



What's Included in this Fact Sheet?

The 2022 California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) requires that third-party special inspectors called Home Energy Rating System (HERS) Raters perform field verification and diagnostic testing of certain installed building features and systems.

This fact sheet covers HERS verification and diagnostic testing required for single-family buildings, which include single-family homes, accessory dwelling units (ADUs), duplexes and townhomes of any height. New Construction, Additions and Alterations are covered. An Alteration is any change to an existing home that is regulated by the 2022 Energy Code. An Addition is any change to a building that increases both conditioned floor area and conditioned volume.

What Are HERS Raters?

The California Energy Commission (CEC) has delegated the responsibility for field verification and diagnostic testing to HERS Raters, who must be specially trained and certified to perform these services to help improve poor construction quality and equipment installation. In California's 2022 Energy Code, installed energy-related building features that trigger HERS verification are referred to as *HERS measures*. These cover a variety of features such as HVAC systems, plumbing systems and insulation installation for residential and some nonresidential projects. Certified HERS Raters perform on-site inspections and diagnostic tests, to ensure proper installation per verification protocols defined by the CEC in the Energy Code's Reference Appendices.

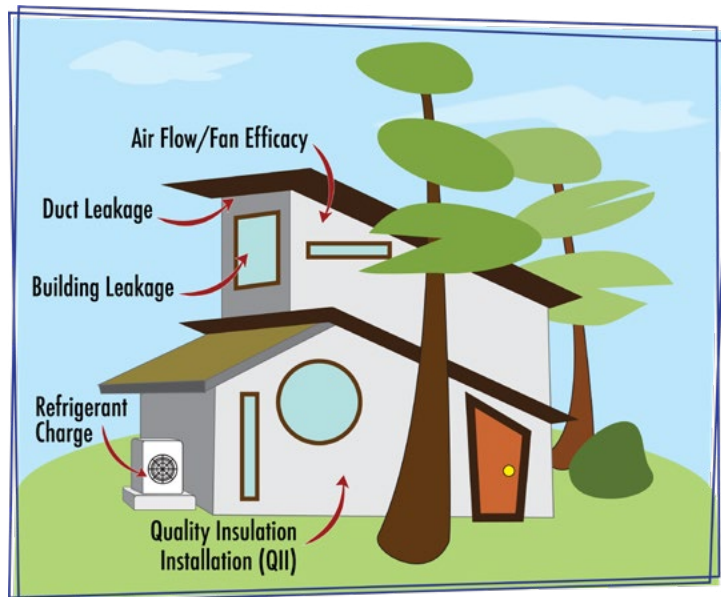


Figure 1. Examples of HERS Measures in a Single-family Home

Why Should I Care about HERS Verification?

As a homeowner or building owner, you should expect your building features to be installed as designed and compliant with the Energy Code. The HERS verification process provides an extra level of quality assurance toward these goals.

As a contractor or developer, the HERS verification process helps to assure you that your sub-contractors are held responsible for compliance of the energy-related building features that they install.

For code enforcement personnel, HERS Raters provide specialized expertise on the diagnostic tests and tools so that building departments can focus on the other codes and inspections.

When Are HERS Raters Required?

Simply put, for single-family buildings, a HERS Rater is required when the Certificate of Compliance (CF1R) indicates that HERS measures are required.

- ✦ **New Construction, Additions > 1,000 ft² and accessory dwelling units (ADUs) that are Additions of any size:** These projects always require at least one HERS measure (verification of ventilation airflow) and usually several others, depending on the types of features installed.
- ✦ **Additions ≤ 1,000 ft² and any Alteration to an existing home:** HERS verification requirements depend on the building features being added. Required HERS measures are listed on the Certificate of Compliance (CF1R).

Who Hires the HERS Rater and When?

For New Construction and Additions, the building owner or the general contractor typically hires the HERS Raters. For HVAC Alterations, HERS Raters are typically hired by the installing contractor. HERS Raters cannot be employees of the builder or contractor whose work they are verifying. Also, HERS Raters cannot have a financial interest in the builder's or contractor's business and cannot advocate or recommend the use of any product or service that they are verifying.

Typically, HERS Raters should be engaged at the beginning of a project so that they can coordinate with the contractor on when they need to perform inspections and testing. It is also important to coordinate with the energy consultant or documentation author when assigning a Rater to the project. This allows the Rater to have access to the registered compliance documentation associated with the project. HERS Raters can provide excellent advice to each installer on how best to simplify the process and comply with the requirements.

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Who Does What?

