

# IESNA LM79 - 2008 Test Report

Photometric testing and evaluation in accordance with LM79-2008

|                             |                                                                        |
|-----------------------------|------------------------------------------------------------------------|
| <b>Report prepared for:</b> | R. STAHL Schaltgeräte GmbH<br>Nordstrasse 10<br>99427 Weimar / Germany |
| <b>Report number:</b>       | LM79-20240829-1013445 / 02                                             |

|                            |                                                              |
|----------------------------|--------------------------------------------------------------|
| <b>Sample tested:</b>      | 6002/4 GR.4   6402/4 GR.4<br>with clear cover, with diffuser |
| <b>Start date of test:</b> | 2024-08-29                                                   |
| <b>Manufacturer:</b>       | R. STAHL Schaltgeräte GmbH                                   |

|                            |                                                                                                                                                                                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Testing laboratory:</b> | ILEXA GbR<br>Werner-von-Siemens-Strasse 4a<br>98693 Ilmenau / Germany<br><br>Tel.: (+49) 3677 / 466 33 0<br>Fax: (+49) 3677 / 466 33 14<br>Internet: <a href="http://www.ilexa.de">www.ilexa.de</a> |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                          |                                                                                                                      |
|--------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Testing location:</b> | Technische Universität Ilmenau<br>Fachgebiet Lichttechnik<br>Professor-Schmidt-Strasse 26<br>98693 Ilmenau / Germany |
|--------------------------|----------------------------------------------------------------------------------------------------------------------|

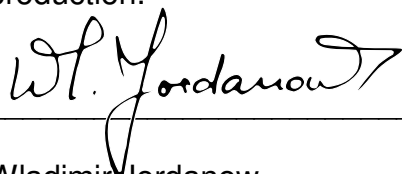
# Table of contents

|      |                                     |    |
|------|-------------------------------------|----|
| 1.   | Scope of testing.....               | 3  |
| 2.   | Test method.....                    | 3  |
| 3.   | Description of test sample.....     | 4  |
| 3.1. | General information.....            | 4  |
| 3.2. | Manufacturer specifications.....    | 4  |
| 3.3. | Pictures test sample.....           | 5  |
| 4.   | Measurement results.....            | 6  |
| 5.   | Results goniophotometer.....        | 7  |
| 5.1. | Candela plots.....                  | 7  |
| 5.2. | Illuminance plots.....              | 9  |
| 6.   | Results spectroradiometer.....      | 10 |
| 6.1. | Relative spectral distribution..... | 10 |
| 6.2. | Chromaticity diagram.....           | 11 |
| 6.3. | Color calculation.....              | 12 |
| 7.   | List of testing equipments.....     | 13 |

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Wladimir Jordanow  
ILEXA GbR president

## 1. Scope of testing

Photometric and electrical testing in accordance with IESNA LM 79-2008 IES (Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products).

**Start date of test:** 2024-08-29

**Report and test prepared by:** Kranhold / ILEXA GbR

## 2. Test method

Testing is performed in accordance with the procedures outlined in IESNA LM79-2008. The testing location is a temperature - controlled, draft free photometric laboratory.

All measurements are made using the goniophotometer / spectroradiometer test method.

### 3. Description of test sample

#### 3.1. General information

|                  |                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------|
| Sample received: | 2024-08-21                                                                                                  |
| Manufacturer:    | R. STAHL Schaltgeräte GmbH<br>Business Unit Light and Signaling<br>Nordstrasse 10<br>99427 Weimar / Germany |
| Product type:    | Luminaire                                                                                                   |
| Sample tested:   | 6002/4 GR.4   6402/4 GR.4<br>with clear cover, with diffuser                                                |
| Model number:    | WE24-08-13<br>6500K CRI 90                                                                                  |
| Driver:          | internal                                                                                                    |
| Fitted with:     | LED BIN F 1Q K                                                                                              |

**Dimensions of luminaire [mm]:**

|        |      |          |     |
|--------|------|----------|-----|
| Length | 1312 | Diameter | -/- |
| Width  | 183  | Height   | 128 |

