

## Generator 1A Enclosure Lighting Calculations

Installation : External Lighting

Project number : 200468

Customer : Hillingdon Hospital

Processed by : Subin Varghese (EE-CPW)

Date : 10.12.2020

The following values are based on precise calculations performed on calibrated lamps and luminaires, and their configurations, whereby gradual, unavoidable deviations can occur in practice. All guarantee claims are excluded for the specified data.

This exclusion of liability applies irrespective of the legal grounds for both damages and consequential damages suffered by users and third parties.

## 1 Luminaire data

### 1.1 Whitecroft Lighting, Kolo (K6H3124KS)

#### 1.1.1 Data sheet

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**Manufacturer: Whitecroft Lighting**

**K6H3124KS Kolo**

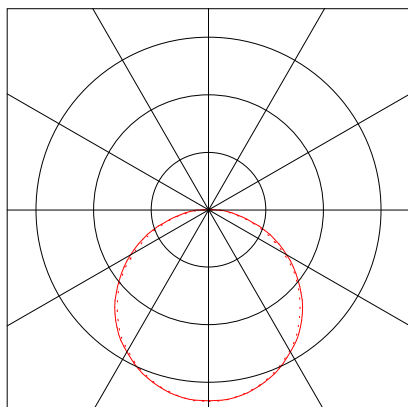
#### **Luminaire data**

Luminaire efficiency : 99.9999%  
Luminaire efficacy : 129.09 lm/W  
Classification : A40 ↓99.1% ↑0.9%  
CIE Flux Codes : 46 77 94 99 99  
UGR 4H 8H : 22.3 / 22.0  
Power : 8.8 W  
Luminous flux : 1136 lm

#### **Equipped with**

Quantity : 1  
Designation : LED  
Colour : 4000k  
Luminous flux : 1136 lm  
Colour reproduction : 1

Dimensions : Ø300 mm x 85 mm



## 1 Luminaire data

### 1.2 Whitecroft Lighting, Centurion L65 LED Wall mounted ... (CENLH14K)

#### 1.2.1 Data sheet

Manufacturer: Whitecroft Lighting

#### CENLH14K Centurion L65 LED Wall mounted surface

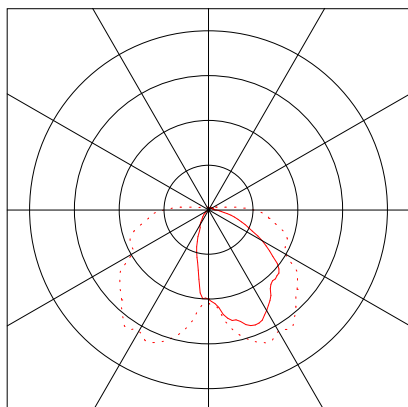
##### Luminaire data

Luminaire efficiency : 100%  
Luminaire efficacy : 74.17 lm/W  
Classification : A31 ↓92.7% ↑7.3%  
CIE Flux Codes : 40 69 88 93 101  
UGR 4H 8H : 21.5 / 24.8  
Power : 12 W  
Luminous flux : 890 lm

##### Equipped with

Quantity : 1  
Designation : LED  
Colour : 4000k  
Luminous flux : 890 lm  
Colour reproduction : 1

