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National Lighting Contractors Association of America

# Code Clean up

NLCAA is providing these recommend language changes for clarity, understanding, in line with current language or to provide layman language to better interpret the codes.

**NA7.6.2.2(a):**

Current:

Occupancy sensor has been located to minimize false signals:

Recommended change:

Occupancy sensor has been located to prevent false signals:

This could be removed, it is verified during the functional testing

**NA7.6.3.2 Method (1) (b)(1)**

Current:

Using the manual switches/dimmers in each space, set the lighting system to full output. Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at less than full output or may be off.

Recommended change:

Check if the system had been task tuned. If the system has been task tuned override the controls to allow the lighting system to go to full output. Using the manual switches/dimmers in each space, set the lighting system to full output. Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at less than full output, or may be of

**NA7.6.2.2 (a) and (d)**

Current:

(a) Occupancy sensor has been located to minimize false signals:

(b) Occupancy sensors do not encounter any obstructions that could adversely affect desired performance

Recommend change:

(a) Occupancy sensing control has been located to minimize false signals:

(b) Occupancy sensing control does not encounter any obstructions that could adversely affect desired performance

This could be removed, it is verified during the functional testing

**Exception to Section 130.1(a)**

Up to 0.2 watts per square foot of indoor lighting may be continuously illuminated to allow for means of egress illumination consistent with California Building Code Section 1008. Egress lighting complying with this wattage limitation is not required to comply with manual area control requirements if

This exception should be moved up to come right after (a) Manual Area Controls. Each area enclosed by ceiling-height partitions shall provide lighting controls that allow the lighting in that area to be manually turned on and off. The manual control shall:

Could the code differentiate the difference of the intent of 0.2 w/ft² in (a) and 0.1 w/ft² (c), this would go a long way to clear up confusion between these two sections of code.

**130.1(b)**

Current:

Multi-Level Lighting Controls. The general lighting of any enclosed area 100 square feet or larger with a connected lighting load that exceeds 0.5 watts per square foot shall provide multi-level lighting controls that allow the level of lighting to be adjusted up and down. The multi-level controls shall provide the number of control steps and meet the uniformity requirements specified in TABLE 130.1-A.

EXCEPTION 1 to Section 130.1(b): An area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps.

EXCEPTION 2 to Section 130.1(b): Restrooms.

EXCEPTION 3 to Section 130.1(b): Healthcare facilities.

Recommend change:

Multi-Level Lighting Controls. The general lighting of any enclosed area ~~100 square feet or larger with a connected lighting load that exceeds 0.5 watts per square foot~~ shall provide multi-level lighting controls that allow the level of lighting to be adjusted up and down. The multi-level controls shall provide the number of control steps and meet the uniformity requirements specified in TABLE 130.1-A.

EXCEPTION 1 to Section 130.1(b): An area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps.

EXCEPTION 2 to Section 130.1(b): Restrooms.

EXCEPTION 3 to Section 130.1(b): Healthcare facilities.

EXCEPTION 4 to section 130.1(b): Enclosed area that is 100 square feet or less

EXCEPTION 5 to section 130.1(b): Enclosed area with a connected lighting load that is 0.5 watts per square foot or less.

Note: There are exceptions to Table 130.1-A.

**130.1(d)(3)(B)**

Current:

For each space, ensure the combined illuminance from the controlled lighting and daylight is not less than the illuminance from controlled lighting when no daylight is available

Recommend change:

For each space, ensure the combined illuminance from the controlled lighting and daylight when daylight is 60-95% of the illuminance when no daylight is available, is not less than the illuminance from controlled lighting when no daylight is available.

**130.1(d)(2)**

Current:

The automatic daylighting controls shall provide separate control for luminaires in each type of daylit zone. Luminaires that fall in both a skylit and sidelit daylit zone shall be controlled as part of the skylit zone.

Recommended change:

The automatic daylighting controls shall provide separate control for luminaires in each type of daylit zone. One automatic daylighting control may control more than one zone if each zone is controlled able to be controlled independently. Luminaires that fall in both a skylit and sidelit daylit zone shall be controlled as part of the skylit zone.

**Code, Testing Forms and NAs:**

**Problem:** Testing forms and Codes do not always align with each other.

Example:

Section 110.12(c)(1) States "For compliance testing, the lighting controls shall demonstrate a lighting power reduction in controlled spaces of a minimum of **15 percent** below the total installed lighting power. The controls may provide additional demand responsive functions or abilities."

and

NRCA-LTI-04-A (B-1) (step 2)(j) states "The combined electric light and daylight illuminance is not reduced to less than **50%** of the design illuminance in the tested space."

and

NA7.6.3.1 (Method 1) (b)(5) states "Calculate the area-weighted average reduction in illuminance in the demand response condition, compared with the full output condition. The area-weighted reduction must be at least **15%** but must not reduce the combined illuminance from electric light and daylight to less than **50%** of the design illuminance in any individual space."

Even the 50% reduction is in both the Test forms and Reference appendices, it's never mentioned in the code.