**Dimensions of luminous area [mm]:**

|          |      |             |    |
|----------|------|-------------|----|
| Length   | 1285 | Height C0   | 58 |
| Width    | 145  | Height C90  | 58 |
| Diameter | -/-  | Height C180 | 58 |
|          |      | Height C270 | 58 |

#### 3.2. Manufacturer specifications

|                       |              |
|-----------------------|--------------|
| Rated power [W]:      | -/-          |
| Rated voltage [V]:    | 151...240 AC |
| Rated current [A]:    | -/-          |
| Rated frequency [Hz]: | 50...60      |

### 3.3. Pictures test sample

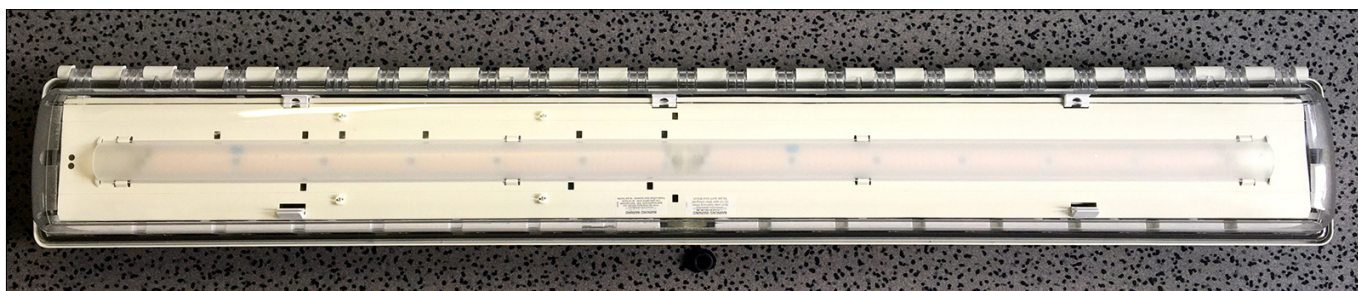


Figure 3.1: Test sample – general view

WE24-08-13 6002/4 & 6402/4 GR.4  
6500K CRI90, LED BIN F 1Q K

Figure 3.2: Test sample ID

## 4. Measurement results

The results were obtained after stabilization of the sample in accordance with the requirements set forth in section 5.0 of IES LM79-2008.

|                                               | Goniophotometer | Spectroradiometer |
|-----------------------------------------------|-----------------|-------------------|
| Total luminous flux [lm]                      | 5400            | -/-               |
| Luminous efficacy [lm/W]                      | 155.6           | -/-               |
| Correlated color temperature (CCT) [K]        | -/-             | 6387              |
| Color rendering index (CRI – R <sub>a</sub> ) | -/-             | 94.6              |
| Color rendering index (CRI – R <sub>e</sub> ) | -/-             | 92.3              |
| Chromaticity (x / y)                          | -/-             | 0.3146 / 0.3327   |

**Table 4.1: Photometric results**

|                      |          |
|----------------------|----------|
| Input power [W]      | 34.70    |
| Input voltage [V]    | 229.6 AC |
| Input current [A]    | 0.161    |
| Input frequency [Hz] | 50.0     |

**Table 4.2: Electrical parameters**

|                                            |            |
|--------------------------------------------|------------|
| Orientation (burning position) during test | horizontal |
| Prior operation time [minutes]             | 10         |
| Stabilization time [minutes]               | 50         |
| Total operating time [minutes]             | > 180      |
| Ambient temperature [°C]                   | 25 ± 1     |

