



CERTIFICATE OF INSTALLATION		NRCI-LTI-E	
<i>This Certificate of Installation is used to document the installation of lighting features, materials, components, and manufactured devices required to demonstrate compliance with Title 24, Part 6 per §10-103(a)3 for nonresidential, hotel/motel and high-rise residential occupancies.</i>			
Project Name:		Report Page:	
Project Address:		Date Prepared:	

Commented [BSN1]: This is a concept draft circulating for feedback from installers, general contractors and building inspectors.
 Please send feedback to Alexis.Markstrum@energy.ca.gov

A. GENERAL INFORMATION			
01	Project Location (city):		05 Authority Having Jurisdiction:
02	Zip Code:		06 Permit #:
03	Date of Permit Set used for construction:		07 Date of As-built Set:
04	Name of Permit Set used for construction:		08 Name of As-built Set:

Commented [BSN2]: These fields will tell the inspector if the installer was using a different set for construction than what was permitted, and if an as-built set was created.

B. INSTALLATION DETAILS
Indicate the building feature you or your company installed below in column 01 (select all that apply). Then review the permitted plans, specifications and Energy Code form and select all Energy Code items in column 02 where there is a difference between the permitted documents and as-builts. Note the differences for these Energy Code items in column 03.*

Commented [BSN3]: This table will tell the inspector where the install differed from the permit set.

01	02	03	04	
Select building feature installed:	Select all Energy Code items where permit set differs from as-builts:	Describe the difference between permitted and as-built:	Field Inspector	
			Pass	Fail
<input type="checkbox"/> Luminaires	<input type="checkbox"/> Number of Each Luminaire Type <input type="checkbox"/> Watts per Luminaire <input type="checkbox"/> Modular Lighting Systems <input type="checkbox"/> No difference between permit set & as-builts for all items listed above		<input type="checkbox"/>	<input type="checkbox"/>

Commented [BSN4]: There would not be a new row for each system, the installer would need to describe here any changes for all lighting systems on the project. This can be more clearly prompted through an online user interface if the form is completed online.

Commented [BSN5]: If this form is completed online, this checkbox could grey out column 03 for this row.

* Compliance with Title 24, Part 6 may be via the prescriptive or performance path for indoor lighting systems. If indoor lighting systems have complied prescriptively, you will see the NRCC-LTI-E form as part of the permit documents. If indoor lighting systems have been included in the energy model and complied via the performance path, you will see it on the NRCC-PRF-E form.

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01	02	03	04	
Select building feature installed:	Select all Energy Code items where permit set differs from as-builts:	Describe the difference between permitted and as-built:	Field Inspector	
			Pass	Fail
<input type="checkbox"/> Controls	<input type="checkbox"/> Demand Response <input type="checkbox"/> Shut-Off Controls <input type="checkbox"/> Area Controls <input type="checkbox"/> Multi-Level Controls <input type="checkbox"/> Daylighting <input type="checkbox"/> No difference between permit set & as-builts for all items listed above		<input type="checkbox"/>	<input type="checkbox"/>

C. INSTALLED LIGHTING CONTROLS

Identify each type of lighting control system installed by checking the boxes below. If an Energy Management Control System (EMCS) or Lighting Control System is installed to function as another type of lighting control, check the box for the control system for which it functions. Example: If the EMCS is acting as a time-switch control, check "Time-switch".

Confirm functionality listed for all lighting control systems has been installed and programmed.

Time-switch Controls

Installed controls that provide time-switch functionality, including automatic & astronomical controls:

- Have program backup capabilities to prevent the loss of schedule for at least 7 days & the date and time for at least 72 hours if power is interrupted;
- Are capable of providing manual override to each connected load and of resuming normally scheduled operation within 2 hours after manual override is initiated (nonresidential buildings only);
- Provide automatic holiday shutoff that turns off all connected loads for at least 24 hours and then resumes normally scheduled operation (nonresidential buildings only);
- Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 min per year (astronomical only);
- Are capable of displaying date, current time, sunrise time, sunset time, and switching times for each step during programming and automatically adjusting for daylight savings time (astronomical only);
- Have the ability to independently offset the on and off for each channel by at least 90 minutes before and after sunrise & sunset (astronomical only); and
- Include at least 2 separately programmable steps per zone (multi-level only)

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C. INSTALLED LIGHTING CONTROLS (CONTINUED)

Time-switch Controls (Continued)

H. Indicator lights integral to lighting controls shall consume no more than one watt of power per indicator light.

Daylighting Controls

Installed controls that provide automatic daylighting functionality:

- A. Automatically return to its most recent time delay setting within 60 minutes of the last received input when left in calibration mode;
- B. Have a set point control that easily distinguishes setting to within 10% of full scale adjustment;
- C. Provide a linear response within 5% accuracy over the range of luminance measured by the light sensor; and
- D. Are capable of being calibrated in a manner that the person initiating the calibration is remote from the sensor during calibration to avoid influencing calibration accuracy, for example by having a light sensor that is physically separated from where the calibration adjustments are made.
- E. Indicator lights integral to lighting controls shall consume no more than one watt of power per indicator light.

