

CODES AND STANDARDS ENHANCEMENT INITIATIVE (CASE)

Statewide Utility CASE Team Responses to Additional Stakeholder Comment Letters on the Proposed Title 24 Standards for Residential Lighting

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California Utilities Statewide Codes and Standards Team

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INTRODUCTION

This document contains the Statewide Utility Codes and Standards Enhancement (CASE) Team's responses to several stakeholder comment letters as they relate to the Residential Lighting CASE Report and the CEC's draft proposal for residential lighting. The stakeholder comments are in black text and the Statewide CASE Team's responses are in blue text.

NEMA COMMENT LETTER: DECEMBER 22, 2014 (POSTED DEC. 24, 2014)

Comments on Section 150

NEMA Comment 4. 150(k)1.C. (December 22 Letter)

Section 100.1 has added a new definition for a "recessed luminaire". Under this definition, a recessed luminaire is "a luminaire that is mounted above the ceiling or behind a wall or other surface with the opening of the luminaire level with the interior surface." This means that a recessed luminaire includes troffers as well as recessed sconces or hallway lights, as well as downlights. The requirements in this section include various thermal and insulation contact requirements that have never applied to this broader definition of recessed lighting. It also applies to spaces where there may not be any insulation, such as a wall. We do not understand why recessed lighting is subject to additional thermal requirements and must comply with JA8, regardless of light source type. As currently proposed, this section will essentially obsolete all fluorescent troffers and steplights. We acknowledge that the insulation contact is appropriate for downlights installed in a space with insulation; however the test methods have not been applied to other types of recessed luminaires. There is no technical justification for a recessed luminaire to comply with Joint Appendix JA8. There are also various inconsistencies in the references to JA8 because the requirements appear to focus on solid state lighting, but many of the tests do not apply to non-SSL technologies. Furthermore, the thresholds established would obsolete many energy-efficient and cost-effective recessed lighting solutions.

CASE Team Response to Comment 4. (December 22 Letter)

The definition for recessed luminaire comes from ANSI/IES RP-16-10, "Nomenclature and Definitions for Illuminating Engineering." In describing luminaire mounting, this is how this standard defined flush mounted or recessed luminaires: "A luminaire that is mounted above the ceiling (or behind a wall or other surface) with the opening of the luminaire level with the surface."¹ However, it appears that NEMA's concern is not so much the definition, but the requirement in Section 150(k)1C that pertain to recessed luminaires. The following is what was published for the 45 day language.

- C. **Recessed Luminaires in Ceilings.** Luminaires recessed into ceilings shall meet all of the following requirements:

¹ p. 46 Section 10.4 "Luminaire Mounting" ANSI/IES RP-16-10, "Nomenclature and Definitions for Illuminating Engineering." Illuminating Society of North America. New York. 2010

- i. Be listed, as defined in Section 100.1, for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and
- ii. Have a label that certifies the luminaire is airtight with air leakage less than 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283. An exhaust fan housing shall not be required to be certified airtight; and
- iii. Be sealed with a gasket or caulk between the luminaire housing and ceiling, and shall have all air leak paths between conditioned and unconditioned spaces sealed with a gasket or caulk; and
- iv. For luminaires with hardwired ballasts or drivers, allow ballast or driver maintenance and replacement to be readily accessible to building occupants from below the ceiling without requiring the cutting of holes in the ceiling; and
- v. Shall not contain screw base sockets; and
- vi. Shall contain light sources that comply with References Joint Appendix JA8 including the elevated temperature requirements of JA8.4.8 and shall not contain light sources that are labeled “not for use in enclosed fixtures” or “not for use in recessed fixtures.”

The NEMA comments above about recessed luminaires in walls are irrelevant since the code requirement in 150(k) is for “recessed luminaires in ceilings.”

In regards to test procedures being originally written for LEDs, we appreciate this comment and have intentionally called out technology-specific test procedures for issues such as light source stabilization where appropriate. However this standard is written to be performance based and not technology based. The CASE proposal stipulates that many of the test procedures originally written for LEDs are to be used for all sources “notwithstanding scope.” There is nothing technology specific to measuring light for lumen depreciation, flicker, CRI, R9, etc. However, if NEMA or NEMA members find that some of the test procedures are impossible to perform on a given technology this would be important information to relay to the Commission and the CASE Team as soon as possible – including the specifics of the test and the technology in question. We would very much welcome this type of productive comment.

