Universal Lighting Technologies

May 13th 2013

Mr. Andrew McAllister
Commissioner
California Energy Commission
1516 Ninth Street
Sacramento, California 95814

Universal Lighitng Technologies appreciates the opportunity to provide the attached information for the Rulemaking for Appliance Efficiency Regulations (Title 20)

Universal Lighitng Technologies is a subsidiary of Panasonic and a major supplier of lighting components in the America's. We are represented in California by 2 Distribution Agents that represent over 255 points of distribution within California.

Thanks for your consideration of this information, and if you have any questions please contact us.

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Universal is hesitant to support the development of a standard for dimming ballasts or LED at this time.

- Dimming Ballasts – These products already support energy efficiency, and today the CEC endorses the use of these products with requirements in Title 20 and Title 24.
    - Further any testing for efficiency of these products would need to be done at full light output – and for that reason any development should be worked on by a proficient standards organization that will consider North America and International Product Codes.
    - We would recommend the CEC to look at the NEMA standard LL-9 Dimming of T8 Fluorescent Lighting Systems http://www.nema.org/Standards/Pages/Dimming-of-T8-Fluorescent-Lighting-Systems.aspx
- LED – We believe that these products are the future of energy savings and offer significant benefit above traditional lighting. We do however feel that any regulation done to early could harm the consumer acceptance. There is no interoperability around LED today and compatibility is still being worked out – for this reason acting to soon could be detrimental in the use of LED in California.

This all said the following information is all we have to offer today to try to provide some help – we stress our preference above, and welcome a one on one conversation with the CEC.

For all lighting product categories (fluorescent dimming ballasts, LED lamps, and MR lamps), please provide data and discussion regarding:

a) Category definition and scope:
    1. Fluorescent dimming ballasts are typically made in one of five different performance types;
        - Phase dimming
        - Step dimming
        - Analog (0-10V) dimming
        - DALI
        - Power line carrier controlled dimming.
        - That is not to say there are no other types, but we find these are the most common.
    2. For information on LED and OLED driver types, the CEC might investigate the database managed by the U.S. Department of Energy's LED Lighting Facts Label program.
b) Standards (existing or under development):
    1. Some suggested reading and education standards include the following. For dimming; ANSI C82.11, NEMA LL9, ANSI C78.81, ANSI C78.901, ANSI C82.77, UL 935. For LED; UL8750, IEC60529, ANSI C136.67, C78.377, IES LM-79,IES LM-80, IES TM-15
c) Test procedures (existing or under development):
    1. Some suggested reading and education standards include the following. For dimming; ANSI C82.11, ANSI C78.375, ANSI C82.3, IES LM-9, IES LM-78, ANSI C82.77.
        - Be aware that we ULT also have designed our own internal tests around our QC and reliability.

2. For LED; ANSI C78.377, IES LM-79, IES LM-80 and, again, proprietary internal testing

d) Sources of test data (confidential or public):
   1. The CEC is invited to review the public information on the U.S. DOE's reporting website for regulated products (CCMS: https://www.regulations.doe.gov/ccms/).
   2. We believe that evaluating published specification sheets can cause issues as there are discrepancies on how testing is done are reported from manufacturer to manufacturer – this came apparent in the new DOE testing and they defaulted to actually testing field samples.

e) Energy use metrics (e.g., lumens vs. beam lumens per watt):
   1. The most common metrics are Lumens Per Watt (LPW), Ballast Luminous Efficiency (BLE) and Ballast Efficacy Factor (BEF). LED products today are mostly measured in terms of Lumens Per Watt.

