



Use this checklist when the project involves one or more of the following:

- **Opaque Envelope:** Alters the home’s solid doors, raised floor or walls – exterior or demising (separates enclosed conditioned space from unconditioned space)
- **Lighting:** Replaces, alters or adds any permanently-installed luminaires within the home or attached to its exterior
- **Ventilation:** Replaces or adds kitchen hood; replaces, alters or adds bathroom exhaust system
Refer to other Permit Technician Checklists if the project also includes alterations to attics, rafter roofs, roofing materials (i.e., reroofing), fenestration, HVAC or water heating.

* This checklist is not intended to support projects in which the enforcement agency requires building design plans and specifications to be submitted with the application for a building permit.

ESSENTIALS

Opaque Envelope §150.0(b)(c)(d)

1. Does the project trigger California’s Building Energy Efficiency Standards (Energy Code or Title 24, Part 6)?

YES NO

- The project triggers the Energy Code if the home’s raised floor or any wall is opened up (made accessible) or rebuilt in the same location, or if solid exterior doors are replaced.

2. Does it meet Energy Code requirements?

- 1) All joints, penetrations and other openings in the building envelope that are potential sources of air leakage must be caulked, gasketed, weather stripped or otherwise sealed.
- 2) Any altered walls and raised floors must be insulated to meet the requirements listed below to comply, even if there was no existing insulation.

Opaque Envelope Component	U-factor (area weighted average)		R-value	Section of Energy Code; Joint Appendix JA4
<ul style="list-style-type: none"> • Wall (wood framed): 2 x 4, above grade^B 2 x 6, above grade 	<ul style="list-style-type: none"> ≤0.102 ≤0.071 	or ^A	<ul style="list-style-type: none"> (between wood framing) ≥ R-13 ≥ R-20 	150.0(c); JA4.3.1
<ul style="list-style-type: none"> • Wall (masonry mass): Above Grade, insulation on interior Above Grade, insulation on exterior Below Grade, insulation on interior Below Grade, insulation on exterior 	<ul style="list-style-type: none"> ≤0.077 ≤0.125 ≤0.077 ≤0.200 	or ^A	<ul style="list-style-type: none"> ≥ R-13 ≥ R-8 ≥ R-13 ≥ R-5 	150.1(c)1Bii; JA4.3.6 and JA4.3.14
<ul style="list-style-type: none"> • Raised Floor (wood framed)^C 	≤0.037	or ^A	≥ R-19	150.0(d); JA4.4.1
<ul style="list-style-type: none"> • Solid Door or less than 25% glazing 	≤0.20		N/A	150.1(c)5

Lighting §150.0(k)

1. Does the project trigger California’s Energy Code?

- The project triggers the Energy Code when any permanently-installed lighting is altered, added or replaced.
Permanently-installed luminaires are those that are hardwired to the home or any other structure.
- The project does NOT trigger the Energy Code if it involves portable lighting plugged into a traditional outlet, such as a floor lamp.

YES NO

2. Does it meet Mandatory Energy Code requirements? (Lighting has no Prescriptive requirements.)

- First, installed luminaires must officially qualify as “high luminous efficacy.”

YES NO

Mandatory High Luminous Efficacy Requirements for Indoor and Outdoor Light Sources

Location	Light Sources NOT Required to be JA8 Certified	Light Sources Required to be JA8 Certified ^D
<ul style="list-style-type: none"> • Indoor 	<ul style="list-style-type: none"> • Pin-based linear fluorescent with electronic ballast • Pin-based compact fluorescent with electronic ballast • Inseparable Solid State Lighting (SSL) luminaires with colored light sources to provide decorative lighting • Ceiling fan light kits subject to federal appliance regulations 	JA8-certified light sources are required for the following: <ul style="list-style-type: none"> • LED luminaires with white, integral light sources that are not decorative • Screw-based LED lamps • Pin-based LED lamps • Any light source not otherwise listed
<ul style="list-style-type: none"> • Outdoor 	<ul style="list-style-type: none"> • High-intensity discharge (HID) light sources such as pulse-start metal halide and high-pressure sodium light sources • Luminaires with hardwired high frequency generator and induction lamp • LED light sources that are installed outdoors 	JA8-2022-E-certified lamps are required for the following: <ul style="list-style-type: none"> • Enclosed or recessed lamps and luminaires • Recessed ceiling downlights^E

Content adapted from Table 150.0-A and Table 160.5-A

- Additionally, there are Mandatory lighting **control** requirements.^F

Mandatory Lighting Controls for Installed Luminaires					
Location	Control Requirements				Special Considerations
	Auto-Off Sensor	Dimmer	Pressure Switch	On/Off Switch	
Habitable Spaces: <i>Such as kitchens, bedrooms, living rooms, offices, dining rooms</i>	Vacancy or occupancy auto-off sensors are not required.	Lighting in habitable spaces must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase-cut dimmers controlling LED light sources must comply with NEMA SSL 7A. Dimmers are not required when: <ul style="list-style-type: none"> • Vacancy or occupancy auto-off sensors are used • Luminaires connect to a circuit with controlled lighting power <20 watts 	Lighting internal to drawers and cabinetry with opaque fronts or doors requires controls that turn lights off when the drawer or door is closed. The lighting does not require dimmers.	On/off switches must be readily accessible wall-mounted manual controls, allowing occupants easy control of lighting in the space. Ceilings fans with integral lighting can be controlled with remote control.	Exhaust fans must be controlled separately from lighting. Under-cabinet, under-shelf and display case lighting must be switched separately from ceiling installed lighting. Energy Management Control Systems (EMCS) can be used if they meet Energy Code lighting control requirements and comply with §150.0(k)2 or §160.5(a)2 EMCS requirements.
Bathrooms Laundry or Utility Rooms Walk-in Closets Garages: <i>Attached or unattached</i>	At least one luminaire in each of these rooms must be controlled with a vacancy or occupancy sensor with auto-off function.	Dimmers are not required for nonhabitable spaces.	Same as above	Same as above	Exhaust fans must be controlled separately from lighting. Under-cabinet, under-shelf and display case lighting must be switched separately from ceiling installed lighting. Energy Management Control Systems (EMCS) can be used if they meet Energy Code lighting control requirements and comply with §150.0(k)2 or §160.5(a)2 EMCS requirements. Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages.
Other Nonhabitable Spaces: <i>Such as attic spaces, non-walk-in closet, detached storage buildings</i>	Vacancy or occupancy auto-off sensors are not required.	Same as above	Same as above	Same as above	Exhaust fans must be controlled separately from lighting. Under-cabinet, under-shelf and display case lighting must be switched separately from ceiling installed lighting. Energy Management Control Systems (EMCS) can be used if they meet Energy Code lighting control requirements and comply with §150.0(k)2 or §160.5(a)2 EMCS requirements. Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages.
Navigation Lighting: <i>Night lights, step lights, path lights</i>	Same as above	Dimmers are not required when lighting is <5 watts.	NA	Same as above	
Blank Electrical Boxes: <i>>5 ft above floor</i>	Each box must be controlled by a vacancy sensor, occupancy sensor, dimmer, low voltage wiring or a fan speed control.				The number of blank electrical boxes must be no greater than the number of bedrooms.
Outdoors: <i>Lighting attached to single-family homes, duplexes or townhomes or to any other building on the properties</i>	Sensor types allowed include: <ul style="list-style-type: none"> • Photocell and motion sensor OR • Photocell and time switch OR • Astronomical time clock OR • An EMCS that works like any of the above Controls that override to ON are not allowed unless the override automatically reactivates within 6 hours. Internally illuminated signs must meet nonresidential sign lighting power requirements §140.8, or use no more than 5 watts.			On/off switches are required to allow all other outdoor control functions to work automatically.	Landscape lighting is exempt. Outdoor lighting not attached to buildings on single-family, duplex or townhome properties is exempt.



Ventilation §150.0(o) per ASHRAE Standard 62.2

1. Does the project trigger California’s Energy Code?

- The project triggers Energy Code when a kitchen or bathroom is remodeled and changes are made to the local exhaust systems (kitchen exhaust fan, kitchen hood used as local exhaust fan, or bathroom exhaust fan). YES NO

2. Does it meet Mandatory Energy Code requirements?

- **Bathroom:** Per ASHRAE 62.2 §5.1, each bathroom shall include a local mechanical exhaust that is either demand controlled (50 cfm) or continuous (20 cfm). YES NO
- **Kitchen:** Per ASHRAE 62.2 §5.1, each kitchen shall include a local mechanical exhaust as follows:
 - If the existing kitchen range hood was installed under the 2008 to 2016 Energy Codes and is replaced in the exact same location, the requirements for ventilation are based on the Energy Code when the range hood was originally installed, or 100 cfm, whichever is greater.⁶
 - If kitchen was built before 2008, none of the kitchen ventilation requirements will apply. If the kitchen range hood changes location or was installed under the 2019 Energy Code it must meet the following 2022 Energy Code requirements:
 - Demand Controlled Vented Kitchen Range Hood: The 2022 Energy Code requires enclosed or nonenclosed kitchens to have an HVI or AHAM certified kitchen range hood meeting minimum airflow and sound ratings.
For kitchen range hoods installed in a new location or kitchen range hoods replacing ones originally installed under the 2019 Energy Code, the airflow capacity is now determined by the kitchen range fuel source and dwelling unit size (see table below). The sound rating must be ≤3.0 sones measured at no less than 100 cfm. The kitchen range hoods must be verified by a HERS rater.
 - Local Exhaust Fan: Required when no kitchen hood is installed. Either demand controlled (enclosed kitchen ≥300 cfm or 5 air changes per hour (ACH), nonenclosed kitchen ≥300 cfm) or continuous for enclosed kitchens at 5 ACH.

Kitchen Range Hood Airflow Rates (cfm) and ASTM E3087 Capture Efficiency (CE) Ratings per Dwelling Unit Floor Area and Kitchen Range Fuel Type (adapted from Table 150.0-G)		
Dwelling Unit Floor Area (ft ²)	Hood Over Electric Range	Hood Over Natural Gas Range
>1500	50% CE or 110 cfm	70% CE or 180 cfm
>1000 - 1500	50% CE or 110 cfm	80% CE or 250 cfm
750 - 1000	55% CE or 130 cfm	85% CE or 280 cfm
<750	65% CE or 160 cfm	85% CE or 280 cfm

3. Are the necessary Prescriptive forms included with the permit application?

There are no Certificate of Compliance (CF1R) forms required for opaque envelope, lighting or ventilation alterations, only a Certificate of Installation (CF2R) form. A Certificate of Verification (CF3R) will be required if a kitchen hood is used for local kitchen exhaust, to be completed prior to final building inspection. As a result, no additional forms must be submitted with the permit application, though a Mandatory Measures summary is recommended (see “2022 Low-Rise Residential Mandatory Measures Summary”^H).

A – H See page 5 for notes.



Required Documentation

Are Certificates of Compliance (CF1R forms) required?

- The **CF1R-ALT-05-E** or **CF1R-ALT-01** may be used to show compliance for envelope alterations, though it is not required if the project only includes the alterations listed above.
- There are no CF1R forms that would apply to lighting or ventilation alterations.

Will Home Energy Rating System (HERS) verification be required?

- When a kitchen hood is used for the local kitchen exhaust system, HERS verification is required.
- There are no HERS measures associated with Residential envelope and lighting alteration projects.

What forms will the building inspector require?

- The inspector will look for the following forms, which are completed by the installing contractor:
 - **Envelope:**
CF2R-ENV-03-E: Certificate of Installation for Insulation Installation – for HERS Registered Projects **or**
CF2R-ALT-05-E: Certificate of Installation for Prescriptive Residential Alterations That Do Not Require HERS Field Verification
 - **Lighting:**
CF2R-LTG-01-E: Certificate of Installation for Prescriptive Lighting for Single-Family Dwellings
 - **Ventilation:**
CF2R-MCH-27a-H: Certificate of Installation for Indoor Air Quality and Mechanical Ventilation
CF3R-MCH-27a-H: Certificate of Verification for Indoor Air Quality and Mechanical Ventilation (completed by HERS Rater when kitchen hood is local exhaust)
CF2R-MCH-32-H: Certificate of Installation for Local Mechanical Exhaust
CF3R-MCH-32-H: Certificate of Verification for Local Mechanical Exhaust

Projects That Replace Only Lamps or a Single Luminaire

What if the Alteration project only involves replacing one luminaire? Does this trigger the Energy Code?

