

SUBCHAPTER 4

NONRESIDENTIAL, HIGH-RISE RESIDENTIAL AND HOTEL/MOTEL OCCUPANCIES—MANDATORY REQUIREMENTS FOR LIGHTING SYSTEMS AND EQUIPMENT, AND ELECTRICAL POWER DISTRIBUTION SYSTEMS

SECTION 130.0 LIGHTING SYSTEMS AND EQUIPMENT, AND ELECTRICAL POWER DISTRIBUTION SYSTEMS —GENERAL

(a) The design and installation of all lighting systems and equipment in nonresidential, high-rise residential, hotel/motel buildings, outdoor lighting, and electrical power distribution systems within the scope of Section 100.0(a), shall comply with the applicable provisions of Sections 130.0 through 130.5.

NOTE: The requirements of Sections 130.0 through 130.5 apply to newly constructed buildings. Section 141.0 specifies which requirements of Sections 130.0 through 130.5 also apply to additions and alterations to existing buildings.

(b) **Functional areas where compliance with the residential lighting standards is required.** The design and installation of all lighting systems, lighting controls and equipment in the following functional areas shall comply with the applicable provisions of Section 150.0(k). In buildings containing these functional areas, all other functional areas, such as common areas, shall comply with the applicable nonresidential lighting standards and the applicable non-residential controlled receptacle requirements in Section 130.5(d).

1. High-rise residential dwelling units.
2. Outdoor lighting that is attached to a high-rise residential or hotel/motel building, and is separately controlled from the inside of a dwelling unit or guest room.
3. Fire station dwelling accommodations.
4. Hotel and motel guest rooms. Additionally, hotel and motel guest rooms shall meet the requirements of Section 130.1(c)8 and Section 130.5(d)4.
5. Dormitory and Senior housing dwelling accommodations.

NOTE: The requirements of Section 130.0(b) also apply to additions and alterations to functional areas of existing buildings as specified in Section 130.0(b).

(c) **Luminaire classification and power.** Luminaires classified and wattage shall be determined as follows:

1. Luminaire labeling. Luminaire wattage shall be labeled as follows:
 - A. The maximum relamping rated wattage of a luminaire shall be listed on a permanent, preprinted, factory installed label, as specified by UL 1574, 1598, 2108 or 8750, as applicable; and

B. The factory-installed maximum relamping rated wattage label shall not consist of peel-off or peel-down layers or other methods that allow the rated wattage to be changed after the luminaire has been shipped from the manufacturer.

Exception to Section 130.0(c)1B: Peel-down labels may be used only for the following luminaires, when they can accommodate a range of lamp wattages without changing the luminaire housing, ballast, transformer or wiring. Qualifying luminaires shall have a single lamp, and shall have integrated ballasts or transformers. Peel-down labels must be layered such that the rated wattage reduces as successive layers are removed.

- i. High-intensity discharge luminaires, having an integral electronic ballast, with a maximum relamping rated wattage of 150 watts.
 - ii. Low-voltage luminaires (except low voltage track systems), ≤ 24 volts, with a maximum relamping rated wattage of 50 watts.
 - iii. Compact fluorescent luminaires, having an integral electronic ballast, with a maximum relamping rated wattage of 42 watts.
2. For luminaires with line voltage lamp holders not containing permanently installed ballasts or transformers; the wattage of such luminaires shall be determined as follows:
 - A. The maximum relamping rated wattage of the luminaire; and
 - B. For recessed luminaires with line-voltage medium screw base sockets, wattage shall not be less than 50 watts per socket.
 3. Luminaires and luminaire housings designed to accommodate a variety of trims or modular components that allow the conversion between incandescent and any other lighting technology without changing the luminaire housing or wiring shall be classified as incandescent.
 4. Screw-based adaptors shall not be used to convert an incandescent luminaire to any type of nonincandescent technology. Screw-based adaptors, including screw-base adaptors classified as permanent by the manufacturer, shall not be recognized for compliance with Part 6.
 5. Luminaires and luminaire housings with incandescent screw base sockets shall be classified only as incandescent.

