

# Section 150 Residential Lighting Requirements

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**This document contains proposed language for Section 150(k), for presenting at the May 24, 2011 Staff Workshop on proposed lighting changes for the 2013 update to the Title 24 Building Energy Efficiency Standards.**

**The proposed lighting language is presented in two forms in this document:**

- 1. With Track changes accepted for clarity, as the language would appear if all of the proposed changes were adopted.**
  
- 2. With track changes not accepted, showing the existing 2008 lighting language compared to the proposed language changes.**

## **PROPOSED LIGHTING LANGUAGE WITH TRACK CHANGES ACCEPTED**

Section 150(k) **Residential Lighting.**

**1. Luminaire Requirements**

- A. Luminaire Efficacy:** Installed luminaires shall be classified as high-efficacy or low-efficacy for compliance with Section 150(k) in accordance with Tables 150-C and 150-D, as applicable
- B. Hybrid Luminaires:** When a high efficacy and low efficacy lighting system are combined together in a single luminaire, the high efficacy and low efficacy lighting systems shall separately comply with the applicable provisions of Section 150(k)
- C. Luminaire Wattage.** The wattage of permanently installed luminaires in residential kitchens shall be determined in accordance with Section 130(c). In residential kitchens the wattage of electrical boxes finished with a blank cover or where no electrical equipment has been installed, and where the electrical box can be used for a luminaire or a surface mounted ceiling fan, shall be calculated as 180 watts of low efficacy lighting per electrical box.
- D. Electronic Ballasts.** Ballasts for fluorescent lamps rated 13 watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.
- E. Night Lights.** Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall be rated to consume no more than 5 watts of power in accordance with Section 130(d), and shall not contain a medium screw-base socket.
- F. Lighting Integral to Exhaust Fans.** Lighting integral to exhaust fans shall meet the applicable requirements of Section 150(k).

EXCEPTION to Section 150(k)6. Lighting installed by the manufacturer in kitchen exhaust hoods.

2. **Switching Devices and Controls.**

- A. High efficacy luminaires shall be switched separately from low efficacy luminaires.
- B. Exhaust fans shall be switched separately from lighting systems, or if an exhaust fan has an integral lighting system, the lighting system shall be separately switched in accordance with the applicable provision of Section 150(k) while allowing the fan to continue to operate for an extended period of time.
- C. Luminaires shall be switched with readily accessible controls that permit the luminaires to be manually switched ON and OFF.
- D. Lighting controls and equipment shall be installed in accordance with the manufacturer's instructions.
- E. No controls shall bypass a dimmer or vacancy sensor function where that dimmer or vacancy sensor has been installed to comply with Section 150(k) .
- F. Lighting controls shall comply with the applicable requirements of Section 119.
- G. An Energy Management Control System may be used to comply with dimmer requirements in Section 150(k) if at a minimum it provides the functionality of a dimmer in accordance with Section 119, meets the acceptance test requirements in Section 134 for dimming lighting control systems, and complies with all of the applicable requirements in Section 150(k)2.
- H. An Energy Management Control System may be used to comply with vacancy sensor requirements in Section 150(k) if at a minimum it provides the functionality of a vacancy sensor in accordance with Section 119, meets the acceptance test requirements in Section 134 for vacancy sensor lighting control systems, and complies with all of the applicable requirements in Section 150(k)2.
- I. A multi-scene programmable controller may be used to comply with dimmer requirements in Section 150(k) if at a minimum it provides the functionality of a dimmer in accordance with Section 119, and complies with all of the applicable requirements in Section 150(k)2.

3. **Lighting in Kitchens.** A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy.

EXCEPTION to Section 150(k)3: Up to 50 watts for dwelling units less than or equal to 2,500 ft<sup>2</sup> or 100 watts for dwelling units larger than 2,500 ft<sup>2</sup> may be exempt from the 50 percent high efficacy requirement when all lighting in the kitchen is controlled in accordance with the applicable provisions in Section 150(k)2, and is also controlled by vacancy sensors or dimmers, .

