

BayREN Codes & Standards Training
Energy Code Training
Part I:
Residential Forms and Permit
Submittals For Additions

Updated October 2016



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INTRODUCTION

BayREN Codes & Standards Trainings

- BayREN Codes & Standards is a joint effort of Bay Area cities and counties to achieve full compliance with provisions of the California Energy Code.
- BayREN trainings seek to provide building department staff and private sector building professionals with tools and strategies for improving energy code compliance.
- Today's Brown Bag is part of the Residential Forms and Submittal Best Practices Series.

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Today's Learning Objectives

- Understand how Compliance forms are used
- Navigate the Compliance Process
- Maximize the benefit of the HERS Registries



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Introduction

2013 vs. 2016 Codes

Note:

- The information presented in this class is applicable to both the 2013 and 2016 versions of the energy code.
- While there were substantial changes, they mostly affect the features that have to be installed and **not the process for verifying those features**, which is what this class covers.
- Summaries of the 2016 changes are provided as extra handouts.
- Where there are differences between the two code versions, they are called out in these materials.

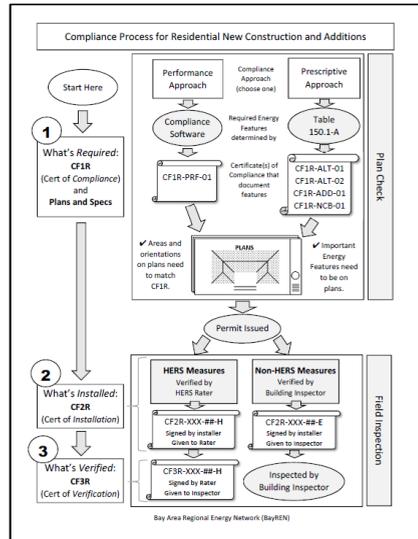
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Understanding the COMPLIANCE PROCESS

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Compliance Process Flow Diagram

Refer to full-size copy provided with your handouts.



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Compliance Process Flow Diagram

Note: The "compliance approach" is the *method* by which energy features are determined.

There are two basic approaches, **prescriptive** and **performance**.

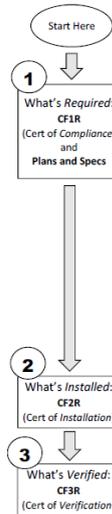
These are in addition to the **mandatory** measures, which apply regardless of the compliance approach.

This is covered in more detail in a later section.

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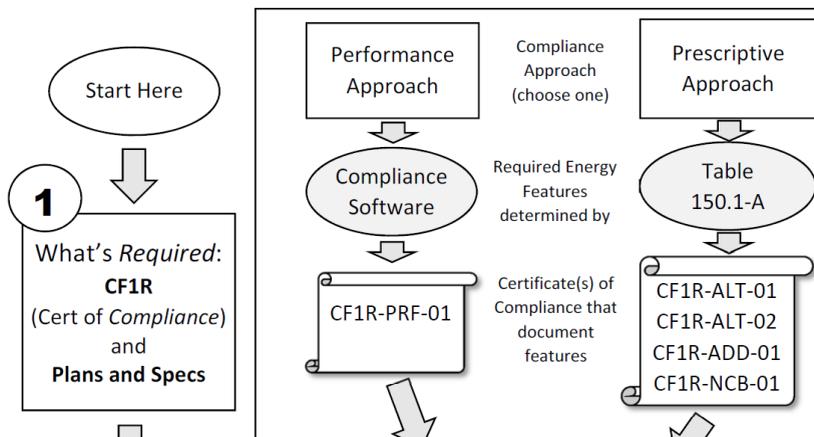
Compliance Process Flow Diagram

- Notice that the forms (CF1R, CF2R, and CF3R) are there and follow a simple 1 - 2- 3 flow.
- Notice that process is divided into Plan Check and Field Inspection sections and that good communication must flow between them.
- The forms are intended to facilitate this.



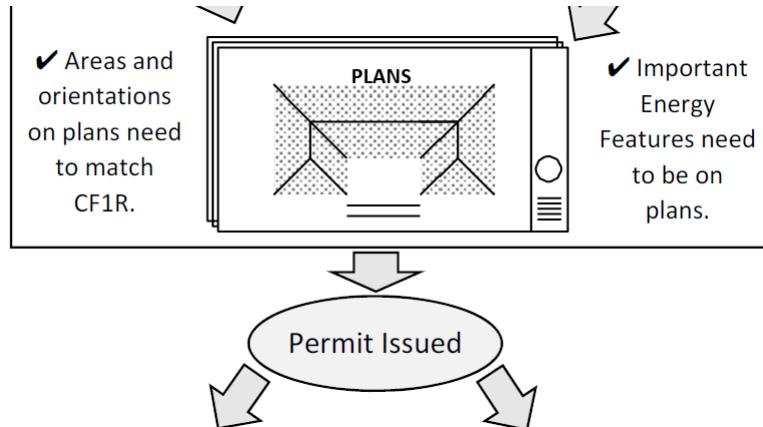
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Compliance Process Flow Diagram



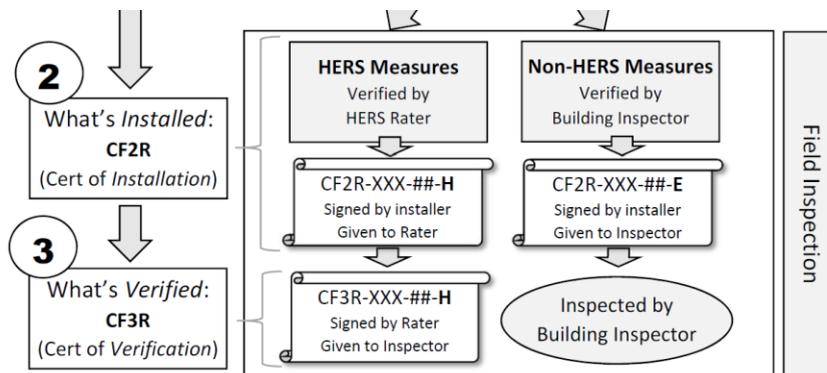
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Compliance Process Flow Diagram



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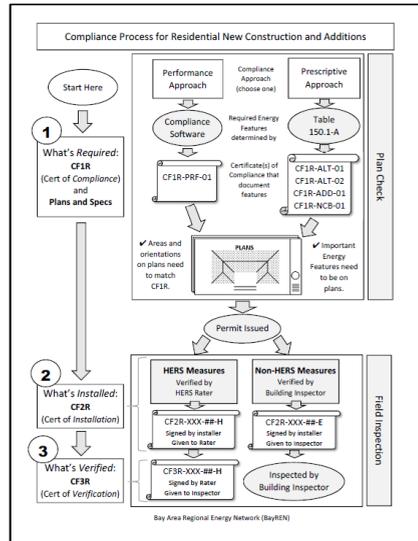
Compliance Process Flow Diagram



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Compliance Process Flow Diagram

Any questions?



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UNDERSTANDING THE FORMS 1-2-3

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Understanding the Forms 1-2-3

- There is a clear, intentional sequence to the documents:
 1. Document what is **required**
 2. Document what was **installed**
 3. Document what was **verified**
- When these three *kinds* of documentation **match**, the process was successful.
- Note: Not all installed features need to be third party verified.