Energy Consultants

Energy consultants determine appropriate HERS Measures required for the project scope and include them in the Certificate of Compliance (CF1R).

HERS Raters

HERS Raters verify compliance of installed HERS measures with California's Energy Code. They are third-party special inspectors who perform field verification and diagnostic testing services for the benefit of the homeowner or building owner to ensure proper measure installation and systems operation. They document their verifications by completing and signing a Certificate of Verification (CF3R) for each HERS measure. HERS Raters are trained, tested and certified by a HERS Provider.

HERS Providers

HERS Providers are organizations approved by the CEC to train and certify HERS Raters and conduct quality assurance reviews to maintain consistency and integrity among HERS Raters. Providers also maintain a HERS registry, which contains an online database of projects that require HERS verification and provides easy access to all related compliance documents.

Building Inspectors

Building inspectors perform inspections for all building codes (structural, electrical, plumbing, etc.) throughout construction. HERS Raters are special inspectors assisting the building inspector and must demonstrate competence, to the satisfaction of the building official, for the visual inspections and diagnostic testing that they perform. Building inspectors are responsible for field verifying all of the non-HERS measures and make sure that all compliance documentation is completed by checking the online Project Status Report, accessible through the HERS registries.

Installers

Installers are the tradespeople who install the energy-related features in the home. They must take responsibility for the features that they install by completing and signing the Certificates of Installation (CF2Rs). If they install HERS measures, they must cooperate with the HERS Rater to ensure that all energy-related features pass HERS verification.

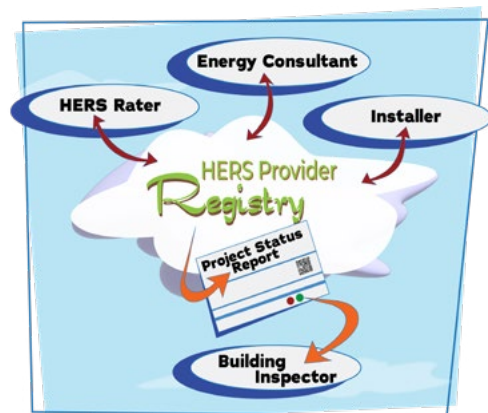


Figure 2. Overview of the HERS Registry Information Pathway

What Forms Are Used?

There are several documents that the building department needs to verify Energy Code compliance. The three types of Energy Code compliance documents required at different stages of construction include:

- ✦ **Certificate of Compliance (CF1R):** The CF1R documents the building features required to comply with the Energy Code. These features vary depending on the project and the compliance approach used and are submitted to the building department as part of the building permit application.
- ✦ **Certificate of Installation (CF2R):** CF2Rs document that the building products and features actually installed in the field match those required in the Certificate of Compliance. These forms must be completed and signed by the installer or contractor responsible for installing regulated building.
- ✦ **Certificate of Verification (CF3R):** CF3Rs document compliance with applicable HERS measures. Each CF3R form must be completed and signed by a HERS Rater.

How Are Documents Registered?

Registering compliance documents helps to ensure validity, accuracy and tracking of required energy compliance documents. If HERS measures are required by the Certificate of Compliance (CF1R), the building department requires a *registered* CF1R before issuing a permit.

The registration process is generally initiated by the energy consultant for newly constructed homes and by the homeowner or HVAC contractor for Alterations consisting of HVAC changeouts. However, the process can be started by anyone. The responsible party, owner, architect or contractor needs to establish password-protected access to the HERS Provider's registry to sign off and approve the required energy features before a *registered* CF1R may be generated. This approval is an important step in the process and should be completed to prevent delays in the completion of additional required documentation.

To establish an account with a HERS Provider, go to a Provider's website and follow its directions based on your role (homeowner, contractor or architect/designer). For security purposes, this process will require you to provide personal identification. Once your account is established, you will have access to either create or sign off on a project, whichever is applicable. Additional responsible parties can be given access to the project by whoever controls it.

After the CF1R has been approved and signed off by all responsible parties, it is ready to be submitted to the building department. The registered compliance documents contain a unique registration number, date and time stamp, watermark and name of the HERS Provider at the bottom of each page. This tells the building department that the documents are registered. If any changes occur to the scope of work, the CF1R will need to be revised, re-registered and re-submitted to the building department for approval. This can all be done electronically through the HERS Provider's registry.

Project Status Report

For code enforcement personnel, the most important tool for the Energy Code compliance process is the Project Status Report. This online tool is accessible through the HERS registries and is customized for each project. It shows all of the forms that are required for that specific project and what the status of each form is by a simple red dot (not complete) or green dot (complete). This greatly simplifies and streamlines the building inspector's job. A project should not be finalized until every form has a green dot.