**NOTE:** For the purpose compliance with Section 150(k), kitchen lighting includes all permanently installed lighting in the kitchen except for lighting that is internal to cabinets for the purpose of illuminating only the inside of the cabinets. Lighting in areas adjacent to the kitchen, including but not limited to dining and nook areas, are considered kitchen lighting if they are not separately switched from kitchen lighting.

4. **Lighting Internal to Cabinets.** Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet. The length of an illuminated cabinet shall be determined using one of the following measurements, regardless of the number of shelves or the number of doors per cabinet section:

- A. One horizontal length of illuminated cabinet, or
- B. One vertical length, per illuminated cabinet section, or
- C. No more than one vertical length per every 40 horizontal inches of illuminated cabinet.

5. **Lighting in Bathrooms.** Lighting installed in bathrooms shall meet the following requirements:

- A. A minimum of one high efficacy luminaire shall be installed in each bathroom; and
- B. All other lighting installed in each bathroom shall be high efficacy or controlled by vacancy sensors.

6. **Lighting in Garages, Laundry Rooms, and Utility Rooms.** Lighting installed in attached and detached garages, laundry rooms, and utility rooms shall be high efficacy luminaires and shall be controlled by vacancy sensors. Vacancy sensors in garages shall use ultrasonic, dual technology, or other methods for occupant detection which do not rely solely on line of sight.
7. **Lighting other than in Kitchens, Bathrooms, Garages, Laundry Rooms, and Utility Rooms.** Lighting installed in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, utility rooms shall be high efficacy, or shall be controlled by either dimmers or vacancy sensors.

**EXCEPTION 1 to Section 150(k)7:** Luminaires in closets less than 70 square feet.

**EXCEPTION 2 to Section 150(k)7:** Lighting in detached storage buildings less than 1000 square feet located on a residential site.

8. **Recessed Luminaires in Insulated Ceilings.** Luminaires recessed into insulated ceilings shall meet all of the following requirements:
  - A. Be listed, as defined in Section 101, for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratories; and
  - B. Have a label that certifies that 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
  - C. 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
  - D. For recessed compact fluorescent luminaires with ballasts to qualify as high efficacy for compliance with Section 150(k), the ballasts shall be certified to the Commission to comply with the applicable requirements in Section 119; and
  - E. Allow ballast maintenance and replacement to be readily accessible to building occupants from below the ceiling without requiring the cutting of holes in the ceiling.
9. **Residential Outdoor Lighting.** Luminaires providing residential outdoor lighting shall meet the following requirements, as applicable:
  - A. For single-family residential buildings, outdoor lighting permanently mounted to a residential building or other buildings on the same lot shall be high efficacy.

**EXCEPTION to Section 150(k)9(A):** Outdoor low efficacy luminaires shall be allowed provided they are controlled by a manual ON and OFF switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following methods:

- i. Photocontrol not having an override or bypass switch that disables the photocontrol; or
- ii. Astronomical time clock not having an override or bypass switch that disables the astronomical time clock, and which is programmed to automatically turn the outdoor lighting OFF during daylight hours; or
- iii. Energy management control system which meets all of the following requirements: At a minimum provides the functionality of an astronomical time clock in accordance with Section 119; meets the acceptance test requirements in Section 134 for an astronomical time clock lighting control system; does not have an override or bypass switch that allows the luminaire to be always ON; and, is programmed to automatically turn the outdoor lighting OFF during daylight hours.

Outdoor low efficacy luminaires used to comply with the Exception to Section 150(k)9(A) may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within 6 hours.