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Understanding the Forms 1-2-3

Example:

- An addition project complies using the *prescriptive* approach (essentially a list of features, based on climate zone).
- The energy features needed to comply are:
 - Feature A (e.g., dual-pane, low-E, vinyl framed windows, with performance factors of X and Y)
 - Feature B (e.g., R-19 walls)
 - Feature C (e.g., R-38 ceiling)
 - Feature D (e.g., HVAC sealed ducts) *
 - Feature E (e.g., proper airflow and fan watt draw) *

* Requires third party verification

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Understanding the Forms 1-2-3

- All of the required features need to be documented in a clear, concise manner so that all parties involved know what is expected of them.
- Also, someone needs to assume responsibility for making sure that this list gets distributed to all involved parties.
- The “Step 1 Document” does this (Document what is required)

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Step 1 – Document What is Required

- This first compliance document is called the:

**CF1R – Certificate of
Compliance**

<p>CF1R Certificate of Compliance</p> <p>"What's Required"</p> <p>Feature A Feature B Feature C Feature D* Feature E*</p> <p>X </p>

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Understanding the Forms 1-2-3

- Notice that
 - Feature A,
 - Features B and C, and
 - Features D and Eare probably installed by three different specialty contractors.

- Each specialty contractor must assume responsibility for his or her **own** work.

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Understanding the Forms 1-2-3

- They need to attest to the fact that
 - They knew what was **supposed** to be installed
 - They **installed** the correct feature

- The “Step 2 Document” does this. (Document what was *installed*)

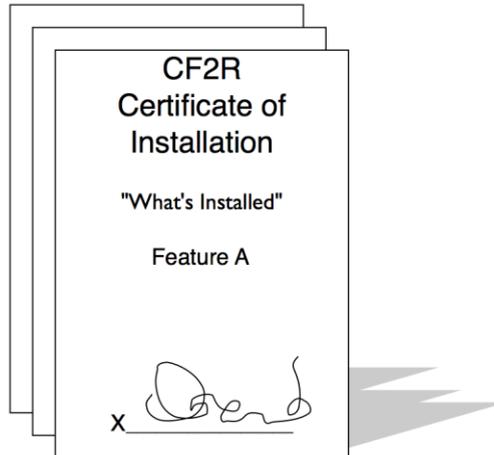
- There should be a different form for each trade or feature.

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Step 2 – Document What is Installed

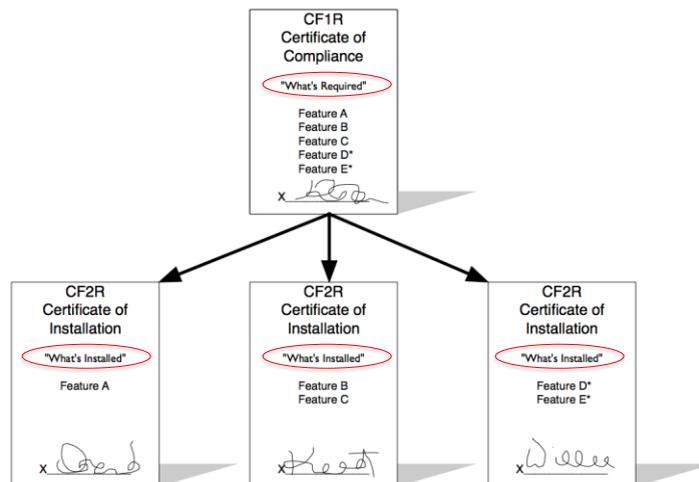
- This second compliance document is called the:

CF2R – Certificate of Installation



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Step 2 – Document What is Installed



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Understanding the Forms 1-2-3

A note about the **CF2R Certificate of Installation**:

Up until the 2013 Code the CF2R was referred to as the CF6R and it was one long, single document signed by ALL of the installers at the job site. Breaking it into multiple parts made it easier to distribute to the responsible parties. Making it electronic made it so that it could be signed from anywhere.

A certificate of installation was requested by and lobbied for very heavily by the building industry, mainly production home builders represented by California Building Industry Association (CBIA). This occurred during the late '90s when defect litigation was a serious problem. Builders needed a way to put more accountability on the trades.

It is essentially an affidavit that the correct features were installed.

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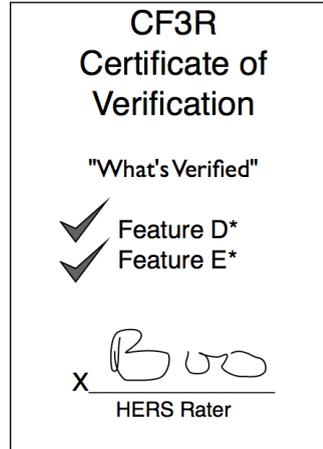
Understanding the Forms 1-2-3

- For Features D and E, which require **third party verification**, there needs to be a way for the building inspector to be assured that third party verification actually occurred and that the features **passed** any necessary tests.
- The “Step 3 Document” does this. (Document what was verified)
- There should be a different one for each test/verification.

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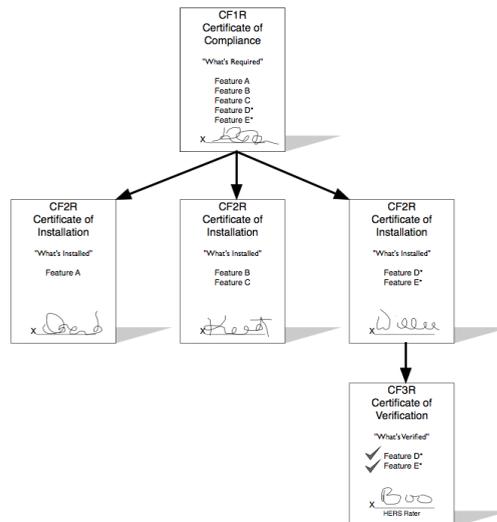
Step 3 – Document What is Verified

- This third compliance document is called the: **CF3R – Certificate of Verification**



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Step 3 – Document What is Verified



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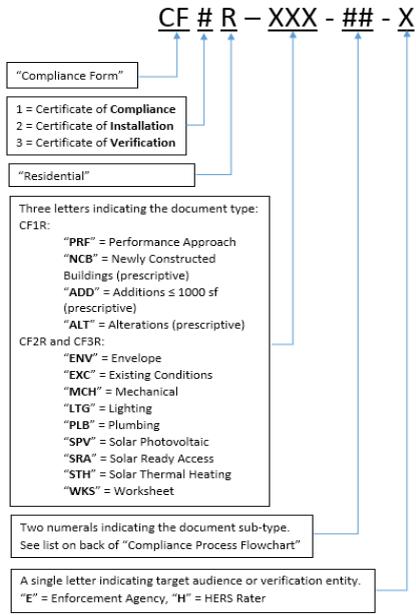
Understanding the Forms 1-2-3

- When these three kinds of documentation **match**, the process was successful.
- Not all installed features need to be third party verified (Step 3), but when they do Steps 1 and 2 need to **match** Step 3 for those features.

