

Suggested energy code solutions for commercial buildings

The compliant solutions listed below are suggested based on total installed cost, 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.

Diagram key:

● = New construction

⚙ = Lighting retrofit¹

⚙ = New construction and retrofit¹

		Atrium	Classroom, Lecture Hall, Training Room	Conference, Break Room	Corridor ²	Guestroom ³	Lobby ⁴	Open Office (>250 sq. ft.)	Parking Garage ⁵	Private Office (<250 sq. ft.)	Restaurant/Cafeteria, Retail	Restroom	Stairwell ²	Storage Room	Warehouse and Library Stacks ⁴	Facade/Landscape	Other Exterior ⁶	
Manual Control	Switch					⚙								⚙				
	Dimmer or scene control	⚙	⚙	⚙	⚙		⚙	⚙	⚙	⚙	⚙				⚙			
Automatic ON/OFF Control	Timeclock	⚙					⚙		⚙		⚙				⚙	⚙	⚙	
	Occupancy sensor		⚙	⚙	⚙	⚙	●	⚙	⚙	⚙		⚙	⚙	⚙	●		⚙	
	Settings	Full ON				⚙		⚙		⚙			⚙	⚙			⚙	⚙
		Partial ON	⚙						⚙			⚙				⚙		
		Manual ON		⚙	⚙			⚙			⚙				⚙			
		Full OFF	⚙	⚙	⚙		⚙	⚙	⚙	⚙	⚙	⚙	⚙		⚙	⚙	⚙	⚙
Partial OFF					⚙		⚙		⚙				⚙		⚙		⚙	
Other	Daylight responsive control	●	●	●	●		●	●	●	●	● ⁷	●	●	●	●			
	Receptacle control		●	●			●			●								
	Demand response																	

1 Retrofit requirements indicated are for lighting alterations greater than 20% of the connected load in a space.

2 To comply with some life safety code requirements for egress illumination, automatic full OFF is not suggested. For non-egress areas, the occupancy sensor should turn the lights to full OFF and a switching control may be used.

3 Automatic OFF is required for all luminaires and switched receptacles. Bathrooms must have a separate automatic OFF control for lighting.

4 When typically occupied, the occupancy sensor provides partial OFF functionality. When typically unoccupied, the sensor provides full OFF functionality.

5 When typically occupied, the sensor provides Partial OFF functionality. When typically unoccupied, the sensor provides Full OFF functionality. For entrances and exits, daylight responsive control is not required nor recommended, and the maximum light level is set to 50% at night

6 Astronomical timeclock shall ensure all lights are off during daylight hours. For lights mounted below 24 ft. provide occupancy sensing to Partial OFF. All other lighting shall be scheduled to Partial OFF. See section 9.4.1.4 for scheduling times.

7 Not required for sidelight daylight zones in retail spaces.

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Code requirement summary

Minimum control type		Description	Code provision	
Manual 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.	9.4.1.1 (a)	
	Dimmer or scene control	Lighting shall be capable of providing at least one level between 30% and 70% of full power, in addition to 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.	9.4.1.1 (a) 9.4.1.1 (d)	
Automatic ON/OFF Control	Timeclock	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, turns lighting ON or OFF based on typical occupancy and daylight (requires astronomical timeclock).	9.4.1.1 (i) 9.4.1.2 (a) & (c) 9.4.1.4 (a), (b), & (c)	
	Occupancy sensor	Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less (15 minutes for exterior).	9.4.1.1 9.4.1.2 (b) 9.4.1.4 (d)	
	Settings	Full ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.	9.4.1.1 (h)
		Partial ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% or less of maximum lighting power.	9.4.1.1 (c)
		Manual ON	Lighting is turned ON manually by an occupant.	9.4.1.1 (b)
		Full OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.	9.4.1.1 (h)
Partial OFF		When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power (30% for parking garages). Automatic full OFF also complies.	9.4.1.1 (g) 9.4.1.2 (b) & (c) 9.4.1.4 (c) & (d)	
Other	Daylight responsive control	Interior: A sensor which adjusts lighting in response to available daylight is required for sidelight and skylight zones. There must be at least two light levels between ON and OFF. See the “Daylight Zone Requirements” diagrams for more information. The perimeter 20ft. of parking garages with access to daylight must automatically reduce lighting power by at least 50% in response to daylight. Exterior: A photosensor can be used as an alternate to the dawn/dusk operation of an astronomical timeclock.	9.4.1.1 (e) 9.4.1.1 (f) 9.4.1.2 (d) 9.4.1.4 (a)	
	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. Plug-in devices do not comply.	8.4.2	
	Demand response	Demand response is not required by this energy code.	N/A	

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 9.4.3).

