



**Lamp measurement report – 17 Jan 09 for Line Lite Int.**

**Line Lite EcoLED PS60 WW SHARP 8W**





## Lamp measurement report – 17 Jan 09 for Line Lite Int.

### Summary measurement data

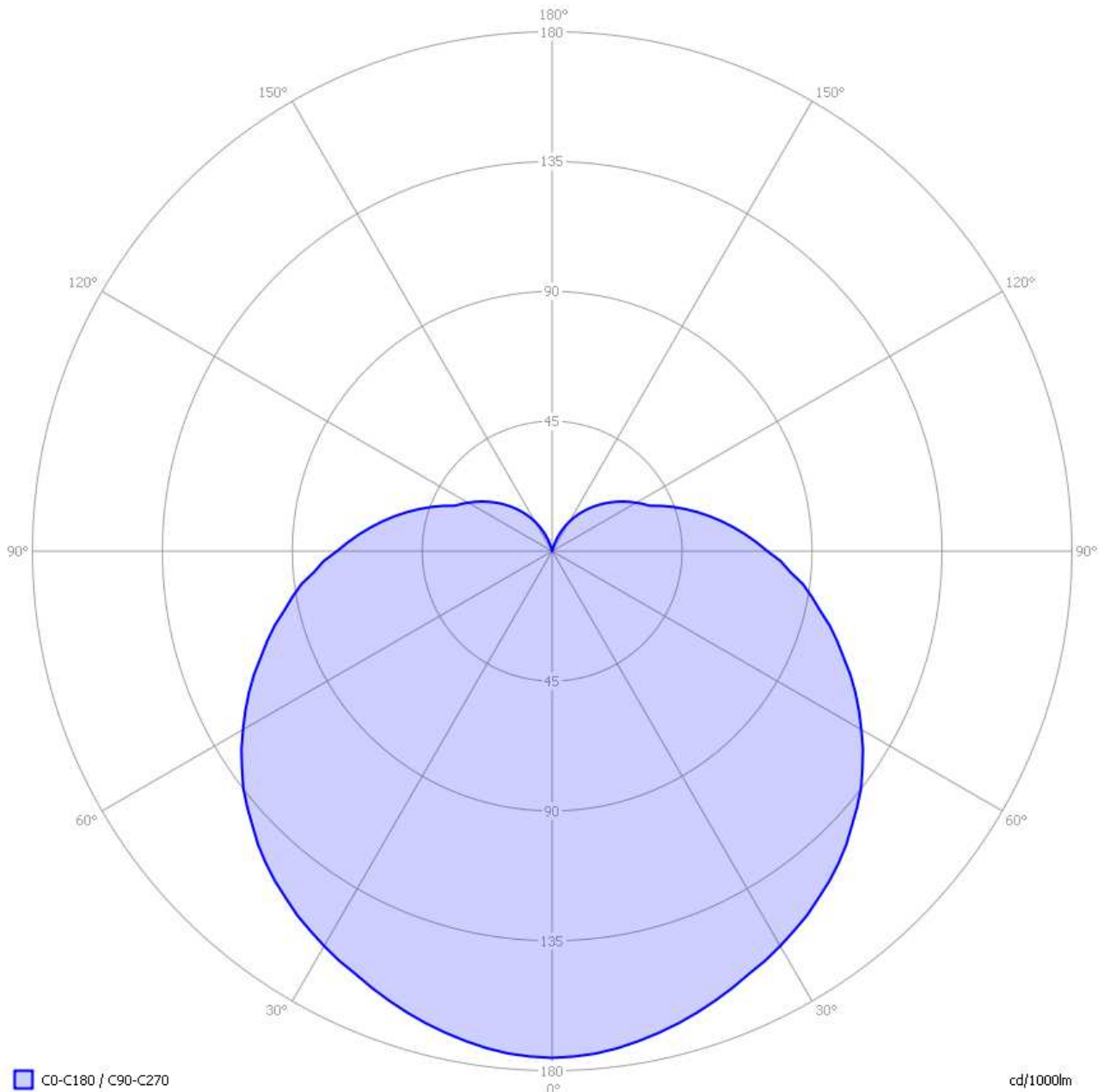
parameter	meas. result	remark
Color temperature	2881 K	Warm white
Luminous intensity $I_v$	48 Cd	
Beam angle	165 deg	A wide beam.
Power P	7.3 W	
Power Factor	0.52	For every 1 kWh net power consumed, there has been 1.6 kVAhr for reactive power.
Luminous flux	270 lm	
Luminous efficacy	37 lm/W	
CRI_Ra	75	Color Rendering Index.
Coordinates chromaticity diagram	x=0.4377 and y=0.3918	
Fitting	E27	
D x H external dimensions	60 x 102 mm	External dimensions of the light bulb.
Diameter luminous area	60 mm	Dimensions of the luminous area (used in Eulumdat file). This is the diameter of the bulb.
General remarks		<p>The ambient temperature during the whole set of measurements was 23 - 28 deg C.</p> <p>Warm up effect: the illuminance drops about 15 % due to the warming up of the led.</p> <p>Voltage dependency: consumed power and illuminance are linearly dependent from the light bulb voltage.</p> <p>Note: according to the supplier, these light bulbs have the Kema Keur label.</p>



## Lamp measurement report – 17 Jan 09 for Line Lite Int.

### Eulumdat light diagram

An interesting graph is the light diagram, indicating the intensity in the C0-C180 and the C90-C270 plane. This light diagram below comes from the program Qlumedit, that extracts these diagrams from an Eulumdat file.



