

TABLE 141.0-E Requirements for Luminaire Alterations

Quantity of existing affected luminaires per Enclosed Space ¹	Resulting Lighting Power for Each Enclosed Space	Applicable Mandatory Control Provisions for Each Enclosed Space	Multi-level Lighting Control Requirements for Each Altered Luminaire
Alterations that do not change the area of the enclosed space or the space type			
Sum total < 10% of existing luminaires	Existing lighting power is permitted	Existing provisions are permitted	Existing controls are permitted
Sum total ≥ 10% of existing luminaires	≤ 85% of allowed lighting power per Section 140.6 Area Category Method	§130.1(a), (c)	Two level lighting control ² or §130.1(b)
	> 85% of allowed lighting power per Section 140.6 Area Category Method	§130.1(a), (c), (d) ³	§130.1(b)
Alterations that change the area of the enclosed space or the space type or increase the lighting power in the enclosed space			
Any number	Comply with Section 140.6 <i>Prescriptive Req.</i>	§130.0(d) ³ §130.1(a), (c), (d) ³ , (e)	§130.1(b)
¹ Affected luminaires include any luminaire that is changed, replaced, removed, relocated, or, connected to, altered or revised wiring, except as permitted by EXCEPTIONS 1 and 2 to Section 141.0(b)2iii: ² Two level lighting control shall have at least one control step between 30 percent and 70 percent of design lighting power in a manner providing reasonably uniform illuminations ³ Daylight controls in accordance with Section 130.0(d) are required only for luminaires that are altered.			

*30.0(d) Lighting Controls. All lighting controls and equipment shall comply w/ applicable requirements in Section 140.9 and shall be installed per manuf. Specs
Mandatory Req.*

TABLE 141.0-F Requirements for Luminaire Modifications-in-Place

For compliance with this Table, building space is defined as any of the following:

1. A complete single story building
2. A complete floor of a multifloor building
3. The entire space in a building of a single tenant under a single lease
4. All of the common, not leasable space in single building

Quantity of affected luminaires per Building Space per annum	Resulting Lighting Power per Each Enclosed Space Where ≥ 10% of Existing Luminaires are Luminaire Modifications-in-Place	Applicable mandatory control provisions for each enclosed space ¹	Applicable multi-level lighting control requirements for each modified luminaire ²
Sum total < 40 Luminaire Modifications-in-Place	Existing lighting power is permitted	Existing provisions are permitted	Existing controls are permitted
Sum total ≥ 40 Luminaire Modifications-in-Place	≤ 85% of allowed lighting power per Section 140.6 Area Category Method	§130.1(a), (c)	Two level lighting control ³ Or §130.1(b)
	> 85% of allowed lighting power per Section 140.6 Area Category Method	§130.0(d) ⁴ §130.1(a), (c), (d) ⁴	§130.1(b)
¹ Control requirements only apply to enclosed spaces for which there are Luminaire Modifications-in-Place. ² Multi-level controls are required only for luminaires for which there are Luminaire Modifications-in-Place. ³ Two level lighting control shall have at least one control step between 30 percent and 70 percent of design lighting power in a manner providing reasonably uniform illuminations. ⁴ Daylight controls in accordance with Section 130.0(d) are required only for luminaires that are modified-in-place.			

SECTION 141.1 – REQUIREMENTS FOR COVERED PROCESSES IN ADDITIONS, ALTERATIONS TO EXISTING BUILDINGS THAT WILL BE NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES

TABLE 140.6-B COMPLETE BUILDING METHOD LIGHTING POWER DENSITY VALUES

TYPE OF BUILDING	ALLOWED LIGHTING POWER DENSITY (WATTS PER SQUARE FOOT)
Auditorium Building	1.5
Classroom Building	1.1
Commercial and Industrial Storage Building	0.6
Convention Center Building	1.2
Financial Institution Building	1.1
General Commercial Building/Industrial Work Building	1.0
Grocery Store Building	1.5
Library Building	1.3
Medical Building/Clinic Building	1.1
Office Building	0.8
Parking Garage Building	0.2
Religious Facility Building	1.6
Restaurant Building	1.2
School Building	1.0
Theater Building	1.3
All others buildings	0.6

TABLE 140.6-C AREA CATEGORY METHOD - LIGHTING POWER DENSITY VALUES (WATTS/FT²)

PRIMARY FUNCTION AREA		ALLOWED LIGHTING POWER (W/ft ²)	PRIMARY FUNCTION AREA		ALLOWED LIGHTING POWER (W/ft ²)
Auditorium Area		1.5 ³	Library Area	Reading areas	1.2 ³
Auto Repair Area		0.9 ²		Stack areas	1.5 ³
Beauty Salon Area		1.7	Lobby Area	Hotel lobby	1.1 ³
Civic Meeting Place Area		1.3 ³		Main entry lobby	1.5 ³
Classroom, Lecture, Training, Vocational Areas		1.2 ⁵	Locker/Dressing Room		0.8
Commercial and Industrial Storage Areas (conditioned and unconditioned)		0.6	Lounge Area		1.1 ³
Commercial and Industrial Storage Areas (refrigerated)		0.7	Malls and Atria		1.2 ³
Convention, Conference, Multipurpose and Meeting Center Areas		1.4 ³	Medical and Clinical Care Area		1.2
Corridor, Restroom, Stair, and Support Areas		0.6	Office Area	> 250 square feet	0.75
Dining Area		1.1 ³		≤ 250 square feet	1.0
Electrical, Mechanical, Telephone Rooms		0.7 ²	Parking Garage Area	Parking Area	0.14
Exercise Center, Gymnasium Areas		1.0		Dedicated Ramps	0.3
Exhibit, Museum Areas		2.0		Daylight Adaptation Zones ⁹	0.6
Financial Transaction Area		1.2 ³	Religious Worship Area		1.5 ³
General Commercial and Industrial Work Areas	Low bay	0.9 ²	Retail Merchandise Sales, Wholesale Showroom Areas		1.2 ^{6 and 7}
	High bay	1.0 ²			
	Precision	1.2 ⁴	Theater Area	Motion picture	0.9 ³
Grocery Sales Area		1.2 ^{6 and 7}		Performance	1.4 ³

SECTION 140.6 – PRESCRIPTIVE REQUIREMENTS FOR INDOOR LIGHTING

SECTION 110.9 – MANDATORY REQUIREMENTS FOR LIGHTING CONTROL DEVICES AND SYSTEMS, BALLASTS, AND LUMINAIRES

- (a) All lighting control devices and systems, ballasts, and luminaires subject to the requirements of Section 110.9 shall meet the following requirements:
1. Shall be installed only if the lighting control device or system, ballast, or luminaire complies with all of the applicable requirements of Section 110.9.
 2. Lighting controls may be individual devices (Self Contained Lighting Control) or systems (Lighting Control Systems) consisting of two or more components.
 3. Self Contained Lighting Controls, as defined in Section 100.1, shall be certified by the Manufacturer as required by the Title 20 Appliance Efficiency Regulations.
 4. Lighting Control Systems, as defined in Section 100.1, shall be a fully functional lighting control system complying with the applicable requirements in Section 110.9(b), and shall meet the Lighting Control Installation requirements in Section 130.4.
 5. If indicator lights are integral to a lighting control system, they shall consume no more than one watt of power per indicator light.
- (b) **All Installed Lighting Control Systems** listed in Section 110.9(b) shall comply with the requirements listed below; and all components of the system considered together as installed shall meet all applicable requirements for the application for which they are installed as required in Sections 130.0 through 130.5, Sections 140.6 through 140.8, Section 141.0, and Section 150.0(k).
1. **Time-Switch Lighting Controls**
 - A. **Automatic Time-Switch Controls** shall meet all requirements for Automatic Time Switch Control devices in the Title 20 Appliance Efficiency Regulations.
 - B. **Astronomical Time-Switch Controls** shall meet all requirements for Astronomical Time-Switch Control devices in the Title 20 Appliance Efficiency Regulations.
 - C. **Multi-Level Astronomical Time-Switch Controls**, in addition to meeting all of the requirements for Astronomical Time-Switch Controls, shall include at least 2 separately programmable steps per zone.
 - D. **Outdoor Astronomical Time-Switch Controls**, in addition to meeting all of the requirements for Astronomical Time-Switch Controls, shall have setback functions that allow the lighting on each controlled channel to be switched or dimmed to lower levels. The set back functions shall be capable of being programmed by the user for at least one specific time of day.
 2. **Daylighting Controls**
 - A. **Automatic Daylight Controls** shall meet all requirements for Automatic Daylight Control devices in the Title 20 Appliance Efficiency Regulations.
 - B. **Photo Controls** shall meet all requirements for Photo Control devices in the Title 20 Appliance Efficiency Regulations.
 3. **Dimmers** shall meet all requirements for Dimmer Control devices in the Title 20 Appliance Efficiency Regulations.
 4. **Occupant Sensing Controls: Occupant, Motion, and Vacancy Sensor Controls** shall meet the following requirements:
 - A. **Occupant Sensors** shall meet all applicable requirements for Occupant Sensor Control devices in the Title 20 Appliance Efficiency Regulations.

