

ASHRAE 90.1 (2019)

Scope: Interior building spaces, exterior lighting powered through building electrical service

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

Simplified Method: A simplified method for lighting and control compliance is available for office, retail or school buildings and building exteriors when < 25,000ft² (section 9.3)

COMMERCIAL LIGHTING CONTROL REQUIREMENTS

<p>Lighting Alterations 9.1.2 Alterations Must Follow:</p> <ul style="list-style-type: none"> Interior lighting power and control requirements (except daylighting) Exterior lighting power and control requirements 	<p>Required for</p> <ul style="list-style-type: none"> Lighting system alterations Lamp plus ballast/driver or one for one luminaire replacement (only comply with lighting power and shut-off requirements) 	<p>Key Exceptions</p> <ul style="list-style-type: none"> Alterations of 20% or less of connected lighting load given LPD not increased Routine maintenance 				
<p>Local Control Device 9.4.1.1(a) One or more manual control devices in a space:</p> <ul style="list-style-type: none"> Readily accessible Can see lighting controlled from local device (May be an on/off switch or dimmer) 	<p style="text-align: center;">Space ≤ 10,000ft²?</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">YES</td> <td style="width: 50%;">NO</td> </tr> <tr> <td>Control area must be ≤ 2,500ft²</td> <td>Control area must be ≤ 10,000ft²</td> </tr> </table>	YES	NO	Control area must be ≤ 2,500ft ²	Control area must be ≤ 10,000ft ²	<p>Key Exceptions</p> <ul style="list-style-type: none"> Remote control device permitted for safety or security, provided it has a status pilot light and is labeled to identify lights controlled
YES	NO					
Control area must be ≤ 2,500ft ²	Control area must be ≤ 10,000ft ²					
<p>Manual or Partial Auto On 9.4.1.1(b) and 9.4.1.1(c)</p> <ul style="list-style-type: none"> Lighting shall either be manual on or auto on to no more than 50% of the general lighting 	<p>Lighting Full Auto On Only Permitted for</p> <ul style="list-style-type: none"> Corridors Restrooms Lobbies Stairwells Healthcare facility Where manual on would endanger safety or security Storage rooms < 50ft² Elect/mech rooms 	<p>Key Exceptions</p> <ul style="list-style-type: none"> Where full auto on is permitted, manual on or partial auto on is not required 				
<p>Bi-level Control 9.4.1.1(d)</p> <ul style="list-style-type: none"> Besides on and off, general lighting is either continuously dimmed or controlled with at least one step between 30% and 70% of full lighting power 	<p style="text-align: center;">Choose between bi-level switching or continuous dimming control</p>	<p>Key Exceptions</p> <ul style="list-style-type: none"> Atriums < 20ft ht Corridors Elect/mech rooms Storerooms Loading docks Restrooms Lobbies 				
<p>Automatic Daylight Responsive Control 9.4.1.1(e) and 9.4.1.1(f)</p> <ul style="list-style-type: none"> Control general lighting with automatic continuous dimming which reduces lighting to ≤ 20% power and all the way off Lighting level cannot adjust above the unoccupied setpoint No calibration at sensor. Calibration located ≤ 11ft off floor <p>Sidelighting – Two independent zones: primary and secondary Toplighting – Single primary zone under skylights and monitors</p>	<p style="text-align: center;">Primary daylight area lighting ≥ 150W or primary and secondary daylight area lighting ≥ 300W?</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">YES</td> <td style="width: 50%;">NO</td> </tr> <tr> <td>Daylight Control Required Continuous Dimming</td> <td>Daylight Control Not Required</td> </tr> </table>	YES	NO	Daylight Control Required Continuous Dimming	Daylight Control Not Required	<p>Key Exceptions Sidelight</p> <ul style="list-style-type: none"> Adjacent structure obstruction Glazing < 20ft² Retail spaces External projections above thresholds <p>Key Exceptions Toplight</p> <ul style="list-style-type: none"> Obstruction > 1,500 hrs/year Skylight effective aperture < 0.006 Climate zone 8 and lighting < 200W
YES	NO					
Daylight Control Required Continuous Dimming	Daylight Control Not Required					
<p>Automatic Partial Off 9.4.1.1(g)</p> <ul style="list-style-type: none"> Automatically reduce general lighting ≤ 50% within 20 minutes of occupants leaving. Automatic Full Off complies. (Occupancy sensor control) 	<p>Required for the Following Space Types</p> <ul style="list-style-type: none"> Corridors (not manufacturing) Lobbies Library stacks Storage rooms > 1,000ft² Classroom labs Stairwells Warehouses 	<p>Key Exceptions</p> <p>All three conditions must be met:</p> <ol style="list-style-type: none"> LPD no more than 0.8W/ft² Spaces lit by HID lamps Light power reduced by ≥ 30% within 20 minutes after leaving 				
<p>Automatic Full Off 9.4.1.1(h)</p> <ul style="list-style-type: none"> All lighting (including those connected to emergency circuits) must auto off within 20 minutes of occupants leaving. Control device shall control an area no larger than 5,000ft². (Occupancy sensor control) 	<p>Required for the Following Space Types</p> <ul style="list-style-type: none"> Classroom/training rooms Conference/meeting rooms Lounge/break rooms Copy/print rooms Multipurpose rooms Lecture Hall Restrooms Fitting/dressing rooms Storage rooms ≥ 50 to ≤ 1,000ft² Locker rooms Offices ≤ 250ft² 	<p>Key Exceptions</p> <ul style="list-style-type: none"> Shop and classroom laboratories Electrical and mechanical rooms Where auto off would endanger safety or security Lighting for 24/7 operation Lighting load ≤ 0.02W/ft² times building gross ft² 				
<p>Scheduled Shut Off 9.4.1.1(i)</p> <p>Lighting (including those on emergency circuits) not already shut off by Automatic Full Off control must be shut off when scheduled unoccupied:</p> <ul style="list-style-type: none"> Time schedule or other control device signal Control area ≤ 25,000ft² but not more than one floor Override ≤ 2 hours and area ≤ 5,000ft² 	<p style="text-align: center;">Required for spaces not already controlled by Automatic Full Off (9.4.1.1(h))</p>	<p>Key Exceptions</p> <ul style="list-style-type: none"> Lighting for patient care Where auto off would endanger safety or security Lighting for 24/7 operation Electrical and mechanical rooms Lighting load ≤ 0.02W/ft² times building gross ft² 				
<p>Special Application Lighting 9.4.1.3</p> <ul style="list-style-type: none"> Lighting must have local control independent of general lighting Must either have Auto Full Off or Scheduled Shutoff control 	<p>Required for the Following Lighting</p> <ul style="list-style-type: none"> Display or accent Under shelf Supplemental task Under cabinet Display cases 	<p>Key Exceptions</p> <ul style="list-style-type: none"> None 				
<p>Automatic Receptacle Control 8.4.2</p> <p>At least 50% of receptacles and 25% of feeders to modular furniture shall auto off by either:</p> <ul style="list-style-type: none"> Time schedule, ≤ 2 hour override, control area ≤ 5,000ft² Occupancy sensor with 20 minute off delay Automated signal that shall auto off receptacles within 20 minutes of occupants leaving 	<p>Required for the Following Space Types</p> <ul style="list-style-type: none"> Private offices Print/copy rooms Individual workstations Conference rooms Break rooms Classrooms 	<p>Key Exceptions</p> <ul style="list-style-type: none"> Equipment operating 24/7 Where auto control would endanger safety or security 				