*The light diagram giving the radiation pattern.*



## Lamp measurement report – 17 Jan 09 for Line Lite Int.

It indicates the luminous intensity around the light bulb. This light diagram is symmetrical around the z-axis.

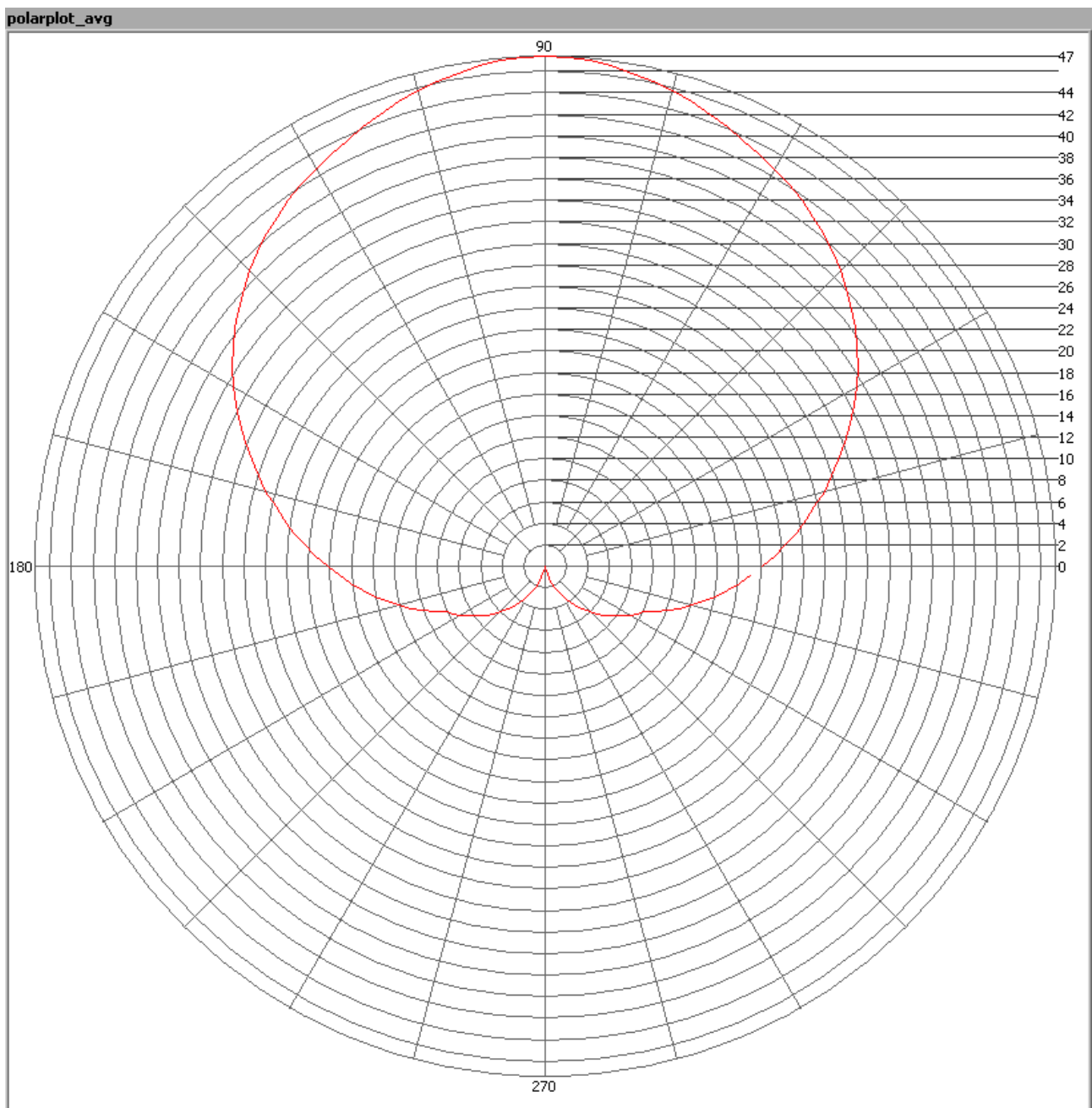
The unit is Cd/1000lm, meaning the intensity in Cd assuming there would be 1000 lumen in the measured light bulb. This enables comparing different types of light bulbs.

### **Illuminance $E_v$ at 1 m distance, or luminous intensity $I_v$**

Herewith the plot of the *averaged* luminous intensity  $I_v$  as a function of the inclination angle with the light bulb.



## Lamp measurement report – 17 Jan 09 for Line Lite Int.



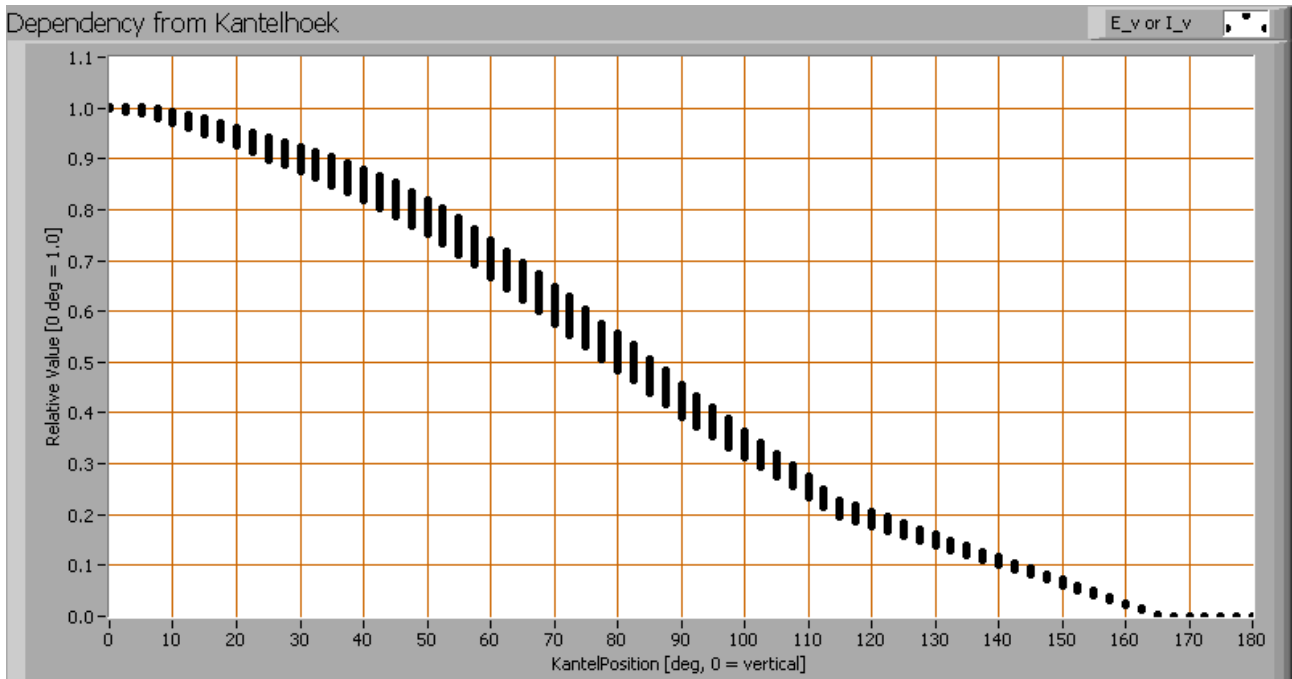
*The radiation pattern of the light bulb.*

This radiation pattern is the same as the one given earlier. This is because in this light spot's case, the radiation pattern is symmetric around the z-axis, meaning that the averaged pattern given here is the same as the extraction of the Eulumdat file.

These averaged values are used (later) to compute the lumen output.



## Lamp measurement report – 17 Jan 09 for Line Lite Int.



*Intensity data of every measured turn angle at each inclination angle.*

This plot shows per inclination angle the intensity measurement results for each turn angle at that inclination angle. So at 70 degrees inclination angle, all the measurement results of illuminance for all measured turn angles are in the range of 57-65 % of the illuminance value at 0 degrees inclination angle.

When using the average values per inclination angle, the beam angle can be computed, being 165 degrees.

### Luminous flux

With the averaged illuminance data at 1 m distance, taken from the graph showing the averaged radiation pattern, it is possible to compute the luminous flux.

The result of this computation for this light spot is a luminous flux of 270 lm.

### Luminous efficacy

The luminous flux being 270 lm, and the power of the lightbulb being 7.3 W, yields a luminous efficacy of 37 lm/W.

