

## Optical Analysis

**Customer:**

Secto Design

Secto Design Oy  
Kauppalaantie 12  
02700 Kauniainen, Finland

**Research contract:**

ref.no: ta25042013AK.pdf

**Target:**

Secto Design luminaire, Owalo 7000 pendant luminaire (shown in Fig. 1).

Handmade design pendant. Crafted in Finland of PEFC-certified formpressed Finnish birch by highly skilled craftsmen. Uses the latest LED technology

Finishes of the shade:

Natural birch  
White laminated  
Black laminated  
Walnut veneer

Cable: 200 cm, heat-resistant clear cables  
+ 2 steel wires. White rectangular ceiling  
box.

Manufacturer: Secto Design  
Designer: Seppo Koho

**Fig. 1.** Owalo 7000. The tested luminaire  
was with black laminated finish.



**Testing time:**

The start of the test: 12<sup>th</sup> June, 2013

The end of the test: 15<sup>th</sup> August, 2013

**Purpose of the test:**

The goal of these measurements is to determine the light intensity distribution of the luminaire for lighting design purposes.

**Test method:**

The light intensity distribution of the luminaire is measured in a goniometer. The goniometer

moves a detector of a photometer around the luminaire in one vertical plane and records the illuminance. The luminaire can be rotated around the vertical axis (horizontal angles).

Vertical angles (around the horizontal axis):  $0^\circ - 180^\circ$ , measurement in five-degree increments

Horizontal angles (C-planes):  $0^\circ - 180^\circ$ , measurement in 15 degree increments

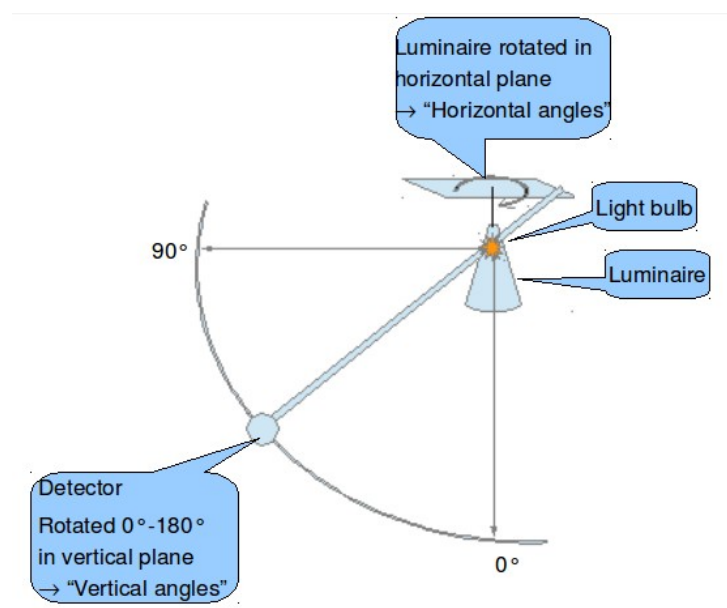
#### Validation of the test method:

The light intensity distribution curves provide the designer with important information about the way light is distributed from the luminaire towards e.g. the surrounding walls. This information can be used e.g. with DiaLux modelling software to model how the lighting changes the ambiance in a room.

#### Performed actions:

Light intensity distribution of Owalo 7000 with laminated birch slats was investigated. The lamp was equipped with a LED light source.