ADDITIONAL LIGHTING CONTROL REQUIREMENTS

<p>Parking Garage Lighting Control 9.4.1.2</p> <ul style="list-style-type: none"> Automatic lighting shut off per 9.4.1.1(i) Automatically reduce lighting ≥ 50% when no activity within 10 minutes the area controlled ≤ 3,600ft² Covered vehicle entrances and exits have controls to reduce lighting to no more than general light level from sunset to sunrise Within 20ft of perimeter wall openings, automatic continuous light dimming in response to daylight 	<p>Key Exceptions for Garage Daylighting</p> <ul style="list-style-type: none"> Openings < 24ft² Eye adaptation transition lighting Screens or architectural elements obstructing > 50% of opening Adjacent structures twice as high as the horizontal distance between the structures
<p>Guestroom Control 9.4.1.3(b)(1) Auto off all lighting and switched receptacles within 20 minutes of occupants leaving</p> <p>Bathroom Control 9.4.1.3(b)(2) Guestroom bathrooms have separate control to auto off bathroom lighting within 30 minutes of occupants leaving</p>	<p>Key Exceptions</p> <p>Lighting and switched receptacles controlled by a captive key system</p> <p>Bathroom Exceptions</p> <p>Nightlights up to 5W per bathroom</p>
<p>Exterior Lighting Controls 9.4.1.4</p> <ul style="list-style-type: none"> Auto off when daylight is available Façade, landscape auto off no later than midnight or closing and 6AM or opening Reduce other lighting and signage ≥ 50% no later than midnight or within one hour after operations end to 6AM or opening, or when no activity detected for > 15 minutes Parking lights > 78W with mounting heights ≤ 24ft must reduce power ≥ 50% when no activity detected for > 15 minutes. Control zone ≤ 1500W 	<p>Key Exceptions</p> <ul style="list-style-type: none"> Covered vehicle entrances for safety, security, or eye adaptation and lighting integral to signage.
<p>Functional Testing 9.4.3</p> <p>Lighting controls tested for proper calibration, adjustment, programming, and working condition . Testing process documented in commissioning plan</p> <ul style="list-style-type: none"> Certify occupancy sensor parameters (see 9.9.1(a)) Confirm and verify automatic time switch parameters (see 9.9.1(b)) Verify daylight controls meet criteria (see 9.9.1(c)) <p>Commissioning provider or verification and testing provider is a third party to the design and construction team, or is the building owner(4.2.5). Reports shall be provided to the building owner before the certificate of occupancy is issued.that lighting controls meet the performance criteria</p>	<p>Key Exceptions</p> <ul style="list-style-type: none"> Where projects are < 10,000ft² & < 960kBtu/hr combined heat, cool & service water capacity

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