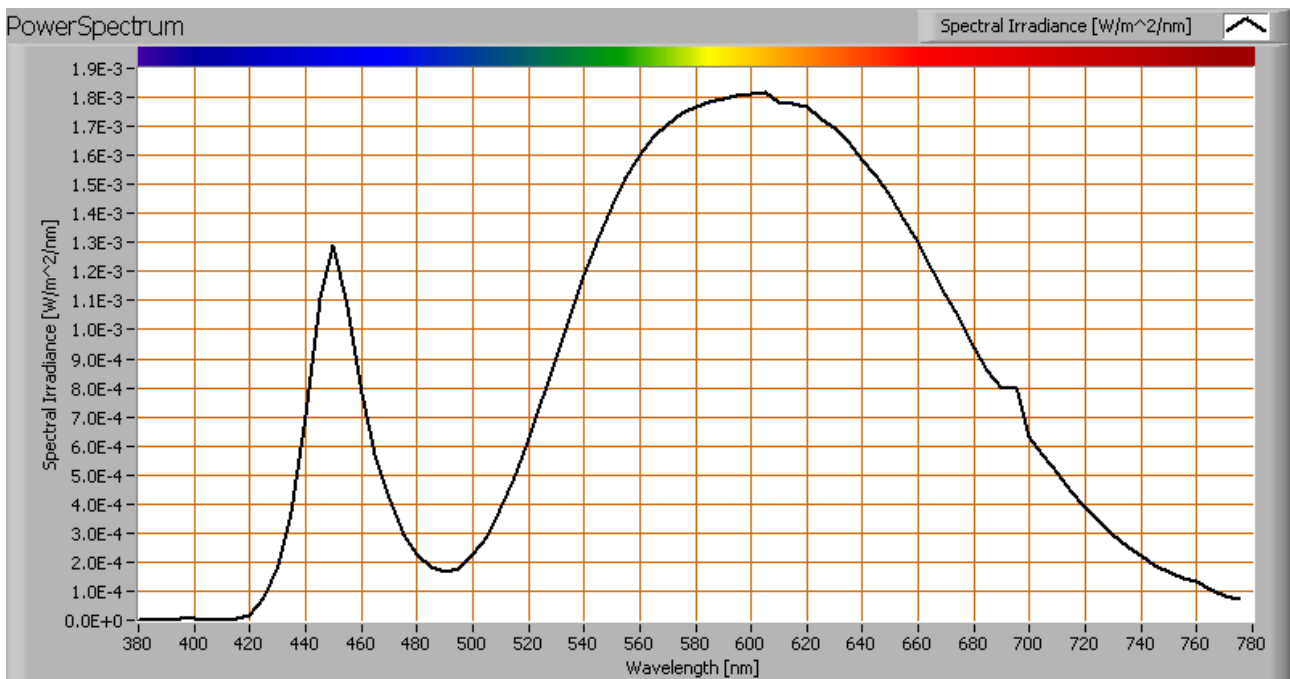
A power factor of 0.52 means that for every 1 kWh net power consumed, a reactive component of 1.6 kVAr was needed.



## Lamp measurement report – 17 Jan 09 for Line Lite Int.

Light bulb voltage	230 V
Light bulb current	61 mA
Power P	7.3 W
Apparent power S	14.0 VA
Power factor	0.52

### Color temperature and Spectral power distribution



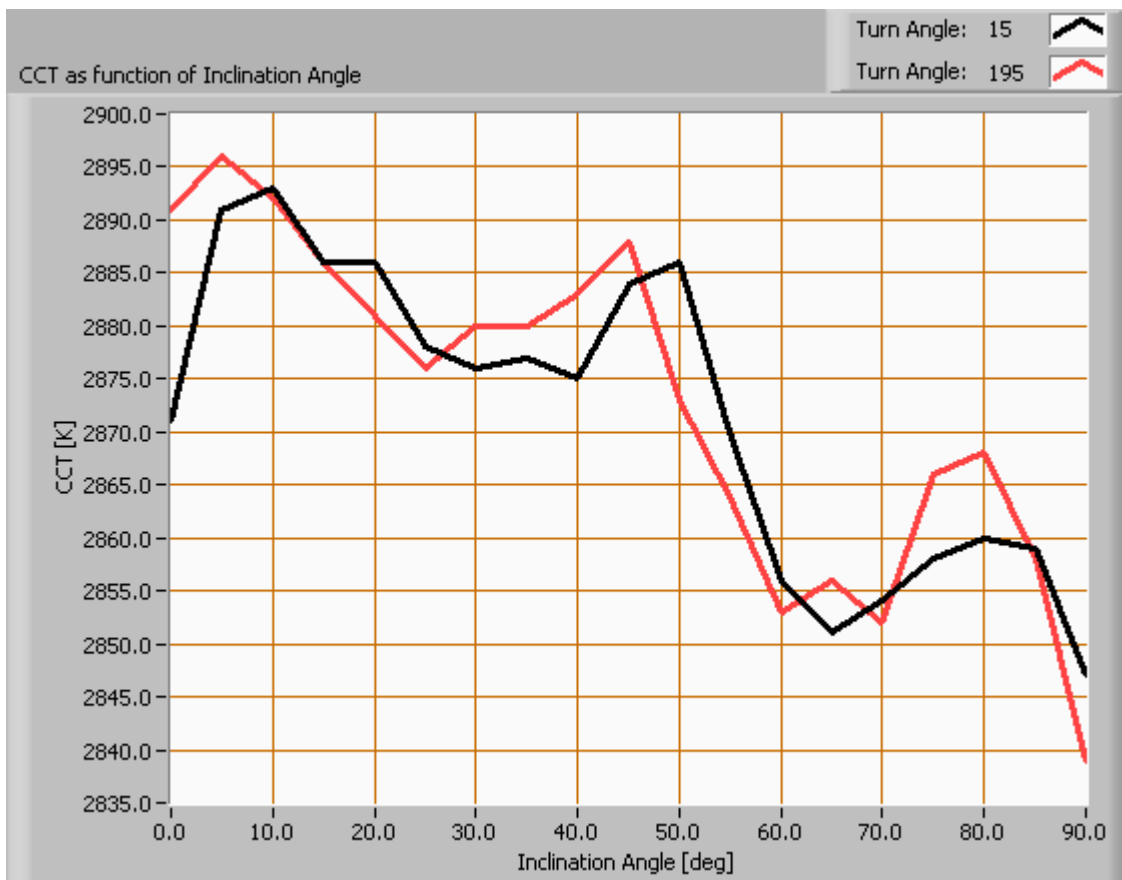
*The spectral power distribution of this light bulb.*