NEMA Comment 5. 150.1(k)2.A. (December 22 Letter)

Interior Lighting Switching Devices and Controls –The CEC needs to add “leading-edge” to this because SSL 7A only cover leading-edge phase cut dimmers. We suggest the following change:

150.0(k)2. A. All leading –edge phase cut dimmers shall comply with NEMA SSL 7A.

CASE Team Response to comment 5. (December 22 Letter)

We agree with this edit. CEC made this change in the 45 day language.

Comments on JA8

NEMA Comment on JA8 (a) (December 22 Letter)

Since JA8 has now been modified to cover all high efficacy lighting and Section 150 requires all lighting to be high efficacy, there are a variety of test methods and/or reporting requirements applicable to these products that are technically flawed. Many of the requirements appear to relate to LED test methods for light sources or lamps, but the draft text would cover all high efficacy lighting including luminaires. The joint appendix needs substantial work to clarify whether requirements apply to a lamp, LED board or luminaire.

CASE Team Response to Comment (a) (December 22 Letter)

The proposals attempted to specify each existing test procedures would be used for any source complying with JA8. However, if there are any test procedure references that are technically flawed (i.e. a specific test procedure could not be utilized for certain light source technologies), further suggestions from NEMA would be greatly appreciated.

NEMA Comment on JA8 (c) (December 22 Letter)

In most cases, the Commission has not provided the technical justification for the quality metrics or thresholds. Some thresholds reference levels that are inconsistent with industry standards or relate to areas where ongoing research is being conducted to establish industry standards.

CASE Team Response to Comment (c) (December 22 Letter)

The proposals attempted to be consistent with industry standards and test procedures. More specific feedback from NEMA would be appreciated where ongoing research would impact the proposal.

NEMA Comment on JA8 (d) (December 22 Letter)

The scope of JA8 covers all LED sources well as any sources not included in Table 150.0-A. This approach raises concerns because any new lighting technology is subject to JA8, even if the criteria do not apply to the new technology. For instance, organic LED lighting would be subject to the requirements of JA8. Many OLED products are very low wattage any may not meet JA8 efficacy, color or electrical requirements. Therefore, the Commission is restricting the introduction of new and promising energy efficient technologies through the misapplication of JA8. There may be other lighting technologies introduced in the future that would be restricted for use in California due to the requirements of JA8. We recommend that any luminaires that are 5 watts or less be exempt from the requirements of JA8. Furthermore, because CEC is extending this appendix to lamps through reference to the T24 Joint Appendices in lamp requirements we also propose that lamps 5 watts or less also be excluded from these requirements in the Appendix. This 5w level for lamps is consistent with programs such as ENERGY STAR Lamps which uses 5w as a threshold for changes to requirements such as power factor.

CASE Team Response to Comment (d) (December 22 Letter)

The proposed efficacy, electrical and quality requirements were designed to ensure a minimum level of product performance, regardless of technology type. If future technologies (such as OLED) are introduced that cannot meet these requirements, the intent of the proposed standard is to prevent them from being installed in California new homes. For example, any light source providing less than 45 lpw would not be considered a 'high efficacy' source and would not be permitted by the building code.

That said, with respect to OLED technology, while we agree that currently OLED sources do tend to have lower average efficacies than LEDs, 45 lpw is not an aggressive target even for OLED – many products are available that far exceed 45 lpw (including commercial products that have been available above 100 lpw for over a year, and other lab demonstrations of OLEDs achieving 130 – 160 lpw). OLED products are also available at CRI's above 90, with drivers that provide 0.90 Power Factor; etc. We are not aware of any inherent reasons why OLED products would not be able to meet JA8.

NEMA Comment on JA8 (e) (December 22 Letter)

Many luminaires are now being designed to provide color changing or color tunable lighting, and this feature will be negatively impacted by the CRI and CCT requirements of JA8. Light sources or

luminaires that provide color changing or color tunable lighting should be excluded from the color requirements of JA8.