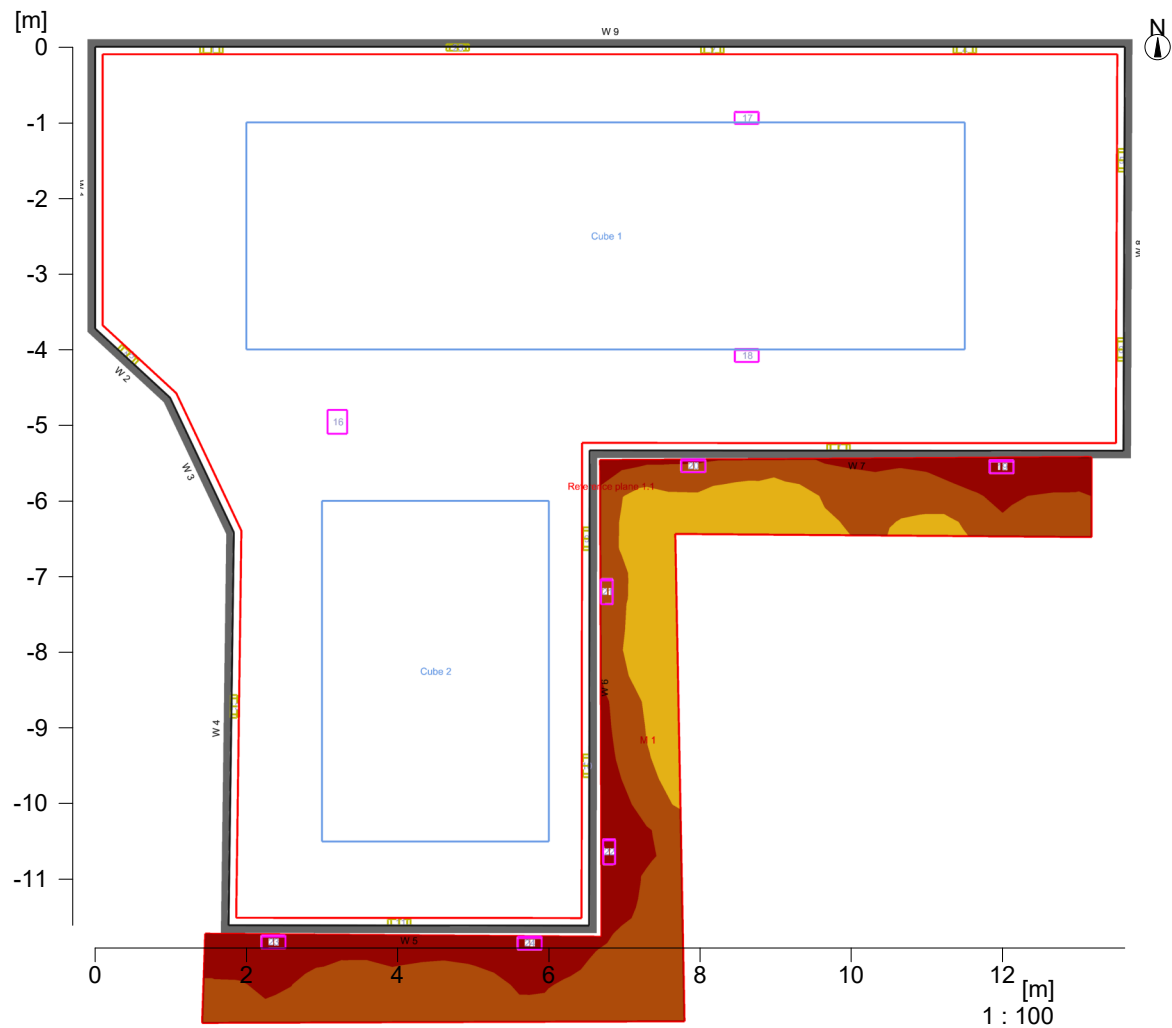
Dimensions : 315 mm x 259 mm x 156 mm



## 2 Room 1

### 2.1 Description, Room 1

#### 2.1.1 Floor plan



Object : Generator 1A Enclosure Lighting Calculations  
Installation : External Lighting  
Project number : 200468  
Date : 10.12.2020



## 2 Room 1

### 2.1 Description, Room 1

#### 2.1.1 Floor plan

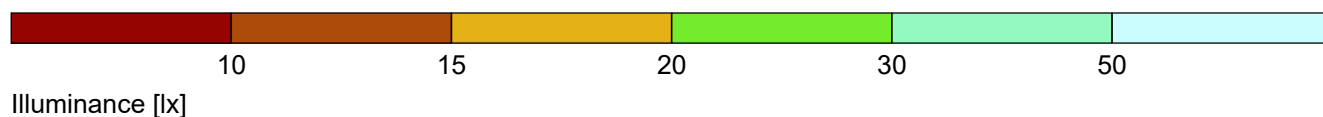
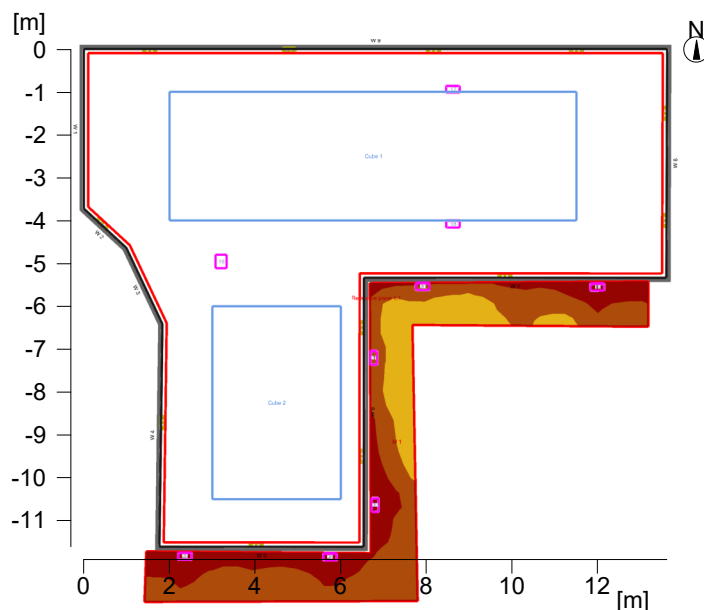
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| Wall                 | x       | y       | Length  | Reflectance |
|----------------------|---------|---------|---------|-------------|
| 1                    | 5.29 m  | 55.63 m | 3.72 m  | 50.0 %      |
| 2                    | 6.28 m  | 54.72 m | 1.35 m  | 50.0 %      |
| 3                    | 7.12 m  | 52.94 m | 1.97 m  | 50.0 %      |
| 4                    | 7.05 m  | 47.75 m | 5.19 m  | 50.0 %      |
| 5                    | 11.82 m | 47.75 m | 4.77 m  | 50.0 %      |
| 6                    | 11.83 m | 54.02 m | 6.28 m  | 50.0 %      |
| 7                    | 18.89 m | 54.02 m | 7.06 m  | 50.0 %      |
| 8                    | 18.91 m | 59.36 m | 5.34 m  | 50.0 %      |
| 9                    | 5.29 m  | 59.36 m | 13.62 m | 50.0 %      |
| Floor                |         |         |         | 20.0 %      |
| Ceiling              |         |         |         | 70.0 %      |
| Room height          |         | 3.00 m  |         |             |
| Height of ref. plane |         | 0.00 m  |         |             |