The measured color temperature is about 2900 K which is warm white.

This color temperature is measured straight underneath the light bulb. Below a graph showing the color temperature for different inclination angles.



## Lamp measurement report – 17 Jan 09 for Line Lite Int.



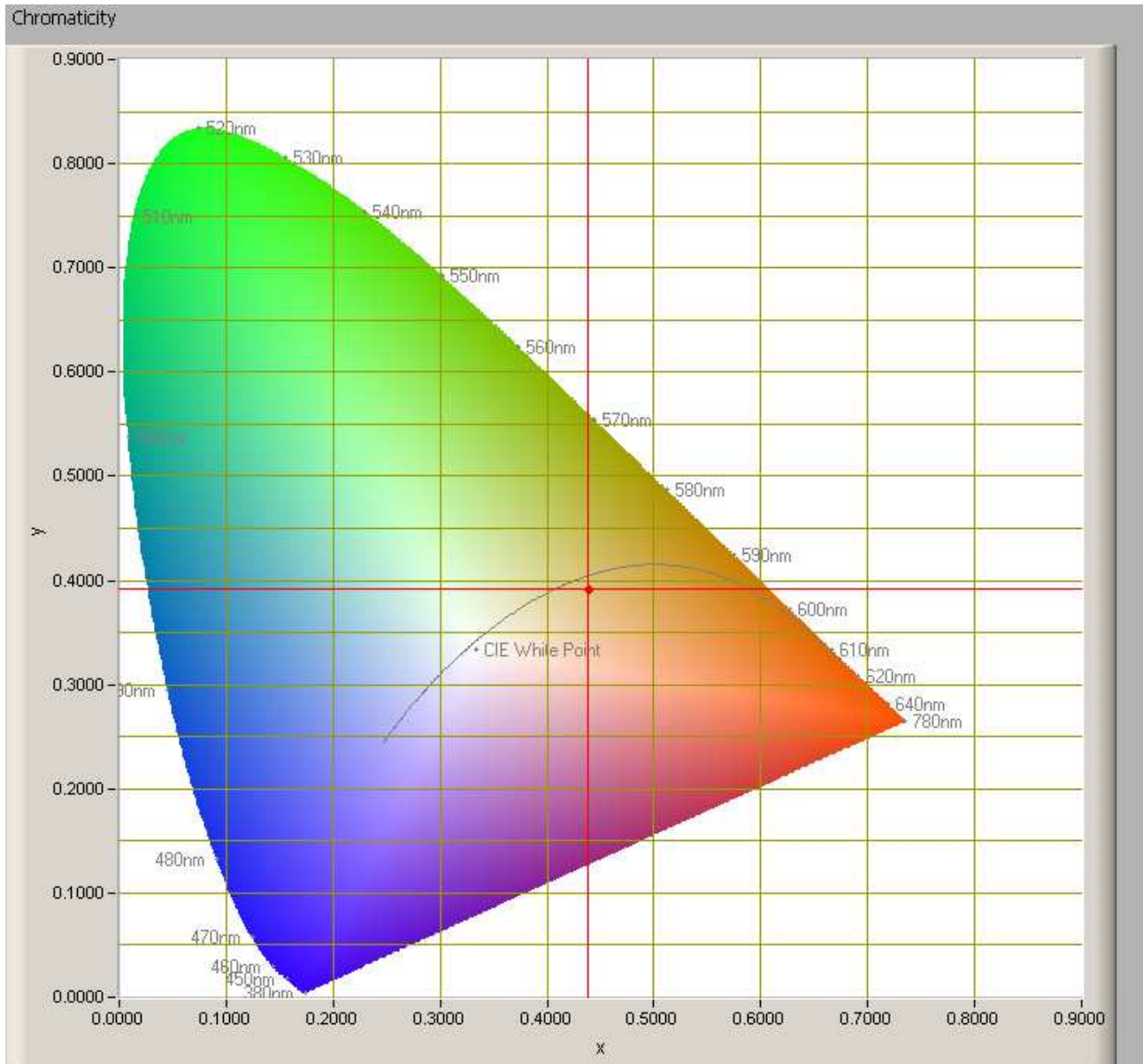
*Color temperature as a function of inclination angle.*

