Occupant response to different correlated colour temperatures of white LED lighting - DTU Orbit (19/11/2018)

**Occupant response to different correlated colour temperatures of white LED lighting**

Correlated Colour Temperature (CCT) of lighting may affect not only occupant visual perception, but also other indoor environment perceptions, such as perceptions of the thermal environment or the air quality. This study aimed at quantifying the association between CCT of white LED lighting and subjective perceptions and performance at operative temperatures at the upper and lower borders and in the middle of the comfort range. Higher CCT was significantly associated with decreasing thermal sensation, but only at the thermally neutral condition. Female subjects responded stronger to changes in CCT than male subjects. Under all temperature conditions, CCT was clearly associated with the perceived brightness of the light, and at 22 °C also with the perceived air quality and with subjectively assessed alertness. CCT had no effect on the measured performance of a d2 task. At 22 °C, the observed decrease in thermal sensation when CCT went from 2700 K to 6200 K was equivalent to a difference in operative temperature of 1.7 °C. With an assumed neutral CCT of 4500 K (middle of range), a decreased heating set point in an office building, corresponding to an equivalent shift in CCT from 4500 K to 2700 K, resulted in a reduction of around 8% of the building's total annual energy use. However, this assumes ideal conditions without influence from daylight, light from PC monitors, or coloured surfaces and other potentially disturbing factors.

**General information**

State: Published
Organisations: Department of Civil Engineering, Indoor Environment, Department of Photonics Engineering, Technical University of Denmark, Diode Lasers and LED Systems, Aalborg University
Contributors: Toftum, J., Thorseth, A., Markvart, J., Logadóttir, Á.
Pages: 258-268
Publication date: 1 Oct 2018
Peer-reviewed: Yes

**Publication information**

Journal: Building and Environment
Volume: 143
ISSN (Print): 0360-1323
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 5.22 SJR 2.169 SNIP 2.534
Web of Science (2017): Impact factor 4.539
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.51 SJR 1.998 SNIP 2.215
Web of Science (2016): Impact factor 4.053
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.37 SJR 2.067 SNIP 2.463
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.14 SJR 1.887 SNIP 2.742
Web of Science (2014): Impact factor 3.341
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.57 SJR 1.547 SNIP 2.551
Web of Science (2013): Impact factor 2.7
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.06 SJR 1.293 SNIP 2.857
Web of Science (2012): Impact factor 2.43
ISI indexed (2012): ISI indexed yes
Keywords: Illumination, Indoor environment, Lighting, Temperature, Thermal perception

DOIs: 10.1016/j.buildenv.2018.07.013

Source: Scopus

Source-ID: 85050077069

Research output: Research - peer-review > Journal article – Annual report year: 2018