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External Lighting Design Report for Apartment Development at Old Nangor Road for Dublin Simon Community



Caio Holanda
W1739
21/10/2022

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Luminaire list

Φ_{total} 21521 lm	P_{total} 204.0 W	Luminous efficacy 105.5 lm/W
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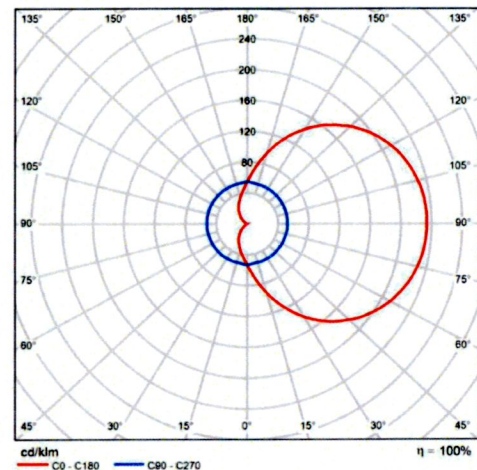
pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
9	Thorn Lighting	92900420	EYE BE LED1100-840 COR MWS S ANT [STD]	11.0 W	1150 lm	104.5 lm/W
4	Thorn Lighting	96268401	R2L2 S 12L35 740 WS CL1 GY [STD]	15.0 W	2036 lm	135.7 lm/W
3	Thorn Lighting	96275589	URBA BOLLARD 4L105 730 CL1 [STD]	15.0 W	1009 lm	67.3 lm/W

Product data sheet

Thorn Lighting - EYE BE LED1100-840 COR MWS S ANT [STD]



Article No.	92900420
P	11.0 W
Φ_{Lamp}	1150 lm
$\Phi_{Luminaire}$	1150 lm
η	100.00 %
Luminous efficacy	104.5 lm/W
CCT	4000 K
CRI	80



Polar LDC

Round, impact resistant LED bulkhead luminaire. Electronic, fixed output control gear. Class I electrical, IP65, IK10. Body: small size, die-cast aluminium (LM6), powder coated anthracite. Diffuser: opal polycarbonate with die-cast aluminium bezel feature. Electrical connection via 3 x 2 x 2.5mm² terminal block. With integral motion sensor for corridor function control (master). Complete with 4000K LED

Dimensions: \varnothing 285 x 150 mm
 Luminaire input power: 11 W
 Weight: 2.52 kg

Product data sheet

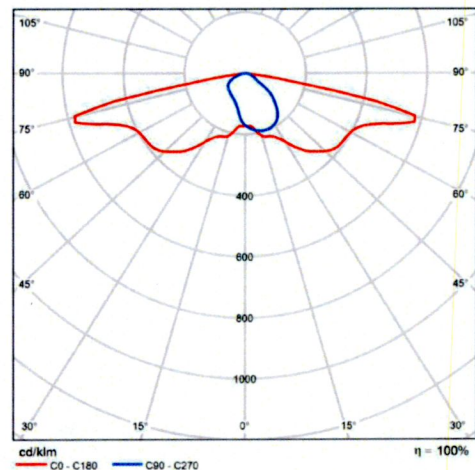
Thorn Lighting - R2L2 S 12L35 740 WS CL1 GY [STD]



Article No.	96268401
P	15.0 W
Φ_{Lamp}	2036 lm
$\Phi_{Luminaire}$	2036 lm
η	100.00 %
Luminous efficacy	135.7 lm/W
CCT	4000 K
CRI	70

A small size LED road lighting lantern with 12 LEDs driven at 350mA with Wide Street optic. LED driver Programmable. Class I electrical, IP66, IK08. Housing: die-cast aluminium (EN AC-44300), powder coated textured light grey. Enclosure: tempered flat glass. Screws: stainless steel, Ecolubric® treated. Post top (Ø60/76mm, tilted 0°/5°/10°) or lateral (Ø34/42/49/60mm, tilted 0°/-5°/-10°/-15°) mounting. Complete with 4000K LED.

