

Major Differences of ASHRAE 90.1-2010 in Lighting Control

OVERVIEW

ASHRAE 90.1 is an ANSI approved national Energy Standard for Buildings Except Low-Rise Residential Buildings. To achieve the 30% plus energy savings target, the ASHRAE 90.1-2010 edition has required significantly more mandatory provisions in lighting control than its earlier editions. The U.S. Department of Energy (DOE) has issued a ruling that requires all state authorities to update the local energy codes to meet or exceed the criteria of ASHRAE 90.1-2010 by October 18, 2013. It is expected that these lighting control requirements will eventually be in place for the majority of states for all new construction and retrofit projects of commercial buildings.

To help professionals quickly understand the major provisions for lighting control in the 2010 edition, the following table highlights the new requirements and revised code in comparison with the 2007 edition. As always, lighting control professionals should review specific code requirement from state to state to ensure project compliance.

| ASHRAE 90.1-2010 | ASHRAE 90.1-2007 | What does this mean? |
|--|---|--|
| 1. Threshold for code compliance (REVISED) | | |
| Any new construction project and retrofit project involving alteration of more than 10% of connected lighting load shall comply with LPD and automatic shutoff requirements. | Any new construction project and retrofit project involving alteration of more than 50% of connected lighting load. | The threshold for code compliance has been drastically reduced on the retrofit projects. This means that even a very modest lighting update may require code compliance. |
| 2. Automatic Lighting Control (REVISED) | | |
| Any automatic control device required shall either be manual-on or auto-on to no more than 50% power, except in the spaces where full auto-on is allowed; <ol style="list-style-type: none"> public corridors and stairwells restrooms primary building entrance areas and lobbies areas where manual-on operation would endanger the safety or security of the room or occupants | Enclosed spaces (individual rooms, areas enclosed by ceiling height partitions) must have a control device to control the general lighting in the space either manually or automatically. | Lighting controls must be configured to manual-on operation or, if auto-on is desired, the space must be properly wired and controlled so that no more than 50% of the general lighting will turn on automatically. |
| 3. Automatic Lighting Shutoff (REVISED) | | |
| Indoor lighting of all spaces in buildings shall be controlled with an automatic control device to provide automatic lighting shutoff by means of any of the below: <ul style="list-style-type: none"> ● scheduled shutoff by time-of-day control device ● occupancy sensor which will turn off the lighting within 30 minutes after occupant leaves ● signal from another control system that will indicate the vacancy of specific areas | Required in building larger than 5,000 sq. ft. | All buildings, regardless of size, are required to provide automatic lighting shutoff control. |

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| 4. Light Level Reduction (NEW) | | |
| <p>Each enclosed space with ceiling height partitions must have controls that can reduce the lighting power level by 30-70% of the full connected load in addition to turning off all lighting.</p> | <p>NONE</p> | <p>The lighting control of enclosed spaces must provide at least one control step to reduce between 30 and 70% of the full connected lighting power in addition to all off.</p> |
| 5. Space Control Requirement (REVISED) | | |
| <p>An occupancy sensor or a time switch shall be installed that automatically turns lighting off within 30 minutes after the last occupant leaves a space in:</p> <ol style="list-style-type: none"> 1. classrooms and lecture halls 2. conference, meeting, and training rooms 3. employee lunch and break rooms 4. storage & supply rooms between 50-1000 ft² 5. rooms for document copying and printing 6. office space up to 250 ft² 7. restrooms 8. dressing, locker, and fitting rooms | <p>A control device shall be installed that automatically turns lighting off within 30 minutes after the last occupant leaves a space in:</p> <ol style="list-style-type: none"> 1. classrooms 2. conference and meeting rooms 3. employee lunch and break rooms | <p>Occupancy sensors and time switches are the ONLY control devices that comply, and these must be configured to either manual-on or auto-on to 50% or less to comply with the "Automatic Control Requirements" provision.</p> |
| 6. Parking Garage Lighting Control (NEW) | | |
| <p>Lighting for parking garages shall comply with</p> <ul style="list-style-type: none"> ● Automatic shutoff control ● At least 30% or more of lighting power of each fixture shall be automatically reduced if there is no activity detected in a lighting zone ($\leq 3,600$ ft²) within 30 minutes ● Daylight control for fixtures within 20 ft of any perimeter wall structure that has at least 40% of net opening to wall ratio | <p>NONE</p> | <p>ASHRAE 90.1-2010 has added major provisions for internal lighting, such as automatic shutoff control, light level reduction, and daylight control. They have also been incorporated into the new requirements for parking garage lighting.</p> |
| 7. Automatic Daylight Control (NEW) | | |
| <p>Automatic, multi-level daylight control must be installed in each enclosed space with side-light area (≥ 250 ft²) and all sky-light area (> 900 ft²).</p> | <p>NONE</p> | <p>For daylight areas, an automatic daylight control should be available to provide at least one control step with lighting power between 50% and 70%, and another step between 0%(off) and 35% of lighting power.</p> |

