DOCKETED

Docket Number:	17-BSTD-01
Project Title:	2019 Building Energy Efficiency Standards PreRulemaking
TN #:	221550
Document Title:	Philips Lighting Comments on Title 24 2019 Express Terms
Description:	N/A
Filer:	System
Organization:	Philips Lighting
Submitter Role:	Public
Submission Date:	10/19/2017 4:39:45 PM
Docketed Date:	10/19/2017

Comment Received From: Kelly Seeger
Submitted On: 10/19/2017
Docket Number: 17-BSTD-01

Philips Lighting Comments on Title 24 2019 Express Terms

Additional submitted attachment is included below.

PHILIPS

October 20, 2017

Submitted via website: https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=17-BSTD-01

Mr. Payam Bozorgchami
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Docket No.: 17BSTD-01

Philips Lighting Comments on the Express Terms for the 2019 California Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 6

Dear Mr. Bozorgchami,

Philips Lighting appreciates the opportunity to provide the attached comments on the Express Terms for the 2019 California Building Energy Efficiency Standards California Code of Regulations, Title 24, Part 6.

Philips Lighting is a global leader in lighting products, systems, and services. Our understanding of how lighting positively affects people coupled with our deep technological know-how enable us to deliver digital lighting innovations that unlock new business value, deliver rich user experiences and help to improve lives. Serving professional and consumer markets, we sell more energy efficient LED lighting than any other company. We lead the industry in connected lighting systems and services, leveraging the Internet of Things to take light beyond illumination and transform homes, buildings, and urban spaces.

Please contact me if you have any questions about these comments.

Sincerely,

Kelly M. Seeger, MSc, LC, IES, LEED AP
Technical Policy Manager, Building Codes & Standards
Standards and Regulations Americas
Philips Lighting
Tel: +1 (781) 825-3312
email: kelly.seeger@philips.com

PHILIPS

Philips Lighting Comments on the Express Terms for the 2019 California Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 6

We thank the Energy Commission for improving the way of working with industry during the 2019 code cycle. We sincerely appreciate the willingness of Staff to dialogue on comments and concerns, and work through proposals.

Section 10-106

We recommend that the Energy Commission further consider the language in 10-106(a)2 and 10-106(b)3 as these sections seem to contradict each other. We recommend that the language in 10-106(a)2 be changed to reflect the intent of 10-106(b)3.

Section 100.1 - Definitions and Rules of Construction

We are unable to find the term 'narrow band spectrum' in the Building Energy Efficiency Standards other than as a defined term in Section 100.1. If the term is not used in the Standard, it should be removed.

We appreciate the efforts of the Energy Commission to clarify the definitions for automatic scheduling control, dimmer, motion sensor, partial-on occupant sensor, and partial-off occupant sensor. We believe that in all cases the changes made are an improvement and clarify use of the terms.

Section 110.9 - Mandatory Requirements for Lighting Control Devices and Systems, Ballasts, and Luminaires

For 110.9(b)1 through 110.9(b)5, Title 20 references have been removed for lighting controls requirements and explicitly defined requirements have been added. We have concerns that this treatment of the code may lead to definitions with different or additional language in multiple places and the possibility of misalignment (i.e. for Astronomical Time Switch Controls T24 express language Sec 110.9 (b)(1)(B)iv and T20 1605.3(l)(2)(C)v). Although the intent may be the same, this separation can lead to different interpretations. Requirements should remain in Title 20 and be referenced in Title 24.

Also concerning is that it may become increasingly confusing for users of the code to know whether Title 24 or Title 20 has precedence in situations where revisions are made to Title 20 that are not yet incorporated into Title 24.

While we appreciate the desire of the Energy Commission to separate the two Standards so that each may stand alone, we believe this is impractical because of the nature of the Standards. Title 20 is the Appliance Efficiency Standards for the State of California governing what can be sold into the State, while Title 24 is the building code and governs what can be installed in buildings in accordance with the requirements of Title 20. Title 20 is clearly the overarching Standard and its requirements should be referenced in Title 24.

PHILIPS

Section 130.1 – Mandatory Indoor Lighting Controls

130.1(c)3 Automatic Shut-OFF Controls Areas Where Occupant Sensing Controls are Required

We support the changes to the language of 130.1(c)3 as the proposed changes simplify the language for occupancy sensing requirements and the removal of separate sections for Partial On/Partial Off sensors adds clarity.

130.1(f) Controls Interactions

We support the inclusion of this new section to define controls interactions as it adds much needed clarification for the interaction and functionality of installed lighting controls.

