

Poster

The Experience of Ambient Light from Common Light Sources with Different Spectral Power Distribution – Light Emitting Diodes (LED) vs. 3-Phosphorus Fluorescent Tubes (T5)

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Abstract

This abstract shows a comparison of the subjective experience between indirect light from LED and T5-fluorescent tubes at different ambient light levels in an indoor office environment. The test was conducted as a laboratory study containing 50 subjects, ranging from 18 to 68 years of age. The experience of the environment was measured by using semantic scales. Furthermore the experience of the lighting situation was conducted by means of semantic scales.

The aim of the present study was to investigate whether ambient light in the normal field of view was experienced as brighter at luminance levels of 100 and 300cd/m² on the walls comparing LED Fortimo vs. T5 fluorescent tubes at 4000K.

Two hypotheses were stated:

- Ambient light from the LED may be experienced more bright than from T5
- Ambient luminance levels up to 300cd/m² may not be experienced as glaring.

Results were investigated in terms of:

- Room appearance
- Experienced brightness
- Experienced lighting quality
- Biological aspects – hormone analyses

Results

Results show that the experienced brightness from LED was significant higher in both ambient light levels and there was also a tendency to experience light quality as better from LED as better than from the T5 tubes at 100cd/m².

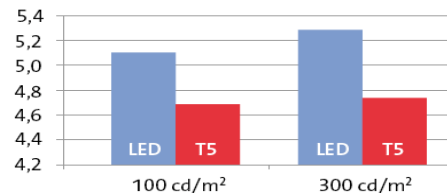
Room appearance

The two test rooms in the two different ambient lighting conditions were perceived

quite neutral. The rooms were perceived neither pleasant nor unpleasant, neither complex nor much unified and no significant differences were found between perceptions of the light sources at same CRI and CCT.

Experienced brightness

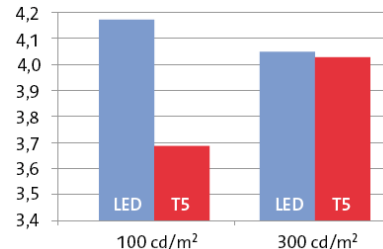
In general the results show that the experienced brightness from LED was significant higher in both ambient light levels than from T5 tubes. Differences in experienced light intensity between T5 4000K vs. LED 4000K, CRI=80 at different ambient light levels, $p=.034$. Furthermore, the difference in brightness increased at the highest ambient light level.



Experienced brightness on front walls

Experienced lighting quality

There was a tendency to experience the light from LED as better than from the T5 tubes ($p=.07$) at 100cd/m². However, the lighting quality was reduced for LED at the higher ambient light level, although not significant.



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