ghm.fr)

## 2. SAFETY AND REGULATIONS



'High-mast' solution designs put operator safety first.

Below is a summary of the main regulatory requirements set out in the various laws and standards at the time of writing this document.

## Design and implementation

### General standards

- CTCIM recommendations on structural calculations for lighting poles for large areas:  
Specifies the applicable limits for steel lighting poles between 15 m and 80 m high.

- NF EN 1991-1-4 NA:  
Specifies the wind actions to factor in.

- NF EN 85-014 | NF EN 85-015:  
Specifies design standards for metal work platforms and walkways used by maintenance, execution and operation personnel and design standards for metal stairs, step ladders and railings used by maintenance, execution and operation personnel.

- NF EN ISO 14122-4:  
Defines general safety rules for access to machinery.

- NF E 85-012:  
Sets out rules on 'anti-intruder' protections to prevent low access to fixed ladders.

- NF EN 795:  
Specifies requirements for fall protection anchoring devices.

- NF EN 353-1:  
Sets out requirements on mobile fall protection devices for ladders or climbing rungs.

- NF EN 361 | NF EN 362 | NF EN 363 | NF EN 364 | NF EN 365:

Sets out requirements, test methods, markings, information supplied by the manufacturer and packaging for fall protection harnesses.

Specifies the requirements for connectors. Specifies the general characteristics and assembly of personal fall protection systems.

Specifies the test methods for personal protective equipment against falls from a height.

Specifies the requirements for fall prevention equipment.

- NF EN 1090  
Defines the requirements for evaluating the conformity of structural components.

- R.4312-1 of the French Labour Code (Chapters 1 and 4) defines the rules applicable to new machinery and the technical risk prevention rules related to hoisting.

- NF EN 60204-1:  
Sets out the criteria for electrical controls.

- NF EN 14492-1:  
Specifies the requirements for electrical winches.

- NF EN 12385:  
Specifies the requirements for hoisting cables.

### Standards for Mobile Systems

- R.4311-4 of the French Labour Code (1°) defines the equipment type

## Lighting

### Public Lighting

- FD CEN/TR 13201-1 | NF EN 13201-2 | NF EN 13201-3 | NF EN 13201-4 | NF EN 13201-5:

. Selection of road classes, and related requirements. Also provides indications for selecting the study area.

. Performance requirements. Defines the photometric performance levels to be met by the defined road classes according to the regulations in force in different European countries.

. Performance calculation. Gives the required calculation methods and procedures for the photometric performance levels of public lighting installations.

. Photometric performance measurement methods.

- AFE:  
. Guide for designers, technical reference, code of practice and state of the art.

### Sport

- NF EN 12193:  
. Specifies the most common lighting types for sporting events in Europe, both indoor and outdoor.

. Provides values for the project and for lighting inspection for sports facilities in terms of illuminance, uniformity, glare reduction and the colour properties of the light sources.

- AFE:  
. Good practices for lighting equipment implementation and maintenance for principals, designers, installers, manufacturers, managers and users.

- OTHER:  
. UEFA stadium infrastructure regulations.

### Working outdoors

- NF EN 12464-2:

. The current European Standard sets out requirements for lighting outdoor worksites to meet the applicable needs and ensure visual comfort and performance levels.

### Special standards

- Technical Instructions on Civilian Aerodromes ('Instructions Techniques sur les Aérodomes Civils'):

. A French reference text for the design, construction, management and maintenance of aviation infrastructure. gestion et l'entretien des infrastructures aéronautiques.



### 3. POLES AND BASES



### Steel poles

Your partners GHM and ECLATEC can provide steel poles to meet the latest lighting applications at heights of up to 35 metres. Having design and manufacturing capabilities under the same roof helps us research and implement adapted technical solutions, both for standard products and custom designs:

- Our design engineers are specialists in the use of suitable simulation tools to define high-mast solutions. The technical approaches they select are supported by drawings and calculations, available on request.

- The proposed poles are manufactured in GHM's production facilities, using modern and adapted means of production and control.

- The steel types used are in accordance with standard NF EN 10025.

The hot-dip galvanisation method meets the requirements of standard NF EN ISO 1461.

On request, high-mast steel poles can be finished in polyester powder coating.

The poles come with anchor rods and jigs.

### Concrete poles

The fixed and mobile systems on offer are also adaptable for reinforced concrete poles.

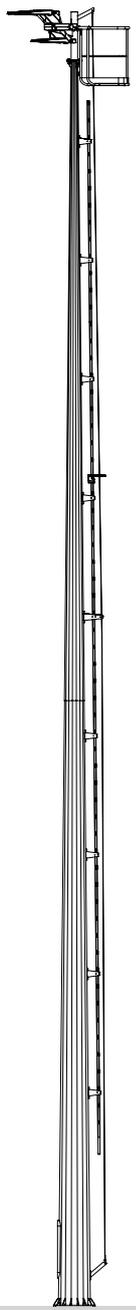
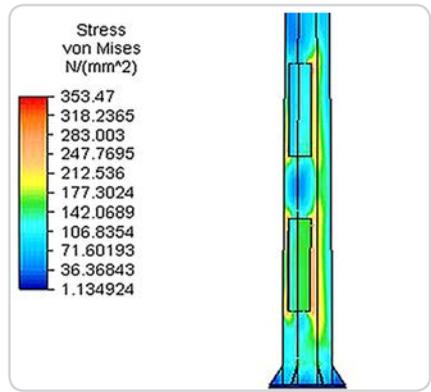
The anchoring points of our equipment are attached to the reinforcement and encased in the structural concrete.

Anchoring point layout drawings are available on request.

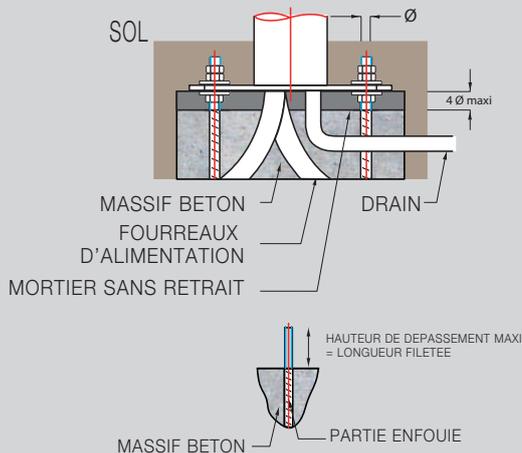
### Bases

Bases are determined by several factors, such as wind surface area, overturning moments, exposure and the nature of the terrain. An assessment, purely for information purposes, may be conducted using the Andrée-Norsa formula.

The project manager must always enlist a research firm specialising in civil engineering to more perform a more precise calculation.



