



Use this checklist when the project is for an existing building and either:

- Involves an **entirely new** or complete replacement HVAC system (indoor/outdoor units **and** $\geq 75\%$ of new ducting; for either packaged or split-system) **or**
- Replaces just **part** of an HVAC system (ducts, furnace, air handler, heat exchanger, condensing unit or any refrigerant-containing component)

* 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

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 it replaces or adds to the existing HVAC system.
- Exceptions that do NOT trigger the Energy Code include:
 - Extending ≤ 25 ft of ducting anywhere in home (except in the garage). This ducting is not associated with an Addition and uses minimum R-8 insulation in unconditioned spaces.
 - Fixing or changing anything not included in the table below, including anything that is a “refrigerant-containing device.” (For example, fixing or replacing fans, motors, belts and electrical components will NOT trigger the Energy Code)

2. Does it meet the Energy Code’s requirements under the Prescriptive Approach?

YES NO

If project changes this – and nothing else...	Mandatory Requirements							Prescriptive Requirements	
	Equipment Efficiency ^A	Thermostat (Setback or EMCS) ^B	Cooling & Heating Loads ^C	Air Filter MERV-13 ^D	HERS: Duct* Leakage ^E	HERS: Airflow Rate ^F	HERS: Fan Efficacy ^F	Duct Insulation ^G	HERS: Refrigerant Charge ^H
• New HVAC and $\geq 75\%$ New Ducts	Yes	Yes	Yes	Yes	Yes	Yes, if AC	Yes, if AC	Yes	Yes, if AC
• Add < 25 ft ducting to existing HVAC for Alterations only	No	No	Yes	No	No	No	No	Yes	No
• Add any duct length for an Addition with existing HVAC	No	No	Yes	No	Yes	No	No	Yes	No
• Replace ducting only ^I	No	No	No	no Yes, if $\geq 75\%$ new ducts	Yes	no Yes, if $\geq 75\%$ new ducts if AC	no Yes, if $\geq 75\%$ new ducts if AC	Yes	No
• Add or replace AC to ducted system	Yes	Yes	No	No	Yes	Yes	No	No	Yes
• Replace furnace only	Yes	Yes	No	No	Yes	No	No	No	No
• Add or replace gas wall heater with new gas wall heater	Yes	No	No	No	No	No	No	No	No
• Add or replace hydronic heating systems ^J	Yes	Yes	No	No	no Yes, if ducted	No	No	no Yes, if ducted	No
• Replace room AC unit using existing fuel type	Yes	No	No	No	No	No	No	No	No
• Replace heating and cooling equipment only (no altered ducting)	Yes	Yes, if AC	No	No	Yes, if ducted	Yes, if AC	No	No	Yes, if AC
• Replace gas with electric heat pump	Yes	Yes	No	No	Yes, if ducted	No	No	No	Yes, if AC
• Replace gas with electric resistance	Not allowed per §150.2(b)1G								

* Any new or altered ducting located in a garage triggers HERS duct testing no matter the length

3. Does the HVAC change trigger insulation requirements in a vented attic?

YES NO

- The project triggers the insulation requirements below when the air handler and ducts are located entirely in a vented attic.^K

Prescriptive Vented Attic Alteration				
	Climate Zone	New Insulation Requirement ^K	Luminaires in Ceiling	Attic Ventilation
Vented Attic	10	≥ R-49 (for U-factor ≤ 0.020) + Air Sealing ^{*L}	Maintain Insulation depth above recessed downlight luminaires ^{**}	Must comply with California Building Code ^{***}
[*] <i>Exceptions to Insulation:</i> <ul style="list-style-type: none"> Existing ≥R-19 insulation at ceiling level When atmospherically vented space heating or water heating combustion appliances are located inside the pressure boundary of the dwelling unit 		^{**} <i>Exceptions to Insulation at Luminaires:</i> <ul style="list-style-type: none"> Existing ≥R-19 insulation at ceiling level 		^{***} <i>Exceptions to Attic Ventilation:</i> <ul style="list-style-type: none"> Existing ≥R-38 insulation installed at ceiling level Where the alteration would directly cause the disturbance of asbestos Attic with knob and tube wiring Where the attic space is not large enough to accommodate the required R-value, the entire accessible space must be filled with insulation provided such installation does not violate Section 806.3 of Title 24, Part 2.5. If the attic space is shared with another dwelling unit

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

YES NO

Involves a ducted system or adds/replaces AC, in an existing building	CF1R-ALT-02-E*: Certificate of Compliance for Alterations to Space Conditioning Systems (with HERS) ^{**}
Involves a non-ducted system and does NOT add or replace AC in an existing building	CF1R-ALT-05-E: Certificate of Compliance for Residential Alterations (Non-HERS)
Note: If the project involves an Addition onto a home along with an HVAC Alteration, alternative CF1R-ADD paperwork will be required.	

