



2019 Energy Code –

Nonresidential Outdoor Lighting

California Energy Commission



The 2019 Energy Code

- **Effective January 1, 2020**
 - Based on date of application for building permit
- **30% more efficient** than 2016 Code (nonresidential)
- **Applies to occupancy groups:**
 - A, B, E, F, H, I, M, R, S, and U
 - I-1 and I-2 (healthcare facilities)
 - **Does not apply to I-3, I-4, L (Institution and Labs)**
- **Sections applicable to nonresidential lighting**
 - 110.9, 110.12, 130.0-130.4, 140.6-140.8, 141.0(b)2I-L
- **Sections applicable to residential lighting**
 - 110.9, 130.0, 150.0(k)



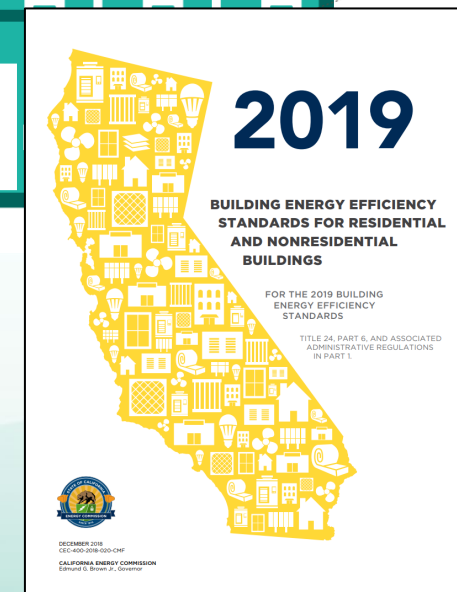
HEALTHCARE FACILITIES

For the first time, energy efficiency standards extend to newly constructed healthcare facilities and incorporates the appropriate application of standards.



LIGHTING

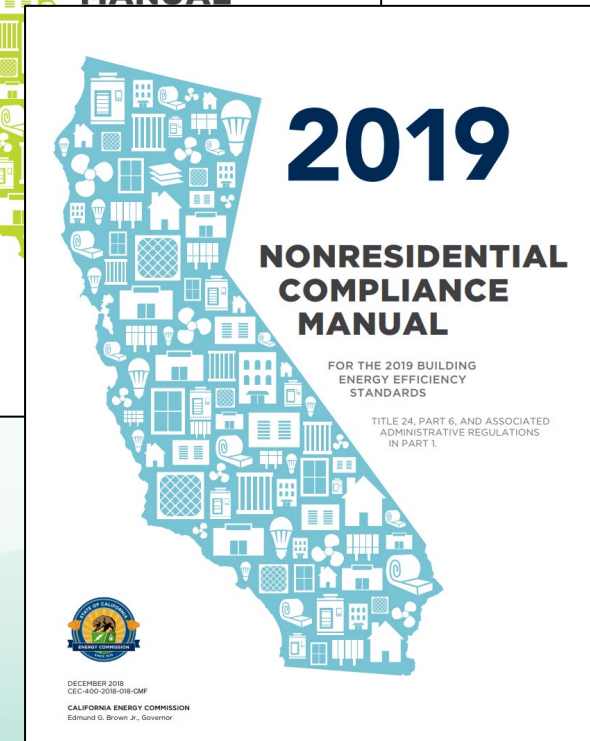
Update indoor and outdoor lighting values to assume the use of LED lighting. LED lights use little energy and will save money on monthly electricity bills meaning smaller operating budgets for commercial buildings. Maintenance costs are reduced because bulbs do not need to be changed as often. The standards also add occupancy sensing requirements for restrooms.





Residential Lighting in Nonresidential Buildings

- Which lighting must **meet the residential requirements** in nonresidential buildings?
 - High-rise residential dwelling units
 - Hotel and motel guestrooms
 - Additional controlled receptacle and captive card key or auto shut-off control requirements
 - Fire station dwelling accommodations
 - Dormitory and senior housing dwelling accommodations
 - Outdoor lighting attached to high-rise residential or hotel and motel buildings that is separately controlled from inside the dwelling or guest room





Nonresidential Outdoor Lighting Administrative Requirements



10-114 Outdoor Lighting Zones

- **LZ determines outdoor lighting power allowances for the project**
 - Illumination lowest in LZ0, highest in LZ4
 - Maximum zonal lumen limits (Luminaire cutoff)
- **LZ prevents over lighting of outdoor areas**
 - Reduce glare
 - Reduce light pollution
 - Save energy



TABLE 10-114-A

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 maybe 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.



10-114 Outdoor Lighting Zones cont.

- Determining LZ
 - Lookup address on U.S. Census Bureau site <http://factfinder.census.gov>
 - Census data will specify area type:
 - Rural area (LZ2)
 - Urban area (LZ3)

The screenshot shows the American FactFinder website interface. The search bar contains the address "1516 Ninth St, Sacramento, California, 95814". The search results table lists various geographies, with "Sacramento, CA Urbanized Area (2010)" highlighted in red, indicating it is an Urban Area.

Geography Name	Geography Type	Geography Code	About
Vest Region	Region	020	?
Pacific Division	Division	030	?
California	State	040	?
Sacramento County, California	County	050	?
Sacramento CCD, Sacramento County, California	County Subdivision	060	?
Block 1077, Block Group 1, Census Tract 11.01, Sacramento County, California	Block	100	?
Census Tract 11.01, Sacramento County, California	Census Tract	140	?
Block Group 1, Census Tract 11.01, Sacramento County, California	Block Group within Census Tract	150	?
Sacramento city, California	Place within State	160	?
Sacramento-Roseville-Arden-Arcade, CA Metro Area	Metro/Micro Statistical Area	310	?
Sacramento city, CA, Sacramento-Roseville-Arden-Arcade, CA Metro Area	Principal City (or part) within State within Metro/Micro Statistical Area	312	?
Sacramento-Roseville, CA CSA	CSA	330	?
Sacramento-Yolo, CA CMSA	MSA/CMSA	380	?
Sacramento, CA PMSA, Sacramento-Yolo, CA CSA	PMSA within CMSA	385	?
Sacramento, CA Urbanized Area (2010)	Urban Area	400	?
Congressional District 6 (110th Congress), California	Congressional District	500	?
State Senate District 6 (2016), California	State Legislative District (Upper)	610	?
Assembly District 7 (2016), California	State Legislative District (Lower)	620	?
Voting Districts not defined, Sacramento County, California	Voting District/Remainder	700	?
Sacramento County (West)-Sacramento City (Central/Downtown & Midtown) PUMA, California	Public Use Microdata Area (PUMA)	795	?
ZCTA5 95814	5-Digit ZCTA	860	?
ZIP 95814 (Sacramento, CA)	5-Digit ZIP Code	861	?
Remainder of California, California	School District (Elementary)/Remainder	950	?
Remainder of California, California	School District (Secondary)/Remainder	960	?
Sacramento City Unified School District, California	School District (Unified)/Remainder	970	?
Sacramento city, California	Economic Place	E00	?