- B. **Motion Sensors** shall meet all applicable requirements for Motion Sensor Controls devices in the Title 20 Appliance Efficiency Regulations.
- C. **Vacancy Sensors** shall meet all applicable requirements for Vacancy Sensor Controls devices in the Title 20 Appliance Efficiency Regulations.
- D. **Partial-ON Sensors** shall meet all applicable requirements for partial on sensing devices in the Title 20 Appliance Efficiency Regulations.
- E. **Partial-OFF Sensors** shall meet all applicable requirements for partial off sensing devices in the Title 20 Appliance Efficiency Regulations.

EXCEPTION to Section 110.9(b)4: Occupant Sensing Control systems may consist of a combination of single or multi-level Occupant, Motion, or Vacancy Sensor Controls, provided that components installed to comply with manual-on requirements shall not be capable of conversion by the user from manual-on to automatic-on functionality.

- 5. **Part-Night Outdoor Lighting Controls**, as defined in Section 100.1, shall meet all of the following requirements:
 - A. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within five minutes per year; and
 - B. Have the ability to setback or turn off lighting at night as required in Section 130.2(c), by means of a programmable timeclock or motion sensing device; and
 - C. When controlled with a timeclock, shall be capable of being programmed to allow the setback or turning off of the lighting to occur from any time at night until any time in the morning, as determined by the user.
- (c) **Track Lighting Integral Current Limiter.** An integral current limiter for line-voltage track lighting shall be recognized for compliance with Part 6 only if it meets all of the following requirements:
 - 1. Shall be certified to the Energy Commission as meeting all of the applicable requirements in Section 110.9(c); and
 - 2. Shall comply with the Lighting Control Installation requirements in accordance with Section 130.4; and
 - 3. Shall be manufactured so that the current limiter housing is used exclusively on the same manufacturer's track for which it is designed; and
 - 4. Shall be designed so that the current limiter housing is permanently attached to the track so that the system will be irreparably damaged if the current limiter housing were to be removed after installation into the track. Methods of attachment may include but are not limited to one-way barbs, rivets, and one-way screws; and
 - 5. Shall employ tamper resistant fasteners for the cover to the wiring compartment; and
 - 6. Shall have the identical volt-ampere (VA) rating of the current limiter, as installed and rated for compliance with Part 6 clearly marked as follows; and:
 - A. So that it is visible for the building officials' field inspection without opening coverplates, fixtures, or panels; and
 - B. Permanently marked on the circuit breaker; and
 - C. On a factory-printed label that is permanently affixed to a non-removable base-plate inside the wiring compartment.
 - 7. Shall have a conspicuous factory installed label permanently affixed to the inside of the wiring compartment warning against removing, tampering with, rewiring, or bypassing the device; and
 - 8. Each electrical panel from which track lighting integral current limiters are energized shall have a factory printed label permanently affixed and prominently located, stating the following: "NOTICE: Current limiting devices installed in track lighting integral current limiters connected to this panel shall only be replaced with the same or lower amperage. Adding track or replacement of existing current limiters with

higher continuous ampere rating will void the track lighting integral current limiter certification, and will require re-submittal of compliance documentation to the enforcement agency responsible for compliance with the California Title 24, Part 6 Building Energy Efficiency Standards.”

- (d) **Track Lighting Supplementary Overcurrent Protection Panel.** A Track Lighting Supplementary Overcurrent Protection Panel shall be used only for line-voltage track lighting and shall be recognized for compliance with Part 6 only if it meets all of the following requirements:
1. Shall comply with the Lighting Control Installation requirements in accordance with Section 130.4; and
 2. Shall be listed as defined in Section 100.1; and
 3. Shall be used only for line voltage track lighting. No other lighting or building power shall be used in a Supplementary Overcurrent Protection Panel used to determine input wattage for track lighting; and
 4. Be permanently installed in an electrical equipment room, or permanently installed adjacent to the lighting panel board providing supplementary overcurrent protection for the track lighting circuits served by the supplementary over current protection pane; and
 5. Shall have a permanently installed label that is prominently located stating the following: "NOTICE: This Panel for Track Lighting Energy Code Compliance Only. The overcurrent protection devices in this panel shall only be replaced with the same or lower amperage. No other overcurrent protective device shall be added to this panel. Adding to, or replacement of existing overcurrent protective device(s) with higher continuous ampere rating, will void the panel listing and require re-submittal of compliance documentation to the enforcement agency responsible for compliance with the California Title 24, Part 6 Building Energy Efficiency Standards.”
- (e) **Residential High Efficacy Light Emitting Diode (LED) Lighting.** To qualify as high efficacy for compliance with the residential lighting Standards in Section 150.0(k), a residential LED luminaire or LED light engine shall be certified to the Energy Commission according to Reference Joint Appendix JA-8. LED lighting not certified to the Energy Commission shall be classified as low efficacy for compliance with Section 150.0(k). Nonresidential LED lighting is not required to be certified to the Energy Commission.
- (f) **Ballasts for Residential Recessed Luminaires.** To qualify as high efficacy for compliance with Section 150.0(k), any compact fluorescent lamp ballast in a residential recessed luminaire shall meet all of the following conditions:
1. Be rated by the ballast manufacturer to have a minimum rated life of 30,000 hours when operated at or below a specified maximum case temperature. This maximum ballast case temperature specified by the ballast manufacturer shall not be exceeded when tested in accordance to UL 1598 Section 19.15; and
 2. Have a ballast factor of not less than 0.90 for non-dimming ballasts and a ballast factor of not less than 0.85 for dimming ballasts.

SECTION 130.1 – INDOOR LIGHTING CONTROLS THAT SHALL BE INSTALLED**X (a) Area Controls.**

1. All luminaires shall be functionally controlled with manually switched ON and OFF lighting controls. Each area enclosed by ceiling-height partitions shall be independently controlled.

EXCEPTION to Section 130.1(a)1: Up to 0.2 watts per square foot of lighting in any area within a building may be continuously illuminated during occupied times to allow for emergency egress, if:

- A. The area is designated an emergency egress area on the plans and specifications submitted to the enforcement agency under Section 10-103(a)2 of Part 1; and
 - B. The control switches for the egress lighting are not accessible to unauthorized personnel.
2. The lighting controls shall meet the following requirements:
 - A. Be readily accessible; and
 - B. Be operated with a manual switch that is located in the same room or area with the lighting that is controlled by that lighting control; and
 - C. If controlling dimmable luminaires, be a dimmer switch that allows manual ON and OFF functionality, and is capable of manually controlling lighting through all lighting control steps that are required in Section 130.1(b).

EXCEPTION 1 to Section 130.1(a)2: In malls, auditoriums, retail and wholesale sales floors, industrial facilities, convention centers, and arenas, the lighting control shall be located so that a person using the lighting control can see the lights or area controlled by that lighting control, or so that the area being lit is annunciated.

EXCEPTION 2 to Section 130.1(a)2: Public restrooms having two or more stalls may use a manual switch not accessible to unauthorized personnel.

3. **Other Lighting Controls.**

- A. Other lighting controls may be installed in addition to the manual lighting controls provided they do not override the functionality of controls installed in accordance with Section 130.1(a)1, 2, or 4.
4. **Separately Controlled Lighting Systems.** In addition to the requirements in Section 130.1(a)1, 2, and 3:
 - A. General lighting shall be separately controlled from all other lighting systems in an area.
 - B. Floor and wall display, window display, case display, ornamental, and special effects lighting shall each be separately controlled on circuits that are 20 amps or less.
 - C. When track lighting is used, general, display, ornamental, and special effects lighting shall each be separately controlled.

