Optical Analysis

Customer:

Secto Design

Secto Design Oy
Kauppalantie 12
00270 Kauniainen, Finland

Research contract:

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Target:

Secto Owalo 7000 Luminaire with new LED module.

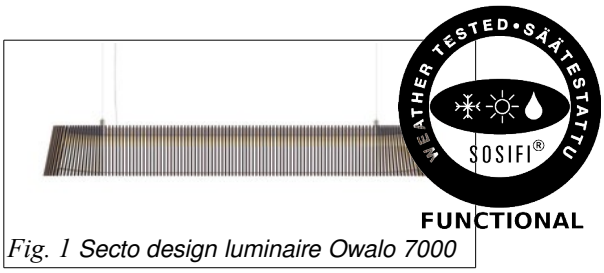

Fig. 1 Secto design luminaire Owalo 7000

Testing time:

The start of the test: November 22, 2013
The end of the test: November 27, 2013

Purpose of the test:

The goal of the measurement is to determine the light intensity distribution and total luminous flux (in lumen) of Owalo 7000 with new LED-module.

Test method:

Luminous flux is measured in a goniometer. The goniometer rotates the measured luminaire around horizontal axis of the luminaire (vertical angles, γ) in each C plane (= orientation around vertical axis of the luminaire). The detector measures illuminance at each orientation of the luminaire. Total luminous flux is calculated from this data.

Vertical angles, γ (around the horizontal axis): 0° – 160^0 , (No light at larger angles),
measurement in 2-degree increments
Horizontal angles (C-planes): 0° - 345° in 15-degree increments
Temperature: 21°C ± 1°C,

Validation of the test method:

Light intensity distribution gives information on how the light is spread around the luminaire. This information is used e.g. for modelling how the luminaire lights up a room.

Performed actions:

Light intensity distribution of the luminaire was measured.

The measurements were performed with a goniophotometer in the optical laboratory of SSL Resource Oy. The detector, which is a photometer measuring the illuminance of the light source in lux, is fixed in location. The luminaire is rotated around the vertical and horizontal axes. The orientation of different axes and C-planes are respectively shown in Fig. 2 and Fig. 3.

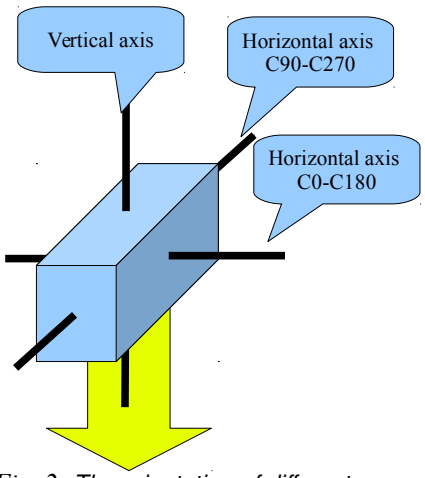

Fig. 2: The orientation of different axes of rotation.

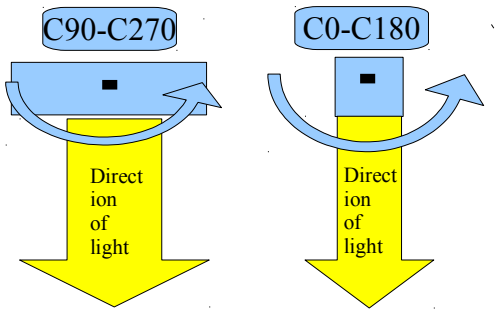

Fig. 3: The directions of C-planes (horizontal angles) C0-C180, C90-C270.

The intensity measurements in a C-plane were performed starting straight “below” the luminaire (vertical angle 0^0) and then increasing the vertical angle with two-degree increments. The vertical angle was increased until no light was detected any more. The similar measurements through the vertical angles were repeated at every C-plane from 0° to 345° increasing the horizontal angle with 15-degree increments.

The measured light distribution curve of the measured luminaire is shown in Fig. 4. The curve was determined using QLumEdit program. The values of the light distribution curves are scaled to correspond to 1000 lm from the light source (cd/1000 lm). The curves represent a cut in a plane through the luminaire and show the intensity of light emitted in directions C0-C180 and C90-C270. The centre of the light source is at the origin.