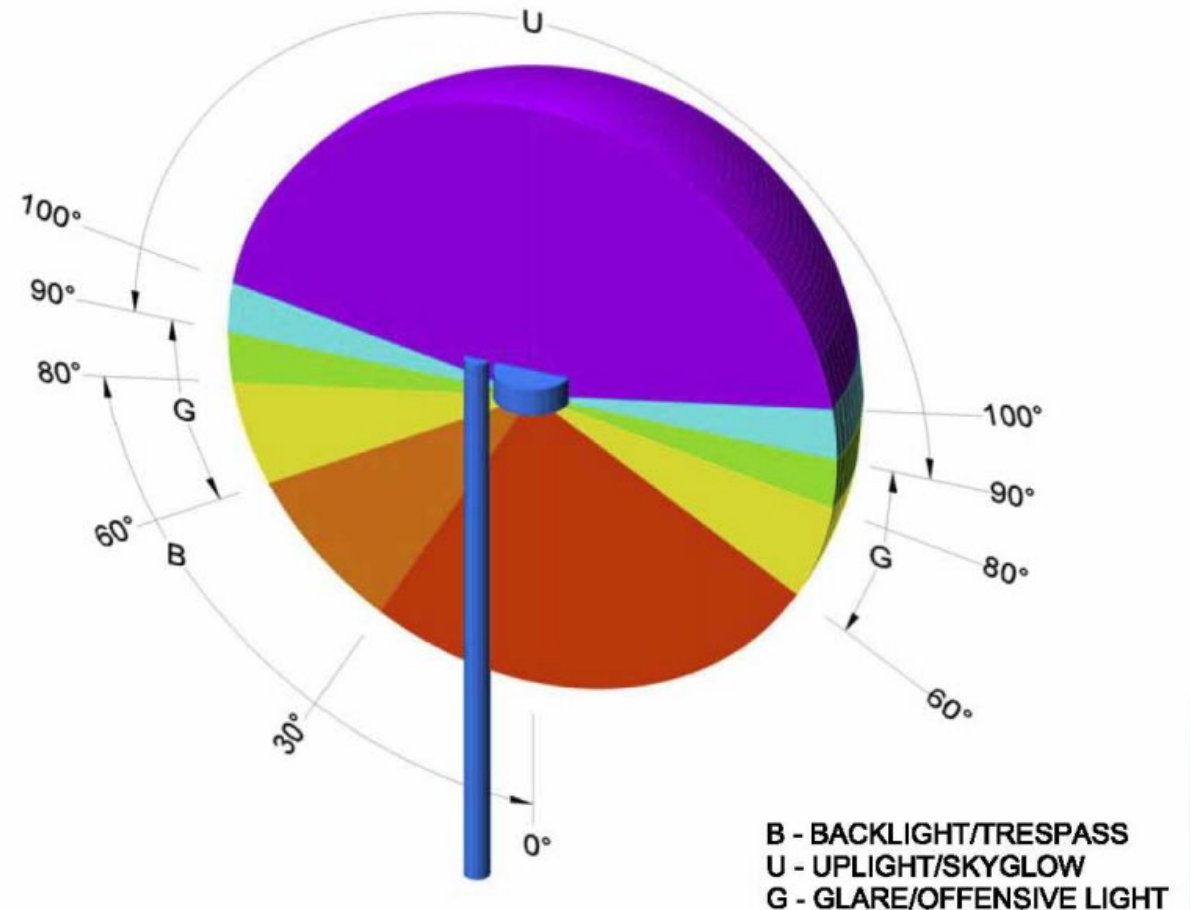


Nonresidential Outdoor Lighting Mandatory Measures



130.2(b) Luminaire Cutoff

- Required for luminaires with initial lumens of **6,200 or greater**
 - Exception: Lighting attached to high-rise residential or hotel building and controlled from inside dwelling unit
- Maximum zonal limit requirements are now located in Title 24, Part 11 (CalGreen), Section 5.106.8
 - See CalGreen TABLE 5.106.8





Title 24, Part 11 TABLE 5.106.8

TABLE 5.106.8 [N]
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS^{1,2}

ALLOWABLE RATING	LIGHTING ZONE LZ0	LIGHTING ZONE LZ1	LIGHTING ZONE LZ2	LIGHTING ZONE LZ3	LIGHTING ZONE LZ4
Maximum Allowable Backlight Rating³ (B)					
Luminaire greater than 2 mounting heights (MH) from property line	N/A	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	N/A	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	N/A	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	N/A	B0	B0	B1	B2
Maximum Allowable Uplight Rating (U)					
For area lighting ⁴	N/A	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	N/A	U1	U2	U3	U4
Maximum Allowable Glare Rating⁵ (G)					
Luminaire greater than 2 MH from property line	N/A	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	N/A	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	N/A	G0	G0	G1	G1
Luminaire front hemisphere is less than 0.5 MH from property line	N/A	G0	G0	G0	G1



130.2(c) Outdoor Lighting Controls

- **Daylight Availability** - all outdoor lighting must be controlled by:
 - Photo control; or
 - Astronomical time-switch control; or
 - Other control capable of automatically shutting OFF lighting when daylight is available
- **Automatic scheduling control** - all outdoor lighting must be controlled:
 - Capable of reducing lighting power by 50 to 90% and turn lighting OFF during unoccupied periods
 - Capable of being programmed with a minimum of two nighttime periods



130.2(c) Outdoor Lighting Controls cont.

- **Motion Sensing**

- Outdoor lighting mounted ≤ 24 feet above the ground (except for outdoor luminaires for building facade, ornamental hardscape, dining, sales frontage)
- Wall packs mounted ≤ 24 feet above the ground for building facade, ornamental hardscape, dining, sales frontage
- Reduces lighting by 50 to 90% during unoccupied period
- Reduce or dim lighting within 15 minutes of area being vacated
- No more than 1,500 watts controlled together

- **Exceptions:**

- Luminaires ≤ 40 watts
- Outdoor lighting applications exempt from 140.7(a)
- Lighting subject to health or life safety statute may have minimum timeout > 15 min. or dimming level above 50% to comply with applicable law





130.4 Acceptance Testing

- **Acceptance testing required for:**

- Automatic time-switch
- Motion sensors
- Automatic scheduling controls



- Must use certified ATTs from an approved Acceptance Test Technician Certification Provider (ATTCP)
- More information available at the CEC [Acceptance Test Technician Certification Provider Program](#) webpage