CASE Team Response to Comment (e) (December 22 Letter)

The requirement reads as follows: “The light source shall be capable of providing a nominal Correlated Color Temperature (CCT) that is 3000 Kelvin or less and within 0.0033 Duv of the black body locus in the 1976 CIE color space.” The term “capable of providing” was included to require that sources be capable of providing chromaticity similar to that of incandescents but to allow sources that can also provide other chromaticities and CCTs at well. In other words, warm dim products or other color changing products that provide a range of CCTs or Duv values will meet the JA8 requirements provided that they are at least capable of providing light at a CCT below 3000 and near the black body locus.

NEMA Comment on JA8 (f) (December 22 Letter)

As was indicated by the lighting industry at the June workshop, color temperature is a consumer preference and may be warm or cool depending on the furnishings in the space. In addition, color rendering may need to be high in some applications, but not so high in others. Mandating a 3000K or less within 0.0033 Duv may not represent customer preference for a color above or below the BB curve. The current color proposals mandate a superior color performance that may not be cost-effective for certain areas of the home or multi-family facility. We recommend that the regulations be written to allow the consumer to evaluate the performance and cost tradeoffs, since this information is widely available on the Lighting Facts label, and make the decision about what product meets their needs.

We recommended at the June workshop that the builder or designer be required to advise the owner regarding the selection of light sources /luminaires and their color characteristics. A process could easily be put in place to have an owner sign off, validating that the owner is aware of the color performance that will be installed. This allows the end user to select based on their preference and evaluate the cost tradeoffs. A minimum CRI may be warranted to ensure that poor performing products are not installed. A 90 CRI may be desirable for some consumers in certain areas such as a kitchen or bathroom, while an 80 CRI may be sufficient in a garage. The 2013 Standard allowed flexibility since low-efficacy lighting was allowed to a certain extent in a home. The 2016 proposals establish a minimum 90 CRI for all LED lighting in all areas of a home, but this position has never been technically validated to reflect consumer preference nor has it been illustrated to be cost-effective. See our comment (k) below.

CASE Team Response to Comment (f) (December 22 Letter)

The code does not require 90CRI or impose any chromaticity or CCT requirements for legacy high efficacy sources, including pin based linear fluorescent, GU24 sockets, pulse start metal halide, high pressure sodium, etc. If consumers or builders would prefer to put these sources in various places throughout the home, these will still be allowed, just as they are allowed in the current code. Further, JA8 sources are allowed to provide a wide range of CCT and Duv, as long as they are color tunable and can also provide a warm CCT near the black body locus. These requirements were found to be cost-effective.

NEMA Comment on JA8 (g) (December 22 Letter)

As indicated at the June workshop, the requirements of JA8 now apply to all luminaires including outdoor lighting. Many of the requirements, such as CRI and CCT, are not appropriate for outdoor lighting. The Commission should reevaluate the requirements relative to outdoor lighting and provide the technical justification for any quality requirements for outdoor lighting beyond efficacy.

CASE Team Response to Comment (g) (December 22 Letter)

We agree with this comment and suggest the CEC exempt dedicated LED outdoor luminaires from the JA8 requirements.

NEMA Comment on JA8 (h) (December 22 Letter)

The marking requirements under JA8.5 are not reasonable and in many cases are not feasible. The performance levels are already listed on the packaging in the Lighting Facts label. It is unclear why the manufacturing date is needed since Title 24 is based on the building installation, not when the product was manufactured. However the manufacturing date is listed on the UL label. These markings seem to be included to help facilitate the inspection; however, we encourage the Commission to consider inspector training and builder/designer documentation rather than attempting to put information on a small product where the performance and/or aesthetics may be compromised.

CASE Team Response to comment (h) (December 22 Letter)

The label is critical to the success of this measure because it enables building inspectors to quickly confirm that luminaires have JA8 compliant products installed (particularly the “CA T-24 JA8 compliant” marking), if stakeholders feel that “CA T-24 JA8 compliant” is too long, an abbreviated version of this marking should be considered such as “T24 JA8” or “JA8-16” to identify the specific (2016) code cycle.