### INSTALLATION OF LIGHTING POLES FOR LARGE SPACES

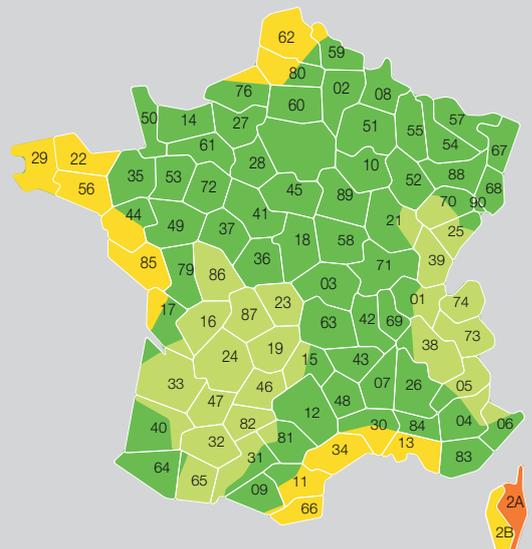


### WIND MAP

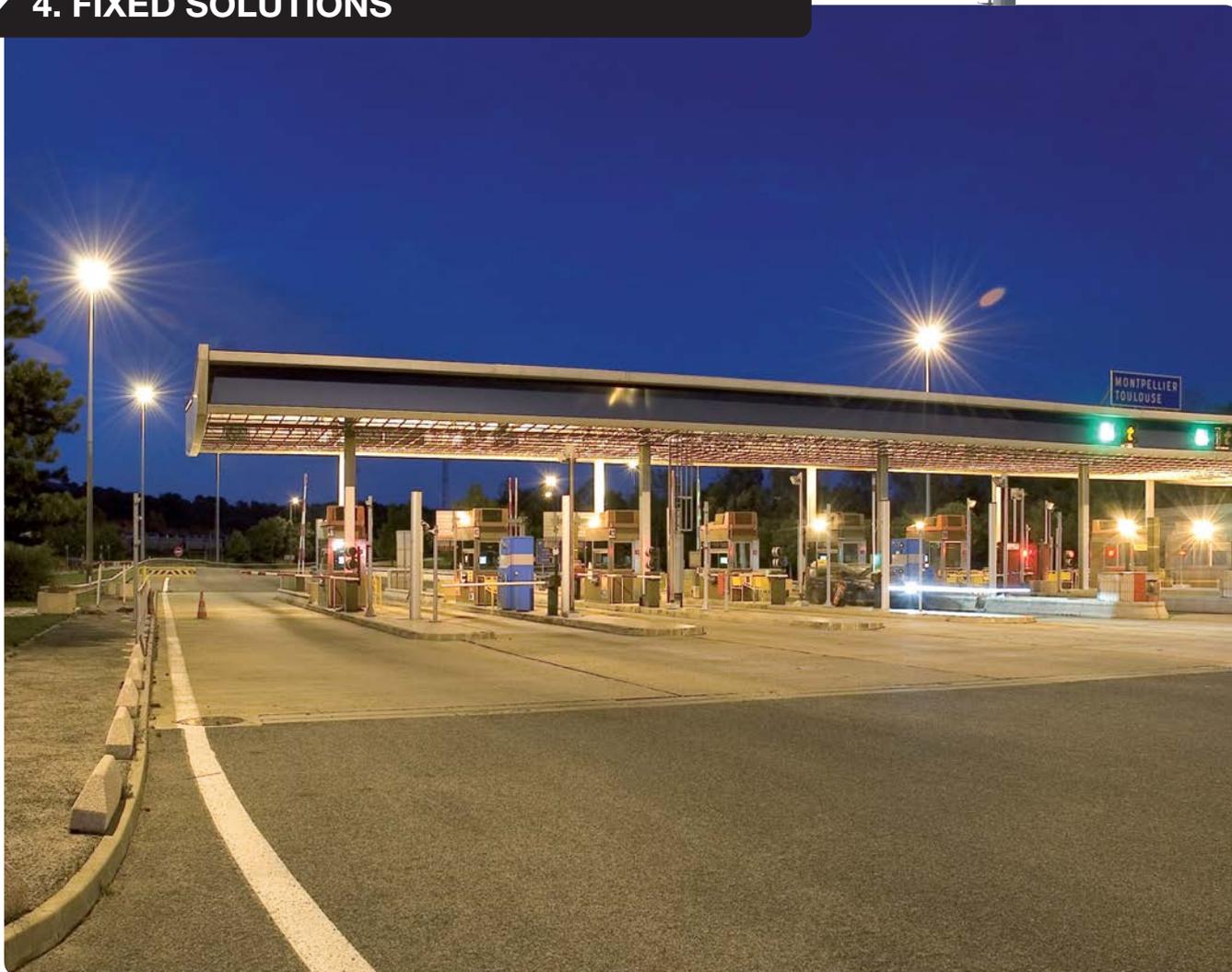
ZONES DE VENT	VITESSES DE RÉFÉRENCE
1	22 m/s
2	24 m/s
3	26 m/s
4	28 m/s

ZONES DE VENT	VITESSES DE RÉFÉRENCE
Guyane	17 m/s
Martinique	32 m/s
Reunion	34 m/s
Guadeloupe	36 m/s
Mayotte	30 m/s



## 4. FIXED SOLUTIONS



## Light support structures

The proposed brackets meet the requirements for strength, accessibility and adaptability. The type, number and orientation of the lights depend on the situation.

These brackets are the result of thorough analysis, with attention to standardisation as well. Made from hot-dip galvanised steel, they are adaptable to all high-mast poles.

### Crosspiece

Straight crosspieces of different lengths that can hold 1 to 5 lights.



It enables 360° lighting.  
**Rectangular headframe**  
Particularly suited for installing 2 rows of lights.

### Circular headframe

This headframe is attached to the masthead and its diameter varies depending on the type and number of lights to be installed.



### Arms

Removable side arm holding 1 or 2 lights, often used in combination with

## Light brackets

Made from hot-dip galvanised steel, compatible with all light types, the bracket product line offers multiple lighting configurations. On request, they can be fitted with an electrical junction box for the lights.

Custom designs for specific projects (shape, number of lights, etc.)

Supplied with stainless steel screws.



## Walkways

Made from hot-dip galvanised steel, their ergonomics provide operators with comfort and safety when performing maintenance on lights.

Supplied with stainless steel screws.



## Ladders, lifelines and harnesses

Ladders made from hot-dip galvanised steel for stable access. Anti-slip steps at a constant pitch and spacing. Rest platforms positioned according to the intervals set out in standard NF EN ISO 14122-4. Access prohibited for unauthorised persons (for this purpose, the first steps are not fixed at less than 3 metres from the ground; with option for removable bottom part).

