



California Energy Commission

DOCKETED

14-BSTD-01

TN 74022

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Mr. Andrew McAllister
Commissioner
California Energy Commission
Dockets Office, MS-4
Re: Docket # 14-BSTD-01
1516 Ninth Street
Sacramento, CA 95814-5512

**Notice of Staff Workshop on Draft
Language for the Residential and
Nonresidential Building Energy
Efficiency Standards and Associated
Documents**

Date: 2014-11-19

Dear Commissioner McAllister,

Philips Lighting appreciates the opportunity to provide the attached comments on the Notice of Staff Workshop on Draft Language for the Residential and Nonresidential Building Energy Efficiency Standards and Associated Documents.

As you may know, Philips North America is headquartered in Andover, Massachusetts. The U.S. Philips companies are affiliates of the Netherlands-based Royal Philips N.V., a diversified health and well-being company, focused on improving people's lives through meaningful innovations. Our long history in North America began in 1933, and today, it is the company's largest single market in the world, with approximately 22,000 employees and operations at 55 major facilities in 25 states and across 3 Canadian provinces. Sales for the region in 2013 was more than \$9.5 billion*, which accounts for more than 30% of Philips global revenue.

Philips is a diversified technology company, focused on improving people's lives through meaningful innovation in the areas of Healthcare, Consumer Lifestyle and Lighting. Innovation has been a cornerstone of the company's strategy for over 120 years, creating a strong and trusted Philips brand with market access all over the world. Philips is a leader in cardiac care, acute care and home healthcare, energy efficient lighting solutions and new lighting applications, as well as male shaving/grooming and oral healthcare. Philips lights 65% of the world's top

airports, 30% of offices and hospitals and landmarks such as the Empire State Building, the Sydney Opera House, the New Year's Eve Times Square Ball and the Great Pyramids. Philips owns more than 64,000 patent rights, is one of the world's top-50 most valuable brands, one of the world's top-50 most innovative companies, and ranked as one of the Best Global Green Brands by Interbrand.

Please find our detailed comments below. We look forward to working with you further on this important effort. If you have any questions on these comments, please contact me.

Sincerely,



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Comments for Proposed Language for 2016 Title 24 Part 06 & 2016 Joint Appendices

2016 Title 24 Part 06

Simplification

Philips applauds the efforts of the CEC staff to simplify the code and align with other standards such as ASHRAE 90.1. As a manufacturer, we receive frequent calls for interpretation of Title 24, waste a lot of time trying to interpret Title 24 ourselves, and when that fails (frequently), waste more time getting interpretations from CEC. We hear contradictory interpretations from people we deal with in California. We hear complaints from customers and installers about high cost and complication of dealing with the 2013 version of Title 24. Removing items like: "Luminaire modification in place" is a step in the right direction.

We urge the CEC to remove all declarations such as in 130.0(c)5: "...Field modifications, including hard wiring of an LED module, shall not be recognized as converting an incandescent luminaire or luminaire housing to a non-incandescent technology". It is very confusing to all involved to convert a luminaire from one technology to another and yet continue to treat it as if it were something else.

As the expense of putting in controls is often higher than the expense of buying a higher-efficacy light source, and saves less energy, depending on the application, we propose that the CEC enable this alternative path to energy savings and not blindly require controls in every application.

Screw base luminaires

We applaud CEC's proposal in Section 130.0 to allow screw base luminaires to qualify as high efficacy. The concern that people will purchase a high-efficacy luminaire, perhaps with a rebate, and then convert it to low-efficacy, by replacing the lamp with an incandescent, is fading, as LED Lamp prices decrease, acceptance and adoption increase, and incandescents are disappearing from the market. Also, as efficacy increases, the need for heatsinking with strong thermal contact from light source to luminaire, is decreasing. Allowing screw bases will reduce the multiplication of products, allowing higher volumes and lower cost for manufacturers and customers, and enable easy replacement of failed light sources without having to replace the entire luminaire.