Dimmers

Installed controls that provide dimming functionality:

- A. Are capable of reducing lighting power consumption by a minimum of 65% when at its lowest setting;
- B. Provide reduced flicker operation, meaning that directly controlled light sources shall be provided electrical power such that the light output has an amplitude modulation of less than 30% for frequencies less than 200 Hz without causing premature lamp failure;
- C. Provide an off setting that produces a zero lumen output; and
- D. For wall box dimmers and associated switches designed for use in three way circuit, be capable of turning lights off, and on to the level set by the dimmer if the lights are off.
- E. Indicator lights integral to lighting controls shall consume no more than one watt of power per indicator light.

Occupant Sensing Controls

Installed occupant sensing controls include occupant sensors, motion sensors, and vacancy sensors, including those with a Partial-ON or Partial- OFF function:

- A. Are capable of automatically turning the controlled lights in the area either off or down no more than 20 minutes after the area has been vacated;
- B. For manual-on controls, have a grace period of no less than 15 seconds and no more than 30 seconds to turn on lighting automatically after the sensor has timed out; and
- C. Provide a visible status signal that indicates that the device is operating properly, or that it has failed or malfunctioned. The visible status signal may have an override that turns off the signal.

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C. INSTALLED LIGHTING CONTROLS (CONTINUED)

Occupant Sensing Controls (Continued)

- D. Provide a visible status signal that indicates that the device is operating properly, or that it has failed or malfunctioned. The visible status signal may have an override that turns off the signal.
- E. Indicator lights integral to lighting controls shall consume no more than one watt of power per indicator light.
- F. NOTE: Occupant Sensing Control systems may consist of a combination of single or multilevel Occupant, Motion, or Vacancy Sensor Controls, provided that components installed to comply with manual-on requirements shall not be capable of conversion by occupants from manual-on to automatic-on functionality.
- G. Sensors that are used by occupant sensing controls to detect occupants shall meet all of the following requirements:
 - i. Shall not incorporate switches or mechanical devices that allow the sensor to be disabled without changing the settings of the control;
 - ii. Sensors that utilize ultrasonic radiation for detection of occupants shall comply with 21 C.F.R. part 1002.12, not emit audible sound and not emit ultrasound in excess of the decibel levels shown below in Table 110.9-A measured no more than five feet from the source, on axis;
 - iii. Sensors that utilize microwave radiation for detection of occupants shall comply with 47 C.F.R. parts 2 and 15 and not emit radiation in excess of 1 milliwatt per square centimeter measured at no more than 5 centimeters from the emission surface of the device.

TABLE 110.9-A - ULTRASOUND MAXIMUM DECIBEL VALUES

Mid-frequency of Sound Pressure Third-Octave Band (in kHz)	Maximum db Level within Third-Octave Band (in dB reference 20 micropascals)
Less than 20	80
20 or more to less than 25	105
25 or more to less than 31.5	110
31.5 or more	115

Interlocking Lighting Systems

Lighting systems installed in auditoriums, convention centers, conference rooms, multipurpose rooms or theaters:

- A. Must not have more than two lighting systems used for an area, and if there are two they must be interlocked.



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C. INSTALLED LIGHTING CONTROLS (CONTINUED) Interlocking Lighting Systems (Continued)

- B. The two lighting systems are interlocked with a non-programmable double throw switch to prevent simultaneous operation. For compliance with Part 6 a Nonprogrammable Double-Throw Switch is an electrical switch commonly called a "single pole double throw" or "three-way" switch that is wired as a selector switch allowing one of two loads to be enabled. It can be a line voltage switch or a low voltage switch selecting between two relays. It cannot be overridden or changed in any manner that would permit both loads to operate simultaneously.

 Controls in Videoconferencing Studio

If additional lighting power for a Videoconferencing Studio was included in the prescriptive compliance strategy on the NRCC-LTI-E:

- A. The Videoconferencing Studio must be a room with permanently installed videoconferencing cameras, audio equipment, and playback equipment for both audio-based and video-based two-way communication between local and remote sites; and
 B. General lighting must be switched in accordance with TABLE 130.1-A (see below); and
 C. Wall wash lighting is separately switched from the general lighting system; and
 D. All of the lighting in the studio, including general lighting, is controlled by a multi-scene programmable control system (also known as a scene preset control system).