Supplied with standardised components with stainless steel screws.

Lifeline, stainless steel cable, 8 mm in diameter, supplied with attachment accessories and tensioner.

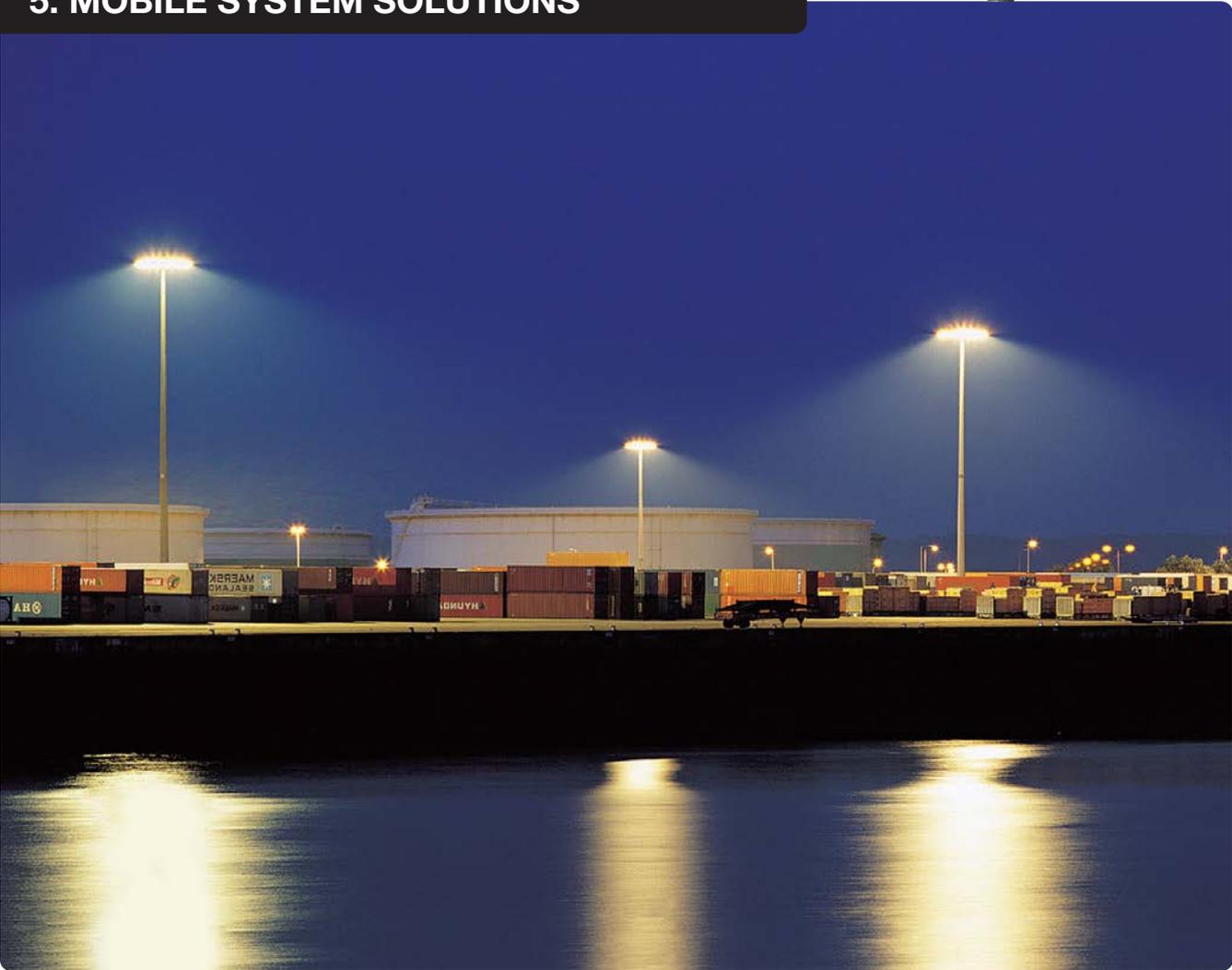
These approved kits meet the requirements of standards NF EN 353-1 and NF EN 363.

Safety harness, lanyard and mobile fall arrestor, available as options.





**5. MOBILE SYSTEM SOLUTIONS**



## MOBILE SYSTEM SOLUTIONS

### Operating principle and commissioning

The ECLATEC mobile lighting system enables maintenance of lights from the ground; this solution eliminates the need to scale the pole or use aerial work platforms. Consequently, this decreases response time and work expenditures and increases reliability.

This system, **developed and patented by ECLATEC**, combines safety, efficiency, reliability and ease of use.

It is adaptable to steel or concrete poles, and to newly installed or renovated brackets. It is also possible to conduct research for installation on supports other than poles (e.g. smokestacks, wooden frames, etc.).

The **structure is moved using a fixed-cable electric winch** at the pole base. The winch is connected to the structure by a counter pulley at the masthead.

The structure is **kept in high position by traction on the cable**. The winch design (worm screw and pinion), which blocks reverse motion, prevents the structure lowering due to gravity. A drag chute attached to the structure provides redundancy. The absence of a latch mechanism eliminates the current risk of seizure with other systems.

Rail guidance ensures **movement stability**, enabling system travel at windspeeds of up to 60 km/h.

The guide rail is made from extruded aluminium, with a specially adapted profile. It comes in two sizes:

- 100 mm-wide for loads of up to 700 kg
- 200 mm-wide for loads from 700 kg to 2400 kg

The main trolley that receives the load-bearing structure is **fitted with a drag chute** with eccentric toothed cam and return spring (two of each if load > 700 kg). This chute activates instantly by direct contact with the guide rail if the cable breaks.

Brake activation triggers an electrical safety device (cable slack) that blocks all movements.

A mechanical torque limiter and an electrical torque limiter eliminate the risk of stripping in the event of a blockage during ascent.

**Automatic stop** when **raising or lowering the structure** is controlled by the top and bottom limit switches.

The electrical connections are provided using ribbon cables guided along the rail by cable-guide trolleys. This design enables continuous power supply to the lights during movement, thus eliminating the risk of electrical faults seen in plug connection systems.

The operator performs the **movements in total safety** using a control box connected by an electrical cable of adequate length, for operation from locations other than below the structure.



Installation support



Fixed motorised winch at pole base



Movement of rail-guided structure



Fall prevention provided by a drag chute with cam



Permanent electrical connection for lights Movement of cables with the structure



Movement control safety thanks to portable box

# MOBILE SYSTEM SOLUTIONS

## Description des éléments constituant le système mobile



### Head

This is made from hot-dip galvanised steel and contains the counter pulley for the traction cable, of standardised diameter. The pulley is fitted with a bronze ring and rotates around a stainless steel axle. The head is fitted with anti-rotation coupling system.