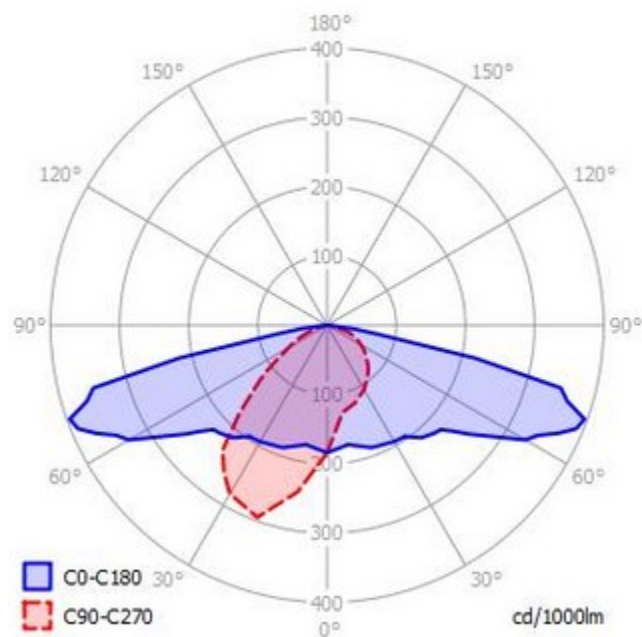
The test arrangement is shown schematically in Fig. 2. The detector of a photometer is mounted in a goniometer. The goniometer can be rotated in a vertical plane. The luminaire is installed in such a way that the centre of the light bulb is placed at the origin of the goniometer.



**Fig. 2.** Scheme of the test arrangement.

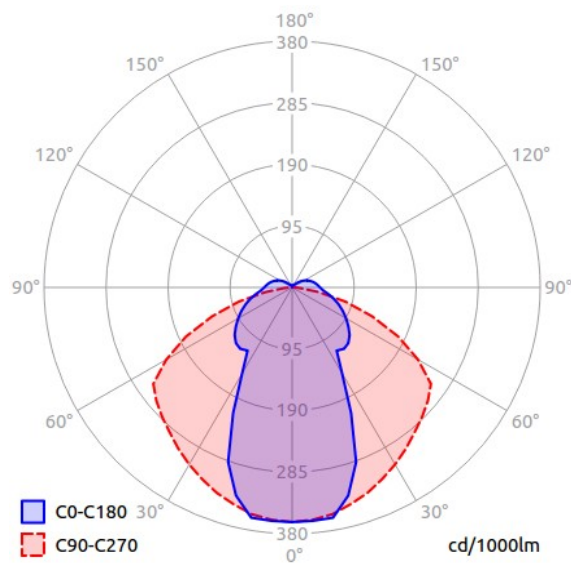
Luminaire was rotated in horizontal plane in 15 degree increments in the range of  $0^\circ - 90^\circ$ . The measurement in vertical angles was performed in five-degree increments in the range of  $0^\circ - 180^\circ$  in each of these horizontal angles.

Figure 3 shows an example of a light distribution curve. The diagram represents a cut in a plane through a luminaire or lamp and shows the intensity of light emitted in each direction. The centre of the light source is at the origin. The direction  $0^\circ$  is the downward direction and  $180^\circ$  is the upward direction. The straight radial lines in Fig. 3 indicate the angle of the light emitted while the circles are intensity contours. The intensity values of the light distribution curve are scaled to correspond to 1000 lm from the light source (cd/1000 lm). The real cd-value for a specific light bulb can be calculated by multiplying by the 1/1000 of the lumen-value of the bulb. Blue and red curves show light intensity distribution at perpendicular horizontal angles (=C-planes).



**Fig. 3.** Light intensity distribution curve. From ref. <http://sourceforge.net/projects/qlumedit/> (14.4.2013)

Light distribution curve of the Owalo 7000 luminaire is shown in Fig. 4. The curve was determined using QLumEdit program.



**Fig. 4.** Light distribution curve of Owalo 7000. Light distribution is shown in two perpendicular vertical planes (C-planes).

**Used equipment:**

Goniometer, No. 59

Photometer, No. 50, calibrated 28<sup>th</sup> May, 2013, calibration is valid

**Analysis/Recommendations:**

N/A

**Conclusions:**

The light intensity curve of the luminaire under test was determined (see **Fig. 4**).

**Remarks:**

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

This review report is based on research report SectoDesignJuselius\_\_tr010513AK.pdf.

**Signatures:** 

Riitta Perälä

Littoinen 10<sup>th</sup> June, 2014

