

# CUKRARNA

Installation : RAZSTAVNI PROSTOR

Project number : 405/16

Customer : SCAPELAB

Processed by : SCAPELAB

Date : 16.11.2016

The following values are based on exact calculations on calibrated lamps, luminaires and their arrangement. In practice, gradual divergences can occur.

Guarantee claims for luminaire data are excluded.

Relux and the luminaire manufacturers accept no liability for consequential damage and damage which is occasioned to the user or to third parties.

Object : CUKRARNA  
Installation : RAZSTAVNI PROSTOR  
Project number : 405/16  
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## 1 Luminaire data

### 1.1 ZUMTOBEL, TECTON HILIO TW 930-60 § 40... (D36758AA.Idt)

#### 1.1.1 Data sheet

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Manufacturer: ZUMTOBEL

D36758AA.Idt TECTON HILIO TW 930-60 § 4000K - LCAI 75W 250mA TW Ip - P=62.6W /  
T=3960K / x=0.3776 / y=0.3614 / phi=5927.3lm

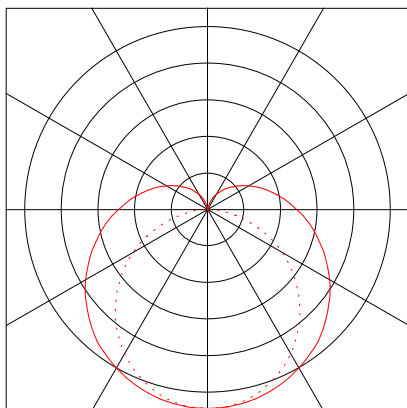
#### Luminaire data

Luminaire efficiency : 100%  
Luminaire efficacy : 94.68 lm/W  
Classification : B31 ↓81.8% ↑18.2%  
CIE Flux Codes : 37 65 86 82 100  
UGR 4H 8H : 26.4 / 24.1  
Power : 62.6 W  
Luminous flux : 5927 lm

#### Equipped with

Quantity : 1  
Designation : LED  
Colour : Unknown  
Luminous flux : 5927 lm

Dimensions : 1395 mm x 115 mm x 75 mm



Object : CUKRARNA  
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## 1 Luminaire data

### 1.2 Zumtobel, SUP2 M 1/LED550-930 FL LDO WH [... (42184349)

#### 1.2.1 Data sheet

Manufacturer: Zumtobel

#### 42184349 Surface-mounted suspended SUP2 M 1/LED550-930 FL LDO WH [STD]

LED spotlight module with one LED spotlight unit, "midi" construction size; equipped with lens system for high quality accent lighting in museums and exhibitions spaces; combination of LED PCBs, lens and film creates uniform light distribution with high intensity and soft transitions, without stray light from the light cone; Luminaire with low voltage adapter for Zumtobel SUPERSYSTEM II (48 V) low voltage track; adapter is fixed without tools and contains electronics converting the constant voltage (48V) to constant current; lamp(s): 1/8.2W, Colour rendering Ra > 90, colour temperature 3000 K; Luminaire or spotlight with FLOOD light distribution; colour tolerance: SDCM 2 initial, LED PCBs premium-selected; Luminaire luminous flux: 499 lm, Luminaire efficacy: 61 lm/W; service life: 50000h for luminous flux at 90% of initial value; dimming of illuminance, Slave luminaire for DALI control (DALI only); lamp unit can rotate through 360° and tilt through 90°; lamp unit of die-cast aluminium, coated white; optic consists of glass lens and film of plastic; front ring is for glare reduction and accommodating films; total power: 8.2 W; dimensions: 166x45x94 mm; weight: 0.19 kg;

Note: Film can be replaced to achieve other light distribution patterns; ring louvre or the extended anti-glare cylinder can be exchanged for the front ring.

