

TANGRAM HB

LIGHTING FOR PUBLIC SPACES

Modularity
Light output ratio (LOR \geq 0.95)
Wide application range
Wide range of optics



Industrial lighting
Sports lighting
Street lighting
Façade lighting

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TANGRAM HB is top quality, highly energy efficient LED luminaire, suitable for extreme ambient conditions. Wide range of light output and light distributions make it suitable for different types of lighting in public spaces. Lighting management leads to smart energy consumption.



Efficiency
95%

31 different
optics

Ambient
temperatures
30 - 55°C

ENERGY EFFICIENCY By choosing appropriate light distribution and distances between luminaires, depending on heights, there are significant reductions in required installed power (compared to standard light sources).

Considering longevity of all components (>100,000h), the need for maintenance is reduced, leading to additional savings.



THERMAL
MANAGEMENT



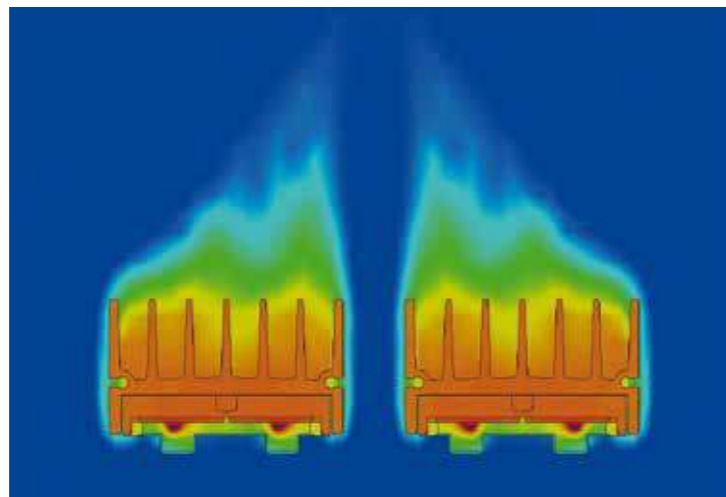
INNOVATION

OPEN DESIGN

Aluminum heatsink with vertical ribs promotes an air flow that cools the LEDs and allows smooth operation of lamps at extreme ambient temperatures up to 55°C. Each LED source has its own heatsink. Separating the light module and control gear prevents heat transfer to the control gear ensuring its longevity and reliability.

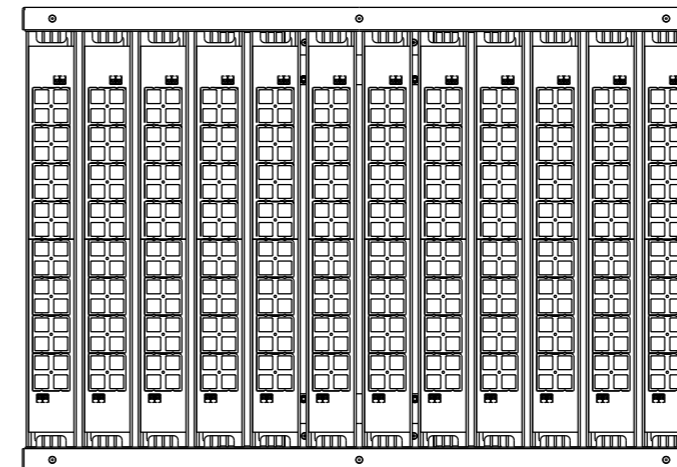
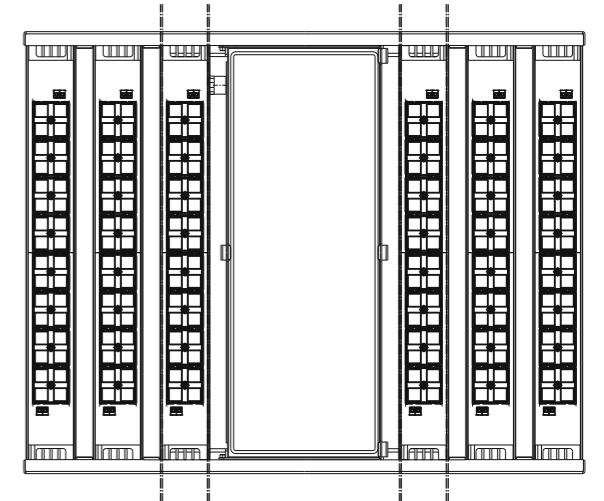
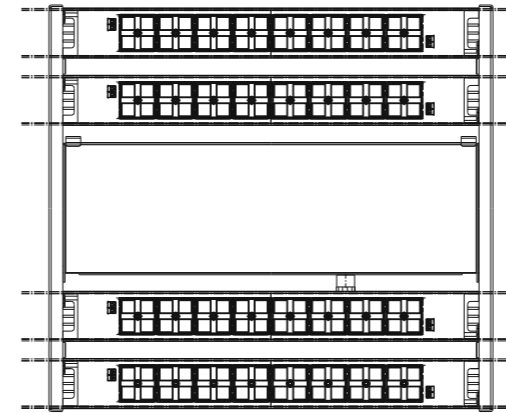
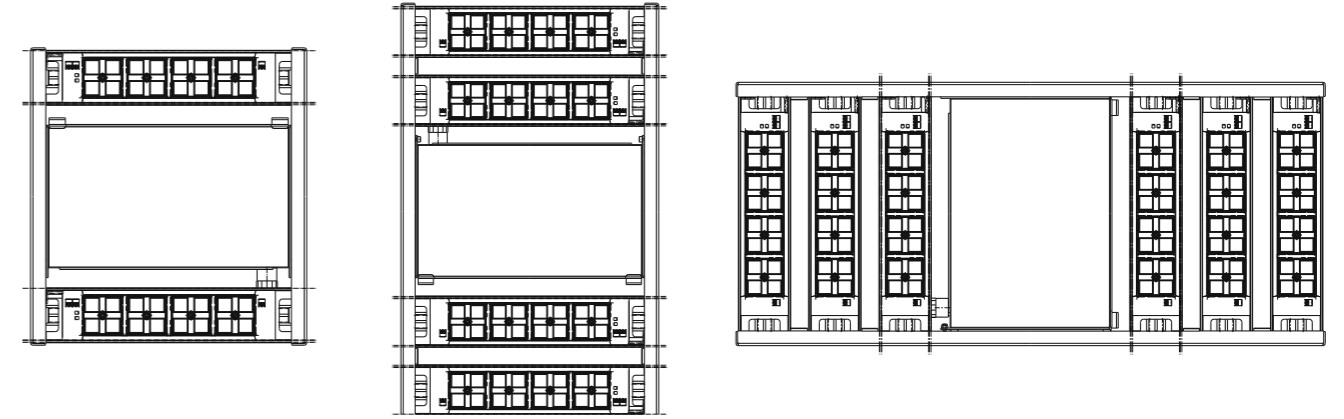
THERMAL MANAGEMENT

The combination of robust heat sink and IP protection of LED modules enables excellent thermal management and safe operation over life time. Open design of luminaire provides natural air flow and guarantees operating at high ambient temperatures.



MODULARITY

One luminaire type TANGRAM HB features 2/4/6/8/12/24 prefabricated modules containing LED-s, optics and cooling part. This approach enables the whole area to be illuminated in the desired way, with only one luminaire model, regardless of the size of the production hall, warehouse, sports terrain, street intersection.



	DIMENSIONS A / B / H	LED LUMEN (4000K/CRI 70) MIN/NOM/MAX.	TOTAL POWER (W) MIN/NOM/MAX.	NUMBER OF LEDS	WEIGHT
TANGRAM 2	360 / 340 / 95	4972 / 8875 / 11955	35 / 72 / 110	32	5.50
TANGRAM 4	540 / 340 / 95	9945 / 17750 / 23910	68 / 141 / 220	64	7.50
TANGRAM 6	755 / 340 / 95	14917 / 26620 / 35864	101 / 212 / 330	96	10
TANGRAM 8	545 / 595 / 95	19889 / 35500 / 47820	136 / 282 / 440	128	14
TANGRAM 12	755 / 595 / 95	29834 / 53240 / 71728	202 / 424 / 660	192	17
TANGRAM 24	902 / 621 / 206	59668 / 106480 / 143456	404 / 848 / 1320	384	23

OPTICS

PMMA lenses of high light transmission (95%). Vast range of different powers and lenses cater for wide application in all types of outdoor illumination.

The distribution of light is defined by lenses made of optical grade PMMA with high UV and temperature conditions. These lenses allow better targeting of light rays so that the light scattering to adjacent buildings and light pollution is minimized. Numerous light distribution are available due to use of standardized lenses. The lighting requirements that may occur in indoor and outdoor spaces such as roads, pedestrian zones, parking lots, squares, sports lighting, industrial high bay and open areas, facades can be met by choosing appropriate light distribution. The main advantage is that lamp Tangram HB has range of 31 different types of optics.



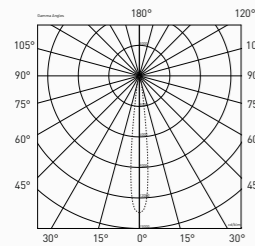
4 972lm
to
143456lm

PMMA LENSES
95% LOR

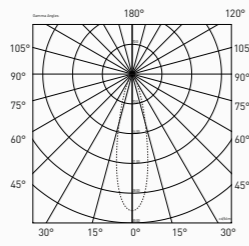


OPTIC TYPES

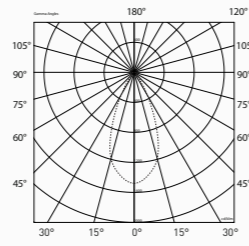
SYMETRIC



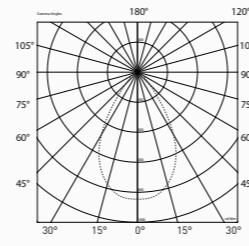
RS



M

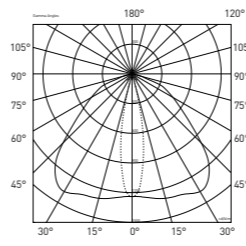


RW

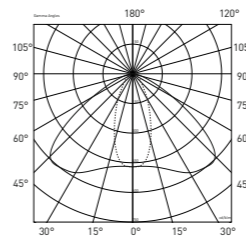


WW

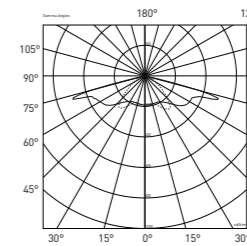
ELIPTIC



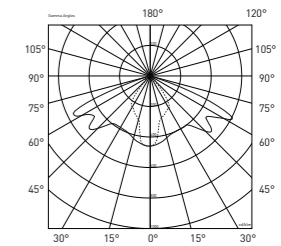
O



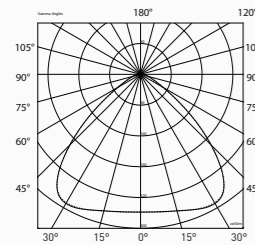
B2



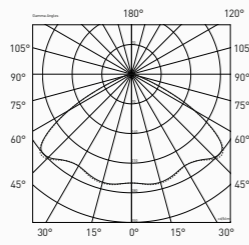
CAT



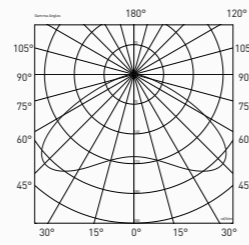
CAT B



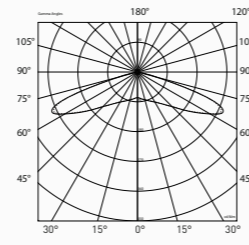
WWW



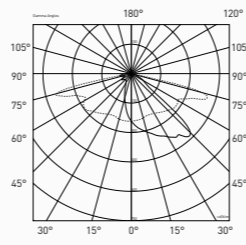
CY



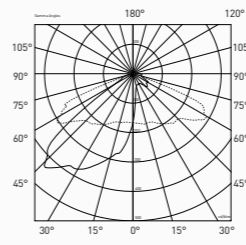
C



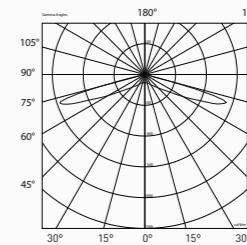
VSM



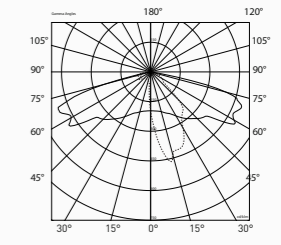
ME



MEW

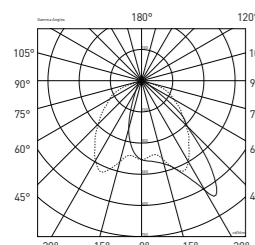


T1

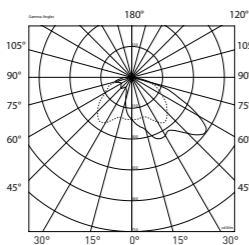


T2

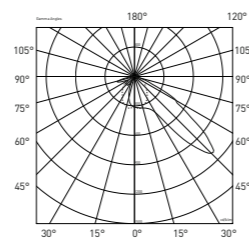
ASYMETRIC



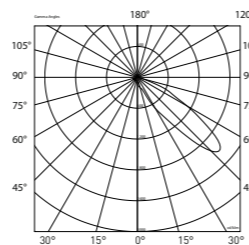
DN



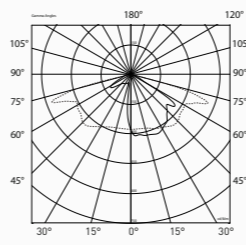
T4



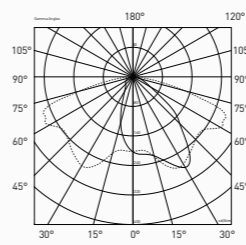
FN



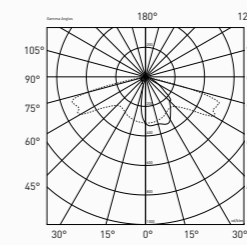
TF



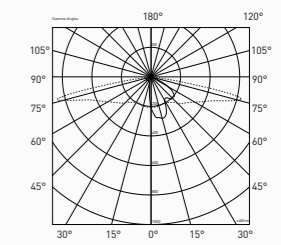
T3



DNW



DWC

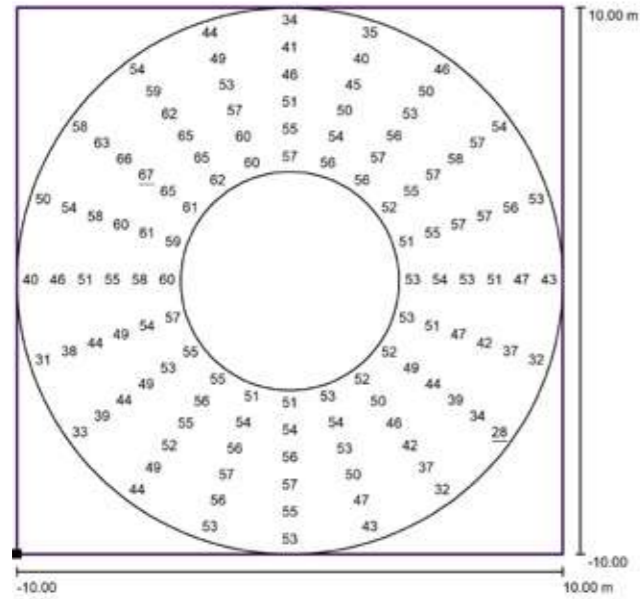


SCL

APPLICATION / USE

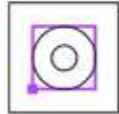
ROUNABOUT

HORIZONTAL CALCULATION SURFACE



Values in Lux, Scale 1 : 161

Position of surface in external scene:
Marked point: (14.014 m, 13.512 m,
0.000 m)