Nonresidential Outdoor Lighting Prescriptive Measures



NRCM TABLE 6-1

Table 6-1: Scope of the Outdoor Lighting Requirements

Lighting Applications Covered		Lighting Applications Not Regulated (only as detailed in §140.7)
General Hardscape (trade-offs permitted)	Specific Applications (trade-offs not permitted)	
<p>The general hardscape area of a site shall include parking lot(s), roadway(s), driveway(s), sidewalk(s), walkway(s), bikeway(s), plaza(s), bridge(s), tunnel(s) and other improved area(s) that are illuminated.</p>	<p>Canopies: Sales and Non-sales Tunnels Drive-Up Windows Emergency Vehicle Facilities Building Entrances or Exits Building Facades Guard Stations Hardscape Ornamental Lighting Outdoor Dining Primary Entrances for Senior Care Facilities, Police Stations, Healthcare Facilities, Fire Stations, and Emergency Vehicle Facilities Outdoor Sales Frontage and Lots Special Security Lighting for Retail Parking and Pedestrian Hardscape Student Pick-up/Drop-off zone Vehicle Service Station: Canopies, Hardscape, and Uncovered Fuel Dispenser ATM Machine Lighting</p>	<p>Temporary outdoor lighting Required and regulated by FAA Required and regulated by the Coast Guard. For public streets, roadways, highways, and traffic signage lighting, and occurring in the public right-of-way For sports and athletic fields, and children's playground For industrial sites For public monuments Signs regulated by §130.3 and §140.8 For stairs and wheelchair elevator lifts For ramps that are not parking garage ramps Landscape lighting For themes and special effects in theme parks For outdoor theatrical and other outdoor live performances For qualified historic buildings</p>
<p>Other outdoor lighting applications that are not included in Energy Standards Tables 140.7-A or 140.7-B are assumed to be not regulated by these Standards. This includes decorative gas lighting and emergency lighting powered by an emergency source as defined by the California Electrical Code. The text in the above list of lighting applications that are not regulated has been shortened for brevity. Please see Section 6.2.2.2 for details about unregulated lighting applications.</p>		



140.7(d)1 General Hardscape Lighting Power Allowance (LPA)

- General hardscape allowances listed in **TABLE 140.7-A**
- How to calculate general hardscape allowance:
 - Outdoor lighting zone (LZ)
 - Illuminated hardscape area
 - Hardscape area (ft²)
 - Hardscape perimeter length (ft)

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).

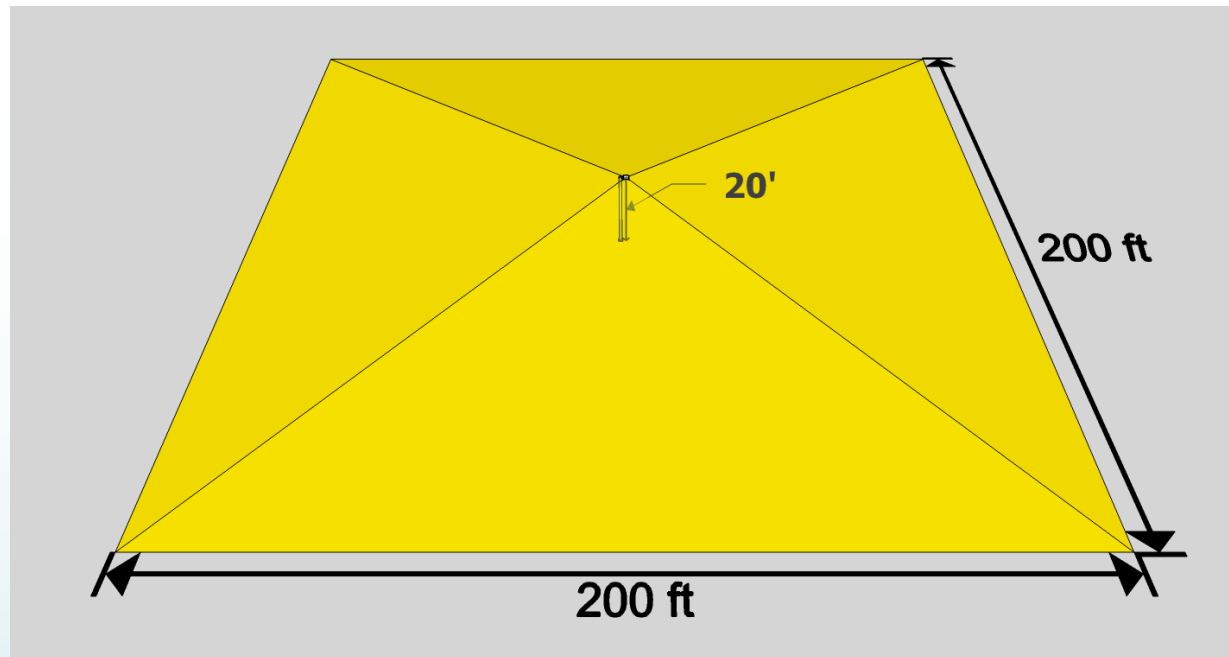
²Where greater than 50% of the paved surface of a parking lot is finished with concrete. This does not extend beyond the parking lot, and does not include any other General Hardscape areas.

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.