- B. For low-rise multi-family residential buildings, outdoor lighting for private patios, entrances, balconies, and porches; and outdoor lighting for residential parking lots and residential carports with less than eight vehicles per site shall comply with one of the following requirements:
    - i. Shall be high efficacy, or
    - ii. Shall comply with the Exception to Section 150(k)9A, or
    - iii. Shall comply with the applicable requirements in Sections 119, 130, 132, 134, 147, and 149
  - C. For low-rise residential buildings with four or more dwelling units, outdoor lighting not regulated by Section 150(k)9B or Section 150(k)9D shall comply with the applicable requirements in Sections 119, 130, 132, 134, 147, and 149
  - D. Outdoor lighting for residential parking lots and residential carports with a total of eight or more vehicles per site shall comply with the applicable requirements in Sections 119, 130, 132, 147, and 149
10. **Internally illuminated address signs.** Internally illuminated address signs shall:
- A. Comply with Section 148; or
  - B. Not contain a screw-base socket, and consume no more than 5 watts of power as determined according to Section 130(c).
11. **Residential Garages for Eight or More Vehicles.** Lighting for residential parking garages for eight or more vehicles shall comply with the applicable requirements in Sections 119, 130, 131, 134, 146, and 149.
12. **Interior Common Areas of Low-rise Multi-Family Residential Buildings.**
- A. In a low-rise multi-family residential building where the total interior common area in a single building equals 20 percent or less of the floor area, permanently installed lighting for the interior common areas in that building shall be high efficacy luminaires or controlled by an occupant sensor.
  - B. In a low-rise multi-family residential building where the total interior common area in a single building equals more than 20 percent of the floor area, permanently installed lighting in that building shall:
    - i. Shall comply with the applicable requirements in Sections 119, 130, 131, 146, and 149; and
    - ii. Lighting installed in corridors and stairwells shall be controlled by occupant sensors that reduce the lighting power in each space by at least 50 percent. The occupant sensors shall be capable of turning the light fully on from all designed paths of egress.

**TABLE 150-C CLASSIFICATION OF HIGH EFFICACY AND LOW EFFICACY LIGHT SOURCES**

<p>High Efficacy Light Sources</p> <p>Luminaires manufactured, designed and rated for use with only lighting technologies in this column shall be classified as high efficacy:</p>	<p>Low Efficacy Light Sources</p> <p>Luminaires manufactured, designed or rated for use with any of the lighting technologies in this column shall be classified as low efficacy.</p>
<ol style="list-style-type: none"> <li>1. Pin-based fluorescent lamps.</li> <li>2. Pulse-start metal halide lamps.</li> <li>3. High pressure sodium lamps.</li> <li>4. GU-24 sockets rated for LED lamps.</li> <li>5. GU-24 sockets rated for compact fluorescent lamps, and which are not recessed luminaires.</li> <li>6. Luminaires using LED light sources which have been certified to the Energy Commission as high efficacy in accordance with Joint Appendix JA-8.</li> <li>7. Luminaire housings rated by the manufacturer for use with only LED light engines.</li> <li>8. Induction lamps.</li> </ol> <p>Note: Adaptors which convert an incandescent lamp holder to a high-efficacy luminaire shall not be used to classify a luminaire as high efficacy.</p>	<ol style="list-style-type: none"> <li>1. Line-voltage lamp holders (sockets) capable of operating incandescent lamps of any type.</li> <li>2. Low-voltage lamp holders capable of operating incandescent lamps of any type.</li> <li>3. High efficacy lamps installed in low-efficacy luminaires, including screw base compact fluorescent and screw base LED lamps.</li> <li>3. Mercury vapor lamps.</li> <li>4. Track lighting or other flexible lighting system which allows the addition or relocation of luminaires without altering the wiring of the system.</li> <li>6. Luminaires using LED light sources which have not been certified to the Energy Commission as high efficacy.</li> <li>7. Lighting systems which have modular components that allow conversion between high-efficacy and low-efficacy lighting without changing the luminaires' housing or wiring.</li> <li>8. Electrical boxes finished with a blank cover or where no electrical equipment has been installed, and where the electrical box can be used for a luminaire or a surface mounted ceiling fan.</li> </ol>