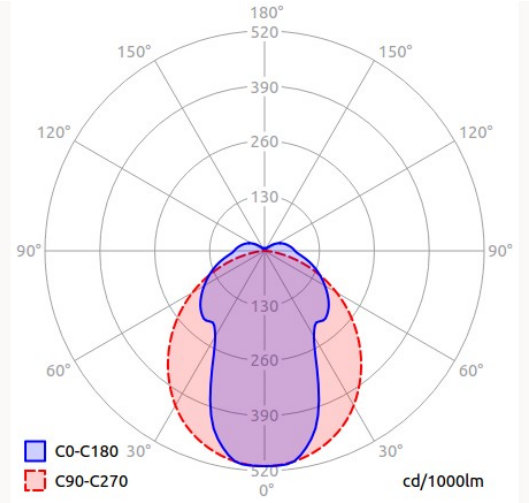

Fig. 4: The light distribution curve of the measured luminaire.

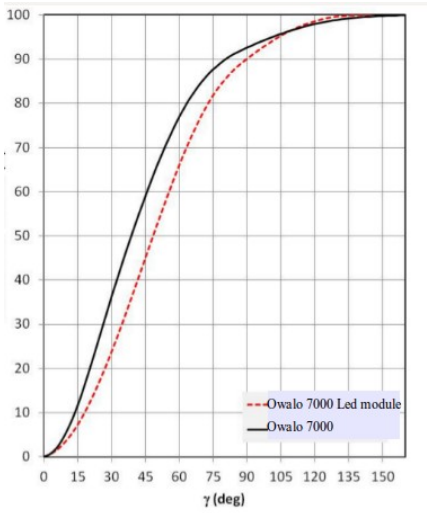

Fig. 5: Cumulative light flux (%) vs. Vertical angle.

The measurements give also values for total luminous flux (Φ_v), Input power (P_{in}), efficacy (η_v), downward flux fraction (DWFF), 50%-beam width (BA50) and 10%-beam width (BA10), which are shown in Table 1 for the measured luminaire Secto Owalo 7000 and for comparison for Secto Owalo LED module. The cumulative light flux vs. the vertical angle for the measured Owal 7000 and Owalo Led module alone are presented in Fig. 5.

Table 1: The performance characteristics of the measured luminaire.

Luminaire	Φv [lm]	Pin [W]	ηv [lm/W]	DWFF	BA50	BA10
Owalo 7000	1072	21.51	49.8	93%	54°/102°	194°/147°

Used equipment:
Illuminance: Goniophotometer with PRC Krochmann Luxmeter 110, calibrated 4.9.2012. Accuracy of the Luminous flux measurement is ±3.4 % (k = 2)
Input power: HP104 AC, calibrated 8.9.2012. Accuracy of the input power measurement is ±1.3 % (k = 2)

Analysis/Recommendations:

N/A

Conclusions:

The luminous intensity curves of Owalo 7000 with the new LED module is presented in Fig. 6. The cumulative luminous flux of Owalo 7000 and the Owalo LED module alone can be seen in Fig. 7.

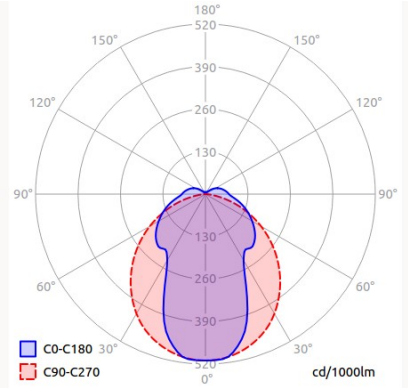

Fig. 6: The light distribution curve of Owalo 7000 with the new LED

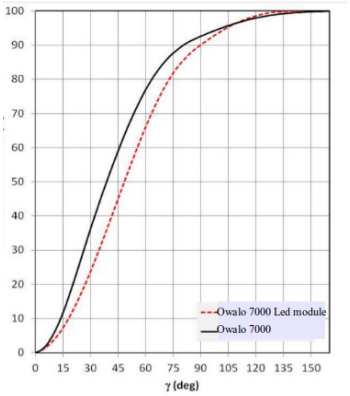

Fig. 7: Cumulative light flux (%) vs. Vertical angle.

Luminous flux (Φ_v), Input power (P_{in}), efficacy (η_v), downward flux fraction (DWFF), 50%-beam width (BA50) and 10%-beam width (BA10) are shown in Table 2 below.

Table 2: The performance characteristics of the Owalo 7000 luminaire .

Luminaire	Φv [lm]	Pin [W]	ηv [lm/W]	DWFF	BA50	BA10
Owalo 7000	1072	21.51	49.8	93%	54°/102°	194°/147°

Remarks:

Actions, operations and reporting are in accordance with IEC/ISO 17025 'General requirements for the competence of testing laboratories'.

This Executive Summary report is based on Comprehensive Test Report SectoDesignJuselius__tr281113AK.pdf.

Signatures:

Ari Kuusisto
Littoinen
18.11.2014

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