

# TECHLUME

A U S T R A L I A

## LM-79 Test Report

|                       |                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------|
| Testing Method:       | IES Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products |
| Relevant Standards:   | IES LM-79-08                                                                                  |
| Test Date and Time:   | 14/07/2023 4:25:15 PM                                                                         |
| Test Location:        | Techlume Australia - East Goderich Street<br>Deloraine, TAS 7304                              |
| Operator:             | Johnny Elmer                                                                                  |
| Measurement Number:   | VFR-230714-0120-MS                                                                            |
| Measurement Method:   | Far Field, Type C Horizontal                                                                  |
| Measurement Distance: | 453.1 cm                                                                                      |

### Equipment Used

|                      |                                                   |
|----------------------|---------------------------------------------------|
| System Name:         | LabSpion Goniometer                               |
| Sensor Name / Model: | Viso LabSensor Model2 / Freedom VIS (Custom Viso) |
| Spectrometer Range:  | 360 nm – 830 nm                                   |
| Calibration Date:    | 7/12/2022                                         |
| Flicker Meter Type:  | Viso Systems LabFlicker                           |
| Manufacturer:        | Viso Systems, Denmark                             |

### Test Conditions

|                      |              |
|----------------------|--------------|
| Ambient Temperature: | 25 °C ± 1 °C |
|----------------------|--------------|

### Remarks

The results stated in this report represent the tested sample only. All photometric and colourimetric data has been measured in compliance with IES LM-79-08 standards.



## Product Overview

Product Description:

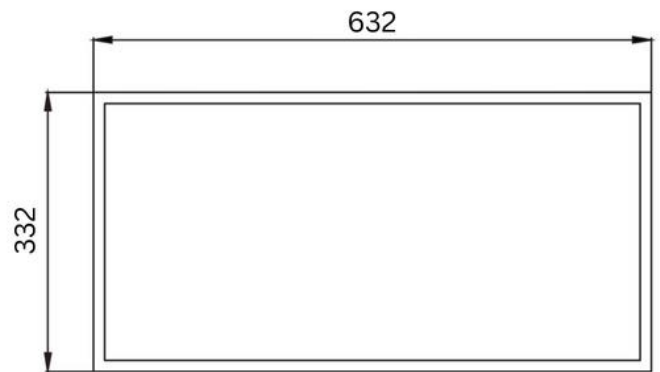
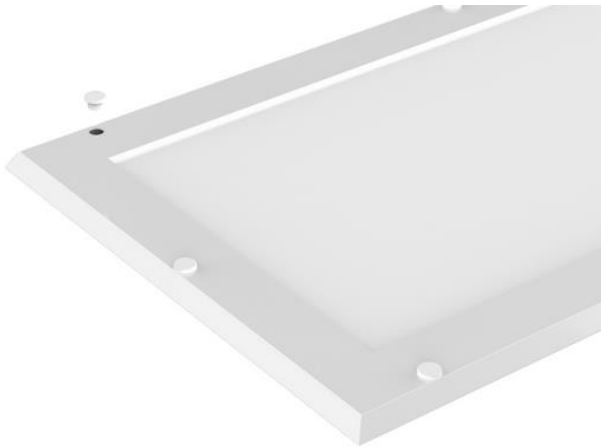
BURNET 24W Cleanroom Panel Light, IP54,  
632x332mm, 4000K, Non-Dim

Item Number:

LC7402

Manufacturer:

Decrolux Lightng Pty Ltd



## Photometric Measurements

| Total Luminous Flux | Luminous Efficacy | Luminous Intensity |
|---------------------|-------------------|--------------------|
| 2455 lm             | 98 Lumen/watt     | 830 cd             |

| Correlated Colour Temperature, Target | Correlated Colour Temperature, Measured | Colour Rendering Index (CRI) |
|---------------------------------------|-----------------------------------------|------------------------------|
| 4000 K                                | 4145 K                                  | Ra 81.9                      |