- (b) 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 meet the following requirements:

1. Lighting shall have the required number of control steps and meet the uniformity requirements in accordance with TABLE 130.1-A; and
2. Multi-level lighting controls shall not override the functionality of other lighting controls required for compliance with Sections 130.1(a), and (c) through (e); and
3. Each luminaire shall be controlled by at least of one of the following methods:
 - A. Manual dimming meeting the applicable requirements of Section 130.1(a)
 - B. Lumen maintenance as defined in Section 100.1
 - C. Tuning as defined in Section 100.1

- A. For low-voltage luminaires that do not allow the addition of lamps, lamp holders, or luminaires without rewiring, the wattage shall be the rated wattage of the lamp/transformer combination.
 - B. For low-voltage lighting systems, including low voltage tracks and other low-voltage lighting systems which allow the addition of lamps, lamp holders, or luminaires without rewiring, the wattage shall be the maximum rated input wattage of the transformer, labeled in accordance with Item 1, or the maximum rated wattage published in transformer manufacturer's catalogs, as specified by UL 2108.
9. Light emitting diode (LED) Luminaires, and LED Light Engine.
- A. The wattage of such luminaires shall be the maximum rated input wattage of the system when tested in accordance with IES LM-79-08.
 - B. The maximum rated input wattage shall be labeled in accordance with Section 130.0(c)1.
 - C. An LED lamp, integrated or non-integrated type in accordance with the definition in ANSI/IES RP-16-2010, shall not be classified as a LED lighting system for compliance with Part 6. LED modules having screw-bases including screw based pig-tails, screw-based sockets, or screw-based adaptors shall not be recognized as a LED lighting system for compliance with Part 6.
 - D. Luminaires and luminaire housings equipped with screw-base sockets shall not be classified as a LED lighting system for compliance with Part 6.
 - E. Luminaires manufactured or rated for use with low-voltage incandescent lamps, into which have been installed LED modules or LED lamps, shall not be recognized as a LED lighting system for compliance with Part 6.
 - F. For LED lighting systems that allow the addition of luminaires or light engines without rewiring, the wattage of such luminaires shall be the maximum rated input wattage of the power supply, labeled in accordance with Section 130.0(c)1 or published in the power supply manufacturer's catalog.
10. The wattage of all other miscellaneous lighting equipment shall be the maximum rated wattage of the lighting equipment, or operating input wattage of the system, labeled in accordance with Section 130.0(c)1, or published in manufacturer's catalogs, based on independent testing lab reports as specified by UL 1574 or UL 1598. Lighting technologies listed in Subsections 2 through 9 shall be determined in accordance with the applicable requirements in Subsections 1 through 9.

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(d) **Lighting Controls.** All lighting controls and equipment shall comply with the applicable requirements in Section 110.9, and shall be installed in accordance with the manufacturer's instructions.

D. Automatic daylighting controls in accordance with Section 130.1(d)

E. Demand responsive lighting controls in accordance with Section 130.1(e)

EXCEPTION 1 to Section 130.1(b): Classrooms, with a connected general lighting load of 0.7 watts per square feet and less, shall have at least one control step between 30-70 percent of full rated power.

EXCEPTION 2 to Section 130.1(b): An area enclosed by ceiling height partitions that has only one luminaire with no more than two lamps.

(c) Shut-OFF Controls

1. In addition to lighting controls installed to comply with Sections 130.1(a) and (b), all installed indoor lighting shall be equipped with controls that meet the following requirements:

- A. Shall be controlled with an occupant sensing control, automatic time-switch control, signal from another building system, or other control capable of automatically shutting OFF all of the lighting when the space is typically unoccupied; and
- B. Separate-controls for the lighting on each floor; and
- C. Separate controls for a space enclosed by ceiling height partitions not exceeding 5,000 square feet; and

EXCEPTION to Section 130.1(c)1C: In the following function areas the area controlled may not exceed 20,000 square feet: Malls, auditoriums, single tenant retail, industrial, convention centers, and arenas,

D. Separate controls for general, display, ornamental, and display case lighting.

EXCEPTION 1 to Section 130.1(c)1: Where the lighting is serving an area that is in continuous use, 24 hours per day/365 days per year.

EXCEPTION 2 to Section 130.1(c)1: Lighting complying with Section 130.1(c)5, or 7.

EXCEPTION 3 to Section 130.1(c)1: In office buildings, up to 0.05 watts per square foot of lighting in any area within a building may be continuously illuminated, provided that the area is designated an emergency egress area on the plans and specifications submitted to the enforcement agency under Section 10-103(a)2 of Part 1.

EXCEPTION 4 to Section 130.1(c)1: Electrical equipment rooms subject to Article 110.26(D) of the California Electric Code.

2. Countdown timer switches shall not be used to comply with the automatic shut-OFF control requirements in Section 130.1(c)1.

EXCEPTION 1 to Section 130.1(c)2: Single-stall bathrooms less than 70 square feet, and closets less than 70 square feet may use countdown timer switches with a maximum setting capability of ten minutes to comply with the automatic shut-Off requirements.

EXCEPTION 2 to Section 130.1(c)2: Lighting in a Server Aisle in a Server Room, as defined in Section 100.1, may use countdown timer switches with a maximum setting capability of 30 minutes to comply with the automatic shut-OFF requirements.

3. 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 override lighting control that:

- A. Complies with Section 130.1(a); and
- B. Allows the lighting to remain ON for no more than 2 hours when an override is initiated.

EXCEPTION to Section 130.1(c)3B: In the following function areas, the override time may exceed 2 hours: Malls, auditoriums, single tenant retail, industrial, and arenas where captive-key override is utilized.

4. 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.

EXCEPTION to Section 130.1(c)4: In retail stores and associated malls, restaurants, grocery stores, churches, and theaters, the automatic time-switch control is not required to incorporate an automatic holiday shut-OFF feature.

5. **Areas where Occupant Sensing Controls are required to shut OFF All Lighting.** In offices 250 square feet or smaller, multipurpose rooms of less than 1,000 square feet, classrooms of any size, and conference rooms of any size, lighting shall be controlled with occupant sensing controls to automatically shut OFF all of the lighting when the room is unoccupied. In addition, controls shall be provided that allow the lights to be manually shut-OFF in accordance with Section 130.1(a) regardless of the sensor status.
6. **Areas where partial ON/OFF occupant sensing controls are required in addition to complying with Section 130.1(c)1.**

- A. In aisle ways and open areas in warehouses, lighting 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 independently control lighting in each aisle way, and shall not control lighting beyond the aisle way being controlled by the sensor.

EXCEPTION 1 to Section 130.1(c)6A: In aisle ways and open areas in warehouses in which the installed lighting power is 80 percent or less of the value allowed under the Area Category Method, occupant sensing controls shall reduce lighting power by at least 40 percent.

EXCEPTION 2 to Section 130.1(c)6A: When metal halide lighting or high pressure sodium lighting is installed in warehouses, occupant sensing controls shall reduce lighting power by at least 40 percent.

- B. In library book stack aisles 10 feet or longer that are accessible from only one end, and library book stack aisles 20 feet or longer that are accessible from both ends, lighting 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 independently control lighting in each aisle way, and shall not control lighting beyond the aisle way being controlled by the sensor.
 - C. Lighting installed in corridors and stairwells shall be controlled by occupant sensing controls that separately reduce the lighting power in each space by at least 50 percent when the space is 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.
7. **Areas where partial ON/OFF occupant sensing controls are required 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.

EXCEPTION to Section 130.1(c)7A: In corridors and stairwells in which the installed lighting power is 80 percent or less of the value allowed under the Area Category Method, occupant sensing controls shall reduce power by at least 40 percent.

- B. In parking garages, parking areas and loading and unloading areas, general lighting shall be controlled by occupant sensing controls having at least one control step between 20 percent and 50 percent of design lighting power. No more than 500 watts of rated lighting power shall be controlled together as a single zone. A reasonably uniform level of illuminance shall be achieved in accordance with the applicable requirements in TABLE 130.1-A. 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.

Interior areas of parking garages are classified as indoor lighting for compliance with Section 130.1(c)7B. Parking areas on the roof of a parking structure are classified as outdoor hardscape and shall comply with the applicable provisions in Section 130.2.

EXCEPTION to Section 130.1(c)7B: Metal halide luminaires with a lamp plus ballast mean system efficacy of greater than 75 lumens per watt, used for general lighting in parking garages, parking areas

and loading and unloading areas, shall be controlled by occupant sensing controls having at least one control step between 20 percent and 60 percent of design lighting power.

