



2022 Energy Code

Single-Family Lighting Requirements

California Energy Commission

March 2023



Single-family Defined

All Buildings § 100.1

Updated for 2022



Single-family building

- Occupancy group R-3
 - Two or less dwelling units
 - Not multifamily, hotel, or motel
- Townhouse
- Occupancy group R-3.1
- Occupancy group U on residential site



Luminaire Efficacy §150.0(k)1A

All luminaires or light sources must be high efficacy

Luminaire efficacy is determined by TABLE 150.0-A;
must meet one of the following:

- Column 1: Types that are automatically high efficacy
- Column 2: Certified as meeting Joint Appendix 8 requirements



Luminaire Efficacy Cont.

Exceptions to 150.0(k)1A:

- Lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers
- Night lights, step lights, and path lights less than 5 watts
- Lighting internal to drawers, cabinetry, and linen closets with efficacy ≥ 45 lumens per watt



Luminaire Efficacy Continued:

Table 150.0-A

Automatically High Efficacy	Must be JA8 Certified
LED light sources installed outdoors.	All light sources installed in ceiling recessed downlight luminaires (screw-based sockets not allowed).
Inseparable solid state lighting luminaires containing colored light sources installed for decorative lighting.	Any light source not listed in this table.
Pin-based linear fluorescent or compact fluorescent light sources using electronic ballasts.	
High intensity discharge light sources including pulse start metal halide and high pressure sodium.	
Luminaires with hard-wired high frequency generator and induction lamp.	
Ceiling fan light kits subject to federal appliance regulations.	



Joint Appendix 8 Requirements

Category	Requirements
Color Rendering Index (CRI)	≥ 90
Luminous Efficacy	≥ 45 lumens per watt
Power Factor	≥ 0.90 at full output
Start Time	Turn on within 0.5s
Correlated Color Temperature (CCT)	Inseparable SSL light engines & GU24 LED lamps: $\leq 4000\text{K}$ Others: $\leq 3000\text{K}$



Joint Appendix 8 Requirements Cont.

Category	Requirements
R9	> 50
Minimum Dimming Levels	$\leq 10\%$
Flicker	< 30% for frequencies of 200 Hz or below
Audible Noise	< 24 dBa at 1 meter from light source
Marking	JA8-2022 or JA8-2022-E



§150.0(k)1B Screw Base Luminaires

Shall contain lamps that comply with JA8 and the lamp and light source is JA8 certified:

- Manufacturer marking
- Listing in the MAEDBS





§150.0(k)1C Recessed Downlights

- Cannot have a screw base socket
- Must have a label certifying airtight
- Must be sealed with gasket or caulk, or be installed per manufacturer's instructions
- Must meet clearance and installation requirements of California Electrical Code 410.116



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§150.0(k)1D Enclosed and Recessed Luminaires

Lamps and separable light sources

- Must comply with JA8 elevated temperature requirements
- Must be marked “JA8-XXXX-E”





Indoor Lighting Controls



Lighting Control Types

Lighting Control Type	What does it do?
Dimmer	<ul style="list-style-type: none">• Varies brightness by changing power delivered to the system
Occupant Sensor (indoor and outdoor)	<ul style="list-style-type: none">• Auto-off when area vacated• Auto-on when area occupied
Vacancy Sensor	<ul style="list-style-type: none">• Auto-off when area vacated• Manual-on
Photo Control	<ul style="list-style-type: none">• Auto-on/-off based on available daylight
Astronomical Time-Switch Control (outdoor)	<ul style="list-style-type: none">• Controls light based on time of day• Based on astronomical events like sunset, sunrise; accounts for geographic location & calendar date



§150.0(k)2 Indoor Lighting Controls

- A. Must have readily accessible wall-mounted manual on/off controls (ceiling fans may provide control of integrated lighting via remote control)
- B. May not bypass dimmer, occupancy sensor, or vacancy sensor installed to comply with §150.0(k)
- C. Must comply with applicable requirements of §110.9
- D. Energy Management Control Systems or multi-scene programmable controls may be used to meet control requirements



§150.0(k)2 Indoor Lighting Controls Cont.

E. Automatic Off Controls

- i. Bathrooms, garages, laundry rooms, utility rooms, and walk-in closets: At least one luminaire controlled by occupancy or vacancy sensor.
- ii. Lighting internal to drawers and cabinetry with opaque fronts or doors: Controls that turn light off when the drawer or door is closed shall be provided.



§150.0(k)2 Indoor Lighting Controls Cont.

F. Dimming Controls

- i. Lighting in habitable spaces must have readily accessible wall-mounted dimming controls.
- ii. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.

Exceptions to 150.0(k)2F:

1. Ceiling fan lighting may be controlled with remote control
2. Luminaires connected to circuit with lighting power < 20 watts or controlled by occupancy or vacancy sensor.
3. Navigation lighting < 5 watts
4. Lighting internal to drawers and cabinetry with opaque fronts or doors with automatic-off controls



§150.0(k)2 Indoor Lighting Controls Cont.

G. Independent Controls

- i. Lighting integrated in an exhaust fan must be controlled independently from the fan.
- ii. The following must be controlled separately from ceiling-installed lighting:
 - i. Under-cabinet lighting.
 - ii. Under-shelf lighting.
 - iii. Interior lighting of display cabinets.
 - iv. Switched outlets.



Outdoor Lighting and Controls





§150.0(k)3A Outdoor Lighting Attached to Building

- Must meet high efficacy requirements from §150.0(k)1A
- Must have manual on/off and one of the following:
 - Photocell and either motion sensor or automatic time switch control
 - Astronomical time clock control
- Controls that override to on must return to normal operation within 6 hours.





§150.0(k)5 Garages for Eight or More Vehicles

- Meet applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 141.0, and 140.6.



Additions and Alterations





§150.2(a) and (b) Additions and Alterations

- Altered lighting systems must meet requirements in §150.0(k).
- Altered luminaires must meet luminaire efficacy requirements in §150.0(k) and Table 150.0-A.
- Existing screw based sockets in ceiling recessed luminaires can stay; need to install new JA8-compliant trim kits or lamps designed for use with recessed downlights or luminaires.



Energy Code Hotline



Monday through Friday

- 8:00 a.m. to 12:00 p.m.
- 1:00 p.m. to 4:30 p.m.

Call

- 800-772-3300 in CA
- 916-654-5106 outside CA



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