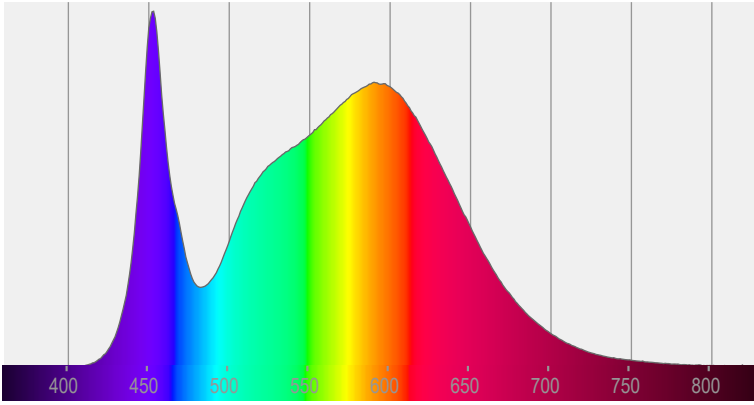
## Electrical Measurements

| Input Voltage | Input Current | Input Power | Input Voltage Frequency |
|---------------|---------------|-------------|-------------------------|
| 240 VAC       | 0.114 A       | 25.0 W      | 60 Hz                   |

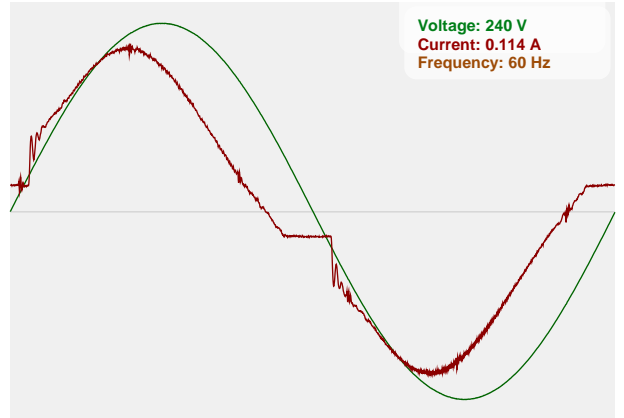
| Power Factor | Stabilisation Time                  | Stabilisation Variation | Hours Operated Prior to Test |
|--------------|-------------------------------------|-------------------------|------------------------------|
| 0.92         | Lamp stabilized in 35 min<br>34 sec | -0.9%                   | 0 hours                      |