### Cam

Aluminium  
A high cam, automatic stop in high position.  
A low cam, automatic stop in low position.



### MAIN TROLLEY

Aluminium  
Length of 1500 mm for a 200 mm rail  
Length of 1000 mm for a 100 mm rail  
Stainless steel screws and track rollers



### Limit switch

Dual-function toggle switch  
Automatic stop when raising and lowering



### Cable slack

Toggle switch  
Automatic stop in the event of cable breakage or slack



### Drag chute

Stainless steel screws, shafts, cams and springs  
One toothed cam, one spring for load < 700 kg  
Two toothed cams, two springs for load > 700 kg



### Embedded distribution box

Polyester (aluminium, stainless steel, etc., on request)  
This enables connection of lights, limit switches and additional accessories.  
The size and quantity of connection terminals depend on the number of lights.



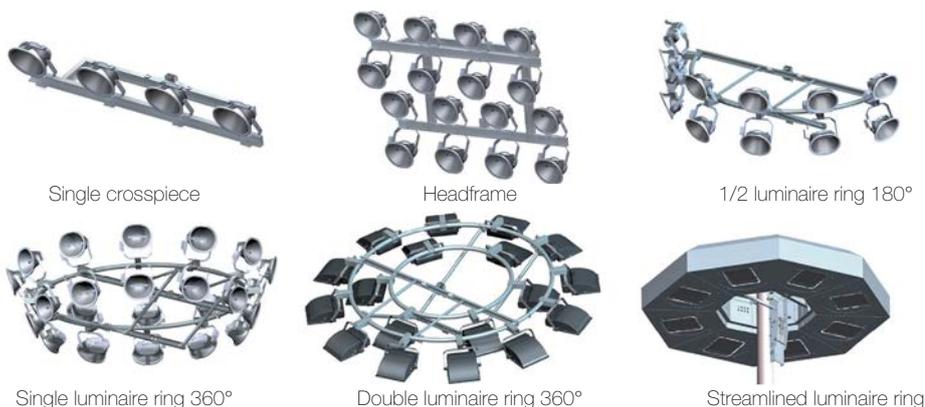
### Light brackets

Galvanised steel or aluminium  
Crosspiece, Headframe, 1/2 Luminaire ring 180°, Luminaire ring 360°



## LIGHT SUPPORT STRUCTURES

The support structures are the product of thorough study, with attention to strength, accessibility, standardisation and adaptability. They are made from hot-dip galvanised steel or from aluminium and are adaptable to all high-mast poles. The type, number, position and orientation of the lights depend directly on the lighting situation.



The adaptability of the design allows for combination with these different configurations. Use of a guide rail enables asymmetric distribution of lights on the brackets.

The lighting fixtures can be embedded on the structure or positioned at the pole base.

NB: Studies can be conducted on request for any special shapes or needs.



### Rail

Profiled from anodised aluminium  
100 mm-wide for load < 700 kg  
200 mm-wide for load > 700 kg  
Fish joint  
Stainless steel screws



### Ejector

Anodised aluminium  
Removes cable guide trolleys from the rail.  
Stainless steel screws



### Base protection conduit

Aluminium sheet  
Fixed on the rail at the pole base  
Protects flat electrical cables for the first 2.5 metres.



### Base anchoring

Aluminium sheet  
Anchoring for flat cables at the pole base  
Stainless steel screws



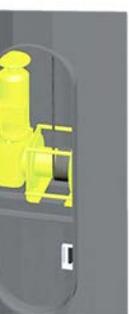
### Cable guide trolley

Made from cast aluminium and aluminium sheet, polyamide track rollers  
Stainless steel screws



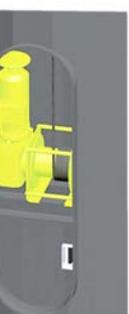
### Flat electrical cable

12 x 2.5 mm<sup>2</sup> neoprene  
Quantity determined based on number of lights.  
Larger cross-section if lighting fixtures embedded



### Winch and gear motor

(fixed or removable gear motor)  
Worm drive with pinion  
Average speed: 2 m/minute  
Installed inside or outside depending on the pole type and size.  
Capacity determined based on weight.



### Traction cable

Safety factor 6  
Determined based on load  
One pointed end (winch side) and one sleeved loop end (drag chute side), custom-produced ex works (no cable clamp)  
Galvanised steel, multi-strand wires  
Stainless steel in special cases (corrosive environments)

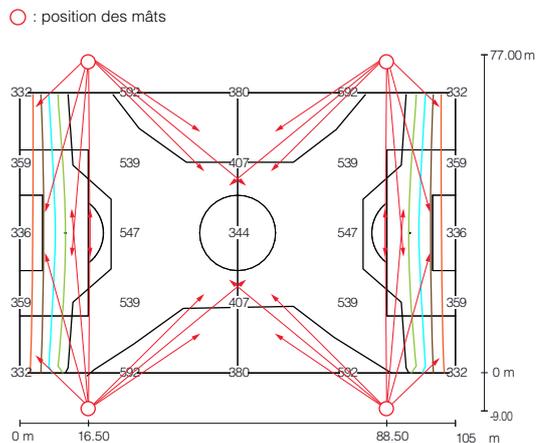
## 6. PHOTOMETRY EXAMPLES



**Football pitch E3**

- 32 lights, STELIS 2000W MH long arc
- 4 poles, 22 m high
- Lamps, 2000 W MH

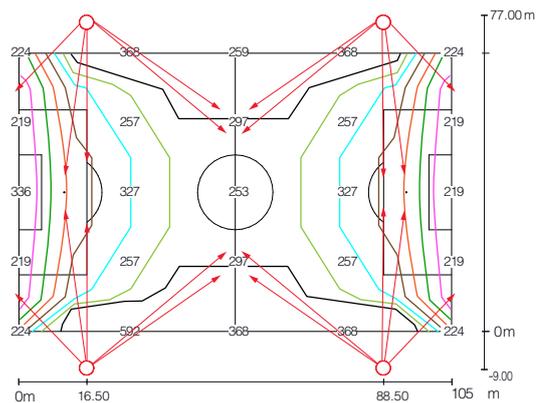
Average illuminance: 439 lux  
 Min. illuminance: 332 lux  
 Max. illuminance: 592 lux  
 Min. illuminance/ave. illuminance: 0.76  
 Min. illuminance/max. illuminance: 0.56