#### Luminaire data

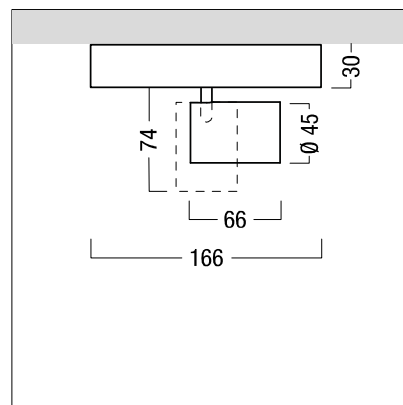
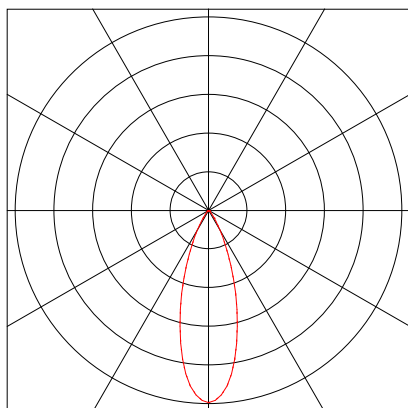
Absolute Photometry

Luminaire efficacy : 60.85 lm/W  
Classification : A80 ↓100.0% ↑0.0%  
CIE Flux Codes : 97 100 100 100 100  
UGR 4H 8H : 14.7 / 14.7  
Power : 8.2 W  
Luminous flux : 499 lm

#### Equipped with

Quantity : 1  
Designation :  
  
Colour :  
Colour reproduction : 90

Dimensions : 166 mm x 45 mm x 94 mm  
Height freestanding luminaire 500 mm



Object : CUKRARNA  
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## 1 Luminaire data

### 1.3 Zumtobel, RESCLITE C ANTIPANIC AD NSI WH ... (42180404)

#### 1.3.1 Data sheet

Manufacturer: Zumtobel

#### 42180404 surface mounted RESCLITE C ANTIPANIC AD NSI WH [STD]

LED Safety luminaire for anti-panic lighting with min. 0.5 lx as specified in EN 1838; surface mounted; Luminaire for central emergency lighting supply for individual luminaire monitoring via Powerline, adjustable emergency lighting level; room height 2.2 to 5 m; high power LED, cool white; large die-cast aluminium heat sink ensures optimum thermal management, lens made of polycarbonate (PC); luminaire housing made of die-cast aluminium in powder coated white finish, RAL 9016; luminaire can be installed quickly without tools; tool-free maintenance; through-wiring plug-in terminals for wire cross-sections up to 2.5 mm<sup>2</sup>; luminaire total power: 5 W; power supply: 230V AC, 220V DC; rotary switch for mechanical address-setting; non-maintained and maintained mode possible, Maintained mode: -5°C to +25°C, Non-maintained mode: -5°C to +30°C; Dimensions: 146 x 146 x 37 mm; IP40; weight: 0.55 kg; Luminaire wired with halogen-free leads; max. line length from emergency power source to last luminaire: 300 m.

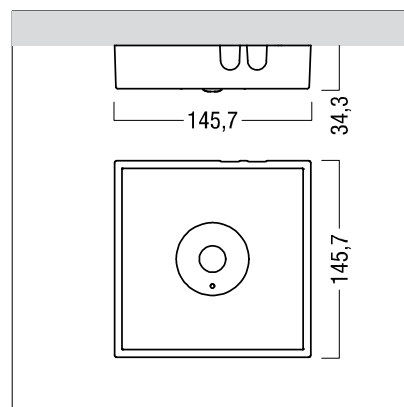
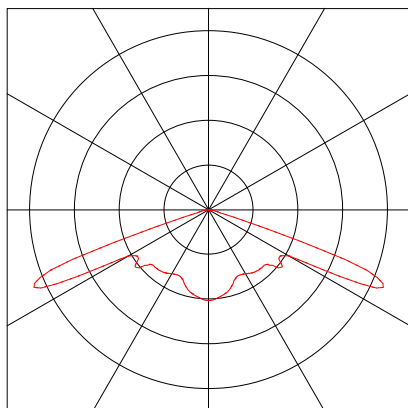
#### Luminaire data

Absolute Photometry  
Luminaire efficacy : 39.6 lm/W  
Classification : A20 ↓100.0% ↑0.0%  
CIE Flux Codes : 27 57 99 100 100  
UGR 4H 8H : 27.9 / 27.9  
Power : 5 W  
Luminous flux : 198 lm

#### Equipped with

Quantity : 1  
Designation : LED-Z630  
Colour : Unknown  
Colour reproduction :

Dimensions : 146 mm x 146 mm x 37 mm



Object : CUKRARNA  
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## 1 Luminaire data