Section 130.2 - Outdoor Lighting Controls and Equipment

130.2(b) Luminaire Cutoff Requirements

We continue to oppose the reduction to the exemption for luminaire cutoff requirements. The Energy Commission is proposing that the maximum zonal lumen requirements (BUG ratings) of Title 24, Part 11, Section 5.106.8 (CA Green Building Standards Code, CALGreen) apply to all outdoor luminaires > 30 watts. We are concerned that the proposed reduction (from 150 Watts) of this exemption may exclude some efficient decorative and specialty luminaires that cannot meet the BUG requirements and would limit the choices of designers and owners to specify and install these types of outdoor lighting.

Section 130.2(c) Total Wattage on an Occupancy Control

We continue to oppose a wattage limit for occupancy controls. We think that the importance of both wattage limits and area limits for occupancy-based controls will decline as the market moves beyond traditional control installations and toward networked, site-wide outdoor lighting systems. The control requirements already in place within the code ensure energy savings levels. The 15,000 sq. ft. maximum area that the proposed control wattage limit is derived from was more appropriate a number of years ago when occupancy-based control meant a specific coverage area per control device and standalone, i.e., non-connected luminaires.

Section 140.6 Prescriptive Requirements for Indoor Lighting

Section 140.6(a)4. Luminaire Classification and Power Adjustment

We commend the Energy Commission on the proposed inclusion of an additional lighting power allowance for tunable-white luminaires and dim-to-warm luminaires in the 2019 Building Energy Efficiency Standards. We believe this will be a promising way to encourage usage and market acceptance for dynamic lighting

which offers both energy and non-energy benefits (NEBs)[1] provided several important changes are incorporated.

We recommend that the language of the allowance be modified as follows. These modifications will increase both the applicability of the allowance and encourage the installation of tunable-white and dim-to-warm LED lighting systems in buildings which we believe is the intent of this additional power allowance.

4. **Luminaire Classification and Power Adjustment.**

A. Luminaire Classification and Power shall be determined in accordance with Section 130.0(c).

B. Additional Power Allowed for ~~Small Aperture~~ Tunable-White and Dim-to-Warm Luminaires. For ~~qualifying small aperture~~ tunable-white and dim-to-warm LED luminaires, the actual lighting power of these luminaires can be calculated by multiplying their maximum rated wattage by 0.75. Qualifying luminaires shall meet all of the following:

~~i. Small Aperture. Qualifying luminaires longer than 18 inches shall be no wider than four inches.Qualifying luminaires with a length of 18 inches or less shall be no wider than eight inches.~~

ii. Color Changing. Qualifying tunable-white luminaires shall be capable of a color change greater than or equal to 2000 Kelvin correlated color temperature (CCT). Qualifying dim-to-warm luminaires shall be capable of color change greater than or equal to 500 Kelvin CCT.

iii. Controls. Qualifying luminaires shall be connected to controls that allows color changing of the luminaires.

First, the small aperture criteria should be removed. The fact is that tunable-white and dim-to-warm luminaires are available now and will continue to be developed in many shapes, sizes, and form factors[2]. Spectrally tuned LED luminaires are in no way limited to small aperture form factors and efficacy, especially as part of multi-channel LED systems, changes irrespective of aperture size. 'Small aperture does not accurately describe or classify tunable-white and dim-to-warm luminaires.

Tunable-white luminaires and dim-to-warm luminaires are installed and will continue to be installed as part of multi-channel LED systems. In our comments to the Energy Commission on the Draft CASE Reports (June 2017), we provided a detailed analysis of tunable-white luminaire efficacy. That analysis highlighted the reality that in multi-channel LED systems, luminaire efficacy does not follow a predictable pattern. From

[1] NEBs include benefits such as improved occupant comfort and well-being, tenant satisfaction, reduced absenteeism, increased productivity, quality of light, personal control, meeting corporate sustainability goals, reduced maintenance.
[2] Please see http://www.usa.lighting.philips.com/products/product-highlights/tunable-white-technology

the data we provided, it was also illustrated that the relationships between efficacy, light output, power, and color are also not constant in a variable CCT system[3].

As a result, it is not possible to make assumptions about luminaire efficacy for tunable-white and dim-to-warm luminaires without knowing the details of the electrical circuitry and board design, the efficacies of the LEDs in each channel, and the number of channels in the system at a minimum.

Therefore, we strongly recommend that 'small aperture' not be required for use of the additional lighting power allowance for tunable-white and dim-to-warm luminaires that the Energy Commission proposes.

Second, healthcare facilities and hospitals are the primary location for the installation of spectrally tuned lighting systems for circadian support and wellbeing. However, we believe there is solid support for broad application of tunable-white and dim-to-warm luminaires, as part of dynamic interior environments. This support will continue to grow and expand as metrics to measure non-energy benefits are developed and implemented. Clearly, dynamic lighting environments are beneficial to occupants in many applications, including offices and classrooms. Creating engaging healthy spaces that increase occupant comfort and wellbeing is not limited to healthcare applications, and is indeed highly relevant and applicable to today's schools, offices, and retail spaces.