Date of manufacture is extremely valuable for consumers in the event of early failure. This will provide consumers with perspective on product reliability to help inform future purchases, and to help in claiming any warranties offered on the products. Though date of manufacture is not a substitute for purchase date, it generates an outside bound for the consumer. The date of purchase in all cases will be after the date of manufacture, so in the event of a failed product four years after the date of the manufacture, the consumer will know that *at most*, they’ve owned the product for four years.

Other proposed aspects of the marking (performance metrics including, lumens, CCT, CRI, etc.) were proposed so that consumers will be able to identify replacement lamps/products when these products eventually fail. These marking may not be as critical for integral luminaires that are not designed to have replacement lamps installed in them, though there should be plenty of space on these luminaires (even if on the back side of the mounting), and many of these markings are already often included, so we are not aware of any hardship associated with these requirements.

We recognize that some of these requirements may be challenging for especially small products such as G9, G4, and GY6.35 based lamps, with diameters that are often less than 1”. We agree that the Commission should consider an alternate strategy for some of these lamp types that are too small to accommodate all of these data points. Though we believe at the very least, a “JA8-16” or equivalent compliance marking should be required, an exception for some of the other markings may be warranted for lamps with diameters below a certain threshold. We would like to work further with the Commission to identify a suitable strategy.

NEMA Comment on JA8 (i) (December 22 Letter)

Regarding CRI markings, we note to the CEC that there is an acceptable IEC marking system which simplifies the process. If the CEC moves to require CRI/CCT markings on lamps, this system should be used and could be included by adding text such as “The IEC62732 system may be used to identify the CRI and CCT of the light source.”

CASE Team Response to comment (i) (December 22 Letter)

It is not clear to us why this label would substantially simplify the marking process for manufacturers, but if it does, we agree, this should be considered by the CEC, provided that the color temperature and CRI could still be easily interpreted by lay people.

NEMA Comment on JA8 (k) (December 22 Letter)

The desire by California to require higher CRI as shown in the JA8 Appendix is not consistent with a growing number of global technical experts demonstrating mounting evidence that a color rendering index above 80 is not justified. This is shown in the following documents:

- <http://www.ies.org/PDF/PositionStatements/PS-8-14.pdf> from the Illuminating Engineering Society
- http://www.lightingeurope.org/uploads/files/LightingEurope_position_paper_on_color_quality_06102014.pdf from LightingEurope
- http://www.edisonfoundation.net/iei/Documents/IEE_Evaluation%20of%20Best-in-Class%20LED_Final.pdf from Edison Foundation IEE
- <http://www.nema.org/Policy/Documents/NEMA%20Lighting%20Division%20Position%20Paper%20on%20Color%20Rendering%20Index%2021Nov14.pdf> from NEMA
- <http://www.regulations.gov/contentStreamer?objectId=09000064817aed61&disposition=attachm&contentType=pdf> from Dr. Kevin Houser of Penn State
- <http://www.lrc.rpi.edu/programs/solidstate/pdf/Freyssinier-ColorMetrics-SPIE2010.pdf> from The Lighting Research Center at Rensselaer Polytechnic Institute

CASE Team Response to Comment (k) (December 22 Letter)

The first paper referenced (by IES), was published without the consent or involvement of the IES' own Color Committee and after its publication was quite controversial. Many IES members asked for this paper to be withdrawn and continue to do so. Though there is agreement that the CRI R_a value (which is the average of the R1 through R8 color samples), is not by itself a perfect metric, there absolutely is not consensus that it should not be used in any standards development processes until a revised metric is adopted. Most agree that R_a , when used in conjunction with a minimum R9 value (deep, saturated red rendering) is sufficient to ensure high color accuracy. Furthermore, the paper points out that changes are underway to the CRI metric. This is true, however, the new CRI metric, when complete will not be fundamentally different than the old one; the primary difference will be the addition of more color samples. It will be an improvement over the R_a value current used, but because the current Title 24 proposal includes both an R_a requirement and an R9 requirement, the current proposal is already significantly better than an R_a requirement by itself.