### 1.4 Zumtobel, RESCLITE C SPOT AD NSI WH [STD] (42180420)

#### 1.4.1 Data sheet

Manufacturer: Zumtobel

#### 42180420 surface mounted RESCLITE C SPOT AD NSI WH [STD]

LED Safety luminaire for illuminating fire-fighting and first-aid equipment and danger spots with minimum output 5 lx; surface mounted; Luminaire for central emergency lighting supply for individual luminaire monitoring via Powerline, adjustable emergency lighting level; room height 2.2 to 7 m; high power LED, cool white; large die-cast aluminium heat sink ensures optimum thermal management; lens made of polycarbonate (PC); luminaire housing made of die-cast aluminium in powder coated white finish, RAL 9016; gear tray made of galvanised sheet steel; housing can be installed quickly on gear tray without tools; tool-free maintenance; through-wiring plug-in terminals for wire cross-sections up to 2.5 mm<sup>2</sup>; side cable-entry possible; luminaire total power: 5 W; power supply: 230V AC, 220V DC; rotary switch for mechanical address-setting; non-maintained and maintained mode possible, Maintained mode: -5°C to +25°C, Non-maintained mode: -5°C to +30°C; Dimensions: 146 x 146 x 37 mm; IP40; weight: 0.55 kg; Luminaire wired with halogen-free leads; max. line length from emergency power source to last luminaire: 300 m.

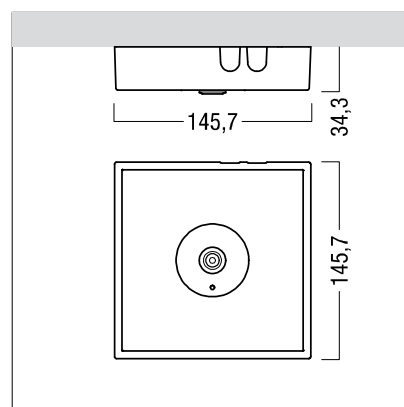
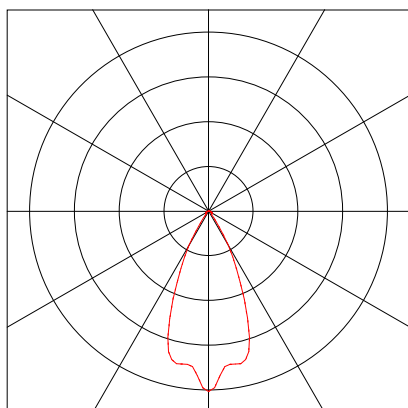
#### Luminaire data

Absolute Photometry  
Luminaire efficacy : 38.6 lm/W  
Classification : A70 ↓100.0% ↑0.0%  
CIE Flux Codes : 89 95 98 100 100  
UGR 4H 8H : 13.7 / 13.7  
Power : 5 W  
Luminous flux : 193 lm

#### Equipped with

Quantity : 1  
Designation : LED-Z644  
Colour : Unknown  
Colour reproduction :

Dimensions : 146 mm x 146 mm x 37 mm



Object : CUKRARNA  
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## 1 Luminaire data

### 1.5 ZUMTOBEL, ONLITE ERI (70446584 (STD - Standard))

#### 1.5.1 Data sheet

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Manufacturer: ZUMTOBEL

70446584 (STD - Standard)

ONLITE ERI

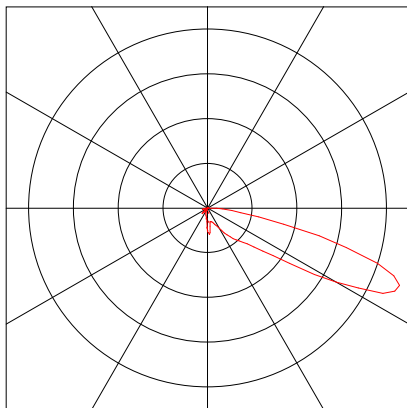
#### Luminaire data

Luminaire efficiency : 100%  
Luminaire efficacy : 34 lm/W  
Classification : A10 ↓99.6% ↑0.4%  
CIE Flux Codes : 23 48 87 100 100  
UGR 4H 8H : 47.8 / 20.8  
Power : 1 W  
Luminous flux : 34 lm