The maximum value of inclination angle is 90 degrees. Beyond that value there is virtually no intensity anymore. The color temperature first remains constant and then decreases slightly to about 1 % less than its value at 0 degrees.



## Lamp measurement report – 17 Jan 09 for Line Lite Int.

### Chromaticity diagram



*The chromaticity space and the position of the lamp's color coordinates in it.*

The light coming from this lamp is at a distance from the Planckian Locus (the black path in the graph).

Its coordinates are  $x=0.4377$  and  $y=0.3918$ .

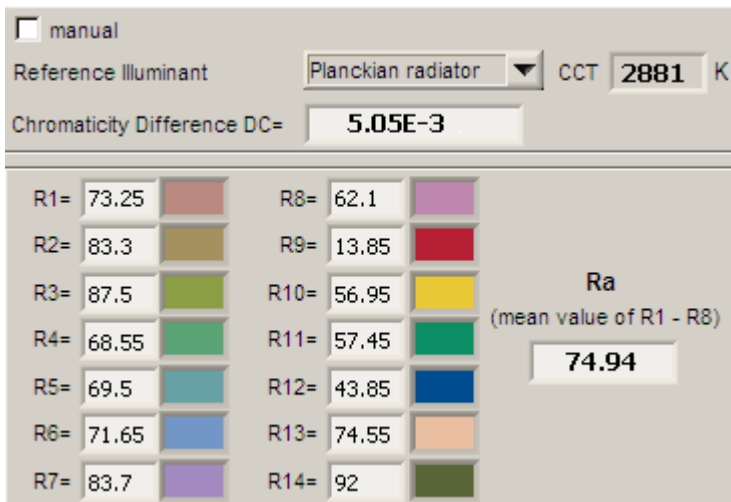


## Lamp measurement report – 17 Jan 09 for Line Lite Int.

### Color Rendering Index (CRI) or also Ra

Herewith the image showing the CRI as well as how well different colors are represented (rendered). The higher the number, the better the resemblance with the color when a black body radiator would have been used (the sun, or an incandescent lamp).

Each color has an index  $R_x$ , and the first 8 indexes ( $R_1 .. R_8$ ) are averaged to compute the  $R_a$  which is equivalent to the CRI.



*CRI of the light of this lightbulb.*

The value of 75 is lower than 80 which is considered a minimum value for indoor usage.

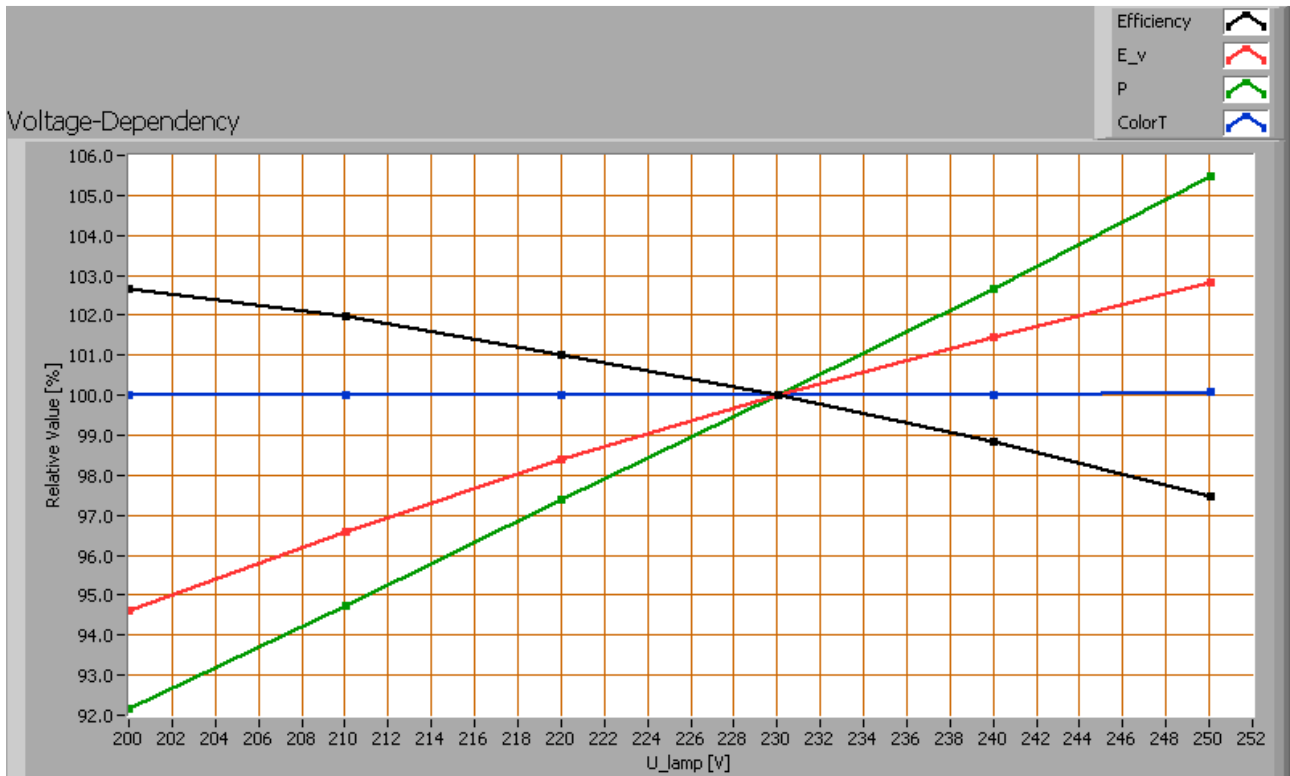
Note: the chromaticity difference is 0.0051 indicates the distance to the Planckian Locus. Its value is lower than 0.0054, which means that the calculated CRI result is meaningful.