**Football pitch E4**

- 20 lights, STELIS long arc
- 4 poles, 22 m high
- Lamps, 2000 W MH

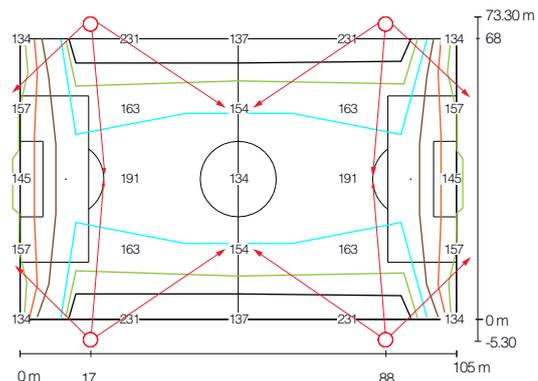
Average illuminance: 269 lux  
 Min. illuminance: 219 lux  
 Max. illuminance: 368 lux  
 Min. illuminance/ave. illuminance: 0.81  
 Min. illuminance/max. illuminance: 0.60



**Football pitch E5**

- 12 lights, STELIS long arc
- 4 poles, 18 m high
- Lamps, 2000 W MH

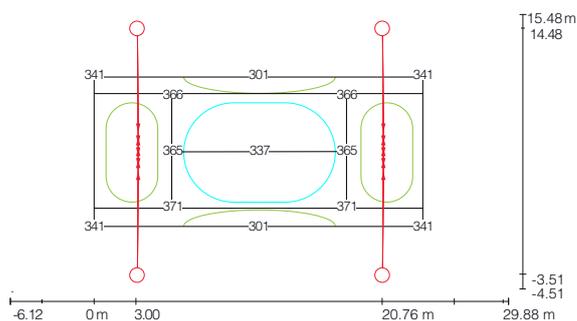
Average illuminance: 165 lux  
 Min. illuminance: 134 lux  
 Max. illuminance: 231 lux  
 Min. illuminance/ave. illuminance: 0.81  
 Min. illuminance/max. illuminance: 0.58



**Tennis court**

- 16 lights, KERIS
- 4 poles, 9 m high
- Source LED, 700 mA 161 W

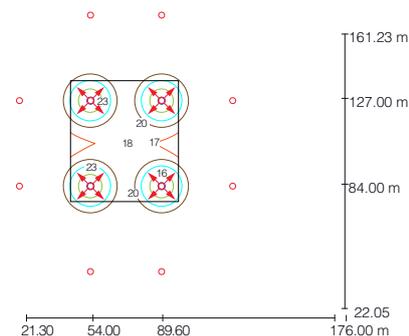
Average illuminance: 347 lux  
 Min. illuminance: 301 lux  
 Max. illuminance: 371 lux  
 Min. illuminance/ave. illuminance: 0.87  
 Min. illuminance/max. illuminance: 0.81



**Storage area - Car park (example)**

- 64 lights, KERIS
- 4 poles, 18 m high
- Source LED, 300 mA 70 W

Average illuminance: 21 lux  
 Min. illuminance: 17 lux  
 Max. illuminance: 28 lux  
 Min. illuminance/ave. illuminance: 0.81  
 Min. illuminance/max. illuminance: 0.59



## 7. LIGHTS



**KERIS**



**STELIS**



**ASTRIS**



# KERIS



KERIS 2



KERIS 3



## Applications

Secondary interurban and urban streets and roadways, car parks, sports facilities (tennis, handball, bouldromes, etc., not adapted for football pitches), industrial sites and business parks, architectural enhancement and pedestrian crossings

## Description

Lights available in 2 sizes: KERIS 2 and KERIS 3

Body made from die cast aluminium

Finished with polyester powder coating, paint of choice

IP 66

Standard LED Strips (SLS) fitted with **QUADRALENS lenses**

Average temperatures of colour 3000 K or 4000 K

Heat-tempered and screen-printed glass bowl

IK 08

Class I or II

Light that meets the Energy Savings Certificate criteria

## Useful reference figures

Material compositions:

KERIS 2: Aluminium 37%, Steel 29%, Glass 20%, Other 14%

KERIS 3: Aluminium 47%, Steel 25%, Glass 14%, Other 14%

According to the European RoHS Directive

ULR < 1%

Increased recyclability

## Watertightness

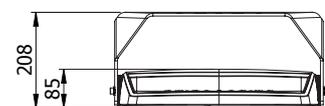
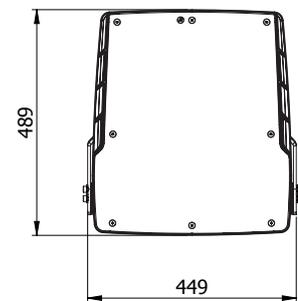
Watertightness of IP 66 according to standard EN 60 529

Extruded silicon joint

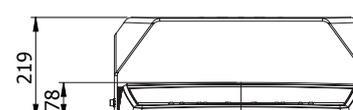
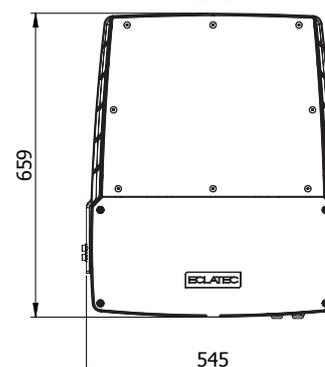
Anchor gland (two per light)