- cent. Field modifications, including but not limited to hard wiring of an LED module, shall not be recognized as converting an incandescent luminaire or luminaire housing to a nonincandescent technology for compliance with Part 6 unless such sockets are removed.
6. Luminaires with permanently installed or remotely installed ballasts or drivers. The wattage of such luminaires shall be determined as follows:
 - A. The operating input wattage of the rated lamp/ballast combination published in ballast manufacturer's catalogs based on independent testing lab reports as specified by UL 1598.
 - B. The maximum input wattage of the rated driver published in driver's manufacturer catalogs based on independent testing lab reports as specified by UL 8750 or LM-79.
 7. Line-voltage lighting track and plug-in busway that allows the addition or relocation of luminaires without altering the wiring of the system. The wattage of such luminaires shall be determined by one of the following methods:
 - A. The wattage of line voltage busway and track rated for more than 20 amperes shall be the total volt-ampere rating of the branch circuit feeding the busway and track.
 - B. The wattage of line voltage busway and track rated for 20 amperes or less shall be determined by one of the following methods:
 - i. The volt-ampere rating of the branch circuit feeding the track or busway; or
 - ii. The higher of the rated wattage of all of the luminaires included in the system, where luminaire classification and wattage is determined according to the applicable provisions in Section 130.0(c), or 45 watts per linear foot; or
 - iii. When using a line-voltage track lighting integral current limiter, the higher of the volt-ampere rating of an integral current limiter controlling the track or busway, or 12.5 watts per linear foot of track or busway. An integral current limiter shall be certified to the Energy Commission in accordance with Section 110.9, and shall comply with the lighting control installation requirements in accordance with Section 130.4, to qualify to use subsection Biii to determine luminaire power; or
 - iv. When using a dedicated track lighting supplementary overcurrent protection panel, the sum of the ampere (A) rating of all of the overcurrent protection devices times the branch circuit voltages. Track lighting supplementary overcurrent protection panels shall comply with the applicable requirements in Section 110.9, and shall comply with the lighting control installation requirements in accordance with Section 130.4, to qualify to use subsection 130.0(c)1B to determine luminaire power.
 8. Luminaires and lighting systems with permanently installed or remotely installed transformers. The wattage of such luminaires shall be determined as follows:
 - A. For low-voltage luminaires that do not allow the addition of lamps, lamp holders or luminaires without rewiring, the wattage shall be the rated wattage of the lamp/transformer combination.
 - B. For low-voltage lighting systems, including low voltage tracks and other low-voltage lighting systems that allow the addition of lamps, lamp holders or luminaires without rewiring, the wattage shall be the maximum rated input wattage of the transformer, labeled in accordance with Item 1, or the maximum rated wattage published in transformer manufacturer's catalogs, as specified by UL 2108.
 9. Light emitting diode (LED) luminaires, and LED light engine.
 - A. The wattage of such luminaires shall be the maximum rated input wattage of the system when tested in accordance with IES LM-79-08.
 - B. The maximum rated input wattage shall be labeled in accordance with Section 130.0(c)1.
 - C. An LED lamp, integrated or nonintegrated type in accordance with the definition in ANSI/IES RP-16-2010, shall not be classified as a LED lighting system for compliance with Part 6. LED modules having screwbases, including but not limited to screw based pig-tails, screw-based sockets, or screw-based adaptors, shall not be recognized as a LED lighting system for compliance with Part 6.
 - D. Luminaires manufactured or rated for use with low-voltage incandescent lamps, into which have been installed LED modules or LED lamps, shall not be recognized as a LED lighting system for compliance with Part 6.
 - E. For LED lighting systems that allow the addition of luminaires or light engines without rewiring, the wattage of such luminaires shall be the maximum rated input wattage of the power supply, labeled in accordance with Section 130.0(c)1, or published in the power supply manufacturer's catalog.

Exception to Section 130.0(c)9: Luminaires in areas that must comply with Section 150.0(k), as specified by Section 130.0(b).
 10. The wattage of all other miscellaneous lighting equipment shall be the maximum rated wattage of the lighting equipment, or operating input wattage of the system, labeled in accordance with Section 130.0(c)1, or published in manufacturer's catalogs, based on independent testing lab reports as specified by UL 1574 or UL 1598. Lighting technologies listed in Subsections 2 through 9 shall be determined in accordance with the applicable requirements in Subsections 1 through 9.

(d) **Lighting controls.** All lighting controls and equipment shall comply with the applicable requirements in Section 110.9, and shall be installed in accordance with the manufacturer's instructions.

(e) **Energy Management Control System (EMCS).**

1. An EMCS may be installed to comply with the requirements of one or more lighting controls if it meets the following minimum requirements:
 - A. Provides all applicable functionality for each specific lighting control or system for which it is installed in accordance with Section 110.9; and
 - B. Complies with all applicable lighting control installation requirements in accordance with Section 130.4 for each specific lighting control or system for which it is installed; and
 - C. Complies with all applicable application requirements for each specific lighting control or system for which it is installed, in accordance with Part 6.

SECTION 130.1

MANDATORY INDOOR LIGHTING CONTROLS

Nonresidential, high-rise residential and hotel/motel buildings shall comply with the applicable requirements of Sections 130.1(a) through 130.1(e).

(a) **Area controls.**

1. All luminaires shall be functionally controlled with manual ON and OFF lighting controls. Each area enclosed by ceiling-height partitions shall be independently controlled.

Exception to Section 130.1(a)1: Up to 0.2 watts per square foot of lighting in any area within a building may be continuously illuminated to allow for means of egress illumination, if:

- A. The area is designated for means of egress on the plans and specifications submitted to the enforcement agency under Section 10-103(a)2 of Part 1; and
 - B. The controls for the egress lighting are not accessible to unauthorized personnel.
2. The lighting controls shall meet the following requirements:
 - A. Be readily accessible; and
 - B. Be operated with a manual control that is located in the same room or area with the lighting that is controlled by that lighting control.

Exception 1 to Section 130.1(a)2: In malls and atria, auditorium areas, retail merchandise sales areas, wholesale showroom areas, commercial and industrial storage areas, general commercial and industrial work areas, convention centers, and arenas, the lighting control shall be located so that a person using the lighting control can see the lights or area controlled by that lighting control, or so that the area being lit is annunciated.

Exception 2 to Section 130.1(a)2: Public restrooms having two or more stalls, parking areas, stairwells, and corridors may use a manual control not accessible to unauthorized personnel.

3. **Other lighting controls.**

- A. Other lighting controls may be installed in addition to the manual lighting controls, provided they do not override the functionality of controls installed in accordance with Section 130.1(a)1, 2 or 4.

4. **Separately controlled lighting systems.** In addition to the requirements in Section 130.1(a)1, 2 and 3:

- A. General lighting shall be separately controlled from all other lighting systems in an area.
- B. Floor and wall display, window display, case display, ornamental and special effects lighting shall each be separately controlled on circuits that are 20 amps or less.
- C. When track lighting is used, general, display, ornamental and special effects lighting shall each be separately controlled.

(b) **Multilevel lighting controls.** The general lighting of any enclosed area 100 square feet or larger, with a connected lighting load that exceeds 0.5 watts per square foot shall provide multilevel lighting control that meets the following requirements:

1. Lighting shall have the required number of control steps and meet the uniformity requirements in accordance with Table 130.1-A;
2. Multilevel lighting controls shall not override the functionality of other lighting controls required for compliance with Sections 130.1(a), and (c) through (e); and
3. Dimmable luminaires shall be controlled by a dimmer control that is capable of controlling lighting through all required lighting control steps and that allows the manual ON and OFF functionality required by Section 130.1(a).