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FORMS THAT WILL COMMONLY BE USED FOR *ADDITIONS*

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Form Name Nomenclature

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Forms That Will Commonly Be Used for *Additions*

CF1R Certificates of Compliance

- **CF1R-ADD-01-E:** Used when the *prescriptive* approach is used to demonstrate compliance for additions less than or equal to 1000 square feet. *See example in Appendix.*
 - The prescriptive approach basically uses a list of features that vary by climate zone.
 - Some prescriptive and mandatory measures do not apply because it is less than 1000 square feet.
 - The prescriptive approach is simple, but less flexible.

ADD = Addition

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Forms That Will Commonly Be Used for *Additions*

- **CF1R-NCB-01-E:** Used when the *prescriptive* approach is used to demonstrate compliance for additions *over* 1000 square feet. *See example in appendix.*
 - Note: additions *over* 1000 square feet have very similar requirements to a completely new home.
- Similar to CF1R-ADD-01-E but requires more mandatory and prescriptive features because it is for larger additions.

NCB = Newly Constructed Building

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Forms That Will Commonly Be Used for *Additions*

- **CF1R-PRF-01-E:** Used when the *performance* approach is used to demonstrate compliance for any size addition. *See example in Appendix.*
- The performance approach uses a computerized energy-simulation program to determine the energy features.

PRF = Performance

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Forms That Will Commonly Be Used for *Additions*

- A **CF1R-ALT-02** may also be needed to document the *special requirements* of an altered HVAC system if the existing home's HVAC system is being *altered* (modified) by the addition or replacement of:
 - Condenser, coil, air handler, or
 - More than 40 feet of duct

ALT = Alteration

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Forms That Will Commonly Be Used for *Additions*

- If an entirely new system is being installed for the addition, a **CF1R-ALT-02** is not needed.



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Forms That Will Commonly Be Used for *Additions*

CF2R Certificates of Installation document **proper installation** of the identified measure.

Non-HERS Measures (note the “E” at the end = Enforcement)

- CF2R-ENV-01-E: **fenestration** (windows, skylights, etc.)
- CF2R-ENV-02-E: **air sealing** features (weatherstripping, caulking/sealing, backdraft dampers, etc.)
- CF2R-ENV-03-E: **insulation**
- CF2R-ENV-04-E: **roofing** products
- CF2R-LTG-01-E: **lighting** features
- CF2R-MCH-01-E: **mechanical** systems (HVAC)

ENV = Envelope

LTG = Lighting

MCH = Mechanical

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Forms That Will Commonly Be Used for *Additions*

HERS Verified Features (notice the “H” in the document name) will all have a corresponding CF3R form.

- CF2R-MCH-20-H: **sealed ducts***
- CF2R-MCH-22-H: **fan efficacy** (fan watt draw)*
- CF2R-MCH-23-H: **fan airflow***
- CF2R-MCH-25-H: **refrigerant charge***
- CF2R-MCH-27-H: **ventilation** to the ASHRAE 62.2 standard (additions greater than 1000 feet only)*

MCH = Mechanical
H = HERS Verified

* Similar to any newly constructed building, when the performance approach is used any or all of the CF2R forms may be required depending on the features modeled and compliance credits taken.

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Forms That Will Commonly Be Used for *Additions*

CF3R Certificates of Verification document **verification of proper installation** of the identified measure:

- CF3R-MCH-20-H: **sealed HVAC ducts**
- CF3R-MCH-22-H: **fan efficacy** (fan watt draw)
- CF3R-MCH-23-H: **fan airflow**
- CF3R-MCH-25-H: **refrigerant charge**
- CF3R-MCH-27-H: **ventilation** to the ASHRAE 62.2 standard (additions greater than 1000 feet only)

**MCH = Mechanical
H = HERS Verified**

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HERS Registry

- Building departments have direct access to registered documents within their jurisdiction through the revamped HERS provider registry.

Building department sign-up information.



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HERS Registry

- When a project requires HERS verified features, the CF1R Certificate of Compliance (and all subsequent CF2R and CF3R documents) must be “registered” with a HERS provider.
- A HERS registry is an on line *database* that generates, tracks and stores the CF1R, CF2R and CF3R documents.
- It will be rare for projects not to require any HERS verification.

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HERS Registry

- To not have any HERS measures, the project would have to:
 - Be an addition less than 1000 square feet
 - Use the prescriptive approach
 - Not have a new A/C or ducted heating system
 - Not involve the addition or replacement of a condenser, coil, air handler or 40 feet of duct

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HERS Registry

- BayREN has a special class dedicated specifically to learning how to best use the HERS registry.
- See your BayREN county representative for information on scheduling this and other classes.

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PRIORITIZING THE INFORMATION ON THE CF1R

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What to Check on a CF1R-PRF-01

- Refer to the “What to Check on a CF1R-PRF-01” checklist tool provided in your handouts.

BAY AREA Regional Energy Network

Permit Number: _____
Date Completed: _____
Completed By / Initials: _____

What to Check on a CF1R-PRF-01 (Residential Performance Approach)

The following items highlight the more important features to be verified on the CF1R-PRF-01 form.

General Information Section

- Item 06 Climate Zone – Should be correct for location of project.
- Item 11 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor Area – Should match plans.
- Item 15 Front Orientation (degrees or “cardinal”) if master plan – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 22 Glazing Percentage – Total glass area divided by floor area (Item 14, above). Should match plans.

Compliance Results Section

- Row 02 Building Incorporates HERS Features – Leverage any listed HERS tests to reduce inspections.
- Column 07 Compliance Margin – How much it exceeds code by. <0%: small discrepancies may affect compliance. 0% to 10%: only large discrepancies will affect compliance. >10%: only very large discrepancies will affect compliance. Note: Energy Star and some reach codes require a compliance margin of 10%.

Opaque Surfaces Section (CF1R-ENV-03*)

- Column 01 Name – These are just arbitrary test descriptors. Make sure all sides of the house are listed.
- Column 03 Construction – Reference a later section that details each surface type.
- Column 04 and 05 Azimuth and Orientation – Make sure all sides of the house are listed.
- Column 06 Gross Area – Check to see if these are reasonable, according to plans.

Attic Section (CF1R-ENV-04*)

- Column 08 – If radiant barrier is specified, installation is verified in the field.
- Column 07 – If cool roof is specified, reflectance and emittance are verified in the field.

Windows Section (CF1R-ENV-05*)

- Column 09 Orientation-Echomath and Column 07: Area – Should match plans.
- Columns 04 and 05: U-Factor and SHGC – Important to verify in the field.

Overhangs and Flats Section

- Column 01 Depth – Length of overhang. Quickly check anything > 1' against plans.

Opaque Surface Construction Section (CF1R-ENV-03*)

- Column 03 Construction name – Referenced from Opaque Surfaces Section, Column 03: Construction.
- Column 06 Assembly Layers – Look for R-values. These should be verified in the field.

Building Envelope HERS Verification Section (CF1R-ENV forms*)

- Leverage any listed HERS tests to reduce inspections.

Water Heating Section (CF1R-PLB-02*)

- System Type, Number of Water, Energy Factor and volume should be verified in the field.
- Leverage any listed HERS tests to reduce inspections. (CF1R-PLB forms)

HVAC Section (CF1R-ACH-01*)

- System Type, Efficiency, Duct Locations and Duct R-value should be verified in the field.
- Leverage any listed HERS tests to reduce inspections. (CF1R-ACH forms)

IAQ (Indoor Air Quality) Fans Section (CF1R-ACH-2*)

- Leverage any listed HERS tests to reduce inspections.

