



TITLE 24 2019

Updates & Changes to the 2016 Code

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Objectives

1. High level changes
2. Non-residential updates
3. Residential updates
4. Lighting alterations

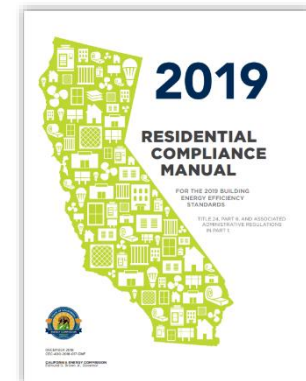
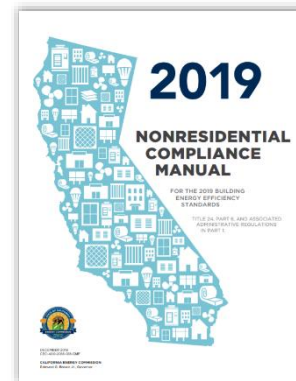
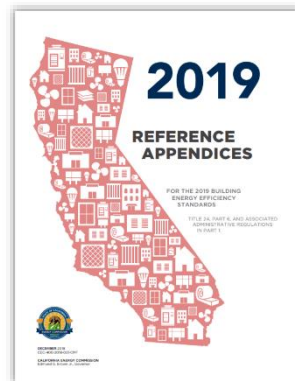
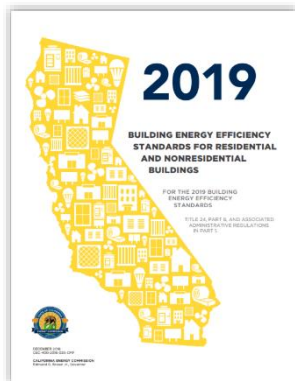


1. High Level Changes



Code Effective Date

- Effective **01/01/2020!**
- Permit applications submitted on or after 01/01/2020 subject to 2019 Standards
- 2019 Building Energy Efficiency Standards (BEES):
 - <https://www.energy.ca.gov/title24/2019standards/index.html>





Healthcare Facilities

- Institutional facilities added (Occupancy I-1 & I-2)



I-1 Covers

- ✓ Alcohol and drug centers
- ✓ Assisted Living facilities
- ✓ Congregate care facilities
- ✓ Convalescent facilities
- ✓ Group homes
- ✓ Halfway houses
- ✓ Residential board and custodial care facilities



I-2 Covers

- ✓ Foster care facilities
- ✓ Detoxification facilities
- ✓ Hospitals
- ✓ Nursing homes
- ✓ Psychiatric hospitals



Demand Management

Section 110.12

- Demand Response Control: *is an automatic control that is capable of receiving and automatically responding to a demand response signal (100.1)*
- New code section that consolidates all Demand Response items
- Standards based signal is OpenADR 2.0a or 2.0b
[110.12(a)]



Reduced Lighting Allowances

Based on Prescriptive Compliance Approaches

- Complete Building Method LPD Changes
- Area Category Method LPD Changes
- Power Adjustment Factors (PAF)



Reduced Lighting Allowances

Complete Building Method

Table 140.6-B Complete Building Method Lighting Power Density Values

Type of Building	Allowed Lighting Power Density (Watts/sqft)	
	2016	2019
Auditorium Assembly Building	1.40	0.70
Classroom Building	1.10	n/a
Commercial and Industrial Storage Building	0.60	0.45
Convention Center Building	1.00	n/a
Financial Institution Building	1.00	0.65
Industrial/Manufacturing Facility Building [2016: General Commerical Building/Industrial Work Building]	1.00	0.60
Grocery Store Building	1.50	0.95
Gymnasium Building	n/a	0.65
Library Building	1.20	0.70
Healthcare Facility	n/a	0.90
Medical Building/Clinic Building	1.00	n/a
Office Building	0.80	0.65
Parking Garage Building	0.20	0.13
Religious Facility Building	1.50	0.70
Restaurant building	1.10	0.70
Retail Store building	n/a	0.90
School Building	0.95	0.65
Sports Arena Building	n/a	0.75
Motion Picture Theater Building	1.30	0.70
Performing Arts Theater Building	n/a	0.80
All others buildings	0.50	0.40



Reduced Lighting Allowances

Area Category Method (part 1 of 4)

Table 140.6-C Area Category Method - Lighting Power Density Values (Watts/sqft)

Primary Function Area	Allowed Lighting Power Density (W/sqft)		Additional Lighting Power		
			Qualified Lighting Systems	Allowed Lighting Power Density (W/sqft)	
				2016	2019
Auditorium Area	1.4	0.7	Ornamental	0.5	0.3
			Accent, display and feature	N/A	0.2
Auto Repair / Maintenance Area	0.9	0.55	Detailed Task Work	0.5	0.2
Audience Seating Area [2016: n/a]	N/A	0.6	Ornamental	N/A	0.3
Beauty Salon Area	1.7	0.8	Detailed Task Work	-	0.2
			Ornamental	-	0.3
Civic Meeting Place Area	1.3	1	Ornamental	0.5	0.3
Classroom, Lecture, Training, Vocational Areas	1.2	0.7	White or Chalk Board	5.5 W/ft	4.5 W/ft
Commerical /Industrial Storage Warehouse	N/A	0.45	-	N/A	-
Shipping & Handling	N/A	0.6	-	N/A	-
[2016: Commerical and Industrial Storage Areas (conditioned and unconditioned)]	0.6	N/A	N/A	-	N/A
[2016: Commerical and Industrial Storage Areas (refrigerated)]	0.7	N/A	N/A	-	N/A
Convention, Conference, Multipurpose and Meeting Center	1.2	0.85	Ornamental	0.5	0.3
Copy Room [2016: n/a]	N/A	0.5	-	N/A	-