The second paper, drafted by LightingEurope, the association of lighting manufacturers in Europe (similar to NEMA) is a position paper that actually agrees with the continued use of CRI as the metric for color fidelity. The main point of the paper is that color fidelity is not the only aspect of color quality, but it acknowledges that CRI is one measure of color quality.

The third paper explains a consumer preference study that was conducted a couple of years ago. In the experiment, PAR lamps were shown on a white wall and participants were asked to rank them. As would be expected, the higher CRI sources did not receive any improved scores / preferences by the studies' participants. CRI is a measure of color fidelity so an experiment that doesn't utilize an array of colors is not designed to assess CRI.

The fourth paper is a position paper published by NEMA. We support the response to this piece submitted to the CEC by professor Lorne Whitehead, a highly regarded color scientist, and member of the International Commission on Illumination (CIE) committee currently working on color rendering metrics. Professor Whitehead's comments are available here:

http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-11-03_workshop/comments/A_Critical_Review_of_the_Recent_NEMA_Position_Statement_on_the_Color_Rendering_Index_2015-01-27_TN-74388.pdf

The fifth letter discusses some of the shortcomings of R_a , but it does not address the CEC's specific proposal to require a high R_a value in conjunction with a minimum R9. This combination resolves those shortcomings. Further, the letter predicts the publication of a new CRI metric in fall of 2014, but we have not seen the new CRI metric yet. California cannot afford to wait indefinitely for a revised metric to ensure improved color fidelity in high efficacy sources.

The sixth paper suggests that Gamut Area Index (GAI) would be an additional metric that could complement the CRI metric. We agree that other metrics might augment CRI and would be good indications of other aspects of color performance. However, GAI and other metrics like it are not yet widely used in the industry (as opposed to CRI which is over 40 years old).

Comments on JA10

NEMA Comment on JA10 (December 22 Letter)

The flicker thresholds proposed have not been technically justified and do not accurately represent the flicker potential of the light source, luminaire and dimmer operating as a system. The proposed standard focuses on flicker percent rather than flicker index, which is the most common approach to quantifying flicker. The proposed restriction on flicker percent will eliminate some energy efficient and cost effective step drivers for residential applications. There is a series of ongoing research in the area of flicker. It is premature, and potentially harmful, for the Commission to establish arbitrary levels at this time. We refer the Commission to our recent comments to Title 20's rulemaking regarding Flicker.³ While NEMA agrees that flicker test procedures are needed, and our members are actively participating in these efforts internally and externally to the association, we disagree with CEC's attempts to be the source of these test procedures. There are several efforts underway in groups such as IEEE 1789 (document in ballot), IEC, NEMA (SSL-7B) and at research facilities such as LRC (ASSIST program) and others. CEC should defer to the scientific lighting community on this subject and not undermine their efforts with a one-off State-specific requirement which has not been adequately tested. We again refer to our comments to CEC Title 20 on the issues regarding the inadequacy of the Flicker Test proposal development process.

The draft language in Section JA10.2 is confusing and should be withdrawn. For example, it is unclear which dimmer(s) are to be used. As written the test arguably must be repeated for every dimmer/lamp combination, and every number of lamps that can be used, and the test results reported and enforced by CEC. The uncertainty and administrative burden should not be overlooked. Our point is that there is a huge amount of testing required to confirm compatibility using the proposed California-specific approach. This testing will rapidly become burdensome, and will never ensure 100% compatibility.

The CEC should remain compliant with existing processes, which require manufacturers to maintain compatibility lists for dimmer/lamp combinations in writing or on their websites (such as is now done in ENERGY STAR). In the November 3rd public workshop, it was stated that the proposed test is needed to enable compliance with existing Title 20 requirements. We understand this sentiment. It was further stated that while this test is not harmonized with existing requirements, "something is better than

nothing”. We disagree. By establishing a test procedure, the CEC is implying that it will effectively address the issue of flicker. It will not. Nor is it based on a statistically significant study and data set.

The proposed test will become an added burden on manufacturers for testing and reporting and those costs will be passed on to the consumer, without proof that the flicker issue will be effectively addressed and resolved. Additionally, the approach used by CEC in establishing the proposed flicker requirements at the component level ignores the reality that flicker is caused by interaction of two or more discrete components. The approach in JA10 with respect to how it is intended to apply to flicker and solve the perceived problem is flawed. This inaccuracy means that individual components cannot be tested and reported as compliant, due to the infinite numbers of light source to dimmer combinations. This raises possible enforcement and legal complications. For all these reasons, the CEC should wait for current flicker specifications development activities to conclude.