### Spectral Power Distribution (SPD)



### Input Power Curve

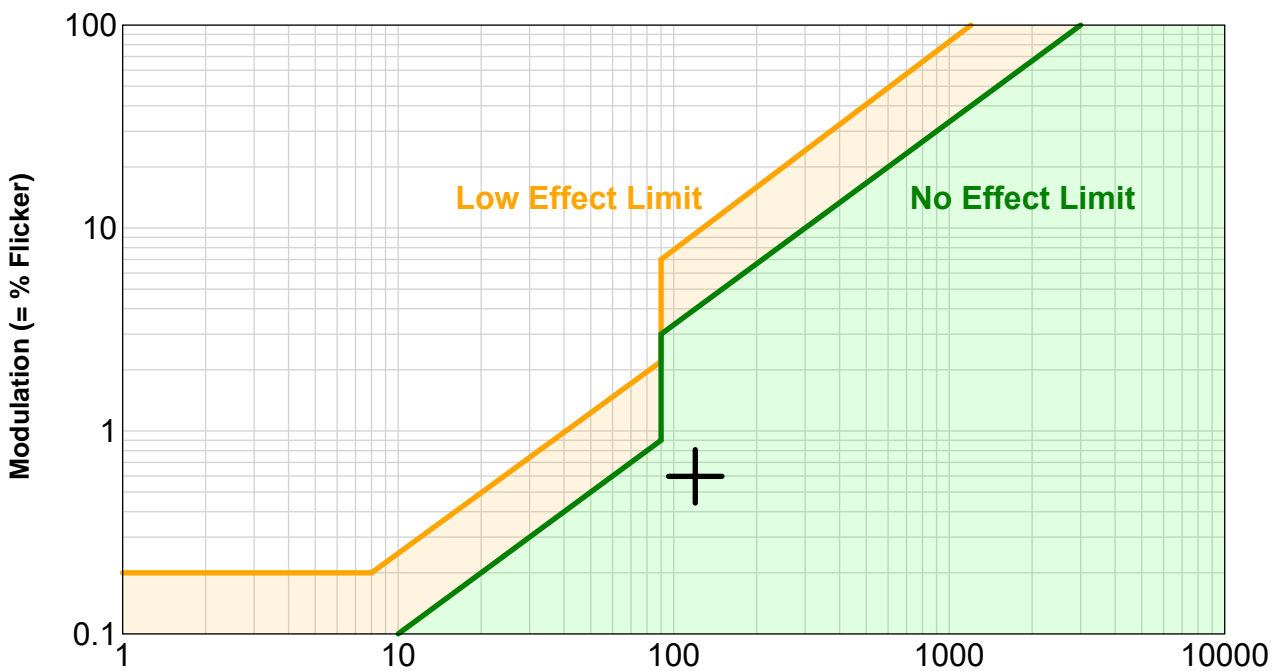


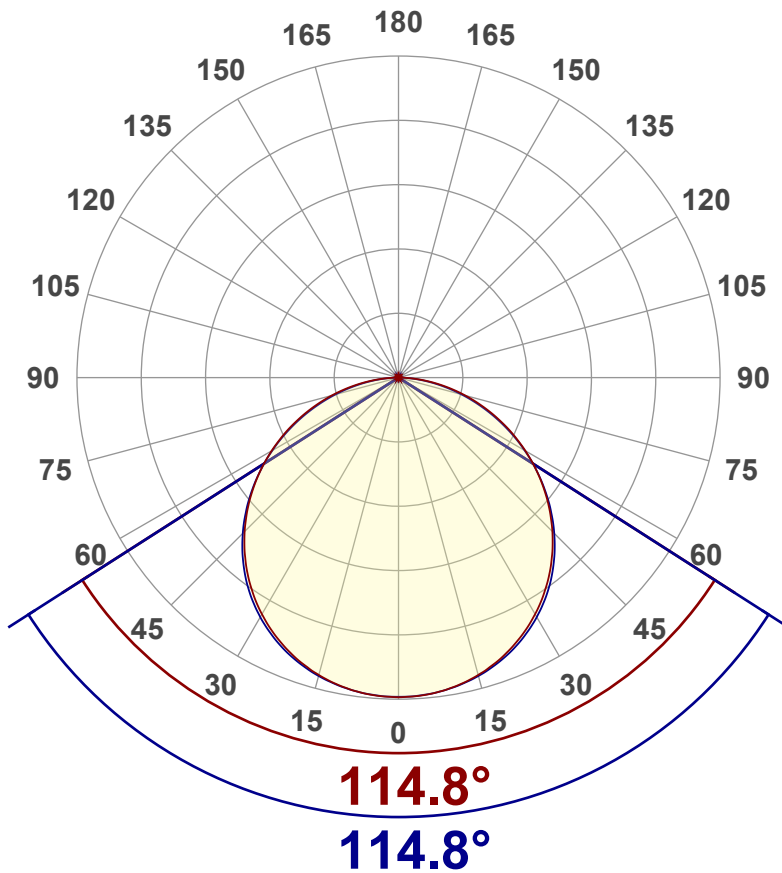
### Flicker Details

| Flicker Sample Rate | Flicker Percentage | Flicker Frequency | Flicker Index |
|---------------------|--------------------|-------------------|---------------|
| 20000 sample/s      | 0.6%               | 119.76 Hz         | 0             |

| Flicker SVM Value | Flicker PstLM Value | Measurement Time (PstLM) | Measurement Time (all other indices) |
|-------------------|---------------------|--------------------------|--------------------------------------|
| 0.01              | 0.06                | 180 s                    | 1.2 s                                |

### IEEE 1789 Frequency/Modulation Plot



**Angular Distribution – 0° / 90° Plane**

**Main Values**

|                           |         |
|---------------------------|---------|
| <b>Total Lumen Output</b> | 2455 lm |
| <b>Lumen Up%</b>          | 0.1%    |
| <b>Lumen Down%</b>        | 99.9%   |
| <b>Peak Intensity</b>     | 830 cd  |
| <b>Beam Angle (90%)</b>   | 114.8°  |