Exception 1 to Section 130.1(b): Classrooms, with a connected general lighting load of 0.7 watts per square feet or less and public restrooms shall have at least one control step between 30–70 percent of full rated power.

Exception 2 to Section 130.1(b): An area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps.

Exception 3 to Section 130.1(b): The areas specified in Sections 130.1(c)6 and 7 are not also required to meet the requirements of Section 130.1(b).

(c) **Shut-OFF Controls.**

1. In addition to lighting controls installed to comply with Sections 130.1(a) and (b), all installed indoor lighting shall be equipped with controls that meet the following requirements:

- A. Shall be controlled with an occupant sensing control, automatic time-switch control, or other control capable of automatically shutting OFF all of the lighting when the space is typically unoccupied; and

NONRESIDENTIAL, HIGH-RISE RESIDENTIAL AND HOTEL/MOTEL OCCUPANCIES—MANDATORY REQUIREMENTS FOR LIGHTING SYSTEMS AND EQUIPMENT, AND ELECTRICAL POWER DISTRIBUTION SYSTEMS

B. Separate controls for the lighting on each floor, other than lighting in stairwells; and

C. Separate controls for a space enclosed by ceiling height partitions not exceeding 5,000 square feet; and

Exception to Section 130.1(c)1C: In the following function areas the area controlled may not exceed 20,000 square feet: malls, auditoriums, single tenant retail, industrial, convention centers and arenas.

D. Separate controls for general, display, ornamental and display case lighting.

Exception 1 to Section 130.1(c)1: Where the lighting is serving an area that is in continuous use, 24 hours per day/365 days per year.

Exception 2 to Section 130.1(c)1: Lighting complying with Section 130.1(c)5 or 7.

Exception 3 to Section 130.1(c)1: Up to 0.1 watts per square foot of lighting in any area within a building may be continuously illuminated, provided that the area is designated for means of egress on the plans and specifications submitted to the enforcement agency under Section 10-103(a)2 of Part 1.

Exception 4 to Section 130.1(c)1: Electrical equipment rooms subject to Article 110.26(D) of the *California Electrical Code*.

Exception 5 to Section 130.1(c): Illumination provided by lighting equipment that is designated for emergency lighting, connected to an emergency power source or battery supply, and is intended to function in emergency mode only when normal power is absent.

2. Countdown timer switches shall not be used to comply with the automatic shut-OFF control requirements in Section 130.1(c)1.

Exception 1 to Section 130.1(c)2: Single-stall bathrooms less than 70 square feet, and closets less than 70 square feet may use countdown timer switches with a maximum setting capability of ten minutes to comply with the automatic shut-Off requirements.

Exception 2 to Section 130.1(c)2: Lighting in a server aisle in a server room, as defined in Section 100.1, may use countdown timer switches with a maximum setting capability of 30 minutes to comply with the automatic shut-OFF requirements.

**TABLE 130.1-A
MULTILEVEL LIGHTING CONTROLS AND UNIFORMITY REQUIREMENTS**

LUMINAIRE TYPE	MINIMUM REQUIRED CONTROL STEPS (percent of full rated power ¹)				UNIFORM LEVEL OF ILLUMINANCE SHALL BE ACHIEVED BY:
Line-voltage sockets except GU-24	Continuous dimming 10-100 percent				
Low-voltage incandescent systems					
LED luminaires and LED source systems					
GU-24 rated for LED					
GU-24 sockets rated for fluorescent > 20 watts	Continuous dimming 20-100 percent				
Pin-based compact fluorescent > 20 watts ²					
GU-24 sockets rated for fluorescent ≤ 20 watts	Minimum one step between 30-70 percent				Stepped dimming; or Continuous dimming; or Switching alternate lamps in a luminaire
Pin-based compact fluorescent ≤ 20 watts ²					
Linear fluorescent and U-bent fluorescent ≤ 13 watts					
Linear fluorescent and U-bent fluorescent > 13 watts	Minimum one step in each range:				Stepped dimming; or Continuous dimming; or Switching alternate lamps in each luminaire, having a minimum of four lamps per luminaire, illuminating the same area and in the same manner
	20-40%	50-70%	75-85%	100%	
Track Lighting	Minimum one step between 30 – 70 percent				Step dimming; or Continuous dimming; or Separately switching circuits in multicircuit track with a minimum of two circuits.
HID > 20 watts	Minimum one step between 50 - 70 percent				
Induction > 25 watts					
Other light sources					

1. Full rated input power of ballast and lamp, corresponding to maximum ballast factor.

2. Includes only pin based lamps: twin tube, multiple twin tube, and spiral lamps.

3. If an automatic time-switch control, other than an occupant sensing control, is installed to comply with Section 130.1(c)1, it shall incorporate an override lighting control that:

- A. Complies with Section 130.1(a); and
- B. Allows the lighting to remain ON for no more than 2 hours when an override is initiated.

Exception to Section 130.1(c)3B: In the following function areas, the override time may exceed 2 hours: Malls, auditoriums, single tenant retail, industrial, and arenas where captive-key override is utilized.

4. If an automatic time-switch control, other than an occupant sensing control, is installed to comply with Section 130.1(c)1, it shall incorporate an automatic holiday “shut-OFF” feature that turns OFF all loads for at least 24 hours, and then resumes the normally scheduled operation.

Exception to Section 130.1(c)4: In retail stores and associated malls, restaurants, grocery stores, churches, and theaters, the automatic time-switch control is not required to incorporate an automatic holiday shut-OFF feature.

5. **Areas where occupant sensing controls are required to shut OFF all lighting.** In offices 250 square feet or smaller, multipurpose rooms of less than 1,000 square feet, classrooms of any size, and conference rooms of any size, lighting shall be controlled with occupant sensing controls to automatically shut OFF all of the lighting when the room is unoccupied.