Reduced Lighting Allowances

Area Category Method (part 2 of 4)

Table 140.6-C Area Category Method - Lighting Power Density Values (Watts/sqft)

Primary Function Area	Allowed Lighting Power Density (W/sqft)		Additional Lighting Power		
			Qualified Lighting Systems	Allowed Lighting Power Density (W/sqft)	
				2016	2019
Corridor Area [2016: Corridor, Restroom, Stair, and Support Areas]	0.6	0.6	-	-	-
Dining Area Bar/Lounge and Fine Dining Cafeteria/Fast Food Family and Leisure	1	0.55	Ornamental	0.5	0.3
		0.4			
		0.5			
Electrical, Mechanical, Telephone Rooms	0.55	0.4	Detailed Task Work	0.5	0.2
Exercise/Fitness Center and Gymnasium Areas	1	0.5	-	-	-
Hotel Function Area	1.43	0.85	Ornamental	-	0.3
Museum Area Exhibition/Display Restoration Room [2016: N/A]	1.8	0.6	-	-	-
	N/A	0.75	Detailed Task Work	N/A	0.2
Financial Transaction Area	1	0.8	Ornamental	0.5	0.3
General/Commercial & Industrial Work Area Low Bay High Bay Precision	0.9	0.6	Detailed Task Work	0.5	0.2
	1	0.65	Detailed Task Work	0.5	0.2
	1.2	0.85	Precision Work	1	0.7
Library Area Reading Area Stacks Area	1.1	0.8	Ornamental	0.5	0.3
	1.5	1.1	Ornamental	0.5	-



Reduced Lighting Allowances

Area Category Method (part 3 of 4)

Table 140.6-C Area Category Method - Lighting Power Density Values (Watts/sqft)

Primary Function Area	Allowed Lighting Power Density (W/sqft)		Additional Lighting Power		
			Qualified Lighting Systems	Allowed Lighting Power Density (W/sqft)	
	2016	2019		2016	2019
Main Entry Lobby [2016: Lobby Area: Hotel Lobby Main Entry Lobby]	0.95	0.85	Ornamental	0.5	0.3
Locker Room [2016: Locker/Dressing Room]	0.7	0.45	-	-	-
Lounge, Breakroom, or Waiting Areas [2016: Lounge Area]	0.9	0.65	Ornamental	0.5	0.3
Concourse and Atria Area [2016: Malls and Atria]	0.95	0.9	Ornamental	0.5	0.3
Office Area <div> <div>> 250 square feet</div> <div>< 250 square feet</div> <div>Open plan office</div> </div>	0.75	0.65	Portable lighting for office areas	-	0.2
	1	0.7			
	N/A	0.6			
Parking Garage Area <div> <div>Parking Zone</div> <div>[2016: Parking Area]</div> <div>Dedicated Ramps</div> <div>Daylight Adaptation Zones</div> </div>	0.14	0.1	First ATM	N/A	100 W
			Additional ATM	N/A	50 W each
	0.3	0.25	-	-	-
	0.6	0.5	-	-	-
Pharmacy Area [2016: N/A]	N/A	1.1	Specialized Task Work	N/A	0.35



Reduced Lighting Allowances

Area Category Method (part 4 of 4)

Table 140.6-C Area Category Method - Lighting Power Density Values (Watts/sqft)

Primary Function Area	Allowed Lighting Power Density (W/sqft)		Additional Lighting Power		
			Qualified Lighting Systems	Allowed Lighting Power Density (W/sqft)	
	2016	2019		2016	2019
Laundry Area	0.7	0.45	-	-	-
Religious Worship Area	1.5	0.95	Ornamental	0.5	0.3
Restrooms [2016: Corridor, Restroom, Stair, and Support Area]	0.6	0.65	-	-	-
Transportation Function Area Baggage Area Ticketing Area	0.5	0.4	-	-	-
	1	0.45	Accent, display and feature	-	0.2
Sports Arena - Playing Area Class I Facility Class II Facility Class III Facility Class IV Facility	N/A	2.25	-	N/A	-
		1.45	-		-
		1.1	-		-
		0.75	-		-
Stairwell [2016: Corridor, Restroom, Stair, and Support Area]	0.6	0.5	Accent, display and feature	-	0.2
			Decorative	-	0.15
Videoconferencing Studio	1.2	0.9	Videoconferencing	1.5	1
All Other	0.5	0.4	-	-	-