Possible solution:

To Section 110.12, add "For compliance testing, the lighting controls shall demonstrate a lighting power reduction in controlled spaces of a minimum of **15 percent** below the total installed lighting power. The combined electric light and daylight illuminance is not reduced to less than **50%** of the design illuminance in any single space. The controls may provide additional demand responsive functions or abilities."

Example 2:

In the NRCA-LTI-02-A form and in the Reference appendices NA7.6.2.2 the requirement to install an Occupancy sensor no closer than 4 feet from a HVAC diffuser are mentioned. This is never mentioned in Section 130.1(c) of the building energy efficiency standards.

Recommend change:

Have this added to Section 130.1(c) and add that lights controlled by an occupancy sensor must turn off/reduce the lights within a maximum of 20 minutes from start of an unoccupied condition to section 130.1(c). This is where most people will look for these requirements first.

**NRCA-LTI-02-A(A-1)(f)**

Current:

Override switches remote from area with controlled luminaires have annunciator lights. (NA7.6.2.4(f), §130.1(c)3A, §130.1(a)) OR The manual override switch is exempt from being in the same enclosed area with the lighting it controls. (EXCEPTION 1 to §130.1(a)2).

Problem: Section 130.1(a) does not specify that remote switches have to have annunciator lights.

The code states …. the manual area control may instead be located so that a person using the control can see the lights or area controlled by that control, or visually signal or display the current state of the controlled lighting.

Recommended change:

Override switches remote from area with controlled luminaires ~~have annunciator lights.~~ allow the user to see the lights they are controlling or have a visually signal or display showing the current start of the controlled lighting.

**NRCA-LTI-02(A-2) (b)**

Current:

Occupant sensors are located no closer than four (4) feet from any HVAC diffuser.

Recommended change:

Occupant sensors are located no closer than four (4) feet from any HVAC diffuser or installed in accordance manufacturer instructions, whichever is more stringent.

This would help line up with Section 130.0(d) with states "All lighting controls and equipment shall comply with the applicable requirements in Sections 110.9, 130.1 and 130.2, and shall be installed in accordance with any applicable manufacturer instructions."

**130.1(c)(1)(A) and NRCA-LTI-02-A**

Problem: Section 130.1(c)(1)(A) states "Shall be controlled with an occupant sensing control, automatic time-switch control, or other control capable of automatically shutting OFF all of the lighting when the space is typically unoccupied; and"

There is no test for other control on the NRCA-LTI-02-A only a test for automatic time-switch and occupant sensing device.

Recommended:

Needs to be discussed further. Possibly add additional test.

**130.1(c)(3)**

Current:

If an automatic time-switch control, other than an occupant sensing control, is installed to comply with Section 130.1(c)1, it shall incorporate a manual override lighting control that:

Recommended:

If an automatic time-switch control~~, other than an occupant sensing control,~~ is installed to comply with Section 130.1(c)1, it shall incorporate a manual override lighting control that:

**130.1(c)(4)**

Current:

If an automatic time-switch control, other than an occupant sensing control, is installed to comply with Section 130.1(c)1, it shall incorporate an automatic holiday "shut-OFF" feature that turns OFF all loads for at least 24 hours, and then resumes the normally scheduled operation.

Recommended:

If an automatic time-switch control~~, other than an occupant sensing control,~~ is installed to comply with Section 130.1(c)1, it shall incorporate an automatic holiday "shut-OFF" feature that turns OFF all loads for at least 24 hours, and then resumes the normally scheduled operation.

**130.1(c)5**

Current:

In areas not required by Section 130.1(b) to have multi-level lighting controls, the occupant sensing controls shall function either as a:

A. Occupant Sensor; or

Recommended:

In areas not required by Section 130.1(b) to have multi-level lighting controls, the occupant sensing controls shall function either as a:

A. Occupant Sensor that may automatically turn on 100% of controlled lighting power; or use other terminology like Full-ON. There is confusion when the term Occupancy Sensor is used as a device and a programming method.

**130.1(c)(7)(A)**

Current:

Areas where partial OFF occupant sensing controls are required. Lighting installed in the following areas shall meet the following requirements instead of complying with Section 130.1(c)1.

A. Lighting in stairwells and common area corridors that provide access to guestrooms and dwelling units of high-rise residential buildings and hotel/motels shall be controlled with occupant sensing controls that automatically reduce lighting power by at least 50 percent when the areas are unoccupied. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

Using "at least" means that you can go beyond the 50% reduction all the way down to 100% if you wanted. But I don't believe this is correct since section 130.1(c)(6) states "Areas where full or partial OFF occupant sensing controls are required."

**130.1(d)3(C)**

Current:

C. For areas other than parking garages, ensure that when the daylight illuminance is greater than 150 percent of the design illuminance received from the general lighting system at full power, the general lighting power in that daylight zone shall be reduced by a minimum of 65 percent; and

D. For parking garages, ensure that when illuminance levels measured at the farthest edge of the secondary sidelit zone away from the glazing or opening are greater than 150 percent of the illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power consumption is zero.

