



What Are Residential Indoor and Outdoor Lighting Requirements?

Residential indoor and outdoor lighting technologies regulated by California's Building Energy Efficiency Standards (Energy Standards), Title 24, Part 6 include luminaires, high-efficacy luminaires, vacancy sensors, and switching controls. The requirements in this fact sheet apply to residential, single-family buildings and multifamily buildings that are three stories or less. Residential lighting requirements also apply to residential spaces in nonresidential buildings, including dwellings in high-rise residential buildings, guestrooms of hotels/motels, and dwelling spaces of fire stations, dormitories and senior housing.

Know Your Project – Key Terms

- **Additions:** Include any addition of new square footage, where new luminaires are installed
- **Alterations:** Include modifications where luminaires are replaced
- **Permanently Installed Lighting:** Includes ceiling luminaires, chandeliers, vanity lamps, wall sconces, under-cabinet luminaires, and any other type of luminaire that is attached to the dwelling
- **Vacancy Sensor:** A manual-on/automatic-off lighting control, which includes a manual-off option

Why? The California Energy Commission estimates that in California, lighting accounts for 22% of residential electricity use. The Energy Standards for residential lighting are designed to increase the use of efficient technologies in order to decrease this consumption. In doing so, these requirements will also support achieving the mandates of Assembly Bill 1109 that requires residential indoor lighting energy consumption be reduced by 50% of 2007 levels by 2018.

Relevant Code Sections

2016 California Building Energy Efficiency Standards, Title 24, Part 6:

- [Section 110.9](#) – Mandatory Requirements for Lighting Controls and Systems, Ballasts, and Luminaires
- [Section 130.0\(b\)](#) – Functional Areas where Compliance with the Residential Lighting Standards is Required
- [Section 130.0\(c\)](#) – Luminaire Classification and Power
- [Section 150.0\(k\)](#) – Mandatory Features and Devices, Residential Lighting
- [Reference Joint Appendix 8 \(JA8\)](#) – Qualification Requirements for High Efficacy Light Sources
- [Residential Compliance Manual, Chapter 6](#) – Residential Lighting
- [Reference Joint Appendix 10 \(JA10\)](#) – Test Method for Measuring Flicker of Lighting Systems

Relevant Compliance Forms

- [CF2R-LTG-01-E](#) – Certificate of Installation, Lighting - Single Family Dwellings
- [CF2R-LTG-02-E](#) – Certificate of Installation, Lighting - Multi-Family Dwellings

Compliance Requirements

All residential lighting requirements are Mandatory requirements. There are no tradeoffs between lighting and other building features. For compliance with the Title 20 Appliance Efficiency Regulations and the Energy Standards, the Energy Commission maintains a database of appliances, controls, and other devices which have been certified to the Energy Commission, including qualifying high efficacy luminaires.

Mandatory Requirements

Luminaires Section 150.0(k)

- Lighting integral to exhaust fans, unless part of a kitchen exhaust system, must also meet luminaire efficacy and lighting control requirements of [Section 150.0\(k\)](#)
- Luminaire Efficacy: Installed luminaires shall be classified as high-efficacy for compliance with [Section 150.0\(k\)](#)
- Blank Electrical Boxes: The number of electrical boxes that are more than 5 feet above the finished floor and do not contain a luminaire or other device shall be no greater than the number of bedrooms
 - These electrical boxes must be served by a dimmer, vacancy sensor control, or fan speed control
- Recessed Downlight Luminaires in Ceilings: Luminaires recessed into ceilings must not contain screw base sockets and must meet the following requirements:
 - Be defined in [Section 100.1](#) for zero clearance insulation contact
 - Have a label that certified it is airtight with air leakage less than 2.0 CFM at 75 Pascals, be sealed with a gasket or caulk between the luminaire housing and ceiling
 - Have all air leaks paths between conditioned and unconditioned spaces sealed with a gasket or caulk
 - Allow ballast or driver maintenance and replacement to be readily accessible from below the ceiling for luminaires with hardwired ballasts or drivers
 - Contain light sources that comply with [JA8](#)
- Electronic Ballasts: Ballasts for fluorescent lamps 13 watts and greater shall be electronic with an output frequency ≥ 20 kHz
- Night Lights: Permanently installed night lights and night lights integral to installed luminaires or exhaust fans shall be rated to consume no more than five watts of power per luminaire or exhaust fan as determined in accordance with [Section 130.0\(c\)](#). Night lights shall not be required to be controlled by vacancy sensors
- Screw-based Luminaires: Must not be recessed and must meet high-efficacy requirements of [JA8](#)
- Enclosed Luminaires: May only contain light sources that are marked “JA8-2016-E” and must meet high-efficacy requirements of [JA8](#)

High-Efficacy Luminaires JA8

To qualify as a [JA8](#) high-efficacy light source for compliance with the residential lighting Energy Standards in [Section 150.0\(k\)](#), a residential light source must be certified to the Energy Commission according to [JA8](#). The requirements include a minimum efficacy of 45 lumens/watt, a power factor of 0.90 or higher at full output, a maximum start time of 0.5 seconds, a color temperature (CCT) of 3000K or less, and a color rendering index (CRI) of at least 90. Inseparable SSL luminaires, LED light engines, and GU24-based LED lamps may provide a CCT of 4,000K or less.

