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Docket Number:	15-AAER-06
Project Title:	Small Diameter Directional LED Lamps and General Purpose LED Lamps
TN #:	206865
Document Title:	Lumileds Comments on Title 20 45 Day Language
Description:	N/A
Filer:	System
Organization:	Lumileds/Alex Baker
Submitter Role:	Public
Submission Date:	12/7/2015 3:36:59 PM
Docketed Date:	12/7/2015

Comment Received From: Alex Baker
Submitted On: 12/7/2015
Docket Number: 15-AAER-06

Lumileds Comments on Title 20 45 Day Language

Additional submitted attachment is included below.

LUMILEDS

December 4, 2015

Re: Docket #: 15-AAER-06: Small Diameter Directional LED Lamps and General Purpose LED Lamps, Express Terms 45 Day Language (docketed 15 October 2015)

Dear Commissioner McAllister:

Lumileds is a $2 billion manufacturer of LED devices, one of the three largest in the world, with research, marketing and production facilities located in San Jose, California. Our devices are incorporated into consumer LED lamps, as well as other general illumination applications, displays, mobile phones, and automotive lighting. We work closely with our customers every day to design LED lamps for sale in the North American market. The light emitted by our customers' products begins with the light from our products. To support our customers we closely follow developing standards & regulations, and we provide input to regulatory processes only as warranted.

With respect to the subject 45 day language, Lumileds is concerned that the proposal consists of requirements which, taken individually, would set a high bar, but when combined form a specification of bleeding-edge performance which is not an appropriate regulatory floor for the California market, or any other market where a balance between performance and consumer cost must be reached. Lumileds respectfully submits that the CEC, in its well-intentioned effort to drive quality along with energy efficiency, has produced a draft regulation proposing higher performance than the Voluntary California Quality LED Lamp Specification. We submit the following comments towards the goal of ensuring Californians have high quality, high efficiency LED lamps at prices that will enable, rather than impede, consumer adoption.

First, regarding chromaticity, we urge the CEC to make normative reference to American National Standard ANSI C78.377-2015, rather than attempting to reproduce such technical requirements in the regulation itself. Standards exist to enable consistency and clarity in the market, and this standard – in addition to being widely referenced across the lighting industry – is well suited to help the CEC achieve its stated goals. ANSI standard C78.377, with its scope for LED lamps and luminaires, has also become the de facto LED binning standard used by all major LED device manufacturers worldwide, including Lumileds and its competitors (note: this de facto status has held since the original version was published in 2008). If the CEC feels that 4-step instead of the standardized 7-step quadrangles are necessary, please reference Annex B, which was created specifically in reaction to the CEC's publication of the aforementioned "Voluntary" specification.

Compared to the ANSI standard, the CEC's proposed requirements create a band of acceptable chromaticities which would eliminate more than 70% of LED package color binning space. The proposed 2-step band of acceptability detailed in the 45 day language is too restrictive and would unnecessarily and dramatically limit consumer choice while driving up costs. With the understanding that initial cost is *the* primary consumer consideration when purchasing lighting products, and knowing that consumers have myriad ways to obtain LED lamps from outside of California (e.g. via online retailers), we believe this proposal is in conflict with and will work against the CEC's LED lamp adoption goals.

Regarding the proposed color rendering requirements, the minimum LED lamp requirement of 82 R_a conflicts with how Lumileds and its competitors bin and supply LED devices for incorporation into LED lamps. LED devices in the market are not binned this way. A normal distribution would be minimum 80 R_a, typical 82. LED lamp secondary optics (e.g. the outer diffuser of an A-19 lamp) tend to lower lamp R_a scores, thus the ~2 additional points in a typ. 82 shipment provide margin for the LED lamp manufacturer to confidently achieve min. 80 R_a measured at the lamp level.

The matter becomes more complex when the proposed R_1 through R_8 requirements are considered. Requiring a minimum score of 72 for R_1 through R_8 essentially, and in simpler terms, calculates to a minimum R_a value of 85 at lamp level. Stated another way, only LED lamps with R_a scores of 85 and higher would meet the proposed R_1 through R_8 requirements. A lamp manufacturer designing an 85 R_a lamp, as explained above, would need LEDs binned at min 85, typical 87. These are truly uncommon LED devices. The few available min. 85 / typ. 87 LED devices are designed for use in other applications (e.g. higher end outdoor lighting), not for consumer LED lamps. Consequently, the lamp manufacturer would have little choice but to procure more commonly available LEDs binned at nominally 90 R_a, further driving up cost to meet performance levels which simply aren't required for every application a California consumer will encounter.

To alleviate these costly barriers to adoption, Lumileds requests that the CEC adopt the industry norm of specifying a minimum of 80 R_a rather than 82. All lighting vision scientists agree that with the color rendering index, two points are completely imperceptible anyway (most would also agree with conventional wisdom that less than 10 points difference are imperceptible). We also ask you to reconsider your approach to specifying color rendering requirements by abandoning the proposed R_1 through R_8 minimum requirements, and sticking with R_a requirements alone.

Above and beyond the aforementioned specification constraints, the "minimum compliance scores" detailed in Table K-14 would further reduce the number of LED devices available to support the California market. To ensure a broad range of LED devices are available to support the LED lamp market at consumer-friendly shelf prices, we restate our request for a minimum 80 R_a requirement at the lamp level, and ask you to consider a reduction of the minimum compliance scores as well.

In closing, the proposal for LED lamps as detailed in the 45 day language is a somewhat arbitrary definition of high performance which would drive up cost and leave a great many LED devices behind that could otherwise support the CEC's effort to reduce energy consumption in California. National LED lamp shipment data illustrate that consumers are rapidly adopting LED lamps, and that the adoption curve for LED lamps in no way resembles that of CFLs. There is still, however, tremendous room for growth of the LED lamp market which would be enabled by lower shelf prices, not by unnecessarily restrictive regulations which would eliminate consumer choice and drive up shelf prices.

We thank you again for the opportunity to provide input, and ask that you consider Lumileds a resource for any questions you may have throughout the remainder of this process.

Sincerely,

Alex Baker
Director of Standards & Regulations