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| 8. Additional Control Requirements (REVISED) | | |
| <ul style="list-style-type: none"> ● Guestroom lighting – Guestrooms of hotels, motels, boarding houses or similar buildings must have one or more control devices at the entry door that collectively controls all permanently installed lighting fixtures and switched receptacles. Bathrooms must have a control device that can turn off the bathroom lighting (except night lighting <5W) within 60 minutes after occupant leaves the space. ● Stairwell Lighting – Lighting in stairwells shall have one or more control devices to automatically reduce lighting power in its controlled zone by at least 50% within 30 minutes after all occupants leave. | <ul style="list-style-type: none"> ● Guestroom lighting – Hotel and motel guestrooms and suites must have control device at the entry door that controls all permanently installed lightings fixtures and switched receptacles. ● Stairwell Lighting – NONE | <ul style="list-style-type: none"> ● Guestroom lighting ASHRAE 90.1-2010 requires the bathroom of hotel/motel guestrooms to have a control device (occupancy sensor) to provide automatic lighting shutoff within 60 minutes after occupant leaves the space. ● Stairwell Lighting – The stairwell lightings must have one or more control devices (i.e. bi-level occupancy or vacancy sensor) to automatically reduce the lighting power by at least 50% during vacancy. |
| 9. Exterior Lighting Control (REVISED) | | |
| <ul style="list-style-type: none"> ● All applicable exterior lighting shall be controlled by a device that automatically turns off the lighting when sufficient daylight is available. ● Building façade and landscape lighting shall be automatically shut off between midnight or business closing and 6am or business opening. ● Other applicable exterior lighting, including advertising signage, shall be controlled to automatically reduce the connected lighting power by at least 30% from midnight or within 1 hour after business closing to 6 am or business opening; or during any period if no activity is detected within 15 minutes. | <ul style="list-style-type: none"> ● Lighting must be off during the day when daylight available. ● Lighting not designated for dusk-to-dawn operation must be controlled by a photosensor, time switch, or an astronomical time switch. | <p>The exterior lighting now has more stringent requirements than before to ensure that it is off or operating at reduced lighting power at nighttime to achieve more energy savings.</p> |
| 10. Functional Testing (NEW) | | |
| <ul style="list-style-type: none"> ● All lighting control devices and systems must be tested and documented by a 3rd party to ensure that control hardware and software are properly calibrated, adjusted, programmed and functioned. ● Occupancy Sensors – confirm that the placement, sensitivity and time-out adjustments yield acceptable performance. ● Schedule Controls – confirm that the time switch or schedule controlled lighting to be turned off as programmed. ● Daylight Controls – confirm that the photo sensor inhibits switching the light or reduces the light levels based on the amount of usable daylight in the space as specified. | <p>NONE</p> | <p>ASHRAE 90.1-2010 requires a third party not directly involved in either design or construction of the project to be responsible for the functional testing. This party shall also provide documentation certifying that the installed lighting controls meet or exceed the required performance criteria.</p> |