

Evaluating OLED and Edge-lit LED Panels

Thin profile, flat panel luminaires made using advanced solid state light sources such as organic light-emitting diodes (OLEDs) or Edge-lit LED panels have the potential to create very attractive lighted spaces. One commonly quoted benefit of OLEDs is their soft, non-glary appearance.



The reason why today's OLED panels are considered soft and non-glary is because of their low luminance. With technology advancement and increased luminance, OLED panels will become glary.

Experiment

LRC researchers measured and compared their photometric performance and then conducted a human factors study on the perception of discomfort glare at similar light conditions.

One edge-lit LED panel and one OLED panel of similar size were selected (both were commercially available). The two panels were characterized for their luminous flux, luminous efficacy, luminance, and CCT. For the discomfort glare experiment, five subjects observed the two panels at five light level conditions and one background lighting condition. The five light level conditions were characterized by the luminance of the light source as well as the illuminance at the observer's eye at each of those luminances. Subjective ratings of discomfort glare were measured by the De Boer scale (1 = unbearable, 9 = unnoticeable glare).

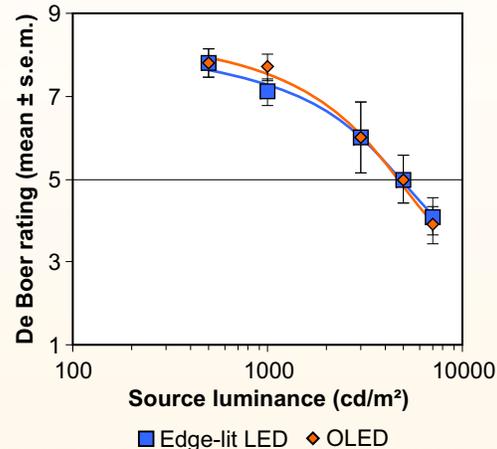
Sponsor

New York State Energy Research and Development Authority (agreement no. 34929)



Results

The panels tested had very similar luminance values as a function of input current. The human factors results showed that the perception of discomfort glare depended on the source luminance and the illuminance at the observer's eye for both panel types. When the subjects looked directly at the panels, luminances of 5000 cd/m² or greater resulted in glare conditions that, on average, would be described as unacceptable or even disturbing according to the De Boer rating scale.



De Boer ratings as a function of light source luminance for a background luminance of 75 cd/m² and its corresponding illuminance at the eye of 100 lx. Ratings below 5 indicate the panel was considered glary.

Photometric Performance

	Input Current (A)	Input Voltage (V)	Light Output (lm)	Luminous Efficacy (lm/W)	CCT (K)
OLED	0.10	18.74	83	44	2830
Edge-lit LED	0.10	8.53	88	103	3999

Citation

Mou, X., N. Narendran, Y. Zhu, and J.P. Freyssinier. 2016. Evaluation of OLED and edge-lit LED lighting panels. *Proceedings of SPIE 9954, Fifteenth International Conference on Solid State Lighting and LED-based Illumination Systems*, 995403 (September 7, 2016); doi: 10.1117/12.2240465.