8. Hotel motel guest rooms shall have captive card key controls, occupancy sensing controls, or automatic controls such that, no longer than 30 minutes after the guest room has been vacated, lighting power is switched off.

EXCEPTION to Section 130.1(c)8: One high efficacy luminaire as defined in TABLE 150.0-A or 150.0-B that is switched separately and where the switch is located within 6 feet of the entry door.

(d) Automatic Daylighting Controls.

1. Daylit Zones shall be defined as follows:

- A. **SKYLIT DAYLIT ZONE** is the rough area in plan view under each skylight, plus 0.7 times the average ceiling height in each direction from the edge of the rough opening of the skylight, minus any area on a plan beyond a permanent obstruction that is taller than the following: A permanent obstruction that is taller than one-half the distance from the floor to the bottom of the skylight. The bottom of the skylight is measured from the bottom of the skylight well for skylights having wells, or the bottom of the skylight if no skylight well exists.

For the purpose of determining the skylit daylit zone, the geometric shape of the skylit daylit zone shall be identical to the plan view geometric shape of the rough opening of the skylight; for example, for a rectangular skylight the skylit daylit zone plan area shall be rectangular, and for a circular skylight the skylit daylit zone plan area shall be circular.

- B. **PRIMARY SIDELIT DAYLIT ZONE** is the area on a plan directly adjacent to each vertical glazing, one window head height deep into the area, and window width plus 0.5 times window head height wide on each side of the rough opening of the window, minus any area on a plan beyond a permanent obstruction that is 6 feet or taller as measured from the floor.
- C. **SECONDARY SIDELIT DAYLIT ZONE** is the area on a plan directly adjacent to each vertical glazing, two window head heights deep into the area, and window width plus 0.5 times window head height wide on each side of the rough opening of the window, minus any area on a plan beyond a permanent obstruction that is 6 feet or taller as measured from the floor.

Note: Modular furniture walls shall not be considered a permanent obstruction.

2. Luminaires providing general lighting that are in or are partially in the Skylit Daylit Zones or the Primary Sidelit Daylit Zones shall be controlled independently by fully functional automatic daylighting controls that meet the applicable requirements of Section 110.9, and the applicable requirements below:
 - A. All Skylit Daylit Zones and Primary Sidelit Daylit Zones shall be shown on the plans.
 - B. Luminaires in the Skylit Daylit Zone shall be controlled separately from those in the Primary Sidelit Daylit Zones.
 - C. Luminaires that fall in both a Skylit and Primary Sidelit Daylit Zone shall be controlled as part of the Skylit Daylit Zone.
 - D. **Automatic Daylighting Control Installation and Operation.** For luminaires in daylight zones, automatic daylighting controls shall be installed and configured to operate according to all of the following requirements:
 - i. Photosensors shall be located so that they are not readily accessible to unauthorized personnel, and the location where calibration adjustments are made to automatic daylighting controls shall not be readily accessible to unauthorized personnel.
 - ii. Automatic daylighting controls shall provide functional multilevel lighting having at least the number of control steps specified in TABLE 130.1-A.

EXCEPTION 1 to Section 130.1(d)2Dii: Controlled lighting having a lighting power density less than 0.3 W/ft² is not required to provide multilevel lighting controls.

EXCEPTION 2 to Section 130.1(d)2Dii: When skylights are replaced or added to an existing building where there is an existing general lighting system that is not being altered, multilevel lighting controls are not required.

- iii. For each space, the combined illuminance from the controlled lighting and daylight shall not be less than the illuminance from controlled lighting when no daylight is available.
- iv. In areas served by lighting that is daylight controlled, when the illuminance received from the daylight 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.

EXCEPTION 1 to Section 130.1(d)2: Rooms in which the combined total installed general lighting power in the Skylit Daylit Zone and Primary Sidelit Daylit Zone is less than 120 Watts.

EXCEPTION 2 to Section 130.1(d)2: Rooms that have a total glazing area of less than 24 square feet.

EXCEPTION 3 to Section 130.1(d)2: Parking garages complying with Section 130.1(d)3.

3. **Parking Garage Daylighting Requirements.** In a parking garage area with a combined total of 36 square feet or more of glazing or opening, luminaires providing general lighting that are in the combined primary and secondary sidelit daylit zones shall be controlled independently by automatic daylighting controls, and shall meet the following requirements as applicable:

- A. All primary and secondary sidelit daylit zones shall be shown on the plans.
- B. Automatic Daylighting Control Installation and Operation. Automatic daylighting control shall be installed and configured to operate according to all of the following requirements:
 - i. Automatic daylighting controls shall have photosensors that are located so that they are not readily accessible to unauthorized personnel, and the location where calibration adjustments are made to the automatic daylighting controls shall not be readily accessible to unauthorized personnel.
 - ii. Automatic daylighting controls shall be multi-level, continuous dimming or ON/OFF.
 - iii. The combined illuminance from the controlled lighting and daylight shall not be less than the illuminance from controlled lighting when no daylight is available.
 - iv. When primary sidelit zones receive illuminance levels greater than 150 percent of the illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power consumption shall be zero.

EXCEPTION 1 to Section 130.1(d)3: Luminaires located in the daylight transition zone and luminaires for only dedicated ramps. Daylight transition zone and dedicated ramps are defined in Section 100.1.

EXCEPTION 2 to Section 130.1(d)3: The total combined general lighting power in the primary sidelit daylight zones is less than 60 watts.

 (e) **Demand Responsive Controls.**

Lighting power in buildings larger than 10,000 square feet shall be capable of being automatically reduced in response to a Demand Response Signal; so that the building's total lighting power can be lowered by a minimum of 15 percent below the total installed lighting power. Lighting shall be reduced in a manner consistent with uniform level of illumination requirements in TABLE 130.1-A.

Spaces that are non-habitable shall not be used to comply with this requirement, and spaces with a lighting power density of less than 0.5 watts per square foot shall not be counted toward the building's total lighting power.

NRCC	Nonresidential Certificate of Compliance
NRCA	Nonresidential Certificate of Acceptance
NRCI	Nonresidential Certificate of Installation
LTI	Lighting, Indoor
LTO	Lighting, Outdoor
LTS	Lighting, Sign
01	The first set of compliance documents in this sequence
E	Primarily used by enforcement authority
A	Primarily used by acceptance tester

5.10.6 Certificate of Compliance Documents

Nonresidential indoor lighting Certificate of Compliance documents are listed below:

- NRCC-LTI-01-E; Certificate of Compliance; Indoor Lighting
- NRCC-LTI-02-E; Certificate of Compliance; Indoor Lighting Controls
- NRCC-LTI-03-E; Certificate of Compliance; Indoor Lighting Power Allowance
- NRCC-LTI-04-E; Certificate of Compliance; Tailored Method Worksheets
- NRCC-LTI-05-E; Certificate of Compliance; Line Voltage Track Lighting Worksheet

LTI-01-E through LTI-03-E are required for all projects; LTI-04-E and LTI-05-E are required when the tailored method is used for prescriptive compliance, or when line voltage track lighting is installed.

5.10.7 Instructions for Completing Nonresidential Indoor Lighting Certificates of Compliance

A. NRCC-LTI-01-E *Certificate of Compliance; Indoor Lighting*

This document has four pages. Each page must appear on the plans (usually near the front of the electrical drawings). A copy of this documents should also be submitted to the enforcement agency along with the rest of the compliance submittal at the time of building permit application. With enforcement agency approval, the applicant may use alternative formats of these documents (rather than the official Energy Commission documents), provided the information is the same and in a similar format.

NRCC-LTI-01-E *Page 1 of 4*

Project Description

- Project Name is the title of the project, as shown on the plans and known to the enforcement agency.