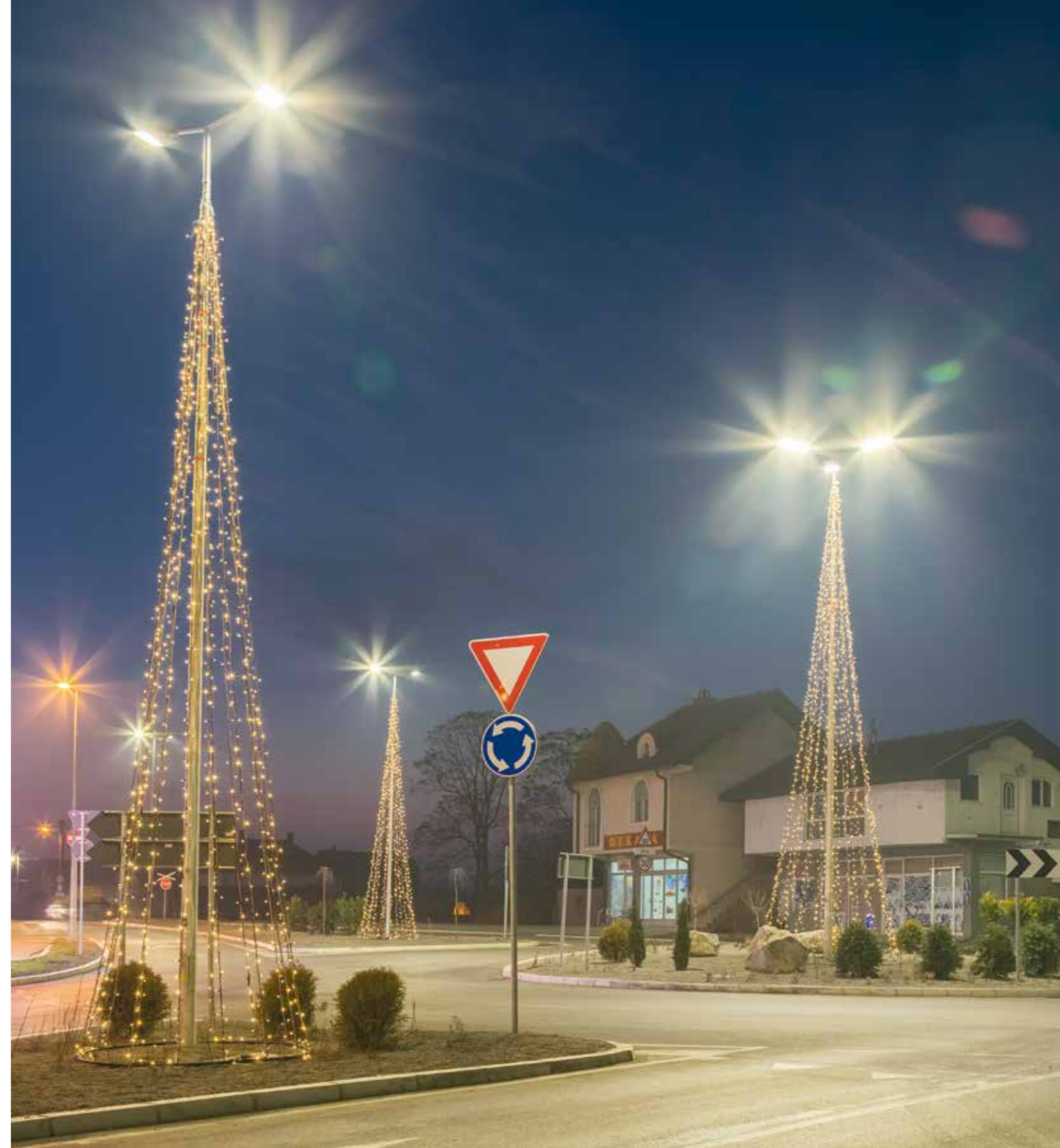
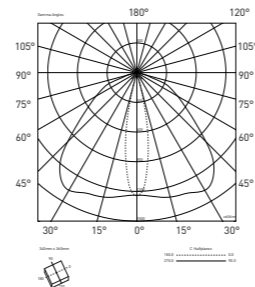


Grid: 20 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$	E_{min} / E_{max}
51	28	67	0.55	0.42

APPLICATION

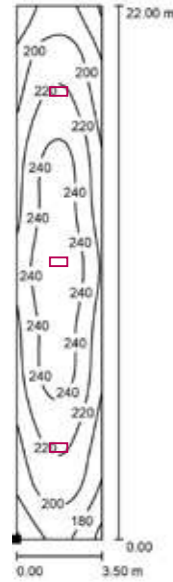
The use of the Tangram HB6 luminaire with elliptical optics particularly emphasizes illumination of the roundabout, leaving the island non illuminated. Mounting height 12m, 1.5 m triple arm, angle of installation 5 °. The calculation results are in accordance with the standard EN 13201-2 for the C0 ($E_{av} > 50lx$, $u0 > 0.4$) illumination class.



APPLICATION / USE

INDUSTRY, INDOOR-HIGH-BAY WAREHOUSE

HORIZONTAL CALCULATION SURFACE



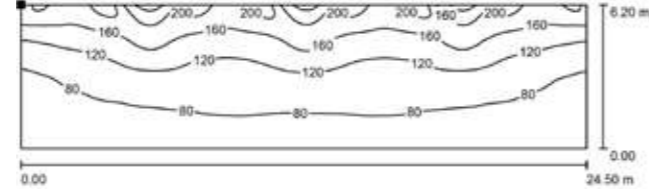
Position of surface in room:
Marked point:
(-5.720 m, -11.093 m, 0.000 m)



Grid: 16 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
219	155	255	0.710	0.610

VERTICAL CALCULATION SURFACE



Position of surface in room:
Marked point:
(-5.510 m, -12.300 m, 7.300 m)



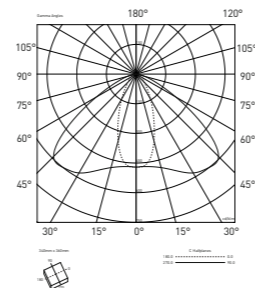
Grid: 32 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
111	45	220	0.407	0.205

Values in Lux, Scale 1 : 173

APPLICATION

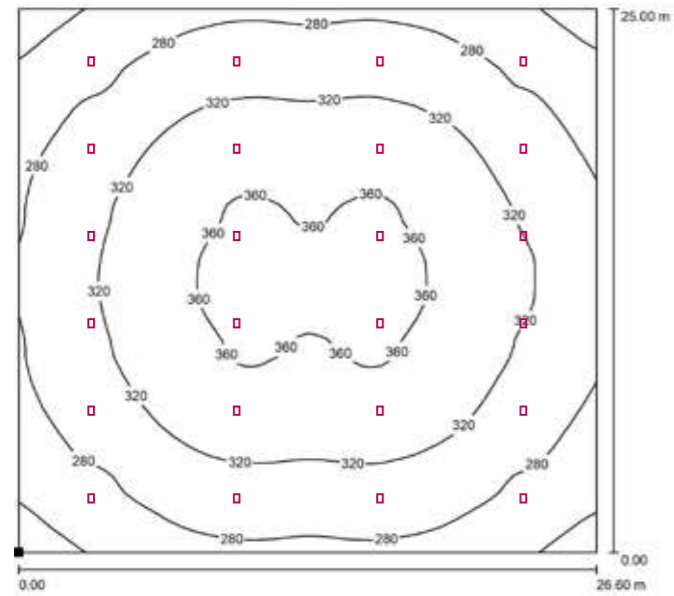
When illuminating the spaces between high bay racks in warehouses, the floodlight TANGRAM HB6 with elliptical optics (B2) provides the required illumination level in the passage and on vertical plane of high bay racks. Mounting height 10m, distance between the racks 3.5m, lengths 22m are illuminated with three suspended floodlights. The results of the calculations are in accordance with the standard EN12464-1 for illumination class 5.4.1 ($E_{av} > 100lx/200lx$, $u_0 > 0.4$).



APPLICATION / USE

INDUSTRY, INDOOR - OPEN SPACE WAREHOUSE

HORIZONTAL CALCULATION SURFACE



Values in Lux, Scale 1 : 196

Position of surface in room:
Marked point:
(-14.600 m, -12.526 m, 0.000 m)

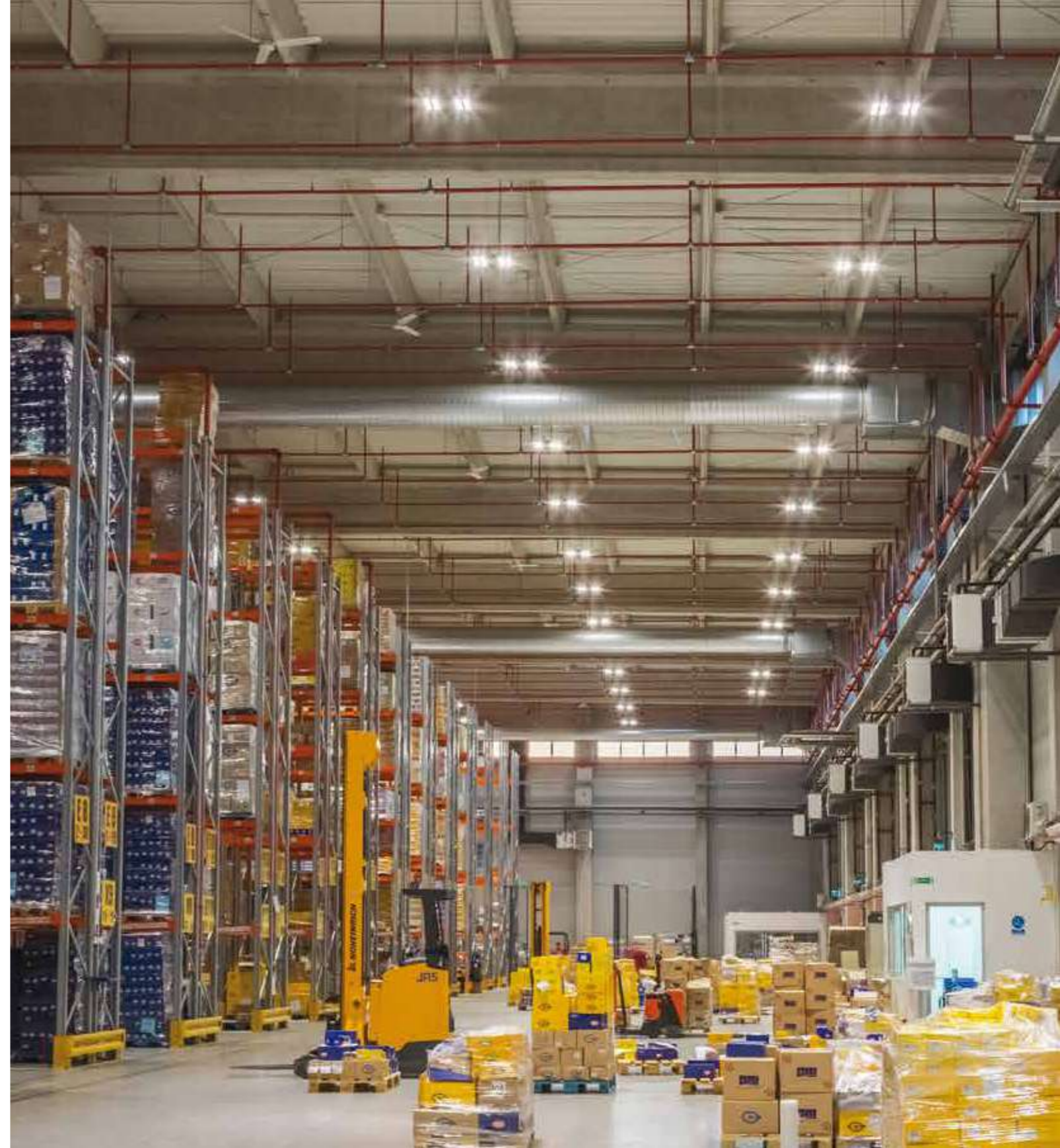
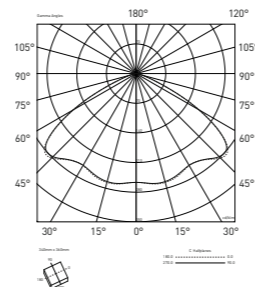