**Cut-off Angle**

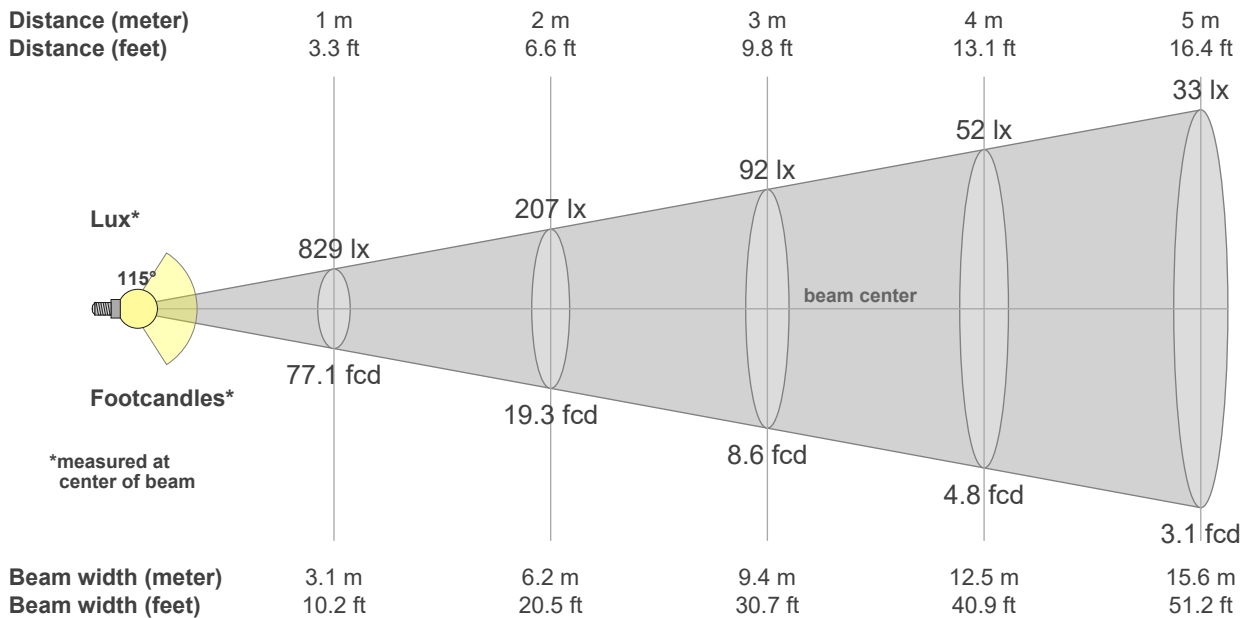
|                     |        |
|---------------------|--------|
| <b>Average 2.5%</b> | 175.2° |
|---------------------|--------|

**Field Angle**

|                    |        |
|--------------------|--------|
| <b>Average 10%</b> | 164.1° |
|--------------------|--------|

**Intensity Ratio**

|                     |       |
|---------------------|-------|
| <b>In 120° Cone</b> | 77.6% |
| <b>In 90° Cone</b>  | 52.6% |

**C000-C180**
**C090-C270**

**Beam intensities from 1 – 20m**

| 1    | 2    | 3   | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | m   |
|------|------|-----|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| 3.3  | 6.6  | 9.8 | 13.1 | 16.4 | 19.7 | 23  | 26.2 | 29.5 | 32.8 | 36.1 | 39.4 | 42.7 | 45.9 | 49.2 | 52.5 | 55.8 | 59.1 | 62.3 | 65.6 | ft  |
| 829  | 207  | 92  | 52   | 33   | 23   | 17  | 13   | 10   | 8    | 7    | 6    | 5    | 4    | 4    | 3    | 3    | 3    | 2    | 2    | lux |
| 77.1 | 19.3 | 8.6 | 4.8  | 3.1  | 2.1  | 1.6 | 1.2  | 1    | 0.8  | 0.6  | 0.5  | 0.5  | 0.4  | 0.3  | 0.3  | 0.3  | 0.2  | 0.2  | 0.2  | fc  |



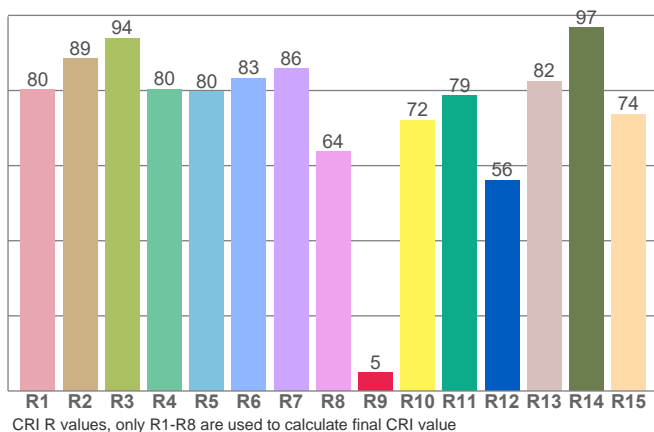
### Colour Details

| Colour Rendering Index (CRI) | Colour Rendering Index R9 Value | Colour Rendering TM30-18                 |
|------------------------------|---------------------------------|------------------------------------------|
| Ra 81.9                      | R9 = 4.9                        | R <sub>f</sub> 82.4, R <sub>g</sub> 94.6 |

| Colour Quality Scale | Correlated Colour Temperature, Target | Correlated Colour Temperature, Measured |
|----------------------|---------------------------------------|-----------------------------------------|
| CQS = 80.6           | CCT = 4000 K                          | CCT = 4145 K                            |