What Is Sampling?

Sampling is a way to reduce the number of verifications needed when there is a lot of similarity between homes being inspected.

Homes are placed in small sample groups (up to five or seven homes per group, depending on sampling method) and self-tested by the installer, and then one house from the sample group is randomly selected and re-tested by the HERS Rater. Sampling is allowed in newly constructed tract homes (subdivisions) but not on custom homes. Sampling is also allowed on HVAC replacements.

To be in a sample group together, all homes must have been worked on by the same installing contractor(s) and have the same set of features that need to be tested.

Sampling is tracked by the HERS registry. Individual jurisdictions can choose to allow sampling or not on projects within their jurisdiction.

Energy Code Requirements

The Energy Code has three different types of requirements. See below for a description of each.

Mandatory Measures

All conditioned buildings must meet a set of Mandatory requirements for minimum envelope efficiencies and construction of assemblies. Examples of building envelope components addressed by Mandatory Measures include minimum insulation levels, infiltration controls and maximum fenestration U-factor. Some Mandatory Measures are HERS Measures, such as indoor air quality (IAQ) ventilation airflow measurement and duct leakage.

Prescriptive Approach

The Prescriptive Approach is considered the most direct path to compliance. It is a set of prescribed performance levels for various building components, where each component must meet or exceed the required minimum efficiency. There are different Prescriptive requirements for New Construction, Additions and Alterations. Some Prescriptive Measures are HERS Measures, including refrigerant charge verification and quality insulation installation (QII).

Performance Approach

The Performance Approach builds on the Prescriptive Approach by allowing energy allotments to be traded between building systems for buildings. There can be proposed energy use trade-offs between features of the building envelope, domestic water-heating, space-heating and cooling equipment. This compliance approach requires using energy analysis software that has been approved by the CEC. There are many "extra credit" measures available only through the Performance Approach that trigger HERS verification.



What HERS Verifications Are Required?

The following table lists the HERS measures associated with single family-homes for New Construction, Additions and Alterations. Note that some HERS measures are Mandatory, some are Prescriptive (required when using the Prescriptive Approach) and some are used only for Performance credits.

HERS Measures: Residential (based on Table RA2-1)	Mandatory 	Prescriptive 	Performance 	Residential Reference Appendices	Compliance Form
DUCT MEASURES					
Duct Sealing: Diagnostic testing that ducts do not exceed maximum leakage rate based on project type (new or altered). Verification that approved materials are used.	§150.0(m)11 (new)	§150.2(b)1D (altered)	N/A	RA3.1.4.3	CF3R-MCH-20
Return Duct Design and Air Filter Device: Visual verification that the return duct design conforms to §150.0(m)13 and confirmation that the air filter devices conform to §150.0(m)12 . Note: This is an alternative to the Cooling System Airflow and Fan Efficacy tests, below.	§150.0(m)12 §150.0(m)13	Exception to §150.1(c)7Aib Exception 2 to §150.2(b)1Fia	N/A	RA3.1.4.4 RA3.1.4.5	CF3R-MCH-28
Bypass Ducts (Zonally Controlled Central Forced Air Unit [FAU]): Visual verification that zonally controlled systems comply with the bypass duct prohibition in §150.1(c)13 . Note: Bypass ducts are only allowed with a Performance penalty.	N/A	§150.1(c)13	Res ACM 2.4.9 Res ACM 2.4.7	RA3.1.4.6	CF3R- MCH -23
Low Leakage Ducts Entirely in Conditioned Space: Visual verification that duct system location is entirely within conditioned space and tested for maximum leakage.	N/A	HPA Option B §150.1(c)9	Res ACM 2.4.7	RA3.1.4.3.8	CF3R- MCH -21
Duct Design, Buried Ducts, Deeply Buried Ducts: Visual verification that duct system is installed according to the design, including location, size and length of ducts, duct insulation R-value. Note: Duct sealing and verification of insulation are required.	N/A	N/A	Res ACM 2.4.7 Res ACM 2.4.7	RA3.1.4.1	CF3R- MCH -29
HEATING AND COOLING EQUIPMENT MEASURES					
Cooling System Airflow: Diagnostic testing and confirmation that system airflow is greater than or equal to a specified criterion (CFM/ton).	§150.0(m)13	§150.1(c)7Aib §150.2(b)Fia	Credit for higher target Res ACM 2.4.6	RA3.3	CF3R- MCH -23
Cooling System Air-handling Fan Efficacy: Diagnostic testing and confirmation that fan efficacy is less than or equal to a specified criterion (W/CFM).	§150.0(m)13	N/A	Credit for lower target Res ACM 2.4.6	RA3.3	CF3R- MCH -22
Refrigerant Charge: Diagnostic testing of air-cooled air conditioners and air-source heat pumps to verify that the system has the correct refrigerant charge. Airflow testing. Note: "Fault Indicator Display" can be installed as an alternative.	N/A	§150.1(c)7A CZ 2,8-15	Credit in CZ 1,3-7,16 Res ACM 2.4.6	RA1.2 RA3.2 RA3.3 RA3.4.2	CF3R- MCH -25
Increased Air Conditioner/Heat Pump Efficiency: Visual verification of installation of specific air conditioner or heat pump equipment models when Performance credit for increased SEER/SEER2/EER/EER2/HSPF/HSPF2 is used. (Continued on next page)	N/A	N/A	§150.1(b)3Bi Res ACM 2.4.6 Res ACM 2.4.6 Res ACM 2.4.1	RA3.4.4 RA3.4.4.1	CF3R- MCH -26
CZ = Climate Zone; EER/EER2 = energy efficiency ratio; ERV = energy recovery ventilation; FAU = forced air unit; HSPF/HSPF2 = heating seasonal performance factor; HRV = heat recovery ventilation; SEER/SEER2 = seasonal energy efficiency ratio.					