Daylight zone requirements

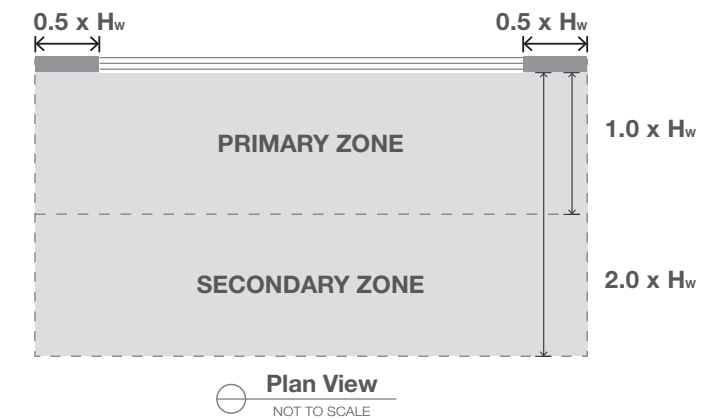
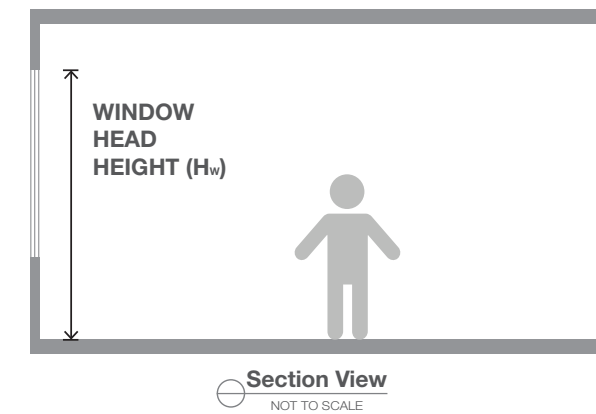
Daylight Zone Requirements:

Fixtures in the primary and secondary daylight zones must be independently controlled by zone. Sidelighted zones must be controlled separately from top lighted zones.

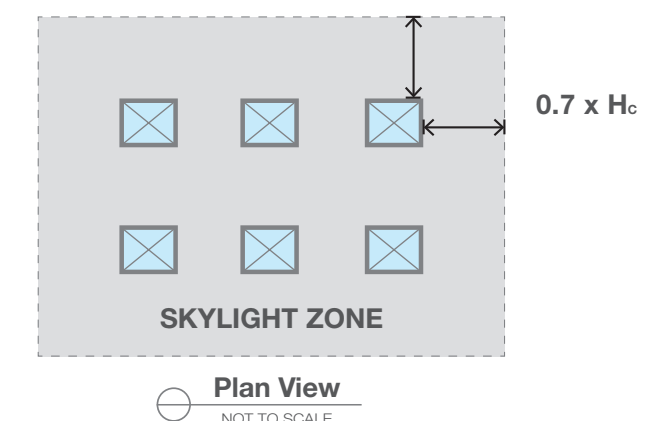
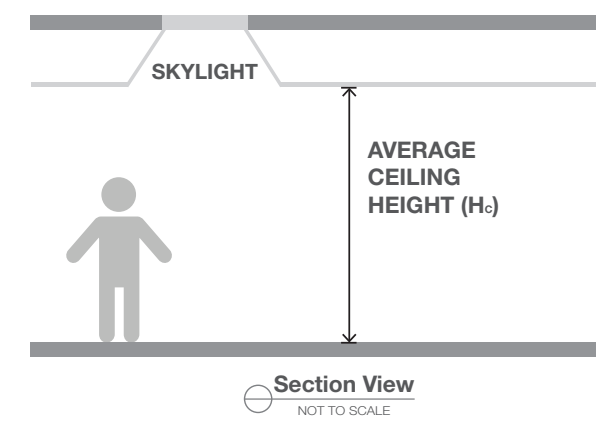
Daylight Exceptions:

Daylight control is not required when the total lighting power of a daylight zone is less than 150W or when the total glazing area is less than 20 sq. ft.

Sidelighting (Window)



Toplighting (Skylight)



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. The recommendations presented in this guide are based on the originally published code prior to addenda. 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.