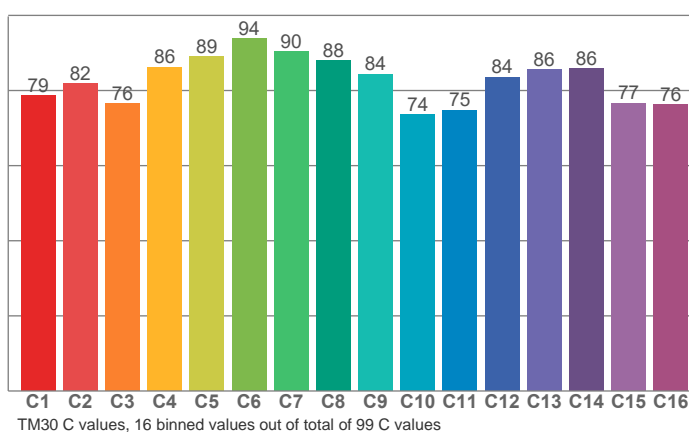
| MacAdam Steps | Colour Coordinates CIE 1931 | Colour Deviation from BBL |
|---------------|-----------------------------|---------------------------|
| SDCM = 3.1    | (x;y) = (0.381;0.377)       | Duv = 0.0004              |

### Colour Rendering Index per reference colour (CIE 1995)



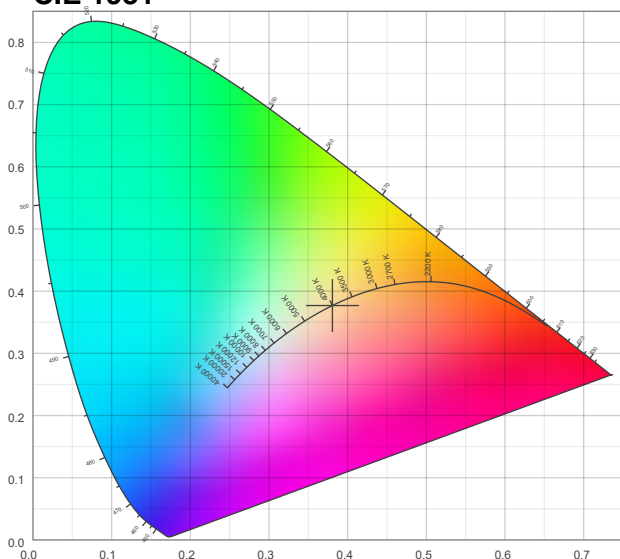
| R1   | R2   | R3   | R4   | R5   | R6   | R7   | R8   | R9  | R10  | R11  | R12  | R13  | R14  | R15  |
|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| 80.2 | 88.5 | 93.9 | 80.4 | 79.7 | 83.3 | 85.8 | 63.7 | 4.9 | 72.0 | 78.7 | 56.1 | 82.4 | 96.8 | 73.6 |

### TM30-18 Rf-values per hue bin

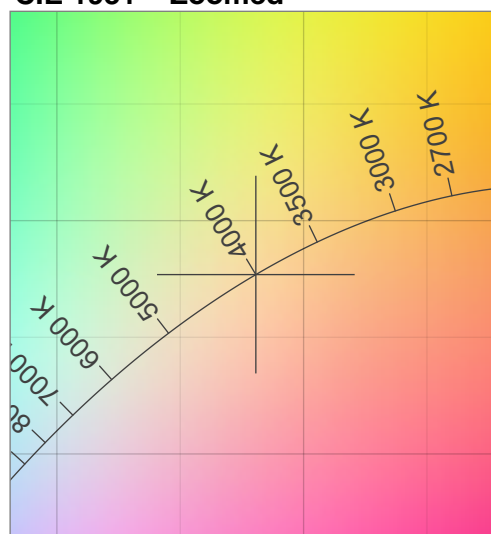


| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 78.6 | 81.8 | 76.4 | 86.2 | 89.1 | 93.7 | 90.3 | 88.0 | 84.4 | 73.5 | 74.7 | 83.5 | 85.5 | 85.8 | 76.6 | 76.2 |

