



Whats new in the 2013 Code?

Mandatory Changes for Title 24 Lighting Requirements

The provisions of Title 24 of the California Code of Regulations include requirements for the structural, plumbing, electrical and mechanical systems of buildings, and for fire and life safety, energy conservation, green design and accessibility in and about buildings. Therefore Title 24 is organized into separate parts, and each part is dedicated to a particular topic area. Energy conservation in buildings, including requirements for lighting systems, are included in Part 6, which is titled The California Energy Code. Part 6 includes requirements for both non-residential and residential lighting systems. For more information on the requirements of Title 24 go to: <http://www.energy.ca.gov/title24/> or the hotline to call 800-772-3300.

Non-Residential Lighting Requirements

The 2013 non-residential requirements have been extensively modified from the previous 2008 version. The updated requirements require lower lighting power densities in many spaces, and continue to mandate automatic lighting shut-off, daylighting control, and area and space controls. The indoor requirements have been expanded to include specific application requirements for on/off and hi-lo occupancy-based control, manual control, mandatory multi-level lighting control, demand response capability, energy use monitoring and reporting, and more specific daylighting control requirements. The outdoor control requirements have been expanded to require part-night

controls, and occupancy-based controls, depending upon area, pole height and light source type.

Multi Level Lighting Controls

In areas larger than 100ft², installed luminaires must:

- Have at least four steps of control, or continuous dimming, depending on lamp type.
 - Incandescent (line & low voltage): continuous dimming 10-100%
 - LED: continuous dimming 10-100%
 - Compact Fluorescent (GU-24 and pin-based) > 20W: continuous dimming 20-100%
 - Compact Fluorescent (GU-24 and pin-based) ≤ 20W: minimum one-step between 30-70%
 - Linear Fluorescent > 13W: minimum four-step, with steps in the following ranges (20-40%, 50-70%, 80-85%, 100%)
 - Other Light Sources (HID, Induction, Etc.) > 20W: minimum one step between 50-70%
- Must have at least one of the following types of controls for each luminaire:
 - Manual continuous dimming and ON/OFF control
 - Lumen maintenance
 - Tuning
 - Automatic daylighting controls
 - Demand responsive controls



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Wireless



Relay
Enclosure



Dynalite
Button Station

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Demand Responsive Controls

The 2013 code expands this requirement significantly, requiring that all nonresidential buildings $\geq 10,000$ ft² be capable of responding to a demand response signal so that:

- Total energy use for lighting can automatically drop to a level at least 15% below the building's maximum total lighting power.
- Lighting is reduced in a manner that creates consistent illumination through continuous or step dimming, based on lamp type.

Note: non-habitable and spaces with a lighting power density ≤ 0.5 W/ft² are excluded from being counted towards the building's total lighting power.

Automatic Daylight Controls

The 2013 code expands this requirement so that essentially all nonresidential spaces with skylights or windows will require auto-matic daylighting controls. The codes specifically states that sidelit spaces with controlled general lighting ≥ 120 W and skylit zones $\geq 5,000$ ft² require automatic daylighting controls. This change in criteria, from sizeable areas to modest lighting power use, significantly expands the number of spaces required to use photocontrols, affecting virtually every office or commercial space with sky-lights or windows.



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Additional Considerations

- Manual ON/OFF/DIM controls are required for independent areas. The only exception is a restroom, which does not require a switch
- Occupancy Sensors continue to be required in Offices ≤ 250 ft², Conference Rooms, Multipurpose Rooms < 1000 ft², and Classrooms.
- Occupancy based hi/lo required in:
 - Warehouse areas and aisles
 - Library stack areas
 - Corridors
 - Stairwells
 - Parking garages
 - Loading and unloading areas
- Philips Advance Optanium ballasts with step-dim capability for T5 and T8 fluorescent lamps represent an affordable, energy-efficient, and versatile lighting solution designed to meet California's Title 24 requirements to reduce power by 50% in stair-wells, aisles, and corridors, among other areas.



Optanium Ballast

Non-Residential Multi-level Lighting Controls and Uniformity Requirements		
Luminaire Type	Minimum Required Control Steps (Percent of Full Rated Power)	Uniform Level of Illuminance Shall Be Achieved by:
Line-voltage sockets except GU-24		
Low-voltage incandescent systems		Continuous dimming 10-100%
LED luminaires and LED source systems		
GU-24 rated for LED		
GU-24 sockets rated for fluorescents >20W		Continuous dimming 20-100%
Pin-based compact fluorescent >20W		
GU-24 sockets rated for fluorescents ≤20W	Minimum one step between 30-70%	<ul style="list-style-type: none"> • Stepped dimming or • Continuous dimming or • Switching alternate lamps in a luminaire
Pin-based compact fluorescent ≤20W		
Linear fluorescent and U-bent fluorescent ≤13W		
Linear fluorescent and U-bent fluorescent >13W	Minimum one step in each range: 20-40% 50-70% 80-85% 100%	<ul style="list-style-type: none"> • Stepped dimming or • Continuous dimming or • Switching alternate lamps in each luminaire, having a minimum of 4 lamps per luminaire, illuminating the same area and in the same manner
Track lighting	Minimum one step between 3 0-70%	<ul style="list-style-type: none"> • Stepped dimming or • Continuous dimming or • Separately switching circuits in a multi-circuit track with a minimum of two circuits
HID >20W		<ul style="list-style-type: none"> • 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 >25W		
Other light sources	Minimum one step between 50-70%	

Alterations and Luminaire Modifications in Place

The 2013 updates to Title 24 contains refined and expanded requirements for renovation and retrofit projects. Requirements are now provided for three categories. These include “new additions,” “alterations,” and “luminaire modification in place.” New additions and any space with a lighting system installed for the first time must meet the same lighting requirements as newly constructed buildings. This means that all mandatory measures for both the prescriptive and performance method of compliance must be met. Title 24 has specific lighting control requirements for lighting alterations and luminaire-modifications-in-place. These requirements are based upon the quantity of luminaires being altered or replaced, and upon the installed lighting power density. The detailed requirements can be found in Subchapter 6, Section 141.0, and in Tables 141.0-E and 141.0-F.

Non Residential Outdoor Lighting Changes

Outdoor lighting, too, includes some major changes. Motion sensor controls are now required, in addition to photocontrols and scheduling controls, for all outdoor lighting mounted 24 feet above the ground or lower and for any incandescent luminaires over 100 watts. Controls must reduce lighting power to each luminaire by at least 40% when the lights are not in use. Applied statewide, the new requirements for adaptive parking and garage lighting are designed to yield significant energy savings.

- Lighting Power Allowances reduced for most lighting
 - Site lighting cutoff requirements will be governed by Uplight and Glare requirements per IES TM-15-11; the Cutoff Classification System has been abandoned
 - No more than 1,500 Watts of outdoor lighting power shall be controlled together
- All outdoor incandescent luminaires rated over 100 W installed for non-residential use must be controlled by a motion sensor.
- Parking Garages will require more comprehensive control schemes for primary and secondary daylight areas
 - Parking garages, parking areas, and loading and unloading, general lighting must be controlled by occupant-sensing controls having at least one control step between 20% and 50% of design lighting power.
 - Parking garages will be allowed a maximum of 500W per occupancy sensor



DynaDimmer



VizorLED

Residential Lighting Changes

The 2013 residential code increases energy efficiency standards for skylights and windows, and it updates and clarifies requirements for lighting in kitchens, bathrooms, garages, utility rooms, and other spaces.

- Electronic Ballasts for fluorescent lamps rated ≥ 13 W must be electronic and have an output frequency ≥ 20 kHz.
- High-efficacy luminaires must be switched separately from low-efficacy luminaires
- A minimum of 50% of the total rated wattage of permanently installed lighting in kitchens must be high-efficacy lighting.
- Bathrooms require at least one high-efficacy luminaire in each bathroom. All other lighting must be high efficacy or controlled by vacancy sensors.
- Luminaires must be switched with readily accessible controls that permit manual on / off switching
- Due to Federal regulations affecting typical 40W and 60W A Lamps, Globes and decorative with medium bases rated > 40 W, will no longer be able to be manufactured (*Section 321 EISA—Some exclusions apply*)
- For single-family residential buildings, outdoor lighting permanently attached to a residential building or other buildings on the same lot must generally be high efficacy.



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A-shape



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