## 2 Room 1

### 2.2 Summary, Room 1

#### 2.2.1 Result overview, Measuring area 1



#### General

|                              |                           |
|------------------------------|---------------------------|
| Calculation algorithm used   | Average indirect fraction |
| Height of evaluation surface | 0.75 m                    |
| Maintenance factor           | 0.80                      |

|                                  |           |
|----------------------------------|-----------|
| Total luminous flux of all lamps | 21642 lm  |
| Total power                      | 213.6 W   |
| Total power per area (101.31 m²) | 2.11 W/m² |

#### Illuminance

|                     |           |               |
|---------------------|-----------|---------------|
| Average illuminance | Em        | 24.5 lx       |
| Minimum illuminance | Emin      | 9.8 lx        |
| Maximum illuminance | Emax      | 42.8 lx       |
| Uniformity Uo       | Emin/Em   | 1:2.49 (0.4)  |
| Diversity Ud        | Emin/Emax | 1:4.34 (0.23) |

#### Type No. Make

##### Whitecroft Lighting

1 12



Order No. : K6H3124KS  
 Luminaire name : Kolo  
 Equipment : 1 x LED 8.8 W / 1136 lm

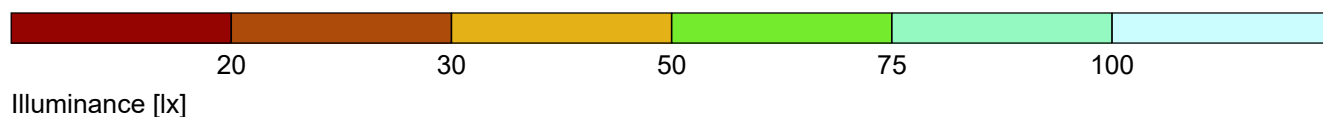
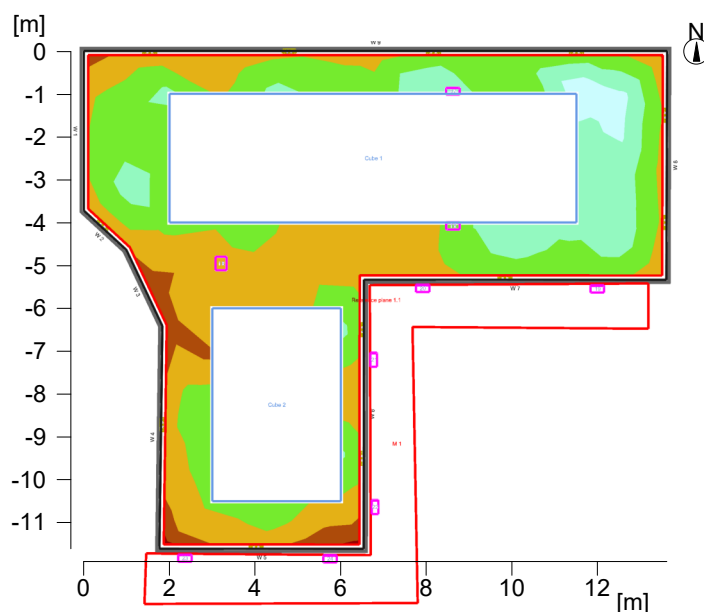
2 9



Order No. : CENLH14K  
 Luminaire name : Centurion L65 LED Wall mounted surface  
 Equipment : 1 x LED 12 W / 890 lm

## 2.2 Summary, Room 1

### 2.2.2 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 (101.31 m²)

16302.00 lm  
 141.6 W  
 1.40 W/m² (2.50 W/m²/100lx)

#### Evaluation area 1

#### Reference plane 1.1

Horizontal  
 Em  
 Emin  
 Emin/Em (Uo)  
 Emin/Emax (Ud)  
 Position

55.8 lx  
 24.3 lx  
 0.43  
 0.24  
 0.00 m

#### Major surfaces

M 1.10 (Ceiling)  
 M 1.1 (Wall)  
 M 1.2 (Wall)  
 M 1.3 (Wall)  
 M 1.4 (Wall)  
 M 1.5 (Wall)  
 M 1.6 (Wall)  
 M 1.7 (Wall)  
 M 1.8 (Wall)  
 M 1.9 (Wall)

Em  
 45.3 lx  
 48.2 lx  
 38.9 lx  
 24.8 lx  
 31.7 lx  
 31.5 lx  
 53.4 lx  
 67.1 lx  
 43.6 lx  
 57.1 lx

Uo  
 0.37  
 0.57  
 0.81  
 0.86  
 0.50  
 0.61  
 0.29  
 0.29  
 0.74  
 0.38

Object : Generator 1A Enclosure Lighting Calculations  
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## 2.2 Summary, Room 1