**TABLE 150-D MINIMUM REQUIREMENTS FOR OTHER LIGHT SOURCES TO QUALIFY AS HIGH EFFICACY**

<p>Use this table to determine luminaire efficacy only for lighting systems not listed in Table 150-C</p>	
<p>Luminaire Power Rating</p>	<p>Minimum Luminaire Efficacy to Qualify and High Efficacy</p>
<p>5 watts or less</p>	<p>30 lumens per watt</p>
<p>over 5 watts to 15 watts</p>	<p>45 lumens per watt</p>
<p>over 15 watts to 40 watts</p>	<p>60 lumens per watt</p>
<p>over 40 watts</p>	<p>90 lumens per watt</p>
<p>Note: Determine minimum luminaire efficacy using the system initial rated lumens divided by the luminaire total rated system input power.</p>	

# PROPOSED LIGHTING LANGUAGE WITH TRACK CHANGES NOT YET ACCEPTED

## (k) Residential Lighting.

### 1. ~~High-Efficacy-Luminaire~~ **Requirements**

~~A. Luminaire Efficacy:~~ **Installed luminaires shall be classified as high-efficacy or low-efficacy for compliance with Section 150(k) according in accordance with to Tables 150-C and 150-D, as applicable**

~~B. Hybrid Luminaires:~~ **When a high efficacy and low efficacy lighting system are combined together in a single luminaire, the high efficacy and low efficacy lighting systems shall separately comply with the applicable provisions of Section 150(k)**

~~A high efficacy luminaire or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in TABLE 150-C and is not a low efficacy luminaire as specified by Section 150(k)2.~~

~~**EXCEPTION 1 to Section 150(k)1:** To qualify as high efficacy, a luminaire rated only for use with a high intensity discharge reflector lamp shall have a minimum lamp efficacy within 2 lumens per watt of the minimum lamp efficacies in TABLE 150-C.~~

~~**EXCEPTION 2 to Section 150(k)1:** When a high efficacy LED Light Engine with Integral Heat Sink is combined with a low efficacy lighting system in a Hybrid LED Luminaire as defined in Section 101, the high efficacy and low efficacy lighting systems shall separately comply with the applicable provisions of Section 150(k).~~

~~2. Low Efficacy Luminaires.~~ A low efficacy luminaire is any luminaire that does not qualify as high efficacy as specified by Section 150(k)1, or any of the following regardless of the efficacy:

~~A. Contains a medium screw base socket (E24/E26) or other line voltage socket or a line voltage lamp holder; or~~

~~**EXCEPTION 1 to Section 150(k)2A:** High intensity discharge (HID) luminaires containing factory installed ballasts and HID rated medium screw base sockets shall be considered high efficacy luminaires provided they meet the efficacies contained in TABLE 150-C.~~

~~**EXCEPTION 2 to Section 150(k)2A:** A Luminaire with a factory installed GU 24 lamp holder may be classified as high efficacy provided that it meets all of the following requirements:~~

~~i. Is not a recessed downlight that is rated to be used with compact fluorescent lamps; and~~

~~ii. Does not contain any other type of line voltage socket or lamp holder; and~~

~~iii. The manufacturer does not make available adaptors or modular components for the luminaire which convert the GU 24 lamp holder to any other type of socket or lamp holder; and~~

~~iv. Is rated, as specified by UL 1598, for use only with high efficacy lamps or high efficacy LED Light Engine with Integral Heat Sink meeting the requirements contained in TABLE 150-C, as listed on a permanent, pre-printed, factory installed label on the luminaire housing.~~

~~B. Low voltage incandescent lighting; or~~

~~C. Track lighting or other lighting systems which allow the addition or relocation of luminaires without altering the wiring of the system; or~~

~~D. Lighting systems which have modular components that allow conversion between screw based and pin based sockets without changing the luminaires' housing or wiring; or~~

~~E. Electrical boxes finished with a blank cover or where no electrical equipment has been installed, and where the electrical box can be used for a luminaire or a surface mounted ceiling fan.~~

**3C. Luminaire Wattage.** The wattage of permanently installed luminaires in residential kitchens shall be determined as specified by in accordance with Section 130(~~dc~~). In residential kitchens the wattage of electrical boxes finished with a blank cover or where no electrical equipment has been installed, and where the electrical box can be used for a luminaire or a surface mounted ceiling fan, shall be calculated as 180 watts of low efficacy lighting per electrical box.

