

CEC TITLE 24 - 2022 ENERGY CODE



Suggested energy code solutions for commercial buildings

The compliant solutions shown below are suggested based on total installed costs, simplicity of design, and basic functional needs for the space. These solutions represent one of multiple compliant options to meet lighting and receptacle control requirements. TITLE 24-2022 can also be used as a comprehensive compliance guide. Applications in this guide will illustrate these solutions and/or alternate solutions for advanced functionality.

Diagram Key:

New Construction =

Lighting Retrofit =

New Construction and retrofit =

		Atrium	Break Room	Classroom, Lecture Hall, Training Room	Conference, Multi-purpose Room	Egress Corridor ³	Lobby	Open Office (>250sq. ft.)	Private Office (<250 sq.ft.)	Restroom ⁴	Egress Stairwell ^{3,4}	Storage Room	Facade/Landscape	Parking Garage ⁴ (Not Roof)	Other Exterior ⁵
Local Control	Switch														
	Multi-level or Dimming														
Automatic Control ²	Timeclock														
	Occupancy sensor														
	Full ON														
	Partial ON														
	Full OFF														
	Partial OFF														
Other	Daylight responsive control														
	Receptacle control ⁷														
	Demand Response														

1. Retrofit requirements indicated are for lighting alterations which replace more than 10% of the number of luminaires in a space, and use less than 80% of the maximum allowed lighting power. Or, one-for-one luminaire replacements for buildings or tenant spaces less than 5,000 sq. ft. when new lighting power is 40% lower than previous lighting power.
2. Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.
3. Up to 0.2 W may be continuously illuminated for means of egress illumination.
4. Local control may not be accessible to unauthorized personnel.

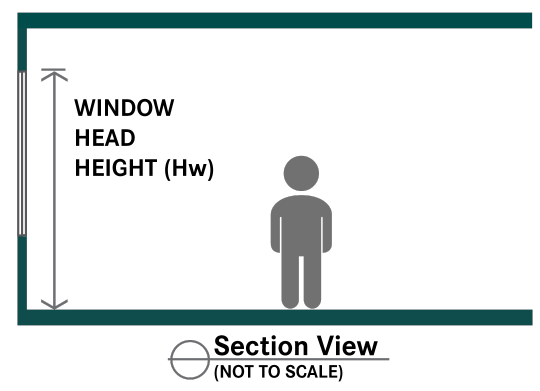
5. Astronomical timeclock shall ensure the lights are off during daylight hours. An occupancy sensor shall provide Full ON and partial OFF control. Occupancy sensing not required for lighting mounted higher than 24 feet.
6. Automatic reduction of lighting power by at least 80% (Full OFF complies) when zones are vacant more than 20 minutes. Lighting in the entire space goes OFF 20 minutes after all occupants have vacated the space.
7. Controlled receptacles in buildings shall be capable of automatically turning OFF all loads connected to the receptacle in response to a demand-response signal.

Minimum Control Type		Description	Code Ref.
Local Control	Switch	Lighting shall be capable of turning ON and OFF. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control.	130.1 (a)
	Multi-level or Dimming ¹	Lighting shall be capable of multiple control steps in enclosed spaces 100 sq.ft. or larger. Light level requirements are defined in Table 130.1-A. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control.	130.1 (b)
Automatic ON/OFF Control ³	Timeclock ²	Interior: Scheduled control, based on time-of-day, turns lighting ON or OFF based on typical occupancy. Occupancy sensors also comply as an alternate to using a timeclock. Exterior: Scheduled control, based on time-of-day and sunrise/sunset (requires astronomical timeclock), turns lighting ON or OFF based on typical occupancy and daylight.	130.1 (c) 1 130.2 (c) 1,2
	Occupancy sensor	Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less. When manual ON is used, provide a vacancy sensor which does not allow for automatic ON.	130.1 (c)
	Full ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.	130.1 (c) 1
	Partial ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% - 70% of maximum lighting power.	130.1 (c) 5
	Full OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.	130.1 (c) 5 130.2 (a)
	Partial OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power for interior spaces, 20% to 50% for parking garages. Exterior: Parking Lot pole- and wall-mounted luminaires 24 ft. or less in height must be controlled with motion sensors that reduce the lighting power by 50% to 90% or OFF, when the zone is vacant by more than 15 minutes. Automatic Full OFF also complies.	130.1 (c) 6&7 130.2 (c) 3
Other ¹	Daylight responsive control ¹	Interior: Interior & Parking Garages: A sensor which adjusts lighting in response to available daylight is required for sidelight and skylight zones (see the "Daylight zone requirements" diagrams). Exterior: A photosensor can be used as an alternate to the dawn/dusk operation of an astronomical timeclock.	130.1 (d) 130.2 (c) 1
	Receptacle control	At least 50% of the receptacles shall automatically turn OFF based on typical occupancy or after a vacancy of 20 minutes or less. Each uncontrolled receptacle must have at least one controlled receptacle within 6 ft. Open offices with receptacles in modular furniture must include one controlled receptacle per workstation. Plug in devices do not comply.	130.5 (d)
	Demand Response	Buildings using more than 4,000 Watts of lighting power in spaces that are required to have multilevel lighting controls shall have demand responsive lighting controls that can reduce lighting power in response to an OpenAPR signal. Controlled receptacles in buildings shall be capable of automatically turning off all loads connected to the receptacle in response to a demand response signal.	130.1 (e) 110.12 (c) 110.12 (e)