### 2.2.2 Result overview, Evaluation area 1

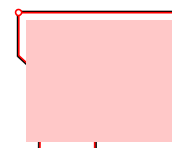
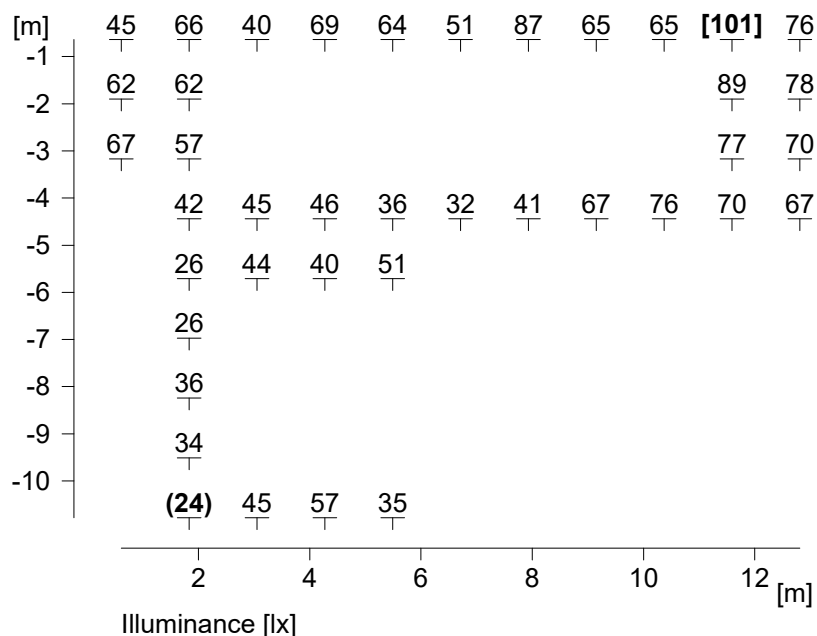
#### Type No.\Make

|                                                                                   |    |                            |                                          |
|-----------------------------------------------------------------------------------|----|----------------------------|------------------------------------------|
|                                                                                   |    | <b>Whitecroft Lighting</b> |                                          |
| 1                                                                                 | 12 | Order No.                  | : K6H3124KS                              |
|  |    | Luminaire name             | : Kolo                                   |
|                                                                                   |    | Equipment                  | : 1 x LED 8.8 W / 1136 lm                |
| 2                                                                                 | 3  | Order No.                  | : CENLH14K                               |
|  |    | Luminaire name             | : Centurion L65 LED Wall mounted surface |
|                                                                                   |    | Equipment                  | : 1 x LED 12 W / 890 lm                  |

## 2 Room 1

### 2.3 Calculation results, Room 1

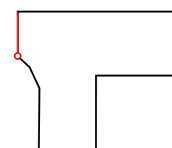
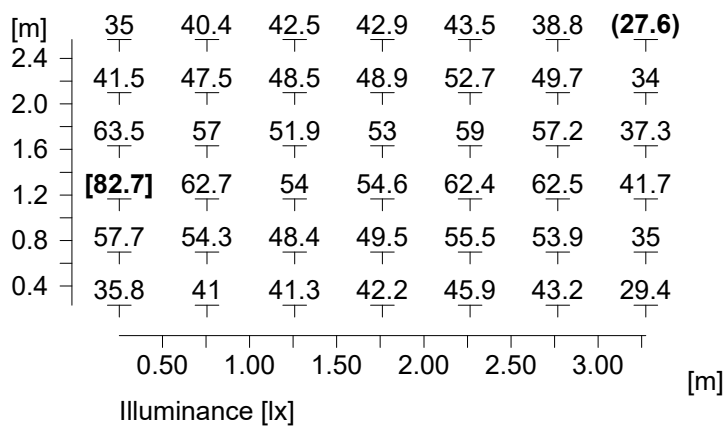
#### 2.3.1 Table, Reference plane 1.1 (E)



|                        |                             |
|------------------------|-----------------------------|
| Height reference plane | : 0.00 m                    |
| Average illuminance    | Em : 56 lx                  |
| Minimum illuminance    | Emin : 24 lx                |
| Maximum illuminance    | Emax : 101 lx               |
| Uniformity Uo          | Emin/Em : 1 : 2.30 (0.43)   |
| Diversity Ud           | Emin/Emax : 1 : 4.16 (0.24) |

## 2.3 Calculation results, Room 1

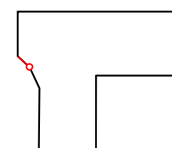
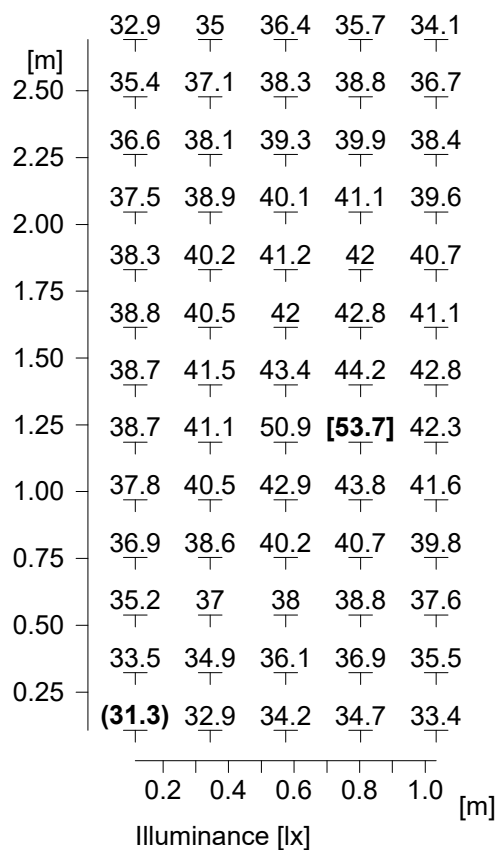
### 2.3.2 Table, Evaluation area 1, Measuring area 1 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 48.2 lx         |
| Minimum illuminance | Emin      | : 27.6 lx         |
| Maximum illuminance | Emax      | : 82.7 lx         |
| Uniformity Uo       | Emin/Em   | : 1 : 1.75 (0.57) |
| Diversity Ud        | Emin/Emax | : 1 : 2.99 (0.33) |