Grid: 64 x 64 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$	E_{min} / E_{max}
312	218	368	0.697	0.590

APPLICATION

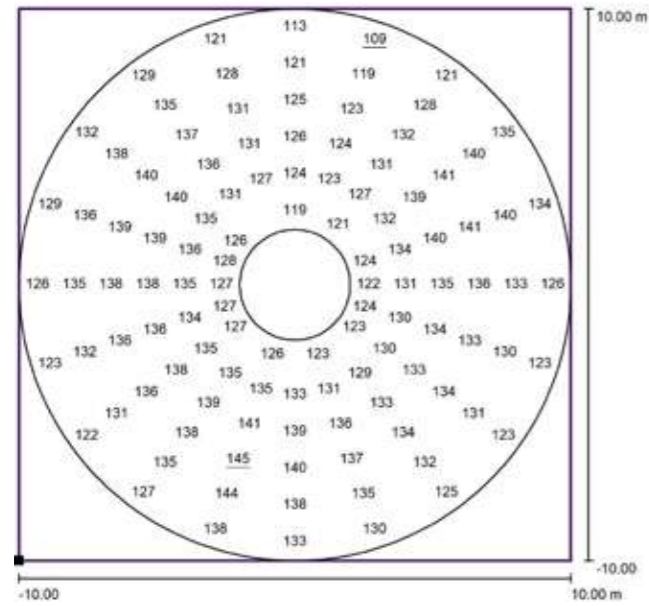
When illuminating packing spaces in warehouses, the floodlight TANGRAM HB4 with wide beam square optics (CY) provides the required illumination level, uniformly illuminating the whole surface. Mounting height 10m, dimensions and disposition as shown, provide the results of calculation in accordance with the standard EN12464-1 for illumination class 5.4.2 ($E_{av}>300lx/200lx$, $u0>0.6$).



APPLICATION / USE

INDUSTRY, OUTDOOR STORAGE SPACE

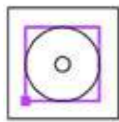
HORIZONTAL CALCULATION SURFACE



Values in Lux, Scale 1 : 161

Not all calculated values could be displayed.

Position of surface in external scene:
Marked point: (14.014 m, 13.512 m, 0.000 m)

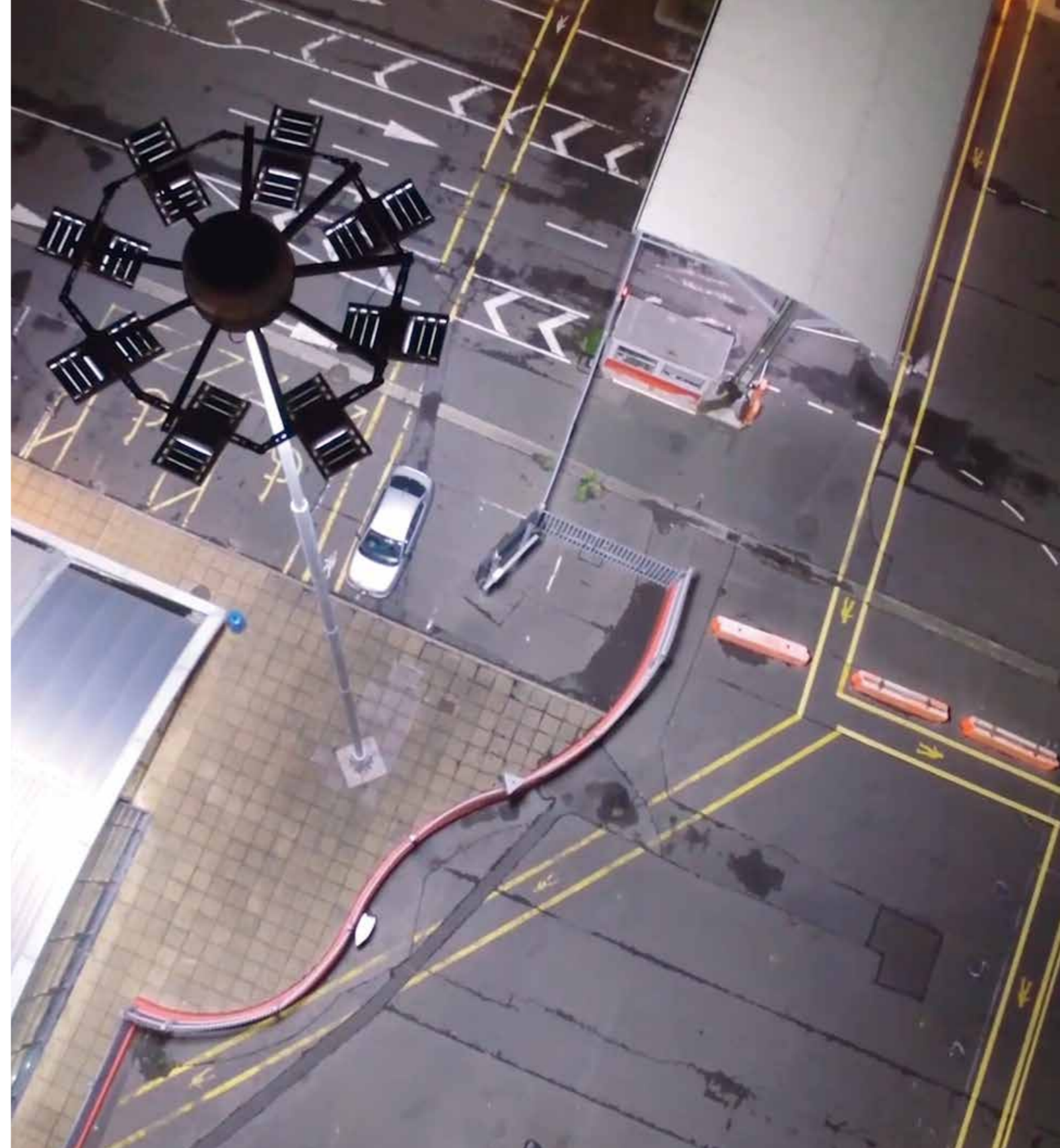
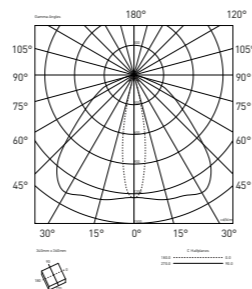


Grid: 20 x 6 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
131	109	145	0.84	0.76

APPLICATION

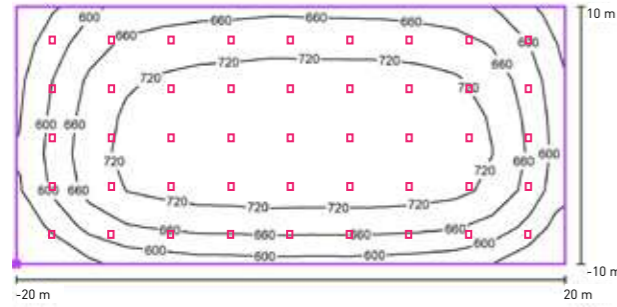
When illuminating outdoor warehouses, TANGRAM HB6/F with elliptical optics (0) provides the required illumination level in wide diameter (20m) from the mast. With mounting height of 30m and 10 pieces of floodlight on a circular carrier, the obtained results are in accordance with the standard EN12464-2 for illumination class 5.7.3 ($E_{av} > 100lx$, $u_0 > 0.5$).



