Soft Lights Foundation

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BY EMAIL

Jill Granat, General Counsel
Restaurant Brands International
jgranat@rbi.com

Re: Spatially Anisotropic Visible-Radiation Devices

Dear Jill Granat,

English Common Law dating back to 1663 states that a property owner has an easement to allow *light* to enter their property.[1] Light referred to sunlight and starlight that could be seen by human eyes. We now know that human-visible *light* is the set of frequencies between approximately 380nm and 700nm on the electromagnetic spectrum. For regulatory purposes and unless otherwise stated, *light* is spatially isotropic, meaning that the shape of the radiation is the same in all spherical directions.

Biological systems have a long history of evolution with *light*. The substance emitted by the sun, stars, fire, candles, and fireflies is *light* and is a fundamental component of biological life. Humans use their visual receptors to see objects using reflected *light*, the different wavelengths of *light* provide color information, and *light* controls circadian rhythms and mood. *Light is spatially isotropic radiation in the human visible portion of the electromagnetic spectrum*.

The substance emitted by LEDs is spatially anisotropic visible radiation. Specifically, the shape of the radiation is a Lambertian ball which is created because the source of the radiation is a flat surface.[2] Since this substance is not the same as that emitted by the spherical sun, the substance emitted by LEDs does not meet the standard regulatory definition of *light*. The radiation energy is different at every point in space, which is very different than the spatially uniform energy of *light*. Light Emitting Diodes are misnamed because they emit visible radiation, but not *light*. LEDs should more properly be named Visible Radiation Emitting Devices or VREDs. The substance emitted by LEDs has theoretically unlimited peak radiance, interferes with the nervous system and can cause eye damage, pain, epileptic seizures, migraines, psychiatric trauma, and thoughts of suicide.

Figure 1 is a diagram showing the categorization of radiation. Figure 1 shows that *light* is spatially isotropic radiation in the human visible portion of the electromagnetic spectrum and that the radiation emitted by LEDs, while visible, is not *light*.

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[1] https://www.britannica.com/topic/ancient-lights
[2] https://ieeexplore.ieee.org/document/8879542

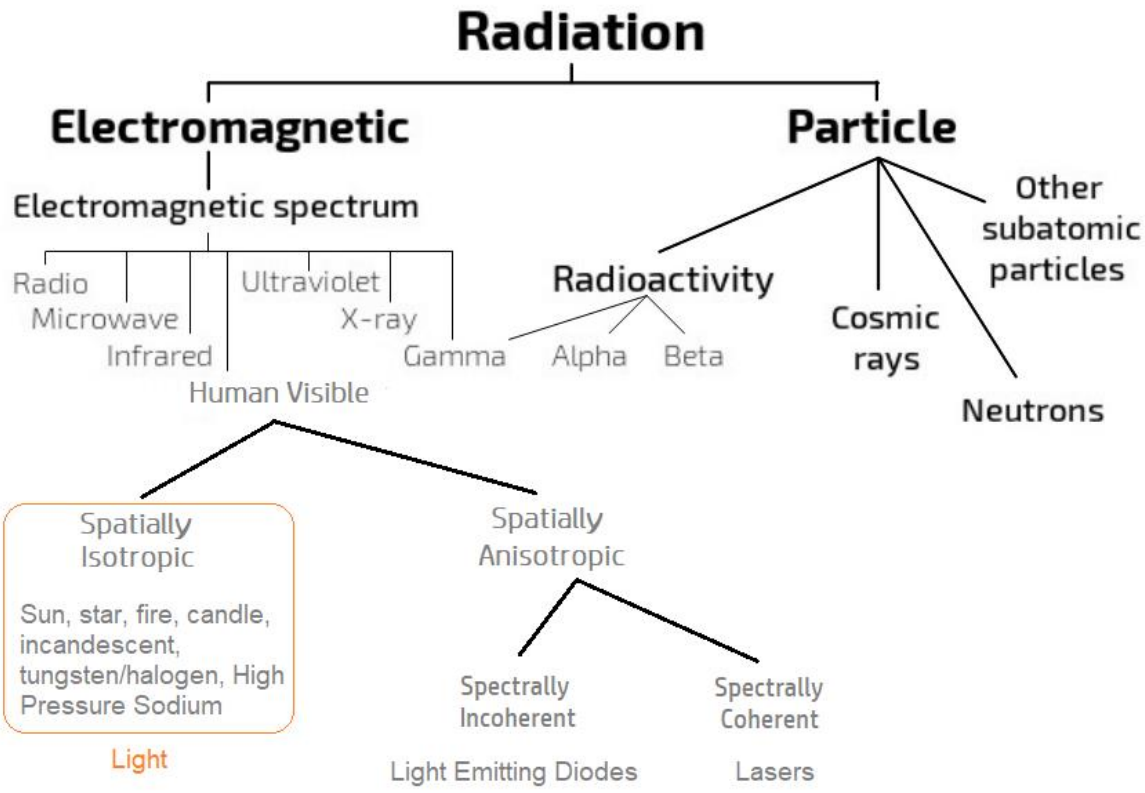


Figure 1 - Radiation Types

We wish to alert the Restaurant Brands International to liability issues related to the installation and operation of LED radiation devices. Figure 2 and Figure 3 show LED radiation devices at Burger King restaurants that are subjecting persons in the area to toxic, hazardous, and discriminatory radiation.

