



7200 Suter Road  
Coopersburg, PA 18036  
www.lutron.com

Gary Flamm  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

March 12, 2007

Dear Gary,

Attached is our follow up recommendations per Russ MacAdam's (Director, Lutron Electronics Co., Inc.) comments made at the hearing on February 26, 2007. The proposed changes are for Sections 119, 131, and 146 from the February 2007 revisions of the 2008 Building Energy Efficiency Standards. These recommendations are based primarily on energy savings and clarity. Let me know if have any questions or if you need more information. Thanks for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael Jouaneh". The signature is fluid and cursive, with a large initial "M" and "J".

Michael Jouaneh  
Marketing Analysis Manager  
Lutron Electronics Co., Inc.  
(610) 282-5350  
[mjouaneh@lutron.com](mailto:mjouaneh@lutron.com)

Enclosures

# Title 24

## 2008 Code proposal

### Section 119

(f) Automatic Daylighting Control Device

(k) Dimmers used to control lighting shall:

1. Shall be capable of reducing power consumption by a minimum of 65 percent when the dimmer is at its lowest light level. <sup>2</sup>

3

---

#### Rationale for changes:

1

- Difficult to measure flicker – perception varies based on frequency (50Hz very noticeable, 500Hz imperceptible). Perception also varies with age, gender, level of ambient light etc.
- Product performance issue, not an energy issue. The marketplace would reject any products that cause flicker.
- Not needed for current products, may have been needed in the magnetic ballast days.

<sup>2</sup> Clarity

<sup>3</sup> See number 1 above.

## Section 131

(b) **Multi-Level Lighting Controls.** The general lighting of any enclosed space that has more than one luminaires, is 100 square feet or larger, and has a connected lighting load that exceeds 0.8 watts per square foot shall have multi-level lighting controls. Multi-level controls shall have at least two control steps that are between 30% and 70% of design lighting power and allow the power of all lights to be manually turned off.<sup>4</sup>

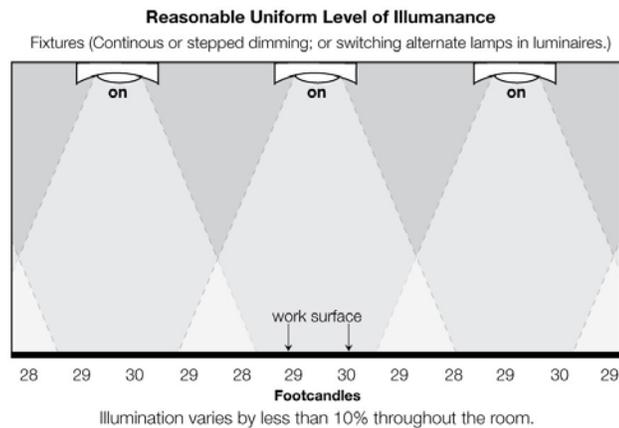
1. A reasonably uniform level of illuminance<sup>5</sup> shall be achieved by any of the following:

A. Continuous or stepped dimming all lamps or luminaires; or

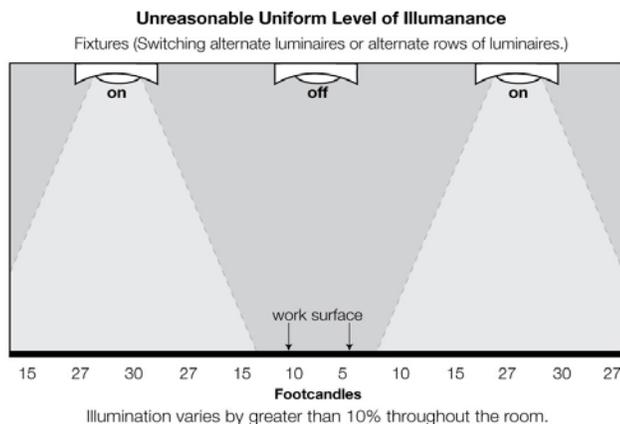
**B. Switching alternate lamps in luminaires, <sup>6</sup>Section 146**

<sup>4</sup> Giving users more than one light level between 30% and 70% saves more energy. With only one light level, no energy is saved unless task requires less light than that level provides. With multiple light levels, more energy savings is achieved because users can select the light level appropriate for the task. In a typical office environment, light levels for different tasks can vary from 5 footcandles to 100 footcandles (see 9<sup>th</sup> Edition of the IES Handbook). And studies (Occupant Use of Manual Lighting Controls in Private Offices. IESNA Paper #34, Lighting Research Center, RPI) show that most (74%) users will use lower light levels if given that option.

<sup>5</sup> Reasonable uniform illuminance:



<sup>6</sup> Reasonable illuminance cannot be achieved if alternate luminaires or alternate rows of luminaires are switched off. Unreasonable uniform illuminance:



## TABLE 146-C LIGHTING POWER ADJUSTMENT FACTORS

Demand responsive lighting control that reduces lighting power consumption in response to a demand response signal by dimming of dimmable electronic ballasts.<sup>7</sup>

## TABLE 146-D RELATIVE SYSTEM EFFICIENCY FOR DIMMABLE ELECTRONIC BALLASTS

RSE requirements should:

- 1) Be completely removed<sup>8</sup>, or
- 2) Only applicable for dimming ballasts that are used to get the demand response credit in Table 146C Lighting Control Power Adjustment Factors<sup>9</sup>, or
- 3) Be applicable to all ballasts, dim and non-dim ballasts<sup>10</sup>.

---

<sup>7</sup> Clarity

<sup>8</sup>

- Tables 146 E-G have updated LPD (W/ft<sup>2</sup>) requirements that force the market to use more efficient dimming and non-dimming ballasts. Francis Rubinstein (Lawrence Berkley National Laboratory) reported at the hearing that dimming ballast manufacturers are already creating higher efficiency ballasts.
- It is not in the best interest of energy savings for Table 150C to allow the use of light sources with less than 35-60 lumens/watt, while Table 146D eliminates the use of ballast/lamp systems with more than 85 lumens/watt.

<sup>9</sup> See above footnote. Also, demand response is only for a limited numbers of hours per year. Ballasts with low RSE's would be less efficient during the rest of the year, thus the need for an RSE limit for ballasts used for the demand response credit.

<sup>10</sup> Francis Rubinstein's study shows that half of all ballasts (dim and non-dim) tested fall below the minimum RSE requirement. Therefore, by not including non-dim ballasts, the standard would push the market to use low-cost, low-RSE non-dim ballasts. This eliminates the benefits of energy saving dimming ballasts and steers manufacturers to create even more low-cost, low-efficiency non-dim ballasts.