Additional Area Categories

New in LPD Tables

Kitchen/Food Preparation Area		0.95	-	-
Scientific Laboratory Area		1.00	Specialized Task Work ⁸	0.35
Healthcare Facility and Hospitals	Exam/Treatment Room	1.15	-	-
	Imaging Room	1.00	-	-
	Medical Supply Room	0.55	-	-
	Nursery	0.95	Tunable white or dim-to-warm ¹⁰	0.10
	Nurse's Station	0.75	Tunable white or dim-to-warm ¹⁰	0.10
	Operating Room	1.90	-	-
	Patient Room	0.55	Decorative	0.15
			Tunable white or dim-to-warm ¹⁰	0.10
	Physical Therapy Room	0.85	Tunable white or dim-to-warm ¹⁰	0.10
	Recovery Room	0.90	Tunable white or dim-to-warm ¹⁰	0.10
Laundry Area		0.45	-	-
Religious Worship Area		0.95	Ornamental	0.30

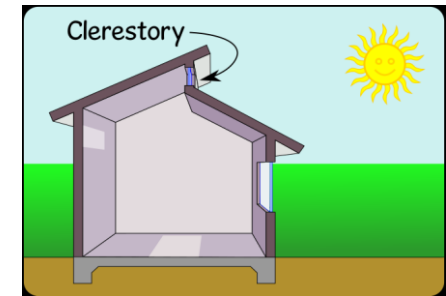


Power Adjustment Factors (PAF)

Table 140.6-A from Section 140.6

TABLE 140.6-A LIGHTING POWER ADJUSTMENT FACTORS (PAF)

TYPE OF CONTROL	TYPE OF AREA	FACTOR
<p>a. To qualify for any of the Power Adjustment Factors in this table, the installation shall comply with the applicable requirements in Section 140.6(a)2</p> <p>b. Only one PAF may be used for each qualifying luminaire unless combined below.</p> <p>c. Lighting controls that are required for compliance with Part 6 shall not be eligible for a PAF</p>		
1. Daylight Dimming plus OFF Control	Luminaires in skylit daylight zone or primary sidelit daylight zone	0.10
2. Occupant Sensing Controls in Large Open Plan Offices	In open plan offices > 250 square feet: One sensor controlling an area that is:	No larger than 125 square feet
		From 126 to 250 square feet
		From 251 to 500 square feet
3 Institutional Tuning	Luminaires in non-daylit areas. Luminaires that qualify for other PAFs in this table may also qualify for this tuning PAF.	0.10
	Luminaires in daylight areas. Luminaires that qualify for other PAFs in this table may also qualify for this tuning PAF.	0.05
4. Demand Responsive Control	All building types of 10,000 square feet or smaller. Luminaires that qualify for other PAFs in this table may also qualify for this demand responsive control PAF	0.05
5. Clerestory Fenestration	Luminaires in daylight areas adjacent to the clerestory. Luminaires that qualify for daylight dimming plus OFF control may also qualify for this PAF.	0.05
6. Horizontal Slats	Luminaires in daylight areas adjacent to vertical fenestration with interior or exterior horizontal slats. Luminaires that qualify for daylight dimming plus OFF control may also qualify for this PAF.	0.05
7. Light Shelves	Luminaires in daylight areas adjacent to clerestory fenestration with interior or exterior light shelves. This PAF may be combined with the PAF for clerestory fenestration. Luminaires that qualify for daylight dimming plus OFF control may also qualify for this PAF	0.10



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2. Non-Resi Updates & Changes



Screw Based Luminaires

Section 130.0(c)2

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 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, or the rated wattage of the installed JA8 compliant lamps.
3. For luminaires with permanently installed or remotely installed ballasts, the wattage of such luminaires shall be the operating input wattage of the rated lamp/ballast combination published in the ballast manufacturer's



Track & Modular Lighting Systems

Section 130.0(c)6

- Baseline approach, take greater of:
 - 30W/linear ft; or
 - Maximum rated wattage of combined luminaires
- Using current limiter (integral or panel based):
 - Maximum wattage of the current limiter devices
- Powered by driver, power supply, or transformer
 - Maximum wattage of power source



Area Controls: Switch Location

Section 130.1(a)

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(f), in addition to the applicable requirements of Sections 110.9 and 130.0.

- (a) **Manual Area Controls.** Each area enclosed by ceiling-height partitions shall provide lighting controls that allow the lighting in that area to be manually turned on and off. The manual control shall:

1. Be readily accessible; and

EXCEPTION to Section 130.1(a)1: Public restrooms having two or more stalls, parking areas, stairwells, and corridors may use a manual control not accessible to unauthorized personnel.

2. Be located in the same enclosed area with the lighting it controls; and

EXCEPTION 1 to Section 130.1(a)2: For 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, arenas, psychiatric and secure areas in healthcare facilities, and other areas where placement of a manual area control poses a health and safety hazard, the manual area control may instead be located so that a person using the control can see the lights or area controlled by that control, or visually signal or display the current state of the controlled lighting.

EXCEPTION 2 to Section 130.1(a)2: In healthcare facilities, for restrooms and bathing rooms intended for a single occupant, the lighting control may be located outside the enclosed area but directly adjacent to the door.