Both should say the state the same intent. Both should state "150 percent of the illuminance provided by the controlled lighting when no daylight is available."

**130.1(d)3(D)**

Current:

D. For parking garages, ensure that when illuminance levels measured at the farthest edge of the secondary sidelit zone away from the glazing or opening are greater than 150 percent of the illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power consumption is zero.

Recommended change:

D. For parking garages, ensure that when daylight illuminance levels measured at the farthest edge of the secondary sidelit zone away from the glazing or opening are greater than 150 percent of the illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power ~~consumption is zero.~~ in the combined daylight zones shall be reduced by 100%.

**130.2(c)2**

Current:

2. Automatic Scheduling Controls.

A. Automatic scheduling controls shall be capable of reducing the outdoor lighting power by at least 50 percent and no more than 90 percent, and separately capable of turning the lighting OFF, during scheduled unoccupied periods.

B. Automatic scheduling controls shall allow scheduling of a minimum of two nighttime periods with independent lighting levels, and may include an override function that turns lighting ON during its scheduled dim or OFF state for no more than two hours when an override is initiated.

C. Acceptance tests of outdoor lighting controls shall verify the scheduled occupied and unoccupied periods, as specified in Section 130.4(a)6.

D. Automatic scheduling controls shall be installed for all outdoor lighting, and may be installed in combination with motion sensing controls or other outdoor lighting controls.

Recommended change:

2. Automatic Scheduling Controls.

A. Automatic scheduling controls shall be installed for all outdoor lighting and may be installed in combination with motion sensing controls or other outdoor lighting controls.

~~A~~B. Automatic scheduling controls shall be capable of reducing the outdoor lighting power by at least 50 percent and no more than 90 percent, and separately capable of turning the lighting OFF, during scheduled unoccupied periods.

~~B~~C. Automatic scheduling controls shall allow scheduling of a minimum of two nighttime periods with independent lighting levels and may include an override function that turns lighting ON during its scheduled dim or OFF state for no more than two hours when an override is initiated.

~~C~~D. Acceptance tests of outdoor lighting controls shall verify the scheduled occupied and unoccupied periods, as specified in Section 130.4(a)6.

~~D. Automatic scheduling controls shall be installed for all outdoor lighting, and may be installed in combination with motion sensing controls or other outdoor lighting controls.~~

**130.2(c)(3)**

Current:

3. Motion Sensing Controls.

A. Motion sensing controls shall be capable of reducing the outdoor lighting power of each controlled luminaire by at least 50 percent and no more than 90 percent, and separately capable of turning the luminaire OFF, during unoccupied periods.

B. Motion sensing controls shall be capable of reducing the lighting to its dim or OFF state no longer than 15 minutes after the area has been vacated, and of returning the lighting to its ON state when the area becomes occupied.

C. No more than 1,500 watts of lighting power shall be controlled by a single sensor.

D. Motion sensing controls shall be installed for the following luminaires, and may be installed for other outdoor lighting and in combination with other outdoor lighting controls:

Recommended change:

3. Motion Sensing Controls.

A. Motion sensing controls shall be installed for the following luminaires, and may be installed for other outdoor lighting and in combination with other outdoor lighting controls:

~~A~~B. Motion sensing controls shall be capable of reducing the outdoor lighting power of each controlled luminaire by at least 50 percent and no more than 90 percent, and separately capable of turning the luminaire OFF, during unoccupied periods.

~~B~~C. Motion sensing controls shall be capable of reducing the lighting to its dim or OFF state no longer than 15 minutes after the area has been vacated, and of returning the lighting to its ON state when the area becomes occupied.

~~C~~D. No more than 1,500 watts of lighting power shall be controlled by a single sensor.

~~D. Motion sensing controls shall be installed for the following luminaires, and may be installed for other outdoor lighting and in combination with other outdoor lighting controls:~~

**Section 130.1(c) Exception 2**

Move: Exception 2 to Section 130.1(c) from the end of this section to the right after Exception to Section 130.1(c): Healthcare.

The placement of it right now can easily be confused with it only being an exception to section 130.1(c)(8). Makes more sense to have it come after the first exception at the beginning.

**110.12(c)**

Current:

Lighting controls in nonresidential buildings larger than 10,000 square feet shall be capable of automatically reducing lighting power in response to a Demand Response Signal. General lighting shall be reduced in a manner consistent with the uniform level of illumination requirements in TABLE 130.1-A.

Recommend Change:

Lighting controls in nonresidential ~~buildings~~ projects larger than 10,000 square feet shall be capable of automatically reducing lighting power in response to a Demand Response Signal. General lighting shall be reduced in a manner consistent with the uniform level of illumination requirements in TABLE 130.1-A.

Square feet are determined by $ft^2$ of the permitted project, not the size of the building. This becomes confusing on alteration projects <10K $ft^2$ in a building >10K $ft^2$.