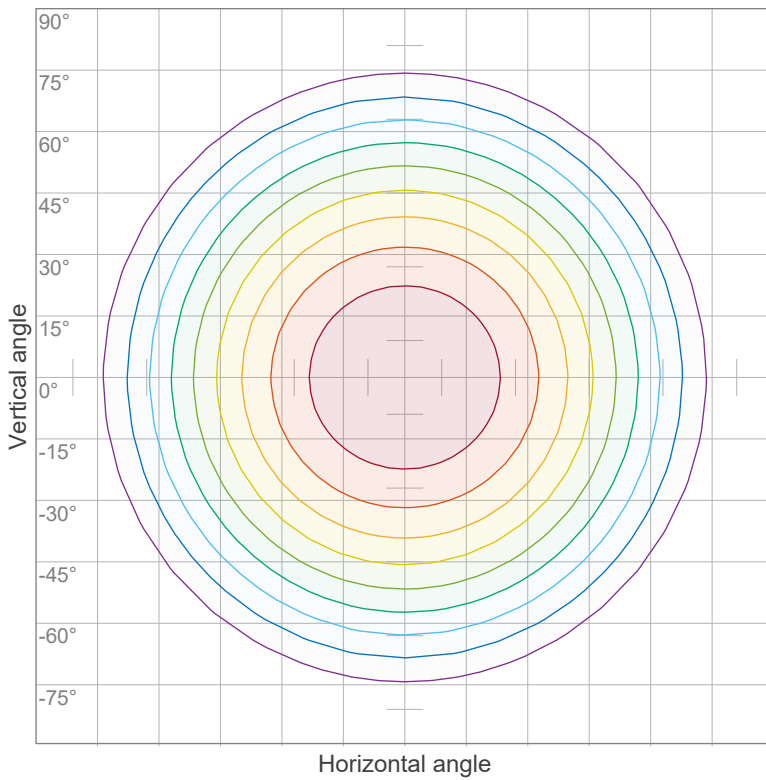
### CIE 1931



### CIE 1931 – Zoomed



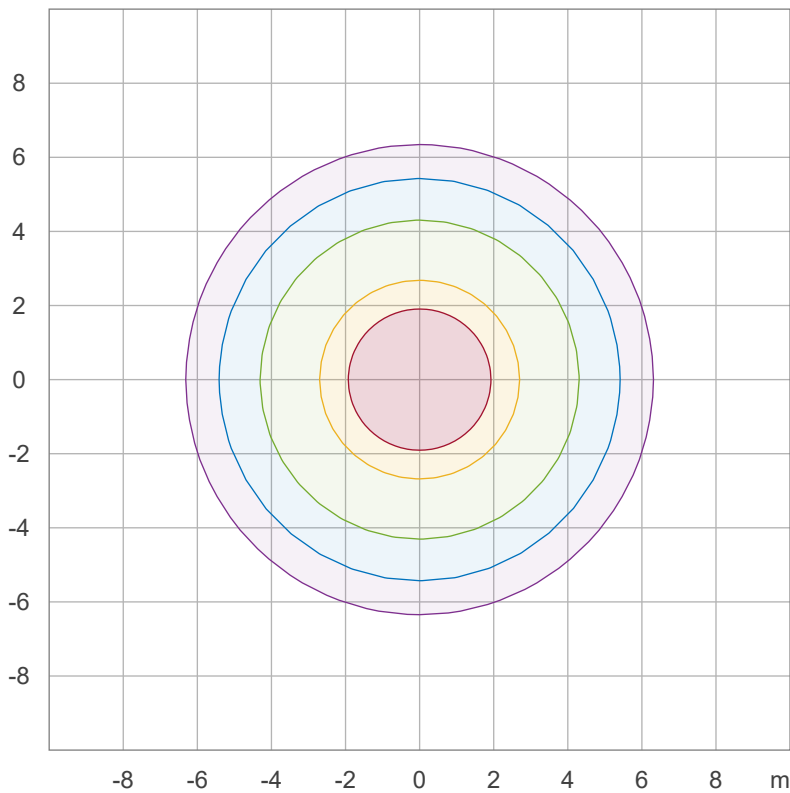
### Iso-intensity Diagram (Iso-Candela)



|      |          |
|------|----------|
| 90 % | 746.9 cd |
| 80 % | 663.9 cd |
| 70 % | 580.9 cd |
| 60 % | 497.9 cd |
| 50 % | 415.0 cd |
| 40 % | 332.0 cd |
| 30 % | 249.0 cd |
| 20 % | 166.0 cd |
| 10 % | 83.0 cd  |