Dimensions: 655 x 362 x 155 mm
 Luminaire input power: 15 W
 Luminaire luminous flux: 2036 lm
 Luminaire efficacy: 136 lm/W
 Weight: 9.08 kg
 Scx: 0.05 m²



Polar LDC

Product data sheet

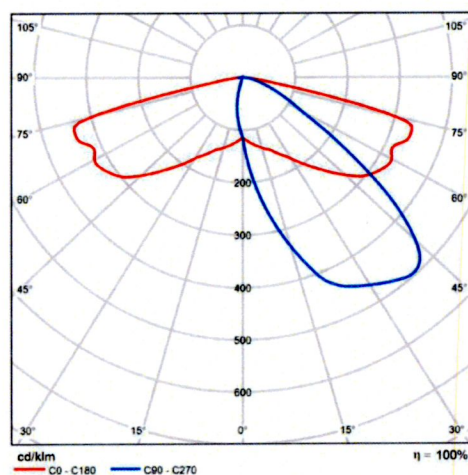
Thorn Lighting - URBA BOLLARD 4L105 730 CL1 [STD]



Article No.	96275589
P	15.0 W
Φ_{Lamp}	1009 lm
$\Phi_{Luminaire}$	1009 lm
η	100.00 %
Luminous efficacy	67.3 lm/W
CCT	3000 K
CRI	70

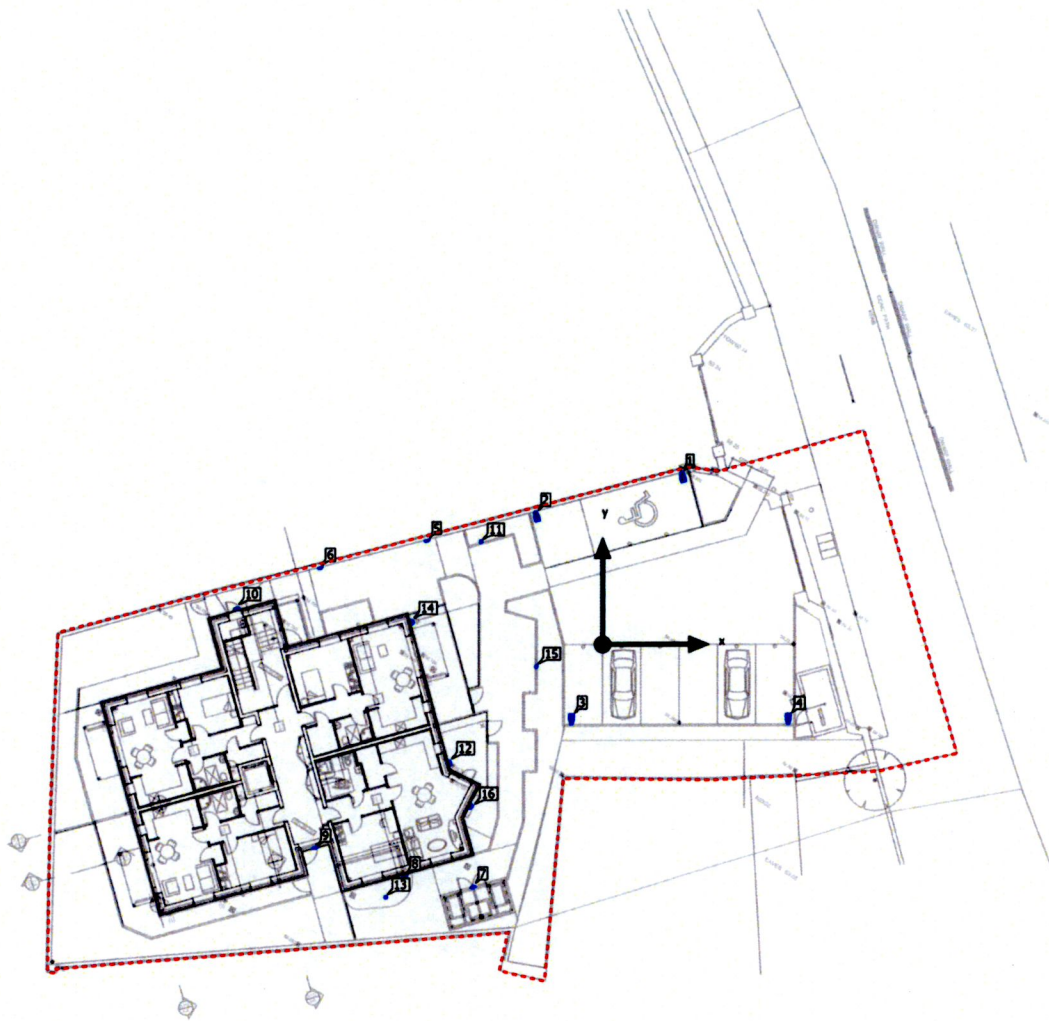
A decorative LED bollard. Electronic, fixed output control gear. Class I electrical, IP65, IK10. Body and bezel: low carbon steel, electro-plated zinc, finished black (RAL 9005). Diffuser: clear 5mm polycarbonate plate. Flange or root mounted using bases to be ordered separately. Complete with 3000K LED.