Declaration Statements

- Documents should be signed by authorized individuals (digital signatures are legal)

*The CF1R/CF3R forms shown above are how the installers/HERS raters will document proper installation of features.

BayREN Checklist
What to Check on a CF1R-PRF-01 (revised 1/2/21/US) Page 1

BayREN Codes & Standards Training

Part II: Improving Energy Code Compliance in Low-rise New Construction Residential New Construction

BayREN Codes & Standards Trainings

- The BayREN Codes & Standards program is a joint effort of Bay Area cities and counties to achieve full compliance with provisions of the California Energy Code
- BayREN trainings seek to provide building department staff and private sector building professionals with tools and strategies for improving energy code compliance
- This is one class in a series of classes presented at no cost to building departments. Contact your BayREN county representative for information on scheduling additional classes.

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Introduction

Learning Objectives:

- Understand the overall compliance process for residential new construction (and larger additions).
- Identify what 2013 compliance documentation is required on permit applications.
- Determine which building features are most likely to affect energy code compliance.
- Focus plan review and field verification efforts on most impactful building energy features.

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Introduction

2013 vs. 2016 Codes

Note:

- The information presented in this class is applicable to both the 2013 and 2016 versions of the energy code.
- While there were substantial changes, they mostly affect the features that have to be installed and not the process for verifying those features, which is what this class covers.
- Summaries of the 2016 changes are provided as extra handouts.
- Where there are differences between the two code versions, they are called out in these materials.

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Introduction

- The energy code compliance process relies heavily on documentation. Keeping track of all the documentation can be very challenging.
- There are very useful online tools to help keep track of the forms for most projects, called “HERS registries”.

Approved HERS Provider Categories

Provider	2013 Standards		
	Newly Constructed	Alterations	Whole House
CalCERTS	Yes ^a	Yes	Yes
CHEERS	Yes ^a	Yes	
USERA		Yes ^b	

^a Also approved for NSHP

^b Third party quality control program, by Enalasy, for residential buildings.

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Introduction

- **Login to the HERS provider (CalCERTS) registry to check the status of any project that requires HERS Verification.**
- Projects are searchable in the registry by registration number, address, or permit number.
- BayREN has a class specifically on how to get the most out of a HERS registry.

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Introduction

- Building departments have direct access to registered documents within their jurisdiction through the revamped HERS provider registry.

Building department sign-up information.



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The Compliance Process

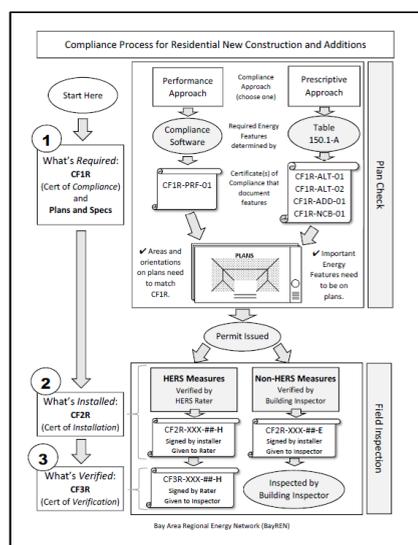
- Before “diving into” the details of the energy code, it is first important to understand the overall process and how different people fit into it.



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Compliance Process Flow Diagram

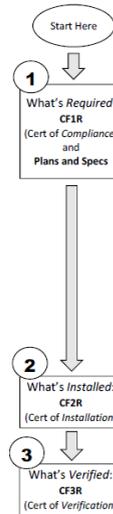
Refer to full-size copy provided with your handouts.



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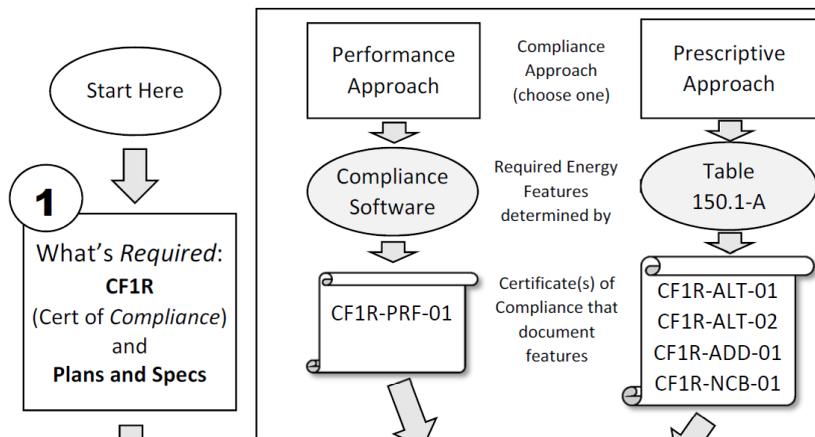
Compliance Process Flow Diagram

- Notice that the forms (CF1R, CF2R, and CF3R) are there and follow a simple 1 - 2 - 3 flow.
- Notice that process is divided into Plan Check and Field Inspection sections and that good communication must flow between them.
- The forms are intended to facilitate this.



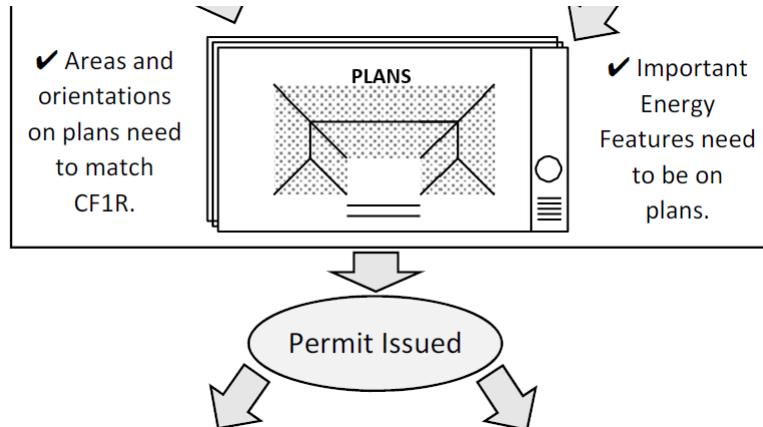
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Compliance Process Flow Diagram



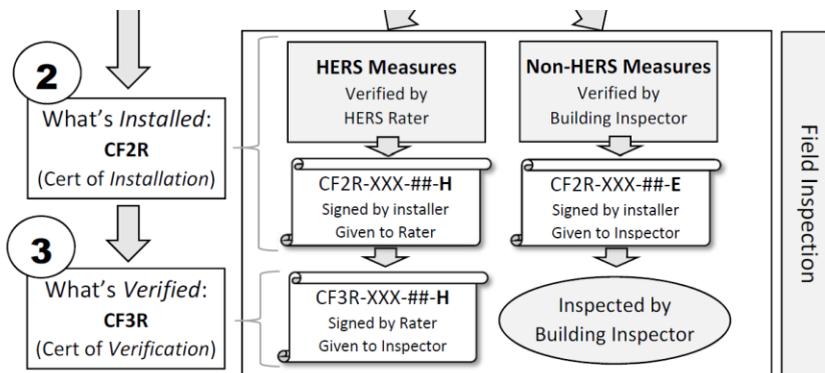
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Compliance Process Flow Diagram