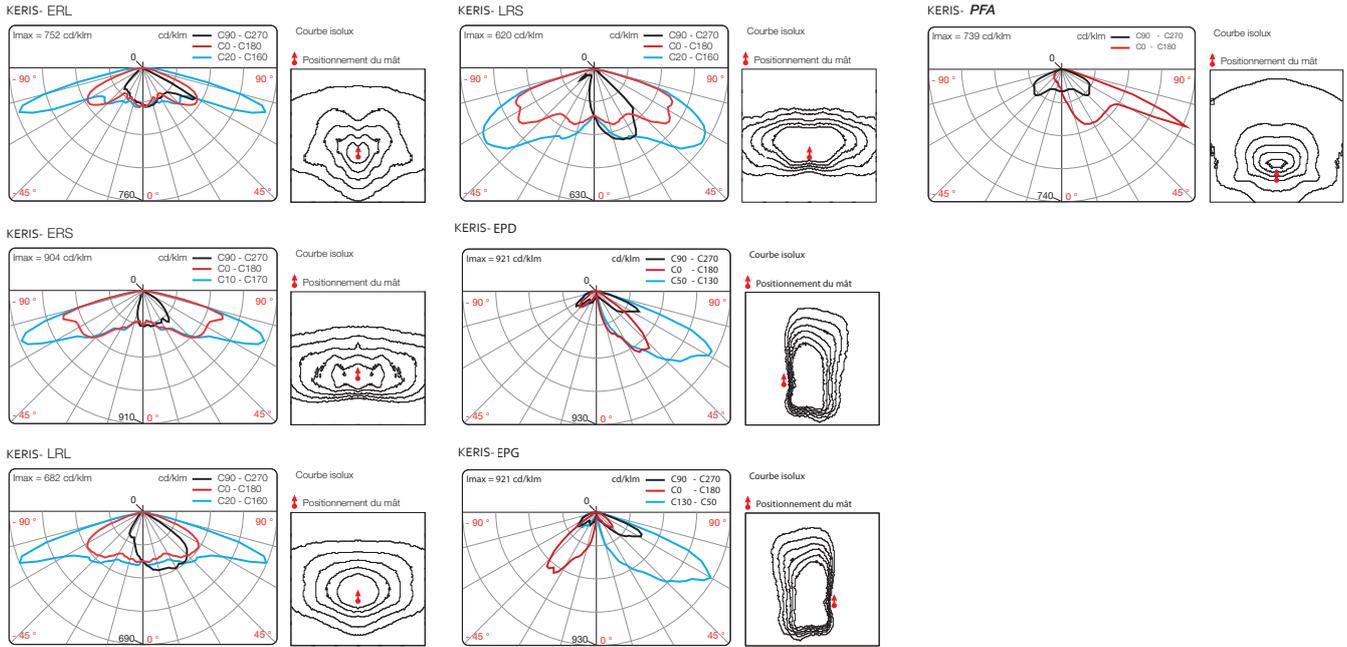
Light ventilation through active charcoal filter

KERIS 2



KERIS 3





Key points

		KERIS 2	KERIS 3
<b>Applications</b>		Secondary interurban and urban streets and roadways, car parks, sports facilities,	
<b>Installation</b>		Attachment on arch	
<b>Dimensions</b>	<b>Length</b>	489 mm	659 mm
	<b>Width</b>	449 mm	545 mm
	<b>Height</b>	208 mm	219 mm
<b>Weight</b>		11 kg	16 kg
<b>SCx</b>		0,04 m2	0,07 m2
<b>Sources</b>		BARETTES BLS	
<b>Lenses and distributions</b>		QUADRALENS : ERS, ERL, ERE, ETS, LRS, LRL, PFA, ECa, Ecb, PAa, PSa, EPD, EPG	
<b>OPTIONS</b>	<b>REP+ CA2P</b> (adjustable from pole base)		○
	<b>CA5</b> (factory setting)		○
	<b>DE</b> (adjustable onsite)		-
	<b>DEDP</b> (adjustable from pole base)		○
	<b>DEP</b> (adjustable from pole base)		-
	<b>DE + CA5</b> (factory setting)		-
	<b>DALI</b>		○
<b>FC</b> (factory setting)		○	

Key to figure: ● Series ○ Option - Not available

E/L/P: Illuminance/Luminance/Projection, R/C/T/F/P: Roadway/Roundabout/Pavement/Beam/Pedestrian Crossing, E/S/L/A/D/G: Narrow/Standard/Wide/Asymmetric/Right/Left, REP: Current adjustable at pole base, CA2P: 2-threshold

Optional rear glare reducer

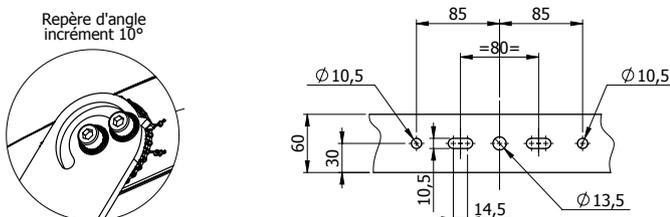
Optional rear barn door (except for EPD, EPG, PSa, ECa and Ecb)

Mechanical interfaces

Installation of the arch on headframe from the top or bottom

Galvanised steel arch, with optional powder coating

Adjustment of tilt with graduated marks on the body



Maintenance

- Maintenance on KERIS 2 lighting fixtures and sources  
Direct access to the power supply and to the SLS strips after removing the bowl by unscrewing 8 screws (lifeline)  
Removable plate

- Maintenance on KERIS 3 fixtures  
Direct access to power supplies after removing the lower cover by unscrewing 4 captive screws  
Removable plate  
- Maintenance on KERIS 3 sources  
Direct access to SLS strips after removing the bowl by unscrewing 8 screws

# STELIS



## Applications

Recommended heights: up to 30 m  
Sports facilities, car parks, logistics platforms, interchanges, toll booths

## Description

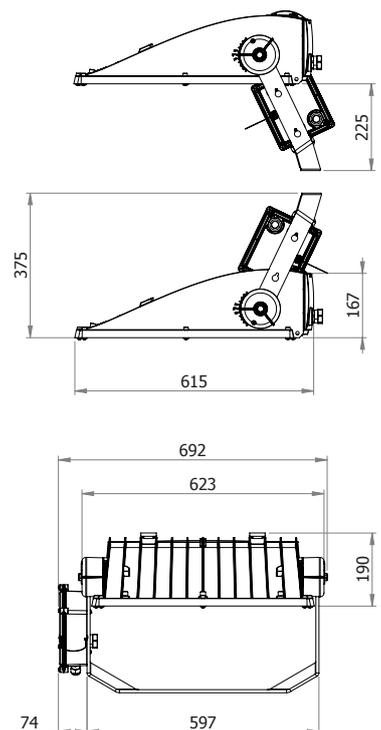
Body made from die cast aluminium  
Black finish, high-temperature liquid paint  
IP 66  
Separate igniter housing made from cast aluminium, on arch  
Reflector made from high-purity pre-anodised aluminium  
Metal-halide lamp, OSRAM 2000 W long arc, 1000/2000 W short arc  
Key component of ECLATEC High-Mast solutions (poles, ladders, rest platforms, lifelines, headframes, fixed or mobile luminaire rings, walkways, accesses, etc.)  
Electronic equipment on a remote board at the pole base or in a cabinet  
Flat heat-tempered glass bowl – IK 10  
Stainless steel safety locks  
Galvanised steel mounting arch

## Useful reference figures

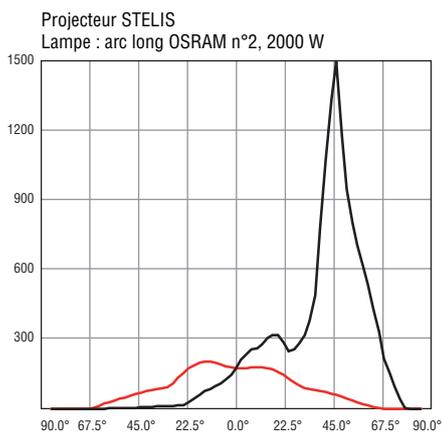
Material composition: Aluminium: 90%, Steel: 5%, Glass: 3% , Other: 2%  
According to the European RoHS Directive