**4D. Electronic Ballasts.** Ballasts for fluorescent lamps rated 13 watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

**5E. Night Lights.** Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall ~~meet one of the following conditions:~~

~~A. Shall contain only high efficacy lamps meeting the minimum efficacies contained in TABLE 150-C and shall not contain a line voltage socket or line voltage lamp holder; or~~

~~B. Shall be rated to consume no more than 5 watts of power as determined by in accordance with Section 130(d), and shall not contain a medium screw-base socket.~~

~~NOTE: Indicator Flights that are integral to lighting controls shall comply with Section 119(b).~~

**6. Lighting Integral to Exhaust Fans.** Lighting integral to exhaust fans, ~~in rooms other than kitchens,~~ shall meet the applicable requirements of Section 150(k).

EXCEPTION to Section 150(k)6. Lighting installed by the manufacturer in kitchen exhaust hoods.

## **72. Switching Devices and Controls.**

~~A. All permanently installed High efficacy luminaires shall be switched separately from low efficacy luminaires.~~

~~B. All exhaust fans shall be switched separately from lighting system(s).~~

~~EXCEPTION to Section 150(k)7B: An exhaust fan with an integral lighting system where the lighting system can be manually turned on and off while allowing the fan to continue to operate for an extended period of time.~~

B. Exhaust fans shall be switched separately from lighting systems, or if an exhaust fan has an integral lighting system, the lighting system shall be separately switched in accordance with the applicable provision of Section 150(k) while allowing the fan to continue to operate for an extended period of time.

~~C. All permanently installed Luminaires shall be switched with readily accessible controls that permit the luminaires to be manually switched ~~on~~ON and ~~off~~OFF.~~

~~D. All Lighting controls and equipment shall be installed in accordance with the manufacturer's instructions.~~

~~E. No controls shall bypass a dimmer or vacancy sensor function A lighting circuit controlled by more than one switch where that a dimmer or ~~manual on occupant~~vacancy sensor has been installed to comply with Section 150(k) shall meet the following conditions:~~

~~i. No controls shall bypass the dimmer or manual on occupant sensor function.~~

~~ii. The dimmer or manual on occupant sensor shall comply with the applicable requirements of Section 119.~~

~~F. Manual on occupant sensors, motion sensors, and dimmers Lighting controls installed to comply with Section 150(~~k~~) shall comply with the applicable requirements of Section 119.~~

G. An Energy Management Control System may be used to comply with dimmer requirements in Section 150(k) if at a minimum it provides the functionality of a dimmer in accordance with Section 119, meets the acceptance test requirements in Section 134 for dimming lighting control systems, and complies with all of the applicable requirements in Section 150(k)2.

H. An Energy Management Control System may be used to comply with vacancy sensor requirements in Section 150(k) if at a minimum it provides the functionality of a vacancy sensor in accordance with Section

119, meets the acceptance test requirements in Section 134 for vacancy sensor lighting control systems, and complies with all of the applicable requirements in Section 150(k)2.

I. A multi-scene programmable controller may be used to comply with dimmer requirements in Section 150(k) if at a minimum it provides the functionality of a dimmer in accordance with Section 119, and complies with all of the applicable requirements in Section 150(k)2.

**83. Lighting in Kitchens.** A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy.

EXCEPTION to Section 150(k)~~387A~~: Up to 50 watts for dwelling units less than or equal to 2,500 ft<sup>2</sup> or 100 watts for dwelling units larger than 2,500 ft<sup>2</sup> may be exempt from the 50 percent high efficacy requirement when the following conditions are met:

A. ~~All low efficacy luminaires~~ lighting in the kitchen is controlled in accordance with the applicable provisions in Section 150(k)2, and is also controlled by a ~~manual on-occupant~~ vacancy sensors, or dimmers, energy management control system (EMCS), or a multi-scene programmable control system; and.