**Table 4.3: Additional parameters**

## 5. Results goniophotometer

### 5.1. Candela plots

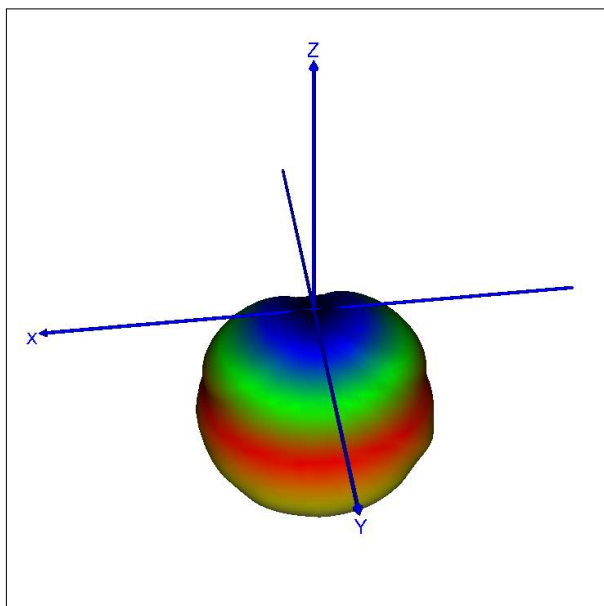