## 2.3 Calculation results, Room 1

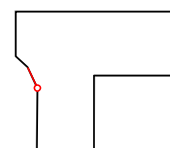
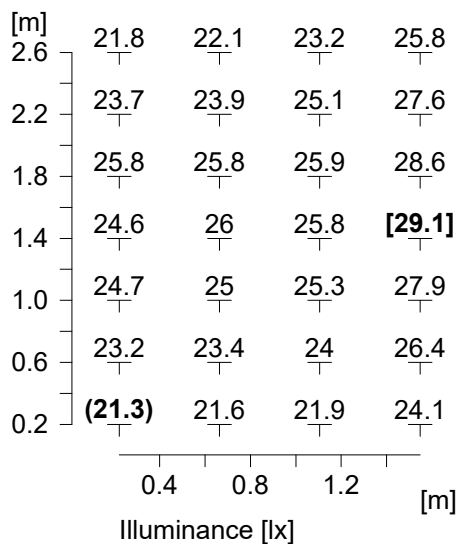
### 2.3.3 Table, Evaluation area 1, Measuring area 2 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 38.9 lx         |
| Minimum illuminance | Emin      | : 31.3 lx         |
| Maximum illuminance | Emax      | : 53.7 lx         |
| Uniformity Uo       | Emin/Em   | : 1 : 1.24 (0.81) |
| Diversity Ud        | Emin/Emax | : 1 : 1.72 (0.58) |

## 2.3 Calculation results, Room 1

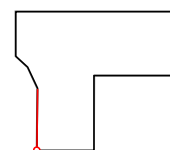
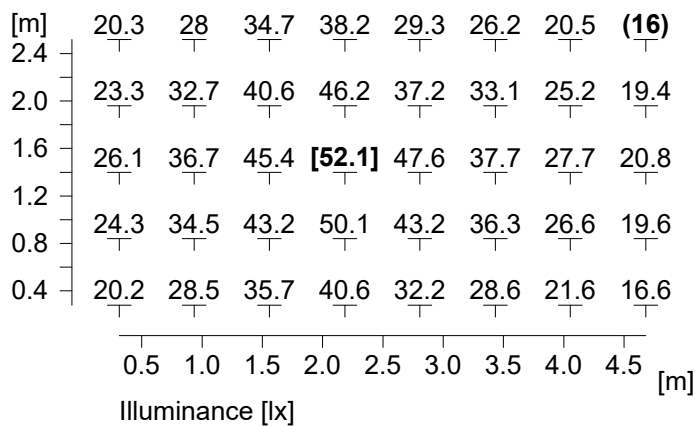
### 2.3.4 Table, Evaluation area 1, Measuring area 3 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 24.8 lx         |
| Minimum illuminance | Emin      | : 21.3 lx         |
| Maximum illuminance | Emax      | : 29.1 lx         |
| Uniformity Uo       | Emin/Em   | : 1 : 1.16 (0.86) |
| Diversity Ud        | Emin/Emax | : 1 : 1.36 (0.73) |

## 2.3 Calculation results, Room 1

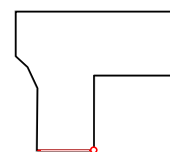
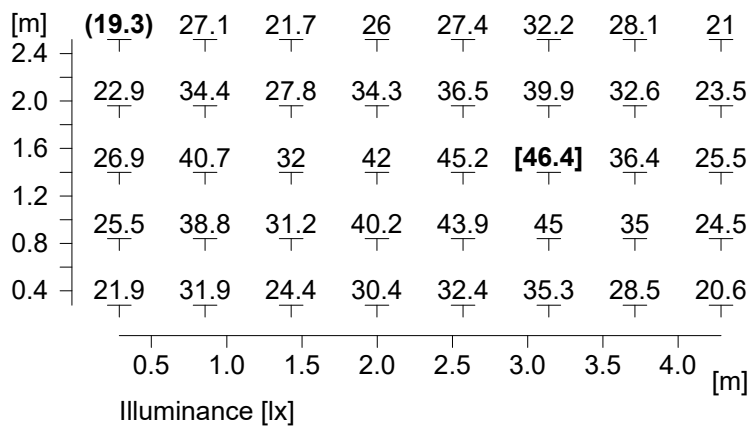
### 2.3.5 Table, Evaluation area 1, Measuring area 4 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 31.7 lx         |
| Minimum illuminance | Emin      | : 16 lx           |
| Maximum illuminance | Emax      | : 52.1 lx         |
| Uniformity Uo       | Emin/Em   | : 1 : 1.98 (0.50) |
| Diversity Ud        | Emin/Emax | : 1 : 3.26 (0.31) |