By the argument in the previous paragraph, we do not believe that CEC should require that recessed luminaires not have screw bases. There are plenty of LED lamps that are designed to handle elevated temperatures and function well in recessed luminaires. Some accomplish this with larger heatsinks or lower power and others, such as the smaller MR16 lamps, accomplish it with integrated fans. In any case, efficacy will continue to increase and thermal concerns to decrease. There is no need to exclude screw-base options. We believe that removing the exception will also help to simplify the code.

Luminaire Classification and Power

With regard to Section 130.0(c), and considering the proliferation of field programmable/intelligent drivers, we urge the CEC to reconsider field labeling of luminaires

and/or wireless verification of wattage levels. We believe the current language that only allows luminaires to be labeled in the factory is not in line with current technologies.

Multi-Level Lighting Controls

The draft Section 130.1(b)(3) has changed the requirement for Dimmable luminaires to be only controlled by a manual dimmer according to Section 130.1(a)2C, and removed the options B-E. Philips opposes this requirement as it reduces the number of options available for lighting designers. Instead, we propose that the CEC retain previous options B-D and simply remove option E (Demand Response).

Shut-OFF Controls

There is a provision added to Section 130.1(c)(5) that all occupant sensing controls shall function either as a Partial ON occupancy Sensor or a Vacancy Sensor and that a Partial-ON Occupant Sensor shall be capable of automatically activating between 50-70 percent of controlled lighting power. There are already a number of a Partial ON occupancy Sensor products in the marketplace that dim to a lower level than 50% (for open office applications, for example). We therefore propose to not define a minimum level and change to activating to a maximum of 70 percent of controlled lighting power.

Controls for Outdoor Lighting

130.2(c)2 Changed control of outdoor lighting from automatic scheduling control to photocontrol or astronomical time-switch. We believe that this indicates that outdoor lighting may be controlled by such devices only, and propose that a clarification such as included in 130.2(c)3B "...or other lighting control systems" be added to clarify that automatic lighting control systems may fulfill this requirement as well.

TLED

In the latest draft, we have noticed that Section 130.0(c)6B has been removed (copied below for reference:

"Replacement of lamps in a luminaire manufactured or rated for use with linear fluorescent lamps, with linear lamps of a different technology such as linear LED lamps, shall not be recognized as converting the fluorescent luminaire to a different technology for compliance with Part 6."

At the pre-workshop, we were assured that "lamp-only changes will not trigger code" whether there is a change from fluorescent to LED or not. This was clarified in latest Blueprint newsletter which references the current Section 141.0(b)2Iiii, which has also been deleted in the proposed draft language. We strongly urge that this be stated explicitly, and without exceptions, in the 2016 version of the code.

In addition, we suggest that CEC allow a path to replace ballasts in installations that have previously converted from fluorescent to TLED, without requiring controls. The scenario that could arise is:

1. A building replaces all fluorescent lamps with TLED, saving energy.

2. A few years later, it is time to change the ballasts.
3. Will the building be able to change the ballasts without replacing all the new TLEDs with dimmable TLEDs and adding controls?

Joint Appendices

Over-specified performance parameters

Philips continues its opposition to requirements for CRI >90, SDCM<4, CCT <3000K and PF>0.9 as minimum requirements in code. The 2016 proposal widens the requirement for these over-specified parameters, by its extended reliance on Appendix JA8. We will not restate the rationale for our objections here, but refer the reader to comments submitted recently by Philips, both to Title 20 and the CA Quality LED Lamp Specification. If CEC desires additional elaboration on the Philips position, please contact Keith Cook or Richard Haring.