3. Provide separate control of general, floor display, wall display, window display, case display, ornamental, and special effects lighting, such that each type of lighting can be turned on or off without turning on or off



Multi-Level Lighting Controls

Section 130.1(b)

(b) **Multi-Level 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 multi-level lighting controls that allow the level of lighting to be adjusted up and down. The multi-level controls shall provide the number of control steps and meet the uniformity requirements specified in TABLE 130.1-A.

EXCEPTION 1 to Section 130.1(b): An area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps.

EXCEPTION 2 to Section 130.1(b): Restrooms.

EXCEPTION 3 to Section 130.1(b): Healthcare facilities.



Shut-OFF Controls

Section 130.1(c)

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, conference rooms of any size, and restrooms 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 multi-level 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.



- Healthcare facilities exempted



Daylighting Controls

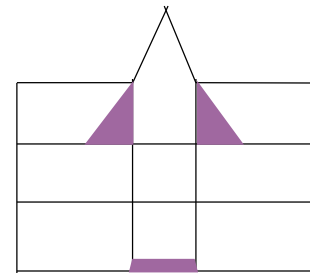
Section 130.1(d)

(d) **Automatic Daylighting Controls.** The general lighting in skylit daylit zones and primary sidelit daylit zones, as well as the general lighting in the combined primary and secondary sidelit daylit zones in parking garages, shall provide controls that automatically adjust the power of the installed lighting up and down to keep the total light level stable as the amount of incoming daylight changes. For skylight located in an atrium, the skylit daylit zone definition shall apply to the floor area directly under the atrium and the top floor area directly adjacent to the atrium.

1. All skylit daylit zones, primary sidelit daylit zones, and the combined primary and secondary sidelit daylit zones in parking garages shall be shown on the plans.

NOTE: Parking areas on the roof of a parking structure are outdoor hardscape, not skylit daylit areas.

2. The automatic daylighting controls shall provide separate control for luminaires in each type of daylit zone. Luminaires that fall in both a skylit and sidelit daylit zone shall be controlled as part of the skylit zone.
3. The automatic daylighting controls shall:
 - A. For spaces required to install multilevel controls under Section 130.1(b), adjust lighting via continuous dimming or the number of control steps provided by the multilevel controls;
 - B. For each space, ensure the combined illuminance from the controlled lighting and daylight is not less than the illuminance from controlled lighting when no daylight is available;
 - C. For areas other than parking garages, ensure that 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; and
 - D. For parking garages, ensure that 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 is zero.





Daylighting Controls

Section 130.1(d) Exceptions

for access.

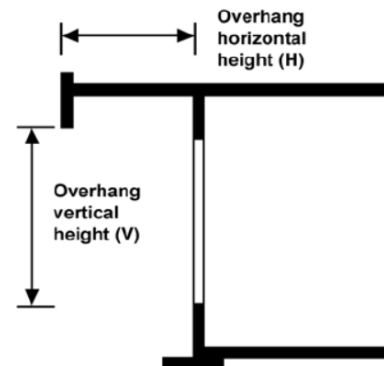
EXCEPTION 1 to Section 130.1(d): Areas under skylights where it is documented that existing adjacent structures or natural objects block direct sunlight for more than 1,500 daytime hours per year between 8a.m. and 4p.m.

EXCEPTION 2 to Section 130.1(d): Areas adjacent to vertical glazing below an overhang, where the overhang covers the entire width of the vertical glazing, no vertical glazing is above the overhang, and the ratio of the overhang projection to the overhang rise is greater than 1.5 for South, East and West orientations or greater than 1 for North orientations.

EXCEPTION 6 to Section 130.1(d): Luminaires in sidelit daylit zones in retail merchandise sales and wholesale showroom areas.

Exception 2 valid if:

- S, E, W orientations: $H / V > 1.5$
- N orientation: $H / V > 1$





Control Interactions

Section 130.1(f); new section

- (f) **Control Interactions.** Each lighting control installed to comply with Section 130.1 shall permit or incorporate the functions of the other lighting controls required by this Section.
1. For general lighting, the manual area control shall permit the level or amount of light provided while the lighting is on to be set or adjusted by the controls specified in Section 130.1(b), (c), (d), and (e).
 2. The manual area control shall permit the shutoff control to turn the lighting down or off.
 3. The multi-level lighting control shall permit the automatic daylighting control to adjust the electric lighting level in response to changes in the amount of daylight in the daylit zone.
 4. The multi-level lighting control shall permit the demand responsive control to adjust the lighting during a demand response event and to return it to the level set by the multilevel control after the event.
 5. The shutoff control shall permit the manual area control to turn the lighting on. If the on request occurs while an automatic time switch control would turn the lighting off, then the on request shall be treated as an override request consistent with Section 130.1(c)3.
 6. The automatic daylighting control shall permit the multi-level lighting control to adjust the level of lighting.
 7. For lighting controlled by multi-level lighting controls and by occupant sensing controls that provide an automatic-on function, the controls shall provide a partial-on function that is capable of automatically activating between 50-70 percent of controlled lighting power.