#### Equipped with

Quantity : 1  
Designation : LED-Z396  
0C8W  
Colour :  
Luminous flux : 34 lm

Dimensions : 15 mm x 15 mm x 2 mm

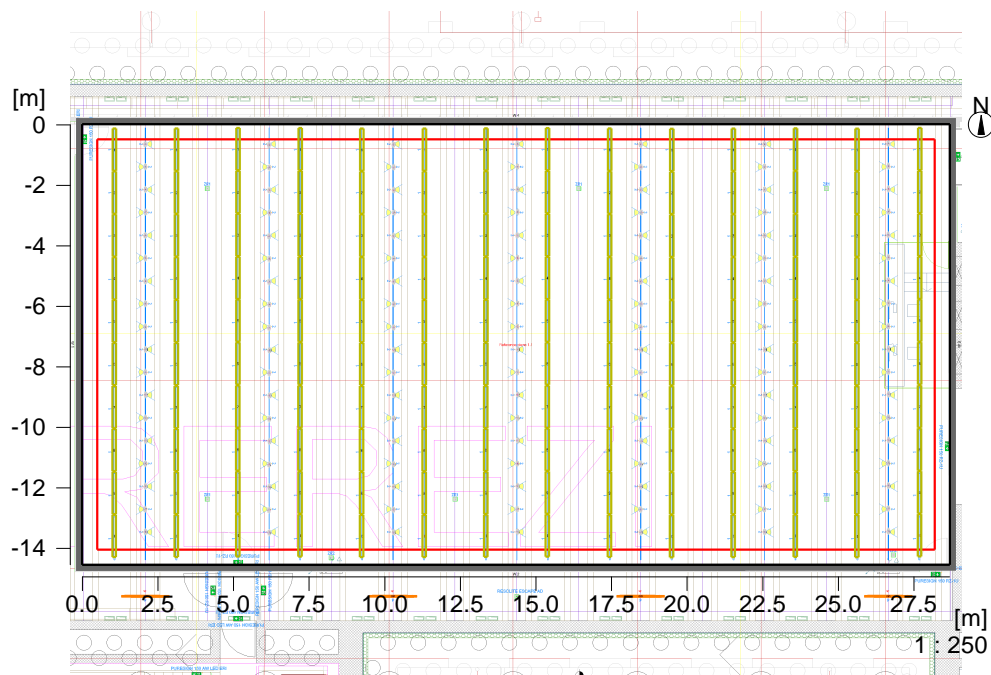


Object : CUKRARNA  
 Installation : RAZSTAVNI PROSTOR  
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## 2 01\_splošna osvetlitev