In areas required by Section 130.1(b) to have multi-level lighting controls, the occupant sensing controls shall function either as a:

- A. Partial-ON Occupant Sensor capable of automatically activating between 50–70 percent of controlled lighting power, or
- B. Vacancy Sensor, where all lighting responds to a manual ON input only.

In areas not required by Section 130.1(b) to have multilevel lighting controls, the occupant sensing controls shall function either as a:

- A. Occupant Sensor; or
- B. Partial-ON Occupant Sensor, or
- C. Vacancy Sensor, where all lighting responds to a manual ON input only.

In addition, controls shall be provided that allow the lights to be manually shut-OFF in accordance with Section 130.1(a) regardless of the sensor status.

6. **Areas where full or partial OFF occupant sensing controls are required.** Lighting installed in the following areas shall meet the following requirements in addition to complying with Section 130.1(c)1.

- A. In aisle ways and open areas in warehouses, lighting shall be controlled with occupant sensing controls that automatically reduce lighting power by at least

50 percent when the areas are unoccupied. The occupant sensing controls shall independently control lighting in each aisle way, and shall not control lighting beyond the aisle way being controlled by the sensor.

Exception 1 to Section 130.1(c)6A: In aisle ways and open areas in warehouses in which the installed lighting power is 80 percent or less of the value allowed under the area category method, occupant sensing controls shall reduce lighting power by at least 40 percent.

Exception 2 to Section 130.1(c)6A: When metal halide lighting or high pressure sodium lighting is installed in warehouses, occupant sensing controls shall reduce lighting power by at least 40 percent.

- B. In library book stack aisles 10 feet or longer that are accessible from only one end, and library book stack aisles 20 feet or longer that are accessible from both ends, lighting shall be controlled with occupant sensing controls that automatically reduce lighting power by at least 50 percent when the areas are unoccupied. The occupant sensing controls shall independently control lighting in each aisle way, and shall not control lighting beyond the aisle way being controlled by the sensor.

C. Lighting installed in corridors and stairwells shall be controlled by occupant sensing controls that separately reduce the lighting power in each space by at least 50 percent when the space is unoccupied. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

7. **Areas where partial OFF occupant sensing controls are required.** Lighting installed in the following areas shall meet the following requirements instead of complying with Section 130.1(c)1.

- A. Lighting in stairwells and common area corridors that provide access to guestrooms and dwelling units of high-rise residential buildings and hotel/motels shall be controlled with occupant sensing controls that automatically reduce lighting power by at least 50 percent when the areas are unoccupied. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

Exception to Section 130.1(c)7A: In corridors and stairwells in which the installed lighting power is 80 percent or less of the value allowed under the area category method, occupant sensing controls shall reduce power by at least 40 percent.

- B. In parking garages, parking areas and loading and unloading areas, general lighting shall be controlled by occupant sensing controls having at least one control step between 20 percent and 50 percent of design lighting power. No more than 500 watts of rated lighting power shall be controlled together as a

single zone. A reasonably uniform level of illuminance shall be achieved in accordance with the applicable requirements in Table 130.1-A. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

Interior areas of parking garages are classified as indoor lighting for compliance with Section 130.1(c)7B. Parking areas on the roof of a parking structure are classified as outdoor hardscape and shall comply with the applicable provisions in Section 130.2.

Exception to Section 130.1(c)7B: Metal halide luminaires with a lamp plus ballast mean system efficacy of greater than 75 lumens per watt, used for general lighting in parking garages, parking areas and loading and unloading areas, shall be controlled by occupant sensing controls having at least one control step between 20 percent and 60 percent of design lighting power.

8. Hotel motel guest rooms shall have captive card key controls, occupancy sensing controls, or automatic controls such that, no longer than 30 minutes after the guest room has been vacated, lighting power is switched off.

Exception to Section 130.1(c)8: One high-efficacy luminaire as defined in Table 150.0-A that is switched separately and where the switch is located within 6 feet of the entry door.

(d) **Automatic daylighting controls.**

1. Daylit zones shall be defined as follows:

A. **SKYLIT DAYLIT ZONE** is the rough area in plan view under each skylight, plus 0.7 times the average ceiling height in each direction from the edge of the rough opening of the skylight, minus any area on a plan beyond a permanent obstruction that is taller than the following: A permanent obstruction that is taller than one-half the distance from the floor to the bottom of the skylight. The bottom of the skylight is measured from the bottom of the skylight well for skylights having wells, or the bottom of the skylight if no skylight well exists.

For the purpose of determining the skylit daylit zone, the geometric shape of the skylit daylit zone shall be identical to the plan view geometric shape of the rough opening of the skylight; for example, for a rectangular skylight the skylit daylit zone plan area shall be rectangular, and for a circular skylight the skylit daylit zone plan area shall be circular.

B. **PRIMARY SIDELIT DAYLIT ZONE** is the area in plan view and is directly adjacent to each vertical glazing, one window head height deep into the area, and window width plus 0.5 times window head

height wide on each side of the rough opening of the window, minus any area on a plan beyond a permanent obstruction that is 6 feet or taller as measured from the floor.

C. **SECONDARY SIDELIT DAYLIT ZONE** is the area in plan view and is directly adjacent to each vertical glazing, two window head heights deep into the area, and window width plus 0.5 times window head height wide on each side of the rough opening of the window, minus any area on a plan beyond a permanent obstruction that is 6 feet or taller as measured from the floor.

Note: Modular furniture walls shall not be considered a permanent obstruction.

2. Luminaires providing general lighting that are in or are partially in the skylit daylit zones or the primary sidelit daylit zones shall be controlled independently by fully functional automatic daylighting controls that meet the applicable requirements of Section 110.9 and the applicable requirements below:

A. All skylit daylit zones and primary sidelit daylit zones shall be shown on the plans.

B. Luminaires in the skylit daylit zone shall be controlled separately from those in the primary sidelit daylit zones.

C. Luminaires that fall in both a skylit and primary sidelit daylit zone shall be controlled as part of the skylit daylit zone.