Following their publication, NEMA is happy to work with CEC staff and stakeholders to collaborate in the incorporation of these standards into Title 20 and Title 24.

Conclusion:

NEMA encourages the CEC to delete JA10.

CASE Team Response to comment on JA10 (December 22 Letter)

Title 24 has had the same requirements for “low flicker operation” of dimming controls since the 2008 Standards. This requirement pertains to dimming sources controlled by dimming controls that have less than 30% amplitude modulation for frequencies less than 200 Hz. The metric used (amplitude modulation or percent flicker) is a commonly used metric in the lighting industry and is officially defined in the IES handbook. Despite the adoption of this 2008 standard, other groups have not stepped forward and developed a test method. Further, California has been publically working on this flicker test procedure since Spring of 2014; NEMA has been aware of this effort but has not provided any data on how light sources perform in terms of flicker, how their products perform using the proposed test method, nor has NEMA proposed improvements to the test procedure. The CASE Team has developed the proposed test method based on work conducted by Pacific Northwest National Laboratory and made use of analytic methodology described by Brad Lehman at Northeastern University (who is also the chairman of the IEEE PAR 1789 committee). The CASE Team has also been in touch with the ENERGY STAR program as they have been drafting their draft criteria for the ENERGY STAR Luminaires Version 2 specification. ENERGY STAR is considering a reporting methodology that would harmonize well with the requirements in JA10.

NEMA refers to the IEEE PAR 1789 committee which is working on a flicker standard. As described in the Residential Lighting CASE Report, the proposed requirement is less stringent than the proposed flicker guideline being developed in IEEE PAR 1789. Figure 3 from the CASE Report is included below.² Though the California “low flicker operation” requirement is less stringent than setting a standard at what is considered to be non-high risk, we believe that once flicker is quantified and published in a CEC flicker database that manufacturers will voluntarily design to even lower amounts of flicker. Thus, the proposal does not require more stringent flicker requirements than what have been in place since 2008. However, the proposal does recognize that flicker is not just a function of the control but also of the light source and its driver or ballast.

² Page 18. http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-06-24_workshop/final_case_reports/2016_T24_CASE_Report-Res_Lighting_Oct2014-V5.pdf.

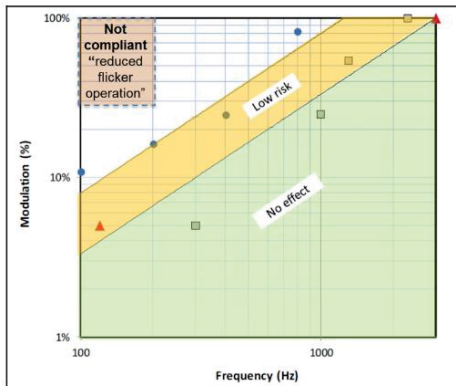


Figure 3: Low risk and no observable effect regions for flicker (Lehman et .a 2014) overlaid with region of graph not compliant with "reduced flicker operation" requirement

Furthermore, multiple manufacturers and other stakeholders, including members of the PAR 1789 committee, have submitted comments to the CEC docket in support of flicker requirements and/or the proposed JA10 flicker test procedure, including but not limited to the following:

- Cree, a NEMA member and one of the largest LED manufacturers in the U.S., specifically supported the CEC’s proposed flicker requirements and the JA10 test procedure in a comment letter dated November 24, 2014.³
- AccurIC, a manufacturer of LED drivers and a member of the IEEE committee developing flicker standard PAR1789, also supported the CEC’s efforts in a comment letter dated January 5, 2015.⁴ In fact, AccurIC recommended that flicker requirements should be significantly stronger than what was proposed by the CASE Team and CEC, and the comment agreed that the proposed JA10 test procedure would be suitable to test LED lamps for adherence to the proposed flicker standard.
- Jade Sky, a California driver IC manufacturer, specifically supported CEC’s flicker proposal in comments docketed September 9, 2014.⁵
- Professor Arnold Wilkins, University of Essex, a member of the IEEE committee developing flicker standard PAR1789, commented to the docket on February 4, 2015 recommending that flicker requirements should be significantly stronger than what was proposed by the CASE Team and CEC. He also stated that it was a “major innovation” to at least begin requiring the collection of flicker test data.⁶

³ http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-11-03_workshop/comments/Cree_Comments_2014-11-24_TN-74046.pdf.