### 2.1 Description, 01\_splošna osvetlitev

#### 2.1.1 Floor plan



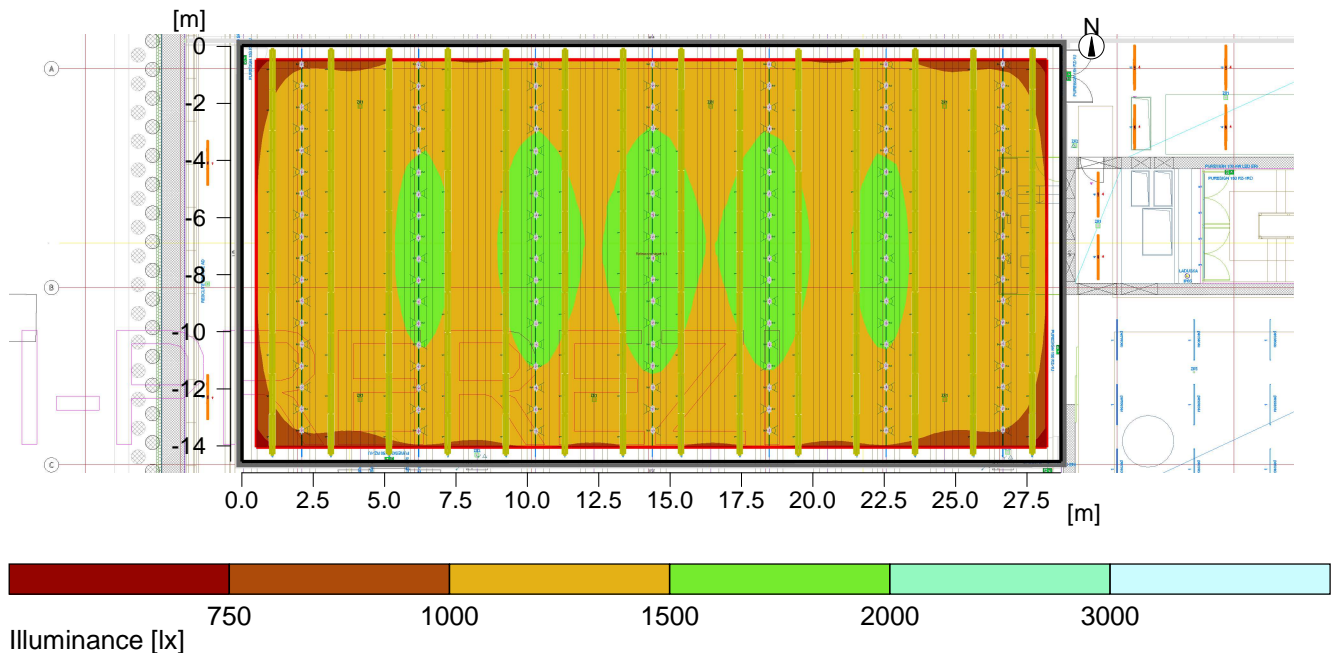
Wall	x	y	Length	Reflectance
1	60.91 m	190.98 m	14.54 m	50.0 %
2	89.59 m	190.98 m	28.68 m	50.0 %
3	89.59 m	205.52 m	14.54 m	50.0 %
4	60.91 m	205.52 m	28.67 m	50.0 %
Floor				20.0 %
Ceiling				70.0 %
Room height		5.16 m		
Height of reference plane		0.75 m		

Object : CUKRARNA  
 Installation : RAZSTAVNI PROSTOR  
 Project number : 405/16  
 Date : 16.11.2016

## 2 01\_splošna osvetlitev

### 2.2 Summary, 01\_splošna osvetlitev

#### 2.2.1 Result overview, Evaluation area 1



#### General

Calculation algorithm used  
 Maintenance factor

Average indirect fraction  
 0.80

Total luminous flux of all lamps  
 Total power  
 Total power per area (416.93 m<sup>2</sup>)

892654 lm  
 9797.2 W  
 23.50 W/m<sup>2</sup> (1.76 W/m<sup>2</sup>/100lx)

#### Evaluation area 1

#### Reference plane 1.1

Horizontal  
 E<sub>m</sub> 1340 lx  
 E<sub>min</sub> 629 lx  
 E<sub>min</sub>/E<sub>av</sub> (U<sub>o</sub>) 0.47  
 E<sub>min</sub>/E<sub>max</sub> (U<sub>d</sub>) 0.39  
 Position 0.75 m

#### Type No.\Make

**ZUMTOBEL**  
 1 140 Order No. : D36758AA.Idt  
 Luminaire name : TECTON HILIO TW 930-60 § 4000K - LCAI 75W 250mA TW Ip  
 - P=62.6W / T=  
 Equipment : 1 x LED 62.6 W / 5927 lm



Object : CUKRARNA  
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## 2 01\_splošna osvetlitev

### 2.2 Summary, 01\_splošna osvetlitev

#### 2.2.1 Result overview, Evaluation area 1

2	126	<b>Zumtobel</b>	
		Order No.	: 42184349
		Luminaire name	: SUP2 M 1/LED550-930 FL LDO WH [STD]
		Equipment	: 1 x LED_SU2-M_499_930 8 W / 499 lm

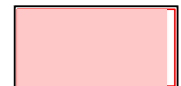
Object : CUKRARNA  
 Installation : RAZSTAVNI PROSTOR  
 Project number : 405/16  
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## 2 01\_splošna osvetlitev

