



**CALIFORNIA ENERGY COMMISSION**  
**2016 Building Energy Efficiency Standards**  
**California Code of Regulations, Title 24, Part 6**  
**Non-Residential Lighting Requirements Summary**  
**3/27/2018**

**Scope:**

The California Title 24 Part 6 - 2016 Building Energy Efficiency Standards is a building code. Title 24 is a broad set of requirements for “energy conservation, green design, construction and maintenance, fire and life safety, and accessibility” that apply to the “structural, mechanical, electrical, and plumbing systems” in a building. Lighting installations in all newly constructed buildings and alterations of existing buildings must meet applicable Title 24 requirements. This summary only covers non-residential lighting requirements.

**Requirements:**

California's current Building Energy Efficiency Standards have been in effect as of January 1, 2017. The 2016 Standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions/alterations to existing buildings. California's 2016 Standards now align with ASHRAE 90.1 2013 standards and include more stringent lighting power density limits for many indoor and outdoor spaces.

**There is no such thing as a Title 24 compliant lighting product as Title 24 does not dictate lighting product performance criteria. T24 compliance is dependent upon the building design and installation. The specific Title 24 lighting requirements vary depending on the installation application.**

Refer to the following sections of the Title 24 Code for detailed lighting requirements:

Section 100.1 – Definitions and rules of construction

Section 110.9 – Mandatory requirements for lighting control devices and systems, ballasts and luminaires

Section 130.0 – Lighting controls and equipment - general

Section 130.1 – Indoor lighting controls that shall be installed

Section 130.2 – Outdoor lighting controls and equipment

Section 130.4 – Lighting control acceptance and installation certificate requirements

Section 130.5 – Electrical power distribution systems

Section 140.3 – Prescriptive requirements for building envelopes

Section 140.6 – Prescriptive requirements for indoor lighting

Note: A summary of the applicable code sections is shown in the CEC-400-2015-037\_Table100A.

For non-residential buildings, there are mandatory requirements (requiring the use of lighting controls) and lighting power density limits. The Lighting Power Allotments are the established maximum lighting power (typically watts per square foot) that can be installed based upon the compliance approach used, the building type, and the type of primary function area. Lighting Power Allotments for an application are determined by one of the following four compliance approaches:

Prescriptive Approach – Complete Building Method

Prescriptive Approach – Area Category Method

Prescriptive Approach – Tailored Method

Performance Approach



## KEY INDOOR LIGHTING REQUIREMENTS

- Mandatory lighting controls are required:
  - MANUAL AREA CONTROLS (Section 130.1(a)).
  - MULTILEVEL LIGHTING CONTROLS (Section 130.1(b))
    - LED luminaires & LED source systems shall provide continuous dimming 10-100%.
    - HID luminaires shall provide a minimum one step dimming between 50–70%.
  - AUTOMATIC SHUT-OFF CONTROLS (Section 130.1(c)). Occupant Sensing Controls are required for some spaces.
  - DAYLIGHT HARVESTING (Section 130.1(d)).
  - DEMAND RESPONSE (Section 130.1(e)).
- Consider Lighting Power Allowances (LPA) and Lighting Power Density Adjustment Factors (PAF).

## KEY OUTDOOR LIGHTING REQUIREMENTS

- All outdoor lighting must be equipped with photocontrol OR an astronomical time switch device that turns OFF all lighting when sufficient daylight is available (Section 130.2(c)1).
- All outdoor lighting must be controlled independently from other electrical loads and must use an automatic scheduling control (Section 130.2(c)2). Outdoor lighting is no longer required to be separately circuited from other lighting, only separately controlled.
- Outdoor luminaires mounted at 24 feet or less from grade: Automatic dimming is required during vacant periods (Section 130.2(c)3). When an area is unoccupied, controls should automatically reduce the lighting power of each luminaire at least 40% but no more than 90% or provide continuous dimming through a range that includes 40-90%. When the area becomes occupied, controls should automatically increase light levels. No more than 1,500 watts of lighting power shall be controlled together.
- Outdoor luminaires mounted over 24 feet do not require motion sensors.
- Some applications with outdoor luminaires rated for greater than 150 watts must comply with uplight and glare limits in the Luminaire Cutoff Requirements (Section 130.2(b)). Backlight, Uplight, and Glare (collectively referred to as "BUG" in accordance with IES TM-15-11, Addendum A) requirements in T24:
  - 1. There are no Backlight requirements in Section 130.2 of Part 6; and
  - 2. Maximum zonal lumens for Uplight shall be in accordance with TABLE 130.2-A; and
  - 3. Maximum zonal lumens for Glare shall be in accordance with TABLE 130.2-B.
- Consider Lighting Power Allowances (LPA). The CEC has specified lighting power allowances based on project locations and whether the surrounding environment is wild (dark), rural (characterized by low ambient light levels) or urban (characterized by higher ambient light levels).