APPLICATION / USE

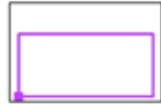
INDOOR HANDBALL COURT

HORIZONTAL CALCULATION SURFACE



Values in Lux, Scale 1 : 278

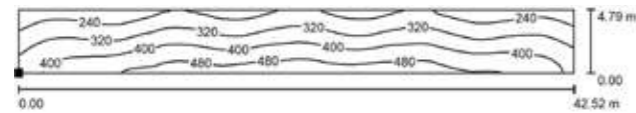
Position of surface in room:
Marked point: (2.676 m, 1.400 m, 0.000 m)



Grid: 15 x 7 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
684	482	781	0.70	0.62

DIAGONAL CALCULATION SURFACE



Values in Lux, Scale 1 : 304

Position of surface in room:
Marked point: (0.779 m, 22.325 m, 1.017 m)

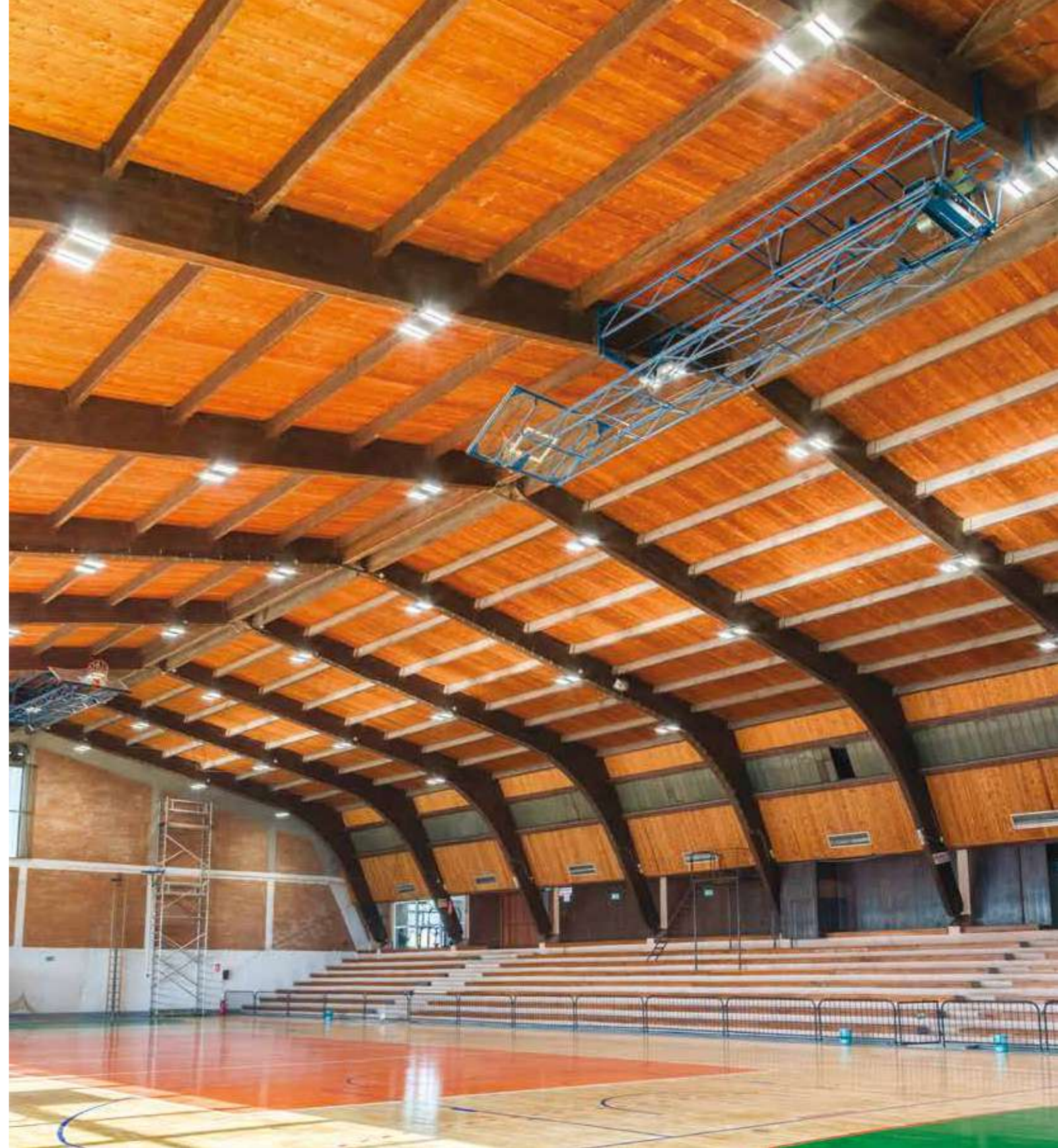
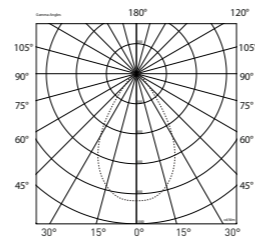


Grid: 128 x 16 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
354	178	529	0.503	0.336

APPLICATION

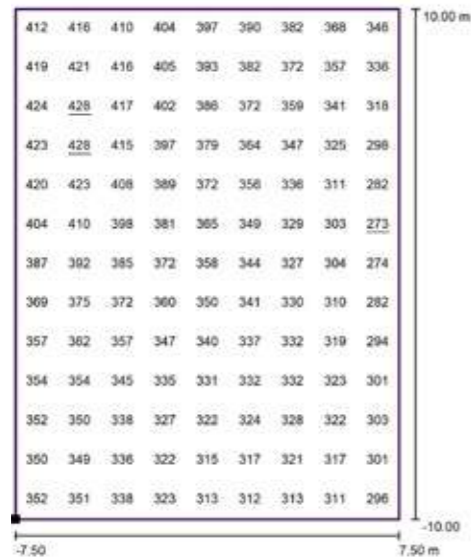
When illuminating indoor sports halls, the floodlight TANGRAM HB4 with wide beam symmetric optics (WW) provides the required illumination level, on the terrain and in the seating area. The mounting height is in accordance with the construction beam, ranging from 7,8m to 9,4m, terrain dimensions 20x40m with disposition of 5x9 surface mounted floodlights, obtains the calculation results in accordance with class II of handball court according to standard EN12193 [$E_{av} > 500lx$, $u_0 > 0.7$].



APPLICATION / USE

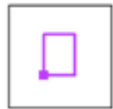
SWIMMING POOL

HORIZONTAL CALCULATION SURFACE



Values in Lux, Scale 1 : 161

Position of surface in external scene:
Marked point: (17.000 m, 15.934 m,
0.000 m)

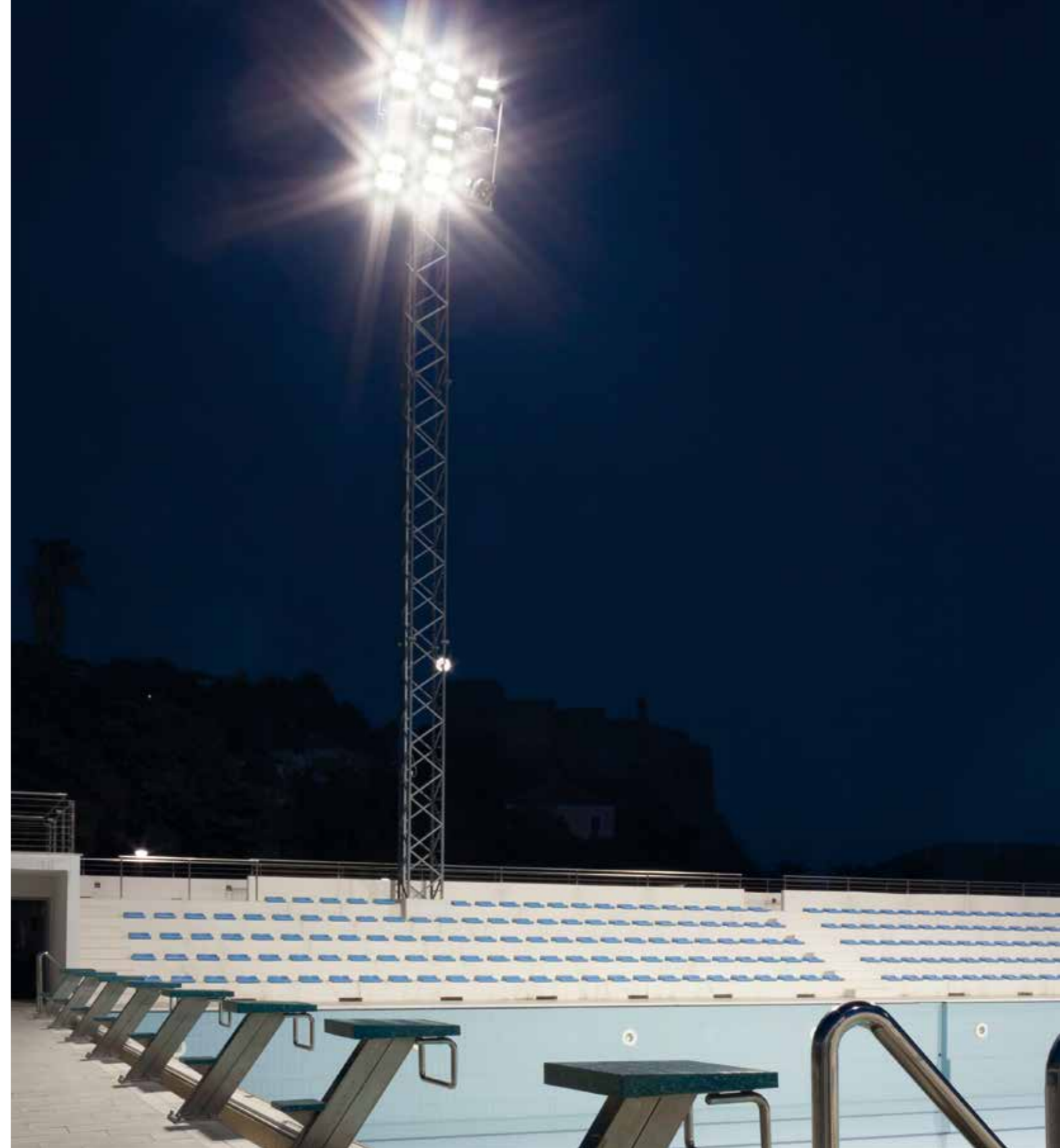
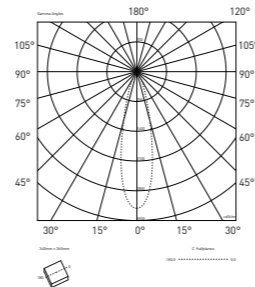