Dimensions: $\varnothing 200 \times 970$ mm
 Luminaire input power: 15 W
 Luminaire luminous flux: 1009 lm
 Luminaire efficacy: 67 lm/W
 Weight: 12.1 kg



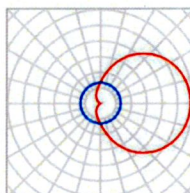
Polar LDC

Site 1
Luminaire layout plan



Site 1

Luminaire layout plan

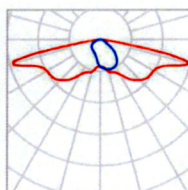
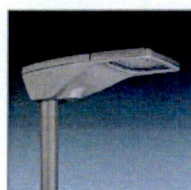


Manufacturer	Thorn Lighting	P	11.0 W
Article No.	92900420	Φ Luminaire	1150 lm
Article name	EYE BE LED1100-840 COR MWS S ANT [STD]		
Fitting	1x LED 11 W		

Individual luminaires

X	Y	Mounting height	Luminaire
-11.079 m	6.573 m	1.825 m	5
-17.822 m	4.897 m	1.800 m	6
-8.137 m	-15.310 m	1.800 m	7
-12.482 m	-14.538 m	2.500 m	8
-18.124 m	-12.713 m	2.500 m	9
-23.066 m	2.240 m	2.500 m	10
-9.655 m	-7.387 m	2.500 m	12
-12.053 m	1.427 m	2.500 m	14
-8.321 m	-10.117 m	2.500 m	16

Site 1

Luminaire layout plan

Manufacturer	Thorn Lighting	P	15.0 W
Article No.	96268401	Φ_{Luminaire}	2036 lm
Article name	R2L2 S 12L35 740 WS CL1 GY [STD]		
Fitting	1x LED 15 W		

Individual luminaires

X	Y	Mounting height	Luminaire
4.966 m	10.683 m	6.000 m	1
-4.213 m	8.247 m	6.000 m	2
-1.947 m	-4.902 m	6.000 m	3
11.657 m	-4.902 m	6.000 m	4

