

Lighting

9.4.1 Lighting Control. Building *controls* shall meet the provisions of 9.4.1.1, 9.4.1.2, 9.4.1.3, 9.4.1.4, 9.4.1.5, 9.4.1.6, and 9.4.1.7.

Any *automatic control device* required in sections 9.4.1.1, 9.4.1.2, and 9.4.1.6 shall either be *manual* on or shall be controlled to automatically turn the lighting on to not more than 50% power, except in the following *spaces* where full automatic-on is allowed;

- a. public corridors and stairwells,
- b. restrooms,
- c. primary *building entrance* areas and lobbies, and
- d. areas where *manual*-on operation would endanger the safety or security of the room or building occupant(s).

9.4.1.1 Automatic Lighting Shutoff. Interior lighting in buildings shall be controlled with an *automatic control device* to shut off building lighting in all *spaces*. This *automatic control device* shall function on either

- a. a scheduled basis using a time-of-day operated *control device* that turns lighting off at specific programmed times—an independent program schedule shall be provided for areas of no more than 25,000 ft² but not more than one floor—or
- b. an *occupant sensor* that shall turn lighting off within 30 minutes of an occupant leaving a *space*, or
- c. a signal from another *control* or alarm *system* that indicates the area is unoccupied.

Exceptions: The following shall not require an *automatic control device*:

- a. Lighting required for 24-hour operation.
- b. Lighting in *spaces* where patient care is rendered.
- c. Lighting in *spaces* where an *automatic* shutoff would endanger the safety or security of the room or building occupant(s).

9.4.1.2 Space Control. Each *space* enclosed by ceiling-height partitions shall have at least one *control device* to independently *control* the *general lighting* within the *space*. Each *manual* device shall be *readily accessible* and located so the occupants can see the controlled lighting. All controlled lighting shall meet the following requirements:

- a. The controlled lighting shall have at least one control step between 30% and 70% (inclusive) of full lighting power in addition to all off.

Exceptions to 9.4.1.2a:

- a. Lights in corridors, electrical/mechanical rooms, public lobbies, restrooms, stairways, and storage rooms
 - b. *Spaces* with only one *luminaire* with rated input power less than 100 W.
 - c. *Spaces* types with *lighting power allowance* of less than 0.6 W/ ft² (see Table 9.6.1).
- b. An *occupant sensor* or a timer switch shall be installed that automatically turns lighting off within 30 minutes of all occupants leaving a *space* in:
 1. classrooms and lecture halls,
 2. conference, meeting, and training rooms,
 3. employee lunch and break rooms,
 4. storage and supply rooms between 50 ft² and 1000 ft²,
 5. rooms used for document copying and printing,
 6. office *spaces* up to 250 ft²,
 7. restrooms, and
 8. dressing, locker, and fitting rooms.

Exceptions to 9.4.1.2b: These *spaces* are not required to be connected to other *automatic* lighting shutoff *controls*:

- a. *Spaces* with *multi-scene control systems*,
 - b. shop and laboratory classrooms,
 - c. *spaces* where an *automatic* shutoff would endanger the safety or security of the room or building occupant(s), and
 - d. lighting required for 24-hour operation.
- c. For *spaces* not included in 9.4.1.2b, each *control device* shall be activated either manually by an occupant or automatically by sensing an occupant. Each *control device* shall control a maximum of 2500 ft² area for a *space* 10,000 ft² or less and a maximum of 10,000 ft² area for a *space* greater than 10,000 ft². The occupant shall be able to override any time-of-day scheduled shutoff *control* for no more than two hours.

Exception to 9.4.1.2c: Remote location shall be permitted for reasons of safety or security when the remote *control device* has an indicator pilot light as part of or next to the *control device* and the light is clearly *labeled* to identify the controlled lighting.

9.4.1.3 Parking Garage Lighting Control. Lighting for parking garages shall comply with the following requirements:

- a. Comply with Section 9.4.1.1.
- b. Lighting shall be controlled by one or more devices that automatically reduce lighting power of each *luminaire* by a minimum of 30% when there is no activity detected within a lighting zone for no more than 30 minutes. Lighting zones for this requirement shall be no larger than 3,600 ft²,
- c. Daylight transition zone lighting, as described in Section 9.2.2.3 exception r, shall be separately controlled by a device that automatically turns lighting on during daylight hours and off at sunset.
- d. For *luminaires* within 20 ft of any perimeter *wall* structure that has a net opening to *wall* ratio of at least 40% and no exterior obstructions within 20 ft, the power shall be automatically reduced in response to daylight.

Exceptions:

- a. Daylight transitions zones and ramps without parking are exempt from sections b and d above.
- b. Applications using HID of 150 watts or less or Induction *lamps* are exempt from section b above.

9.4.1.4 Automatic Daylighting Controls for Primary Sidelighted Areas. When the combined *primary sidelighted area* in an *enclosed space* equals or exceeds 250 ft², the *lamps* for *general lighting* in the *primary sidelighted area* shall be separately controlled by at least one multilevel photocontrol (including continuous dimming devices) having the following characteristics:

- a. the light sensor for the photocontrol shall be remote from where calibration adjustments are made;
- b. the calibration adjustments shall be *readily accessible*, and
- c. the multilevel photocontrol shall reduce electric lighting in response to available daylight with at least one *control* step that is between 50% and 70% of design lighting power and another *control* step that is no greater than 35% (including off) of design power.

Exceptions:

- a. *Primary sidelighted areas* where the top of the existing adjacent structures are twice as high above the windows as their distance away from the windows
- b. *Primary sidelighted areas* where the *sidelighting effective aperture* is less than 0.1 (10%)
- c. retail *spaces*

9.4.1.5 Automatic Daylighting Controls for Toplighting. When the total *daylight area under skylights* plus the total *daylight area under rooftop monitors* in an *enclosed space* exceeds 900 ft², the *lamps* for *general lighting* in the *daylight area* shall be separately controlled by at least one multilevel photocontrol (including continuous dimming devices) having the following characteristics:

- a. the light sensor for the photocontrol shall be remote from where calibration adjustments are made,
- b. the calibration adjustments shall be *readily accessible*, and
- c. the multilevel photocontrol shall reduce electric lighting in response to available daylight with at least one *control* step that is between 50% and 70% of design lighting power and another *control* step that is no greater than 35% of design power.

Exceptions:

- a. *Daylighted areas under skylights* where it is documented that existing adjacent structures or natural objects block direct beam sunlight for more than 1500 daytime hours per year between 8 a.m. and 4 p.m.
- b. *Daylighted areas* where the *skylight effective aperture* (EA) is less than 0.006 (0.6%).
- c. *Buildings* in climate zone 8 with *daylight areas* totaling less than 1,500 ft² in an *enclosed space*.

9.4.1.6 Additional Control. Additional *controls* shall meet the following requirements:

- a. *Display/Accent Lighting*—display or accent lighting shall have a separate *control device*.
- b. *Case Lighting*—lighting in cases used for display purposes shall have a separate *control device*.
- c. *Guest Room Lighting*—Guestrooms in hotels, motels, boarding houses or similar buildings shall have one or more *control device(s)* at the entry *door* that collectively control all *permanently installed luminaires* and switched receptacles, except those in the bathroom(s). Suites shall have *control(s)* meeting these requirements at the entry to each room or at the primary entry to

the suite. Bathrooms shall have a *control device* installed to automatically turn off the bathroom lighting, except for night lighting not exceeding 5 watts, within 60 minutes of the occupant leaving the *space*.”

- d. *Task Lighting*—supplemental *task lighting*, including *permanently installed* undershelf or undercabinet lighting, shall have a *control device* integral to the *luminaires* or be controlled by a *wall-mounted control device* provided the *control device* is *readily accessible* and located so that the occupant can see the controlled lighting.
- e. *Nonvisual Lighting*—lighting for nonvisual applications, such as plant growth and food warming, shall have a separate *control device*.
- f. *Demonstration Lighting*—*lighting equipment* that is for sale or for demonstrations in lighting education shall have a separate *control device*.
- g. *Stairwell Lighting*—Lighting in stairwells shall have one or more *control devices* to automatically reduce lighting power in any one controlled zone by at least 50% within 30 minutes of all occupants leaving that controlled zone.

9.4.1.7 Exterior Lighting Control. Lighting for exterior applications not exempted in section 9.1 shall meet the following requirements:

- a. Lighting shall be controlled by a device that automatically turns off the lighting when sufficient daylight is available.
- b. All building façade and landscape lighting shall be automatically shut off between midnight or business closing, whichever is later, and 6am or business opening, whichever comes first, or between times established by the *authority having jurisdiction*.
- c. Lighting not specified in section b above, including advertising signage, shall be controlled by a device that automatically reduces the connected lighting power by at least 30% for at least one of the following conditions
 - 1. from 12 midnight or within one (1) hour of the end of business operations, whichever is later, until 6 a.m. or business opening, whichever is earlier; or
 - 2. during any period when no activity has been detected for a time of no longer than 15 minutes.

All time switches shall be capable of retaining programming and the time setting during loss of power for a period of at least ten hours.

Exception: Lighting for covered vehicle entrances or exits from buildings or parking structures where required for safety, security, or *eye adaptation*.

9.4.2 Exit Signs. Internally illuminated exit signs shall not exceed 5 W per face.

9.4.3 Exterior Building Lighting Power. The total *exterior lighting power allowance* for all exterior building applications is the sum of the base site allowance plus the individual allowances for areas that are designed to be illuminated and are permitted in Table 9.4.3B for the applicable lighting zone. The *installed exterior lighting power* identified in accordance with Section 9.1.3 shall not exceed the *exterior lighting power allowance* developed in accordance with this section. Trade-offs are allowed only among exterior lighting applications listed in the Table 9.4.3B “Tradable Surfaces” section. The lighting zone for the building exterior is determined from Table 9.4.3A unless otherwise specified by the local jurisdiction.

Exceptions: Lighting used for the following exterior applications is exempt when equipped with a *control device* that complies with the requirements of Section 9.4.1.7 and is independent of the *control* of the nonexempt lighting:

- a. Specialized signal, directional, and marker lighting associated with transportation.
- b. Advertising signage or directional signage.
- c. Lighting integral to *equipment* or instrumentation and installed by its *manufacturer*.
- d. Lighting for theatrical purposes, including performance, stage, film production, and video production.
- e. Lighting for athletic playing areas.
- f. Temporary lighting.
- g. Lighting for industrial production, material handling, transportation sites, and associated storage areas.
- h. Theme elements in theme/amusement parks.
- i. Lighting used to highlight features of public monuments and registered *historic* landmark structures or *buildings*.
- j. Lighting for hazardous locations.
- k. Lighting for swimming *pools* and water features.
- l. Searchlights.