## Summary of key changes between the 2016 Code and 2013 Code:

1. Clarification and simplification of existing language; removing exceptions no longer relevant (§ 130.0 through § 130.5 and § 140.6 through § 140.8).
2. Reductions to lighting power density (LPD) values in TABLES 140.6-B, 140.6-C, and 140.6-G.
3. Removal/addition of power adjustment factors (PAFs) (§ 140.6(a)2).
4. Significant reductions in outdoor lighting power allowances (TABLE 140.7-A).
5. Clarification and streamlining of alteration requirements, including addition of a new compliance path that allows compliance by reducing the existing lighting power. For indoor lighting, this path foregoes bi-level control requirements but is otherwise identical to the 85 percent or less of lighting power allowance path.

## Code Compliance

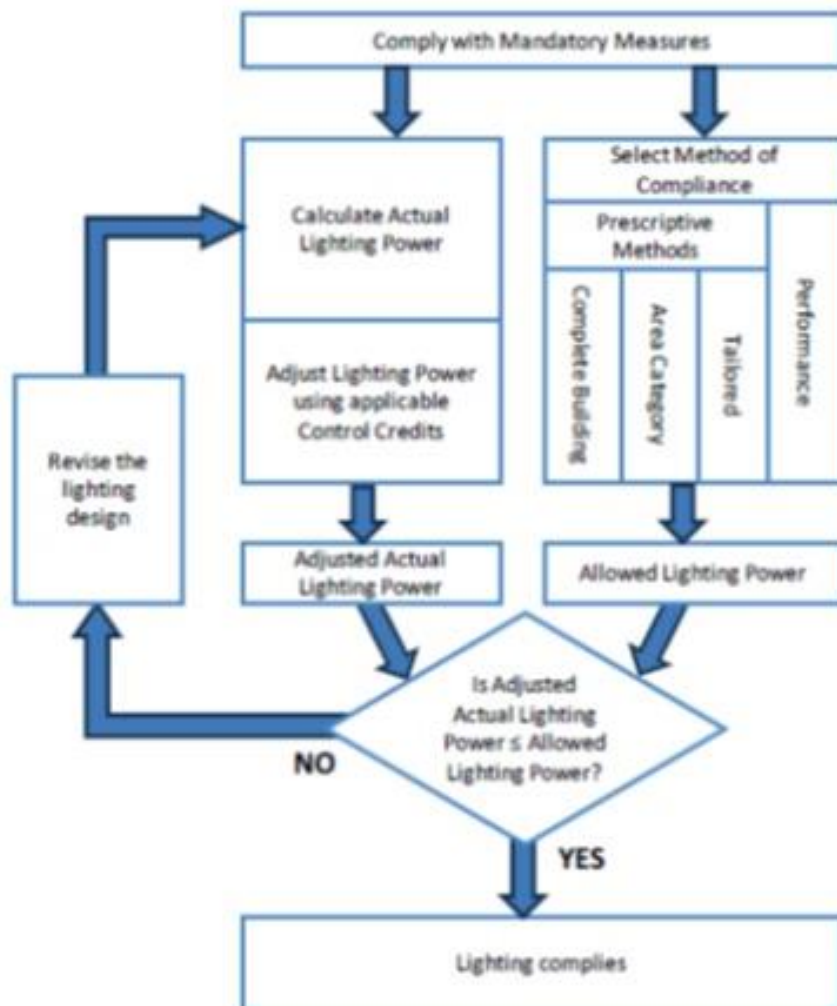
There are two steps required to comply with the Energy Standards.