CERTIFICATE OF COMPLIANCE

Indoor Lighting

NRCC-LTI-01-E
 (Page 1 of 5)

Project Name:

Date Prepared:

Climate Zone: Conditioned Floor Area : Unconditioned Floor Area :

General Information

Building Type: Nonresidential High-Rise Residential Hotel/Motel
 Schools Relocatable Public Schools Conditioned Spaces Unconditioned Spaces

Phase of Construction: New Construction Addition Alteration
 Method of Compliance: Complete Building Area Category Tailored

LIGHTING COMPLIANCE DOCUMENTS (select yes for each document included)

<i>For detailed instructions on the use of this and all Energy Efficiency Standards compliance documents, refer to the Nonresidential Manual published by the California Energy Commission.</i>			
YES	NO	FORM	TITLE
		NRCC-LTI-01-E	Certificate of Compliance. All Pages required on plans for all submittals.
		NRCC-LTI-02-E	Lighting Controls, Certificate of Compliance, and PAF Calculation. All Pages required on plans for all submittals.
		NRCC-LTI-03-E	Indoor Lighting Power Allowance
		NRCC-LTI-04-E	Tailored Method Worksheets
		NRCC-LTI-05-E	Line Voltage Track Lighting Worksheets

Summary of Allowed Lighting Power

Conditioned and Unconditioned space Lighting must not be combined for compliance			
Indoor Lighting Power for Conditioned Spaces		Indoor Lighting Power for Unconditioned Spaces	
1.	Installed Lighting NRCC-LTI-01-E, page 4	+	Watts
2.	PORTABLE ONLY FOR OFFICES NRCC-LTI-01-E, page 3	+	Watts
3.	Minus Lighting Control Credits NRCC-LTI-02-E, page 2	-	Watts
4.	Adjusted Installed Lighting Power (row 1 plus row 2 minus row 3)	=	Watts

STATE OF CALIFORNIA
INDOOR LIGHTING

CEC/NRCC-LTI-01-E (Revised 08/14)

CERTIFICATE OF COMPLIANCE

Indoor Lighting

Project Name:

CALIFORNIA ENERGY COMMISSION

NRCC-LTI-01-E

(Page 2 of 5)

Date Prepared:

5.	Complies ONLY if Installed ≤ Allowed	↕	Complies ONLY if Installed ≤ Allowed	↕
	Allowed Lighting Power		Allowed Lighting Power	
6.	Conditioned NRCC-LTI-03-E, page 1		Unconditioned NRCC-LTI-03-E, page 1	

Declaration of Required Installation Certificates – Declare by selecting yes for all Installation Certificates that will be submitted. (Retain copies and verify forms are completed and signed.)

YES	NO	Form/Title	
		NRCL-LTI-01-E - Must be submitted for all buildings	<input type="checkbox"/> Field Inspector
		NRCL-LTI-02-E - Must be submitted for a lighting control system, or for an Energy Management Control System (EMCS), to be recognized for compliance.	<input type="checkbox"/> Field Inspector
		NRCL-LTI-03-E - Must be submitted for a line-voltage track lighting integral current limiter, or for a supplementary overcurrent protection panel used to energize only line-voltage track lighting, to be recognized for compliance.	<input type="checkbox"/> Field Inspector
		NRCL-LTI-04-E - Must be submitted for two interlocked systems serving an auditorium, a convention center, a conference room, a multipurpose room, or a theater to be recognized for compliance.	<input type="checkbox"/> Field Inspector
		NRCL-LTI-05-E - Must be submitted for a Power Adjustment Factor (PAF) to be recognized for compliance.	<input type="checkbox"/> Field Inspector
		NRCL-LTI-06-E - Must be submitted for additional wattage installed in a video conferencing studio to be recognized for compliance.	<input type="checkbox"/> Field Inspector

Declaration of Required Certificates of Acceptance – Declare by checking all of the Certificates of Acceptance that will be submitted. (Retain copies and verify forms are completed and signed.)

YES	NO	Form/Title	
		NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	<input type="checkbox"/> Field Inspector
		NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	<input type="checkbox"/> Field Inspector
		NRCA-LTI-04-A - Must be submitted for demand responsive lighting controls.	<input type="checkbox"/> Field Inspector



CERTIFICATE OF COMPLIANCE

Indoor Lighting

Project Name:

Date Prepared:

NRCC-LTI-01-E
 (Page 3 of 5)

A separate Lighting Schedule Must Be Filled Out for Conditioned and Unconditioned Spaces. Installed Lighting Power listed on this Lighting Schedule is only for:
 CONDITIONED SPACE **UNCONDITIONED SPACE**

A. INDOOR LIGHTING SCHEDULE and FIELD INSPECTION ENERGY CHECKLIST

- The actual indoor lighting power listed on this page and on the next page includes all installed permanent and planned portable lighting systems.
- When Complete Building Method is used for compliance, list each different type of luminaire on separate lines.
- When Area Category Method or Tailored Method is used for compliance, list each different type of luminaire by each different function area on separate lines
- Also include track lighting in schedule, and submit the track lighting compliance form (NRCC-LTI-05-E) when line-voltage track lighting is installed.

B. Installed Portable Luminaires in Offices – Exception to Section 140.6(a)

- This section shall be filled out ONLY for portable luminaires in offices (As defined in §100.1). All other planned portable luminaires shall be documented on next page of this compliance form.
- This section is used to determine if greater than 0.3 watts of portable lighting is planned for any office
- Fill out a separate line for each different office. Small offices that are typical (having the same general and portable lighting) may be grouped together. This allowance shall not be traded between offices having different lighting systems.

Office Portable Luminaire Schedule	Office Installed Portable Luminaire Watts Per Square Foot						Accountable Watts	Office Location	Field Inspector	
	A	B	C	D	E	F				G
Complete Luminaire Description (i.e., LED, under cabinet, furniture mounted direct/indirect)	Watts per Luminaire	Number of Luminaires	Installed portable luminaire watts in this office (B x C)	Square feet of this office	Watts per square foot (D / E)	If F ≤ 0.3, enter zero; if F > 0.3, (F-0.3)	E x G	Identify Office area in which these portable luminaires are installed	Pass	Tail
									<input type="checkbox"/>	<input type="checkbox"/>
									<input type="checkbox"/>	<input type="checkbox"/>
									<input type="checkbox"/>	<input type="checkbox"/>
									<input type="checkbox"/>	<input type="checkbox"/>
									<input type="checkbox"/>	<input type="checkbox"/>
Total installed portable luminaire watts that are greater than 0.3 watts per square foot per office:									Enter sum total of all pages into NRCC-LTI-01-E; Page 1	



CERTIFICATE OF COMPLIANCE

NRCC-LTI-01-E

(Page 4 of 5)

Indoor Lighting

Project Name:

Date Prepared:

A separate Lighting Schedule Must Be Filled Out for Conditioned and Unconditioned Spaces. Installed Lighting Power listed on this Lighting Schedule is only for:
 CONDITIONED SPACE UNCONDITIONED SPACE

C. INDOOR LIGHTING SCHEDULE and FIELD INSPECTION ENERGY CHECKLIST

A	B	C	D		E	F	G	H	
			Watts per Luminaire	How wattage was determined				Field Inspector 1	Pass
Name or Item Tag	Complete Luminaire Description (i.e., 3 lamp fluorescent troffer, F32T8, one dimmable electronic ballast)		CEC Default from NA8	According to §130.0(c)	Number of Luminaires	Total Installed Watts in this area (C x E)	Primary Function area in which these luminaires are installed		
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
INSTALLED WATTS PAGE TOTAL:								Enter sum total of all pages into NRCC-LTI-01-E; Page 2	

CERTIFICATE OF COMPLIANCE

Indoor Lighting

NRCC-LTI-01-E
 (Page 5 of 5)

Project Name:

Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:

Documentation Author Signature:

Company:

Signature Date:

Address:

CEA/HERS Certification Identification (if applicable):

City/State/Zip:

Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:

Responsible Designer Signature:

Company:

Date Signed:

Address:

License:

City/State/Zip:

Phone:

STATE OF CALIFORNIA
INDOOR LIGHTING – LIGHTING CONTROLS
 CEC-NRCC-LTI-02-E (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE

Indoor Lighting - Lighting Controls

Project Name:

Date Prepared:

NRCC-LTI-02-E
 (Page 1 of 3)

The NRCC-LTI-02-E shall be used to document all mandatory and prescriptive lighting controls that are applicable to the project.

Mandatory Lighting Control Declaration Statements (Indicate if the measure applies by checking Yes or no below.)