Figure 5.1: 3D - luminous intensity distribution

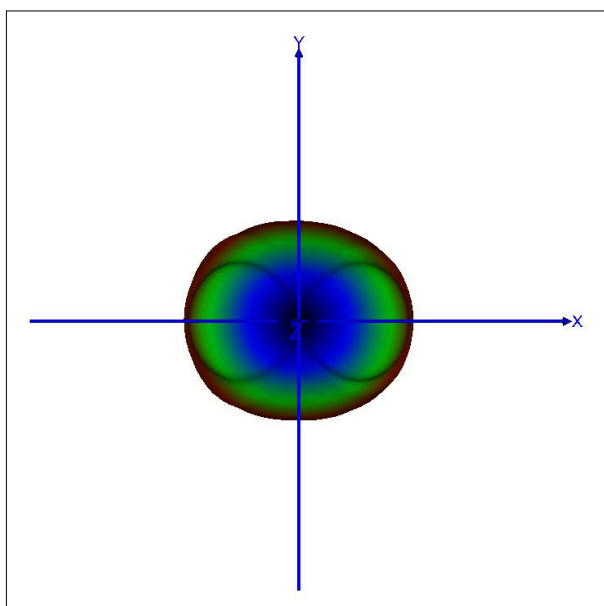
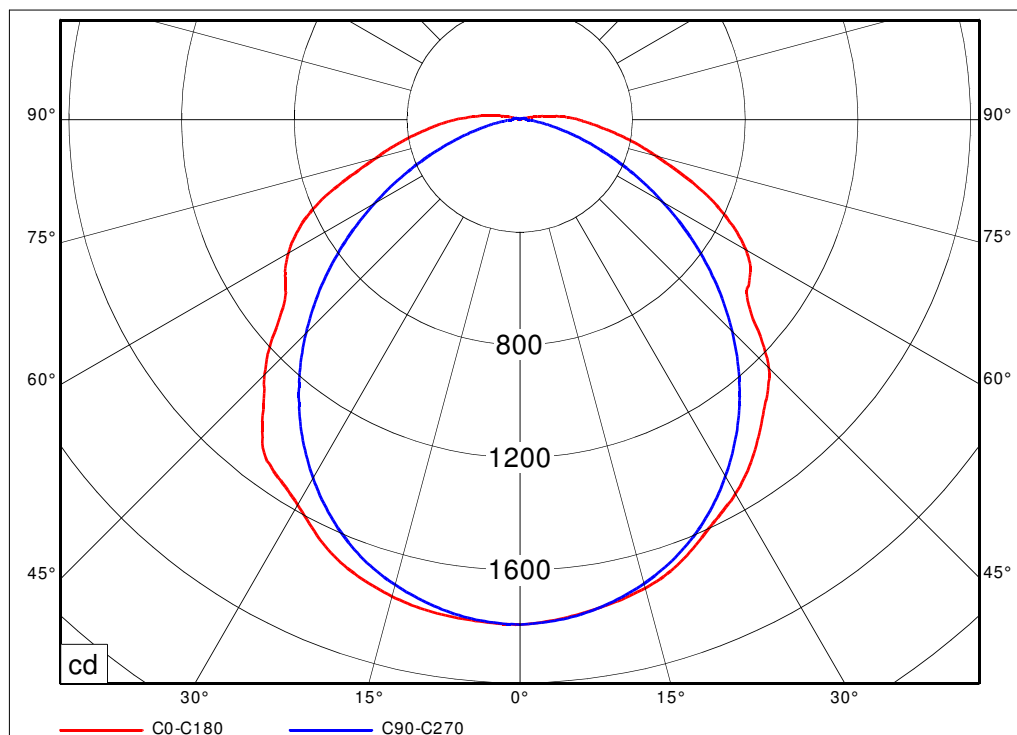
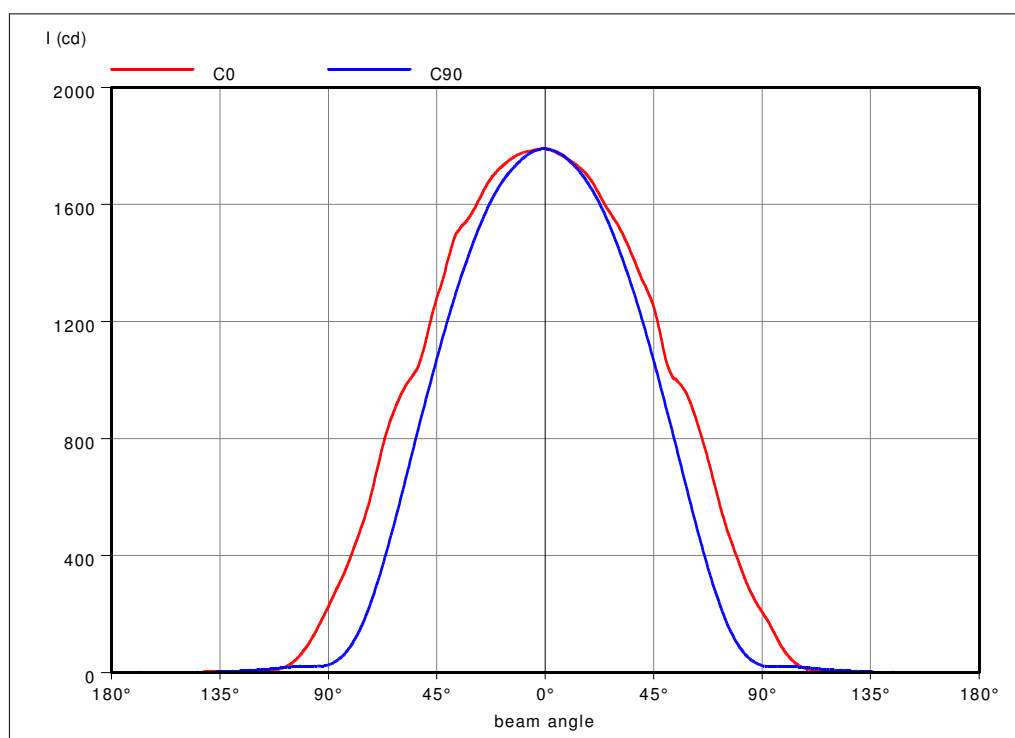