^{*} When attic insulation is triggered as part of a HVAC change, a Certificate of Compliance for Alterations (CF1R-ALT-01-E) must also be completed to capture the envelope change.

^{**} This is an electronic form that **must** be registered with a HERS Provider prior to permit application. It can be used with any climate zone.

A – L See page 4 for notes.



HVAC Permits, HERS Measures and Required Documentation

The permit applicant wants to change to a different fuel source for the new HVAC system.

Can a permit be granted?

- The HVAC system may maintain its existing fuel source (gas, propane or heat pump) or change to a different fuel source as long as there are no jurisdictional reach codes.
- In the case of an existing electric resistance HVAC system, that system may be replaced in kind as long as it is unducted or ducted with an AC system that is not being added or replaced per Exceptions 1 and 2 to §150.2(b)1G.

Are Certificates of Compliance (CF1R forms) really required for an altered HVAC system?

- As with any project involving Home Energy Rating System (HERS) verification, as soon as one HERS measure is triggered, **all** forms must then be registered with a HERS Provider. This applies whether or not a given project form directly involves a HERS measure.
 - With the exception of projects only altering or adding 25 ft or less of ducts to an existing HVAC system, **all ducted** HVAC unit replacements will trigger HERS verification. However, there are other types of HVAC system replacements that will not trigger HERS, such as a ductless hydronic systems, wall furnaces, gas space heaters and room air conditioners.
- Some enforcement agencies may, at their discretion, choose **not** to require compliance documents for Prescriptive Residential Alteration projects that do NOT require Home Energy Rating System (HERS) verification. Even so, exemptions from submitting compliance documentation must not be deemed to grant authorization for any work to be done in any manner in violation of this code or other provisions of law. See §10-103(a)1C for more information.

What forms will the building inspector require?

- In addition to the **CF1R-ALT** form(s) submitted with the permit application, the inspector will look for the **CF2R-MCH-01-E: Certificate of Installation for Space Conditioning Systems, Ducts and Fans** form(s), which is completed by the installing contractor.
- Additional forms required by the building inspector depend on project scope and associated HERS measures which is provided by the Project Status Report (provided by the HERS Providers). The most commonly used CF2R (Certificates of Installation) and CF3R (Certificates of Verification) forms for HVAC projects are:

Responsibility of Installing Contractor:	Responsibility of HERS Rater:
CF2R-MCH-20-H: Duct Leakage Diagnostic Test	CF3R-MCH-20-H: Duct Leakage Diagnostic Test
CF2R-MCH-22-H: Space Conditioning System Fan Efficacy	CF3R-MCH-22-H: Space Conditioning System Fan Efficacy
CF2R-MCH-23-H: Space Conditioning System Airflow Rate	CF3R-MCH-23-H: Space Conditioning System Airflow Rate
CF2R-MCH-25-H: Refrigerant Charge Verification	CF3R-MCH-25-H: Refrigerant Charge Verification
CF2R-ENV-03: Insulation Installation*	

* Only required when attic insulation is triggered

Prescriptive or Performance Approach

What do you mean by “Performance Approach” to compliance?

- The Performance Approach uses approved modeling software to “tradeoff” energy efficiency measures (so you can do “worse” than Prescriptive for some things, and “better” than Prescriptive for others, as long as the Mandatory requirements are met and the energy budget balances). This proof of energy budget balance is documented via the **CF1R-PRF-01-E** report. This may be considered if the project is unable to meet the Prescriptive requirements for an HVAC Alteration supported by this checklist.

Confirming Equipment Compliance with Federal and State Regulations

What resources can I direct permit applicants to in order to find out whether a particular make and model of HVAC system is compliant with Mandatory Federal and State Appliance Efficiency regulations?

- All appliances regulated under Title 20 must be certified to the California Energy Commission via its MAEDbS™ database (Modernized Appliance Efficiency Database System). The general public can access this database directly at: cacertappliances.energy.ca.gov/

Attic Insulation

Does altering the HVAC system trigger insulation requirements for my vented attic?

- Yes, starting with the 2022 Energy Code, insulation is prescriptively required when the air handler and ducting are located in the attic.

Is insulating the ceiling with R-49 or greater really necessary?

- Alterations using the Prescriptive Approach require ≥R-49 insulation at the ceiling level. However, using the Performance Approach, this requirement may be lowered by trading away other elements of the building to show compliance.