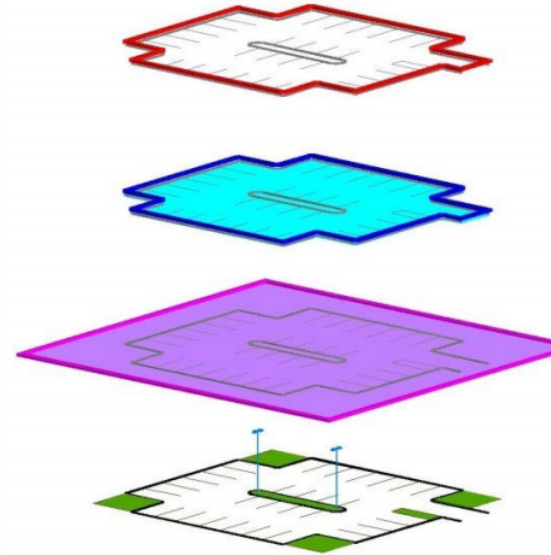
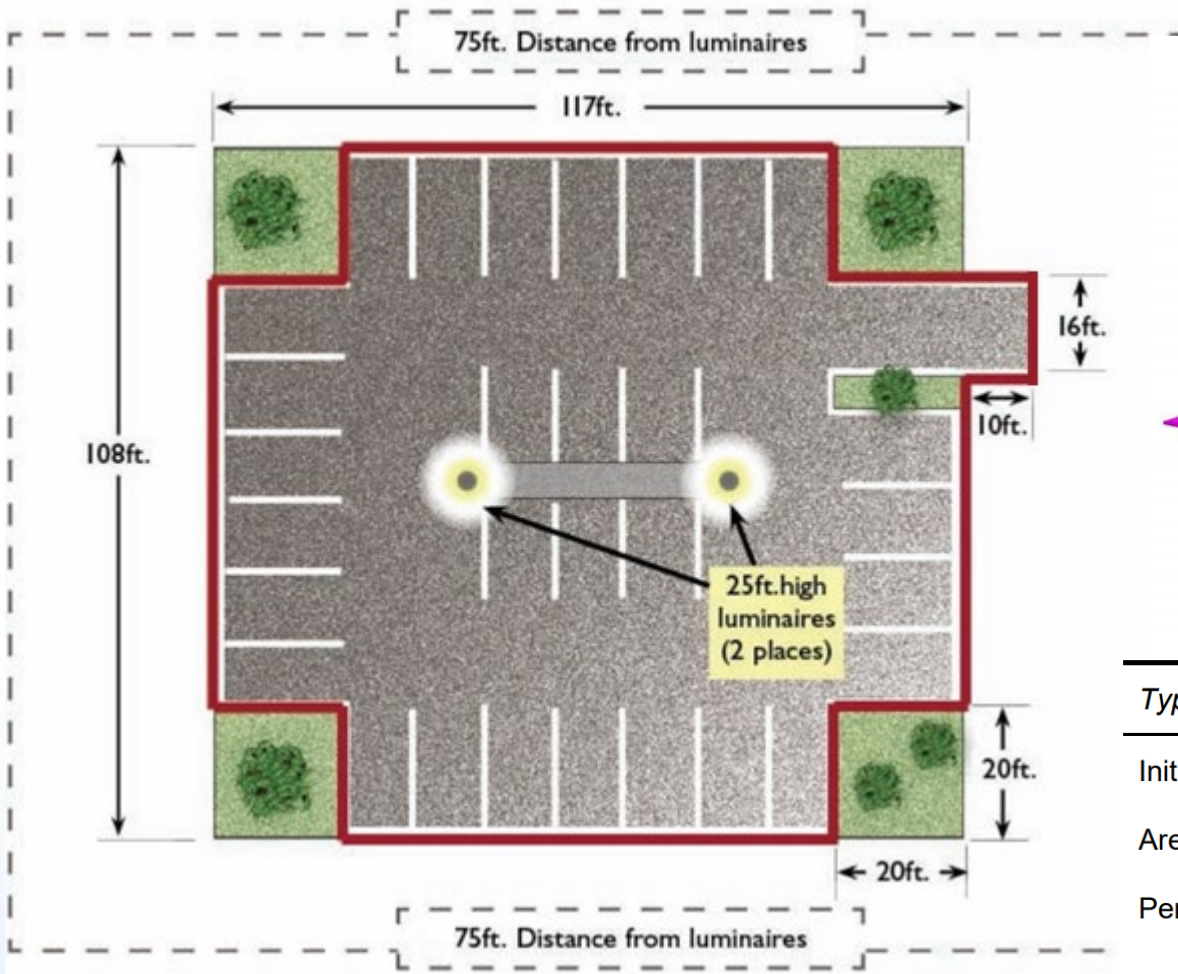
140.7(d)1 General Hardscape Lighting Power Allowance cont.

- **Illuminated hardscape area:** hardscape area within a square pattern around each luminaire that is ten times the luminaire mounting height with the luminaire in the middle of the pattern





Example: Calculating General Hardscape Allowance



General Hardscape LPA – Perimeter

General Hardscape LPA – Area

General Hardscape LPA – Initial Allowance

Additional Lighting Power Allowance (LPA) for Specific applications

Type of Allowance	Allowance	Area/Perimeter Value	Power Allowance
Initial	350 W	-	350 W
Area	0.03 W/sq. ft.	11,196 sq. ft.	336 W
Perimeter	0.4 W/LF	470 ft.	188 W
TOTAL POWER ALLOWANCE			874 W



140.7(d)2 Allowance for Specific Applications

- **Additional Lighting Power Allowance is “use it or lose it”**
 - Cannot claim additional lighting power if lighting for the specific application is not installed
 - Cannot tradeoff additional lighting power
- **TABLE 140.7-B** lists additional lighting power allowances for specific applications



TABLE 140.7-B

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.			
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	Not applicable	No Allowance	0.007 W/ft ²	0.013 W/ft ²	0.019 W/ft ²



Nonresidential Outdoor Lighting Prescriptive Alterations



141.0(b)2L Outdoor Lighting Alterations

- **Three scenarios for outdoor lighting alterations:**
 - Increase connected lighting load
 - Replacement of 5 luminaires or $\geq 10\%$ of existing luminaires (whichever is greater)
 - Replacement of 5 luminaires or $\geq 50\%$ of existing luminaires (whichever is greater)
- Requirements triggered when **replacing, increasing connected lighting load, or adding new luminaires**
 - Typically does not include altering or retrofitting existing luminaires



141.0(b)2L Outdoor Lighting Alterations cont.

- **Increase connected lighting load**
 - Added or altered luminaires must meet all control requirements in 130.2(c)
 - General Hardscape or specific lighting applications with added or altered luminaires must meet power allowance in 140.7



141.0(b)2L Outdoor Lighting Alterations cont.

- Replacement of **5 luminaires** or $\geq 10\%$ of existing luminaires (whichever is greater)
 - Altered parking lot and outdoor sales lot luminaires mounted ≤ 24 ft above ground:
 - Photocell or astronomical time-switch, and motion sensor
 - For all other applications and where the altered luminaire is mounted > 24 ft above ground:
 - Photocell or astronomical time-switch, and automatic scheduling control or other control capable of reducing outdoor lighting power by 40% when the area is vacant



141.0(b)2L Outdoor Lighting Alterations cont.

- Replacement of **5 luminaires** or $\geq 50\%$ of existing luminaires (whichever is greater)
 - Altered parking lot and outdoor sales lot luminaires mounted ≤ 24 ft above ground:
 - Photocell or astronomical time-switch, and motion sensor
 - For all other applications and where the altered luminaire is mounted ≥ 24 ft above ground
 - Photocell or astronomical time-switch, and automatic scheduling control or other control capable of reducing outdoor lighting power by 40% when the area is vacant
- Meet power allowance in 140.7, unless replacement luminaires reduce power by $\geq 40\%$



130.2(b), Outdoor Lighting Alterations cont.

- **Replacement luminaires $\geq 6,200$ initial lumens** must meet cutoff requirements
- **Replacement of pole mounted luminaires** meeting all of the following conditions are exempted from BUG requirements if:
 - Existing luminaire does not meet BUG requirements; and
 - Spacing between existing poles is greater than 6 times the mounting height of existing luminaires; and
 - No additional poles are being added to the site; and
 - New wiring to the luminaires is not being installed; and
 - Connected lighting power wattage is not increased



141.09b)2L Outdoor Lighting Alterations cont.