Controls Outdoor Lighting

Section 130.2; quick highlights

Item #	T24 2019 Code (Jan 1, 2020 implementation)	T24 2016 Code	T24 Code Section Ref	Opportunity
NON-RESIDENTIAL OUTDOOR LIGHTING CONTROLS				
18	All outdoor luminaires ≥ 6,200 lumens shall comply with BUG requirement (includes Backlight)	Went by > 150 lamps watts and did not require Backlight	2019-130.2(b)	Impact to luminaire selection and design approach
19	Auto scheduling controls requires a minimum of two nighttime periods with different lighting levels	Did not specify nighttime periods	2019-130.2(c)(2)(B)	Sequence of Operation (SOO) impact
20	For outdoor luminaires ≤ 24ft required to have motion sensor, motion sensing must be able to do HIGH/LOW/OFF	Did not require OFF by motion sensing; just HIGH/LOW	2019-130.2(c)(3)(A)	Sensor must be capable of both HIGH/OFF and HIGH/LOW. Don't need to use both methods when in operation.
21	For outdoor luminaires ≤ 24ft required to have motion sensor, can be exempt if ≤ 40 watts	Currently ≤ 75 watts and ≤ 30 watts for poled and non-poled luminaires respectively	2019-130.2(c)(3)Exception1	Increase demand for outdoor luminaires controlled by motion sensors. Biggest impact to poled lights since it's going from 75w to 40w, but non-poled lights benefit from the change from 30w to 40w.





Controls Outdoor Lighting

Section 130.2; quick highlights

- (c) **Controls for Outdoor Lighting.** Outdoor lighting shall be independently controlled from other electrical loads, and the controls for outdoor lighting shall meet the following functional requirements:

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 or reduced.

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

1. **Daylight Availability.** All installed outdoor lighting shall be controlled by a photo control, astronomical time-switch control, or other control capable of automatically shutting OFF the outdoor lighting when daylight is available.

2. **Automatic Scheduling Controls.**

- A. Automatic scheduling controls shall be capable of reducing the outdoor lighting power by at least 50 percent and no more than 90 percent, and separately capable of turning the lighting OFF, during scheduled unoccupied periods.
- B. Automatic scheduling controls shall allow scheduling of a minimum of two nighttime periods with independent lighting levels, and may include an override function that turns lighting ON during its scheduled dim or OFF state for no more than two hours when an override is initiated.

SECTION 130.2 – OUTDOOR LIGHTING CONTROLS AND EQUIPMENT



Controls Outdoor Lighting

Section 130.2; quick highlights

C. Acceptance tests of outdoor lighting controls shall verify the scheduled occupied and unoccupied periods, as specified in Section 130.4(a)6.

D. Automatic scheduling controls shall be installed for all outdoor lighting, and may be installed in combination with motion sensing controls or other outdoor lighting controls.

3. **Motion Sensing Controls.**

A. Motion sensing controls shall be capable of reducing the outdoor lighting power of each controlled luminaire by at least 50 percent and no more than 90 percent, and separately capable of turning the luminaire OFF, during unoccupied periods.

B. Motion sensing controls shall be capable of reducing the lighting to its dim or OFF state no longer than 15 minutes after the area has been vacated, and of returning the lighting to its ON state when the area becomes occupied.

C. No more than 1,500 watts of lighting power shall be controlled by a single sensor.

D. Motion sensing controls shall be installed for the following luminaires, and may be installed for other outdoor lighting and in combination with other outdoor lighting controls:

- i. Outdoor luminaires other than Building Façade, Ornamental Hardscape, Outdoor Dining, or Outdoor Sales Frontage lighting, where the bottom of luminaire is mounted 24 feet or less above grade; and,
- ii. Outdoor wall mounted luminaires installed for Building Façade, Ornamental Hardscape or Outdoor Dining lighting that have a bilaterally symmetric distribution as described in the IES Handbook (typically referred to as “wall packs”) mounted 24 feet above grade or lower.

EXCEPTION 1 to Section 130.2(c)3: Luminaires with a maximum rated wattage of 40 watts each are not required to have motion sensing controls.

EXCEPTION 2 to Section 130.2(c)3: Applications listed as Exceptions to Section 140.7(a) are not required to have motion sensing controls.

EXCEPTION 3 to Section 130.2(c)3: Lighting subject to a health or life safety statute, ordinance, or regulation may have a minimum time-out period longer than 15 minutes or a minimum dimming level above 50 percent when necessary to comply with the applicable law.