f) Relevant performance indicators (The below list is not all-inclusive)
   1. For Dimming:
      - Watts - input power ranges from 10 to 150 watts typically
      - BLE (Ballast Luminous Efficiency) (but not while in the dimmed state)
      - BF (Ballast Factor) – typically ranges from 0.03 to 1.18
      - BEF (Ballast Efficacy Factor) – typically ranges from 0.7 to 1.5
      - PF(Power Factor) – typically ranges from 0.8 to 0.99
      - THD (Total Harmonic Distortion) – typically ranges from 2% to 20%
   2. For LED:
      - Watts – ranging anywhere from 5W to 150W
      - Lumens – typically ranging from 100 to 10,000
      - CCT – typically ranging from 2700 to 6500
      - CRI – often specified at >60, >70, >80, or >90
      - Standard Deviation of Color Matching (SDCM) - (2,3,6)

g) Range of typical performance for each indicator (given above)
   1. For fluorescent dimming ballasts a set formula is used to determine any given ballast's actual efficiency and the range of performance across a ballast type (an Instant Start 32 watt for example) will change with the number of lamps that are driven by the ballast. Therefore, ballast efficiency is not a single discrete number, it is systems and installation dependent.

h) Incremental costs of energy efficiency features:
   1. ULT is unwilling to discuss this publically – but is willing to have a confidential conversation with CEC.

i) Product development trends:
   1. ULT is unwilling to discuss this publically – but is willing to have a confidential conversation with CEC.

j) Market barriers to energy efficiency:
   1. No Comment.

k) Number of California small businesses associated with manufacture, sale, distribution, or installation.
   1. Addressed above

l) Commercial vs. residential vs. governmental sector sales:
   1. ULT is unwilling to discuss this publically – but is willing to have a confidential conversation with CEC.

m) How do consumers identify efficient products on the market?
   1. Another typical reference is individual product specification sheets widely available online and in catalogs.
   2. Another tool for identifying high-performance fluorescent ballasts is the NEMA Premium Ballast Program. NEMA Premium is a widely recognized trademark, and the NEMA Premium program is advertised to and well-known by building managers, specifiers, lighting designers and many utilities. Many partners in the program list qualified dimming ballasts. http://www.nema.org/Products/Pages/NEMA-Premium-Lighting-Programs.aspx
   3. Another well-known program is ENERGY STAR, which includes categories for LED lamps and LED Luminaires.

Data Requests: Fluorescent Dimming Ballasts

1. Logical product categorization for analysis. Market Share:
   a. ULT is unwilling to discuss this publically – but is willing to have a confidential conversation with CEC.
2. Features that impact efficiency across the dimming range and in standby mode, and options to improve efficiency:
   a. This varies by the design and protocol used to control the ballast. There is no hard or fast rule – would recommend a conversation with multiple manufacturers to understand fully.
3. Cost vs. ballast luminous efficiency (BLE):
   a. These products have not been evaluated against BLE – no comparison is available for us to make today
4. BLE and lamp arc power across the dimming range
   a. BLE will decrease with decreased light output/arc wattage
   b. Fixed losses in ballast do not change with dimming
   a. Filament voltage increases with decreasing lamp power
5. Typical range of color shift / flicker at dimmed levels:
   a. N/A.
6. Controller impact on energy consumption:
   a. No Comment

Data Requests: Light Emitting Diode (LED) Lamps

1. Logical product categorization for analysis:
   a. Market Share not reported
2. LM-79 and TM-21 reports:
   a. Confidential
3. Types of dimming circuitry & minimum dimming levels:
   a. LED lamps have been made to function with one or more of all the common dimming circuits today. Minimum dimming levels vary by manufacturer and by dimmer-lamp combinations at times.
4. Patent or proprietary technology issues:
   a. The LED market involves gigantic amounts of intellectual property. We advise the CEC to tread with caution and not rely on 3rd party observations for IP, rather the CEC should investigate IP issues for proposed regulations which dive into product function and performance.
5. Cost of improved color consistency & quality:

a. ULT cautions the CEC that higher CRI comes at a price of efficiency (lower lumens per watt) ULT suggests that the CEC review and use the NEMA SSL 4 for reference as this will streamline this process greatly.

Data Requests: Small Diameter Directional (MR) Lamps

ULT will not participate

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