Figure 5.2: 3D - luminous intensity distribution



**Figure 5.3: Polar candela distribution**



**Figure 5.4: Cartesian candela distribution**

## 5.2. Illuminance plots

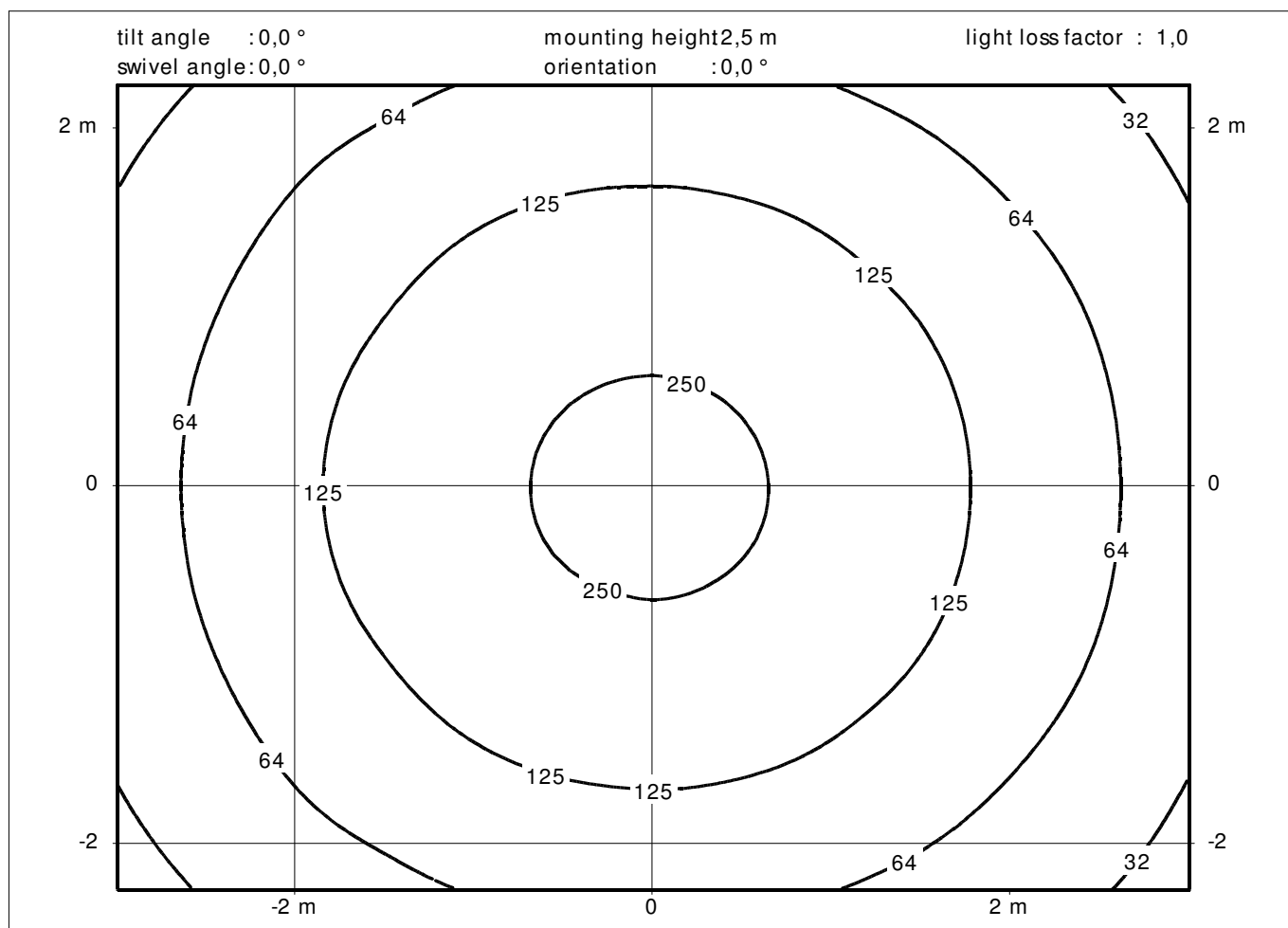


Figure 5.5: Isolux diagram

## 6. Results spectroradiometer

### 6.1. *Relative spectral distribution*

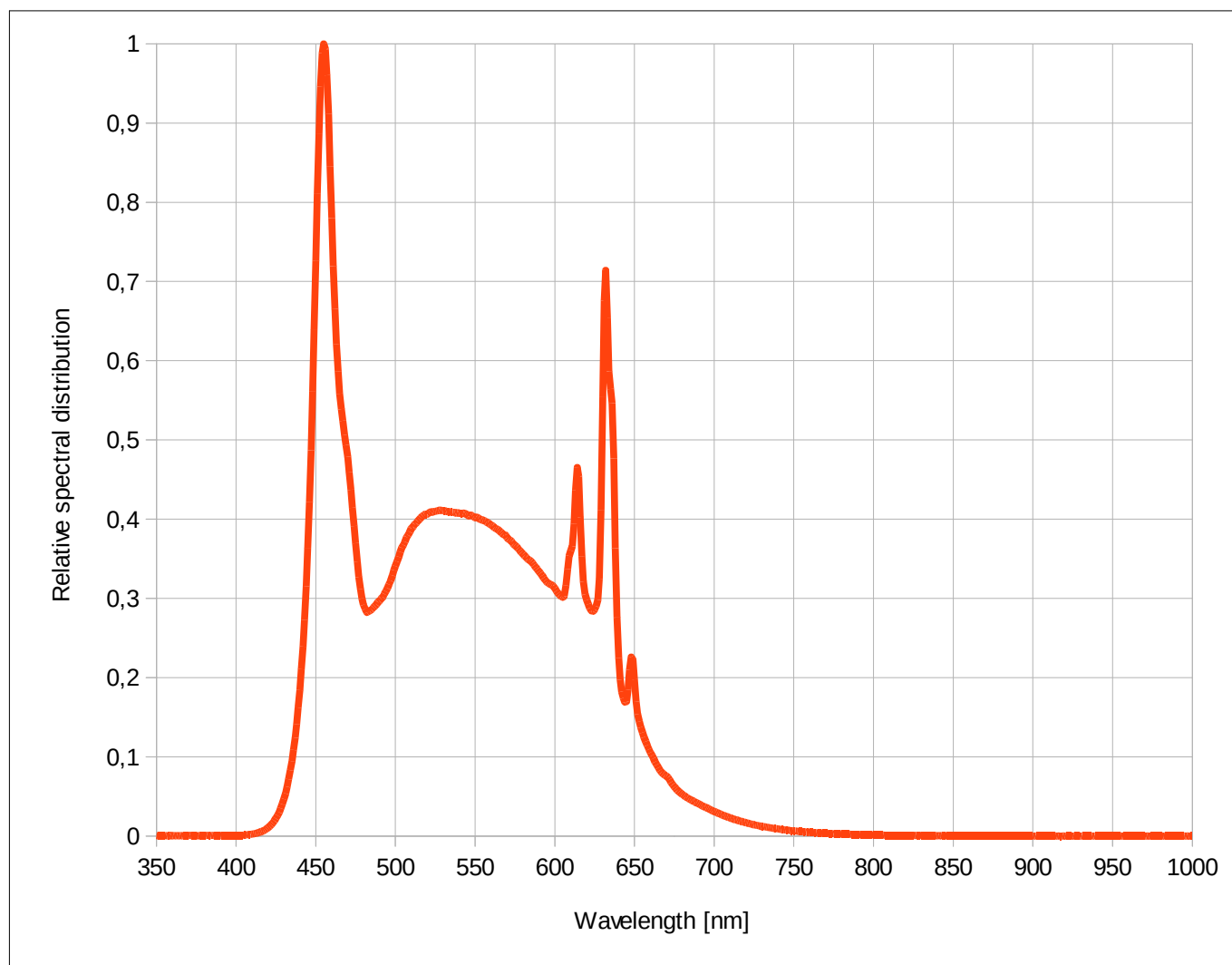


Diagram 6.1: Relative spectral distribution

## 6.2. Chromaticity diagram

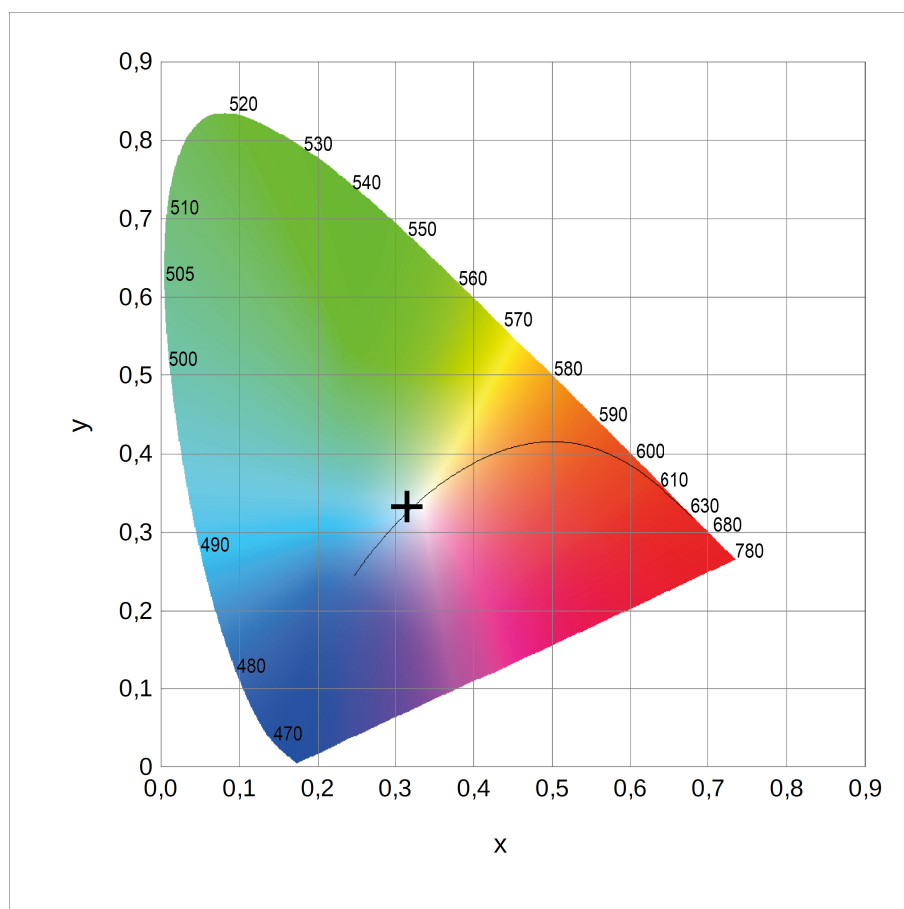


Diagram 6.2: Chromaticity diagram

| Tristimulus Value |        |
|-------------------|--------|
| x                 | 0.3146 |
| y                 | 0.3327 |

Table 6.1: Chromaticity coordinates

The location of the tristimulus coordinates is indicated by the black cross on the diagram.

### 6.3. Color calculation

| color sample | CRI         | color sample   | CRI         |
|--------------|-------------|----------------|-------------|
| R1           | 96.4        | R9             | 84.8        |
| R2           | 99.2        | R10            | 95.4        |
