

White Light at Night: Beyond Visual Performance

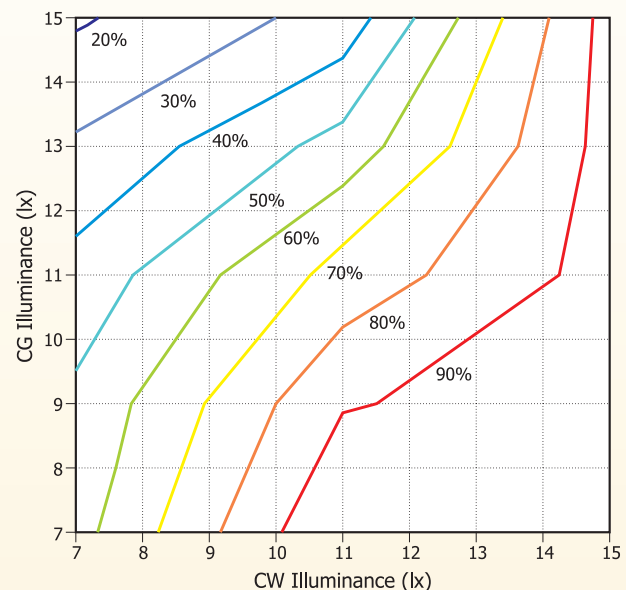
The LRC has conducted over 25 studies in the past decade looking at the impact of light level and spectrum on visual detection and response time at night. A unified system of photometry was developed from those studies and was used successfully to make predictions of visual performance while driving at night (Akashi et al., 2007).



Subjects evaluated perceived brightness and sense of security under varying lighting conditions using ceramic metal halide lamps (foreground) and high-pressure sodium lamps (background).

In addition to visual performance for driving safety, other aspects of nighttime lighting are also important. Pedestrians share the nighttime environment with drivers and their appreciation of electric lighting is not necessarily based upon visual performance, but rather their cognitive appraisals of security and comfort.

Philips Lighting wanted to know what factors affect subjective impressions of lighting quality at night, including sociability, facial recognition, preference and clarity. Similar to the findings from visual performance, “white” ceramic metal halide light sources were always preferred over an “orange” high-pressure sodium source at equal photopic light levels. For equivalent responses on these subjective tests, illuminance levels could be reduced by 20–30 percent for the white light sources.



The colored lines show the percentage of people who reported the Philips' Cosmo White (CW) was brighter than the Cosmo Gold (CG) for various illuminances of each light source. For example, when CW illuminance was 9 lx and CG illuminance was 11, approximately 60% of the subjects chose the CW as the brighter light source.

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