D. **Automatic daylighting control installation and operation.** For luminaires in daylight zones, automatic daylighting controls shall be installed and configured to operate according to all of the following requirements:

- i. Photosensors shall be located so that they are not readily accessible to unauthorized personnel. The location where calibration adjustments are made to an automatic daylighting controls shall be readily accessible to authorized personnel and may be inside a locked case or under a cover which requires a tool for access.

- ii. Automatic daylighting controls shall provide functional multilevel lighting, having at least the number of control steps specified in Table 130.1-A.

Exception 1 to Section 130.1(d)2Dii: Controlled lighting having a lighting power density less than 0.3 W/ft² is not required to provide multilevel lighting controls.

- iii. For each space, the combined illuminance from the controlled lighting and daylight shall not be less than the illuminance from controlled lighting when no daylight is available.

- iv. In areas served by lighting that is daylight controlled, when the daylight illuminance is greater than 150 percent of the design illuminance received from the general lighting system at full power, the general lighting power in that daylight zone shall be reduced by a minimum of 65 percent.

Exception 1 to Section 130.1(d)2: Rooms in which the combined total installed general lighting power in the skylit daylit zone and primary sidelit daylit zone is less than 120 Watts.

Exception 2 to Section 130.1(d)2: Rooms that have a total glazing area of less than 24 square feet.

Exception 3 to Section 130.1(d)2: Parking garages complying with Section 130.1(d)3.

- 3. **Parking garage daylighting requirements.** In a parking garage area with a combined total of 36 square feet or more of glazing or opening, luminaires providing general lighting that are in the combined primary and secondary sidelit daylit zones shall be controlled independently from other lighting in the parking garage by automatic daylighting controls, and shall meet the following requirements as applicable:

A. All primary and secondary sidelit daylit zones shall be shown on the plans.

B. Automatic daylighting control installation and operation. Automatic daylighting control shall be installed and configured to operate according to all of the following requirements:

- i. Automatic daylighting controls shall have photosensors that are located so that they are not readily accessible to unauthorized personnel. The location where calibration adjustments are made to the automatic daylighting controls shall be readily accessible to unauthorized personnel but may be inside a locked case or under a cover which requires a tool for access.
- ii. Automatic daylighting controls shall be multi-level, continuous dimming or ON/OFF.
- iii. The combined illuminance from the controlled lighting and daylight shall not be less than the illuminance from controlled lighting when no daylight is available.
- iv. When illuminance levels measured at the farthest edge of the secondary sidelit zone away from the glazing or opening are greater than 150 percent of the illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power consumption shall be zero.

Exception 1 to Section 130.1(d)3: Luminaires located in the daylight transition zone and luminaires for only dedicated ramps. Daylight transition zone and dedicated ramps are defined in Section 100.1.

Exception 2 to Section 130.1(d)3: The total combined general lighting power in the primary sidelit daylight zones is less than 60 watts.

(e) **Demand responsive controls.**

- 1. Buildings larger than 10,000 square feet, excluding spaces with a lighting power density of 0.5 watts per square foot or less, shall be capable of automatically reducing lighting power in response to a demand response signal; so that the total lighting power of non-excluded spaces can be lowered by a minimum of 15 percent below the total installed lighting power when a demand response signal is received. Lighting shall be reduced in a manner consistent with uniform level of illumination requirements in Table 130.1-A.

Exception to Section 130.1(e): Lighting not permitted by a health or life safety statute, ordinance, or regulation to be reduced shall not be counted toward the total lighting power.

- 2. Demand responsive controls and equipment shall be capable of receiving and automatically responding to at least one standards-based messaging protocol by enabling demand response after receiving a demand response signal.

**SECTION 130.2
OUTDOOR LIGHTING CONTROLS AND EQUIPMENT**

Nonresidential, high-rise residential and hotel/motel buildings shall comply with the applicable requirements of Sections 130.2(a) through 130.2(c).

(a) **Outdoor incandescent lighting.** All outdoor incandescent luminaires rated over 100 watts, determined in accordance with Section 130.0(c)2, shall be controlled by a motion sensor.

(b) **Luminaire cutoff requirements.** All outdoor luminaires rated for use with lamps greater than 150 lamp watts, determined in accordance with Section 130.0(c), shall comply with backlight, uplight, and glare (collectively referred to as “BUG” in accordance with IES TM-15-11, Addendum A) requirements as follows:

- 1. There are no backlight requirements in Section 130.2 of Part 6; and
- 2. Maximum zonal lumens for uplight shall be in accordance with Table 130.2-A; and
- 3. Maximum zonal lumens for glare shall be in accordance with Table 130.2-B.

NOTE: Title 24, Part 11, Section 5.106.8 includes additional restrictions on backlight, uplight and glare that may apply.

Exception 1 to Section 130.2(b): Signs.

Exception 2 to Section 130.2(b): Lighting for building facades, public monuments, statues and vertical surfaces of bridges.

Exception 3 to Section 130.2(b): Lighting not permitted by a health or life safety statute, ordinance or regulation to be a cutoff luminaire.

Exception 4 to Section 130.2(b): Temporary outdoor lighting.

Exception 5 to Section 130.2(b): Replacement of existing pole mounted luminaires in hardscape areas meeting all of the following conditions:

- A. Where the existing luminaire does not meet the luminaire BUG requirements in Section 130.2(b); and
- B. Spacing between existing poles is greater than six times the mounting height of the existing luminaires; and
- C. Where no additional poles are being added to the site; and
- D. Where new wiring to the luminaires is not being installed; and
- E. Provided that the connected lighting power wattage is not increased.

Exception 6 to Section 130.2(b): Luminaires that illuminate the public right of way on publicly maintained roadways, sidewalks and bikeways.

