

- (f) Actual condenser water supply temperature increases to meet the new setpoint within $\pm 2^{\circ}\text{F}$.
- (g) Cooling tower fan(s) stage properly and/or adjust speed accordingly to meet the lower setpoint.
- (h) Chiller load amperage increase.

Step 3: Restore reset control parameter to automatic control. Verify and document the following:

- (i) Condenser water supply temperature controls modulate as intended.
- (j) Actual condenser water supply temperature changes to meet the new setpoint.
- (k) Cooling tower fan(s) and chiller(s) stage properly and/or adjust speed accordingly to return to normal operation and meet the setpoint.

NA7.6 Lighting Control Acceptance Requirements

Lighting control acceptance testing shall be performed on:

- (a) Automatic Daylighting Controls complying with Section 130.1(d)
- (b) Shut-off Controls complying with Section 130.1(c)
- (c) Demand Responsive Controls in accordance with Section 130.1(e).

NA7.6.1 Acceptance tests for Automatic Daylighting Controls complying with Section 130.1(d)

NA 7.6.1.1 Construction Inspection

Verify that automatic daylighting controls qualify as one of the required control types, are installed, and fully functional in accordance with each applicable requirement in Section 130.1(d), and list each specific exception claimed, from Section 130.1(d).

NA 7.6.1.2 Functional testing

All photocontrols serving more than 5,000 ft² of daylit area shall undergo functional testing. Photocontrols that are serving smaller spaces may be sampled as follows:

For buildings with up to five (5) photocontrols, all photocontrols shall be tested. For buildings with more than five (5) photocontrols, sampling may be done on spaces with similar sensors and cardinal orientations of glazing. If the first photocontrol in the sample group passes the functional test, the remaining building spaces in the sample group also pass. If the first photocontrol in the sample group fails the functional test, the rest of the photocontrols in the group shall be tested. If any tested photocontrol fails the functional test, it shall be repaired, replaced or adjusted until it passes the test.

For each photocontrol to be tested do the following:

- (a) Test each group of lights controlled separately by the photocontrol according to the following protocol. In all interior spaces other than parking garages, a separate test shall be conducted for daylighting control of the primary sidelit zone separate from the secondary sidelit zone.

NA 7.6.1.2.1 Continuous Dimming Control Systems

This requirement is for systems that have more than 10 levels of controlled light output in a given zone.

- (a) Identify the minimum daylighting location in the controlled zone (Reference Location). This can be identified using either the illuminance method or the distance method.

Illuminance Method

- (b) Turn OFF controlled lighting and measure daylight illuminance within zones illuminated by controlled luminaires.
- (c) Identify the Reference Location; this is the task location with lowest daylight illuminance in the zone illuminated by controlled luminaires. This location will be used for illuminance measurements in subsequent tests.

Distance Method

Identify the task location within the zone illuminated by controlled luminaires that is farthest away from daylight sources. This is the Reference Location and will be used for illuminance measurements in subsequent tests.

- (d) No daylight test. Simulate or provide conditions without daylight. Verify and document the following:
 - 1. Automatic daylight control system provides appropriate control so that electric lighting system is providing full light output unless otherwise specified by design documents.
 - 2. Document the reference illuminance, which is the electric lighting illuminance level at the reference location identified in Step 1.
 - 3. Light output is stable with no discernable flicker.
- (e) Full daylight test. Simulate or provide bright conditions. Verify and document the following:
 - 1. Lighting power reduction is at least 65 percent under fully dimmed conditions and light output is stable with no discernable flicker.
 - 2. Only luminaires in daylit zones are affected by daylight control. . If the daylighting controls control lighting outside of the daylight zones including those behind obstructions as described in Section 130.1(d)1, the control system is not compliant
- (f) Partial daylight test. Simulate or provide daylight conditions where illuminance (fc) from daylight only at the Reference Location is between 60 and 95 percent of Reference Illuminance (fc) documented in Step 2. Verify and document the following:
 - 1. Measure that the combined illuminance of daylight and controlled electric lighting (fc) at the reference location is no less than the electric lighting illuminance (fc) at this location during the no daylight test documented in Step 2.
 - 2. Measure that the combined illuminance of daylight and controlled electric lighting (fc) at the Reference Location is no greater than 150 percent of the reference illuminance (fc) documented in Step 2.
 - 3. Light output is stable with no discernable flicker.

NA 7.6.1.2.2 Stepped Switching or Stepped Dimming Control Systems

This requirement is for systems that have no more than 10 discrete steps of control of light output.

If the control has 3 steps of control or less, conduct the following tests for all steps of control. If the control has more than 3 steps of control, testing 3 steps of control is sufficient for showing compliance.

- (a) Identify the minimum daylighting location(s) in the controlled zone. (Reference Location). This can be identified using either the illuminance method or the distance method.

Illuminance Method

- 1. Turn OFF controlled lighting and measure daylight illuminances within a zone illuminated by controlled luminaires.
- 2. Identify the reference location; this is the task location with lowest daylight illuminance in the zone illuminated by controlled luminaires. This location will be used for illuminance measurements in subsequent tests.

3. Turn controlled lights back ON.

Distance Method

1. Identify the task location within the zone illuminated by controlled luminaires that is farthest away from daylight sources. This is the reference location and will be used for illuminance measurements in subsequent tests.
- (b) No daylight test. Simulate or provide conditions without daylight for a stepped switching or stepped dimming control system. Verify and document the following:
1. If the control is manually adjusted (not self commissioning), make note of the time delay and override time delay or set time delay to minimum setting. This condition shall be in effect through step 4.
 2. Automatic daylight control system turns ON all stages of controlled lights unless it is documented that multi-level luminaires have been "tuned" to less than full output and providing design illuminance (fc) levels
 3. Stepped dimming control system provides reduced flicker over the entire operating range per §110.9.
 4. Document the reference illuminance which is the electric lighting illuminance level measured at the reference location identified in Step 1.
- (c) Full daylight test. Simulate or provide bright conditions. Verify and document the following:
1. Lighting power reduction of controlled luminaires is at least 65 percent
 2. Only luminaires in daylit zones (toplit zone, primary sidelit zone and secondary sidelit zone) are affected by daylight control. If the daylighting controls control lighting outside of the daylight zones including those behind obstructions as described in Section 130.1(d)1, the control system is not compliant.
- (d) Partial daylight test. For each control stage that is tested in this step, the control stages with lower setpoints than the stage tested are left ON and those stages of control with higher setpoints are dimmed or controlled off. Simulate or provide conditions so that each control stage turns on and off or dims. Verify and document the following for each control stage:
1. Document the total daylight and electric lighting illuminance level measured at its reference location just after the stage of control dims or shuts off a stage of lighting:
 - A. The total measured illumination shall be no less than the reference illuminance measured at this location during the no daylight test documented in Step 2.
 - B. The total measured illumination shall be no greater than 150 percent of the reference illuminance.
 2. The control stage shall not cycle on and off or cycle between dim and undimmed while daylight illuminance remains constant.
 3. Only luminaires in daylit zones (toplit zone, primary sidelit zone, and secondary sidelit zone) are affected by daylight control.
- (e) Verify time delay.
1. Verify that time delay automatically resets to normal mode within 60 minutes.
 2. Set normal mode time delay to at least three minutes.
 3. Confirm that there is a time delay of at least 3 minutes between the time when illuminance exceeds the setpoint for a given dimming stage and when the control dims or switches off the controlled lights.