- **Acceptance testing** is required for lighting alterations if installing controls for more than 20 luminaires for the entire project





Forms





Certification of Compliance

- **Certificate of Compliance (NRCC-XXX)**
 - Submitted with permit application, included with plans
 - Used by plans examiner to verify compliance
 - LPA calculations, schedules, lighting controls, PAF, voltage drop, etc.
- **Indoor**
 - NRCC-LTI-E
- **Outdoor**
 - NRCC-LTO-E
- **EPDS, Sign**
 - NRCC-ELC-E, NRCC-LTS-E





Certification of Installation

- **Certificate of Installation (NRCI-XXX)**
 - Completed by installing contractor
 - Left on-site for building inspector
 - Identifies construction documents that show lighting and controls were installed as proposed in the certificate of compliance
- **Indoor**
 - NRCI-LTI-01 – NRCI-LTI-06
- **Outdoor**
 - NRCI-LTO-01 – NRCI-LTO-02
- **EPDS, Sign**
 - NRCI-ELC-01, NRCI-LTS-01

<p>STATE OF CALIFORNIA INDOOR LIGHTING CERTIFICATE OF INSTALLATION</p> <p>Project name:</p> <p>Project address:</p> <p>GENERAL INFORMATION DATE OF BUILDING PERMIT: PERMIT #</p> <p>BUILDING TYPE <input type="checkbox"/> Nonresidential <input type="checkbox"/> High-Rise Residential</p> <p>PHASE OF CONSTRUCTION <input type="checkbox"/> New Construction <input type="checkbox"/> Addition</p> <p>SCOPE OF RESPONSIBILITY Enter the date of approval by enforcement agency of this Certificate of Compliance that provides the specifications for the energy efficiency measures for the installation Certificate.</p> <p>In the table below identify all applicable construction documents that specify the requirements for the scope of responsibility reported by this Installation Certificate (continued).</p> <table border="1"><thead><tr><th>Document Title or Description</th><th>Applicable Sheets or Pages, Tables, Schedules, etc.</th></tr></thead><tbody></tbody></table>	Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	<p>STATE OF CALIFORNIA OUTDOOR LIGHTING CERTIFICATE OF INSTALLATION</p> <p>Project name:</p> <p>Project address:</p> <p>GENERAL INFORMATION DATE OF BUILDING PERMIT: PERMIT #</p> <p>BUILDING TYPE <input type="checkbox"/> Nonresidential Outdoor Lighting <input type="checkbox"/> High-Rise Residential</p> <p>PHASE OF CONSTRUCTION <input type="checkbox"/> New Construction <input type="checkbox"/> Addition</p> <p>SCOPE OF RESPONSIBILITY Enter the date of approval by enforcement agency of this Certificate of Compliance that provides the specifications for the energy efficiency measures for the installation Certificate.</p> <p>In the table below identify all applicable construction documents that specify the requirements for the scope of responsibility reported by this Installation Certificate (continued).</p> <table border="1"><thead><tr><th>Document Title or Description</th><th>Applicable Sheets or Pages, Tables, Schedules, etc.</th></tr></thead><tbody></tbody></table>	Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	<p>STATE OF CALIFORNIA SIGN LIGHTING CERTIFICATE OF INSTALLATION</p> <p>Project name:</p> <p>Project address:</p> <p>GENERAL INFORMATION DATE OF BUILDING PERMIT: PERMIT #</p> <p>LOCATION OF SIGNS <input type="checkbox"/> Outdoor (Signs) <input type="checkbox"/> Indoor (Signs)</p> <p>TYPE OF CONSTRUCTION <input type="checkbox"/> New Sign(s)</p> <p>SCOPE OF RESPONSIBILITY Enter the date of approval by enforcement agency of this Certificate of Compliance that provides the specifications for the energy efficiency measures for the installation Certificate.</p> <p>In the table below identify all applicable construction documents that specify the requirements for the scope of responsibility reported by this Installation Certificate (continued).</p> <table border="1"><thead><tr><th>Document Title or Description</th><th>Applicable Sheets or Pages, Tables, Schedules, etc.</th></tr></thead><tbody></tbody></table>	Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	<p>STATE OF CALIFORNIA ELECTRICAL POWER DISTRIBUTION CERTIFICATE OF INSTALLATION</p> <p>Project name:</p> <p>Project address:</p> <p>GENERAL INFORMATION DATE OF BUILDING PERMIT: PERMIT #</p> <p>BUILDING TYPE <input type="checkbox"/> Nonresidential <input type="checkbox"/> High-Rise Residential (Common Area) <input type="checkbox"/> Home/Hotel (Common Area)</p> <p>PHASE OF CONSTRUCTION <input type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Alteration</p> <p>SCOPE OF RESPONSIBILITY Enter the date of approval by enforcement agency of this Certificate of Compliance that provides the specifications for the energy efficiency measures for the installation Certificate.</p> <p>In the table below identify all applicable construction documents that specify the requirements for the scope of responsibility reported by this Installation Certificate (continued).</p> <table border="1"><thead><tr><th>Document Title or Description</th><th>Applicable Sheets or Pages, Tables, Schedules, etc.</th><th>Date Approved by the Enforcement Agency</th></tr></thead><tbody></tbody></table>	Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved by the Enforcement Agency
Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.											
Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.											
Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.											
Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved by the Enforcement Agency										



Certification of Acceptance

- **Certificate of Acceptance (NRCA-XXX)**
 - Completed by acceptance test technician
 - Left on-site for building inspector, can also be provided electronically
 - Recording of test results and verification of installed controls
 - Form should be from one of the approved providers with logo, CEC forms are watermarked as not for use
- **Indoor**
 - NRCA-LTI-02 - NRCA-LTI-05
- **Outdoor**
 - NRCA-LTO-02





Nonresidential Outdoor Lighting Forms

- Lighting Certificate of Compliance forms combined into one interactive PDF
- Auto populate information from user inputs and conduct simple math
- Form expands and collapses based on selections
- Drop down selections
- Interactive instructions
- Add and delete table rows
- One single signature page

STATE OF CALIFORNIA
Outdoor Lighting
 NRCC-LTO-E (Created 11/19)
 CALIFORNIA ENERGY COMMISSION
 NRCC-LTO-E

CERTIFICATE OF COMPLIANCE
This document is used to demonstrate compliance with requirements in §110.9, §130.0, §130.2, §140.7, and §141.0(b)2L for outdoor lighting scopes using the prescriptive path.

Project Name: _____ Report Page: Page 1 of 4
 Project Address: _____ Date Prepared: _____

A. GENERAL INFORMATION

01	Project Location (city)		04	Total Illuminated Hardscape Area (ft ²)	
02	Climate Zone				
03	Outdoor Lighting Zone per Title 24, Part 1 §10-114 or as designated by Authority Having Jurisdiction (AHJ):				
<input type="checkbox"/> LZ-0: Very Low - Undeveloped Parkland		<input type="checkbox"/> LZ-2: Moderate - Rural Areas		<input type="checkbox"/> LZ-4: High - Must be reviewed by CA Energy Commission for Approval	
<input type="checkbox"/> LZ-1: Low - Developed Parkland		<input type="checkbox"/> LZ-3: Moderately High - Urban Areas			

B. PROJECT SCOPE

Table Instructions: Include any outdoor lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.7 or §141.0(b)2L for alterations.

