



**Illuminating**  
ENGINEERING SOCIETY

**Illuminating Engineering Society of  
North America**

120 Wall Street, 17th Floor  
New York, NY 10005-4001

T 212-248-5000

F 212-248-5017, 18

[www.ies.org](http://www.ies.org)

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## **An Optional Method For Adjusting the Recommended Illuminance for Visually Demanding Tasks Within IES Illuminance Categories P through Y Based on Light Source Spectrum**

The Illumination Engineering Society (IES) is a collegial community dedicated to improving the lighted environment, and the quantification of the effects of lighting on human vision is a fundamental element of the Society's purpose. The development and documentation of the consensus-based illuminance selection criteria is a key element of the IES' role in guiding and supporting global efforts to provide quality luminous environments.

Illuminating engineering metrics are based on assumptions related to the human eye response to a light source's spectral characteristics using the photopic luminous efficiency function. In addition, the Spectral Power Distribution (SPD) of a specific light source is known to affect pupil size, visual acuity, and visual efficiency. Various bodies of research have defined conditions where a light source's spectral characteristics can result in variations in visual acuity and pupil response relative to those predicted by the photopic luminous efficiency function.

This Position Statement provides guidance from the Society's Board of Directors to establish a framework under which TM-24 should be used and the application of TM-24 in luminous environments and the lighting design process. TM-24 as a Technical Memorandum is merely a vehicle to disseminate a focused topic of technical information, which could have an impact on lighting product designs and/or applications per the limited scope of TM-24. TM-24 is not a Design Guide or Recommended Practice, and should not be used as such.

When applying the concepts in TM-24, it is crucial to fully understand the scope for its appropriate use. The Equivalent Visual Efficiency (EVE) calculation, introduced within the TM-24 document to account for a light source's spectrum, applies only to applications for visually demanding tasks performed in interior lighting conditions where the recommended illuminance target is for categories P through Y. The light distribution should be uniform and the luminance of the task background is greater than 50 cd/m<sup>2</sup>. It also applies only to visual tasks performed under conditions of a full field of view.

Applications where the visual field of view is constricted and/or where there will likely be occupants with abnormal vision or poor ocular health compared to the general population may result in conditions in which the spectral effects of lighting on visual acuity differ from the factors described in TM-24. In addition, design considerations such as visual contrast, color quality, lighting for aesthetic effects as well as integration of lighting with architecture and finishes may be essential to the overall lighting design strategy.

The conditions upon which the TM-24 findings were developed, include five critical control measures. The control measures are:

1) full field of view; 2) adaptation; 3) light level/spectral comparison; 4) visual acuity test and 5) fixed distance to task. While these control measures are crucial to the evaluation of spectral content and visual performance, these characteristics may not be easily controlled in applications with dynamic tasks or where occupants are known to differ in their ocular health from the general population. The conclusion presented within TM-24 represents the view point of The Visual Effects of Lamp Spectral Distribution committee on this topic. On-going research may offer additional insights regarding spectral content and visual performance.

TM-24 is not an official IES recommendation or practice, but rather an optional calculation method for very specific light level conditions only. This does not inherently translate into energy savings or reduced lighting power densities. TM-24 should not be used for the development of energy policy or energy efficiency programs purposes for any lighting applications, as this goes against current IES recommendations. TM-24 and this Position Statement supersede any references, either printed or verbal, that state otherwise.

## **ABOUT THE ILLUMINATING ENGINEERING SOCIETY**

The IES is a collegial community dedicated to improving the lighted environment. The IES is composed of a diverse membership, all with an interest in and a dedication to good lighting. 25% of the membership is involved in manufacturing (lamps, sources, luminaires, accessories); another 25% is composed of lighting designers and architects. The remaining 50% is composed of consultants, electrical and building contractors, distributors, and wholesalers, individuals working in affiliated lighting fields, those working for utilities and energy services, and people in government and education. Over one thousands of these individuals serve on committees, most serving on the Society's document development committees; these committees develop standards, design guides, technical memoranda, lighting energy management materials, guidelines and lighting measurement, testing and calculation guides.

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