B. ~~All permanently installed luminaires in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and are controlled by a manual on-occupant sensor.~~

NOTE: For the purpose of ~~this requirement~~ compliance with Section 150(k), kitchen lighting includes all permanently installed lighting in the kitchen except for lighting that is internal to cabinets for the purpose of illuminating only the inside of the cabinets. Lighting in areas adjacent to the kitchen, including but not limited to dining and nook areas, are considered kitchen lighting if they are not separately switched from kitchen lighting.

**94. Lighting internal to eCabinets.** Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet. The length of an illuminated cabinet shall be determined using one of the following measurements, regardless of the number of shelves or the number of doors per cabinet section:

A. One horizontal length of illuminated cabinet, or

B. One vertical length, per illuminated cabinet section, or

C. No more than one vertical length per every 40 horizontal inches of illuminated cabinet.

**5. Lighting in Bathrooms.** Lighting installed in bathrooms shall meet the following requirements:

A. A minimum of one high efficacy luminaire shall be installed in each bathroom; and

B. All other lighting installed in each bathroom shall be high efficacy or controlled by vacancy sensors.

~~106. Lighting in Bathrooms, Garages, Laundry Rooms, Closets, and Utility Rooms.~~ Permanently Lighting installed ~~luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy luminaires and shall be controlled by a vacancy sensors. Vacancy sensors in garages shall use ultrasonic, dual technology, or other methods for occupant detection which do not rely solely on line of sight.~~

~~EXCEPTION 1 to Section 150(k)10:~~ Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual on-occupant sensor certified to comply with the applicable requirements of Section 119.

~~EXCEPTION 2 to Section 150(k)10:~~ Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual on-occupant sensor.

~~117. Lighting other than in Kitchens, Bathrooms, Garages, Laundry Rooms, Closets, and Utility Rooms.~~ Permanently Lighting installed ~~luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires, or shall be controlled by either dimmers or vacancy sensors.~~

EXCEPTION 1 to Section 150(k)7: Luminaires in closets less than 70 square feet.

~~EXCEPTION 1 to Section 150(k)11:~~ Permanently installed ~~l~~ow efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of Section 119, or by a manual on-occupant vacancy sensor that complies with the applicable requirements of Section 119.

**EXCEPTION 2 to Section 150(k)1127:** Lighting in detached storage buildings less than 1000 square feet located on a residential site ~~is not required to comply with Section 150(k)11.~~

~~8132.~~ **Recessed Luminaires in Insulated Ceilings.** Luminaires recessed into insulated ceilings shall meet all of the following ~~conditions~~ **requirements:**

- A. Be listed, as defined in Section 101, for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratories; and
- B. Have a label that certifies that 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

~~**EXCEPTION to Section 150(k)123B:** An exhaust fan housing shall not be required to be certified airtight.~~

- C. 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

~~Note: An exhaust fan shall be sealed with a gasket or caulk between the exhaust fan housing and ceiling.~~

- D. For recessed compact fluorescent luminaires with ballasts to qualify as high efficacy for compliance with Section 150(k), the ballasts shall be certified to the Commission to comply with the applicable requirements in Section 119(n); and
- E. Allow ballast maintenance and replacement to be readily accessible to building occupants from below the ceiling without requiring the cutting of holes in the ceiling.

~~1349.~~ **Residential Outdoor Lighting.** Luminaires providing residential outdoor lighting shall meet the following requirements, as applicable; ~~including outdoor lighting for private patios on low rise residential buildings with four or more dwelling units, entrances, balconies, and porches, and which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires.~~

A. For single-family residential buildings, outdoor lighting permanently mounted to a residential building or other buildings on the same lot shall be high efficacy.