We strongly encourage the Energy Commission to broaden the allowed space types for the proposed power allowance for tunable-white and dim-to-warm luminaires to include office and conference spaces, classrooms and childcare spaces, multipurpose rooms, gymnasiums, retail spaces, and hospitality and dining spaces at a minimum.

Section 140.6(c)2.A Area Category Method

We strongly support the inclusion of language that permits the user to select a reasonably equivalent type if the primary function area type is not listed in Table 140.6-C when determining the lighting power allowance for an indoor space. We commend the Energy Commission on the alignment of this language with ANSI/ASHRAE/IES 90.1-2016, as it will make the determination of indoor lighting power allowances easier for all users of the code.

Section 141.0 – Nonresidential, High-Rise Residential, and Hotel/Motel Occupancies – Additions, Alterations, and Repairs

Section 141.0(b)2I and Table 141.0-E

We applaud and support the Energy Commission's decision to rewrite the code language for lighting alterations. Removal of the alteration sub-types (entire luminaire modifications, luminaire component modifications, and lighting wiring modifications) results in language that is significantly simpler and clearer

[3] Please see Philips Lighting comments on the Draft CASE Reports for Title 24 2019 submitted to Docket No. 17BSTD-01.

in meaning than the existing language. We also appreciate the Energy Commission's consideration of the California Energy Alliance CASE proposal that generated much of this language.

Users of the code could further benefit from the addition of a brief description of the control requirement described by each section number in Table 141.0-E. This addition would prevent the reader from having to jump back and forth between pages in the code to learn requirements, enhancing understanding and efficient use of the code.

We bring to the attention of Staff that for automatic shut-off controls, requirements for 130.1(c)7 and 130.1(c)8 listed in Table 141.0-E appear to have been removed from 130.1(c). We assume that this is an oversight and will be corrected.

Section 150.0

Section 150.0(k)B.

The Express Terms adds following language on General Lighting in Section 150.0(k)B:

> (k) **Residential Lighting.**
>
> 1. **Luminaire Requirements**
>
> A. **Luminaire Efficacy.** All installed luminaires shall be high-efficacy in accordance with TABLE 150.0-A.
>
> B. **General Lighting.** All general lighting in habitable spaces shall be dimmable and capable of providing a correlated color temperature of 3500K or less.

The proposed language mandates a maximum correlated color temperature of 3500 K in low-rise residential applications. Some cultures prefer cooler color temperatures and the Building Energy Efficiency Standards should not remove the option to select higher (cooler) color temperatures if it is preferred.

Joint Appendices

JA 8.2 Certification of Test Labs

For Title 20 products, the testing lab must be approved by the Energy Commission; NVLAP accreditation is not required. We encourage the Energy Commission to harmonize and adopt the Title 20 accreditation requirements into Title 24.

JA 8.3.1 Efficacy Test

The phrase 'efficacy at full light output' is unclear. Is the intent of this language to indicate that the efficacy of the product is to be tested without a dimmer? If that is indeed the case, then it would be less ambiguous for the language to say 'efficacy of product measured without a dimmer' instead of at 'efficacy at full light output'.

Efficacy measured without a dimmer ~~at full light output~~ shall be determined by the following test procedures, as applicable to the type of light source…

JA 8.3.2 Power Factor Test

In the second to last sentence, "For lamps, …", change 'average measured values' to 'average measured value'.

JA 8.3.3 Start Time Test

We oppose an allowance for a product that has a specific feature, such as a preprogrammed fade-in, which may favor manufacturers that incorporate it. What is to prevent a manufacturer from declaring that their product has this feature and using this allowance when in fact it does not? How will the Energy Commission police the application of this feature? It is also unclear how to determine when the device begins to follow its preprogrammed fade-in curve.

ENERGY STAR is proposing a very similar change in their starting test procedure, though their procedure is feature independent, so to speak. We recommend that the Energy Commission adopt the recently revised ENERGY STAR procedure without modification, whether Energy Star ultimately makes the change or not.

For a light source with 0.2 watts of standby power or less, the proposed language defines the start time as "… the time between the sending of an on signal to the device and the initial plateau." How does a laboratory determine when a signal is sent to the device (which may be sent wirelessly), to trigger the measurement of start time? It should be kept in mind that the device is already consuming a low amount of power (the mains voltage is 'on'), thus the input power to the lamp/luminaire cannot be used as a trigger. If the lab cannot accurately measure this signal, they may wait until light is produced, resulting in artificially short start times. It should also be clarified which test method should be used if a light source consumes more than 0.2 watts in standby mode as this is unclear from the proposed language.