Figure 2 – Burger King, Florence, Oregon

Figure 3 - Burger King, Yreka, California

The Illuminating Engineering Society Recommended Practice for Design and Maintenance for Roadway Parking Facility Lighting (IES RP-8-18) is the de-facto standard for outdoor lighting for streets and parking lots. Section 2.1 of this document states, “Radiant energy that is capable of exciting the retina and producing a visual sensation is consider *light*.” As noted earlier, a standards document such as IES RP-8-18 assumes the radiation to be spatially isotropic unless explicitly stated to be otherwise. Therefore, the references to *light* in IES RP-8-18 are for *spatially isotropic radiation in the visible portion of the electromagnetic spectrum*. The word *light* in IES RP-8-18 does not refer to microwaves, x-rays, or spatially anisotropic radiation such as LEDs and lasers.

The reason this is important is because RBI has installed or is planning to install LED radiation devices that do not comply with existing standards, emit dangerous radiation, discriminate against persons with disabilities and have unregulated spatial, spectral, and temporal characteristics. LED radiation has been shown to cause pain, sickness, eye damage, seizures, migraines, emotional trauma, and thoughts of suicide.

The Illuminating Engineering Society does not guarantee their own standards and disclaims any liability for the use of their standards. Thus, if RBI claims that they followed standards for LED radiation and are therefore not liable for the harms caused by LEDs, RBI’s claim will fail, both because IES RP-8-18 is not applicable to LED radiation devices, and because IES has warned that their standards are not trustworthy enough to be guaranteed or relied on.

To our knowledge, there are no ocular exposure standards for LEDs. In his 2009 presentation, Senior Engineer Michael Shulman of Underwriters Laboratories wrote, "Currently, neither the U.S. nor Canada have mandatory standards or regulations for ocular exposure to LEDs emitting incoherent visible

light."[3] In the research article, titled Light Emitting Diode Induced Retinal Damage[4] the authors state, "*Excessive LED light exposure presents a potential hazard to retinal function.*" In other research, those in Risk Group 3 (those with epilepsy, autism, migraines, photophobia, etc.) are often purposely ignored during the research, invalidating results that might have shown that LEDs are safe.

LEDs are not "energy efficient". To be energy efficient, a technology must provide the same quality of service and perform the same task as the previous technology[5]. The task in this situation is to provide *light* and uniform illumination while using less energy and not causing harm. Since LEDs do not emit spatially isotropic radiation, LEDs are not illumination devices, as the radiation that LEDs emit is not uniform. Instead, LEDs emit spatially anisotropic visible radiation that is sending people to the hospital, causing eye damage, and violating civil rights. The claim of "energy efficiency" by the LED lighting industry is fraudulent.

The federal Americans with Disabilities Act prohibits discrimination. Since LED radiation interferes with major life functions such as seeing, thinking, and concentrating for people with disabilities, such as those with epilepsy, autism, PTSD, migraines, bipolar disorder and others, LED radiation is discriminatory. RBI cannot claim that LEDs comply with the ADA just because the US Access Board has not yet developed guidelines for spatially anisotropic radiation from LEDs. Since LED radiation prevents safe access to the Burger King business, LED radiation is discriminatory.

As an example of how dangerous LED radiation is, consider this warning shown in Figure 4 from the company Gear Light.

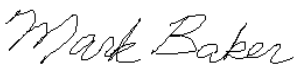
Figure 4 - LED Flashlight

The fact that LEDs do not emit the regulatory definition of *light*, are unregulated and lack standards, cause sickness and eye damage, interfere with the human nervous system, and discriminate against people with disabilities makes RBI liable for the harm and discrimination they cause because RBI installs and operates LED radiation devices.

[3] http://www.softlights.org/wp-content/uploads/2021/10/MichaelShulman_LEDFireElectricalSafety.pdf
[4] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5313540/
[5] https://www.energystar.gov/about/about_energy_efficiency

To protect human health and reduce liability, RBI must protect the natural night resource and limit visible radiation. Any artificial radiation used for illumination must use *only spatially isotropic* radiation with a Correlated Color Temperature of 2700 Kelvin or less, with 2000K preferred to protect the natural night resource, and be fully shielded (not just full cutoff).

Sincerely,



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