Daylight Zone Requirements:

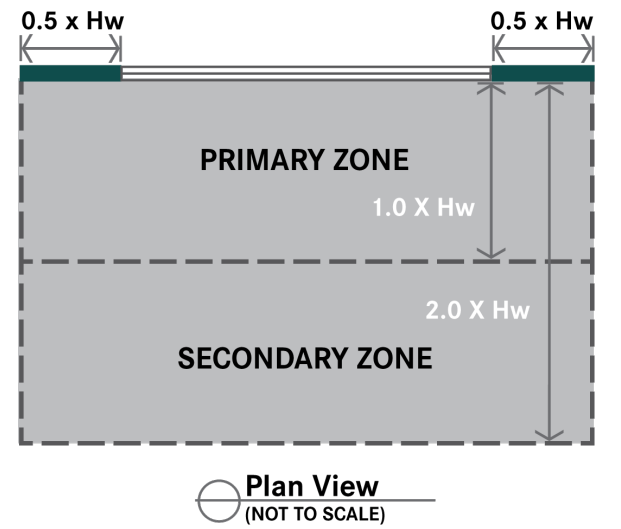
Sidelighted daylight zones must be controlled separately from toplighted zones.

Sidelighting (Window)

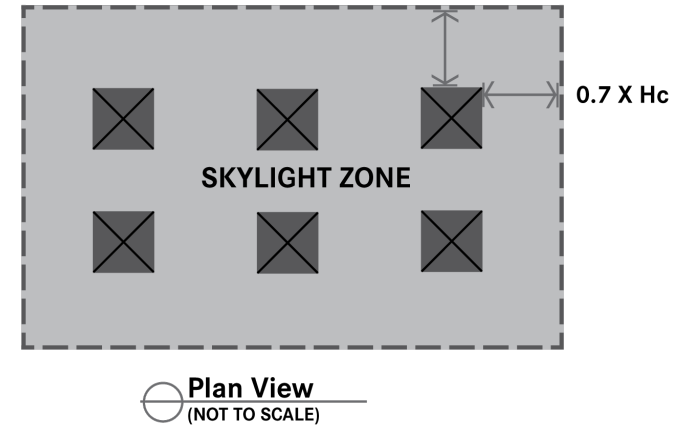
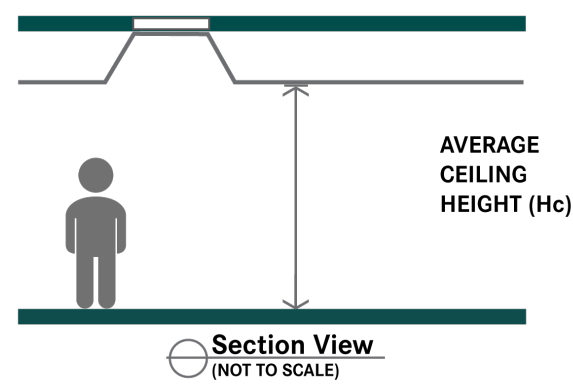


Daylight Exceptions:

Daylight control is not required when the total lighting power of a daylight zone is 120W or less (60W for parking garages), or when the total glazing area is 24 sq. ft. or less (36 sq. ft. for parking garages). Other exceptions exist, based on space type, window area, neighboring obstructions, and glass transmittance.



Toplighting (Skylight)



For areas being used as a path of egress or fixtures being used for emergency, verify compliance with your local authority having jurisdiction. Acceptance (functional) testing is required for all new construction applications to ensure that control hardware and software are calibrated, programmed and functioning properly (Code provision C408.3).

1. When multi-level lighting control and/or daylight responsive control is required, Lutron recommends using continuous dimming to allow for smooth light level adjustment and maximized energy savings.
2. To maximize energy savings and optimize the user experience, Lutron recommends the use of occupancy sensors instead of timeclocks to achieve automatic on/off requirements.
3. Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.

This document summarizes the lighting and receptacle control requirements for commercial buildings. It is for information purposes only. It is not meant to replace your state's or local jurisdiction's official energy code. Please refer to your local building energy code or authority having jurisdiction for your precise requirements. Only the authority having jurisdiction can guarantee code compliance.