## 2.3 Calculation results, Room 1

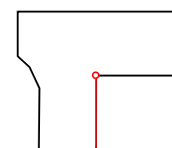
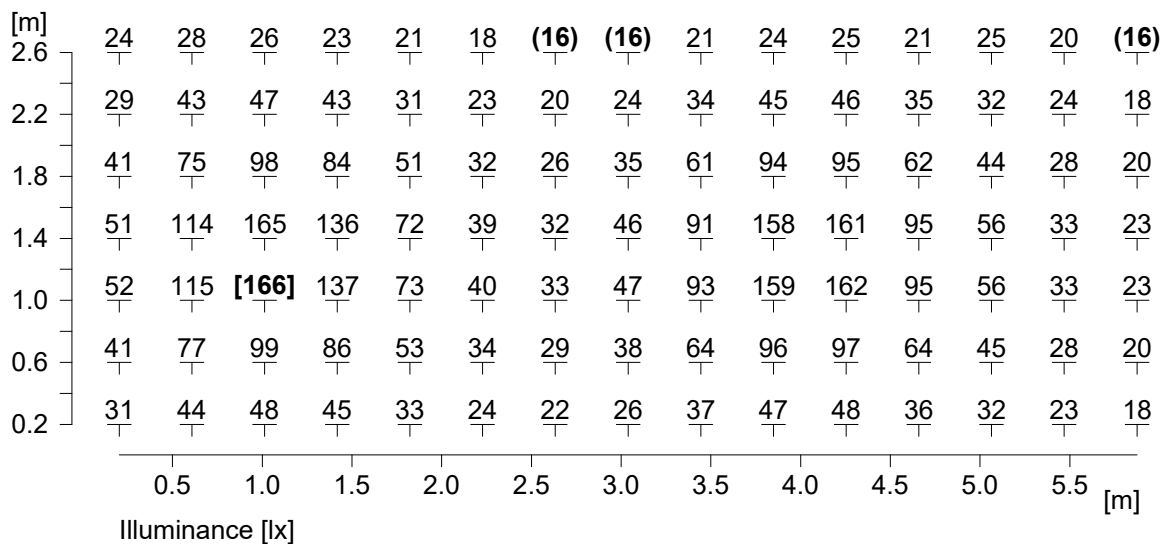
### 2.3.6 Table, Evaluation area 1, Measuring area 5 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 31.5 lx         |
| Minimum illuminance | Emin      | : 19.3 lx         |
| Maximum illuminance | Emax      | : 46.4 lx         |
| Uniformity Uo       | Emin/Em   | : 1 : 1.63 (0.61) |
| Diversity Ud        | Emin/Emax | : 1 : 2.40 (0.42) |

## 2.3 Calculation results, Room 1

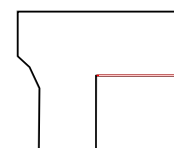
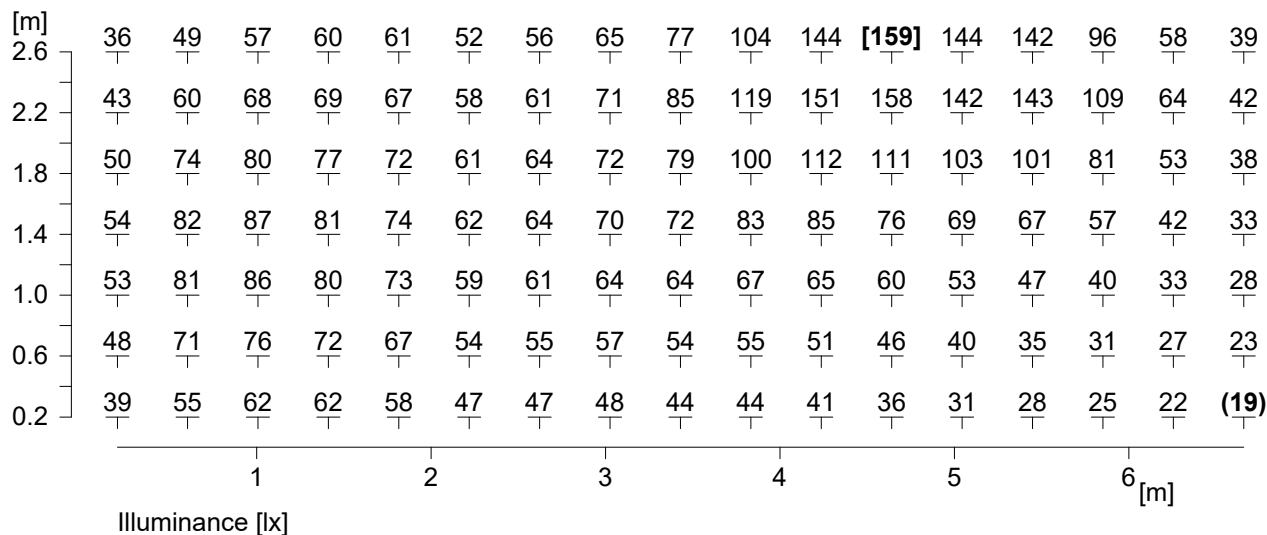
### 2.3.7 Table, Evaluation area 1, Measuring area 6 (Wall) (E)



|                     |           |                    |
|---------------------|-----------|--------------------|
| Average illuminance | Em        | : 53 lx            |
| Minimum illuminance | Emin      | : 16 lx            |
| Maximum illuminance | Emax      | : 166 lx           |
| Uniformity Uo       | Emin/Em   | : 1 : 3.44 (0.29)  |
| Diversity Ud        | Emin/Emax | : 1 : 10.66 (0.09) |