Outdoor Lighting Zone Table

Section 10-114

TABLE 10-114-A LIGHTING ZONE CHARACTERISTICS AND RULES FOR AMENDMENTS BY LOCAL JURISDICTIONS

Zone	Ambient Illumination	State wide Default Location	Moving Up to Higher Zones	Moving Down to Lower Zones
LZ0	Very Low	Undeveloped areas of government designated parks, recreation areas, and wildlife preserves.	Undeveloped areas of government designated parks, recreation areas, and wildlife preserves can be designated as LZ1 or LZ2 if they are contained within such a zone.	Not applicable
LZ1	Low	Developed portion of government designated parks, recreation areas, and wildlife preserves. Those that are wholly contained within a higher lighting zone may be considered by the local government as part of that lighting zone.	Developed portion of a government designated park, recreation area, or wildlife preserve, can be designated as LZ2 or LZ3 if they are contained within such a zone.	Not applicable.
LZ2	Moderate	Rural areas, as defined by the 2010 U.S. Census.	Special districts within a default LZ2 zone may be designated as LZ3 or LZ4 by a local jurisdiction. Examples include special commercial districts or areas with special security considerations located within a rural area.	Special districts and government designated parks within a default LZ2 zone may be designated as LZ1 by the local jurisdiction for lower illumination standards, without any size limits.
LZ3	Moderately High	Urban areas, as defined by the 2010 U.S. Census.	Special districts within a default LZ3 may be designated as a LZ4 by local jurisdiction for high intensity nighttime use, such as entertainment or commercial districts or areas with special security considerations requiring very high light levels.	Special districts and government designated parks within a default LZ3 zone may be designated as LZ1 or LZ2 by the local jurisdiction, without any size limits.
LZ4	High	None.	Not applicable.	Not applicable.

NOTE: Authority: Sections 25402 and 25402.1, Public Resources Code. Reference: Sections 25007, 25008, 25218.5, 25310, 25402, 25402.1, 25402.4, 25402.5, 25402.8, and 25943, Public Resources Code.



New General Hardscape Allowance

Section 140.7

TABLE 140.7-A GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE

Type of Power Allowance	Lighting Zone 0 ³	Lighting Zone 1 ³	Lighting Zone 2 ³		Lighting Zone 3 ³		Lighting Zone 4 ³
	Asphalt/Concrete	Asphalt/Concrete	Asphalt	Concrete ²	Asphalt	Concrete ²	Asphalt/Concrete
Area Wattage Allowance (AWA)	No allowance ¹	0.018 W/ft ²	0.023 W/ft ²	0.025 W/ft ²	0.025 W/ft ²	0.03 W/ft ²	0.03 W/ft ²
Linear Wattage Allowance (LWA)		0.15 W/lf	0.17 W/lf	0.4 W/lf	0.25 W/lf	0.4 W/lf	0.35 W/lf
Initial Wattage Allowance (IWA)		180 W	250 W	250 W	350 W	350 W	400 W

¹Continuous lighting is explicitly prohibited in Lighting Zone 0. A single luminaire of 15 Watts or less may be installed at an entrance to a parking area, trail head, fee payment kiosk, outhouse, or toilet facility, as required to provide safe navigation of the site infrastructure. Luminaires installed shall meet the maximum zonal lumen limits as specified in Section 130.2(b).

²Where greater than 50% of the paved surface of a parking lot is finished with concrete. This does not extend beyond the parking lot, and does not include any other General Hardscape areas.

³Narrow band spectrum light sources with a dominant peak wavelength greater than 580 nm – as mandated by local, state, or federal agencies to minimize the impact on local, active professional astronomy or nocturnal habitat of specific local fauna – shall be allowed a 2.0 lighting power allowance multiplier.



Specific Outdoor Lighting Applications

Section 140.7 (part 1 of 4)

TABLE 140.7-B ADDITIONAL LIGHTING POWER ALLOWANCE FOR SPECIFIC APPLICATIONS
All area and distance measurements in plan view unless otherwise noted.

Lighting Application	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
WATTAGE ALLOWANCE PER APPLICATION. Use all that apply as appropriate.					
Building Entrances or Exits. Allowance per door. Luminaires qualifying for this allowance shall be within 20 feet of the door.	Not applicable	9 watts	15 watts	19 watts	21 watts
Primary Entrances to Senior Care Facilities, Police Stations, Healthcare Facilities, Fire Stations, and Emergency Vehicle Facilities. Allowance per primary entrance(s) only. Primary entrances shall provide access for the general public and shall not be used exclusively for staff or service personnel. This allowance shall be in addition to the building entrance or exit allowance above. Luminaires qualifying for this allowance shall be within 100 feet of the primary entrance.	Not applicable	20 watts	40 watts	57 watts	60 watts
Drive Up Windows. Allowance per customer service location. Luminaires qualifying for this allowance shall be within 2 mounting heights of the sill of the window.	Not applicable	16 watts	30 watts	50 watts	75 watts
Vehicle Service Station Uncovered Fuel Dispenser. Allowance per fueling dispenser. Luminaires qualifying for this allowance shall be within 2 mounting heights of the dispenser.	Not applicable	55 watts	77 watts	81 watts	135 watts
ATM Machine Lighting. Allowance per ATM machine. Luminaires qualifying for this allowance shall be within 50 feet of the dispenser.	Not applicable	100 watts for first ATM machine, 35 watts for each additional ATM machine.			



Specific Outdoor Lighting Applications

Section 140.7 (part 2 of 4)

TABLE 140.7-B ADDITIONAL LIGHTING POWER ALLOWANCE FOR SPECIFIC APPLICATIONS
All area and distance measurements in plan view unless otherwise noted.

