



CALIFORNIA STATEWIDE UTILITY CODES AND STANDARDS PROGRAM

2019 Title 24 Codes & Standards Enhancement (CASE) Proposal

Nonresidential Lighting Alterations

September 8th 2016

Energy Solutions





2019 Title 24 Code Cycle and Alterations

- No proposed code changes at this time.
- Need to quantify the effect of expected lower 2019 Lighting Power Densities (LPDs) on energy savings from alterations, particularly from 50% / 35% wattage reduction compliance option.



2016 Title 24 Lighting Alterations: Triggers

Triggers for Entire Luminaire Alteration	Triggers for Luminaire Component Modification
<ul style="list-style-type: none">• Removing and reinstalling (same luminaires) $\geq 10\%$ of existing luminaires; OR• Replacing or adding entire luminaires (3+ luminaires); OR• Adding, removing, or replacing walls or ceilings along with any redesign of the lighting system (3+ luminaires).	<ul style="list-style-type: none">• Component modifications in place (replacing ballasts or drivers and the associated lamps, permanently changing the light source, or the optical system); AND• ≥ 70 existing luminaires per floor per tenant per year are modified. <p>Note: lamp replacements alone and ballast replacements alone are not a modification if installed and powered w/o modifying the luminaire.</p>

Exempt Projects: ≤ 2 luminaires are replaced or reinstalled.



2016 Title 24 Lighting Alterations: Compliance Options for Entire Luminaire and Component Modification

Compliance Option	Control Requirements
Option 1 ≤ 85% of LPD allowance	<ul style="list-style-type: none">• Manual area controls• Multi-level lighting controls OR two level lighting control for each enclosed space (≥100 sf/enclosed space and lighting load >0.5 W/sf)• Auto shut-off controls
Option 2 > 85% and ≤ 100% of LPD allowance	<ul style="list-style-type: none">• Manual area controls• Multi-level lighting controls (≥100 sf/enclosed space and lighting load >0.5 W/sf)• Auto shut-off controls• Auto daylighting controls• Demand responsive controls (> 10,000 sf/single building AND ONLY when the alteration also changes the area of the space, changes the occupancy type of the space, or increases the lighting power)
Option 3 wattage reduction <ul style="list-style-type: none">• 50% for office, retail, and hotel• 35% for all other	<ul style="list-style-type: none">• Manual area controls• Auto shut-off controls (except 130.1(c)1D, separate shut-off controls for display/ornamental; 130.1(c)6B, full or partial off occupancy sensing in library stacks; 130.1(c)6C, full or partial off occupancy sensing in corridors and stairwells; 130.1(c)7A, partial off occupancy sensing in corridors and stairwells in hotels; 130.1(c)8, guest room card key/occupancy sensing)



2016 Title 24 Lighting Wiring Alterations

Triggers	Requirements
<p>Wiring alterations that:</p> <ul style="list-style-type: none">• Add a circuit feeding luminaires; OR• Replace, modify, or relocate wiring b/w a switch or panelboard and luminaires; OR• Replace lighting control panels, panelboards, or branch circuit wiring.	<ul style="list-style-type: none">• $\leq 100\%$ of LPD allowance• Manual area controls• Multi-level lighting controls OR two level lighting control (for each enclosed space)• Auto shut-off controls (some)• Auto daylighting controls (ONLY where wiring alterations include ≥ 10 luminaires within the primary sidelit daylit zone or the skylit daylit zone)



Summary of 2016 Title 24 Requirements

Lighting Alterations Quick Reference	LPD	area switch	area switch	not override cntrls	separate switch display	dimming	bi-level switching	auto-shut-off either	auto-shut-off, separate display	countdown switches	timeclock timed override	holiday feature time clock	occ sensor only - class, conf rm	motion partial off: warehouse	motion partial off: library	motion partial off: corridor, stair	motion partial off hotel corridors	motion partial off garage	guestroom key card/occ sensor	auto daylighting controls - primary sidelit and skylit	auto daylighting parking garage	demand response > 10,000 sf
	140.6	130.1(a)1	130.1(a)2	130.1(a)3	130.1(a)4	130.1(b)	Multi-level	130.1(c)1A-C	130.1(c)1D	130.1(c)2	130.1(c)3	130.1(c)4	130.1(c)5	130.1(c)6A	130.1(c)6B	130.1(c)6C	130.1(c)7A	130.1(c)7B	130.1(c)8	130.1(d)2	130.1(d)3	130.1(e)
2016 Adopted																						
Entire Luminaire 141.0(b)2Ii > 10%/space	> 85% <100%	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	120 W	60 W	Y
Entire Luminaire 141.0(b)2Ii > 10%/space	< 85%	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Entire Luminaire 141.0(b)2Iii: 50% less power than existing office, retail, hotel, 35% other	NA	Y	Y	Y				Y		Y	Y	Y	Y	Y				Y				
Component Modification, 141.0(b)2Ji: > 70 luminaires/project, > 10%/space	> 85% <100%	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	120 W	60 W	Y
Component Modification, 141.0(b)2Ji: > 70 luminaires/project, > 10%/space	< 85%	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Component Modification, 141.0(b)2Jii: > 70 luminaires/project, 50% less power than existing office, retail, hotel, 35% other	NA	Y	Y	Y				Y		Y	Y	Y	Y	Y				Y				
Wiring Alterations 140.1(b)2K > 2 luminaires	<100%	Y	Y	Y			Y	Y			Y	Y								10+ L	10+ L	



Feedback Request from Stakeholders

To provide input, please call or email

CASE Report Lead

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