Grid: 9 x 13 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
354	273	428	0.77	0.64

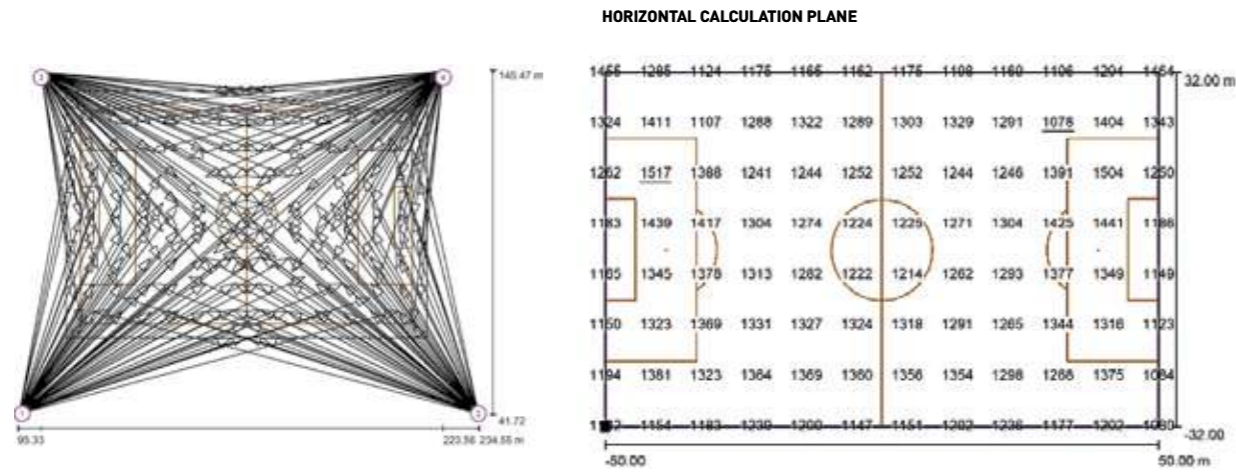
APPLICATION

When illuminating outdoor pools, the floodlight TANGRAM HB8 with narrow beam symmetric optics (M) provides the required illumination level within the pool limits (without light dissipation). The mounting height on 18m, terrain dimensions 20x 15m with total of 18 luminaires on four masts. The obtained calculation result is in accordance with class II of outdoor water polo pool EN12193 ($E_{av} > 300lx$, $u_0 > 0.7$).



APPLICATION / USE

FOOTBALL STADIUM

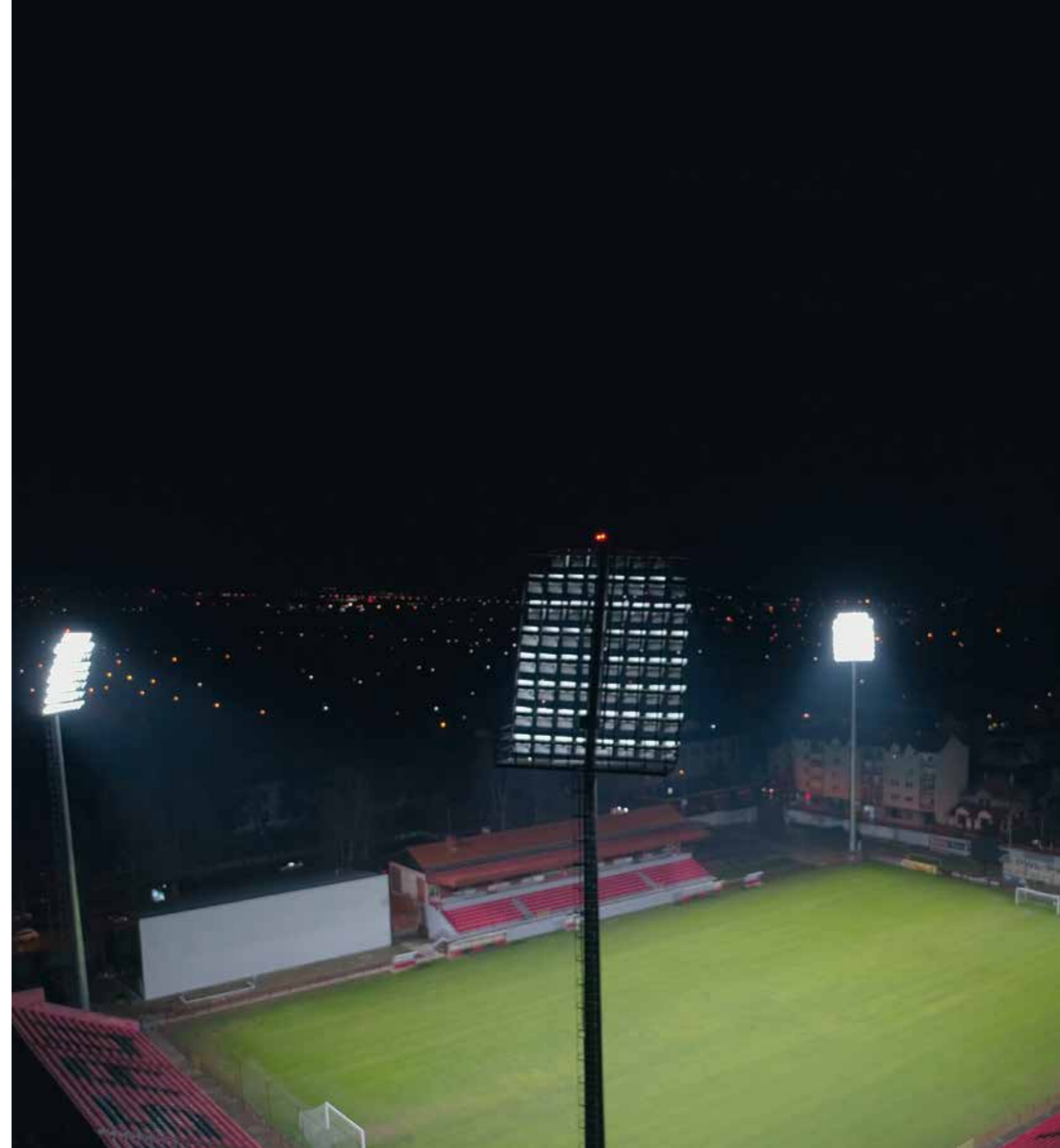
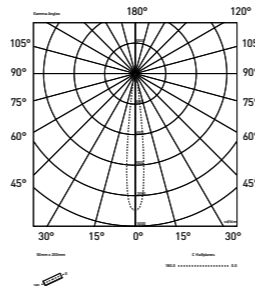


No.	Type	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$	E_{min}/E_{max}	E_{av}/E_{min}	H [m]
1	horizontal	1275	1078	1517	0.85	0.71	/	1.000
2	vertical, perpendicular to sideline 1	800	395	1117	0.49	0.35	1.59	1.000
3	vertical, perpendicular to sideline 2	883	440	1254	0.50	0.35	1.44	1.000
4	vertical, perpendicular to sideline 3	745	391	1045	0.52	0.37	1.70	1.000
5	vertical, perpendicular to sideline 4	903	470	1283	0.52	0.37	1.41	1.000

E_{av}/E_{min} = Relationship between middle horizontal and vertical illuminance, H = Measuring Height

APPLICATION

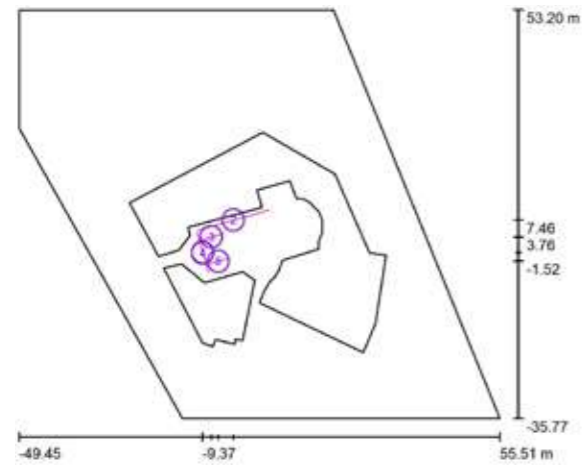
When illuminating the football stadium, the floodlight TANGRAM HB12 with narrow beam symmetric optics (RS) provides the required illumination level within the terrain limits (without light dissipation). The mounting height ranges from 35m to 53m, terrain dimensions 100x 64m with total of 248 luminaires on four masts. The obtained calculation results are in accordance with UEFA 2016 standard for illumination, class C (horizontal calculation field $E_{av}>1200lx$, $u0>0.6$, $E_{min}/E_{max}>0.4$, vertical calculation field $0,90,180,270^\circ$ - $E_{av}>750lx$, $u0>0.45$, $E_{min}/E_{max}>0.35$).



APPLICATION / USE

ST GEORGE CHURCH

VERTICAL CALCULATION SURFACES



Scale 1 : 1013

Calculation Surface List

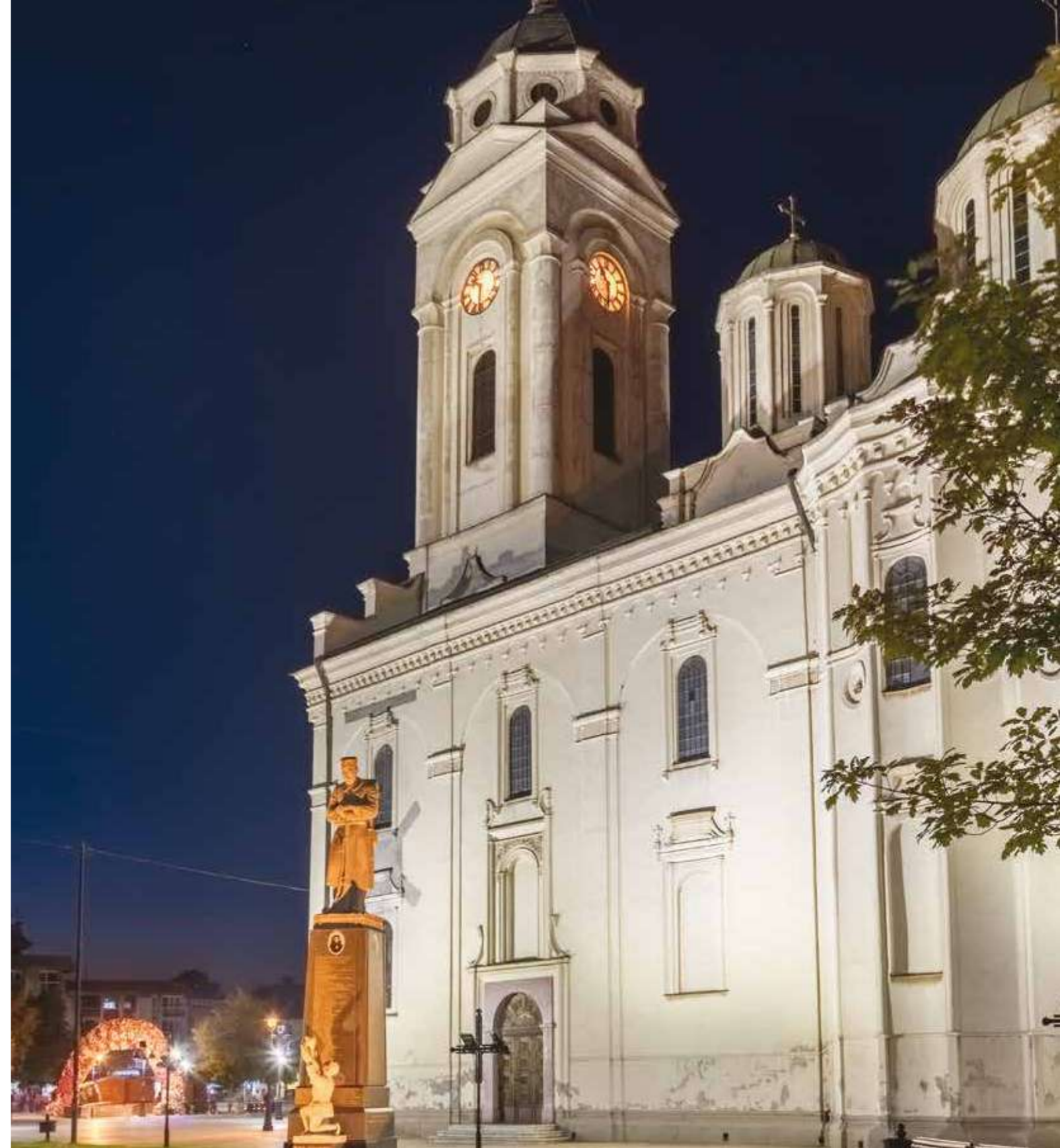
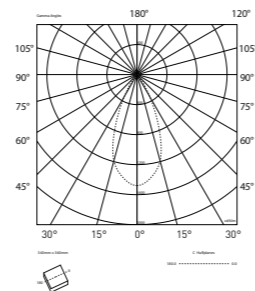
No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$	E_{min} / E_{max}
1	PREDNJA FASADA	perpendicular	128 x 128	85	42	108	0.494	0.388
2	BOCNI ZIDOVI 1 i 2	perpendicular	128 x 128	75	41	91	0.543	0.450
3	BOCNO KULA 2	perpendicular	128 x 128	61	44	68	0.716	0.642
4	PREDNJA KULA	perpendicular	128 x 128	88	56	128	0.641	0.441
5	BOCNO KULE 1 i 2	perpendicular	128 x 128	62	36	76	0.584	0.471

Summary of Results

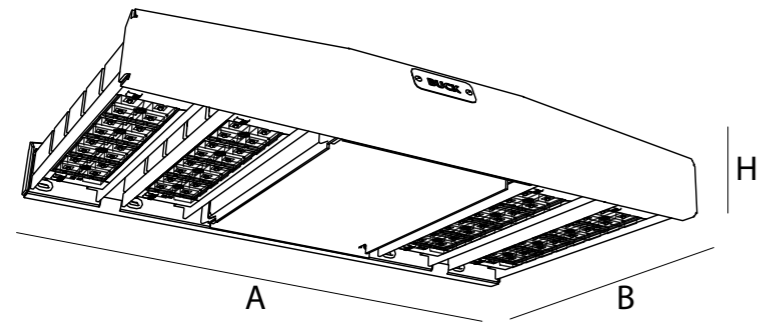
Type	Quantity	Average [lx]	Min [lx]	Max [lx]	$u0$	E_{min} / E_{max}
perpendicular	5	75	36	128	0.48	0.28

APPLICATION

When illuminating facades, the floodlights TANGRAM are put to good use in distant point illumination from the pole towards wide surfaces. In this case, five floodlights TANGRAM HB4 with medium beam symmetric optics (RW) uniformly illuminate the whole facade from 20m distance, mounted on 1.5m poles.



TECHNICAL DATA



Ingressprotection rating	IP66
Finish	black, gray
Ta	≤55°C
Led source	2x8LED modul
LED service life	>120 000h(L70B10)
Lens LOR	95%
Luminaire luminous flux	4 972 - 143456lm
Total power	35 - 1320W
Luminaire efficiency	109 - 148lm/W
Light color temperature	4000K opt 2700K 3000K 5700K 6500K
CRI	70 opt 80
Power supply	220-240VAC (198=264V) 50 60Hz
Conatant current range	350mA 1050mA (700mA nominal)
Control gear	ECG, DIMM 1-10 opt DALI, DMX

The housing is made of combination of marine grade aluminium sheet and extruded aluminium profile. Other mechanical parts are made of saineless steel. Finish is epoxy polyester powder coating.

Optional - Conversion coating for extremely aggressive corrosive environments and environments with increased salinity.

LED modules are compliant with Zagma standard.

Luminaire is equipped with plug-in connector for easy connection
Optional - terminal for connection to voltage IP66.

Surface or suspension mounting.

TANGRAM HB



Different types of mounting kit to be ordered separately

TANGRAM HB/F



Supplied with holder for angle adjustment on one axes.

MOUNTING ACCESSORIES



S KIT

For suspension mounting



CT KIT

For catenary mounting



C KIT

For ceiling mounting

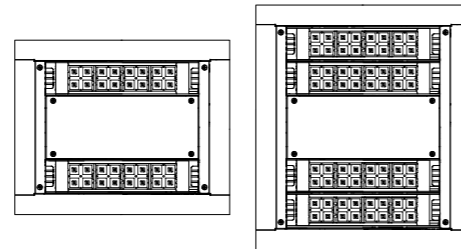
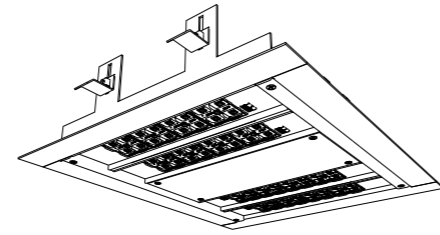


W KIT

For wall mounting



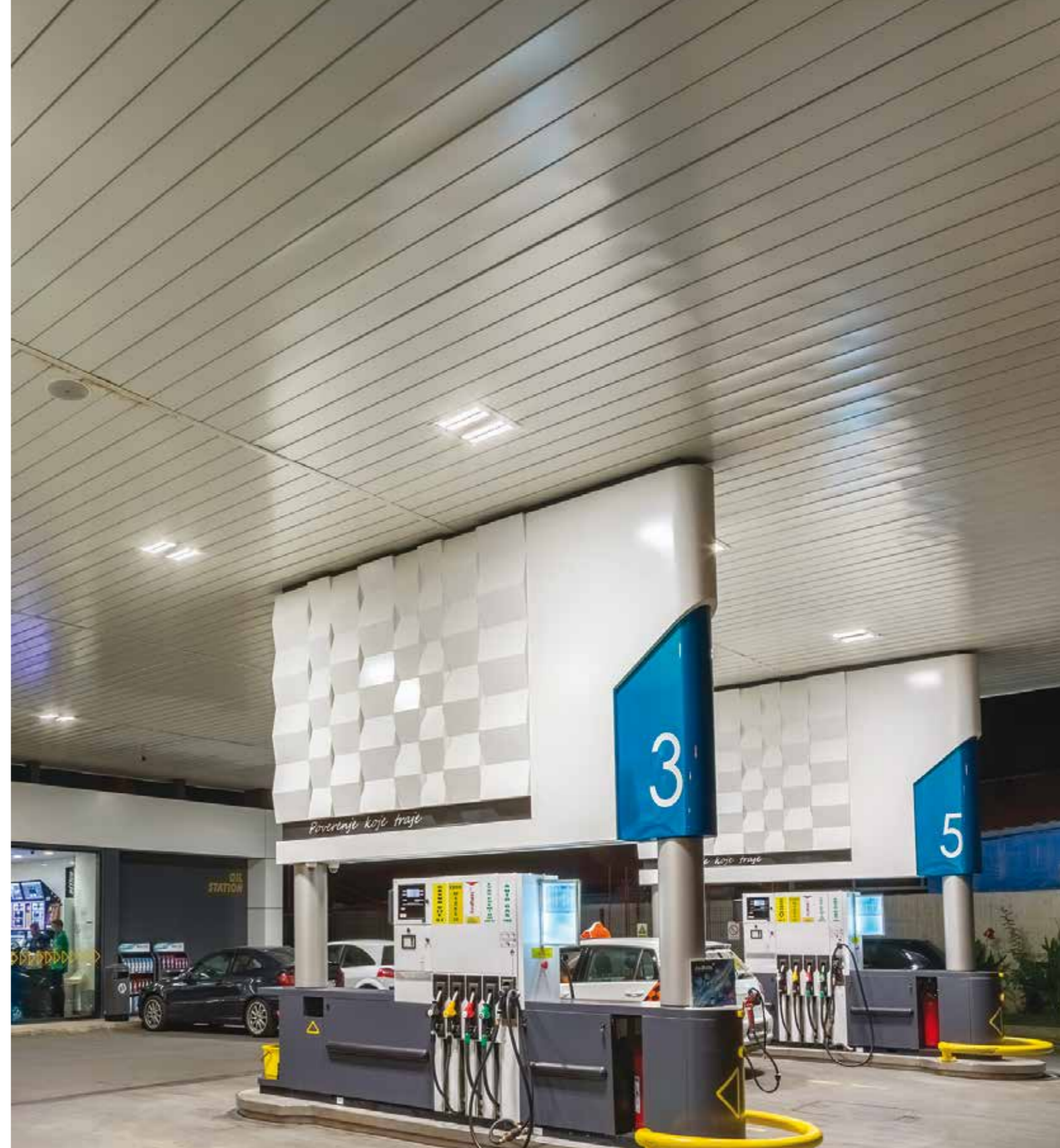
TANGRAM HB /R



	DIMENSIONS A / B / H	LED LUMEN (4000K/CRI 70) MIN/NOM/MAX.	TOTAL POWER (W) MIN/NOM/MAX.	NUMBER OF LEDS	WEIGHT
TANGRAM 2	360 / 340 / 95	4972 / 8875 / 11955	35 / 72 / 110	32	5.50
TANGRAM 4	540 / 340 / 95	9945 / 17750 / 23910	68 / 141 / 220	64	7.50
TANGRAM 6	755 / 340 / 95	14917 / 26620 / 35864	101 / 212 / 330	96	10
TANGRAM 8	545 / 595 / 95	19889 / 35500 / 47820	136 / 282 / 440	128	14
TANGRAM 12	755 / 595 / 95	29834 / 53240 / 71728	202 / 424 / 660	192	17
TANGRAM 24	902 / 621 / 206	59668 / 106480 / 143456	404 / 848 / 1320	384	23

High bay recessed luminaire for illumination of low bay industrial spaces, gas stations and warehouses.

Supplied with mounting frame for lamellar ceiling.

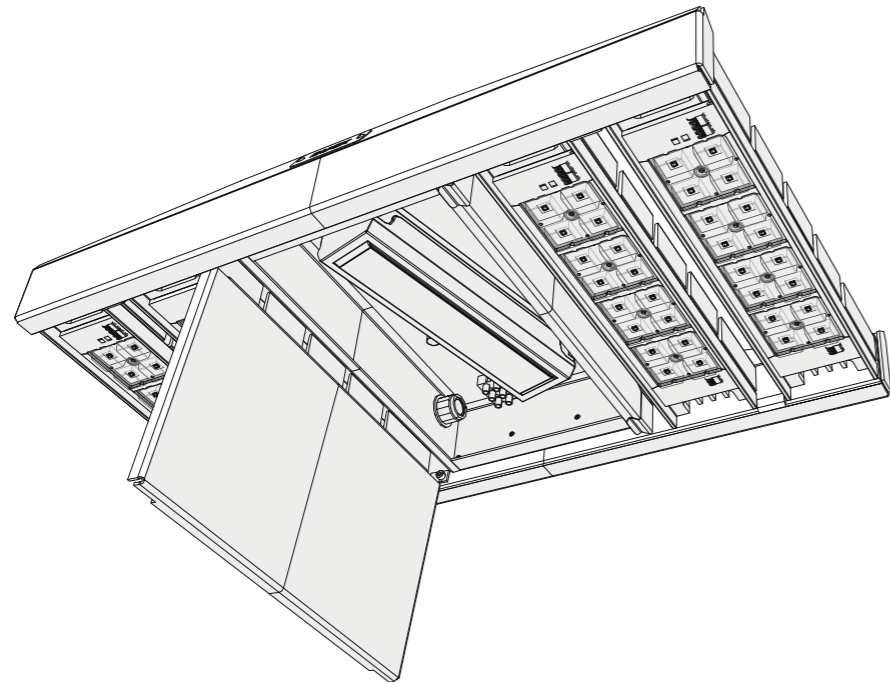


STANDARD EQUIPMENT

- Wireless interface communication
- Programmable
- AOC - Adjustable Output Current
- CLO - Constant light output
- Autonomous dimming in two steps
- Overvoltage protection 6 kW
- Electronic short-circuit protection
- Overload protection
- Thermal protection
- Voltage range 198—264
- 1-10V analog dimming

ADDITIONAL EQUIPMENT

- Power line communication
- DALI
- DMX
- Central management
- Autonomous dimming in seven steps
- Life-Indicator - EOL
- Podesivo vreme paljenja - AST
- Overvoltage protection - 10kV
- Voltage range 170-264VAC
- Thermal protection of drivers and modules



EASY SERVICEABILITY



ACCESS TO ELECTRICAL COMPONENTS WITHOUT TOOLS



The luminaire is programmable directly at the mounting site via a wireless interface communicator.

CENTRAL MANAGEMENT SYSTEM