YES	NO	Control Requirements
		Lighting shall be controlled by self-contained lighting control devices which are certified to the Energy Commission according to the Title 20 Appliance Efficiency Regulations in accordance with Section 110.9.
		Lighting shall be controlled by a lighting control a system or energy management control system in accordance with §110.9. An Installation Certificate shall be submitted in accordance with Section 130.4(b).
		One or more Track Lighting Integral Current Limiters shall be installed which have been certified to the Energy Commission in accordance with §110.9 and §130.0. Additionally, an Installation Certificate shall be submitted in accordance with Section 130.4(b).
		A Track Lighting Supplementary Overcurrent Protection Panel shall be installed in accordance with Section 110.9 and Section 130.0. Additionally, an Installation Certificate shall be installed in accordance with Section 130.4(b).
		All lighting controls and equipment shall comply with the applicable requirements in §110.9 and shall be installed in accordance with the manufacturer's instructions in accordance with Section 130.1.
		All luminaires shall be functionally controlled with manually switched ON and OFF lighting controls in accordance with Section 130.1(a).
		General lighting shall be separately controlled from all other lighting systems in an area. Floor and wall display, window display, case display, ornamental, and special effects lighting shall each be separately controlled on circuits that are 20 amps or less. When track lighting is used, general, display, ornamental, and special effects lighting shall each be separately controlled; in accordance with Section 130.1(a)4.
		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 meet the multi-level lighting control requirements in accordance with Section 130.1(b).
		All installed indoor lighting shall be equipped with controls that meet the applicable Shut-OFF control requirements in Section 130.1(c).
		Lighting in all Daylit Zones shall be controlled in accordance with the requirements in Section 130.1(d) and daylight zones are shown on the plans.
		Lighting power in buildings larger than 10,000 square feet shall be capable of being automatically reduced in response to a Demand Responsive Signal in accordance with Section 130.1(e).
		Before an occupancy permit is granted for a newly constructed building or area, or a new lighting system serving a building, area, or site is operated for normal use, indoor lighting controls serving the building, area, or site shall be certified as meeting the Acceptance Requirements for Code Compliance in accordance with Section 130.4.(a). The controls required to meet the Acceptance Requirements include automatic daylight controls, automatic shut-OFF controls, and demand responsive controls.

STATE OF CALIFORNIA
INDOOR LIGHTING – LIGHTING CONTROLS
 CEC-NRCC-LTI-02-E (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



NRCC-LTI-02-E

(Page 3 of 3)

Indoor Lighting - Lighting Controls

Project Name:

Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:

Documentation Author Signature:

Company:

Signature Date:

Address:

CEA/HERS Certification Identification (if applicable):

City/State/Zip:

Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:

Responsible Designer Signature:

Company:

Date Signed:

Address:

License:

City/State/Zip:

Phone:

STATE OF CALIFORNIA
INDOOR LIGHTING POWER ALLOWANCE
 DEC-NRCC-LTI-03-E (Revised 06/14)



CERTIFICATE OF COMPLIANCE

Certificate of Compliance - Indoor Lighting Power Allowance

Project Name:

Date Prepared:

NRCC-LTI-03-E
 (Page 1 of 4)

ALLOWED LIGHTING POWER

A separate page must be filled out for Conditioned and Unconditioned Spaces. This page is only for:

- CONDITIONED spaces UNCONDITIONED spaces

A. SUMMARY TOTALS OF LIGHTING POWER ALLOWANCES

- If using Complete Building Method for compliance, use only the total in column (a) as total allowed building watts.
 If using Area Category Method, Tailored Method, or a combination of Area Category and Tailored Method for compliance, use only the total in column (b) as the total allowed building watts

1. Complete Building Method Allowed Watts. Documented in section B of NRCC-LTI-03-E (below on this page)
2. Area Category Method Allowed Watts. Documented in section C-1 of NRCC-LTI-03-E (below on this page)
3. Tailored Method Allowed Watts. Documented in section A of NRCC-LTI-04-E

	(a)	(b)
1. Complete Building Method Allowed Watts		
2. Area Category Method Allowed Watts		
3. Tailored Method Allowed Watts		
TOTAL ALLOWED BUILDING WATTS. Enter number into correct cell on NRCC-LTI-01, Page 2, Row 1		

Check here if building contains both conditioned and unconditioned areas.

B. COMPLETE BUILDING METHOD LIGHTING POWER ALLOWANCE

A	B	C	D
TYPE OF BUILDING (From \$140.6 Table 140.6-B)	WATTS PER (ft ²)	COMPLETE BLDG. AREA	ALLOWED WATTS
		X	=
Total Area:			
Total Watts. Enter Total Watts into section A, row 1 (Above on this page)			

C-1 AREA CATEGORY METHOD TOTAL LIGHTING POWER ALLOWANCES (C-2 plus C-3)

Total from section C-2		Watts
Total from section C-3		
Total Watts. Enter Total Watts into section A, row 2 (Above on this page)		

STATE OF CALIFORNIA
INDOOR LIGHTING POWER ALLOWANCE

CEC-NRCC-LTI-03-E (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE
 Certificate of Compliance - Indoor Lighting Power Allowance

NRCC-LTI-03-E

(Page 4 of 4)

Project Name:

Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:

Documentation Author Signature:

Company:

Signature Date:

Address:

CEA/HERS Certification Identification (if applicable):

City/State/Zip:

Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:

Responsible Designer Signature:

Company:

Date Signed:

Address:

License:

City/State/Zip:

Phone:



CERTIFICATE OF INSTALLATION		NRCI-LTI-01-E
Indoor Lighting		(Page 2 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Installation documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California:	
<ol style="list-style-type: none"> 1. The information provided on this Certificate of Installation is true and correct. 2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer. 3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations, and the installation conforms to the requirements given on the plans and specifications approved by the enforcement agency. 4. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met. 5. I will ensure that a completed signed copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy. 	
Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):
Address:	CSLB License:
City/State/Zip:	Phone
	Date Signed:

LIGHTING CONTROL ACCEPTANCE DOCUMENT

CEC-NRCA-LTI-02-A (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF ACCEPTANCE		NRCA-LTI-02-A
Lighting Control Acceptance Document		(Page 1 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

Note: For more than 3 spaces attach additional sets of pages 2 through 5, as required.

Enforcement Agency Use: Checked by/Date

Automatic Shut-off Controls: Automatic Time Switch Control and Occupant Sensor

Intent: Lights are turned off or set to a lower level when not needed per Section 110.9(a) & 130.1(c).

Guidance

This acceptance test form must be filled out for all newly-installed lighting control systems of the following types:

- I. Automatic Time Switch Controls
- II. Occupancy Sensors
- III. Partial-OFF occupancy sensors
- IV. Partial-ON occupancy sensors (only if used to claim a Power Adjustment Factor)
- V. Occupancy Sensors serving small zones in large open plan offices (only if used to claim a Power Adjustment Factor)

For automatic daylighting controls use acceptance test form NRCA-LTI-03-A; for demand responsive lighting controls, use acceptance test form NRCA-LTI-04-A.

The tests on this certificate are required by Section 140.6(a)2 and 130.4(a) of the Building Energy Efficiency Standards 2013. The tests themselves are described in Sections 140.6(a)2 and in Reference Appendix NA7.6.

A. Construction Inspection

Fill out Section A to cover spaces 1 through 3 that are functionally tested under Section B. Make as many copies of pages 2-5 as are required to test all spaces in the building, and attach to page 1.

Instruments needed to perform tests include, but are not limited to: hand-held amperage meter, power meter, or light meter

1	Automatic Time Switch Controls Construction Inspection—confirm for all listed in Section B
a.	All automatic time switch controls are programmed for (check all):
	<input type="checkbox"/> Weekdays
	<input type="checkbox"/> Weekend
	<input type="checkbox"/> Holidays
b.	Document for the owner automatic time switch programming (check all):
	<input type="checkbox"/> Weekdays settings
	<input type="checkbox"/> Weekend settings
	<input type="checkbox"/> Holidays settings
	<input type="checkbox"/> Set-up settings
	<input type="checkbox"/> Preference program setting
	<input type="checkbox"/> Verify the correct time and date is properly set in the time switch
	<input type="checkbox"/> Verify the battery is installed and energized
	<input type="checkbox"/> Override time limit is no more than 2 hours
	<input type="checkbox"/> Occupant Sensors and Automatic Time Switch Controls have been certified to the Energy Commission in accordance with the applicable provision in Section 110.9 of the Standards, and model numbers for all such controls are listed on the Commission database as Certified Appliance and Control Devices
2	Occupancy Sensor Construction Inspection—confirm for all listed in Section B
	<input type="checkbox"/> Occupancy sensors are not located within four feet of any HVAC diffuser
	<input type="checkbox"/> Ultrasonic occupancy sensors do not emit audible sound 5 feet from source

LIGHTING CONTROL ACCEPTANCE DOCUMENT

CEC-NRCA-LTI-02-A (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF ACCEPTANCE		NRCA-LTI-02-A
Lighting Control Acceptance Document		(Page 2 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

B. Functional Testing of Lighting Controls**Representative Spaces Selected**

For every space in the building, conduct functional tests I through V below if applicable. If there are several geometrically similar spaces that use the same lighting controls, test only one space and list in the cells below which "untested spaces" are represented by that tested space.