## Watertightness

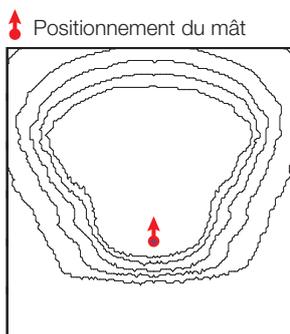
Watertightness of IP 66 according to standard EN 60529  
Extruded pneumatic silicone joint  
Anchor gland  
Light ventilation through active charcoal filter



**Photometric distributions**



Courbe isolux



**Sources**

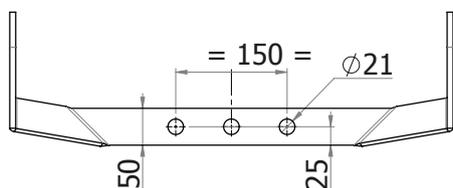
- 1000 W arc court HQITS 1000 W/NDL/S (230 V)
- 2000 W arc court HQITS 2000 W/NDL/S ou 2000 W/D/S/HF (400 V)
- 2000 W arc long HQITS 2000 W/N/L (400 V)

**Points clefs**

		STELIS
<b>Applications</b>		Sports facilities, car parks, logistics platforms, interchanges, toll booths
<b>Height</b>		Starting from 18 m
<b>Installation</b>		On arch
<b>Dimensions</b>	<b>Length</b>	615 mm
	<b>Width</b>	623 mm
	<b>Height</b>	190 mm
<b>Weight</b>		18 kg
<b>SCx</b>		0.13 m²

**Mechanical interfaces**

Installation of the arch on headframe from the top or bottom  
Adjustment of tilt with graduated marks on the body  
Option to use an inclinometer

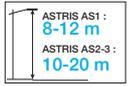


**Maintenance**

- Maintenance on light fixtures and sources:
- Tool-free opening of lamp compartment (2 safety locks)

Lamp access:  
Automatic electrical disconnection on opening

# ASTRIS



## Applications

Recommended heights: ASTRIS AS1: up to 12 m/ ASTRIS AS2 and ASTRIS AS3: up to 15 m  
Sports facilities, car parks, logistics platforms, interchanges, toll booths

## Description

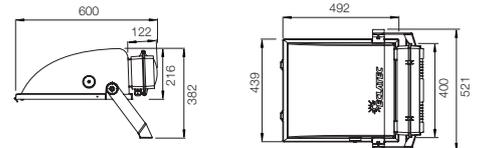
3 models: ASTRIS AS1, ASTRIS AS2 and ASTRIS AS3  
Body and box made from die cast aluminium  
Overall unit finished in polyester powder coating, standard colour: RAL 7035  
IP 65  
Connection by 1 or 2 glands,  $\varnothing$  13 mm  
Asymmetric reflector made from high-purity pre-anodised aluminium  
Built-in fixtures installed on removable plate  
Flat screen-printed mirror made from heat-tempered glass, articulated and locked with aluminium safety locks  
IK 08  
Class I  
Galvanised steel arch, with angle markings  
Tool-free opening of light fixture

## Watertightness

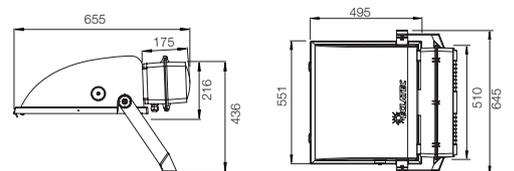
High-temperature extruded silicone joint



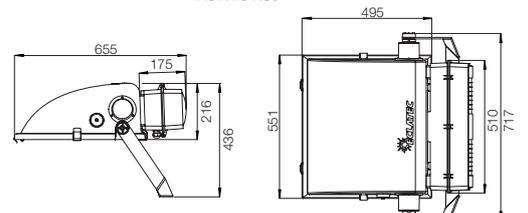
ASTRIS AS1



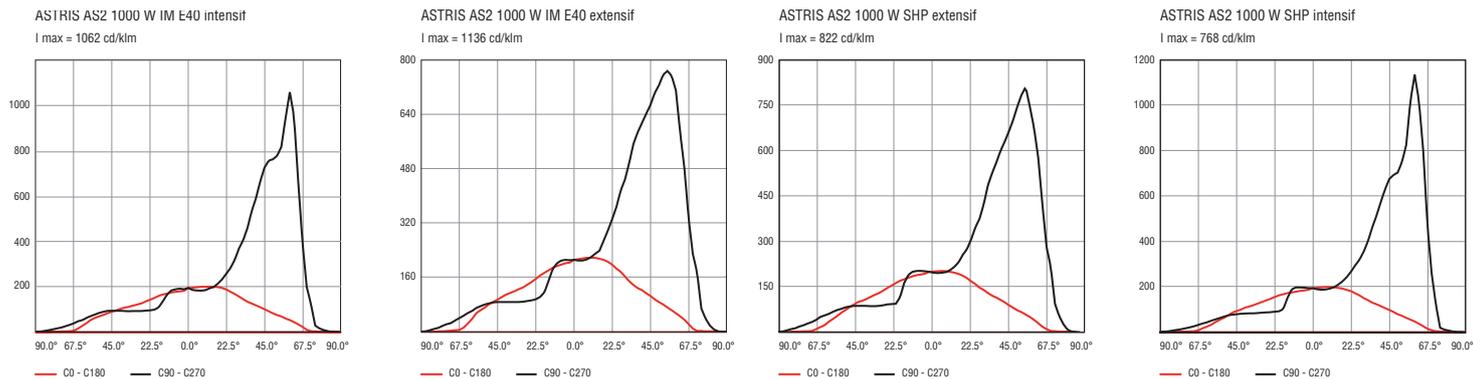
ASTRIS AS2



ASTRIS AS3



**Photometric distributions**



**Sources**

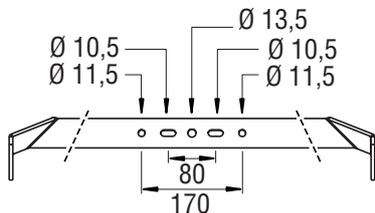
Model	HPS	MH
Astris AS1	250 W (E40)	250 W (E40)
	400 W (E40)	400 W (E40)
	600 W (E40)	/
Astris AS2	1000 W (E40)	1000 W (E40)
Astris AS3	2 x 250 W (E40)	2 x 250 W (E40)
	2 x 400 W (E40)	2 x 400 W (E40)
	2 x 600 W (E40)	/