TABLE 130.1-A MULTILEVEL LIGHTING CONTROLS AND UNIFORMITY REQUIREMENTS

Luminaire Type	Minimum Required Control Steps (percent of full rated power ¹)	Uniform level of illuminance shall be achieved by:
Line-voltage sockets except GU-24	Continuous dimming 10-100 percent	
Low-voltage incandescent systems		
LED luminaires and LED source systems		
GU-24 rated for LED		
GU-24 sockets rated for fluorescent > 20 W	Continuous dimming 20-100 percent	
Pin-based compact fluorescent > 20 W ²		
GU-24 sockets rated for fluorescent ≤ 20 W	Minimum one step between 30-70 percent	Stepped dimming; or Continuous dimming; or Switching alternate lamps in a luminaire
Pin-based compact fluorescent ≤ 20 W ²		
Linear & U-bent fluorescent ≤ 13 W		
Linear & U-bent fluorescent > 13 W	Minimum one step in each range:	Stepped dimming; or Continuous dimming; or Switching alternate lamps in each luminaire, having a
	20-40 % 50-70 % 75-85 % 100 %	



					minimum of 4 lamps per luminaire illuminating the same area and in the same manner
Track Lighting		Minimum one step between 30 – 70 percent			Step dimming; or Continuous dimming; or Separately switching circuits in multi-circuit track with a minimum of two circuits.
HID > 20 W		Minimum one step between 50 - 70 percent			Stepped dimming; or Continuous dimming; or Switching alternate lamps in each luminaire, having a minimum of 2 lamps per luminaire, illuminating the same area and in the same manner.
Induction > 25 W					
Other light sources					
1. Full rated input power of ballast and lamp , corresponding to maximum ballast factor 2. Includes only pin based lamps: twin tube, multiple twin tube, and spiral lamps					

D. INSTALLED TRACK LIGHTING

Identify each type of track lighting system component installed by checking the boxes below. Confirm functionality and labeling listed for all track lighting components has been installed.

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:

- A. Shall have the identical volt-ampere (VA) rating of the current limiter, as installed and rated for compliance with Part 6 clearly marked so that it is visible for the enforcement agency's field inspection without opening cover plates, fixtures, or panels, permanently marked on the circuit breaker and on a factory-printed label that is permanently affixed to a non-removable base-plate inside the wiring compartment;
- B. 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;
- C. 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 resubmittal of compliance documentation to the enforcement agency responsible for compliance with the California Title 24, Part 6 Building Energy Efficiency Standards."

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:

- A. Is a panelboard containing Supplementary Overcurrent Protection Devices as defined in Article 100 of the California Electrical Code, and used only with line voltage track lighting;

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D. INSTALLED TRACK LIGHTING (Continued)

- Track Lighting Supplementary Overcurrent Protection Panel (Continued)
 - B. 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 resubmittal of compliance documentation to the enforcement agency responsible for compliance with the California Title 24, Part 6 Building Energy Efficiency Standards."

E. ACCEPTANCE TESTS & FIELD VERIFICATION

Indoor lighting installations may require Acceptance Testing to comply with Title 24, Part 6. Please confirm below that coordination has been conducted with a certified Acceptance Testing Technician, or that there are no applicable NRCA documents required per the permitted NRCC-LTI-E or permitted NRCC-PRF-E*.*

- Field coordination has been conducted with a certified Acceptance Test Technician to complete the acceptance tests and NRCA documents indicated as required by the permitted NRCC-LTI-E or permitted NRCC-PRF-E, or
- The permitted NRCC-LTI-E or permitted NRCC-PRF-E do not indicate any NRCA forms as required documents.

** See Table U. on the permitted NRCC-LTI-E or Table P. on the permitted NRCC-PRF-E to determine if the NRCA-LTI forms are required for compliance. These documents must be provided to the building inspector by the installer before permit final and must be completed by a certified Acceptance Test Technician if the document name ends in a "-A".*

Commented [SB6]: The intention of this section is to ensure the installer knows when Acceptance Testing is required and confirm they are working with an Acceptance Test Tech. or Field Tech.

This will also help the inspector verify whether the installer worked with the ATT/FT.

If the installer checks that no AT is required, but the NRCC shows that it was, CEC can investigate the reason for the breakdown and figure out an appropriate solution.



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 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 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: