

Nonresidential Interior Lighting – Alterations

Lighting Alteration Compliance Methods

One-for-One Alteration Method (typically called retrofit projects) (§141.0(b)2iii) includes permanently changing the light source, changing the optical system (e.g., reflectors), replacing lamps along with new ballast and/or drivers, and replacing the entire luminaire at the existing location. Limited to buildings and tenant spaces (in multi-tenant buildings) ≤ 5,000 ft² that can show 40% reduction of installed wattage. Energy Code is not triggered when ≤ 50 luminaires per floor or tenant space are altered per year.

Entire Luminaire Alteration Method (§141.0(b)2i and ii) includes removing and reinstalling ≥ 10% of the existing luminaires, replacing and/or removing ≥ 10% of luminaires in an enclosed space, and redesign of the lighting system. Excludes enclosed spaces with only one luminaire. The Area Category Method (§140.6) is used to determine the maximum wattage allowance per space type, which will dictate lighting control requirements.

Rewiring Alteration (§141.0(b)2l) includes replacing or adding lighting circuits, and relocating, modifying or replacing wiring between switch, panels and/or luminaires. Alterations to components of the lighting wiring must meet all applicable requirements in §141.0(b)2l. For example, relocating an existing area control must meet all applicable requirements in §130.1(a), since they are included in §141.0(b)2l. These projects will need to meet the manual area control requirements. Separation of general lighting from other types of lighting such as decorative lighting is only required for new or complete replacement of lighting circuits. Existing controls functionality must be maintained, but they may be expanded upon.

When is the Energy Code Triggered? Example Project Scopes

Replacing/upgrading lamp and nothing else being done to the luminaire (<i>considered a repair</i>)	No
Replacing/upgrading <10% of the luminaires in an enclosed space (<i>alteration exception</i>)	No
Replacing/upgrading ≥10% of the lamps and replacing ballast with same ballast type per enclosed space (<i>considered an alteration</i>)	Yes
Upgrading luminaire by adding an LED driver or upgrading the ballast (<i>considered a One-for-One Alteration</i>)	Yes
Removing luminaires and nothing else (<i>not considered an alteration</i>)	No
Removing and upgrading ≥10% luminaires (upgrading ballast and/or adding LED driver) (<i>considered an alteration</i>)	Yes
Upgrading lamp and ballast/driver for an enclosed space with only one luminaire (<i>alteration exception</i>)	No
Adding lighting controls to a space and nothing else (<i>rewiring exception</i>)	No
Adding/replacing lighting circuits (<i>rewire trigger for area controls</i>)	Yes
Adding walls and not changing the luminaires (area controls required) (<i>not considered an alteration</i>)	No
Taking down ≥10% of the luminaires, then putting them back up for asbestos abatement (<i>alteration exception</i>)	No
Taking down ≥10% of the luminaires, then putting them back up in same place (i.e., painting the ceiling) (<i>considered an alteration</i>)	Yes
Altering the luminaires while also remodeling the space (i.e., changing or removing walls) (<i>considered an alteration</i>)	Yes
Changing the reflected ceiling plan (relocating and/or adding luminaires) (<i>considered an alteration</i>)	Yes

Lighting Alteration Compliance Method Options: Retrofit (One-for-One Alteration) Project

Project Scope has Triggered Code <i>Determine which compliance method can be used</i>	One for One	Using ≤80% LPD	Using >80% LPD
When project alters >50 luminaires a year in a ≤5,000 ft² building or in each ≤5,000 ft² tenant space (or all common areas) in a multi-tenant building while reducing the existing wattage by ≥40% of all altered luminaires combined	Yes	Yes	Yes
Project limited to: <ul style="list-style-type: none"> • >50 luminaires altered in a year • >5,000 ft² building or each >5,000 ft² tenant space (or all common areas) in a multi-tenant building AND/OR • Reducing the existing wattage by <40% of all altered luminaires combined 	No	Yes	Yes
Project is not eligible for the One-for-One Alteration Method but is able to show that post-altered + existing-to-remain luminaire wattage of each room is ≤80% of the wattage allowed per Table 140.6-C (Area Category Method)	No	Yes	Yes
Project is not eligible for the One-for-One Alteration Method but is able to show that post-altered + existing-to-remain luminaire wattage of each room is >80% of the wattage allowed per Table 140.6-C (Area Category Method)	No	No	Yes

If a retrofit project also includes changing the reflected ceiling plan by adding or relocating luminaires, or if rewiring, see Entire Luminaire Alteration Method

**Lighting Alteration Compliance Method Options:
Entire Luminaire Alteration Project**

Project Scope has Triggered Code <i>Determine which compliance method can be used</i>	One for One	Using ≤80% LPD	Using >80% LPD
Project is able to show that post-altered + existing-to-remain luminaire wattage of each room is ≤80% of the wattage allowed per Table 140.6-C (Area Category Method)	No	Yes	Yes
Project is able to show that post-altered + existing-to-remain luminaire wattage of each room is >80% of the wattage allowed per Table 140.6-C (Area Category Method)	No	No	Yes
Along with changing the reflected ceiling plan, the space will also be remodeled (i.e., revised walls, ceilings and floors)	Yes	Yes	Yes
Rewiring the space (or the building) including new circuits	See rewiring alteration		

Mandatory Controls <i>Requirements Based on Lighting Alteration Compliance Method Used</i>		Entire Luminaire Alteration Method <i>Excluding spaces with only 1 luminaire</i>		One-for-One Alteration Method
Acceptance testing requirements of §130.4 are not required for alterations where lighting controls are added/altere to control ≤20 luminaires for the entire permitted project (for indoor, outdoor and sign lighting)		Using >80% of allowed LPD	Using ≤80% of allowed LPD	Total Wattage Reduced ≥40%
Manual Area Controls (on/off): §130.1(a)1, 2 and 3 For each enclosed space • Excluding >0.2 W/ft ² egress lighting		Yes	Yes	Yes
		<i>Separate switching for "general" and "other" not required for shared circuits</i>		
Multi-level Control: §130.1(b) • Enclosed spaces ≥ 100 ft ² AND • Connected lighting load >0.5 W/ft ² • Excluding restrooms • Excluding Healthcare Facilities		Yes <i>Only for modified luminaires</i>	No	No
Auto Shut-Off Control: §130.1(c)1-8 <i>Excluding Healthcare Facilities</i>	Whole Bldg. Shut-Off: §130.1(c)1-4	Yes	Yes	Yes
		<i>Separate switching for "general" and "other" not required for shared circuits</i>		
	Partial-ON, Vacancy or Occupancy Sensor: §130.1(c)5	Yes	Yes	Yes
		<i>In offices ≤ 250 ft², multipurpose rooms < 1,000 ft², and classrooms, conference rooms and restrooms of any size</i>		
	Partial-OFF: §130.1(c)6-7 §130.1(c)6A: Warehouse aisle/stacks §130.1(c)6B: Library book stacks §130.1(c)6C and 7A: Stairs and corridors §130.1(c)7B: Parking garages	Yes	Yes	Yes
	Hotel/motel room auto shut-off: §130.1(c)8	Yes	Yes	Yes
Primary Daylight Control: §130.1(d) • ≥ 120 watts in primary/skylit zone(s) (parking garage ≥ 60 watts) AND • ≥ 24 ft ² fenestration (parking garage ≥ 36 ft ²) • Excluding areas shaded per Exceptions 1 and 2 • Excluding retail merchandise sales/wholesale showroom sidelit zones		Yes	No	No
Demand Response: §110.12(c) • Permitted area >10,000 ft ² • Excluding spaces ≤ 0.5 W/ft ² • Excluding where health & safety do not permit reduced lighting		Yes	No	No

Operation of existing controls must not be removed or altered with lighting alteration project.

See Title 20 Appliance Efficiency Regulations for additional LED General Service and Small Diameter Directional Lamp requirements.

For More Information

Primary Sources

- Energy Code Section 110.9 – Mandatory Requirements for Lighting Controls
energycodeace.com/site/custom/public/reference-ace-2019/Documents/section1109mandatoryrequirementsforlightingcontrols.htm
- Energy Code Section 110.12 – Mandatory Requirements for Demand Management
energycodeace.com/site/custom/public/reference-ace-2019/Documents/section11012mandatoryrequirementsfordemandmanagement.htm
- Energy Code Section 130.1 – Mandatory Indoor Lighting Controls
energycodeace.com/site/custom/public/reference-ace-2019/Documents/section1301mandatoryindoorlightingcontrols.htm
- Energy Code Section 130.4 – Lighting Control Acceptance and Installation Certificate Requirements
energycodeace.com/site/custom/public/reference-ace-2019/Documents/section1304lightingcontrolacceptanceandinstallationcertificatere.htm
- Energy Code Section 140.6 – Prescriptive Requirements for Indoor Lighting
energycodeace.com/site/custom/public/reference-ace-2019/Documents/section1406prescriptiverequirementsforindoorlighting.htm
- Energy Code Section 141.0 – Additions, Alterations, and Repairs to Existing Nonresidential, High-Rise Residential, and Hotel/Motel Buildings, to Existing Outdoor Lighting, and to Internally and Externally Illuminated Signs
energycodeace.com/site/custom/public/reference-ace-2019/Documents/section1410additionsalterationsandrepairsstoexistingnonresidential1.htm
- Title 20 Appliance Efficiency Regulations
energycodeace.com/content/reference-ace-t20-tool

California Energy Commission Information & Services

- Energy Code Hotline: 1-800-772-3300 (Free) or Title24@energy.ca.gov
- Online Resource Center:
www.energy.ca.gov/programs-and-topics/programs/buildingenergy-efficiency-standards/online-resource-center
 - The Energy Commission’s main web portal for the Energy Code, including information, documents and historical information

Additional Resources

- California Lighting Technology Center (CLTC) Guides:
 - Nonresidential Lighting: What’s New in the 2019 Title 24, Part 6 Code?
cltc.ucdavis.edu/article/nonresidential-lighting-whats-new-2019-title-24-part-6-energy-code
- Energy Code Ace:
EnergyCodeAce.com
 - An online “one-stop-shop” providing free resources and training to help appliance and building industry professionals decode and comply with Title 24, Part 6 and Title 20. The site is administered by California’s investor-owned utilities.
Of special interest:
 - Fact Sheets
energycodeace.com/content/resources-fact-sheets/
 - Healthcare Facilities 2019
 - Nonresidential Daylighting and Daylighting Controls 2019
 - Nonresidential Electrical Power Distribution (EPD) 2019
 - Nonresidential Mandatory Lighting Controls 2019
 - State-Regulated Lamps - Lighting the Way to Efficiency
 - Title 20 Lighting FAQ
 - Application Guides
energycodeace.com/content/resources-ace/file_type=application-guide
 - Nonresidential Lighting and Electrical Power Distribution 2019
 - Training
EnergyCodeAce.com/training
 - 2019 Title 24, Part 6 Essentials on Demand – Nonresidential Standards: Using the Lighting Wheel
 - Decoding 2019 Title 24, Part 6: Let’s Talk Healthcare Facilities
 - Decoding What’s New: Let’s Talk 2019 Title 24, Part 6 – Nonresidential

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