- Yes, if the work is being done under a Building Permit, even just one luminaire replacement triggers the Mandatory requirements of Title 24, Part 6.
- The Energy Code is not triggered for simple light bulb or lamp replacements that do not involve a Building Permit.

Confirming Luminaire JA8 Compliance

What resources can I direct permit applicants to in order to find out whether a particular make and model of luminaire is certified to the Energy Commission as JA8 compliant?

- Certified products will appear on the Energy Commission's **Modernized Appliance Efficiency Database System (MAEDbS™)**, a publicly-available database that lists all regulated products that are legally allowed to be sold or offered for sale in California: cacertappliances.energy.ca.gov/Login.aspx.
- Products certified under the 2022 Energy Code will have updated "JA8-2022" or "JA8-2022-E" markings.

Confirming Kitchen Hood Compliance

What resources can I direct permit applicants to in order to find out whether a particular make and model of a kitchen hood meets the airflow and sound requirements?

- Certified products will appear on the **Home Ventilating Institute (HVI)** or the **Association of Home Appliance Manufacturers (AHAM)** websites (HVI: www.hvi.org/; AHAM: www.aham.org/).

Performance Approach "Trade-Offs"

Does the Performance Approach allow for trade-offs for opaque envelope, lighting or ventilation alterations?

- No. All residential envelope, lighting and ventilation alteration requirements are classified as Mandatory requirements. There are no trade-offs allowed between Mandatory measures and other building features using the Performance Approach.
- Solid doors are allowed to be unrated or have a higher U-factor than 0.20 if the project can show compliance with the Performance Approach.



Notes

- A** There are two basic methods for meeting Mandatory insulation requirements for types of opaque construction assemblies listed in this table. These requirements apply specifically to opaque areas of the building envelope that separate conditioned space from unconditioned space or outside air.
- 1) The most flexible method is to calculate the overall U-factor for each altered construction assembly in the proposed project, and then show that the area-weighted average U-factor for each general type of assembly (wall or raised floor) is less than the maximum U-factor allowed in the Energy Code. This is the only method available for metal-framed assemblies or structural insulated panels (SIPs). If the applicant uses averaged U-factor values to demonstrate compliance for insulation installation, the [CF1R-ENV-02-E](#) (Area Weighted Average Calculation Worksheet) must be used to document how the averaged U-factor is achieved.
 - 2) The simplest method only applies to wood-framed walls and floors, and it is just to install insulation with the minimum required R-value between the wood framing. For example, the minimum insulation level for a 2 x 4 wood-frame wall is R-13, so any 2 x 4 wood-frame wall with R-13 insulation or more meets the Mandatory insulation level regardless of any other materials in the overall construction assembly. This method cannot be used for metal-framed construction.
- B** An exception occurs for existing walls already insulated to a maximum U-factor of U-0.110 or between framing members with a minimum insulation of R-11.
- C** A building with controlled ventilation or an unvented crawlspace may omit raised-floor insulation if all of the following conditions are met: foundation walls insulated to meet minimums shown in Energy Code Table 150.1-A; a Class I or II vapor retarder is placed over the entire floor of the crawlspace; vents between the crawlspace and outside air are fitted with automatically operated louvers that are temperature actuated; and requirements are met from Title 24, Part 6 Reference Residential Appendix RA4.5.1.
- D** Light sources in this column of this table must be certified to the Energy Commission as High Efficacy Light Sources in accordance with Title 24, Part 6 Reference Joint Appendix JA8 (JA8), and be marked by the manufacturer directly on the product as meeting JA8 with a marking of either "JA8-2022," "JA8-2022-E," "JA8-2019," "JA8-2019-E," "JA8-2016" or "JA8-2016-E" (where "E" stands for elevated temperature test, such as for use in recessed cans). Products certified under the 2022 Energy Code will have updated "JA8-2022" or "JA8-2022-E" marking. JA8 light sources are listed in the Energy Commission's [Modernized Appliance Efficiency Database System \(MAEDbS™\)](#) at: cacertappliances.energy.ca.gov/Login.aspx.
- E** Per §150.0(k)1Ci, ceiling recessed downlights are not allowed to have screw base sockets regardless of the lamp type.
- F** For more detailed information on required lighting controls presented in an "at-a-glance" table, see page 6 of Energy Code Ace's Fact Sheet titled 2022 Residential Indoor and Outdoor Lighting at: energycodeace.com/resources/?itemld=70413.pdf.
- G** Kitchen range hoods installed under the 2019 Energy Code and being replaced in the same location now must meet the 2022 Energy Code requirements.
Kitchen range hoods being replaced in the same location and originally installed under the 2008 to 2016 Energy Codes are required to install a replacement exhaust fan that meets or exceeds the airflow required by the code year it was permitted under or 100 cfm, whichever is greater. Dwellings permitted before January 1, 2010, that were not required to have a kitchen local ventilation exhaust system, and that are replacing the range hood in the exact same location, are not required to comply with the requirements of §150.0(o)1G.
All existing kitchen range hoods being replaced in new locations must meet the 2022 Energy Code requirements.
- H** The California Energy Commission provides a high-level summary of 2022 Energy Code's single-family Residential Mandatory Measures at: energy.ca.gov/sites/default/files/2022-08/2022_Residential_Mandatory_Measures_Summary_ADA.pdf.



