

December 26, 2021

BY EMAIL

Daniel Salinas, Interim Executive Director
Illuminating Engineering Society
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Re: The LED Fraud

Dear Daniel Salinas,

As you are aware, the Soft Lights Foundation has been contacting the Illuminating Engineering Society over the past few years to alert the IES of the toxicity, hazards, and discriminatory nature of Light Emitting Diodes. We have now come to understand that the IES refusal to take action to solve the LED crisis is due to the fact that the switch to LED radiation devices is based on fraud and that the IES is a major contributor to the fraud.

According to the US Department of Energy's website, energy efficiency means "using less energy to get the same job done."¹ The job is to provide uniform illumination with minimal harm. LEDs do not produce uniform illumination², but rather they emit radiation from a flat surface which creates a mix of energies that are not uniform. Since LEDs do not do the same job as an incandescent or High-Pressure Sodium, the claim that LEDs are energy efficient cannot be made. LEDs are simply a low quality, toxic, hazardous, and discriminatory type of visible radiation.

Figure 1 is a diagram showing the categorization of radiation and shows that *light* and *illumination* are spatially isotropic radiation in the human visible portion of the electromagnetic spectrum. Radiation emitted by LEDs do meet the regulatory meaning of or comply with standards for the use of light as illumination.

¹ https://www.energystar.gov/about/about_energy_efficiency

² <https://ieeexplore.ieee.org/document/8879542>

Regulatory Meaning of Light and Illumination

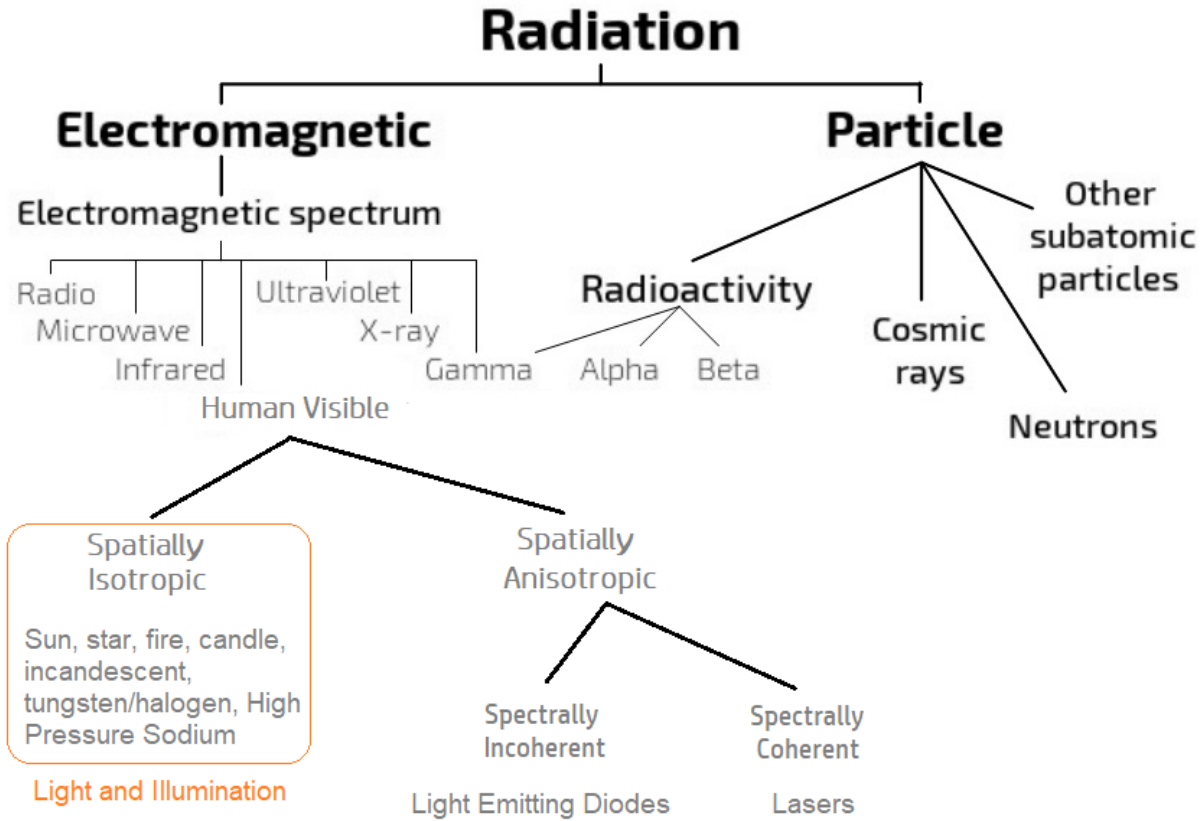


Figure 1 - Radiation Types

The IES RP-8-18 Recommended Practice for Design and Maintenance of Roadway and Parking Facility lighting has its roots in documents such as RP-8-00 from at least the early 1980’s, long before the introduction of high-powered LED “white” light sources. IES RP-8-18 was thus written for spatially isotropic light sources only. The invention of spatially anisotropic LED radiation devices necessitated an entirely different standard, and yet IES attempted to trivialize the non-uniformity of LED radiation devices and has allowed governments and others to invalidly use IES RP-8-18 with LED radiation devices. This action makes IES liable for any negative outcomes from the use of LED radiation devices where IES RP-8-18 was used.

The IES has informed the Soft Lights Foundation that IES RP-8-18 is designed for LED radiation devices, and yet we know this is not true. LEDs emit spatially anisotropic radiation, and the simple formulas used for calculating illuminance on a flat surface such as a roadway for a spatially isotropic source are invalid for LED radiation. The software and hardware devices that currently exist use simple formulas which assume spatially uniform radiation, and these simple formulas cannot be used for LED radiation sources. The peak radiance of an LED radiation device can be exceedingly high, far beyond

human tolerance levels, and can cause thermal and chemical eye damage. Yet, the IES does not mention any of this in IES RP-8-18.