Flicker

The Title 20 specification on flicker is overly restrictive for some frequencies and too lax for others. It states:

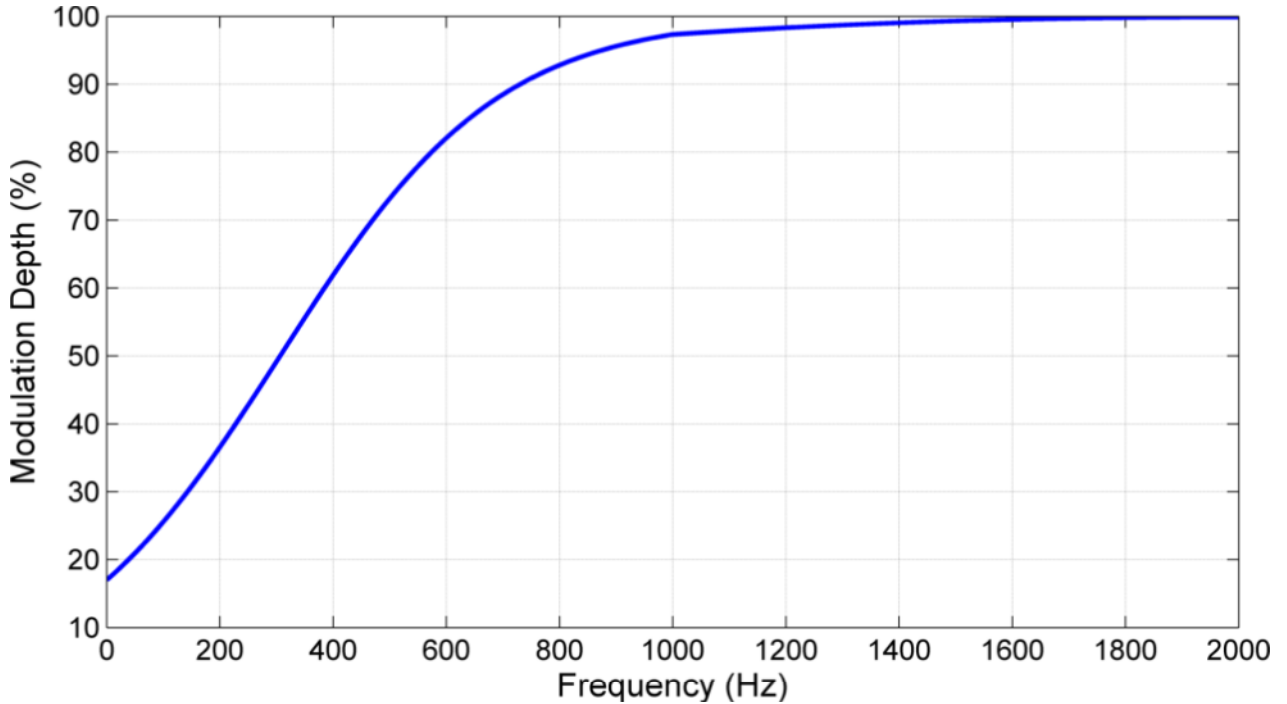
“Dimmer controls that can directly control lamps shall provide electrical outputs to lamps for reduced flicker operation through the dimming range so that the light output has an amplitude modulation of less than 30 percent for frequencies less than 200 Hz without causing premature lamp failure.”

This specification makes no allowance for the dependence of human flicker sensitivity either on frequency or on wave shape. For sine wave modulation, the visibility threshold for stroboscopic effects¹, expressed in terms of modulation depth, is shown in the figure below. At a particular frequency, modulation depths above the curve can be detected by most people. Below the curve, they are not detected by most people. The threshold changes for different wave shapes, in a way that depends on the Fourier components of the light output waveform. A full Fourier approach would take account of both frequency and wave shape effects². Sensitivity to flicker also depends on the application. Flicker in outdoor street lighting or in stairwells is more tolerated than in indoor offices, for instance. Therefore, a curve of *acceptability* may be above the *visibility threshold* curve. Different curves may be needed for different applications.

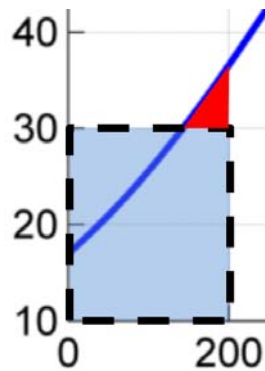
¹ The visibility curve is more complicated below about 80 Hz, where effects other than stroboscopic effects play a role.

² Vogels, I. , Sekulovski, D. and Perz, M. (2011). Visible artefacts of LEDs, Proceedings of the 27th Session of the CIE, 42-51.

