

# Wattstopper® Quick Guide to ASHRAE 90.1 (2010)

## Commercial Lighting and Electrical Control Requirements

**Scope:** Interior building spaces, exterior building features, exterior building grounds. Interior space lighting alterations where 10% or more of the connected lighting is altered.

**Exceptions:** Emergency lighting off during normal operation, lighting within dwelling units, lighting required by health or life safety, gas lighting

<p><b>9.4.1.2 Space Control</b></p> <ul style="list-style-type: none"> <li>At least one manual or occupancy sensing device in each space to control the general lighting</li> <li>Manual controls must be readily accessible</li> <li>Can see lighting controlled from manual device</li> </ul>	<p>When manually controlled, space ≤ 10,000ft<sup>2</sup>?</p> <p><b>YES</b> ↓ Control area must be ≤ 2,500ft<sup>2</sup></p> <p><b>NO</b> ↓ Control area must be ≤ 10,000ft<sup>2</sup></p>	<p><b>Primary Exceptions:</b></p> <ul style="list-style-type: none"> <li>Remote control device permitted for safety or security, provided it has a status pilot light and is labeled to identify lights controlled</li> </ul>
<p><b>9.4.1 Manual or Partial Auto On</b></p> <ul style="list-style-type: none"> <li>Lighting shall either be manual on or auto on to no more than 50% power</li> </ul>	<p><b>Lighting Full Auto On Only Permitted for:</b></p> <ul style="list-style-type: none"> <li>Public corridors</li> <li>Restrooms</li> <li>Stairwells</li> <li>Primary entrances and lobbies</li> <li>Where manual on would endanger safety or security</li> </ul>	<p><b>Primary Exceptions:</b></p> <ul style="list-style-type: none"> <li>Where full auto on is permitted, manual on or partial auto on is not required</li> </ul>
<p><b>9.4.1.2(a) Bi-level Control</b></p> <ul style="list-style-type: none"> <li>Control lighting with at least one step between 30% and 70% of full lighting power [Continuous dimming control would comply]</li> </ul>	<p>Choose between bi-level switching or continuous dimming control</p>	<p><b>Primary Exceptions:</b></p> <ul style="list-style-type: none"> <li>Spaces with one luminaire &lt; 100W</li> <li>Spaces where LPD &lt; 0.6W/ft<sup>2</sup></li> <li>The following spaces: <ul style="list-style-type: none"> <li>Corridors</li> <li>Restrooms</li> <li>Elect/mech rooms</li> <li>Stairways</li> <li>Public lobbies</li> <li>Storerooms</li> </ul> </li> </ul>
<p><b>9.4.1.6(g) Stairwell Partial Auto Off</b></p> <ul style="list-style-type: none"> <li>Automatically reduce lighting ≥ 50% within 30 minutes of occupants leaving</li> </ul>		<p><b>Primary Exceptions:</b> None</p>
<p><b>9.4.1.1 Auto Shut Off</b></p> <p>Interior lighting auto off in all spaces by either:</p> <ol style="list-style-type: none"> <li>Time schedule <ul style="list-style-type: none"> <li>Independently schedule up to 25,000ft<sup>2</sup>, but not more than one floor</li> <li>Occupant override ≤ 2 hours</li> </ul> </li> <li>Occupancy sensor or timer switch with auto off within 30 minutes of occupants leaving</li> <li>Unoccupied signal from another control or alarm system</li> </ol>	<p><b>Occupancy Sensor or Timer Switch Required for:</b></p> <ul style="list-style-type: none"> <li>Classrooms/lecture halls</li> <li>Storage rooms 50ft<sup>2</sup> to 1,000ft<sup>2</sup></li> <li>Conference/training rooms</li> <li>Office spaces ≤ 250ft<sup>2</sup></li> <li>Lunch and break rooms</li> <li>Fitting/dressing rooms</li> <li>Copy/print rooms</li> <li>Locker rooms</li> <li>Restrooms</li> </ul>	<p><b>Primary Exceptions:</b></p> <ul style="list-style-type: none"> <li>Lighting for 24/7 operation</li> <li>Lighting for patient care</li> <li>Where auto off would endanger safety or security</li> <li>Spaces with multi-scene control</li> <li>Shop and laboratory classrooms</li> </ul>
<p><b>9.4.1.4 and 9.4.1.5 Automatic Daylighting Control</b></p> <ul style="list-style-type: none"> <li>Either continuous dimming or step control with at least one step between 50-70% and another step ≤ 35% (including off)</li> <li>Photosensor shall be remote from calibration adjustments</li> <li>Calibration adjustments readily accessible</li> </ul>	<p>Sidelight daylight area lighting ≥ 250ft<sup>2</sup> or toplight daylight area &gt; 900ft<sup>2</sup>?</p> <p><b>YES</b> ↓ Daylight Control Required Choose dimming or step control</p> <p><b>NO</b> ↓ Daylight Control Not Required</p>	<p><b>Primary Exceptions Sidelight:</b></p> <ul style="list-style-type: none"> <li>Adjacent structure obstruction</li> <li>Sidelight effective aperture &lt; 0.1</li> <li>Retail spaces</li> </ul> <p><b>Primary Exceptions Toplight:</b></p> <ul style="list-style-type: none"> <li>Obstruction &gt; 1,500 hrs/year</li> <li>Skylight effective aperture &lt; 0.006</li> <li>Climate zone 8 and area &lt; 1,500ft<sup>2</sup></li> </ul>
<p><b>9.4.1.6 Additional Control</b></p> <ul style="list-style-type: none"> <li>Lighting with additional control requirements</li> </ul>	<p><b>Separate Control Required for the Following Lighting:</b></p> <ul style="list-style-type: none"> <li>Display or accent</li> <li>Lighting for sale</li> <li>Food warming</li> <li>Display cases</li> <li>Lighting for education</li> <li>Plant growth</li> </ul> <p><b>Either a Control Device on the Luminaire or a Readily Accessible Wall-Mounted Control Required for:</b></p> <ul style="list-style-type: none"> <li>Task lighting</li> <li>Undershelf lighting</li> <li>Under cabinet lighting</li> </ul>	<p><b>Primary Exceptions:</b> None</p>
<p><b>8.4.2 Automatic Receptacle Control</b></p> <p>At least 50% of receptacles shall auto off by either:</p> <ul style="list-style-type: none"> <li>Time schedule, independently schedule up to ≤ 25,000ft<sup>2</sup>, but not more than one floor</li> <li>Occupancy sensor with 30 minute off delay</li> <li>Unoccupied signal from another control or alarm system</li> </ul>	<p><b>Required for the Following Space Types:</b></p> <ul style="list-style-type: none"> <li>Private offices</li> <li>Modular partitions</li> <li>Open offices</li> <li>Computer classrooms</li> </ul>	<p><b>Primary Exceptions:</b></p> <ul style="list-style-type: none"> <li>Equipment operating 24/7</li> <li>Where auto off would endanger safety or security</li> </ul>