~~**EXCEPTION 1 to Section 150(k)1349(A):** Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off ON and OFF switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following methods:~~

- ~~A.i.~~ Photocontrol not having an override or bypass switch that disables the photocontrol; or
- ~~B.ii.~~ Astronomical time clock not having an override or bypass switch that disables the astronomical time clock, and which is programmed to automatically turn the outdoor lighting OFF during daylight hours; or
- ~~C.iii.~~ Energy management control system (EMCS) which meets all of the following requirements: At a minimum provides the functionality of an astronomical time clock in accordance with Section 119; meets the acceptance test requirements in Section 134 for an astronomical time clock lighting control system; does not have an override or bypass switch that allows the luminaire to be always on ON; and, is programmed to automatically turn the outdoor lighting OFF during daylight hours.

~~**EXCEPTION 2 to Section 150(k)13:** Outdoor low efficacy luminaires used to comply with the Exception 1 to Section 150(k)13(A) may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within 6 hours.~~

B. For low-rise multi-family residential buildings, outdoor lighting for private patios, entrances, balconies, and porches; and outdoor lighting for residential parking lots and residential carports with less than eight vehicles per site shall comply with one of the following requirements:

- i. Shall be high efficacy, or
- ii. Shall comply with the Exception to Section 150(k)9A, or  
~~shall be high efficacy.~~

iii. Shall comply with the applicable requirements in Sections 119, 130, 132, 134, 147, and 149

C. For low-rise residential buildings with four or more dwelling units, outdoor lighting not regulated by Section 150(k)9B installed for use other than private patios, entrances, balconies, and porches, or Section 150(k)9D shall comply with the applicable requirements in Sections 119, 130, 132, 134, 147, and 149

**~~EXCEPTION 3 to Section 150(k)13:~~** Permanently installed luminaires in or around swimming pools, water features, or other locations subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

. Outdoor lighting for residential parking lots and residential carports with a total of eight or more vehicles per site shall comply with the applicable requirements in Sections 119, 130, 132, 147, and 149

**~~445~~10. Internally illuminated address signs.** Internally illuminated address signs shall:

- A. Comply with Section 148; or
- B. Not contain a screw-base socket, and consume no more than 5 watts of power as determined according to Section 130(~~e~~c).

**~~156~~11. Parking Lots and Residential Garages for Eight or More Vehicles.** Lighting for parking lots and carports with a total of eight or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for residential parking garages for eight or more vehicles shall comply with the applicable requirements in Sections 119, 130, 131, 134, and 146, and 149.

**~~167~~12. Interior Common Areas of Low-rise Multi-Family Residential Buildings.** Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires.

**~~EXCEPTION to Section 150(k)167:~~** Permanently installed low-efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of Section 119. A. In a low-rise multi-family residential building where the total interior common area in a single building equals 20 percent or less of the floor area, permanently installed lighting for the interior common areas in that building shall be high efficacy luminaires or controlled by an occupant sensor.

B. In a low-rise multi-family residential building where the total interior common area in a single building equals more than 20 percent of the floor area, permanently installed lighting in that building shall:

- i. Shall comply with the applicable requirements in Sections 119, 130, 131, 146, and 149; and
- ii. Lighting installed in corridors and stairwells shall be controlled by occupant sensors that reduce the lighting power in each space by at least 50 percent. The occupant sensors shall be capable of turning the light fully on from all designed paths of egress.

**TABLE 150-C HIGH EFFICACY LUMINAIRE REQUIREMENTS**

<b>Lamp Power Rating for Non-LED Lighting (see Note 1), or System Power Rating for LED Lighting (see Notes 2, 3, and 4)</b>	<b>Minimum Lamp Efficacy for Non-LED Lighting, or Minimum System Efficacy for LED Lighting</b>
5 watts or less	30 lumens per watt
over 5 watts to 15 watts	40 lumens per watt
over 15 watts to 40 watts	50 lumens per watt
over 40 watts	60 lumens per watt