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HERS Measures: Residential (based on Table RA2-1)	Mandatory 	Prescriptive 	Performance 	Residential Reference Appendices	Compliance Form
HEATING AND COOLING EQUIPMENT MEASURES (continued)					
Rated Heat Pump Capacity: Visual verification of the installed heating capacity values at 47°F and 17°F of heat pump systems when Performance compliance uses a heat pump system not using default values.	N/A	N/A	§150.1(b)3Bv Res ACM 2.4.1	RA3.4.4.2	CF3R- MCH -26
Low Leakage Air-Handling Units: Visual verification of the installation of a listed factory-sealed air-handling unit (tested by the manufacturer and listed with the CEC). Note: Allows Performance credit of a lower duct leakage rate.	N/A	N/A	§150.1(b)3Biii Res ACM 2.4.7	RA3.1.4.3.9	CF3R- MCH -26
Variable Capacity Heat Pump Compliance Option (VCHP): Field verification that installed system meets the eligibility requirements of the VCHP compliance option when used for Performance credit. Note: Requires other HERS measures and their associated CF3Rs.	N/A	N/A	§150.1(b)3Bii Res ACM 2.4.1	RA3.4.4.3	CF3R-MCH-33
Evaporatively Cooled Condensers: Field verification that installation of evaporatively cooled condensers meets the eligibility requirements. Duct leakage and refrigerant charge are required.	N/A	N/A	Res ACM 2.4.6	RA4.3.1	CF3R- MCH -26
MECHANICAL VENTILATION MEASURES					
Indoor Air Quality (IAQ): Diagnostic testing of whole-building mechanical ventilation. If central fan integrated system is used, verification of installation and intermittent controls.	§150.0(o)2A	N/A	N/A	RA3.7.4.1 RA3.7.4.2	CF3R- MCH -27
Kitchen Range Hood: Visual verification of airflow and sound ratings via certified rating data from the Home Ventilating Institute (HVI) Certified Home Ventilating Products Directory or another CEC-approved directory.	§150.0(o)2B	N/A	N/A	RA3.7.4.3	CF3R- MCH -32
Whole House Fan Ventilation Cooling: Diagnostic testing of the installed whole house fan airflow rate (CFM) and fan efficacy (W/CFM) when Performance compliance uses a whole house fan.	N/A	N/A	§150.1(b)3Bvi Res ACM 2.4.11	RA3.9	CF3R- MCH -31
ERV/HRV Rated Performance Verification: Visual verification that the installed ERV/HRV equipment meets the requirements for eligibility when a performance credit is taken. Airflow measurement for IAQ requirements.	§150.0(o)2C	N/A	Res ACM 2.4.10	RA3.7.4.4	CF3R- MCH -27
Central Fan Ventilation Cooling: Visual verification of central fan ventilation cooling system (CFVCS) and diagnostic testing of the installed CFVCS ventilation airflow rate (CFM) and fan efficacy (W/CFM).	N/A	N/A	§150.1(b)3Bvii Res ACM 2.4.11	RA3.3.4	CF3R- MCH -27
CZ = Climate Zone; EER/EER2 = energy efficiency ratio; ERV = energy recovery ventilation; FAU = forced air unit; HSPF/HSPF2 = heating seasonal performance factor; HRV = heat recovery ventilation; SEER/SEER2 = seasonal energy efficiency ratio.					