Peak intensity: 829.9 cd  
Number of c-planes: 36

### Iso-illuminance Diagram (Iso-lux)



|        |         |
|--------|---------|
| 50.0 % | 46.1 lx |
| 30.0 % | 27.7 lx |
| 10.0 % | 9.2 lx  |
| 5.0 %  | 4.6 lx  |
| 3.0 %  | 2.8 lx  |

Peak illuminance: 92.2 lx  
Mounting height: 3.0 m  
Number of c-planes: 36



### Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

| Reflectances                                                                |     | 70                                                 | 70   | 50   | 50   | 30   | 70                                               | 70   | 50   | 50   | 30   |
|-----------------------------------------------------------------------------|-----|----------------------------------------------------|------|------|------|------|--------------------------------------------------|------|------|------|------|
| ρ Ceiling                                                                   |     | 70                                                 | 70   | 50   | 50   | 30   | 70                                               | 70   | 50   | 50   | 30   |
| ρ Walls                                                                     |     | 50                                                 | 30   | 50   | 30   | 30   | 50                                               | 30   | 50   | 30   | 30   |
| ρ Floor                                                                     |     | 20                                                 | 20   | 20   | 20   | 20   | 20                                               | 20   | 20   | 20   | 20   |
| Room size                                                                   |     | Viewed Crosswise                                   |      |      |      |      | Viewed Endwise                                   |      |      |      |      |
| H = mounting height above eye level                                         |     | (Viewing direction orthogonal to lamp length axis) |      |      |      |      | (Viewing direction parallel to lamp length axis) |      |      |      |      |
| X                                                                           | Y   |                                                    |      |      |      |      |                                                  |      |      |      |      |
| 2H                                                                          | 2H  | 28.5                                               | 29.7 | 28.7 | 30.1 | 30.3 | 28.5                                             | 29.7 | 28.7 | 30.0 | 30.3 |
|                                                                             | 3H  | 30.1                                               | 31.4 | 30.5 | 31.6 | 31.9 | 30.0                                             | 31.3 | 30.4 | 31.6 | 31.8 |
|                                                                             | 4H  | 30.8                                               | 32.0 | 31.2 | 32.3 | 32.6 | 30.6                                             | 31.9 | 31.1 | 32.1 | 32.4 |
|                                                                             | 6H  | 31.4                                               | 32.5 | 31.7 | 32.8 | 33.2 | 31.2                                             | 32.3 | 31.5 | 32.6 | 32.9 |
|                                                                             | 8H  | 31.6                                               | 32.7 | 32.0 | 33.0 | 33.4 | 31.4                                             | 32.4 | 31.7 | 32.7 | 33.1 |
|                                                                             | 12H | 31.7                                               | 32.7 | 32.1 | 33.1 | 33.5 | 31.5                                             | 32.5 | 31.8 | 32.8 | 33.3 |
| 4H                                                                          | 2H  | 29.1                                               | 30.4 | 29.5 | 30.6 | 30.9 | 29.1                                             | 30.3 | 29.5 | 30.6 | 30.9 |
|                                                                             | 3H  | 31.0                                               | 32.0 | 31.4 | 32.4 | 32.8 | 30.9                                             | 31.9 | 31.3 | 32.3 | 32.7 |
|                                                                             | 4H  | 31.8                                               | 32.7 | 32.2 | 33.1 | 33.7 | 31.6                                             | 32.6 | 32.1 | 33.0 | 33.5 |
|                                                                             | 6H  | 32.5                                               | 33.4 | 33.0 | 33.7 | 34.1 | 32.3                                             | 33.2 | 32.8 | 33.5 | 33.9 |
|                                                                             | 8H  | 32.7                                               | 33.6 | 33.2 | 33.9 | 34.3 | 32.5                                             | 33.3 | 33.0 | 33.7 | 34.1 |
|                                                                             | 12H | 32.9                                               | 33.6 | 33.4 | 34.0 | 34.5 | 32.6                                             | 33.3 | 33.1 | 33.7 | 34.2 |
| 8H                                                                          | 4H  | 32.1                                               | 32.9 | 32.6 | 33.3 | 33.7 | 32.0                                             | 32.8 | 32.5 | 33.2 | 33.5 |
|                                                                             | 6H  | 33.0                                               | 33.6 | 33.5 | 34.1 | 34.6 | 32.8                                             | 33.4 | 33.3 | 33.9 | 34.4 |
|                                                                             | 8H  | 33.3                                               | 33.9 | 33.9 | 34.4 | 35.0 | 33.1                                             | 33.6 | 33.6 | 34.2 | 34.8 |
|                                                                             | 12H | 33.6                                               | 34.1 | 34.2 | 34.6 | 35.2 | 33.3                                             | 33.8 | 33.9 | 34.3 | 34.9 |
| 12H                                                                         | 4H  | 32.1                                               | 32.8 | 32.6 | 33.2 | 33.7 | 32.0                                             | 32.7 | 32.5 | 33.1 | 33.6 |
|                                                                             | 6H  | 33.1                                               | 33.6 | 33.6 | 34.1 | 34.8 | 32.9                                             | 33.4 | 33.4 | 33.9 | 34.6 |
|                                                                             | 8H  | 33.4                                               | 33.9 | 34.0 | 34.4 | 35.0 | 33.2                                             | 33.7 | 33.8 | 34.2 | 34.8 |
| <b>Variations with the observer position for the luminaire spacings, S:</b> |     |                                                    |      |      |      |      |                                                  |      |      |      |      |
| S = 1.0H                                                                    |     | 0.1 / -0.1                                         |      |      |      |      | 0.1 / -0.1                                       |      |      |      |      |
| S = 1.5H                                                                    |     | 0.1 / -0.2                                         |      |      |      |      | 0.1 / -0.2                                       |      |      |      |      |
| S = 2.0H                                                                    |     | 0.3 / -0.4                                         |      |      |      |      | 0.4 / -0.4                                       |      |      |      |      |