| R3           | 97.5        | R11            | 94.1        |
| R4           | 91.6        | R12            | 63.8        |
| R5           | 92.8        | R13            | 98.1        |
| R6           | 93.9        | R14            | 98.6        |
| R7           | 93.3        | R15            | 92.6        |
| R8           | 91.6        |                |             |
| <b>Ra</b>    | <b>94.6</b> | <b>CCT [K]</b> | <b>6387</b> |
| <b>Re</b>    | <b>92.3</b> |                |             |

Table 6.2: Color calculation – CRI R1-R15, Ra, Re and correlated color temperature

## 7. List of testing equipments

| Item                 | Manufacturer          | Model            | Calibration due |
|----------------------|-----------------------|------------------|-----------------|
| Goniophotometer      | TechnoTeam            | RiGo801          | yearly          |
| Power supply         | Statron               | Typ 1201         | N/A             |
| Power supply         | Statron AG            | BE2/01H-IP-R20-B | N/A             |
| Power supply         | Elgar                 | CW801            | N/A             |
| Power supply         | TDK-Lambda            | GEN60-12.5       | N/A             |
| Power supply         | Delta Elektronika     | ES 075-2         | N/A             |
| Digital power meter  | Yokogawa              | WT110            | N/A             |
| Digital power meter  | Yokogawa              | WT210            | N/A             |
| Digital Multimeter   | Fluke                 | 8845A            | N/A             |
| Digital oscilloscope | Tektronix             | TDS3014B         | N/A             |
| Spectroradiometer    | JETI                  | specbos 1211     | yearly          |
| Spectroradiometer    | JETI                  | specbos 1201     | yearly          |
| Spectroradiometer    | Optronic Laboratories | OL 750           | yearly          |
| Spectroradiometer    | UPRtek                | MK350S Premium   | yearly          |
| Integrating sphere   | GL Optic              | GLS 500          | N/A             |

**Table 7.1: Test instrumentation**