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HERS Measures: Residential (based on Table RA2-1)	Mandatory 	Prescriptive 	Performance 	Residential Reference Appendices	Compliance Form
BUILDING ENVELOPE MEASURES					
Building Envelope Air Leakage: Diagnostic testing of air leakage when Performance compliance credit is taken for reduced building envelope air leakage.	N/A	N/A	§150.1(b)3Bviii Res ACM 2.2.4	RA3.8	CF3R-ENV-20
Quality Insulation Installation (QII): Visual verification of air barrier and insulation. Note: This is required Prescriptively on New Construction and Additions over 700 ft ² unless a Performance penalty is taken for not meeting it.	N/A	§150.1(c)1E	§150.1(b)3Bix Res ACM 2.2.5	RA3.5	CF3R-ENV-21 CF3R-ENV-22
Spray Polyurethane Foam (SPF) QII: Visual verification of proper installation of SPF insulation product when R-values are better than the default used for compliance credit. (Default = open cell @ 3.6 per inch or closed cell @ 5.8 per inch)	N/A	N/A	Res ACM 2.3.3	RA3.5.6	CF3R- ENV-22
DOMESTIC HOT WATER MEASURES					
Pipe Insulation Compliance Credit: Visual verification that all hot water pipes in non-recirculating systems are insulated and that corners and tees are fully insulated.	N/A	N/A	Res ACM 2.9	RA3.6.3	CF3R-PLB-22
Parallel Piping Compliance Credit: Visual verification that the measured length of piping between the water heater and single central manifold does not exceed 5 ft.	N/A	N/A	Res ACM 2.9	RA3.6.4	CF3R- PLB -22
Compact Hot Water Distribution System Expanded Credit: Visual verification that the straight-line plan-view distance from the water heater to a hot water fixture does not exceed a calculated threshold distance length per RA3.6.5. Note: This is a Performance credit.	N/A	N/A	Res ACM 2.9	RA3.6.5	CF3R- PLB -22
Recirculation Pump Controls: Visual verification of controls and other features specified in Performance compliance documents and pipe insulation.	N/A	N/A	Res ACM 2.9	RA3.6.6 - RA3.6.7	CF3R- PLB -22
Drain Water Heat Recovery (DWHR): Visual verification that the DWHR unit(s) and installation configuration meet the eligibility requirements and the DWHR(s) is certified to the CEC and meet HERS eligibility requirements. Note: This is Prescriptively required in certain situations or a Performance credit.	N/A	§150.1(c)8A §150.1(c)8B	Res ACM 2.9	RA3.6.9	CF3R- PLB -22
PRE-EXISTING VERIFIED MEASURES					
Visual verification (prior to permit being pulled) that existing building energy features are "worse" than default values per Table 150.2-C . Note: Allows Performance credit for improving an existing building feature beyond defaults.	N/A	N/A	Res ACM 2.10.5	Single-family Residential Compliance Manual, Appendix G	CF3R-EXC-20
CZ = Climate Zone; EER/EER2 = energy efficiency ratio; ERV = energy recovery ventilation; FAU = forced air unit; HSPF/HSPF2 = heating seasonal performance factor; HRV = heat recovery ventilation; SEER/SEER2 = seasonal energy efficiency ratio.					



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 Single-family Residential Compliance Manual

bit.ly/CEC-2022-SF-residential-compliance-manual

Read the Compliance Manual for more indepth information on 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.



www.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

www.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

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

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

Q&Ace

www.energycodeace.com/QAndAce

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



Training

www.energycodeace.com/training

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

Of Special Interest:

- ◇ 2022 Title 24, Part 6 Essentials – Residential Standards: What's New
bit.ly/ECA-training-2022-res-whats-new



Resources

www.energycodeace.com/resources

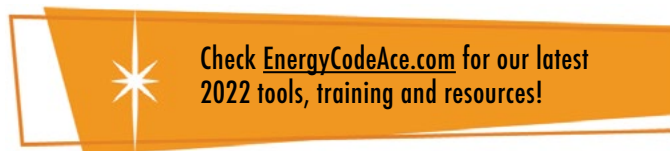
Downloadable materials provide practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards.

Of Special Interest:

Fact Sheets

- ◇ Single-family Buildings: What's Changed in 2022

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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