### 2.3 Calculation results, 01\_splošna osvetlitev

#### 2.3.1 Table, Reference plane 1.1 (E)

	884	1160	1270	1320	1340	1360	1350	1320	1250	1120	
[m]	905	1160	1280	1340	1370	1380	1370	1330	1260	1130	
25.0	917	1170	1290	1360	1390	1390	1380	1350	1280	1150	
	1020	1320	1450	1520	1540	1550	1540	1510	1440	1290	
22.5	1000	1280	1410	1480	1510	1520	1510	1470	1400	1260	
	974	1240	1360	1430	1470	1470	1460	1420	1350	1210	
20.0	1050	1360	1490	1560	1590	1600	1590	1550	1480	1330	
	1040	1330	1460	1530	1570	1580	1560	1520	1450	1300	
17.5	994	1260	1390	1460	1490	1500	1480	1440	1370	1230	
	1060	1360	1500	1560	1600	<b>[1610]</b>	1590	1550	1480	1330	
15.0	1050	1350	1490	1550	1590	1590	1580	1540	1470	1320	
	995	1250	1380	1450	1490	1490	1480	1440	1360	1230	
12.5	1050	1340	1470	1540	1570	1580	1560	1530	1450	1300	
	1050	1350	1480	1550	1580	1590	1570	1540	1460	1310	
10.0	976	1240	1360	1430	1460	1460	1450	1410	1340	1200	
	1010	1290	1420	1490	1520	1530	1510	1470	1400	1250	
7.5	1020	1320	1450	1520	1550	1550	1540	1500	1430	1280	
	920	1180	1300	1360	1390	1400	1380	1350	1280	1140	
5.0	913	1180	1290	1360	1380	1390	1380	1350	1280	1140	
	887	1160	1270	1330	1360	1370	1350	1320	1260	1130	
2.5	658	843	932	977	1000	1010	996	970	921	823	
0.0										<b>(629)</b>	
	0	2	4	6	8	10	12	[m]			
	Illuminance [lx]										



Height of the reference plane

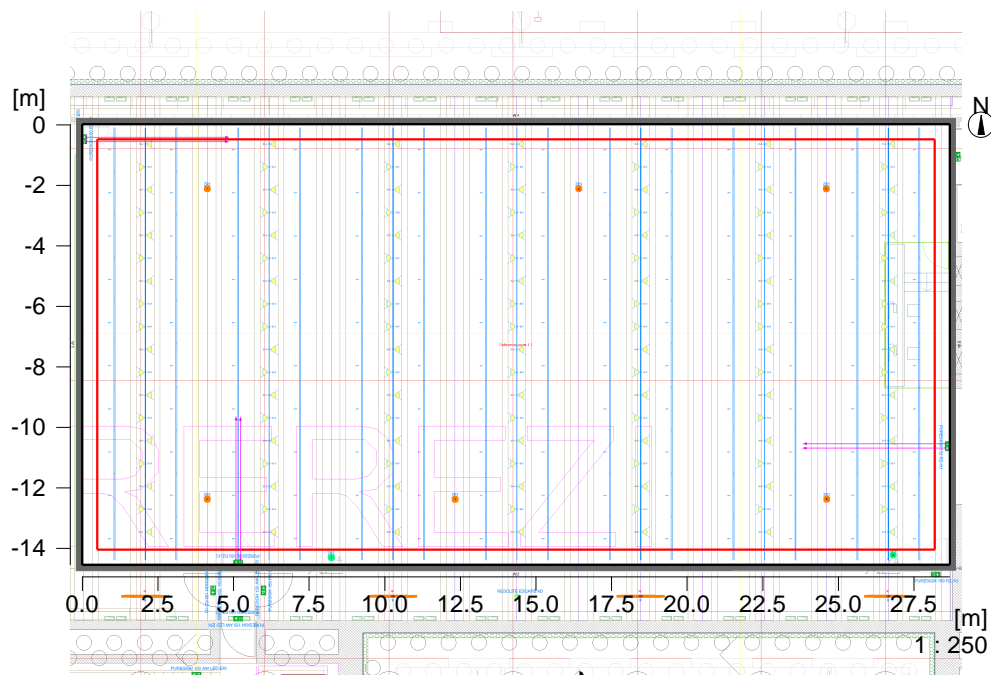
	: 0.75 m
Average illuminance	Eav : 1340 lx
Minimum illuminance	Emin : 629 lx
Maximum illuminance	Emax : 1610 lx
Uniformity Uo	Emin/Eav : 1 : 2.13 (0.47)
Diversity Ud	Emin/Emax : 1 : 2.56 (0.39)

Object : CUKRARNA  
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### 3 02\_varnostna razsvetljava

