**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.

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#### 9.4.1 Space Control

<table>
<thead>
<tr>
<th>When manually controlled, space ≤ 10,000ft²?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control area must be ≤ 2,000ft²</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

**Primary Exceptions:**
- Manual override of control permitted for safety or security.
- Space where LPD ≤ 0.1W/ft².
- Space with multi-scene control.
- Stores, retail stores.
- Retail spaces with multi-scene control.
- Remote control device permitted.

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#### 9.4.1.1 Auto Shut Off

- Interior lighting auto off in all spaces by either:
  - Time schedule
  - Individually scheduled up to 25,000ft², but not more than one fixture
- Occupant override ≤ 2 hours
- Occupancy sensor or timer switch with auto off within 30 minutes of occupants leaving
- Unoccupied signal from another control or alarm system.

**Primary Exceptions:**
- None.

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#### 9.4.1.4 and 9.4.1.5 Automatic Daylighting Control

- Directly illuminated first floor office control with 
  - ≤ 50% at one step
  - ≤ 70% at another step
- Photocell shall be remote from
- Calibration adjustments readily accessible

**Primary Exceptions for Sidelight:**
- Adjacent structure obstruction.
- Sidelight effective aperture ≤ 0.1.

**Primary Exceptions for Toplight:**
- Oclusion > 1,500 hours/year.
- Skylight effective aperture ≤ 0.06.
- Climate zone 8 and area < 1,500ft².

**Required for the Following Space Types:**
- Task lighting
- Undershelf lighting
- Under cabinet lighting

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#### 9.4.1.6(c) Guestroom Control

- Entry door control device that controls all lighting and switchable receptacles.

**Primary Exceptions:**
- Guestroom control, entry door control device that controls all lighting and switchable receptacles.

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#### 9.4.1.7 Exterior Lighting Controls

- Auto off when daylight is available.
- Facade, landscape lighting auto off between midnight or business close and 6AM or business open.
- Reduce all other lighting and signage ≤ 20% no later than midnight or within one hour after business operations and 6AM or business opening, or when no detected activity for 15 minutes.

**Exceptions:**
- Covered vehicle entrances, exits for safety, security, or eye adaptation.

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#### 8.4.2 Automatic Receptacle Control

- At least 50% of receptacles shall auto off by either:
  - Time schedule, independently scheduled up to 25,000ft², but not more than one fixture.
  - Occupancy sensor with 30 minute delay.
- Unoccupied signal from another control or alarm system.

**Primary Exceptions:**
- None.

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#### 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.

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### 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 with and the area controlled ≤ 3,600ft².
- 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 ≤ 150W or induction lumps.

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#### 9.4.1.6 Stairwell Partial Auto Off

- Automatic lighting shut off per 9.4.1.1.
- Automatically reduce lighting ≥ 30%.
- ≤ 30% within 20ft of perimeter wall.
- Automatically reduce lighting ≥ 30%.
- Within 20ft of perimeter wall openings, automatically reduce lighting power in response to daylight.

**Exceptions:**
- Non-parking daylight transition zones.
- HID lamps ≤ 150W or induction lamps.

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#### 9.4.1.8 Nightlights

- Up to 5W per bathroom.
- Within 60 minutes of occupants leaving.

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