### Coefficients of Utilization

| Ceiling reflectance                                                                                                        | 80  |     |     | 70  |     |     | 50  |     |     | 30  |     |     | 10  |     |     | 0   |     |     |
|----------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Wall reflectance                                                                                                           | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 0   |
| Floor reflectance                                                                                                          | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 0   |
| RCR (RCR: Room Cavity Ratio) <small>Room Values are expressed as percentage of Lumen delivered to the task surface</small> |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0                                                                                                                          | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |
| 1                                                                                                                          | 108 | 103 | 99  | 95  | 106 | 101 | 97  | 94  | 97  | 94  | 91  | 93  | 90  | 88  | 89  | 87  | 85  | 83  |
| 2                                                                                                                          | 98  | 90  | 83  | 77  | 96  | 88  | 82  | 76  | 84  | 79  | 74  | 81  | 77  | 73  | 78  | 74  | 71  | 69  |
| 3                                                                                                                          | 90  | 79  | 70  | 64  | 87  | 77  | 69  | 63  | 74  | 68  | 62  | 71  | 66  | 61  | 69  | 64  | 60  | 58  |
| 4                                                                                                                          | 82  | 70  | 61  | 54  | 80  | 68  | 60  | 53  | 66  | 58  | 53  | 63  | 57  | 52  | 61  | 56  | 51  | 49  |
| 5                                                                                                                          | 75  | 62  | 53  | 46  | 73  | 61  | 52  | 46  | 59  | 51  | 45  | 57  | 50  | 45  | 55  | 49  | 44  | 42  |
| 6                                                                                                                          | 69  | 56  | 47  | 40  | 67  | 55  | 46  | 40  | 53  | 45  | 40  | 51  | 45  | 39  | 50  | 44  | 39  | 37  |
| 7                                                                                                                          | 64  | 51  | 42  | 36  | 63  | 50  | 41  | 35  | 48  | 41  | 35  | 47  | 40  | 35  | 45  | 39  | 35  | 33  |
| 8                                                                                                                          | 60  | 46  | 38  | 32  | 58  | 45  | 37  | 32  | 44  | 37  | 31  | 43  | 36  | 31  | 42  | 35  | 31  | 29  |
| 9                                                                                                                          | 56  | 42  | 34  | 28  | 54  | 42  | 34  | 28  | 41  | 33  | 28  | 39  | 33  | 28  | 38  | 32  | 28  | 26  |
| 10                                                                                                                         | 52  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 37  | 30  | 26  | 37  | 30  | 25  | 36  | 30  | 25  | 24  |

**NOTE:** An asymmetry correction has been applied to the beam distribution of this measurement in order to accurately calculate UGR.