**Notes:**

1. Determine minimum lamp efficacy category for lighting systems which are not LED using the initial rated lumens divided by the rated watts of the lamp (not including the ballast).
2. To qualify as high efficacy, an LED luminaire shall meet the minimum system efficacy requirements in Table 150-C when determined according to Reference Joint Appendix JA8, and be certified to comply with Section 119(m), and input power shall be determined according to Section 130(d)5.
3. For a Hybrid LED Luminaire to qualify as a high efficacy luminaire, all lighting systems in the luminaire shall qualify as high efficacy according to Section 150(k)1, and the LED Light Engine with Integral Heat Sink shall comply with Note 4, below.
4. To qualify as high efficacy, an LED Light Engine with Integral Heat Sink shall meet the minimum system efficacy requirements in Table 150-C when determined according to Reference Joint Appendix JA8, shall be certified to comply with Section 119(m), and input power shall be determined according to Section 130(d)5.

**TABLE 150-C CLASSIFICATION OF HIGH EFFICACY AND LOW EFFICACY LIGHT SOURCES**

<u>High Efficacy Light Sources</u> <u>Luminaires manufactured, designed and rated for use with only lighting technologies in this column shall be classified as high efficacy:</u>	<u>Low Efficacy Light Sources</u> <u>Luminaires manufactured, designed or rated for use with any of the lighting technologies in this column shall be classified as low efficacy.</u>
<ol style="list-style-type: none"> <li><u>1. Pin-based fluorescent lamps.</u></li> <li><u>2. Pulse-start metal halide lamps.</u></li> <li><u>3. High pressure sodium lamps.</u></li> <li><u>4. GU-24 sockets rated for LED lamps.</u></li> <li><u>5. GU-24 sockets rated for compact fluorescent lamps, and which are not recessed luminaires.</u></li> <li><u>6. Luminaires using LED light sources which have been certified to the Energy Commission as high efficacy in accordance with Joint Appendix JA-8.</u></li> <li><u>7. Luminaire housings rated by the manufacturer for use with only LED light engines.</u></li> <li><u>8. Induction lamps.</u></li> </ol> <p><u>Note: Adaptors which convert an incandescent lamp holder to a high-efficacy luminaire shall not be used to classify a luminaire as high efficacy.</u></p>	<ol style="list-style-type: none"> <li><u>1. Line-voltage lamp holders (sockets) capable of operating incandescent lamps of any type.</u></li> <li><u>2. Low-voltage lamp holders capable of operating incandescent lamps of any type.</u></li> <li><u>3. High efficacy lamps installed in low-efficacy luminaires, including screw base compact fluorescent and screw base LED lamps.</u></li> <li><u>3. Mercury vapor lamps.</u></li> <li><u>4. Track lighting or other flexible lighting system which allows the addition or relocation of luminaires without altering the wiring of the system.</u></li> <li><u>6. Luminaires using LED light sources which have not been certified to the Energy Commission as high efficacy.</u></li> <li><u>7. Lighting systems which have modular components that allow conversion between high-efficacy and low-efficacy lighting without changing the luminaires' housing or wiring.</u></li> <li><u>8. Electrical boxes finished with a blank cover or where no electrical equipment has been installed, and where the electrical box can be used for a luminaire or a surface mounted ceiling fan.</u></li> </ol>

**TABLE 150-D MINIMUM REQUIREMENTS FOR OTHER LIGHT SOURCES TO QUALIFY AS HIGH EFFICACY**

<u>Use this table to determine luminaire efficacy only for lighting systems not listed in Table 150-C</u>	
<u>Luminaire Power Rating</u>	<u>Minimum Luminaire Efficacy to Qualify and High Efficacy</u>
<u>5 watts or less</u>	<u>30 lumens per watt</u>
<u>over 5 watts to 15 watts</u>	<u>45 lumens per watt</u>
<u>over 15 watts to 40 watts</u>	<u>60 lumens per watt</u>
<u>over 40 watts</u>	<u>90 lumens per watt</u>
<p><u>Note: Determine minimum luminaire efficacy using the system initial rated lumens divided by the luminaire total rated system input power.</u></p>	