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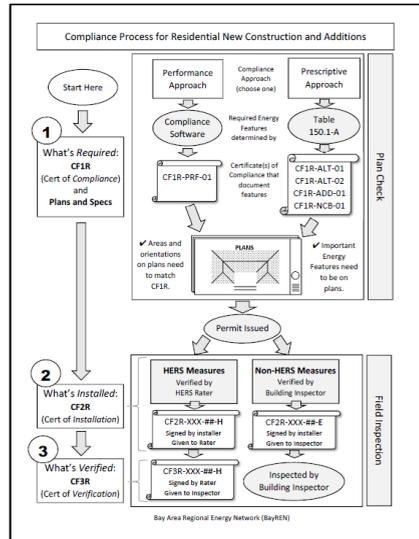
Compliance Process Flow Diagram



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Compliance Process Flow Diagram

Any questions?



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Compliance Documents List (Forms)

CF-2R – Certificates of Installation – Non-HERS Measures (-E)

- Common**
 - CF2R-ENV-01-E: fenestration (windows, skylights, etc.)
 - CF2R-ENV-02-E: air sealing features (weather stripping, caulking, backdraft dampers, etc.)
 - CF2R-ENV-03-E: insulation
 - CF2R-ENV-04-E: roofing products
 - CF2R-LTG-01-E: lighting features
 - CF2R-MCH-01-E: mechanical systems (HVAC)
- Not very common**
 - CF2R-MCH-02-E: whole house fan
 - CF2R-MCH-04-E: evaporative coolers
 - CF2R-PLB-01-E: Multi-family central hot water distribution systems
 - CF2R-PLB-02-E: Single-family central hot water distribution systems
 - CF2R-PLB-03-E: Pool and spa heating systems

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Compliance Documents List (Forms)

CF-2R – Certificates of Installation – HERS Measures (-H)

- CF2R-ENV-20-H: Envelope air leakage (blower door test)
- CF2R-ENV-21-H: QII Framing Stage (batt, loose fill, etc.)
- CF2R-ENV-22-H: QII Ceiling Air Barrier
- CF2R-ENV-23-H: QII Insulation Stage
- CF2R-ENV-24-H: QII Framing Stage (SIP & ICF)
- **CF2R-MCH-20-H: sealed ducts***
- CF2R-MCH-21-H: Supply duct location verification
- **CF2R-MCH-22-H: HVAC system fan efficacy (fan watt draw)***
- **CF2R-MCH-23-H: HVAC system fan airflow***
- CF2R-MCH-24-H: Blower door, when infiltration is used to meet whole house ventilation
- **CF2R-MCH-25-H: HVAC system refrigerant charge***
- CF2R-MCH-26-H: Rated system verification (High SEER/EER)
- **CF2R-MCH-27-H: ventilation to the ASHRAE 62.2 standard***
- CF2R-MCH-28-H: Return Duct sizing table verification (alternative to airflow/Fan watt draw test)
- CF2R-MCH-29-H: Supply duct surface area and buried ducts verification
- CF2R-PLB-21-H: Multi-family central hot water distribution systems
- CF2R-PLB-21-H: Single-family central hot water distribution systems

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***Most common HERS Tests**

Compliance Documents List (Forms)

- For each CF2R-XXX-##-H there is a corresponding CF3R-XXX-##-H, Certificate of Verification
- The list of CF3Rs would look exactly like the list of CF2R-Hs
- The HERS registry will make sure the correct HERS documents (CF2R and CF3R) get used and completed.

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What to Check on a CF1R

- Refer to the “What to Verify on a CF1R” checklist tool provided in your handouts.

BAY AREA Regional Energy Network

Permit Number: _____
 Date Completed: _____
 Completed By/Initials: _____

What to Check on a CF1R-PRF-01 (Residential Performance Approach)

The following items highlight the more important features to be verified on the CF1R-PRF-01 form.

General Information Section

- Item 06 Climate Zone – Should be correct for location of project.
- Item 11 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor Area – Should match plans.
- Item 13 Front Orientation (degrees or “cardinal”) if master plan – Should match plans.
- Item 17 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 12 Ceiling Percentage – Total glass area divided by floor area (Item 14, above). Should match plans.

Compliance Results Section

- How 02 Building incorporates HERS Features – Leverage any listed HERS tests to reduce inspections.
- Column 07 Compliance Margin – How much it exceeds code by. <0%: small discrepancies may affect compliance. 0% to 10%: only large discrepancies will affect compliance. >10%: only very large discrepancies will affect compliance. Note: Energy Star and some reach codes require a compliance margin of 10%.

Opaque Surfaces Section (CF1R-ENV-03*)

- Column 01 Name – These are just arbitrary test descriptors. Make sure all sides of the house are listed.
- Column 02 Construction – Reference a later section that details each surface type.
- Column 04 and 05 Azimuth and Orientation – Make sure all sides of the house are listed.
- Column 06 Gross Area – Check to see if these are reasonable, according to plans.

Attic Section (CF1R-ENV-04*)

- Column 06 – If radiant barrier is specified, installation is verified in the field.
- Column 07 – If cool roof is specified, reflectance and emittance are verified in the field.

Windows Section (CF1R-ENV-05*)

- Column 03 Orientation-Azimuth and Column 07 Area – Should match plans.
- Column 04 and 05 U-Factor and SHGC – Important to verify in the field.

Ceiling and Flats Section

- Column 01 Depth – Length of overhang. Quickly check anything ‘L’ against plans.

Opaque Surface Construction Section (CF1R-ENV-03*)

- Column 01 Construction name – Referenced from Opaque Surface Section, Column 01 Construction.
- Column 06 Assembly Layers – Look for R-values. These should be verified in the field.

Building Envelope HERS Verification Section (CF1R-ENV forms*)

- Leverage any listed HERS tests to reduce inspections.

Water Heating Sections (CF1R-PLB-02*)

- System Type, Number of fixtures, Energy Factor and volume should be verified in the field.
- Leverage any listed HERS tests to reduce inspections. (CF1R-PLB forms)

HVAC Sections (CF1R-MCH-01*)

- System Type, Efficiency, Duct Locations and Duct R-value should be verified in the field.
- Leverage any listed HERS tests to reduce inspections. (CF1R-MCH forms)

IAQ (Indoor Air Quality) Fans Section (CF1R-MCH-2*)

- Leverage any listed HERS tests to reduce inspections.

Declaration Statements

- Documents should be signed by authorized individuals (digital signatures are legal).
- *The CF1R/CF3R forms shown above are how the installers/HERS raters will document proper installation of features.

BayREN Checklist
 What to Check on a CF1R-PRF-01 (revised 1/2/21/15) Page 1

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What to Check on a CF1R

- Also refer to the Sample CF1R provided in your handouts.