## 2.3 Calculation results, Room 1

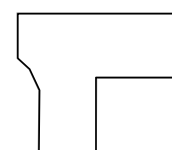
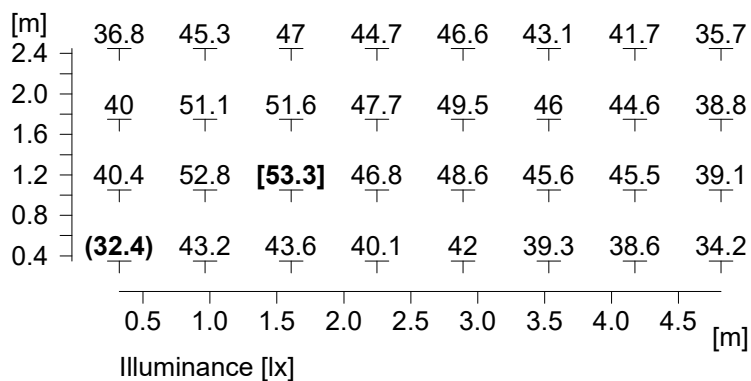
### 2.3.8 Table, Evaluation area 1, Measuring area 7 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 67 lx           |
| Minimum illuminance | Emin      | : 19 lx           |
| Maximum illuminance | Emax      | : 159 lx          |
| Uniformity Uo       | Emin/Em   | : 1 : 3.46 (0.29) |
| Diversity Ud        | Emin/Emax | : 1 : 8.18 (0.12) |

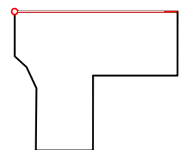
## 2.3 Calculation results, Room 1

### 2.3.9 Table, Evaluation area 1, Measuring area 8 (Wall) (E)



|                     |           |                   |
|---------------------|-----------|-------------------|
| Average illuminance | Em        | : 43.6 lx         |
| Minimum illuminance | Emin      | : 32.4 lx         |
| Maximum illuminance | Emax      | : 53.3 lx         |
| Uniformity Uo       | Emin/Em   | : 1 : 1.35 (0.74) |
| Diversity Ud        | Emin/Emax | : 1 : 1.65 (0.61) |

### 2.3.10 Table, Evaluation area 1, Measuring area 9 (Wall) (E)



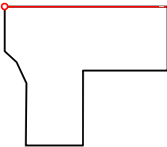
|                     |           |                    |
|---------------------|-----------|--------------------|
| Average illuminance | Em        | : 57 lx            |
| Minimum illuminance | Emin      | : 22 lx            |
| Maximum illuminance | Emax      | : 330 lx           |
| Uniformity Uo       | Emin/Em   | : 1 : 2.61 (0.38)  |
| Diversity Ud        | Emin/Emax | : 1 : 15.05 (0.07) |



2.3 Calculation results, Room 1

2.3.10 Table, Evaluation area 1, Measuring area 9 (Wall) (E)

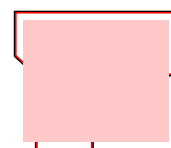
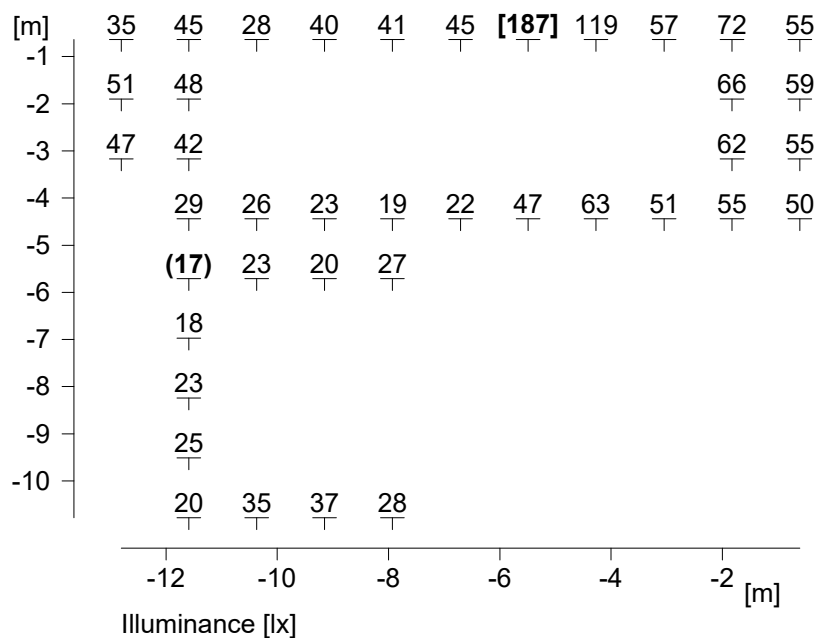
|    |    |
|----|----|
| 40 | 29 |
| 50 | 35 |
| 58 | 38 |
| 64 | 41 |
| 63 | 40 |
| 54 | 35 |
| 43 | 30 |