Lighting Application		Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
	WATTAGE ALLOWANCE PER UNIT LENGTH (w/linear ft). May be used for one or two frontage side(s) per site.					
Outdoor Sales Frontage. Allowance for frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. Luminaires qualifying for this allowance shall be located between the principal viewing location and the frontage outdoor sales area.		Not applicable	No Allowance	11 W/linear ft	19 W/linear ft	25 W/linear ft
	WATTAGE ALLOWANCE PER HARDSCAPE AREA (W/ft²). May be used for any illuminated hardscape area on the site.					
Hardscape Ornamental Lighting. Allowance for the total site illuminated hardscape area. Luminaires qualifying for this allowance shall be rated for 100 watts or less as determined in accordance with Section 130.0(d), and shall be post-top luminaires, lanterns, pendant luminaires, or chandeliers.		Not applicable	No Allowance	0.007 W/ft²	0.013 W/ft²	0.019 W/ft²



Specific Outdoor Lighting Applications

Section 140.7 (part 3 of 4)

TABLE 140.7-B ADDITIONAL LIGHTING POWER ALLOWANCE FOR SPECIFIC APPLICATIONS
All area and distance measurements in plan view unless otherwise noted.

Lighting Application	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
WATTAGE ALLOWANCE PER SPECIFIC AREA (W/ft²). Use as appropriate provided that none of the following specific applications shall be used for the same area.					
Building Facades. Only areas of building façade that are illuminated shall qualify for this allowance. Luminaires qualifying for this allowance shall be aimed at the façade and shall be capable of illuminating it without obstruction or interference by permanent building features or other objects.	Not applicable	No Allowance	0.100 W/ft ²	0.170 W/ft ²	0.225 W/ft ²
Outdoor Sales Lots. Allowance for uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale. Driveways, parking lots or other non sales areas shall be considered hardscape areas even if these areas are completely surrounded by sales lot on all sides. Luminaires qualifying for this allowance shall be within 5 mounting heights of the sales lot area.	Not applicable	0.060 W/ft ²	0.210 W/ft ²	0.280 W/ft ²	0.485 W/ft ²
Vehicle Service Station Hardscape. Allowance for the total illuminated hardscape area less area of buildings, under canopies, off property, or obstructed by signs or structures. Luminaires qualifying for this allowance shall be illuminating the hardscape area and shall not be within a building, below a canopy, beyond property lines, or obstructed by a sign or other structure.	Not applicable	0.006 W/ft ²	0.068 W/ft ²	0.138 W/ft ²	0.200 W/ft ²
Vehicle Service Station Canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	Not applicable	0.220 W/ft ²	0.430 W/ft ²	0.580 W/ft ²	1.010 W/ft ²



Specific Outdoor Lighting Applications

Section 140.7 (part 4 of 4)

TABLE 140.7-B ADDITIONAL LIGHTING POWER ALLOWANCE FOR SPECIFIC APPLICATIONS
All area and distance measurements in plan view unless otherwise noted.

Lighting Application		Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
	WATTAGE ALLOWANCE PER SPECIFIC AREA (W/ft²). Use as appropriate provided that none of the following specific applications shall be used for the same area.					
Sales Canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.		Not applicable	No Allowance	0.470 W/ft ²	0.622 W/ft ²	0.740 W/ft ²
Non-sales Canopies and Tunnels. Allowance for the total area within the drip line of the canopy or inside the tunnel. Luminaires qualifying for this allowance shall be located under the canopy or tunnel.		Not applicable	0.057 W/ft ²	0.137 W/ft ²	0.270 W/ft ²	0.370 W/ft ²
Guard Stations. Allowance up to 1,000 square feet per vehicle lane. Guard stations provide access to secure areas controlled by security personnel who stop and may inspect vehicles and vehicle occupants, including identification, documentation, vehicle license plates, and vehicle contents. Qualifying luminaires shall be within 2 mounting heights of a vehicle lane or the guardhouse.		Not applicable	0.081 W/ft ²	0.176 W/ft ²	0.325 W/ft ²	0.425 W/ft ²



3. Resi Updates & Changes



High Efficacy Requirement

Section 150.0(k)

- ALL Resi Luminaires MUST be high efficacy

TABLE 150.0-A CLASSIFICATION OF HIGH EFFICACY LIGHT SOURCES

High Efficacy Light Sources	
Light sources shall comply with one of the columns below:	
Light sources in this column other than those installed in ceiling recessed downlight luminaires are classified as high efficacy and are not required to comply with Reference Joint Appendix JA8	Light sources in this column are only considered to be high efficacy if they are certified to the Commission as High Efficacy Light Sources in accordance with Reference Joint Appendix JA8 and marked as required by JA8.
1. Pin-based linear fluorescent or compact fluorescent light sources using electronic ballasts. 2. Pulse-start metal halide light sources. 3. High pressure sodium light sources. 4. Luminaires with hardwired high frequency generator and induction lamp. 5. LED light sources installed outdoors. 6. Inseparable SSL luminaires containing colored light sources that are installed to provide decorative lighting.	8. All light sources installed in ceiling recessed downlight luminaires. Note that ceiling recessed downlight luminaires shall not have screw bases regardless of lamp type as described in Section 150.0(k)1C. 9. Any light source not otherwise listed in this table.