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD CF1R-PRF-01

Project Name: Residence Calculation Date/Time: 20:29, Tue, Aug 12, 2014

Calculation Description: Title 24 Analysis Input File Name: kuby

Page 1 of 11

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
03	Project Location				
04	City	Marin Park	05	Standards Version	Compliance 2014
06	ZIP Code	94025	07	Compliance Manager Version	BSM/Comply 2014.62 (2014)
08	Climate Zone	C2	09	Software Version	Comply 11.2
10	Building Type	Single-Family	11	Front Orientation (Mag/Compass)	213
12	Project Sample	Very Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT ²)	3042	15	Number of Zones	2
16	Slab Area (FT ²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area (ft ²)	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT ²)	NA	21	Ceiling Percentage (%)	16.1%

COMPLIANCE RESULTS

01 Building Complies with Complexed Performance

02 This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.

03 This building incorporates one or more special Features extra below:

ENERGY USE SUMMARY					
04	05	06	07	08	
Energy Use (kBtu/yr)	Modelled Design	Proposed Design	Compliance Margin	Percent Improvement	
Space Heating	10.63	10.40	0.23	1.9%	
Space Cooling	1.96	1.90	-0.06	-3.0%	
IAQ Ventilation	1.01	1.01	0.00	0.0%	
Water Heating	0.91	0.88	0.03	3.3%	
Photovoltaic Offset	---	0.00	0.00	---	
Compliance Energy Total	24.51	24.19	0.32	1.3%	
Total Energy (Including AMI/ELV)	61.95	61.79	0.16	0.4%	

* Calculated Appliances and Measurement Energy Use

Registration Number: 214-N070807A-0000000-0000 Registration Date/Time: 2014-08-13 11:58:07 HERS Provider: CxCERTS Inc.
 CA Building Energy Efficiency Standards - 2013 Residential Compliance Report Version: CF1R-RT232014-095; Report Generated at: 2014-08-12T20:32:39

What to Check on a CF1R

- This tool is intended to help you prioritize your limited time by focusing on the features that have the greatest energy impact.
- There are many other data points that can affect compliance but these are the most important.
- Notice how this tool is organized – it has the same section names as the CF1R.

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

Only 7 items

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
03	Project Location				
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT ²)	3843	15	Number of Zones	2
16	Slab Area (FT ²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT ²)	NA	21	Glazing Percentage (%)	16.1%

21 items!

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project. 
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
Project Location					
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT ²)	3843	15	Number of Zones	2
16	Slab Area (FT ²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT ²)	NA	21	Glazing Percentage (%)	16.1%

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work. 
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
Project Location					
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT ²)	3843	15	Number of Zones	2
16	Slab Area (FT ²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT ²)	NA	21	Glazing Percentage (%)	16.1%

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans. 
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
Project Location					
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT²)	3843	15	Number of Zones	2
16	Slab Area (FT²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT²)	NA	21	Glazing Percentage (%)	16.1%

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans. 
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
Project Location					
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT²)	3843	15	Number of Zones	2
16	Slab Area (FT²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT²)	NA	21	Glazing Percentage (%)	16.1%

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description. ←
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
Project Location					
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT²)	3843	15	Number of Zones	2
16	Slab Area (FT²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT²)	NA	21	Glazing Percentage (%)	16.1%

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What to Check on a CF1R

General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description. ←
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans.

GENERAL INFORMATION					
01	Project Name	Residence			
02	Calculation Description	Title 24 Analysis			
Project Location					
04	A City	Menlo Park	05	Standards Version	Compliance 2014
06	Zip code	94025	07	Compliance Manager Version	BEMCmpMgr 2013-2 (595c)
08	Climate Zone	CZ3	09	Software Version	EnergyPro 6.2
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	213
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT²)	3843	15	Number of Zones	2
16	Slab Area (FT²)	0	17	Number of Stories	2
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT²)	NA	21	Glazing Percentage (%)	16.1%

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What to Check on a CF1R

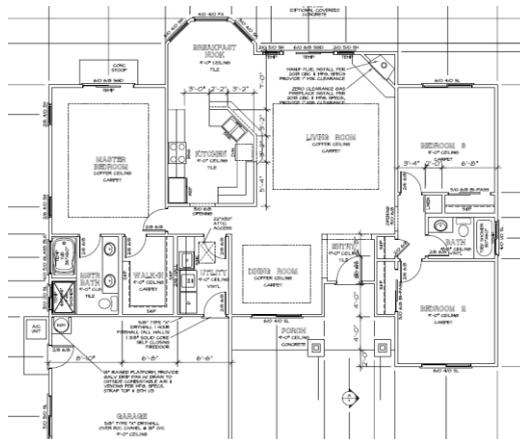
General Information Section

- Item 08 Climate Zone – Should be correct for location of project.
- Item 12 Project Scope (new, addition, etc.) – Should match permit scope of work.
- Item 14 Total Conditioned Floor area – Should match plans.
- Item 11 Front Orientation (degrees or “Cardinal” if master plan) – Should match plans.
- Item 13 Number of Dwelling Units – Should match plans, project description.
- Item 17 Number of Stories – Should match plans, project description.
- Item 21 Glazing percentage – Total Glass area divided by floor area (Item 14, above). Should match plans. **Very Important!**

GENERAL INFORMATION			
01	Project Name Residence		
02	Calculation Description Title 24 Analysis		
03	Project Location		
04	A City Menlo Park	05	Standards Version Compliance 2014
06	Zip code 94025	07	Compliance Manager Version BEMcmpMgr 2013-2 (595c)
08	Climate Zone CZ3	09	Software Version EnergyPro 6.2
10	Building Type Single Family	11	Front Orientation (deg/Cardinal) 213
12	Project Scope Newly Constructed	13	Number of Dwelling Units 1
14	Total Cond. Floor Area (FT²) 3843	15	Number of Zones 2
16	Slab Area (FT²) 0	17	Number of Stories 2
18	Addition Cond. Floor Area NA	19	Natural Gas Available Yes
20	Addition Slab Area (FT²) NA	21	Glazing Percentage (%) 16.1%

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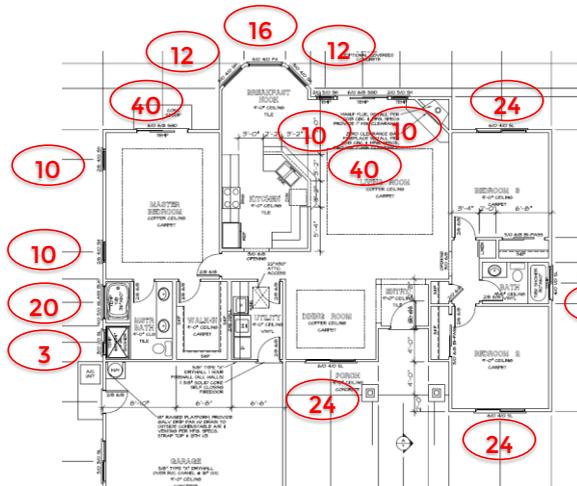
What to Check on a CF1R



1. Add up all the glass area (don't forget skylights)
2. Divide by conditioned floor area (Item 14)

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What to Check on a CF1R



Total Glass Area
Cond Floor Area

= Glazing percentage

- Their % number should not be lower than yours.
- OK if their number is a little higher.
- NOT OK if their number is much higher than yours.

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What to Check on a CF1R

Mainly just informational.