For More Information

CALIFORNIA ENERGY COMMISSION

www.energy.ca.gov

Learn more about the California Energy Commission (CEC) and its programs on its website.

2022 Building Energy Efficiency Standards

bit.ly/CEC2022Standards

Explore the main CEC web portal for the 2022 Energy Code, including information, documents and historical information.

2022 Building Energy Efficiency Standards Summary

bit.ly/CEC2022Summary

View or download this visual summary of the Energy Code's purpose, current changes and impact.

2022 Reference Appendices

bit.ly/ECA-2022-reference-appendices

View the Joint, Residential and Nonresidential Appendices here.

2022 Energy Code Residential Compliance Manual, Chapter 9 – Additions, Alterations and Repairs

<https://bit.ly/CEC-2022-SF-residential-compliance-manual>

Modernized Appliance Efficiency Database System (MAEDbS)

bit.ly/MAEDbS

Search this database to find products that comply with the Energy Code

Energy Code Hotline

Call: 1-800-772-3300 (Free)

Email: Title24@energy.ca.gov

Online Resource Center

bit.ly/CEC-ORC

Use these on-line resources developed for building and enforcement communities to learn more about the Energy Code.



EnergyCodeAce.com

Stop by this online "one-stop-shop" for no-cost tools, training and resources designed to help you comply with California's Title 24, Part 6 and Title 20.



energycodeace.com/tools

Explore this suite of interactive tools to understand the compliance process, required forms, installation techniques and energy efficiency regulations in California.

Reference Ace

energycodeace.com/content/tools-ace-reference-ace

Navigate the Title 24, Part 6 Energy Code using an index, keyword search and hyperlinked text.

Forms Ace

energycodeace.com/content/tools-ace-forms-ace

Find the forms that apply to your specific project.

Energy Code Product Finder

energycodeace.com/content/product-finder

Find Title 24, Part 6-compliant products.

Q&Ace

energycodeace.com/QAndAce

Search our online knowledge base or submit your question to Energy Code Ace™ experts.



energycodeace.com/training

On-demand, live in-person and online training alternatives are tailored to a variety of industry professionals and address key measures.



energycodeace.com/resources

Downloadable materials provide practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards.

Create an account on the Energy Code Ace site and select an industry role for your profile in order to receive messages about all our offerings!



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