Where does Air Sealing happen in my attic alteration?

- The attic alteration project must provide an air seal in all accessible areas of the ceiling plane between the attic and the conditioned space in accordance with §110.7.
- When R-19 insulation is existing at the ceiling level, air sealing is not required.



Notes

- A** §§110.1 and 110.2(a): All HVAC equipment must be certified through Title 20 Appliance Efficiency Standards and meet minimum efficiency requirements. For more on these requirements, see Energy Code Ace's Quick Reference sheet entitled "[Residential Minimum Heating and Cooling Efficiencies 2022](#)," found here: energycodeace.com/resources/?itemld=67830
- B** §§110.2(c), 150.0(i) and 150.2(b)1F: Setback thermostat must have a clock mechanism that allows the building occupant to program the temperature setpoints for at least four periods within 24 hours. It is not required for gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners and room air-conditioner heat pumps.
- C** Per Residential Building Code §303.10 and Building Code §1203.1: Heating systems must maintain a room temperature of $\geq 68^{\circ}\text{F}$, which is typically confirmed via heating load calculations.
- D** §§150.0(m)12-13 and 150.2(b)1C-D: Air filters to be 2" or 1" MERV-13 when an Alteration project involves entirely new or complete replacement HVAC system (equipment and ducts), or replacing $\geq 75\%$ of the ducting, and has > 10 ft of ducting. See §150.0(m)12Bii for the different sizing requirements for 2" versus 1" MERV-13 filters.
- E** §§150.2(b)1C, D and E: HERS duct testing is not required when asbestos is present. See [CEC Blueprint Issue 130](#) for more information on the asbestos exception.
- New or replacement space-conditioning ducts, plenums, air handling units, and cooling or heating coils located in a garage space must meet minimum leakage requirement or be visually inspected by a HERS Rater.
- F** §§150.0(m)13 and 150.2(b)1C-F: HERS Airflow Rate and HERS Fan Efficacy apply to new or completely replaced space-conditioning systems that use forced air ducts to supply cooling to an occupiable space (does not apply to heating only systems or to non-ducted cooling systems).
- Pipe Insulation: §§150.0(j)1B, 150.0(j)2, and 120.3(a) and (b), as well as Table 120.3-A: Cooling system suction lines < 1.5 " in diameter must have a minimum of 0.75" thick insulation for any newly installed air conditioner systems.
- G** §§150.0(m)1, 150.1(c)9 and 150.2(b)1D: Duct insulation requirements for Climate Zone 10:
- Altered duct system ($< 75\%$ New Ducts) in conditioned and unconditioned spaces: Min. R-8 duct insulation
 - New duct ($\geq 75\%$ New Ducts) in conditioned and unconditioned spaces: Min. R-8 duct insulation
 - An HVAC system is considered to have "all new" ducts when 75% or more of the ducts are new material. Up to 25% of existing duct system components (such as registers, grilles, boots, air handler, coil, plenums and duct material) may be reused if those parts are accessible and can be sealed to prevent leakage.
- H** §§150.1(c)7A and 150.2(b)1F, and Table 150.1-A: HERS Refrigerant Charge verification is NOT Prescriptively required in Climate Zone 10 when refrigerant-containing components such as the compressor, condensing coil, evaporator coil, refrigerant metering device or refrigerant piping are altered or added.
- I** Entirely new or complete replacement duct systems installed as part of an Alteration must be constructed of at least 75% new duct material, and up to 25% may consist of reused parts from the dwelling unit's existing duct system including but not limited to registers, grilles, boots, air handler, coil, plenums, duct material; if the reused parts are accessible and can be sealed to prevent leakage.
- J** When only replacing the hydronic source of hot water, the equipment type selected (Air to Water Source Heat Pump or Gas Boiler) must meet the federal minimum standard.
- When installing a new or expanding an existing hydronic system, slab insulation is required if the new hydronic tubing is located in the slab.
- K** §§150.2(b)1Diia and 150.2(b)1J: If a new or complete replacement air handler and duct system is installed in an existing vented attic, it triggers Prescriptive ceiling insulation requirements.
- There are two basic methods for meeting insulation requirements for roof assemblies. The requirements apply specifically to 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 roof or ceiling assembly is less than or equal to the maximum U-factor allowed in the Energy Code. 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 roofs, and it is just to install insulation with the required R-value between the wood framing.
- L** Air seal all accessible areas of ceiling plane between the attic and the conditioned space in accordance with §110.7. Exceptions may apply.



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 Single-family Residential Compliance Manual, Chapter 4 – HVAC Requirements

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 online 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.



Tools

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.



Training

energycodeace.com/training

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



Resources

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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