Site 1
Luminaire layout plan

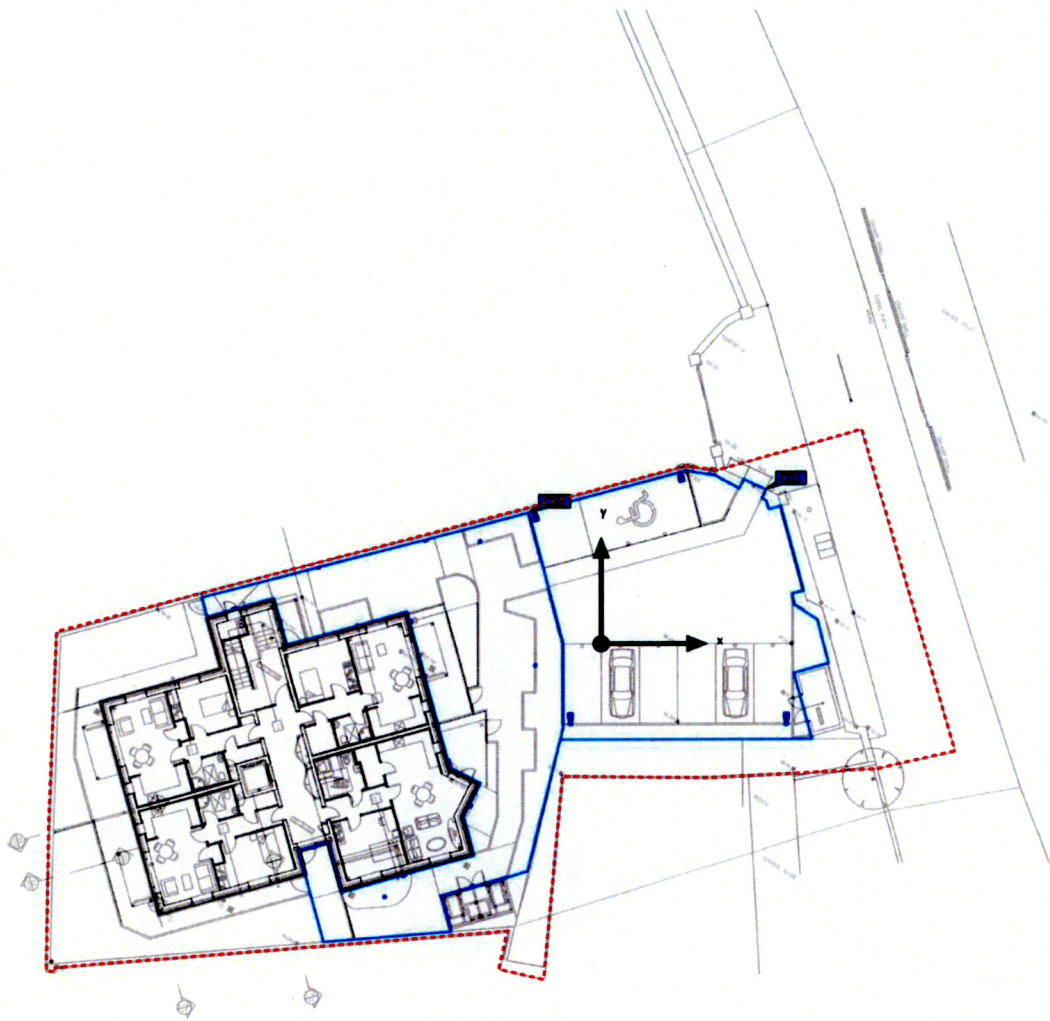


Manufacturer	Thorn Lighting	P	15.0 W
Article No.	96275589	$\Phi_{\text{Luminaire}}$	1009 lm
Article name	URBA BOLLARD 4L105 730 CL1 [STD]		
Fitting	1x LED 15 W		

Individual luminaires

X	Y	Mounting height	Luminaire
-7.646 m	6.457 m	0.000 m	11
-13.676 m	-15.910 m	0.000 m	13
-4.159 m	-1.350 m	0.000 m	15