EXCEPTION: For buildings with up to seven (7) occupancy sensors, all occupancy sensors shall be tested. (NA7.6.2.3)

<input type="checkbox"/>	1	Tested space/ room name: _____ Space Type (office, corridor, etc) _____ Untested areas/rooms _____
<input type="checkbox"/>	2	Tested space/ room name: _____ Space Type (office, corridor, etc) _____ Untested areas/rooms _____
<input type="checkbox"/>	3	Tested space/ room name: _____ Space Type (office, corridor, etc) _____ Untested areas/rooms _____

Functional Tests		Tested Space Number		
Confirm compliance (Y/N) for all control system types (I-V) present in each space:				
1. Automatic Time Switch Controls		1	2	3
Step 1: Simulate occupied condition				
a.	All lights can be turned on and off by their respective area control switch	Y/N	Y/N	Y/N
b.	Verify the switch only operates lighting in the ceiling-height partitioned area in which the switch is located	Y/N	Y/N	Y/N
Step 2: Simulate unoccupied condition				
a.	All lighting, including emergency and egress lighting, turns off. Exempt lighting may remain on per Section 130.1(c)1 and 130.1(a)1.	Y/N	Y/N	Y/N
b.	Manual override switch allows only the lights in the selected ceiling height partitioned space where the override switch is located and remain on no longer than 2 hours (unless serving public areas and override switch is captive key type).	Y/N	Y/N	Y/N
Step 3: System returned to initial operating conditions		Y/N	Y/N	Y/N

2. Occupancy Sensors		1	2	3
Step 1: Simulate an unoccupied condition				
a.	Lights controlled by occupancy sensors turn off within a maximum of 30 minutes from start of an unoccupied condition per Standard Section 110.9(b)	Y/N	Y/N	Y/N
b.	The occupant sensor does not trigger a false "on" from movement in an area adjacent to the controlled space or from HVAC operation	Y/N	Y/N	Y/N
Step 2: Simulate an occupied condition				
a.	Status indicator or annunciator operates correctly	Y/N	Y/N	Y/N
b.	Lights controlled by occupancy sensors turn on immediately upon an occupied condition OR sensor indicates space is "occupied" and lights may be turned on manually	Y/N	Y/N	Y/N
Step 3: System returned to initial operating conditions		Y/N	Y/N	Y/N

LIGHTING CONTROL ACCEPTANCE DOCUMENT

CEC-NRCA-LTI-02-A (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF ACCEPTANCE		NRCA-LTI-02-A
Lighting Control Acceptance Document		(Page 3 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

3. Partial Off Occupancy Sensor		1	2	3
Step 1: Simulate an unoccupied condition				
a.	Lights go to partial off state within a maximum of 30 minutes from start of an unoccupied condition per Standard Section 110.9(a)	Y/N	Y/N	Y/N
b.	The occupant sensor does not trigger a false "on" from movement in an area adjacent to the controlled space or from HVAC operation. For library book stacks or warehouse aisle, activity beyond the stack or aisle shall not activate the lighting in the aisle or stack.	Y/N	Y/N	Y/N
c.	In the partial off state, lighting shall consume no more than 50% of installed lighting power, or: <ul style="list-style-type: none"> No more than 60% of installed lighting power for metal halide or high pressure sodium lighting in warehouses. No more than 60% of installed lighting power for corridors and stairwells in which the installed lighting power is 80 percent or less of the value allowed under the Area Category Method. Light level may be used as a proxy for lighting power when measurements are taken	Y/N	Y/N	Y/N
Step 2: Simulate an occupied condition				
a.	The occupant sensing controls shall turn lights fully ON in each separately controlled areas, Immediately upon an occupied condition	Y/N	Y/N	Y/N

4. Partial On Occupancy Sensors		1	2	3
Step 1. -Simulate an occupied condition. Verify partial on operation.				
a.	Immediately upon an occupied condition, the first stage activates between 30 to 70% of the lighting automatically.	Y/N	Y/N	Y/N
b.	After the first stage occurs, manual switches allow an occupant to activate the alternate set of lights, activate 100% of the lighting power, and manually deactivate all of the lights.	Y/N	Y/N	Y/N
Step 2. Simulate an unoccupied condition				
a.	Both stages (automatic on and manual on) lights turn off within a maximum of 30 minutes from start of an unoccupied condition per Standard Section 110.9(a)	Y/N	Y/N	Y/N
b.	The occupant sensor does not trigger a false "on" from movement in an area adjacent to the controlled space or from HVAC operation	Y/N	Y/N	Y/N

5. Additional test for Occupancy Sensors Serving Small Zones in Office Spaces Larger than 250 Square Feet, to Qualify for a Power Adjustment Factor (PAF)		1	2	3
<i>First, complete Functional Test 2 (above) for each controlled zone</i>				
Step 1. Verify area served and compare actual PAF with claimed PAF. Refer to Functional Test II.				
a.	Area served by controlled lighting (square feet)			
b.	Enter PAF corresponding to controlled area from line (a) above (<125sf for PAF=0.4, 126-250sf for PAF=0.3, 251-500sf for PAF=0.2).			
c.	Enter PAF claimed for occupant sensor control in this space from the Certificate of Compliance			
d.	The PAF corresponding to the controlled area (line b), is less than or equal to the PAF claimed in the compliance documentation (line c)	Y/N	Y/N	Y/N
e.	Sensors shall not trigger in response to movement in adjacent walkways or workspaces.	Y/N	Y/N	Y/N

LIGHTING CONTROL ACCEPTANCE DOCUMENT

CEC-NRCA-LTI-02-A (Revised 06/14)



CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF ACCEPTANCE		NRCA-LTI-02-A
Lighting Control Acceptance Document		(Page 4 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

f.	All steps are conducted in Functional Test 2 "Occupancy Sensor (On Off Control)" and all answers are Yes (Y)	Y / N	Y / N	Y / N
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C	Testing Results	PASS / FAIL	PASS / FAIL	PASS / FAIL
	I Automatic Time Switch Controls (all answers must be Y).			
	II Occupancy Sensor (On Off Control) (all answers must be Y).			
	III Partial Off Occupancy Sensor (all answers must be Y). For warehouses, library book stacks, corridors, stairwells in nonresidential buildings must also be accompanied by passing Test I or Test II.			
	IV Partial On Occupant Sensor for PAF (all answers must be Y).			
	V Occupant Sensor serving small zones for PAF (all answers must be Y). Also must pass Test II			

D.	Evaluation :
<input type="checkbox"/>	PASS: All applicable Construction Inspection responses are complete and all applicable Equipment Testing Requirements responses are positive (Y - yes)

LIGHTING CONTROL ACCEPTANCE DOCUMENT

CEC-NRCA-LTI-02-A (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF ACCEPTANCE		NRCA-LTI-02-A
Lighting Control Acceptance Document		(Page 5 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Acceptance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/HERS/ATT Certification Identification (If applicable):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California:	
<ol style="list-style-type: none"> The information provided on this Certificate of Acceptance is true and correct. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician). The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building. 	
Field Technician Name:	Field Technician Signature:
Field Technician Company Name:	Position with Company (Title):
Address:	ATT Certification Identification (if applicable):
City/State/Zip:	Phone: Date Signed:

RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California:	
<ol style="list-style-type: none"> I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person). The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building. I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy. 	
Responsible Acceptance Person Name:	Responsible Acceptance Person Signature:
Responsible Acceptance Person Company Name:	Position with Company (Title):
Address:	CSLB License:
City/State/Zip:	Phone: Date Signed:

- (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.

NA7.6.2 Acceptance tests for Shut-off Controls complying with Section 130.1(c)**NA7.6.2.1 Construction Inspection and Acceptance Tests**

Verify that the shut-off control qualifies as one of the required control types, is installed, and is fully functional in accordance with each applicable requirement in Section 130.1(c), or that the application meets one of the exceptions. List each specific exception claimed, from Section 130.1(c).

NA7.6.2.2 Occupancy Sensing Lighting Control Construction Inspection

Prior to Functional testing, verify and document the following:

- (a) Occupancy sensor has been located to minimize false signals:
- (b) No closer than four (4) feet from a HVAC diffuser.
- (c) PIR sensor pattern does not enter into adjacent zones.
- (d) Occupancy sensors do not encounter any obstructions that could adversely affect desired performance.
- (e) Ultrasonic occupancy sensors do not emit audible sound.