My project consists of:

01	02	
<input type="checkbox"/> New Lighting System	Must Comply with Allowances from §140.7.	
<input type="checkbox"/> Altered Lighting System	Is your alteration increasing the connected lighting load (Watts)?	
	<input type="radio"/> Yes	<input type="radio"/> No
03	04	05
% of Existing Luminaires Being Altered ¹	Sum Total of Luminaires Being Added or Altered	Calculation Method

¹ FOOTNOTES: % of Existing Luminaires Being Altered = (Sum Total of Luminaires Being Added or Altered / Existing Luminaires within the Scope of the Permit Application) x 100

C. COMPLIANCE RESULTS

Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Calculation of Total Allowed Lighting Power (Watts) §140.7 or §141.0(b)2L						Compliance Results		
01	02	03	04	05	06	07	08	09
General Hardscape Allowance §140.7(d)1 (See Table I)	+ Per Application §140.7(d)2 (See Table J)	+ Sales Frontage §140.7(d)2 (See Table K)	+ Ornamental §140.7(d)2 (See Table L)	+ Per Specific Area §140.7(d)2 (See Table M)	OR Existing Power §141.0(b)2L (See Table N)	= Total Allowed (Watts)	≥ Total Actual (Watts) (See Table F)	07 Must be ≥ 08
						≥		
Cutoff Compliance (See Table G for Details)						Not Applicable		
Controls Compliance (See Table H for Details)						Not Applicable		

CA Building Energy Efficiency Standards - 2019 Nonresidential Compliance: <http://www.energy.ca.gov/title24/2019standards> November 2019



NRCC-LTO-E

STATE OF CALIFORNIA

Outdoor Lighting

NRCC-LTO-E (Created 11/19)

CALIFORNIA ENERGY COMMISSION 

CERTIFICATE OF COMPLIANCE

NRCC-LTO-E

This document is used to demonstrate compliance with requirements in §110.9, §130.0, §130.2, §140.7, and §141.0(b)2L for outdoor lighting scopes using the prescriptive path.

Project Name: California Energy Commission	Report Page: Page 1 of 7
Project Address: 1516 9th St. Sacramento, CA 95814	Date Prepared: 4/7/2020

A. GENERAL INFORMATION

01 Project Location (city)	Sacramento	04 Total Illuminated Hardscape Area (ft ²)	10,000
02 Climate Zone	12		
03 Outdoor Lighting Zone per Title 24, Part 1 §10-114 or as designated by Authority Having Jurisdiction (AHJ):			
<input type="checkbox"/> LZ-0: Very Low - Undeveloped Parkland	<input type="checkbox"/> LZ-2: Moderate - Rural Areas	<input type="checkbox"/> LZ-4: High - Must be reviewed by CA Energy Commission for Approval	
<input type="checkbox"/> LZ-1: Low - Developed Parkland	<input checked="" type="checkbox"/> LZ-3: Moderately High - Urban Areas		

B. PROJECT SCOPE

Table Instructions: Include any outdoor lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.7 or §141.0(b)2L for alterations.

My project consists of:

01	02
<input checked="" type="checkbox"/> New Lighting System	Must Comply with Allowances from §140.7 .
<input type="checkbox"/> Altered Lighting System	Is your alteration increasing the connected lighting load (Watts)? <input type="radio"/> Yes <input type="radio"/> No

¹ FOOTNOTES: % of Existing Luminaires Being Altered = (Sum Total of Luminaires Being Added or Altered / Existing Luminaires within the Scope of the Permit Application) x 100

C. COMPLIANCE RESULTS

Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Calculation of Total Allowed Lighting Power (Watts) §140.7 or §141.0(b)2L						Compliance Results		
01	02	03	04	05	06	07	08	09
General Hardscape Allowance §140.7(d)1	+ Per Application §140.7(d)2	+ Sales Frontage §140.7(d)2	+ Ornamental §140.7(d)2	+ Per Specific Area §140.7(d)2	OR Existing Power §141.0(b)2L	= Total Allowed (Watts)	≥ Total Actual (Watts)	07 Must be ≥ 08
(See Table I)	(See Table J)	(See Table K)	(See Table L)	(See Table M)	(See Table N)		(See Table F)	
810	+		+		OR	= 810	≥ 800	COMPLIES
Cutoff Compliance (See Table G for Details)						COMPLIES		
Controls Compliance (See Table H for Details)						COMPLIES		



NRCC-LTO-E cont.

STATE OF CALIFORNIA

Outdoor Lighting

NRCC-LTO-E (Created 11/19)

CALIFORNIA ENERGY COMMISSION 

CERTIFICATE OF COMPLIANCE

NRCC-LTO-E

Project Name: California Energy Commission

Report Page: Page 2 of 7

Project Address: 1516 9th St. Sacramento, CA 95814

Date Prepared: 4/7/2020

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

Table F. indicates a dropdown selection with a * requiring a note describing the compliance approach, but no notes have been entered.

Table F. Outdoor Lighting Fixture Schedule Permit Applicant Notes:

Ltg1: null

Ltg3: Luminaire initial lumen output is less than 6,200 lm

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. OUTDOOR LIGHTING FIXTURE SCHEDULE

Table Instructions: For new or altered lighting systems demonstrating compliance with [§140.7](#) (ie Table I has expanded for input), include all luminaires being installed and any existing luminaires remaining or being moved within the spaces covered by the permit application in the Table below. For altered lighting systems using the Existing Power method per [§141.0\(b\)2L](#) (ie Table N has expanded for input), include only new luminaires being installed and replacement luminaires being installed as part of the project scope (ie, do not include existing luminaires remaining or existing luminaires being moved).

Designed Wattage:

01	02	03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description	Watts per luminaire ^{1,2}	How Wattage is determined	Total number luminaires ²	Luminaire Status ³	Excluded per §140.7(a)	Design Watts	Cutoff Req. ≥ 6,200 initial lumen output §130.2(b)⁴	Field Inspector	
									Pass	Fail
Ltg1	LED wall pack <input type="checkbox"/> Linear	30	Mfr. Spec ¹	10	New	<input type="checkbox"/>	300	Yes	<input type="checkbox"/>	<input type="checkbox"/>
Ltg2	LED cobra head <input type="checkbox"/> Linear	100	Mfr. Spec ¹	5	New	<input type="checkbox"/>	500	Yes	<input type="checkbox"/>	<input type="checkbox"/>
Total Designed Watts:							800			

* NOTES: Selections with a * require a note in the space below explaining how compliance is achieved.

EX: Luminaire is lighting a statue; EXCEPTION 2 to [§130.2\(b\)](#).

Ltg3 Luminaire initial lumen output is less than 6,200 lm

Reset Add Row Remove Last



NRCC-LTO-E cont.

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E	
Project Name: California Energy Commission	Report Page:	Page 3 of 7	
Project Address: 1516 9th St. Sacramento, CA 95814	Date Prepared:	4/7/2020	

- ¹ FOOTNOTES: Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per §130.0(c)
² For linear luminaires, wattage should be indicated as W/lf instead of Watts/luminaire. Total linear feet for the luminaire should be indicated in column 05 instead of number of luminaires.
³ Select "New" for new luminaires in a new outdoor lighting project or for added luminaires in an alteration. Select "Altered" for replacement luminaires in an alteration. Select "Existing to Remain" for existing luminaires within the project scope that are not being altered and are remaining. Select "Existing Reinstalled" for existing luminaires which are being removed and reinstalled as part of the project scope
 * Compliance with mandatory cutoff requirements is required for luminaires with initial lumen output ≥ 6,200 unless exempted by §130.2(b).