## Lamp measurement report – 17 Jan 09 for Line Lite Int.

### Voltage dependency

The dependency of a number of lamp parameters on the lamp voltage is determined. For this, the lamp voltage has been varied and its effect on the following lamp parameters measured: illuminance  $E_v$  [lx], color temperature CT or correlated color temperature CCT [K], the lamp power  $P$  [W] and the luminous efficacy [lm/W].



*Lamp voltage dependencies of certain light bulb parameters, where the value at 230 V is taken as 100 %.*

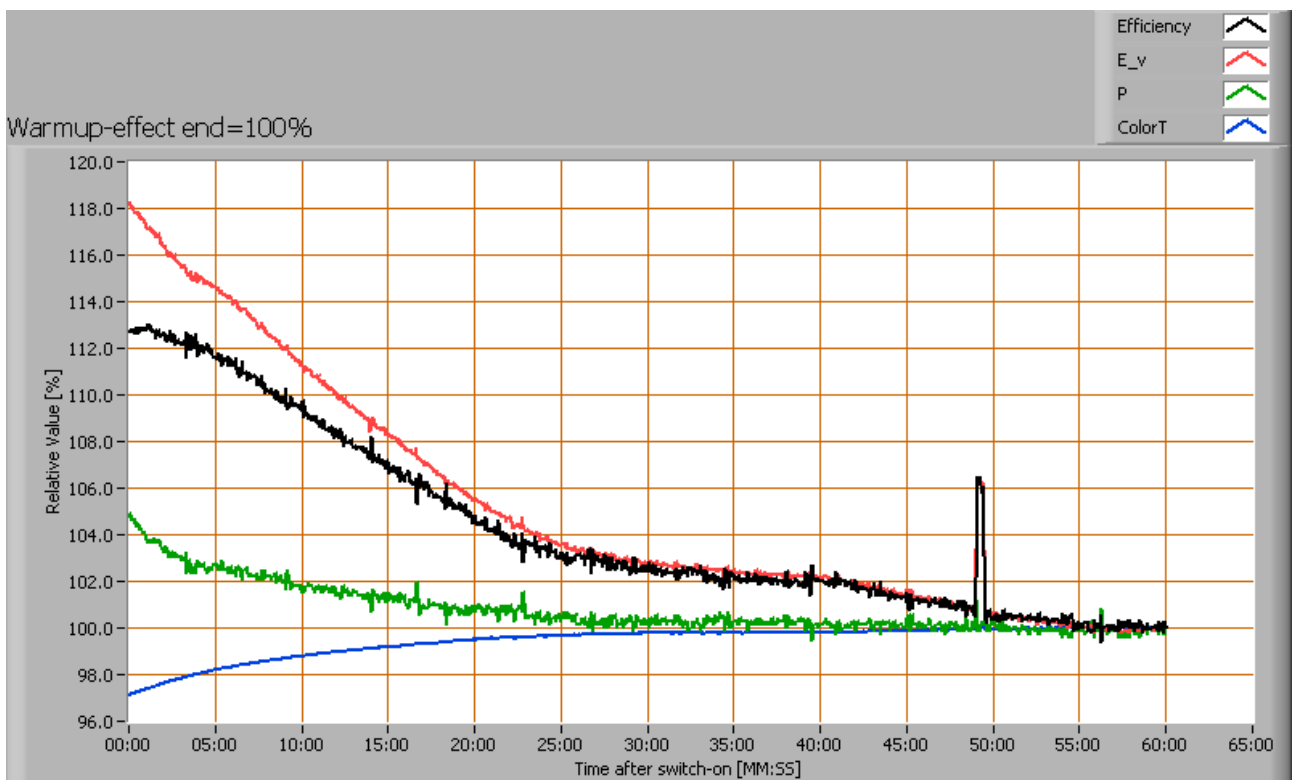
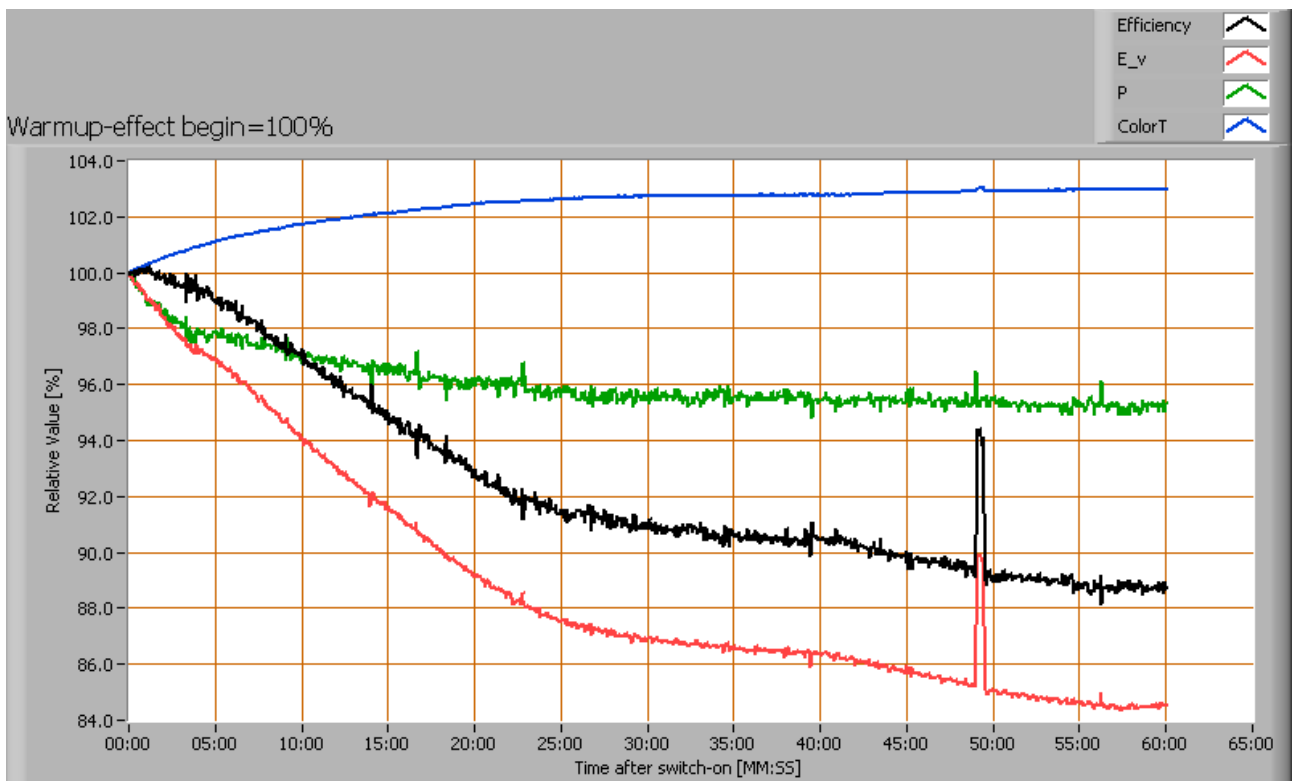
The consumed power and the illuminance depend linearly on the light bulb voltage. When the voltage around 230 V varies with + and - 5 V, then the illuminance varies with + and - 1 %, which is not visible.

### Warm up effects

After switch on of a cold lamp, the effect of heating up of the lamp is measured on illuminance  $E_v$  [lx], color temperature CT or correlated color temperature CCT [K], the lamp power  $P$  [W] and the luminous efficacy [lm/W].



## Lamp measurement report – 17 Jan 09 for Line Lite Int.





## **Lamp measurement report – 17 Jan 09 for Line Lite Int.**

*Effect of warming up on different light bulb parameters. At top the 100 % level is put at begin, and at bottom at the end.*

The illuminance decreases about 15 % due to the warming up of the lamp, which takes about 45 minutes.

There is a small peak for a short time, in the illuminance. It is unclear why.

### **Disclaimer**

The information in this OliNo report is created with the utmost care. Despite of this the information can have inaccuracies. OliNo cannot be held liable for the content of the information in this report nor for the consequences of its use. The data in this report is not legally binding.