NA7.6.2.3 Occupancy Sensing Lighting Control Functional testing

For buildings with up to seven (7) occupancy sensors, all occupancy sensors shall be tested. For buildings with more than seven (7) occupancy sensors, sampling may be done on spaces with similar sensors and space geometries. If the first occupancy sensor in the sample group passes the acceptance test, the remaining building spaces in the sample group also pass. If the first occupancy sensor in the sample group fails the acceptance test the rest of the occupancy sensors in that group must be tested. If any tested occupancy sensor fails it shall be repaired, replaced or adjusted until it passes the test.

For each sensor to be tested do the following:

- (a) For a representative sample of building spaces, simulate an unoccupied condition. Verify and document the following:
 - 1. Lights controlled by occupancy sensors turn off within a maximum of 30 minutes from the start of an unoccupied condition per §119(d).
 - 2. The occupant sensor does not trigger a false "on" from movement in an area adjacent to the space containing the controlled luminaires or from HVAC operation.
 - 3. Signal sensitivity is adequate to achieve desired control.
- (b) For a representative sample of building spaces, simulate an occupied condition. Verify and document the following:
 - 1. Status indicator or annunciator operates correctly.
 - 2. Lights controlled by occupancy sensors turn on immediately upon an occupied condition, OR sensor indicates space is "occupied" and lights are turned on manually (automatic OFF and manual ON control strategy).

NA7.6.2.4 Automatic Time Switch Lighting Control Construction Inspection

Prior to Functional testing, verify and document the following:

- (a) Automatic time switch control is programmed with acceptable weekday, weekend, and holiday (if applicable) schedules.

- (b) Document for the owner automatic time switch programming including weekday, weekend, holiday schedules as well as all set-up and preference program settings.
- (c) Verify the correct time and date is properly set in the time switch.
- (d) Verify the battery back-up (if applicable) is installed and energized.
- (e) Override time limit is set to no more than 2 hours.
- (f) Override switches remote from area with controlled luminaires have annunciator lights.

NA7.6.2.5 Automatic Time Switch Lighting Control Functional testing

- (a) Simulate occupied condition. Verify and document the following:
 - 1. All lights can be turned on and off by their respective area control switch.
 - 2. Verify the switch only operates lighting in the enclosed space (ceiling-height partitioned area) in which the switch is located.
- (b) Simulate unoccupied condition. Verify and document the following:
 - 1. All non-exempt lighting turn off per §131(d)1.
 - 2. Manual override switch allows only the lights in the enclosed space (ceiling height partitioned) where the override switch is located to turn on or remain on until the next scheduled shut off occurs.

NA7.6.3 Acceptance tests for Demand Responsive Controls in accordance with Section 130.1(e).

NA7.6.3.1 Construction Inspection

Prior to Functional testing, verify and document the following:

- (a) That the demand responsive control is capable of receiving a demand response signal directly or indirectly through another device and that it complies with the requirements in Section 130.5(e).
- (b) If the demand response signal is received from another device (such as an EMCS), that system must itself be capable of receiving a demand response signal from a utility meter or other external source.

NA7.6.3.2 Functional testing of Demand Responsive Lighting Controls

For buildings with up to seven (7) enclosed spaces requiring demand responsive lighting controls, all spaces shall be tested. For buildings with more than seven (7) enclosed spaces requiring demand responsive lighting controls, sampling may be done on additional spaces with similar lighting systems. If the first enclosed space with a demand responsive lighting control in the sample group passes the acceptance test, the remaining building spaces in the sample group also pass. If the first enclosed space with a demand responsive lighting control in the sample group fails the acceptance test the rest of the enclosed spaces in that group must be tested. If any tested demand responsive lighting control system fails it shall be repaired, replaced or adjusted until it passes the test.

Test the reduction in lighting power due to the demand responsive lighting control using one or the following two methods.

Method 1: Illuminance Measurement. Measure the reduction in illuminance in enclosed spaces required to meet Section 131(b), as follows:

- (a) In each space, select one location for illuminance measurement. The chosen location must not be in a primary skylit or sidelit area. When placed at the location, the illuminance meter must not have a direct view of a window or skylight. If this is not possible, perform the test at a time and location at which daylight illuminance provides less than half of the design illuminance. Mark each location to ensure that the illuminance meter can be accurately located.

(b) Full output test

1. 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.
2. Take one illuminance measurement at each location, using an illuminance meter.
3. Simulate a demand response condition using the demand responsive control.
4. Take one illuminance measurement at each location with the electric lighting system in the demand response condition.
5. 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.

(c) Minimum output test

1. Using the manual switches/dimmers in each space, set the lighting system to minimum output (but not off). Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at more than minimum output, or may be off.
2. Take one illuminance measurement at each location, using an illuminance meter.
3. Simulate a demand response condition using the demand responsive control.
4. Take one illuminance measurement at each location with the electric lighting system in the demand response condition.
5. In each space, the illuminance in the demand response condition must not be less than the illuminance in the minimum output condition or 50% of the design illuminance, whichever is less.

EXCEPTION: In daylight spaces, the illuminance in the demand response condition may reduce below the minimum output condition, but in the demand response condition the combined illuminance from daylight and electric light must be at least 50% of the design illuminance.

Method 2: Current measurement. Measure the reduction in electrical current in spaces required to meet Section 131(b), as follows:

- (a) At the lighting circuit panel, select at least one lighting circuit that serves spaces required to meet Section 131(b).

(b) Full output test

1. 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.
2. Take one electric current measurement for each selected circuit.
3. Simulate a demand response condition using the demand responsive control.
4. Take one illuminance measurement at each location with the electric lighting system in the demand response condition.
5. Add together all the circuit currents, and calculate the reduction in current in the demand response condition, compared with the full output condition. The combined reduction must be at least 15% but must not reduce the output of any individual circuit by more than 50%.

(c) Minimum output test

1. Using the manual switches/dimmers in each space, set the lighting system to minimum output (but not off). Note that the lighting in areas with photocontrols or occupancy/vacancy sensors may be at more than minimum output, or may be off.

2. Take one electric current measurement for each selected circuit.
3. Simulate a demand response condition using the demand responsive control.
4. Take one electric current measurement for each selected circuit with the electric lighting system in the demand response condition.
5. In each space, the electric current in the demand response condition must not be less than 50% or the electric current in the minimum output condition, whichever is less.

EXCEPTION: Circuits that supply power to the daylit portion of enclosed spaces as long as lighting in non-daylit portions of the enclosed space.

NA7.7 Lighting Control Installation Requirements

Lighting control installation inspection shall be performed on:

Lighting control systems installed to comply with Section 110.9(b).

- (a) Energy Management Control System installed to comply with Section 130.5(f)1.
- (b) All line-voltage track lighting integral current limiters in accordance with Section 110.9 and Section 130.0.
- (c) All dedicated line-voltage track lighting supplementary overcurrent protection panels in accordance with Section 110.9 and Section 130.0.
- (d) Interlocked lighting systems serving an area in accordance with Section 140.6(a)1.
- (e) Lighting controls installed to earn a Power Adjustment Factor (PAF) in accordance with Section 140.6(a)2.
- (f) Lighting for a Videoconferencing Studio in Accordance with Exception to Section 140.6(c)2Gvii.

NA7.7.1 Lighting Control Systems Installed to Comply with Section 110.9(b)

NA7.7.1.1 Installation Inspection

If a lighting control required by Title 24, Part 6 is a field assembled system consisting of two or more components, verify the system components meet all of the requirements for each lighting control type, in accordance with Section 110.9. On the approved installation compliance form, identify, list, and verify each type of lighting control system as follows:

- (a) Separately identify and list each type of lighting control system. When there are identical lighting control systems in a single building, identical lighting control system may be listed together.
- (b) Identify and list all requirements for the type of self-contained lighting control device for which the lighting control system is installed to function as, in accordance with Section 110.9 and in accordance with the Title 20 Appliance Efficiency Regulations.
- (c) Verify the lighting control system complies with all of the applicable requirement as listed.
- (d) If the lighting control system does not meet all applicable requirements, the installation fails.

NA7.7.2 Energy Management Control System (EMCS) Installed in Accordance with Section 130.1(f)

NA7.7.2.1 Installation Requirements

- (a) The EMCS shall be separately tested for each respective lighting control system for which it is installed to function as.