Part2

## 2.3 Calculation results, Room 1

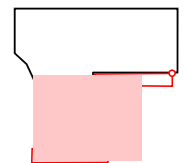
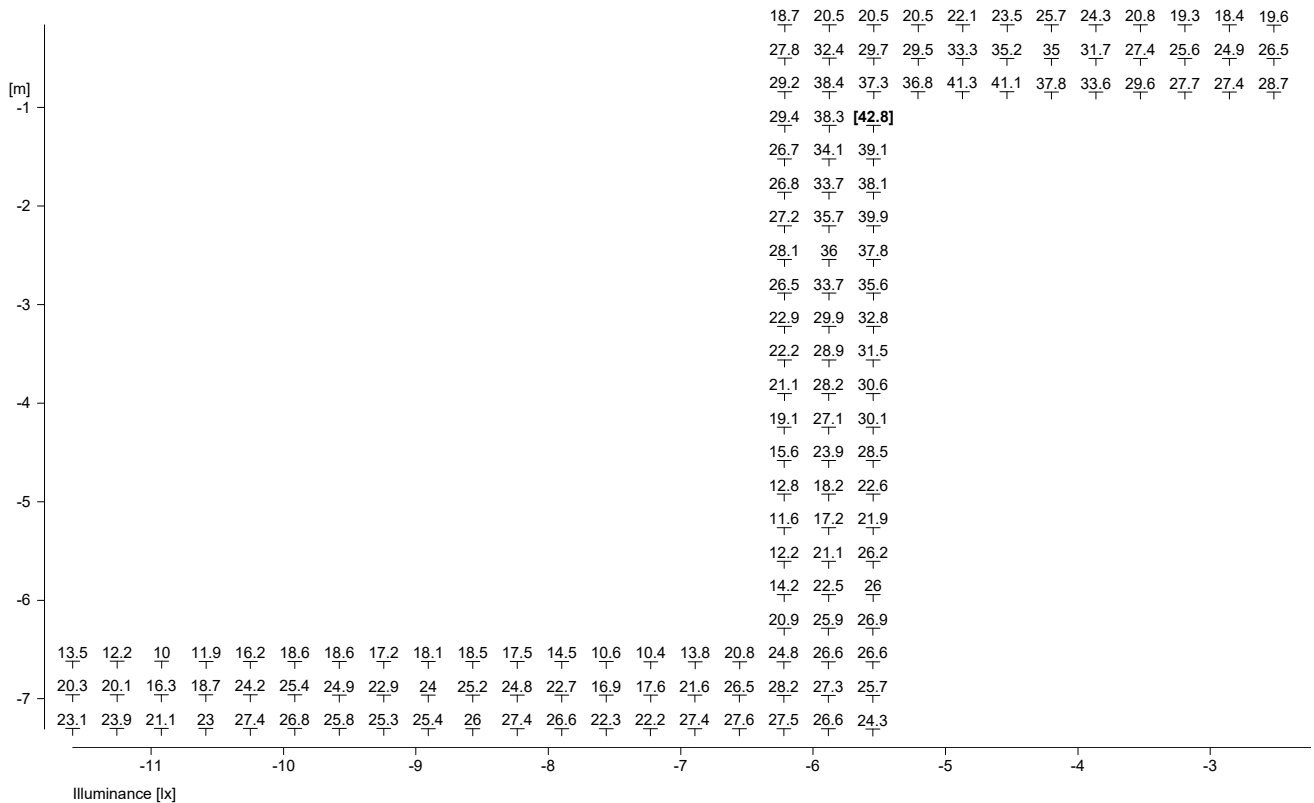
### 2.3.11 Table, Evaluation area 1, Measuring area 10 (Ceiling) (E)



|                     |           |                    |
|---------------------|-----------|--------------------|
| Average illuminance | Em        | : 45 lx            |
| Minimum illuminance | Emin      | : 17 lx            |
| Maximum illuminance | Emax      | : 187 lx           |
| Uniformity Uo       | Emin/Em   | : 1 : 2.74 (0.37)  |
| Diversity Ud        | Emin/Emax | : 1 : 11.32 (0.09) |

## 2.3 Calculation results, Room 1

### 2.3.12 Table, Measuring area 1 (E)



Part1

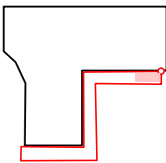
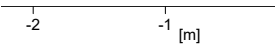
|                        |                             |
|------------------------|-----------------------------|
| Height reference plane | : 0.75 m                    |
| Average illuminance    | Em : 24.5 lx                |
| Minimum illuminance    | Emin : 9.8 lx               |
| Maximum illuminance    | Emax : 42.8 lx              |
| Uniformity Uo          | Emin/Em : 1 : 2.49 (0.40)   |
| Diversity Ud           | Emin/Emax : 1 : 4.34 (0.23) |



2.3 Calculation results, Room 1

2.3.12 Table, Measuring area 1 (E)

|      |      |      |       |      |      |      |
|------|------|------|-------|------|------|------|
| 18,3 | 14,4 | 11,5 | (9,8) | 10   | 11,1 | 12,8 |
| 26,7 | 23,7 | 20   | 15,4  | 18,9 | 20,1 | 20,2 |
| 29,2 | 29,1 | 26,5 | 20,8  | 25,2 | 24,9 | 22,2 |



Part2