Sekulovski, D. , Perz, M. and Vogels, I. (2012). Modelling the visibility of the stroboscopic effect, Proceedings of CIE 2012 Lighting Quality & Energy Efficiency, September 2012, Hangzhou, China, 439-449.



Zooming in on the region from 0 to 200 Hz in the figure above, the shaded rectangular region with dashed outline represents the conditions allowed by the Title 20 specification. The red triangle is forbidden by the Title 20 specification, but flicker in this region is not visible to most observers. Title 20, as a MINIMUM specification, should not exclude acceptable regions where flicker is not even be detected.



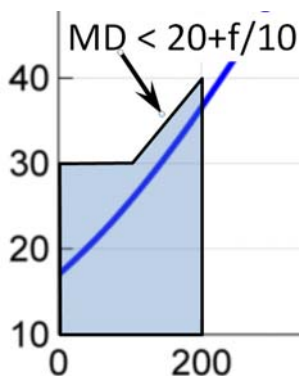
The Title 20 specification does a poor job of defining acceptable flicker levels, and the test procedure in Title 24 does a poor job of determining flicker acceptability. Specifications on flicker and test procedures should wait until the experts (in IEEE and in IEC) conclude their work on this topic and produce a solid standard. Energy Star is also collecting data on flicker and should complete their work and make recommendations before California produces its own specification.

If CEC is unwilling to remove the flicker specification and wait for agreement in standards organizations, then CEC should at the very least modify the present specification to allow use of

the acceptable flicker region denoted by the red triangle in the figure above. We suggest modifying the specification to allow flicker in the region shown in the figure below. The specification would then be:

“Dimmer controls that can directly control lamps shall provide electrical outputs to lamps for reduced flicker operation through the dimming range so that the light output has an amplitude modulation of:

- less than 30 percent for frequencies less than 100 Hz,
 - below the line: Modulation Depth = $20\% + \text{Frequency}/10$, for frequencies from 100 to 200 Hz,
- without causing premature lamp failure.”



We propose that any flicker specification should be moved from Title 20 to Title 24, where the testing procedure is defined. Having the specification in one document and the test procedure in another is unnecessarily complicated.

The draft language in Section JA10.2 is confusing and should be clarified. For example, it is unclear which dimmer(s) are to be used, if the test is supposed to be repeated *for every dimmer/lamp combination*, and the number of lamps are to be used (1, 2, 3, 4,... up to the maximum number supportable by the dimmer?). Should the testing be done with sensors in the circuit as well? The point is that there is a huge amount of testing that *could* be done, to confirm compatibility. That testing will rapidly become burdensome, and will never ensure 100% compatibility. CA should simply require manufacturers to maintain compatibility lists for dimmer/lamp combinations (as is now done in Energy Star).

We believe the number of measurements as defined in JA10.5 and the subsequent data analysis and reporting as defined in JA10.6 and JA10.7, respectively, are overly prescriptive and complex and, as such, will impose an undue burden on manufacturers.

The test procedure, if CEC insists on adding it, should be no more complicated than the procedure presently in use by Energy Star. We see no reason to require testing/calculation with 5 different frequency cutoffs (1000, 400, 200, 90, 50 Hz), when the specification only requires one value (200 Hz), and see no reason to complicate testing by requiring additional dimmer set points as compared to the Energy Star requirements.

Labeling

We continue to disagree with the IOU proposals that a State-specific label or labeling requirements be established. The additional costs and difficulty of assuring proper distribution are not justified in the intangible benefits pursued by the proposals. CEC has routinely stated their intent to set a trend for other States to follow, and should keep in mind that a State-specific label is not in keeping with their attempts to set a standard that can be adopted at the national level. This also respects manufacturer's tendencies to produce and label products for sale in multiple regions. It is costly to produce lamp packaging for sale in a single State and challenging to assure proper distribution therein. Additionally, existing labeling is strictly challenged to meet Federal and other disclosure and marking requirements while being simple to read and understand. A State label only complicates this situation.