### Other Lighting Control Requirements

#### 9.4.1.3

##### Parking Garage Lighting Control

- Automatic lighting shut off per 9.4.1.1
- Automatically reduce lighting ≥ 30% when no activity detected within 30 minutes and with the area controlled ≤ 3,600ft<sup>2</sup>
- Daylight transition zone lighting auto on from daylight hours to sunset
- Within 20ft of perimeter wall openings, automatically reduce lighting power in response to daylight

##### Exceptions:

- Non-parking daylight transition zones
- HID lamps of < 150W or induction lamps

#### 9.4.1.6(c)

##### Guestroom Control

Entry door control device that controls all lighting and switched receptacles

##### Bathroom Control

Guestroom bathrooms have separate control to auto off all bathroom lighting within 60 minutes of occupants leaving

##### Bathroom Exceptions:

Nightlights up to 5W per bathroom

#### 9.4.1.7

##### Exterior Lighting Controls

- Auto off when daylight is available
- Façade, landscape lighting auto off between midnight or business close and 6AM or business open
- Reduce all other lighting and signage ≥ 30% no later than midnight or within one hour after business operations end to 6AM or business opening, or when no detected activity for > 15 minutes

##### Exceptions:

- Covered vehicle entrances, or exits, for safety, security, or eye adaptation

#### 9.4.4

##### Functional Testing

Lighting controls tested for proper calibration, adjustment, programming, and working condition

- Confirm occupancy sensor parameters and performance (see 9.4.4(a))
- Confirm time switch programming for lighting shut off (see 9.4.4(b))
- Confirm daylight controls meet criteria (see 9.4.4(c))

Testing party shall not be involved with project design or construction and provides certifying document that lighting controls meet the performance criteria

Note: This infographic is for informational purposes only. Always refer to the code for specific requirements or contact your local Wattstopper representative.

ASHRAE is an acronym for the American Society of Heating, Refrigeration, and Air Conditioning Engineers.



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