(c) **Controls for outdoor lighting.** Outdoor lighting controls shall be installed that meet the following requirements as applicable:

Exception 1 to Section 130.2(c): Outdoor lighting not permitted by a health or life safety statute, ordinance or regulation to be turned OFF.

Exception 2 to Section 130.2(c): Lighting in tunnels required to be illuminated 24 hours per day and 365 days per year.

- 1. All installed outdoor lighting shall be controlled by a photocontrol or outdoor astronomical time-switch control, or other control capable of automatically shutting OFF the outdoor lighting when daylight is available.
- 2. All installed outdoor lighting shall be independently controlled from other electrical loads by an automatic scheduling control.
- 3. All installed outdoor lighting, where the bottom of the luminaire is mounted 24 feet or less above the ground, shall be controlled with automatic lighting controls that meet all of the following requirements:
 - A. Shall be motion sensors or other lighting control systems that automatically controls lighting in accordance with Item B in response to the area being vacated of occupants; and
 - B. Shall be capable of automatically reducing the lighting power of each luminaire by at least 40 percent but not exceeding 90 percent, or provide continuous dimming through a range that includes 40 percent through 90 percent, and
 - C. Shall employ auto-ON functionality when the area becomes occupied; and

D. No more than 1,500 watts of lighting power shall be controlled together.

Exception 1 to Section 130.2(c)3: Lighting for outdoor sales frontage complying with Section 130.2(c)4.

Exception 2 to Section 130.2(c)3: Lighting for building facades, ornamental hardscape and outdoor dining complying with Section 130.2(c)5.

Exception 3 to Section 130.2(c)3: Outdoor lighting, where luminaire rated wattage is determined in accordance with Section 130.0(c), and which meet one of the following conditions:

- A. Pole-mounted luminaires each with a maximum rated wattage of 75 watts; or
- B. Nonpole mounted luminaires with a maximum rated wattage of 30 watts each; or
- C. Linear lighting with a maximum wattage of 4 watts per linear foot of luminaire.

Exception 4 to Section 130.2(c)3: Applications listed as Exceptions to Section 140.7(a) shall not be required to meet the requirements of Section 130.2(c)3.

- 4. For outdoor sales frontage lighting, an automatic lighting control shall be installed that meets the following requirements:
 - A. A part-night outdoor lighting control as defined in Section 100.1; or
 - B. Motion sensors capable of automatically reducing lighting power by at least 40 percent but not exceeding 90 percent, and which have auto-ON functionality.
- 5. For building facade, ornamental hardscape and outdoor dining lighting, an automatic lighting control shall be installed that meets one or more of the following requirements:
 - A. A part-night outdoor lighting control as defined in Section 100.1; or
 - B. Motion sensors capable of automatically reducing lighting power by at least 40 percent but not exceeding 90 percent, and which have auto-ON functionality; or
 - C. A centralized time-based zone lighting control capable of automatically reducing lighting power by at least 50 percent.
 - D. Outdoor wall mounted luminaires having a bilaterally symmetric distribution as described in the IES Handbook (typically referred to as “wall packs”) where the bottom of the luminaire is mounted 24 feet or less above the ground shall comply with the applicable requirements in Section 130.2(c)3.

TABLE 130.2-A UPLIGHT RATINGS (Maximum Zonal Lumens)

SECONDARY SOLID ANGLE	MAXIMUM ZONAL LUMENS PER OUTDOOR LIGHTING ZONE				
	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Uplight high (UH) 100 to 180 degrees	0	10	50	500	1,000
Uplight low (UL) 90 to < 100 degrees	0	10	50	500	1,000

TABLE 130.2-B GLARE RATINGS (Maximum Zonal Lumens)

GLARE RATING FOR ASYMMETRICAL LUMINAIRE TYPES (Type I, Type II, Type III, Type IV)					
SECONDARY SOLID ANGLE	MAXIMUM ZONAL LUMENS PER OUTDOOR LIGHTING ZONE				
	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Forward very high (FVH) 80 to 90 degrees	10	100	225	500	750
Backlight very high (BVH) 80 to 90 degrees	10	100	225	500	750
Forward high (FH) 60 to < 80 degrees	660	1,800	5,000	7,500	12,000
Backlight high (BH) 60 to < 80 degrees	110	500	1,000	2,500	5,000
GLARE RATING FOR QUADRILATERAL SYMMETRICAL LUMINAIRE TYPES (Type V, Type V Square)					
SECONDARY SOLID ANGLE	MAXIMUM ZONAL LUMENS PER OUTDOOR LIGHTING ZONE				
	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Forward very high (FVH) 80 to 90 degrees	10	100	225	500	750
Backlight very high (BVH) 80 to 90 degrees	10	100	225	500	750
Forward high (FH) 60 to < 80 degrees	660	1,800	5,000	7,500	12,000
Backlight high (BH) 60 to < 80 degrees	660	1,800	5,000	7,500	12,000

**SECTION 130.3
SIGN LIGHTING CONTROLS**

Nonresidential, high-rise residential and hotel/motel buildings shall comply with the applicable requirements of Sections 130.3(a)1 through 130.3(a)3.

(a) **Controls for sign lighting.** All sign lighting shall meet the requirements below as applicable:

- Indoor signs.** All indoor sign lighting shall be controlled with an automatic time-switch control or astronomical time-switch control.
- Outdoor signs.** Outdoor sign lighting shall meet the following requirements as applicable:

A. All outdoor sign lighting shall be controlled with a photocontrol in addition to an automatic time-switch control, or an astronomical time-switch control.

Exception to Section 130.3(a)2A: Outdoor signs in tunnels, and signs in large permanently covered outdoor areas that are intended to be continuously lit, 24 hours per day and 365 days per year.

B. All outdoor sign lighting that is ON both day and night shall be controlled with a dimmer that provides the ability to automatically reduce sign lighting power by a minimum of 65 percent during nighttime hours. Signs that are illuminated at night and for more than 1 hour during daylight hours shall be considered ON both day and night.