Luminaire Efficacy Classification

[Table 150.0-A](#) shows lighting that is automatically classified as high efficacy, unless installed in recessed or enclosed luminaires. For these fixtures installed in recessed or enclosed luminaires must go through [JA8](#) in order to be classified as high efficacy.

Luminaires automatically classified as high efficacy include the following:

- Pin-based linear fluorescent or compact fluorescent lights (CFL) using electronic ballasts
- Pulse-start metal halide lamps
- High pressure sodium lamps
- GU-24 sockets containing light sources other than LEDs, such as CFLs and induction lamps
- Luminaires with hardwired high frequency generator and induction lamp
- Inseparable SSL luminaires that are installed outdoors
- Inseparable SSL luminaires containing colored light sources that are installed to provide decorative lighting



Vacancy Sensors Section 150.0(k)

Vacancy sensors are required in many residential spaces. A minimum of one luminaire in each of the following spaces must be controlled with a vacancy sensor: bathrooms, garages, laundry rooms and utility rooms.

All luminaires that have light sources compliant with [JA8](#) must be controlled by a dimmer or vacancy sensor. Exceptions are provided for closets smaller than 70 ft² in floor area and luminaires for hallways.

Switching Controls Section 150.0(k)2

- Exhaust fans shall be switched separately, except when lighting integral to the fan is installed that meets requirements of [Section 150.0\(k\)2](#)
- Lighting controls must meet applicable requirements of [Section 110.9](#), shall be installed to allow for manual switching of on and off, and shall not bypass a dimmer or vacancy sensor function that complies with [Section 150.0\(k\)](#)

The switching requirements ([Section 110.9](#)) specify that time-switch controls and occupancy sensors meet Title 24 requirements, and contain additional requirements for astronomical-based outdoor lighting controls.

Residential vs. Nonresidential Indoor and Outdoor Lighting

Residential indoor and outdoor lighting requirements can be found in both [Sections 150.0\(k\)](#) and [140.7](#). Residential requirements apply to parking lots, carports, and parking garages when there are fewer than eight parking spots. Nonresidential requirements apply when there are eight or more parking spots. The tables below illustrate when to apply the residential and nonresidential lighting standards for parking garages and other outdoor lighting.



Space Type		Single-Family	Low-Rise Multifamily		High-Rise Multifamily and Hotels
			1-3 dwelling units	≥4 dwelling units	
Parking Garages	One garage per unit	Residential Indoor	Residential Indoor		NA
	Shared garage		Nonresidential Indoor		
Parking Lots & Carports	<8 parking spots	Residential Outdoor ¹	NA		Nonresidential Outdoor
	≥8 parking spots		Nonresidential Outdoor		

Table 1: Residential vs. Nonresidential Parking Area Lighting Requirements

¹ When carport and/or lighting is attached to a building, Residential Outdoor Lighting Requirements apply per §150.0(k)3A.

Space Type	Single-Family	Low-Rise Multifamily		High-Rise Multifamily and Hotels
		1-3 dwelling units	≥4 dwelling units	
Private Patios, Entrances, Balconies, Porches	Residential Outdoor	Residential Outdoor or Nonresidential Outdoor		Residential, if the lighting is separately controlled from inside the dwelling. Otherwise, nonresidential
Other Outdoor Lighting Attached to the Building	Residential Outdoor	Residential or Nonresidential Outdoor	Nonresidential Outdoor	
Outdoor Lighting Not Attached to a Building	Not Regulated		Nonresidential Outdoor	

Table 2: Residential vs. Nonresidential Outdoor Lighting Requirements

Forms – Which & When

During Construction

Single-Family Buildings

- **CF2R-LTG-01-E** – Lighting - Single-Family Dwellings
 - Completed and signed by the responsible person(s) for the lighting construction projects under Section 3 of the Business and Professions Code (note that one or more form may be required depending upon the lighting and controls covered by an individual person)
 - Completed after the residential lighting has been installed
 - The responsible person(s) must also provide the homeowner with a lighting schedule of installed products