**Key points**

		ASTRIS AS1	ASTRIS AS2	ASTRIS AS3
Installation		Attachment on arch		
Dimensions	Length Width Height	600 mm	655 mm	655 mm
		439 mm	551 mm	717 mm
		382 mm	436 mm	436 mm
Weight		15.5 kg	23 kg	23.5 kg
SCx		0.09 m <sup>2</sup>	0.10 m <sup>2</sup>	0.10 m <sup>2</sup>

**Mechanical interfaces**

Installation of the arch on headframe from the top or bottom  
 Adjustment of tilt with graduated marks on the body  
 Arch fitted with angle indicator ring graduated in 5°-increments



**Maintenance**

- Opening and closing of light fixture:  
 Access to the lamp by opening two safety locks (Astris AS1) or 4 safety locks (Astris AS2 and AS3) and opening the mirror by 2 stainless steel hinges
- Maintenance on fixtures:  
 Access to the fixtures by opening the box (2 screws for Astris AS1 and 3 screws for Astris AS2 and AS3) located behind the light. Hinged joint  
 Attached by anchor gland

## 8. ADDITIONAL EQUIPMENT



Large lighting poles make ideal supports for installing additional equipment, such as:

- Mobile telephony aerials
- Aircraft warning signals
- Lightning protection
- Video surveillance, etc.

Various interfaces are available for attaching this equipment.

Attachment of additional equipment requires factoring its load into the support pole strength calculations.

On request, the pole may also be equipped with anchor points for attachment of brackets for possible lowering of exterior cables, coaxial telephony cables, braid cables for lightning protection, etc.



**Mobile telephony aerial bracket**

Height-extension pole made from hot-dip galvanised steel, 4 m high, 114 mm diameter standard.

Accommodates three 120° aerials.

Study on specific needs

Stainless steel attachment screws



**Aircraft warning light bracket**

Bracket made from hot-dip galvanised steel or from aluminium

Accommodates various warning light types.

Fitted with electrical junction box.

Stainless steel attachment screws

We can provide warning lights.



**Lightning rod bracket**

As an option, base made from hot-dip galvanised steel, soldered to the fixed light brackets or the mobile system head.

Stainless steel attachment screws

We can provide the lightning rods.



**Video surveillance**

The mobile system, in its small size (100 mm rail), comes in a version with camera bracket so the equipment can be lowered to the ground for maintenance. It is compatible with all pole types in the heights intended for these application types.

## The High-Mast line also includes support services for commissioning and maintenance of installations.

The teams deployed are made up of full-time group technicians specialised in 'High-Mast' work. These specialists hold the required authorisations and certificates and have access to the equipment needed to perform their work in accordance with the regulations in force.

Work is performed by teams of at least two people in permanent communication.

The work zone is systematically marked off.

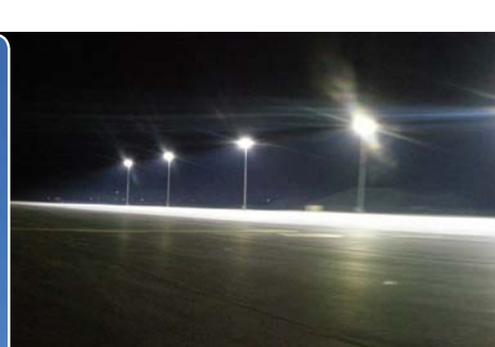
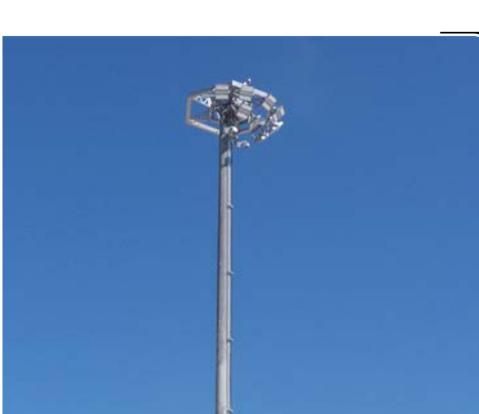
Personnel with the Driver Safety Certificate ('CACES') and the necessary authorisations have access to equipment to enable total safety during work. Adherence to safety instructions and regulations is a point for continuous attention.

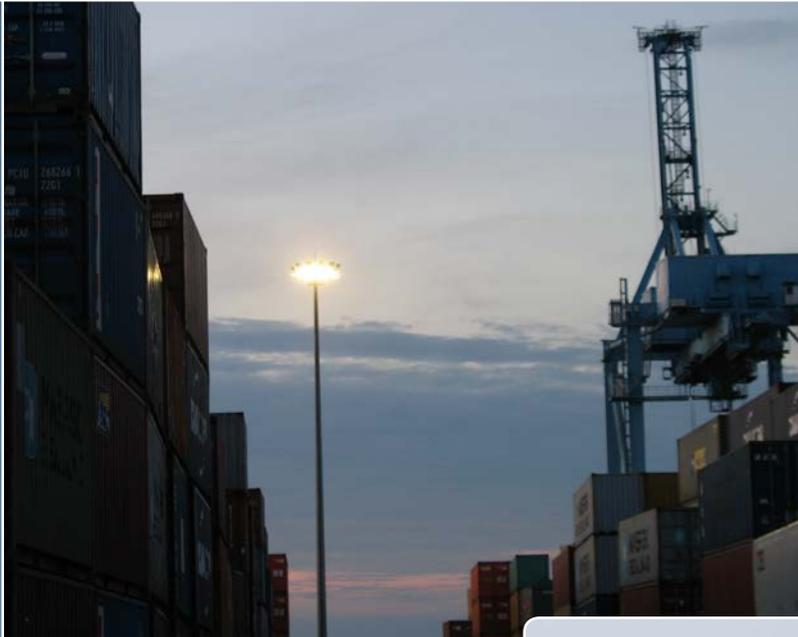


## 9. SUPPORT, MAINTENANCE AND CONTACTS











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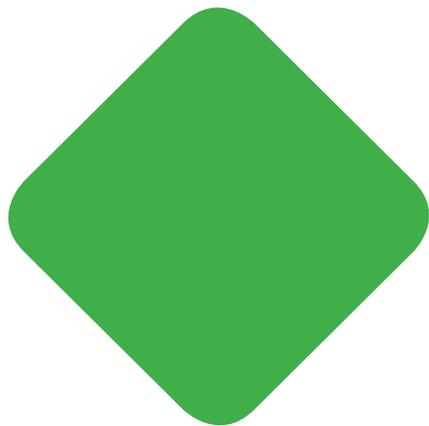


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