Exception to Section 130.3(a)2B: Outdoor signs in tunnels and large covered areas that are intended to be illuminated both day and night.

- Demand responsive electronic message center control.** An electronic message center (EMC) having a new connected lighting power load greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal.

Exception to Section 130.3(a)3: Lighting for EMCs that is not permitted by a health or life safety statute, ordinance or regulation to be reduced by 30 percent.

**SECTION 130.4
LIGHTING CONTROL ACCEPTANCE AND
INSTALLATION CERTIFICATE REQUIREMENTS**

Nonresidential, high-rise residential and hotel/motel buildings shall comply with the applicable requirements of Sections 130.4(a) through 130.4(c).

(a) **Lighting control acceptance requirements.** Before an occupancy permit is granted, indoor and outdoor lighting controls serving the building, area or site shall be certified as meeting the Acceptance Requirements for Code Compliance in accordance with Section 130.4(a). A Certificate of Acceptance shall be submitted to the enforcement agency under Section 10-103(a) of Part 1, that:

- Certifies that all of the lighting acceptance testing necessary to meet the requirements of Part 6 is completed;
- Certifies that the applicable procedures in Reference Nonresidential Appendix NA7.6 and NA7.8 have been followed;
- Certifies that automatic daylight controls comply with Section 130.1(d) and Reference Nonresidential Appendix NA7.6.1;
- Certifies that lighting shut-OFF controls comply with Section 130.1(c) and Reference Nonresidential Appendix NA7.6.2;
- Certifies that demand responsive controls comply with Section 130.1(e) and Reference Nonresidential Appendix NA7.6.3; and

6. Certifies that outdoor lighting controls comply with the applicable requirements of Section 130.2(c) and Reference Nonresidential Appendix NA7.8; and
7. Certifies that lighting systems receiving the Institutional Tuning Power Adjustment Factor comply with Section 140.6(a)2J and Reference Nonresidential Appendix NA7.7.6.2.

(b) **Lighting control installation certificate requirements.** To be recognized for compliance with Part 6 an installation certificate shall be submitted in accordance with Section 10-103(a) for any lighting control system, energy management control system, track lighting integral current limiter, track lighting supplementary overcurrent protection panel, interlocked lighting system, lighting power adjustment factor, or additional wattage available for a videoconference studio, in accordance with the following requirements, as applicable:

1. Certification that when a lighting control system is installed to comply with lighting control requirements in Part 6 it complies with the applicable requirements of Section 110.9; and complies with Reference Nonresidential Appendix NA7.7.1.
2. Certification that when an energy management control system is installed to function as a lighting control required by Part 6 it functionally meets all applicable requirements for each application for which it is installed, in accordance with Sections 110.9, 130.0 through 130.5, 140.6 through 150.0, and 150.2; and complies with Reference Nonresidential Appendix NA7.7.2.
3. Certification that line-voltage track lighting integral current limiters comply with the applicable requirements of Section 110.9 and installed wattage has been determined in accordance with Section 130.0(c); and comply with Reference Nonresidential Appendix NA7.7.3.
4. Certification that line-voltage track lighting supplementary overcurrent protection panels comply with the applicable requirements of Section 110.9 and installed wattage has been determined in accordance with Section 130.0(c); and comply with Reference Nonresidential Appendix NA7.7.4.
5. Certification that interlocked lighting systems used to serve an approved area comply with Section 140.6(a)1; and comply with Reference Nonresidential Appendix NA7.7.5.
6. Certification that lighting controls installed to earn a lighting power adjustment factor (PAF) comply with Section 140.6(a)2; and comply with Reference Nonresidential Appendix NA7.7.6.
7. Certification that additional lighting wattage installed for a videoconference studio complies with Section 140.6(c)2Gvii; and complies with Reference Nonresidential Appendix NA7.7.7.

(c) When certification is required by Title 24, Part 1, Section 10-103.1, the acceptance testing specified by Section 130.4 shall be performed by a certified lighting controls acceptance test technician (CLCATT). If the CLCATT is operating as an employee, the CLCATT shall be employed by a certified lighting controls acceptance test employer. The CLCATT shall disclose on the Certificate of Acceptance a valid CLCATT certification identification number issued by an approved acceptance test technician certification provider. The CLCATT shall complete all certificate of acceptance documentation in accordance with the applicable requirements in Section 10-103(a)4.

Note: Authority cited: Sections 25402, 25402.1 and 25213 *Public Resources Code*. Reference: Sections 25007, 25402(a)-(b), 25402.1, 25402.4, 25402.5, 25402.8 and 25910 *Public Resources Code*.

SECTION 130.5 ELECTRICAL POWER DISTRIBUTION SYSTEMS

Nonresidential, high-rise residential and hotel/motel buildings shall comply with the applicable requirements of Sections 130.5(a) through 130.5(e).

(a) **Service electrical metering.** Each electrical service or feeder shall have a permanently installed metering system which measures electrical energy use in accordance with Table 130.5-A.

Exception to Section 130.5(a): Service or feeder for which the utility company provides a metering system that indicates instantaneous kW demand and kWh for a utility-defined period.

(b) **Separation of electrical circuits for electrical energy monitoring.** Electrical power distribution systems shall be designed so that measurement devices can monitor the electrical energy usage of load types according to Table 130.5-B.

Exception to Section 130.5(b): For each separate load type, up to 10 percent of the connected load may be of any type.

(c) **Voltage drop.** The maximum combined voltage drop on both installed feeder conductors and branch circuit conductors to the farthest connected load or outlet shall not exceed 5 percent.

Exception to Section 130.5(c): Voltage drop permitted by *California Electrical Code* Sections 647.4, 695.6 and 695.7.