⁴ http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-11-03_workshop/comments/AccurIC_Ltd_Comments_Regarding_the_Proposed_Voluntary_California_Quality_LED_Lamp_Specification_2015-02-06_TN-74475.pdf

⁵ http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/prerulemaking_comments/Jade_Sky_Technologies_Comments_on_Title_24_Building_Standards_2014-09-09_TN-73752.pdf

⁶ http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-11-03_workshop/comments/University_of_Essex_-_Arnold_Wilkins_Comment_re_2016_Building_Standards_Update_2015-02-04_TN-74467.pdf

We appreciate NEMA's comment indicating confusion with some of the language in JA10.2, and we believe this section has been clarified by the Commission in its most recent iteration of the code language. As currently stated the manufacturer of a JA8 complaint light source has to show compliance with at least one dimmer of each dimmer *type* (i.e. forward phase, reverse phase, etc.) that is claimed to be compatible with the light source. The test method does not require testing on all combinations of compatible dimmer models or various numbers of light source samples wired with each dimmer. Most light sources will be required to conduct less than three or four test, depending on how many dimmer types are being claimed as compatible. This can be further clarified in the Compliance Manual.

AMERICAN LIGHTING ASSOCIATION (ALA) COMMENT LETTER, JANUARY 29, 2015 (POSTED FEBRUARY 9, 2015)

ALA Comment 1

Section 150.0(k) 1.C.v. We believe that screw-based lamps should be allowed in all fixture types, including downlights, and the allowable bulb types regulated according to their efficacy or wattage rather than their base configuration. Requirement "v." limits the choice of products, restricts manufacturers from providing smaller, less expensive fixtures and is prescriptive rather than functional which limits new product development for this important luminaire type.

CASE Team Response to ALA Comment 1

Several other stakeholders have advocated for the requirement that screw-based sockets not be allowed in recessed ceiling luminaires, and NEMA comments seemed to support this proposal. Irrespective of outcome of the debate as to which types of bases should be allowed in recessed luminaires, it is very important that the light sources in these luminaires are high quality. According to the Residential Lighting CASE Report, half of the projected energy savings from the proposed changes to the standard come from recessed luminaires. Thus, the code change proposal recommends that all light sources in recessed luminaires be high quality, high efficacy light sources.

ALA Comment 2

Section 150.0(k)1.G.ii. This section reads, "The luminaires shall contain lamps that comply with Reference Joint Appendix JA8 and". We believe this wording may be interpreted to indicate that luminaires must be sold with lamps installed in the sockets of the luminaire. This is an unusual industry practice for screw-based lamps and would result in potential damage to both the lamps and the luminaire. We ask that the language be clarified so that lamps that comply with Reference Joint Appendix JA8 are "supplied" with the luminaire.

CASE Team Response to ALA Comment 2

Title 24 is enforced by building inspectors from local building departments. They do not inspect luminaires as they are shipped to new construction projects, but rather after they are installed by the builder. There would be no way for the building code to require a specific lamp be shipped to the job site within a luminaire. However, if it would help avoid confusion among luminaire manufacturers, the CASE Team would not object to revising the code language in 150.0(k). If a change is to be made, we would suggest: "At the time of building inspection, the luminaires shall have light sources installed that

comply with Reference Joint Appendix JA8.” Alternatively, this requirement could be clarified in the Compliance Manual or in subsequent documentation that will provide more information for LED lamp and luminaire manufacturers looking for more information about how to comply with JA8. This documentation will make it clear that the proposal does not mandate a high efficacy “bulb-in-the-box” approach which is used by luminaire (appliance) standards or specification (such as ENERGY STAR) but rather a building code requirement to be enforced at the time of inspection and also certified on the lighting schedule that is given to the new homeowner.