Site 1
Calculation objects



Site 1

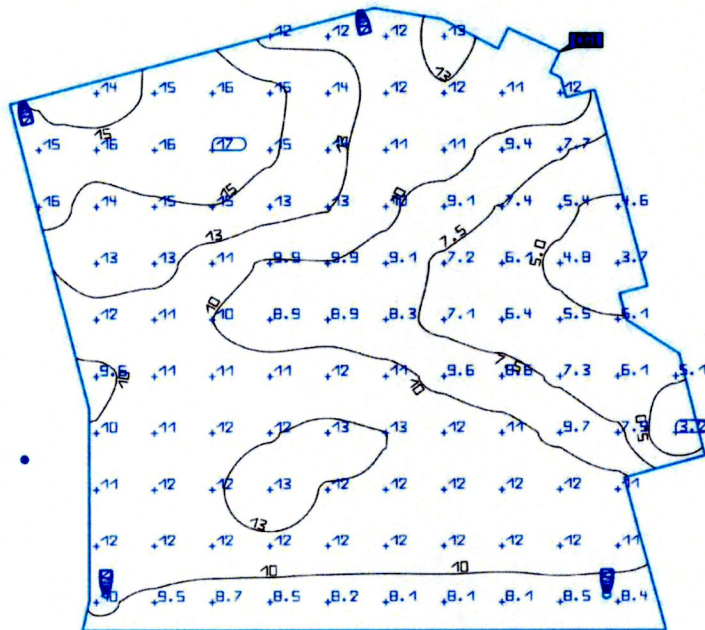
Calculation objects

Calculation surfaces

Properties	E	E _{min}	E _{max}	g ₁	g ₂	Index
Car Park Perpendicular illuminance Height: 0.000 m	10.7 lx	3.16 lx	17.3 lx	0.30	0.18	CG1
External Front Block Perpendicular illuminance Height: 0.020 m	19.0 lx	7.85 lx	59.5 lx	0.41	0.13	CG2

Utilization profile: DIALux presetting, Standard (outdoor transportation area)

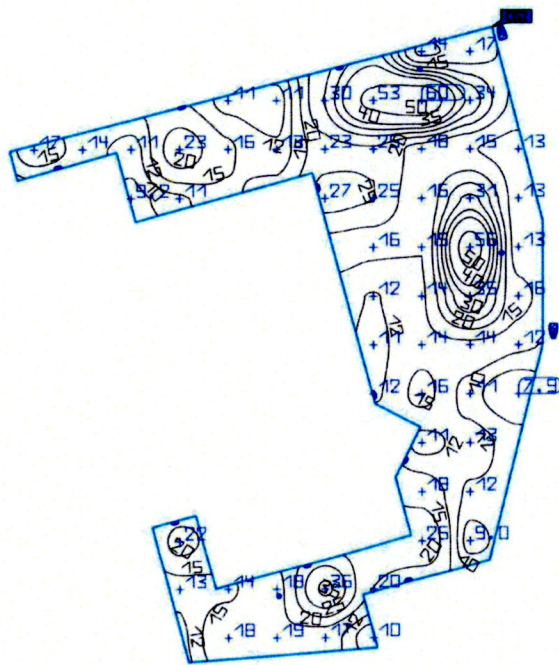
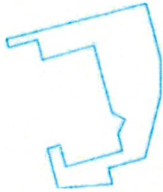
Site 1
Car Park



Properties	E	E _{min}	E _{max}	g ₁	g ₂	Index
Car Park Perpendicular illuminance Height: 0.000 m	10.7 lx	3.16 lx	17.3 lx	0.30	0.18	CG1

Utilization profile: DIALux presetting, Standard (outdoor transportation area)

Site 1
External Front Block



Properties	E	E _{min}	E _{max}	g ₁	g ₂	Index
External Front Block Perpendicular illuminance Height: 0.020 m	19.0 lx	7.85 lx	59.5 lx	0.41	0.13	CG2

Utilization profile: DIALux presetting, Standard (outdoor transportation area)

Glossary

A

A Formula symbol for a surface in the geometry

B

Background area The background area borders the direct ambient area according to DIN EN 12464-1 and reaches up to the borders of the room. In larger rooms, the background area is at least 3 m wide. It is located horizontally at floor level.