#### 3.1 Description, 02\_varnostna razsvetljava

##### 3.1.1 Floor plan



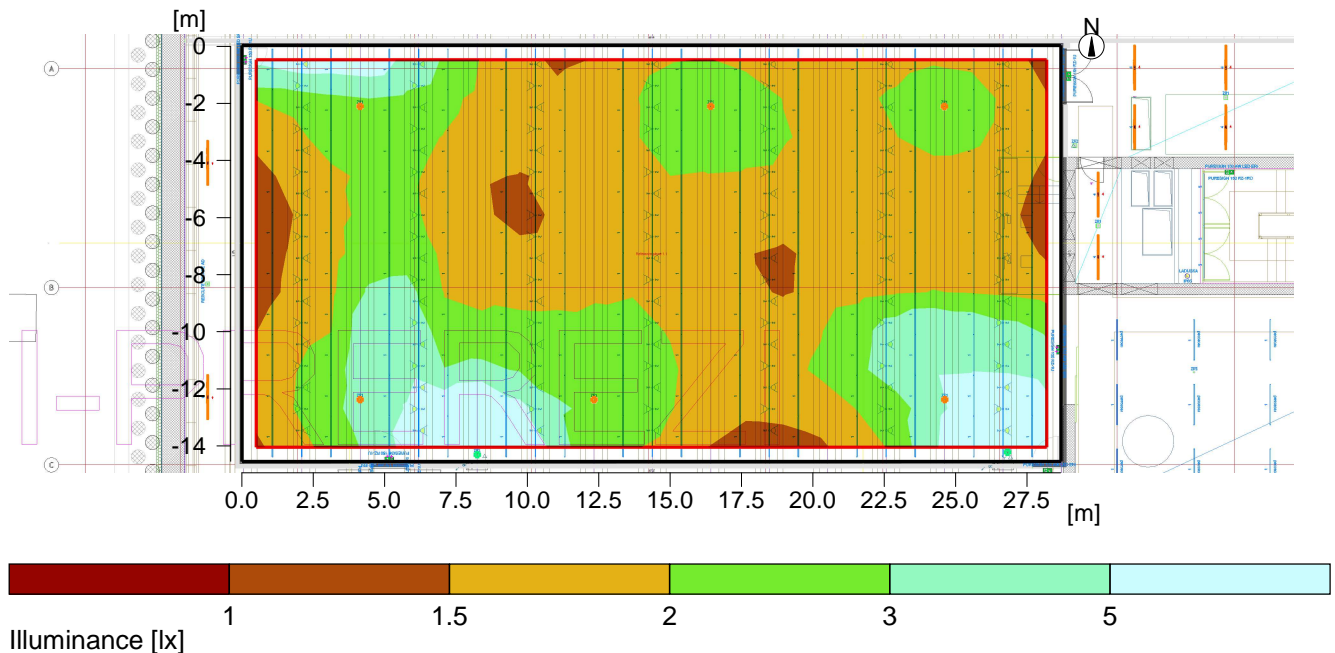
Wall	x	y	Length	Reflectance
1	60.91 m	190.98 m	14.54 m	50.0 %
2	89.59 m	190.98 m	28.68 m	50.0 %
3	89.59 m	205.52 m	14.54 m	50.0 %
4	60.91 m	205.52 m	28.67 m	50.0 %
Floor				20.0 %
Ceiling				70.0 %
Room height		5.16 m		
Height of reference plane		0.03 m		

Object : CUKRARNA  
 Installation : RAZSTAVNI PROSTOR  
 Project number : 405/16  
 Date : 16.11.2016

### 3 02\_varnostna razsvetljava

#### 3.2 Summary, 02\_varnostna razsvetljava

##### 3.2.1 Result overview, Evaluation area 1



#### General

Calculation algorithm used  
 Maintenance factor

Average indirect fraction  
 0.80

Total luminous flux of all lamps  
 Total power  
 Total power per area (416.93 m<sup>2</sup>)

1778 lm  
 46.0 W  
 0.11 W/m<sup>2</sup> (4.76 W/m<sup>2</sup>/100lx)

#### Evaluation area 1

#### Reference plane 1.1

Horizontal  
 E<sub>m</sub> 2.32 lx  
 E<sub>min</sub> 1.29 lx  
 E<sub>min</sub>/E<sub>av</sub> (U<sub>o</sub>) 0.55  
 E<sub>min</sub>/E<sub>max</sub> (U<sub>d</sub>) 0.14  
 Position 0.03 m