G. CUTOFF REQUIREMENTS (BUG) ?

Table Instructions: Complete this table for fixtures of ≥ 6,200 initial luminaire lumens indicated on Table F as needing to comply with Cutoff Requirements. Maximum lumens can be found in Title 24, Part 11, Section 5.106.8.

01	02	03			04			05			06			07			08			09			10			11			12		
		Name or Item Tag	Complete Luminaire Description	Mounting Height from Property Line ¹	Max Allowable Backlight Rating ³	Backlight Rating Per Design	Lighting Type	Max Allowable Backlight Rating ³	Uplight Rating Per Design	Mounting Height from Property Line ¹	Max Allowable Glare Rating ³	Glare Rating Per Design	Pass	Fail	Field Inspector																
Ltg1	LED wall pack	> 2 MH from property line	No Limit	B3	Area Lighting	U0	U0	> 2 MH from property line	G3	G3	<input type="checkbox"/>	<input type="checkbox"/>																			
Ltg2	LED cobra head	> 2 MH from property line	No Limit	B3	Area Lighting	U0	U0	> 2 MH from property line	G3	G3	<input type="checkbox"/>	<input type="checkbox"/>																			

- ¹ FOOTNOTES: Mounting Height is labeled MH in this table
² Authority having jurisdiction may ask for luminaire cut sheets or other documentation to confirm luminaire type, uplight ratings and glare ratings used for compliance per §130.2(b).
³ BUG ratings with a lower number than the 'Max Allowable' are compliant. Ex. If Max Allowable is Bug Rating is B4, then B0, B1, B2, B3 and B4 are all compliant.

H. OUTDOOR LIGHTING CONTROLS ?

Table Instructions: Complete this table demonstrating compliance with controls requirements for all new or altered luminaires installed as part of the permit application. For alteration projects, luminaires which are existing to remain (ie untouched) and luminaires which are removed and reinstalled (wiring only) do not need to be included in this table even if they are within the spaces covered by the permit application.
 When an option having a * is selected, the notes section of this table must be completed. The lighting controls section of the Compliance Summary Table on the first page will show "DOES NOT COMPLY" if the notes are left blank. For each requirement in columns 02 through 04, do not leave the field blank, instead select NA or Exempt* from the dropdown list to indicate not applicable or an exemption.

Table Continued

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E	
Project Name: California Energy Commission	Report Page:	Page 4 of 7	
Project Address: 1516 9th St. Sacramento, CA 95814	Date Prepared:	4/7/2020	

01	02	03	04	05	
Area Description	Shut-Off §130.2(c)1	Auto-Schedule §130.2(c)2	Motion Sensor §130.2(c)3	Field Inspector	
				Pass	Fail

Mandatory Controls					
01	02	03	04	05	
Area Description	Shut-Off §130.2(c)1	Auto-Schedule §130.2(c)2	Motion Sensor §130.2(c)3	Field Inspector	
Parking lot hardscape				Pass	Fail
Astronomical Timer				Yes	Yes

*NOTES: Controls with a * require a note in the space below explaining how compliance is achieved.
 EX: Not permitted by health & safety to be turned off; EXCEPTION 1 to §130.2(c).
Reset Add Row Remove Last

I. LIGHTING POWER ALLOWANCE (per §140.7) ?

Table Instructions: Please complete this table for areas using the allowance calculations per §140.7. General Hardscape Allowance is per Table 140.7-A while "Use it or lose it" Allowances are per Table 140.7-B. Indicate which allowances are being used to expand sections for user input. Luminaires that qualify for one of the "Use it or lose it" allowances shall not qualify for another "Use it or lose it" allowance.

Calculated General Hardscape Lighting Power Allowance per Table 140.7-A (LZ 2 & 3)									
02	03	04	05	06	07	08	09	10	
Area Description	Surface Type	Area Wattage Allowance (AWA)			Linear Wattage Allowance (LWA)			Total General AWA + LWA (Watts)	
		Illuminated Area (ft ²)	Allowed Density (W/ft ²)	Area Allowance (Watts)	Perimeter Length (lf)	Allowed Density (W/lf)	Linear Allowance (Watts)		
Parking lot hardscape	Concrete	10,000	0.03	300	400	0.4	160	460	
							Reset	Add Row	Remove Last
Initial Wattage Allowance for Entire Site (Watts):								350	
Total General Hardscape Allowance (Watts):								810	



Nonresidential Outdoor Lighting for the Plans Examiner

- Verify plans with NRCC-LTO-E form
 - Verify controls are specified
 - Daylight availability
 - Automatic scheduling
 - Motion sensors
 - Luminaire cutoff
 - Verify lighting power and allowances
 - Designed lighting power
 - General hardscape allowances
 - Specific application allowances
 - Hardscape dimensions
 - Verify applicable acceptance & installation forms are specified





Nonresidential Outdoor Lighting for the Building Inspector

- Verify installation matches plans and NRCC-LTO-E
 - Use NRCC-LTO-E as an inspection checklist
- Verify installed controls
 - Daylight availability
 - Automatic scheduling
 - Motion sensors
- Verify completed NRCI forms
- Verify completed NRCA forms
 - Must be signed by a certified technician





Resources





Approved Compliance Software

Residential

- CBECC-Res
- EnergyPro
- Right-Energy Title 24

Nonresidential

- CBECC-Com
- EnergyPro

- More information and up to date [list of approved software](#)



Approved ATTCPs

- **Lighting ATTCPs approved for 2019 Energy Code**
 - CALCTP – California Advanced Lighting Controls Training Program
 - NLCAA – National Lighting Contractors Association of America

- More information available at the CEC [Acceptance Test Technician Certification Provider Program](#) webpage



Blueprint Newsletter

- Published quarterly
- Clarifies frequently asked questions on all topics related to the Energy Code
- Highlights new resources, clarifications, and more on the Energy Code
- Sign up for our list server and receive Blueprint Newsletter email quarterly
- More information about the [Blueprint Newsletter](#)

Issue 126 April - June 2019

BLUEPRINT

CALIFORNIA ENERGY COMMISSION
EFFICIENCY DIVISION

IN THIS ISSUE

- 2019 Energy Code: Low-rise Residential Summary of Major Changes
- 2019 Energy Code: Nonresidential, Hotel and Motel, High-rise Residential Summary of Major Changes
- 2019 Energy Code: CBECC Software and ACM Manuals Approved
- 2016 Energy Code: New Fact Sheets and Videos for Covered Processes
- Q&A
 - Outdoor Electric Heating
 - Flag Pole Lighting
 - Continuous Insulation and Z-Clips
- Energy Code Ace Class Schedule
- Energy Code Ace 2019 Reference Ace

2019 ENERGY CODE: LOW-RISE RESIDENTIAL SUMMARY OF MAJOR CHANGES

The most significant change in the 2019 Building Energy Efficiency Standards (Energy Code) for low-rise residential buildings is the introduction of photovoltaic (PV) requirements in the prescriptive standards. There are also significant changes related to the indoor air quality requirements. This is a summary of these and other major changes:

Mandatory Measures

1. Walls with 2x6 framing require R-20 minimum insulation for wood-framed; or 0.071 maximum U-factor. **§ 150.0(c)2**
2. Modifications to the indoor air quality requirements of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 62.2 are included for various building and dwelling unit configurations such as horizontally attached buildings, or central ventilation systems. Balanced or continuously operating supply or exhaust ventilation system required. Home Energy Rating System (HERS) verification required when kitchen range hoods are installed. **§ 150.0(o)**
3. Minimum efficiency reporting value (MERV) 13 air filters (or equivalent) are required for heating, cooling, and on the supply side of ventilation systems. **§ 150.0(m)12**
4. Fan efficacy requirements are 0.45 watts/cubic feet per minute (CFM) or less for gas furnace air-handling units; or 0.58 watts/CFM or less for air-handling units that are not gas furnaces. New fan efficacy requirement for small-duct high-velocity forced-air systems. **§ 150.0(m)13B, C, D**

Prescriptive Compliance

1. New PV solar electric generation requirement. **§ 150.1(c)14**
2. New prescriptive **Table 150.1-B** for multifamily buildings. **§ 150.1(c)**
3. Wall U-factors in climate zones 1-5 and 8-16 reduced to 0.048 maximum in single-family buildings; climate zones 6-7 remain at 0.065 maximum. **§ 150.1(c)1B**
4. New exterior door U-factor 0.20 maximum and National Fenestration Rating Council (NFRC) labeling requirements. **§ 150.1(c)5, § 110.6(a)5**
5. Quality insulation installation (QII) for all single-family buildings in all climate zones, and multifamily buildings in all climate zones except climate zone 7. HERS verification required. **§ 150.1(c)1E**
6. New prescriptive options for heat pump water heaters for newly constructed buildings, additions, and alterations. **§ 150.1(c)8, § 150.2(a)1D, § 150.2(b)1H**

1



Online Resource Center

Online Resource Center

The Online Resource Center provides educational assistance about the Building Energy Efficiency Standards to building and enforcement communities. The California Energy Commission and utilities developed the resources, which include fact sheets, energy videos, and presentations.

Expand All

- Compliance Forms** +
- Energy Videos** +
- Trainings and Upcoming Events** +
- Exhibitor Booth Handouts** +

BUILDING ENERGY EFFICIENCY STANDARDS - TITLE 24

- 2022 Building Energy Efficiency Standards
- 2019 Building Energy Efficiency Standards
- 2016 Building Energy Efficiency Standards
- Online Resource Center**
- Past Building Energy Efficiency Standards

CONTACT

[Building Energy Efficiency Standards - Title 24](#)

Toll-free in California: 800-772-3300
Outside California: 916-654-5106


SUBSCRIBE

Building Energy Efficiency Standards

First Name *


ENERGY STANDARDS AND FORMS

RESOURCES AND TRAINING MATERIALS




Overview

Look for informational resources that cover multiple building components in a single document for residential and nonresidential buildings.




Commissioning

Mandatory commissioning requirements for nonresidential buildings.




Covered Processes


Mandatory and prescriptive covered processes requirements for nonresidential buildings.



Electrical Power Distribution

Mandatory electrical power distribution requirements for nonresidential buildings.





Online Resource Center webpage



Energy Code Ace

The screenshot shows the Energy Code Ace website homepage. At the top, there is a navigation bar with the Energy Code Ace logo and the tagline "Helping you play your cards right". The navigation bar includes links for "Tools Ace", "Training Ace", "Resources Ace", and a search bar. Below the navigation bar, the main content area features a headline: "Don't gamble on Title 24, Part 6 and Title 20 compliance. Ace it with:". There are three main content blocks, each representing a different tool or resource:

- Ace Tools™**: A variety of tools to help you identify the forms, installation techniques, and standards relevant to building projects in California.
- Ace Training™**: Targeted classroom and online training on Title 24, Part 6 and Title 20 addressing a variety of stakeholders and measures.
- Ace Resources™**: Application Guides, Facts Sheets, Trigger Sheets and Checklists to help you understand how and when to comply with California's building and appliance energy efficiency standards.

Each block includes a description, a button labeled "Ace it", and a small icon representing the tool or resource.

- Forms & Resource tools
- Free training (in person and online)
- Checklists, Trigger Sheets for building departments
- [Energy Code Ace](#) webpage



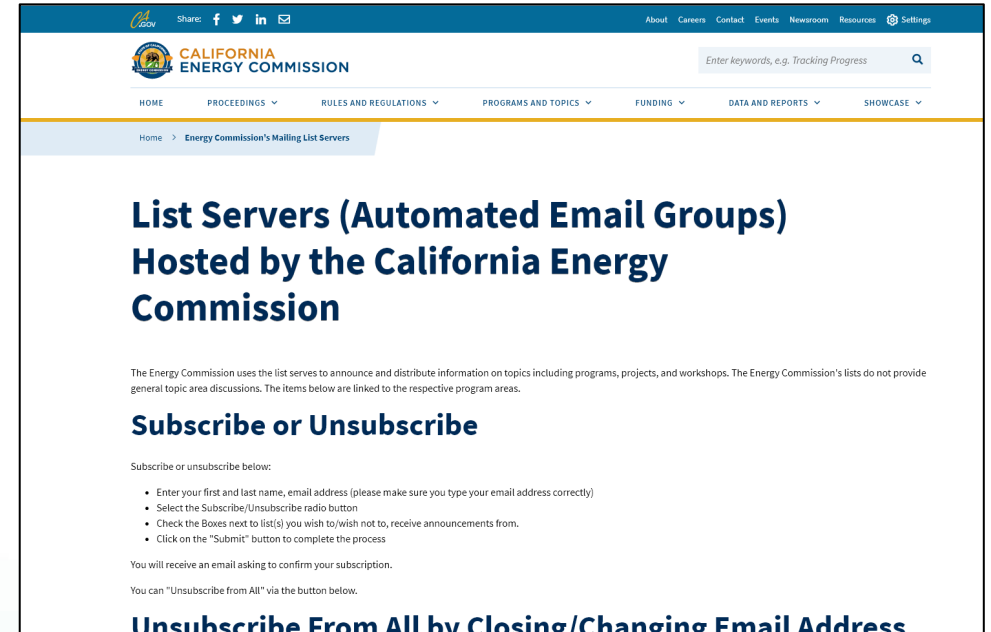
Hotline

- Open Monday through Friday
 - 8:00 a.m. to noon
 - 1:00 p.m. to 4:30 p.m.
- Call at:
 - 1-800-772-3300 (In CA, toll free)
 - 1-916-654-5106 (Outside CA)
- Email at: Title24@energy.ca.gov



E-mail Lists

- Main conduit for communicating with stakeholders
- Sign up on [CEC listserver](#) webpage
- Subscribe to the following Efficiency Lists:
 - Building Standards
 - Blueprint
- Respond to confirmation email within 24 hours





Thank You!