The following are quotes from the IES that we assert are fraudulent or deceitful.

“LED Luminaires employ a number of small point sources of light.”³ – A mathematical point is infinitely small with no spatial attributes. A uniform sphere in 3D space can be shrunk down to a mathematical point. LED radiation, on the other hand, is emitted from a flat chip and thus creates a mathematical shape called a Lambertian.⁴ It is not possible to shrink a spatial Lambertian volume down to an infinitely small mathematical point. LEDs emit non-uniform radiation.

“The small light sources enable excellent beam control with a high level of light beam efficiency.”⁵ – This statement deceitfully attempts to give the impression that the light spread from an LED is uniform through a given angle or steradian. The purpose of an illumination device for roadway lighting is to provide uniform illumination for a certain volume or area. LEDs have an intense peak of energy in the center and the spread of the radiation is not uniform, resulting in a low quality, toxic light that reduces vision and increases danger for the user.

“It’s important to note that there’s no difference between the type of visible radiant energy emitted by LEDs and that emitted by every other kind of light source.”⁶ – This is a fraudulent statement by the IES. As the IES is fully aware, an incandescent light source emits spatially isotropic radiation, while LEDs emit radiation from a flat surface, resulting in spatially anisotropic visible radiation that interferes with human nerves.

“And in fact, [blue light] risks are about the same for typical commercially available LEDs as for they are for other light sources having the same CCT.”⁷ – As the IES is aware, it is not possible to assign a single Correlated Color Temperature to spatially anisotropic radiation. In addition, the research shows the exact opposite of this IES statement. The spectral power distribution and absolute radiance of LEDs, especially the peak at 450nm and the trough at 500nm, is extremely toxic, leading to psychological trauma, migraines, seizures, increased agitation and other harms.

As an example of how dangerous LED radiation is, consider this warning shown in Figure 2 from the company Gear Light.

³ [IES Recommended Practice for Design and Maintenance of Roadway Parking and Facility Lighting, Section 6.5.2.2](#)

⁴ <https://ieeexplore.ieee.org/document/8879542>

⁵ [IES Recommended Practice for Design and Maintenance of Roadway Parking and Facility Lighting, Section 6.5.2.2](#)

⁶ <https://www.ies.org/lda/how-safe-is-the-light-from-leds/>

⁷ <https://www.ies.org/lda/how-safe-is-the-light-from-leds/>

WARNING: To avoid eye injury, do not stare directly into the light beam or shine the beam directly into anyone's eyes. This product is not designed, intended, or recommended for children or hazardous environments.



Figure 2 - LED Flashlight

The Illuminating Engineering Society is liable for the injury and harms caused by its efforts to hide the true toxicity of LED radiation devices.

Sincerely,

Mark Baker

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