#### Type No.\Make



5 6 **ZUMTOBEL**  
 Order No. : 70446584 (STD - Standard)  
 Luminaire name : ONLITE ERI  
 Equipment : 1 x LED-Z396 0C8W 1 W / 34 lm

Object : CUKRARNA  
Installation : RAZSTAVNI PROSTOR  
Project number : 405/16  
Date : 16.11.2016

### 3 02\_varnostna razsvetljava

#### 3.2 Summary, 02\_varnostna razsvetljava

##### 3.2.1 Result overview, Evaluation area 1

		<b>Zumtobel</b>	
3	6	Order No.	: 42180404
		Luminaire name	: RESCLITE C ANTIPANIC AD NSI WH [STD]
		Equipment	: 1 x LED-Z630 5 W / 198 lm
4	2	Order No.	: 42180420
		Luminaire name	: RESCLITE C SPOT AD NSI WH [STD]
		Equipment	: 1 x LED-Z644 5 W / 193 lm

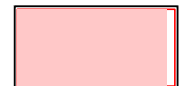
Object : CUKRARNA  
 Installation : RAZSTAVNI PROSTOR  
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### 3 02\_varnostna razsvetljava

#### 3.3 Calculation results, 02\_varnostna razsvetljava

##### 3.3.1 Table, Reference plane 1.1 (E)

	1.66	1.85	1.82	1.65	1.56	1.65	1.85	3.43	4.54	<b>[9.51]</b>	
[m]	1.87	2.28	2.1	1.78	1.72	1.73	1.96	4.01	4.81	7.12	
25.0	1.93	2.39	2.2	1.78	1.72	1.75	2.02	4.45	4.67	3.79	
	1.79	2.09	1.99	1.78	1.68	1.7	1.92	3.62	3.67	2.47	
22.5	1.69	1.9	1.92	1.78	1.66	1.69	1.73	2.64	2.78	2.03	
	1.64	1.87	1.91	1.76	1.67	1.57	1.58	1.96	2.1	1.7	
20.0	1.75	1.99	2.03	1.91	1.61	1.46	1.47	1.73	1.81	1.6	
	1.87	2.31	2.22	1.94	1.67	1.51	1.57	1.65	1.67	1.57	
17.5	2.02	2.53	2.41	1.97	1.82	1.77	1.75	1.71	1.76	1.71	
	1.96	2.3	2.22	2	1.9	1.9	1.9	1.97	2.07	2.03	
15.0	1.78	1.94	1.95	1.87	1.85	1.92	1.98	2.13	2.38	2.46	
	1.51	1.66	1.66	1.61	1.72	1.81	1.94	2.16	2.64	2.77	
12.5	1.45	1.57	1.55	1.53	1.54	1.58	1.83	2.19	2.57	3.15	
	1.59	1.62	1.58	1.49	1.43	1.56	1.81	2.23	2.87	5.66	
10.0	1.93	1.8	1.68	1.52	1.53	1.68	1.89	2.13	3.32	8.82	
	2.8	2.2	1.97	1.83	1.74	1.87	1.97	2.22	3.05	6.79	
7.5	4.38	2.65	2.23	2.1	2.17	2.51	3.38	4.43	4.49	5.11	
	6.57	3	2.47	2.11	2.2	2.46	3.15	3.92	4.12	3.9	
5.0	6.29	2.64	2.25	1.89	1.78	1.74	1.85	1.99	2.38	2.61	
	6.36	2.14	1.86	1.62	1.5	1.54	1.58	1.75	1.96	2	1.78
2.5	5.46	2.02	1.6	1.37	<b>(1.29)</b>	1.34	1.36	1.49	1.66	1.64	1.42
0.0											
	0	2	4	6	8	10	12	[m]			
	Illuminance [lx]										



Height of the reference plane

Average illuminance	Eav	: 0.03 m
Minimum illuminance	Emin	: 2.32 lx
Maximum illuminance	Emax	: 1.29 lx
Uniformity Uo	Emin/Eav	: 9.51 lx
Diversity Ud	Emin/Emax	: 1 : 1.80 (0.55)
		: 1 : 7.40 (0.14)