(d) **Circuit controls for 120-volt receptacles and controlled receptacles.** In all buildings, both controlled and uncontrolled 120 volt receptacles shall be provided in office areas, lobbies, conference rooms, kitchen areas in office spaces and copy rooms. Additionally, hotel/motel guest rooms shall comply with Section 130.5(d)4. Controlled receptacles shall meet the following requirements, as applicable:

1. Install a control capable of automatically shutting OFF the controlled receptacles when the space is typically unoccupied, either at the receptacle or circuit level.

When an automatic time switch control is installed it shall incorporate an override control that allows the controlled receptacle to remain ON for no more than 2 hours when an override is initiated and an automatic holiday “shut-OFF” feature that turns OFF all loads for at least 24 hours and then resumes the normally scheduled operation. Countdown timer switches shall not be used to comply with the automatic time switch control requirements; and

2. Install at least one controlled receptacle within 6 feet from each uncontrolled receptacle or install a splitwired receptacle with at least one controlled and one uncontrolled receptacle. Where receptacles are installed in modular furniture in open office areas, at least one controlled receptacle shall be installed at each workstation; and
3. Provide a permanent and durable marking for controlled receptacles or to differentiate them from uncontrolled receptacles or circuits; and
4. For hotel and motel guest rooms, install controlled receptacles for at least one-half of the 120-volt receptacles in each guestroom. Electric circuits serving controlled receptacles in guestrooms shall have captive card key controls, occupancy sensing controls, or automatic controls so the power is switched OFF no longer than 30 minutes after the guestroom has been vacated.

NOTE: A hardwired power strip controlled by an occupant sensing control may be used to comply with Section 130.5(d). Plug-in strips and other plug-in devices shall not be used to comply with the requirements of this section.

Exception to Section 130.5(d): Receptacles that are only for the following purposes:

- i. Receptacles specifically for refrigerators and water dispensers in kitchen areas.
- ii. Receptacles located a minimum of six feet above the floor that are specifically for clocks.

- iii. Receptacles for network copiers, fax machines, A/V and data equipment other than personal computers in copy rooms.
- iv. Receptacles on circuits rated more than 20 amperes.
- v. Receptacles connected to an uninterruptible power supply (UPS) that are intended to be in continuous use, 24 hours per day/365 days per year, and are marked to differentiate them from other uncontrolled receptacles or circuits.

(e) **Demand responsive controls and equipment.** Demand responsive controls and equipment, where installed, shall be capable of receiving and automatically responding to at least one standards-based messaging protocol which enables demand response after receiving a demand response signal.

NOTE: Definitions of terms and phrases in Section 130.5 are determined as specified in Section 100.1(b). Terms and phrases not found in Section 100.1(b) shall be defined as specified in Title 24, Part 3, Article 100 of the *California Electrical Code*.

**TABLE 130.5-A
MINIMUM REQUIREMENTS FOR METERING OF ELECTRICAL LOAD**

METERING FUNCTIONALITY	ELECTRICAL SERVICES RATED 50 kVA OR LESS	ELECTRICAL SERVICES RATED MORE THAN 50 kVA AND LESS THAN OR EQUAL TO 250 kVA	ELECTRICAL SERVICES RATED MORE THAN 250 kVA AND LESS THAN OR EQUAL TO 1000kVA	ELECTRICAL SERVICES RATED MORE THAN 1000kVA
Instantaneous (at the time) kW demand	Required	Required	Required	Required
Historical peak demand (kW)	Not required	Not required	Required	Required
Tracking kWh for a user-definable period.	Required	Required	Required	Required
kWh per rate period	Not required	Not required	Not required	Required

NONRESIDENTIAL, HIGH-RISE RESIDENTIAL AND HOTEL/MOTEL OCCUPANCIES—MANDATORY REQUIREMENTS FOR LIGHTING SYSTEMS AND EQUIPMENT, AND ELECTRICAL POWER DISTRIBUTION SYSTEMS

**TABLE 130.5-B
MINIMUM REQUIREMENTS FOR SEPARATION OF ELECTRICAL LOAD**

ELECTRICAL LOAD TYPE	ELECTRICAL SERVICES RATED 50 kVA OR LESS	ELECTRICAL SERVICES RATED MORE THAN 50 kVA AND LESS THAN OR EQUAL TO 250 kVA	ELECTRICAL SERVICES RATED MORE THAN 250 kVA AND LESS THAN OR EQUAL TO 1000kVA	ELECTRICAL SERVICES RATED MORE THAN 1000kVA
Lighting including exit and egress lighting and exterior lighting	Not required	All lighting in aggregate	All lighting disaggregated by floor, type or area	All lighting disaggregated by floor, type or area
HVAC systems and components including chillers, fans, heaters, furnaces, package units, cooling towers and circulation pumps associated with HVAC	Not required	All HVAC in aggregate	All HVAC in aggregate and each HVAC load rated at least 50 kVA	All HVAC in aggregate and each HVAC load rated at least 50kVA
Domestic and service water system pumps and related systems and components	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Plug load including appliances rated less than 25 kVA	Not required	All plug load in aggregate Groups of plug loads exceeding 25 kVA connected load in an area less than 5000 sf	All plug load separated by floor, type or area Groups of plug loads exceeding 25 kVA connected load in an area less than 5000 sf	All plug load separated by floor, type or area All groups of plug loads exceeding 25 kVA connected load in an area less than 5000 sf
Elevators, escalators, moving walks and transit systems	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Other individual non HVAC loads or appliances rated 25kVA or greater	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Industrial and commercial load centers 25 kVA or greater including theatrical lighting installations and commercial kitchens	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Renewable power source (net or total)	Each group	Each group	Each group	Each group
Loads associated with renewable power source	Not required	All loads in aggregate	All loads in aggregate	All loads in aggregate
Charging stations for electric vehicles	All loads in aggregate	All loads in aggregate	All loads in aggregate	All loads in aggregate