1. Meet all mandatory requirements by installing required devices, including controls, and ensuring that they perform all required functions.
2. Select your method of compliance by choosing either the Performance Approach or the Prescriptive Approach.

The Prescriptive Approach is considered the most direct path to compliance. It is a set of prescribed performance levels for various building components, where each component must meet the required minimum efficiency. This approach is often used in retrofit projects.

The Performance Approach builds on the Prescriptive Approach by allowing energy allotments to be traded between building systems, such as lighting, HVAC or the building envelope. This compliance approach requires using energy analysis software approved by the Energy Commission to model the overall energy performance of a building. The performance approach is often used for new construction projects.

### Lighting Compliance Process Flow Chart Example





## **Finding Suitable Products**

Certain devices must be certified to the Energy Commission as meeting California's Appliance Efficiency Regulations (Title 20, Section 1601 – 1608 of the California Code of Regulations). Others are regulated only under the Energy Standards (Title 24, Part 6).

### **Products Regulated Under Title 20**

- Fluorescent lamp ballasts (Section 110.9(f))
- Self-contained lighting control devices (Section 110.9)
- Time-switch lighting controls: automatic time-switch controls, astronomical time-switch controls, multi-level astronomical time-switch controls, outdoor astronomical time-switch controls
- Daylighting controls: automatic daylight controls, photo controls
- Dimmers
- Occupant sensing controls: occupant sensors, motion sensors, vacancy sensors, partial-ON sensors, partial-OFF sensors
- Ceiling fan light kits
- Lamps
- Emergency Lighting
- Torchieres and Metal Halide Luminaires
- Power supplies

### **Products Regulated Under the Energy Standards**

The following lighting control devices are regulated under Section 110.9 of the Energy Standards only:

- Part-night outdoor lighting controls (Section 110.9(b)5)
- Track lighting integral current limiter
- Supplementary overcurrent protection panels for use with line-voltage track lighting
- Field-assembled lighting control systems

## **Venture Lighting Products**

Venture offers a broad range of lighting solutions to support California Title 24 compliance. For more information, please refer to individual product specs sheets which identify California Title 24 Ready products.

Notes:

- LED luminaires & source systems for indoor applications shall provide continuous dimming 10-100%.
- LED luminaires & source systems for outdoor applications mounted at 24 feet or less from grade shall provide continuous dimming 40-90%.
- Some applications require that outdoor luminaires rated for greater than 150 watts comply with uplight and glare Luminaire Cutoff Requirements (Section 130.2(b)).
- HID indoor luminaires shall provide a minimum one step dimming between 50–70%. All Venture HID lamps (excluding Natural White) and ballasts which can be dimmed at least 50% are California Title 24 Ready.
- HID outdoor luminaires mounted at 24 feet or less from grade: All Venture HID lamps (excluding Natural White) and ballasts which can be dimmed at least 40% are California Title 24 Ready.
- HID outdoor luminaires mounted over 24 feet: All Venture HID lamps and ballasts are California Title 24 Ready. Dimming is not required.



---

## REFERENCES

CEC-400-2015-037-CMF BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS

CEC-400-2015-038-CMF REFERENCE APPENDICIES

CEC-400-2015-033-CMF NONRESIDENTIAL COMPLIANCE MANUAL

CEC-400-2015-025-CMF-REV NONRESIDENTIAL ALTERNATIVE CALCULATION METHOD REFERENCE MANUAL

CEC-400-2015-039-CMF ALTERNATIVE CALCULATION METHOD APPROVAL MANUAL

CLTC NONRESIDENTIAL LIGHTING AND ELECTRICAL POWER DISTRIBUTION GUIDE

<http://www.energy.ca.gov/title24/2016standards/>

<http://energy.ca.gov/title24/2019standards/rulemaking/>

<https://cltc.ucdavis.edu/title24>