C

CCT (correlated color temperature)
Body temperature of a thermal radiator that serves to describe its light color. Unit: Kelvin [K]. The lesser the numerical value the redder; the greater the numerical value the bluer the light color. The color temperature of gas-discharge lamps and semi-conductors are termed "correlated color temperature" in contrast to the color temperature of thermal radiators.

Allocation of the light colors to the color temperature ranges acc. to EN 12464-1:

Light color - color temperature [K]
warm white (ww) < 3,300 K
neutral white (nw) ≥ 3,300 – 5,300 K
daylight white (dw) > 5,300 K

Clearance height The designation for the distance between upper edge of the floor and bottom edge of the ceiling (in the completely furnished status of room).

CRI (color rendering index)
Designation for the color rendering index of a luminaire or a lamp acc. to DIN 6169: 1976 or CIE 13.3: 1995.

The general color rendering index Ra (or CRI) is a dimensionless figure that describes the quality of a white light source in regards to its similarity with the remission spectra of defined 8 test colors (see DIN 6169 or CIE 1974) to a reference light source.

D

Daylight factor Ratio of the illuminance achieved solely by daylight incidence at a point in the inside to the horizontal illuminance in the outer area under an unobstructed sky.

Formula symbol: D (daylight factor)
Unit: %

Glossary

Daylight quotient effective area	A calculation surface within which the daylight quotient is calculated.
E	
Eta (η)	(light output ratio) The light output ratio describes what percentage of the luminous flux of a free radiating lamp (or LED module) is emitted by the luminaire when installed. Unit: %
G	
g_1	Often also U_o (overall uniformity) Designates the overall uniformity of the illuminance on a surface. It is the quotient from E_{min} to \bar{E} and is required, for instance, in standards for illumination of workstations.
g_2	Actually it designates the "non-uniformity" of the illuminance on a surface. It is the quotient of E_{min} to E_{max} and is generally only relevant for certifying the emergency lighting acc. to EN 1838.
I	
Illuminance	Describes the ratio of the luminous flux that strikes a certain surface to the size of this surface ($lm/m^2 = lx$). The illuminance is not tied to an object surface. It can be determined anywhere in space (inside or outside). The illuminance is not a product feature because it is a recipient value. Luxometers are used for measuring. Unit: Lux Abbreviation: lx Formula symbol: E
Illuminance, adaptive	For the determining of the middle adaptive illuminance on a surface, this is rastered "adaptively". In the area of large illuminance differences within the surface, the raster is subdivided finer; within lesser differences, a rougher classification is made.
Illuminance, horizontal	Illuminance that is calculated or measured on a horizontal (level) surface (this can be for example a table top or the floor). The horizontal illuminance is usually identified by the formula letter E_h .
Illuminance, perpendicular	Illuminance that is calculated or measured plumb-vertical to a surface. This needs to be taken into account for tilted surfaces. If the surface is horizontal or vertical, then there is no difference between the perpendicular and the horizontal or vertical illuminance.

Glossary

Illuminance, vertical	Illuminance that is calculated or measured on a vertical surface (this can be for example the front of some shelves). The vertical illuminance is usually identified by the formula letter E_v .
<hr/>	
L	
LENI	(lighting energy numeric indicator) Lighting energy numeric indicator acc. to EN 15193 Unit: kWh/m ² year
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Light loss factor	See MF
<hr/>	
LLMF	(lamp lumen maintenance factor)/acc. to CIE 97: 2005 Lamp flux maintenance factor that takes the luminous flux reduction into account of a luminaire or an LED module in the course of the operating time. The lamp flux maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no luminous flux reduction existing).
<hr/>	
LMF	(luminaire maintenance factor)/acc. to CIE 97: 2005 Luminaire maintenance factor that takes the soiling into account of the luminaire in the course of the operating time. The luminaire maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing).
<hr/>	
LSF	(lamp survival factor)/acc. to CIE 97: 2005 Lamp survival factor that takes the total failure into account of a luminaire in the course of the operating time. The lamp survival factor is specified as a decimal digit and can have a maximum value of 1 (no failures existing within the time concerned or prompt replacement after the failure).
<hr/>	
Luminance	Dimension for the "brightness impression" that the human eye has of a surface. The surface itself can emit light thereby or light striking it can be reflected (emitter value). It is the only photometric value that the human eye can perceive. Unit: Candela per square meter Abbreviation: cd/m ² Formula symbol: L
<hr/>	
Luminous efficacy	Ratio of the emitted luminous flux Φ [lm] to the absorbed electrical power P [W] Unit: lm/W. This ratio can be formed for the lamp or LED module (lamp or module light output), the lamp or module with control gear (system light output) and the complete luminaire (luminaire light output).
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Glossary

<p>Luminous flux</p>	<p>Dimension for the total light output that is emitted from one light source in all directions. It is thus an "emitter value" that specifies the entire emitting output. The luminous flux of a light source can only be determined in a laboratory. A difference is made between the lamp or LED module luminous flux and the luminaire luminous flux.</p> <p>Unit: Lumen Abbreviation: lm Formula symbol: Φ</p>
<p>Luminous intensity</p>	<p>Describes the intensity of the light in a certain direction (emitter value). The luminous intensity is a matter of the luminous flux Φ that is emitted in a certain spherical angle Ω. The radiation characteristics of a light source are presented graphically in a light distribution curve (LDC). The luminous intensity is an SI base unit.</p> <p>Unit: Candela Abbreviation: cd Formula symbol: I</p>
<p>M</p> <p>MF</p>	<p>(maintenance factor)/acc. to CIE 97: 2005</p> <p>Maintenance factor as decimal number between 0 and 1 that describes the ratio of the new value of a photometric planning parameter (e.g. of the illuminance) to a maintenance value after a certain time. The maintenance factor takes into account the soiling of luminaires and rooms as well as the luminous flux reduction and the failure of light sources.</p> <p>The maintenance factor is taken into account either overall or determined in detail acc. to CIE 97: 2005 by the formula $RMF \times LMF \times LLMF \times LSF$.</p>
<p>P</p> <p>P</p>	<p>(power)</p> <p>Electric power consumption</p> <p>Unit: watt Abbreviation: W</p>
<p>R</p> <p>Reflection factor</p>	<p>The reflection factor of a surface describes how much of the striking light is reflected back. The reflection factor is defined by the color of the surface.</p>

Glossary

RMF	(room maintenance factor)/acc. to CIE 97: 2005 Room maintenance factor that takes the soiling into account of the space encompassing surfaces in the course of the operating time. The room maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing).
<hr/>	
S	
Surrounding area	The ambient area directly borders the area of the visual task and should be planned with a width of at least 0.5 m according to DIN EN 12464-1. It is at the same height as the area of the visual task.
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U	
UGR (max)	(unified glare rating) Measure for the psychological glare effect in interiors. In addition to luminaire luminance, the UGR value also depends on the position of the observer, the viewing direction and the ambient luminance. Among other things, EN 12464-1 specifies maximum permissible UGR values for various indoor workplaces.
<hr/>	
UGR observer	Calculation point in the room, for the DIALux the UGR value is determined. The location and height of the calculation point should correspond to the typical observer position (position and eye level of the user).
<hr/>	
V	
Visual task area	The area that is needed for carrying out the visual task in accordance with DIN EN 12464-1. The height corresponds with the height at which the visual task is executed.
<hr/>	
W	
Wall zone	Circumferential area between working plane and walls that is not taken into account for the calculation.
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Working plane	Virtual measuring or calculation surface at the height of the visual task that generally follows the room geometry. The working plane may also feature a wall zone.
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