Is it JA8 Compliant?

Section 150.0(k)

- Two things inspectors check for:
 1. Certified to CEC; check database:
<https://cacertappliances.energy.ca.gov/Pages/ApplianceSearch.aspx>
 2. Luminaire/Lamp shall be clearly labeled/marked “JA8-2019”
(Reference Appendices section JA8)



Resi Reminder: Indoor

Section 150.0(k)2

- Vacancy sensor [at least 1 luminaire] required for:

- Bathroom
- Garage
- Laundry Room
- Utility Room



- All other spaces [no controlled by vacancy sensor]:

- Dimmer switch
 - Exception 1: Closets less than 70sqft
 - Exception 2: Hallways



- Recessed downlights shall NOT contain screw base sockets



Resi Reminder: Outdoor

Section 150.0(k)3 ... In addition to High Efficacy

1. Single-family

1. Controlled by manual ON/OFF switch AND one of the choices below:
 1. Photocell and motion sensor
 2. Photocell and automatic time switch
 3. Astronomical time clock

2. Low-rise (dwelling units ≥ 4)

1. Parking < 8
 1. Do as above (Single-family resi requirement) OR
 2. Follow non-resi requirements (Section 130.2)
2. Parking > 8
 1. Follow non-resi requirements (Section 130.2)



Resi Reminder: Parking Garage, Vehicles ≥ 8

Section 150.0(k)5 ...

- Follow non-resi parking garage requirements
- Manual ON/OFF switch
- High/Low Motion Sensors



Resi Reminder: Common Areas

Low-rise Multi-Family Building Section 150.0(k)6

- If total interior COMMON AREA \leq 20% of floor area
 1. Comply with High Efficacy requirement
 2. Controlled by occupant sensor
- If total interior COMMON AREA $>$ 20% of floor area
 1. Comply with Non-resi requirements



Resi Code Still Applies Here ...

Section 130.0

1. High rise dwelling units
2. Hotel/Motel guest rooms
3. Fire station dwelling areas
4. Dormitory and senior housing dwelling areas
5. Outdoor lighting attached to high-rise resi bldg or hotel/motel bldg and separately controlled from inside of dwelling unit



Additional Resi Requirements

Section 150.0(k)1

- Night Lights, Step Lights, and Path Lights require a vacancy sensor if > 5 watts or > 150 lumens
- Light sources internal to drawers, cabinetry or linen closets require a vacancy sensor if > 5 watts or > 150 lumens unless they are equipped with controls that automatically turn the lighting off when closed.





4. Lighting Alterations



Lighting Alterations

Section 141.0

- Triggered if 10% or more of luminaires within a enclosed space altered
- Controls depend on path to compliance: i, ii or iii
 - i. Path i meets LPD allowance
 - ii. Path ii beats LPD allowance by 20%
 - iii. Path iii beats existing lighting wattage by 40% (for bldg or tenant spaces $\leq 5,000\text{sqft}$)

Table 141.0-F – Control Requirements for Indoor Lighting System Alterations

Control Specifications		Projects complying with Section 141.0(b)2Ii	Projects complying with Sections 141.0(b)2Iii and 141.0(b)2Iiii
Manual Area Controls	130.1(a)1	Required	Required
	130.1(a)2	Required	Required
	130.1(a)3	Only required for new or completely replaced circuits	Only required for new or completely replaced circuits
Multi-Level Controls	130.1(b)	Required	Not Required
Automatic Shut Off Controls	130.1(c)1	Required; 130.1(c)1D only required for new or completely replaced circuits	Required; 130.1(c)1D only required for new or completely replaced circuits
	130.1(c)2	Required	Required
	130.1(c)3	Required	Required
	130.1(c)4	Required	Required
	130.1(c)5	Required	Required
	130.1(c)6	Required	Required
	130.1(c)7	Required	Required
	130.1(c)8	Required	Required
Daylighting Controls	130.1(d)	Required	Not Required
Demand Responsive Controls	130.1(e)	Required	Not Required



Lighting Alterations Exceptions

Section 141.0(b)2I

the control separation requirements of Section 130.1(a)4 and 130.1(c)1D.

EXCEPTION 1 to Section 141.0(b)2I. Alteration of portable luminaires, luminaires affixed to moveable partitions, or lighting excluded as specified in Section 140.6(a)3.

EXCEPTION 2 to Section 141.0(b)2I. Any enclosed space with only one luminaire.

EXCEPTION 3 to Section 141.0(b)2I. Any alteration that would directly cause the disturbance of asbestos, unless the alteration is made in conjunction with asbestos abatement.

EXCEPTION 4 to Section 141.0(b)2I. Acceptance testing requirements of Section 130.4 are not required for alterations where lighting controls are added to control 20 or fewer luminaires.

EXCEPTION 5 to Section 141.0(b)2I. Any alteration limited to adding lighting controls or replacing lamps, ballasts, or drivers.

EXCEPTION 6 to Section 141.0(b)2I. One-for-one luminaire alteration of up to 50 luminaires either per complete floor of the building or per complete tenant space, per annum.

J. Reserved.



Q&A



THANK YOU.