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HINKLEY
LIGHTING

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Mr. Andrew McAllister
Commissioner
California Energy Commission
1516 Ninth Street
Sacramento, California 95814
Docket #2014-BSTD-01 Submitted via email: docket@energy.ca.gov

**Hinkley Lighting Comments on November 3, 2014 Standards Workshop on Proposed Lighting Efficiency Measures for Residential and Nonresidential Buildings**

Dear Commissioner McAllister,

Thank you for the opportunity to participate in the development of Title 24 Standards. Hinkley Lighting is a 92 year-old decorative luminaire manufacturer located in Avon Lake, Ohio. Hinkley offers more than 2,800 different luminaires of which 600+ are available in GU24 and nearly 1,000 in dedicated (thermally integrated) LED, as ECO Options to the standard incandescent product. Currently Hinkley has over 200 surface mount outdoor and interior luminaires listed in the CEC Appliance Website, all of which are 2,700K and 90+ CRI. Many more dedicated LED luminaires are in process for submittal. From a perspective of a luminaire manufacturer seeking to support the majority of potential fixture selections for the California consumer, Hinkley submits the following information for the CEC's consideration.

As we understand the current proposed changes, a builder lamping a screw based socket will be given the chance to select either a JA8 compliant LED or CFL lamp. The intent as currently proposed, would not require any certification of the fixture. Through our own internal testing of luminaires to meet UL Standards for GU24 CFL and LED lamping, we have found a significant correlation of lamp performance and life, to the fixture it is used within. Decorative fixtures tend to be constructed in such a way that single lamp chambers are close in size to the lamp, and multiple lamp chambers are quite common, especially in interior fixtures. Based on luminaire design and installation, two significant factors will influence the life of the lamp – whether the lighting chamber is fully or partially enclosed with the opening facing the ground, and the number of lamps in the lighting chamber. Three other still significant factors are also influential; 1) the wattage of the lamp selected, 2) the position of the lamp base being horizontal, or vertical (base up or base down), and 3) the geometry of the lighting chamber and shade material surrounding the lamp(s).

In outdoor, E26 medium base fixtures are almost exclusively single sockets. Unfortunately the majority are in base up positions where both CFL ballasts

and LED drivers endure the greatest amount of heat build-up, leading to significantly reduced life - especially given longer typical duty cycles. Due to "wet location" requirements, outdoor luminaire designs are challenged in removing waste heat from the lamp within the lighting chamber, but do somewhat benefit in many climates operating at reduced ambient temperatures. In contrast, E12 candelabra fixtures are typically multiple sockets in the same semi or fully enclosed chamber. Exclusively base down, they are also designed with tight lamp clusters to emulate a small lamp profile. The restrictive space for each individual CFL lamp ballast or LED driver drastically limits dimming function, power factor correction and electrical efficiency. Current lamps do not meet these requirements and effectively in adopting the standard as proposed eliminates candelabra socketed fixtures.

In interior, multiple E26 sockets are favored to place as much lumens within a space, yet minimizing the number of fixtures and subsequently cost for luminaire and supporting installation. Individual lighting chambers for each lamp are typical in bath fixtures and chandeliers. Both tend to have very close geometries of shade to lamp, and generally were designed for a specific type of lamp, in order to evenly illuminate the shade and surroundings. As many consumers have learned, specific CFL lamp designs may not stay within the confines of the shade, but tend to illuminate the same as incandescent lamps. In many incandescent fixtures the CFL ballasts don't have the room to "breathe" as they would in a table lamp and therefore require larger shades or alternative construction. LED lamps add the complexity of varying light distribution, with many not tastefully illuminating the shade or distributing light outwards. While shade changes (becoming larger) may assist with LED lamp thermal issues, the consumer is still left with determining an aesthetically suitable lamp for that fixture and application. The luminaire manufacturer in a bath vanity fixture will often accommodate the fixture being installed in either the lamp base up or base down position, with many consumers favoring the lamp base up to maximize lighting at the counter surface. We have found a substantial reduction in LED and CFL lamp life when mounted in the base up position. This also applies to single lamp wall sconces, especially those with enclosed or narrow diameter shades.

Ceiling fixtures with multiple lamps can be worse in life than recessed fixtures. Surface mount or "flush mount" with fully enclosed chambers can have lamp wattage densities easily exceeding a single recessed can fixture. In general, CFL and LED lamps whether screw or GU24 base, should be scrutinized in these applications. Consumers do prefer to lamp these fixtures with longer life sources as the effort to re-lamp is higher than wall or portable luminaires. Incandescent lamps require the use of foil faced insulation in the lighting chamber, and additional fiberglass within the canopy, to insulate the junction box and premise wiring from excessive heat. In many cases, CFL and LED lamp

use would benefit from the removal of this insulation. LED specifically is far better with ceiling pan metal being able to conduct the heat away.

Semi-flush and inverted pendant ceiling mount fixtures, commonly multiple sockets, can actually do very well with CFL and LED lamp sources. Making sure there is at least 3 to 4 inches of clearance from the top of the luminaire to the ceiling, and the top of the luminaire is open to afford free air convection as well as upward light is critical to maximize lamp life. In designs having some opening in the lower face of the luminaire to allow an internal convective chimney is even better. In single lamp pendant fixtures, a wide aperture opening at the bottom of the shade and venting at the top near the socket to facilitate natural convection is required to use a CFL or LED lamp and attain stated life. Many incandescent luminaire designs do not follow these guidelines, thus negatively impacting a CFL or LED lamp's expected life.

