INSTALLER AND INSPECTOR QUICK-REFERENCE: 2022 NRCA-LTI-03-A Automatic Daylighting Control

Purpose and Scope of the Test

The purpose of this test is to ensure automatic daylighting controls are installed and functioning as required by the Energy Code.
Automatic daylighting controls save energy only if they are functioning correctly. Controls passing the test automatically adjust electric lighting power in response to available daylighting in the space. If the control leaves the space too dark, visual quality is compromised and ultimately the control will be over-ridden resulting in no energy savings. If the control leaves lighting on at too high a level, the full savings from the control are not realized.

Test Trigger

This test is required when automatic daylighting controls are installed in nonresidential and hotel/motel buildings, and in multifamily building common areas. General lighting within a daylit zone must be controlled by automatic daylighting controls.
Automatic daylighting controls are required if the combined total installed power of general lighting in a rooms skylit and primary sidelit daylit zones is at least 120 watts and if the room has at least 24 square feet of glazing.
Automatic daylighting controls are required in parking garages if the total installed power of general lighting in the combined primary and secondary sidelit daylit zone is at least 60 watts and if the parking garage has at least 36 square feet of glazing or opening.
The lighting must have multiple stages of control that meet the uniformity requirements of Table 130.1-A and §130.1(d)3A for nonresidential buildings and Table 160.5-B and section 160.5(b)4Diiia for multifamily common areas.
See sections 130.1(d) and 160.5(b)4D for exceptions to automatic daylighting control requirements.

Relevant Energy Code References and Required Compliance Documents

Title 24, Part 6 of the California Building Code, Building Energy Efficiency Standards (Energy Code) sections 130.1(d), 130.4(a), 160.5(b)4D, and 160.5(e)1; NA7.6.1; NRCC-LTI-E, LMCC-LTI-E.

Who Can Perform the Test

This test must be performed by an acceptance test technician certified by a CEC-approved Acceptance Test Technician Certification Provider, using compliance document NRCA-LTI-03-A.

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Required Tools

To perform the test, it will be necessary to measure ambient light levels and validate overall power reduction. In most cases, the only instrumentation required is a light meter (illuminance or foot-candle meter).
The tester can choose to directly measure power or current or use the manufacturer's dimming performance data. In this case, the following additional instrumentation or data may be needed:

- Hand-held amperage meter or power meter.
- Logging light meter or power meter.
- Manufacturer's lighting efficacy curve for continuous dimming and step dimming ballasts.

Estimated Time to Complete Test

Construction Inspection: 0.5 to 1 hours, depending on whether sensor calibration is necessary, familiarity with lighting control programming, and availability of construction documentation – i.e., electrical drawings, material cut sheets, etc.
Functional Testing: 1 to 3 hours, depending on ability to manipulate ambient light levels, familiarity with lighting control programming language, and method employed for verifying required power reduction

Potential Issues and Cautions

The test should be performed under natural bright light conditions when possible. Natural bright conditions may also be simulated by shining a light into the photosensor.
For the no-daylight test, it may be necessary to conduct the test when daylight is not present, or cover fenestration to prevent daylight from entering the space.

Inspection Enforcement

- Verify that the construction inspection and functional testing items on NRCA-LTI-03-A are marked with "Complies."
- Verify the contact information of the acceptance test technician is complete with the acceptance test technician certification identification.
- Verify that all declaration statements on the last page of the NRCA-LTI-03-A are complete and that the document is signed.

Acceptance Criteria

All daylit zones are shown on the plans.
Automatic daylighting controls provide separate control of general lighting in each type of daylit zone and separately from lighting outside the daylit zone.
In parking garages, automatic daylighting controls provide control of general lighting in the combined primary sidelit and secondary sidelit daylit zone and separately from lighting outside the daylit zone.

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Acceptance Criteria (cont.)

Photosensors are located so that they are not readily accessible to unauthorized personnel. "Readily accessible" is defined as capable of being reached quickly for operation, repair or inspection, without requiring climbing or removing obstacles, or resorting to access equipment.

The location where calibration adjustments are made to automatic daylighting controls is readily accessible to authorized personnel. This could be inside a locked case or under a cover which requires a tool for access.

Automatic daylighting controls provide multi-level control capability following the requirements in Table 130.1-A or Table 160.5-B.

Luminaires do not produce visible flicker at reduced light output.

Under partial daylight conditions:

- The combined daylight and electric lighting illuminance at the reference location is no less than the reference illuminance and no greater than 150 percent of the reference illuminance.
- Reference location is the task location that receives the least amount of daylight in a daylit zone. Usually this is a location that is furthest away from the windows or skylights but is still served by the controlled lighting equipment.
- Reference illuminance is the illuminance from electric lighting when no daylight is available at the reference location.

Under no daylight conditions:

- The control system increases the light output of each fixture to the design light output. This may be full output, but in a space with institutional tuning controls, this could be commissioned to meet the design illuminance requirements.

Under full daylight conditions when daylight illuminance is greater than 150 percent of the reference illuminance:

- Lighting power of controlled luminaires is reduced by a minimum of 90 percent.
- For parking garages, lighting power of controlled luminaires is zero.

Follow the **Construction Inspection** and **Functional Testing** instruction on NRCA-LTI-03-A.