Multifamily Buildings

- **CF2R-LTG-02-E** – Lighting - Multi-Family Dwellings
 - Completed and signed by the responsible person(s) for the lighting construction projects under Section 3 of the Business and Professions Code (note that one or more form may be required depending upon the lighting and controls covered by an individual person)
 - Completed after the residential lighting has been installed
 - The responsible person(s) must also provide the homeowner with a lighting schedule of installed products
- Additional Forms - Where Nonresidential code sections are triggered, corresponding NRCC, NRCL, and NRCA forms may be required.
 - Completed and signed by the responsible person(s) for the lighting construction projects under Section 3 of the Business and Professions Code (note that one or more form may be required depending upon the lighting and controls covered by an individual person)
 - Completed after the nonresidential lighting has been installed
 - The responsible person(s) must also provide the owner with a lighting schedule of installed products

Inspection

For either single- or multifamily lighting compliance, the inspector should verify that all luminaires are high-efficacy and that the required controls have been installed. In addition, the inspector should confirm a luminaire schedule is provided to the building owner.

Why?: To document compliance with lighting requirements applicable to the project.

Certificates of Installation - Submission Guidelines

- A Certificate of Installation (CF2R) must be submitted to the building department for any residential lighting project that is regulated by Title 24, Part 6, whether that lighting project is for only one luminaire, or for the lighting of an entire building.
- If Nonresidential forms are used, the NRCL is the Installation certificate. If an Acceptance Test is required, then an NRCA form, completed by the Acceptance Test Technician (ATT) is required as well.

For More Information

Primary Documents

- Section 110.9 – Mandatory Requirements for Lighting Controls and Systems, Ballasts, and Luminaires
EnergyCodeAce.com/site/custom/public/referenceace-2016/Documents/na710section1109mandatoryrequirementsforlightingcontroldevicesan.htm
- Section 130.0(b) – Functional Areas where Compliance with the Residential Lighting Standards is Required
energycodeace.com/site/custom/public/reference-ace-2016/index.html#!Documents/section1300lightingsystemsandequipmentandelectricalpowerdistribu.htm
- Section 130.0(c) – Luminaire Classification and Power
energycodeace.com/site/custom/public/reference-ace-2016/index.html#!Documents/section1300lightingsystemsandequipmentandelectricalpowerdistribu.htm
- Section 150.0(k) – Mandatory Features and Devices, Residential Lighting
energycodeace.com/site/custom/public/reference-ace-2016/index.html#!Documents/section1500mandatoryfeaturesanddevices.htm
- Reference Joint Appendix JA8 – Qualification Requirements for High Efficacy Light Sources
energycodeace.com/site/custom/public/reference-ace-2016/index.html#!Documents/appendixa8qualificationrequirementsforhighefficacylightsources.htm
- Residential Compliance Manual, Chapter 6 – Residential Lighting
energy.ca.gov/2015publications/CEC-400-2015-032/chapters/chapter_6-Residential_Lighting.pdf
- 2015 Title 20 Appliance Efficiency Regulations
energy.ca.gov/2015publications/CEC-400-2015-021/CEC-400-2015-021.pdf

California Energy Commission Information & Services

Title 24, Part 6

- Energy Standards Hotline: 1-800-772-3300 (Free) or Title24@energy.ca.gov
- Online Resource Center:
energy.ca.gov/title24/orc/
 - The Energy Commission’s main web portal for Energy Standards, including information, documents, and historical information

Title 20

- Appliances Hotline: (888) 838-1467 or outside California (916) 651-7100
- Questions may also be emailed to Appliances@energy.ca.gov
- California Appliance Efficiency Standards Site:
energy.ca.gov/appliances
- Modernized Appliance Efficiency Database (MAEDBS):
<https://cacertappliances.energy.ca.gov/Login.aspx>

Additional Resources

- California Lighting Technology Center (CLTC) Guides:
 - Residential Lighting: What’s New in the 2016 Title 24, Part 6 Code?
cltc.ucdavis.edu/publication/2016-title-24-code-changes-residential
 - Lighting Appliance Efficiency Regulations: What’s New in the Title 20 Code?:
cltc.ucdavis.edu/publication/title-20-lighting-appliance-efficiency
 - Energy Code Ace:
EnergyCodeAce.com
 - An online “one-stop-shop” providing free resources and training to help appliance and building industry professionals decode and comply with Title 24, Part 6 and Title 20. The site is administered by California’s investor-owned utilities.
- Of special interest:* Fact Sheets
energycodeace.com/content/resources-fact-sheets/
- Title 20 Lighting FAQ

Please register with the site and select an industry role for your profile in order to receive messages about all our free offerings!



This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission. © 2017 Pacific Gas and Electric Company, San Diego Gas and Electric, Southern California Gas Company and Southern California Edison. All rights reserved, except that this document may be used, copied, and distributed without modification. Neither PG&E, Sempra, nor SCE — nor any of their employees makes any warranty, express or implied; or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any data, information, method, product, policy or process disclosed in this document; or represents that its use will not infringe any privately-owned rights including, but not limited to patents, trademarks or copyrights.