We continue our opposition to a limit of 0.2 watts for standby power of connected lighting. The appropriate limit for standby power should be set by considering the needs & wants of the user and the functionality to be provided. We do not believe it is the intent of the Energy Commission to stop innovation in lighting, but setting a limit of 0.2 watts for standby power will do just that. While it is technically feasible to have a lamp which consumes only 0.2 watts in standby mode, lamps with this amount of standby power are typically a dimming-only product and run one of a limited number of wireless operating protocols. This functionality is the typical status-quo and is neither smart nor innovative. Limiting consumption in standby mode to 0.2 watts has consequences:

- Beyond-lighting functionality limited to dimming
- No color tuning or color changing
- Features such as embedded Bluetooth speakers, Wi-Fi repeaters, etc. are not possible
- Features that could save energy, such as integrated occupancy or daylight sensing, are not possible

We recommend that the Energy Commission align with ENERGY STAR and adopt 0.5 W for standby power for all lamps with integral controls[4] and 1.0 Watts for luminaires with integral motion sensors, occupancy sensors or photo-sensors, or connected functionality[5].

JA 8.3.7 Tests for Minimum Dimming Level, Flicker, and Audible Noise

We applaud the CEC's decision to allow light sources to be tested for flicker using either Joint Appendix 10 or NEMA 77-2017 Temporal Light Artifacts (TLA): Test Methods and Guidance for Acceptance Criteria Standard. This is a positive step forward for the Building Energy Efficiency Standards.

JA 8.4.1 Luminous Efficacy

We oppose the use of 'full light output' to describe the conditions for the measurement of efficacy of a light source. Please see our comments on JA 8.3.1 Efficacy Test.

JA 8.4.2 Power Factor

'Nominal rated wattage' is a misnomer. 'Rated wattage' and 'nominal wattage' are common industry terms. We suggest that 'nominal rated wattage' be changed to 'rated wattage' for clarity.

ENERGY STAR allows a power factor of 0.70 for most lamps. Some lamps <10W may have a power factor of 0.6. We recommend that the Energy Commission align the power factor requirements in JA 8 with those of ENERGY STAR for clarity and consistency. The requirement for power factor of 0.9 above 5W should be removed.

JA 8.4.4 Color Rendering

We continue to oppose the mandate of CRI 90 and R9 of 50 for all low-rise residential applications. Our reasoning is amply outlined in previous comments to the Energy Commission. If that reasoning is desired again, please let us know.

JA 8.4.6 Dimming, Reduced Flicker Operation and Audible Noise

The Energy Commission has proposed the adoption of NEMA 77-2017 as a Test Standard for flicker alongside JA 10 in Title 24. As such, the appropriate values in NEMA-77 should also be adopted and referenced.

As outlined in our verbal comments at the Staff Workshop on the Express Terms on October 5, 2017, we oppose the limit of 1.0 that is proposed for the stroboscopic effect visibility measure (SVM) because it is not the value that the NEMA-77 Standard recommends be used as the SVM value outside of laboratory conditions.

[4] ENERGY STAR Product Specification for Lamps v2.0
[5] ENERGY STAR Product Specification for Luminaires V2.0

A value of 1.0 is the detection threshold for SVM – the value at which 50% of observers would indicate that they do observe the effect and 50% would indicate do not when required to make a choice. A value of 1.0 does not indicate whether those observers find the observation disturbing, nor does it indicate whether there is a health-related effect. Some detection of stroboscopic effect is acceptable because motion is necessary to see it.

NEMA-77-2017 is the most recent Standard on TLA and it brings together much of the current research to recommend a method of quantifying the visibility of TLA and to recommend initial broad application-dependent limits of TLA. The photometric recommendations and measurement methods are applicable to any lighting equipment (e.g., luminaires, light engines, self-ballasted lamps, drivers, and sensors) with any control system.

The application guidance for SVM for indoor application areas is a value of 1.6. This limit is a real-world acknowledgement that even if SVM is detectable under laboratory conditions, it is not objectionable in many normal conditions. Mass production screwbase LED lamps have been in the market with a SVM of 1.6 without complaint. We believe that adopting SVM as a flicker metric along with Pst to cover all frequencies less than 2000 Hz into Title 24 is a positive development.

We urge the Energy Commission to recognize the findings of NEMA-77 and adopt an SVM value of 1.6 for the 2019 Building Energy Efficiency Standards. 1.6 is a real-world value that is based on research, broadly applicable, and appropriate for the installation of lighting systems in buildings governed by the energy code.

JA 8.5 Marking

We note that JA 8.3.6 Elevated Temperature Life Test has been removed from JA 8. With the removal of this section, how does one determine if a product has passed an elevated temperature test and is safe for use in an elevated temperature installation? We understand the need for elevated temperature testing in an effort to ensure safe installation. We do not support a specific lamp marking for California.

Thank you for your consideration of Philips Lighting Comments on the Express Terms for the 2019 California Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 6.