For prior GU24 CFL certifications to ENERGYSTAR, CFL lamp manufacturers provided a Tcase point and temperature, usually on the lamp ballast case. The luminaire manufacturer in order to meet UL Standards is to ensure this temperature was not exceeded during laboratory testing at 25C ambient air, while in the luminaire. Tests performed in our own accredited lab have shown that CFL lamp lumen output is typically 70% or less of the stated package value when Tcase temperatures were near or at stated limits. Most CFL manufacturers do not have data on lamp life/lumen maintenance at different Tcase values. As a result, ENERGYSTAR required long specific lamp plus luminaire testing periods, embodied as well in your proposed Standards. Without having Tcase and reliability data by lamp from the lamp manufacturer, the proposed luminaire testing will result in higher luminaire costs passed to the consumer and fewer fixture selections. The very same issue is why most decorative fixture manufacturers do not embrace ENERGYSTAR certifications – the market will not bear the cost on a specific fixture + lamp basis.

From our own luminaire testing we know the current ENERGYSTAR 40C ambient temperature life testing of LED lamps does not comprehend the elevated temperatures found in most decorative fixtures. We also do not believe the proposed JA8.3.4 Ambient Temperature Life Test and JA8.3.5 Elevated Temperature Life Test proposed reflect the conditions existing in many surface mount decorative fixtures - especially those with multiple sockets. Further, with the exception of a single brand, LED lamp manufacturers do not offer a Tcase measurement point. Hinkley has been asking this of many brands in the lamping industry for over a year in order to study and understand how we may comply with maximum socket wattage labeling UL requirements. At current no luminaire manufacturer is able to provide this UL requirement unless they produce both the lamp and the luminaire and possess detailed combined operating knowledge. Moreover, it has not been established that wattages and reliability are

common between lamp manufacturers, thus consequently marking an acceptable socket wattage limit may not assure the consumer for all LED lamp manufacturers and models.

Bottom line, for the CEC's intention of utilizing screw based hi-efficacy lamps in decorative, there is no sound logic in allowing just the lamp manufacturer to come forward with a JA8 certified lamp and expecting an equitable life equivalence amongst a varying multitude of luminaires. The consumer either needs to be educated where to use energy efficient lamps, or the luminaire manufacturer needs a means to qualify the use. The bases being screw or GU24 have no bearing on lamp performance.

Hinkley, as surely any decorative luminaire manufacturer, would happily embrace the use of LED lamps and not be bothered with dedicated sockets or LED engines. The cost to perform JA8.4.7 Lumen Maintenance and Rated Life testing is significant and not predictive between luminaire designs. Ultimately for the California Consumer preference, more decorative fixture options require a lamp test for reliability with a stated Tcase measurement. Then luminaire manufacturers can design and certify fixtures that meet expected life and performance in relatively short time period testing concurrent with UL Standards for safety compliance, with little added cost.

In topic summary, we believe the CEC should take a step back from the current proposed acceptance of JA8 certified lamps and meet with both lamp and luminaire manufacturers to explore a new testing discipline, which addresses the inherent variables concerning their use in surface mount decorative fixtures.

With respect to JA8.4.1 Luminous Efficacy, Hinkley would like to point out that many of our current listed T24 dedicated LED luminaires perform at 60+ lumens/watt. Lowering this requirement to 45 lumens/watt would appear contrary to stated objectives. As LED technologies advance, there will be multiple means for higher efficacy to be attained. Setting a future lower efficacy requirement serves both to undermine the value of the current Title and the investments made by compliant manufacturers.

Hinkley would also like to comment on JA8.4.5 Color Rendering. Values for residential outdoor lighting should be set by the CEC and at a minimum reflect an 80 CRI, 15 minimum R9 value. In commodity-low cost offerings we have seen many products with unattractive spectral composition, some of which are currently being marketed for sale in California. Hinkley listed dedicated outdoor fixtures are at 90+ CRI, 50+ R9. As previously indicated achieving this color quality, along with luminous efficacy, becomes easier and cheaper as LED technologies advance and are required.

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Lastly we would like to seek clarity on whether dimming is mandatory for LED lamps and dedicated engines with the proposed changes. The majority of CFL lamps do not dim. Most of Hinkley's dedicated LED listed luminaires do dim and without restriction to incandescent dimmer type or brand. The proposed JA8 changes and subsequent requirements in JA10 Test Method for Measuring Flicker of Lighting Systems and Reporting Requirements reflect very advanced standards with little comprehension and thus component development in the luminaire material supply market. The effort and uncertainty for luminaire manufacturers to attain these requirements is far greater than the prior effort to meet the 90 CRI and LPW requirements in the 2013 cycle. We invite consideration for indicating SSL-7A compliance as a check box on the CEC Appliance database as opposed to an absolute mandate, and allowing one more standards cycle for needed time and experience of product stakeholders to develop compliant product.

Respectfully,

**MICHAEL KACHALA**
*DIRECTOR OF ENGINEERING*

**ERIC WIEDEMER**
*HEAD OF PRODUCT DEVELOPMENT & GENERAL COUNSEL*