ALA Comment 3

JA8.5 Marking. The ALA is in agreement with NEMA (NEMA Comments dated 12/22/14) regarding the requirements to mark the individual lamps and fixtures with burdensome, special, California-only markings which raise costs and complicate ordering, shipping and stocking such products.

CASE Team Response to ALA Comment 3

The comment suggests that manufacturers would have to ship JA8 labeled products only to CA, and not anywhere else, and that this would complicate ordering, stocking, and shipping practices to have to get those products to California. First, whether the product carries a JA8 label or not, only products that meet JA8 will be allowed to be installed in new residential buildings in California – it will be up to the builders to make sure they are installing JA8 compliant sources, so they will be the ones ordering the products that they want to install. The existence of a label would not make it any more complicated to ensure that code compliant products are being installed in California. If anything it will make it easier for builders to confirm they are buying and installing the right products. Furthermore, we are not aware of any reason that products with a JA8 label could not be distributed and sold in other states around the country. In fact the existence of the JA8 label will help builders, retailers, and consumers around the country to identify these quality products.

In terms of the specific provisions of the label, we would re-iterate the comments made earlier in this document: the proposed markings are critical to the success of this measure because they enable building inspectors to quickly confirm that luminaires have JA8 compliant products installed (particularly the “CA T-24 JA8 compliant” marking). If an abbreviated version of this marking, or a “T24 JA8” logo would be more amenable to stakeholders, it should be considered. CEC would need to copyright whatever logo is used so that it can be inappropriately applied. Date of manufacturer is extremely valuable for consumers in the event of early failure. This will provide consumers with perspective on product reliability help inform future purchases, and to help in claiming any warranties offered on the products.

Other proposed aspects of the marking (performance metrics including, lumens, CCT, CRI, etc.) were proposed so that consumers will be able to identify replacement lamps/products when these products eventually fail. These marking may not be as critical for integral luminaires that are not designed to have replacement lamps installed in them. We recognize that some of these requirements may also be challenging for especially small products such as G9 shaped lamps, with diameters that are often less than 1 inch. If the commenter has specific suggestions for how to adjust the proposed marking requirements to make them less onerous for luminaires or small diameter lamps (without removing the “CA T-24 JA8 compliant” or equivalent logo, or the date of manufacture), that would be helpful and should be considered by the CEC.

ALA Comment 4

JA8.4.4 / Color Temperature. It is good to see that CCT values can be “3000 Kelvin or less ...”, but the restriction on Duv doesn't allow for the utilization and ongoing development of “warm dim” or other products where the user may wish to vary the CCT to suit the application.

CASE Team Response to ALA Comment 4

We agree with ALA that “warm dim” and other color changing capabilities are important. The requirement reads as follows: “The light source shall be capable of providing a nominal Correlated Color Temperature (CCT) that is 3000 Kelvin or less and within 0.0033 Duv of the black body locus in the 1976 CIE color space.” The term “capable of providing” was included to require that sources be capable of providing chromaticity similar to that of incandescents but to allow sources that can also provide other chromaticities and CCTs at well. In other words, warm dim products or other color changing products that provide a range of CCTs or Duv values will meet the JA8 requirements provided that they are at least capable of providing a CCT below 3000 and near the black body locus.

ALA Comment 5

Section 150.0(k).2.J. The ALA supports the use of controls as way to achieve greater energy-efficiency, however the use of occupancy sensors in bathrooms would prove to be overly burdensome.

CASE Team Response to ALA Comment 5

As the comment notes, controls are an important means to achieve energy efficiency. Bathrooms have some of the highest hours of use in residential buildings, and represent a prime opportunity for energy savings from controls. Note that the proposed language reads “at least one luminaire...shall be controlled by a vacancy sensor.” This allows flexibility to provide luminaires not controlled by vacancy sensors, and addresses safety concerns. In addition, the current Standards, as well as previous versions of the Standards, require vacancy controls for all low efficacy luminaires in bathrooms, so builders in California are familiar with the use of vacancy controls in bathrooms, and will be capable of meeting this requirement.