Compliance Results Section

- ☐ Row 02 Building Incorporates HERS Features – Leverage any listed HERS tests to reduce inspections.
- ☐ Column 07 Compliance Margin – How much it exceeds code by. <5%: small discrepancies may affect compliance. 5% to 10%: only large discrepancies will affect compliance. >10%: only very large discrepancies will affect compliance. Note: Energy Star and some reach codes require a compliance margin of 15%.

COMPLIANCE RESULTS				
01	Building Complies with Computer Performance			
02	This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.			
03	This building incorporates one or more Special Features shown below			
ENERGY USE SUMMARY				
04	05	06	07	08
Energy Use (kWh/ft ²)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	10.63	10.46	0.17	1.6%
Space Cooling	1.05	1.90	-0.85	-81.0%
IAQ Ventilation	1.01	1.01	0.00	0.0%
Water Heating	8.81	7.88	0.93	10.6%
Photovoltaic Offset	---	0.00	0.00	---
Compliance Energy Total	21.50	21.25	0.25	1.2%
Total Energy (including AMEU)	61.95	61.70	0.25	0.4%

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What to Check on a CF1R

Mainly just informational.

Compliance Results Section

- Row 02 Building Incorporates HERS Features – Leverage any listed HERS tests to reduce inspections.
- Column 07 Compliance Margin – How much it exceeds code by. <5%: small discrepancies may affect compliance. 5% to 10%: only large discrepancies will affect compliance. >10%: only very large discrepancies will affect compliance. Note: Energy Star and some reach codes require a compliance margin of 15%.

COMPLIANCE RESULTS				
01	Building Complies with Computer Performance			
02	This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CE-C approved HERS provider.			
03	This building incorporates one or more Special Features shown below			
ENERGY USE SUMMARY				
04	05	06	07	08
Energy Use (KTDV/H)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	10.63	10.46	0.17	1.6%
Space Cooling	1.05	1.90	-0.85	-81.0%
IAQ Ventilation	1.01	1.01	0.00	0.0%
Water Heating	8.81	7.88	0.93	10.6%
Photovoltaic Offset	---	0.00	0.00	---
Compliance Energy Total	21.50	21.25	0.25	1.2%
Total Energy (including AMEU)	61.95	61.70	0.25	0.4%

Energy use of house if built to prescriptive measures.

Energy use of house as designed.

Difference

% better than code.

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What to Check on a CF1R

Opaque Surfaces Section (CF2R-ENV-03*)

- Column 01 Name – These are just arbitrary text descriptors. Make sure all sides of the house are listed.
- Column 03 Construction – References a later section that details each surface type.
- Columns 04 and 05 Azimuth and Orientation – Make sure all sides of the house are listed.
- Column 06 Gross Areas – Check to see if they are reasonable, according to plans.

OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft ²)	Window Area (ft ²)	Tilt(deg)
Front Wall	Main Floor	R-21 Wall	213	Front	285	38	90
Left Wall	Main Floor	R-15 Wall	303	Left	440	51	90
Rear Wall	Main Floor	R-15 Wall	33	Back	783	249.968	90
Right Wall	Main Floor	R-15 Wall	123	Right	290	21.3	90
Left Front Wall	Main Floor	R-15 Wall	258	45	20	9	90
Right Front Wall	Main Floor	R-15 Wall	168	315	20	9	90
Front 2 x 4 Wall	Main Floor	R-13 Wall1	213	Front	95	18	90
Roof	Main Floor	R-38 Roof Attic			391		
Raised Floor	Main Floor	R-30 Floor Crawlspace			2216		
Front Wall 2	Upper Floor	R-21 Wall	213	Front	435	57	90
Left Wall 2	Upper Floor	R-15 Wall	303	Left	444	56	90

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What to Check on a CF1R

Opaque Surfaces Section (CF2R-ENV-03*)

- Column 01 Name – These are just arbitrary text descriptors. Make sure all sides of the house are listed.
- Column 03 Construction – References a later section that details each surface type.
- Columns 04 and 05 Azimuth and Orientation – Make sure all sides of the house are listed.
- Column 06 Gross Areas – Check to see if they are reasonable, according to plans.

OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft ²)	Window Area (ft ²)	Tilt(deg)
Front Wall	Main Floor	R-21 Wall	213	Front	285	38	90
Left Wall	Main Floor	R-15 Wall	303	Left	440	51	90
Rear Wall	Main Floor	R-15 Wall	33	Back	783	249,968	90
Right Wall	Main Floor	R-15 Wall	123	Right	290	21.3	90
Left Front Wall	Main Floor	R-15 Wall	258	45	20	9	90
Right Front Wall	Main Floor	R-15 Wall	168	315	20	9	90
Front 2 x 4 Wall	Main Floor	R-13 Wall 1	213	Front	95	18	90
Roof	Main Floor	R-38 Roof Attic			391		
Raised Floor	Main Floor	R-30 Floor Crawlspace			2216		
Front Wall 2	Upper Floor	R-21 Wall	213	Front	435	57	90
Left Wall 2	Upper Floor	R-15 Wall	303	Left	440	51	90

Names of surface types detailed in a later section

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What to Check on a CF1R

Opaque Surfaces Section (CF2R-ENV-03*)

- Column 01 Name – These are just arbitrary text descriptors. Make sure all sides of the house are listed.
- Column 03 Construction – References a later section that details each surface type.
- Columns 04 and 05 Azimuth and Orientation – Make sure all sides of the house are listed.
- Column 06 Gross Areas – Check to see if they are reasonable, according to plans.

OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft ²)	Window Area (ft ²)	Tilt(deg)
Front Wall	Main Floor	R-21 Wall	213	Front	285	38	90
Left Wall	Main Floor	R-15 Wall	303	Left	440	51	90
Rear Wall	Main Floor	R-15 Wall	33	Back	783	249,968	90
Right Wall	Main Floor	R-15 Wall	123	Right	290	21.3	90
Left Front Wall	Main Floor	R-15 Wall	258	45	20	9	90
Right Front Wall	Main Floor	R-15 Wall	168	315	20	9	90
Front 2 x 4 Wall	Main Floor	R-13 Wall 1	213	Front	95	18	90
Roof	Main Floor	R-38 Roof Attic			391		
Raised Floor	Main Floor	R-30 Floor Crawlspace			2216		
Front Wall 2	Upper Floor	R-21 Wall	213	Front	435	57	90
Left Wall 2	Upper Floor	R-15 Wall	303	Left	440	51	90

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What to Check on a CF1R

Opaque Surfaces Section (CF2R-ENV-03*)

- Column 01 Name – These are just arbitrary text descriptors. Make sure all sides of the house are listed.
- Column 03 Construction – References a later section that details each surface type.
- Columns 04 and 05 Azimuth and Orientation – Make sure all sides of the house are listed.
- Column 06 Gross Areas – Check to see if they are reasonable, according to plans.

OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft ²)	Window Area (ft ²)	Tilt(deg)
Front Wall	Main Floor	R-21 Wall	213	Front	285	38	90
Left Wall	Main Floor	R-15 Wall	303	Left	440	51	90
Rear Wall	Main Floor	R-15 Wall	33	Back	783	249.968	90
Right Wall	Main Floor	R-15 Wall	123	Right	290	21.3	90
Left Front Wall	Main Floor	R-15 Wall	258	45	20	9	90
Right Front Wall	Main Floor	R-15 Wall	168	315	20	9	90
Front 2 x 4 Wall	Main Floor	R-13 Wall 1	213	Front	95	18	90
Roof	Main Floor	R-38 Roof Attic			391		
Raised Floor	Main Floor	R-30 Floor Crawlspace			2216		
Front Wall 2	Upper Floor	R-21 Wall	213	Front	435	57	90
Left Wall 2	Upper Floor	R-15 Wall	303	Left	440	51	90

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What to Check on a CF1R

Attic Section (CF2R-ENV-04*)

- Column 06 – If Radiant Barrier is specified, installation is **verified in the field**.
- Column 07 – If Cool Roof is specified, reflectance and emittance are **verified in the field**.

ATTIC						
01	02	03	04	05	06	07
Name	Construction	Roof Rise	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof
Attic	Attic Roof Cons	8	0.1	0.85	Yes	No



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What to Check on a CF1R

Attic Section (CF2R-ENV-04*)

- Column 06 – If Radiant Barrier is specified, installation is **verified in the field**.
- Column 07 – If Cool Roof is specified, reflectance and emittance are **verified in the field**.

01	02	03	04	05	06	07
Name	Construction	Roof Rise	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof
Attic	Attic Roof Cons	8	0.1	0.85	Yes	No

 <p>CRRC COOL ROOF RATING COUNCIL</p>		Initial	Weathered
	Solar Reflectance	0.27	0.26
	Thermal Emittance	0.92	0.81
	Rated Product ID Number	0676-0043	
Licensed Seller ID Number	----		
Classification	Production Line		
<small>Cool Roof Rating Council ratings are determined for a fixed set of conditions, and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building performance may vary. Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating Council procedures.</small>			

Minimums (when required – not required in this example)

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What to Check on a CF1R

Windows Section (CF2R-ENV-01*)

- Column 03 Orientation-Azimuth and Column 07. Area – *Should match plans*.
- Columns 08 and 09: U-factor and SHGC – **Important to verify in the field**.

01	02	03	04	05	06	07	08	09	10
Name	Type	Surface (Orientation-Azimuth)	Width(ft)	Height (ft)	Multiplier	Area (ft ²)	U-factor	SHGC	Exterior Shading
Window	Window	Front Wall (Front-213)	----	----	1	28.0	0.30	0.67	
Window in Door	Window	Front Wall (Front-213)	----	----	1	10.0	0.55	0.67	
Window 2	Window	Left Wall (Left-303)	----	----	1	51.0	0.30	0.67	
Window 3	Window	Rear Wall (Back-33)	----	----	1	90.0	0.30	0.67	
10080	Window	Rear Wall (Back-33)	10.0	8.0	1	80.0	0.30	0.67	
10080 2	Window	Rear Wall (Back-33)	12.0	8.0	0.833	80.0	0.30	0.67	
Window 4	Window	Right Wall (Right-123)	----	----	1	21.3	0.30	0.67	
Window 5	Window	Left Front Wall (Left-Front-213)	----	----	1	9.0	0.30	0.67	

Use the same numbers you used to calculate glazing percentage, but now pay attention to orientation.

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What to Check on a CF1R

Windows Section (CF2R-ENV-01*)

- Column 03 Orientation-Azimuth and Column 07. Area – *Should match plans.*
- Columns 08 and 09: U-factor and SHGC – **Important to verify in the field.**

WINDOWS									
01	02	03	04	05	06	07	08	09	10
Name	Type	Surface (Orientation-Azimuth)	Width(ft)	Height (ft)	Multiplier	Area (ft ²)	U-factor	SHGC	Exterior Shading
Window	Window	Front Wall (Front-213)	----	----	1	28.0	0.30	0.67	
Window in Door	Window	Front Wall (Front-213)	----	----	1	10.0	0.55	0.67	
Window 2	Window	Left Wall (Left-303)	----	----	1	51.0	0.30	0.67	
Window 3	Window	Rear Wall (Back-33)	----	----	1	90.0	0.30	0.67	
10080	Window	Rear Wall (Back-33)	10.0	8.0	1	80.0	0.30	0.67	
10080 2	Window	Rear Wall (Back-33)	12.0	8.0	0.833	80.0	0.30	0.67	
Window 4	Window	Right Wall (Right-123)	----	----	1	21.3	0.30	0.67	
Window 5	Window	Left Front Wall (Front-213)	----	----	1	0.0	0.30	0.67	

Make sure NFRC labels do not get removed prior to field inspection! Put a note on the plans!

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What to Check on a CF1R

Overhangs and Fins Section

- Column 02 Depth – Length of overhang. Quickly check anything > 1' against plans.

OVERHANGS AND FINS													
01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Depth	Overhang				Left Fin				Right Fin			
		Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	DistL	Bot Up	Depth	Top Up	Dist R	Bot Up
10080	10	1	2.8	2.8	0	0	0	0	0	0	0	0	0
10080 2	11.5	1	1.8	1.8	0	0	0	0	0	0	0	0	0
5080	1	0.3	4.9	6	0	7.5	0	4.9	0	0	0	0	0
6050	1	0.3	1.7	1.7	0	0	0	0	0	0	0	0	0
3030	2.3	0.3	1	1	0	0	0	0	0	0	0	0	0
5050	1	0.3	5.7	14	0	0	0	0	0	0	0	0	0

Permanent patio covers.
Inset front door with porch, etc.

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What to Check on a CF1R

Opaque Surface Constructions Section (CF2R-ENV-03*)

- ☐ Column 01 Construction name – Referenced from Opaque Surfaces Section, Column 03. Construction.
- ☐ Column 06 Assembly Layers – Look for R-values. **These should be verified in the field.**

OPAQUE SURFACE CONSTRUCTIONS					
01	02	03	04	05	06
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	Assembly Layers
Attic Roof Cons	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.		<ul style="list-style-type: none"> • Roofing: Light Roof (Asphalt Shingle) • Above Deck Insulation - no insulation - • Roof Deck: Wood Siding/sheathing/decking • Cavity: - no insulation - • Inside Finish: - select inside finish -
R-0 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O.C.		<ul style="list-style-type: none"> • Attic Floor: - no attic floor - • Cavity: - no insulation - • Sheathing/Insulation - no sheathing/insul. - • Inside Finish: Gypsum Board
R-13 Wall	Interior Walls	Wood Framed Wall	2x4 @ 16 in. O.C.	R 13	<ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Sheathing/Insulation: - no sheathing/insul. - • Cavity: R 13 • Sheathing/Insulation: - no sheathing/insul. - • Other Side Finish: Gypsum Board
R-30 Floor Crawlspace	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O.C.	R 25	<ul style="list-style-type: none"> • Floor Surface: Carpeted • Concrete Fill: - no concrete fill - • Floor Deck: Wood Siding/sheathing/decking • Cavity: R 25 • Sheathing/Insulation: - no sheathing/insul. - • Exterior Finish: - select finish -
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O.C.	R 21	<ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Sheathing/Insulation: - no sheathing/insul. - • Cavity: R 21 • Sheathing/Insulation: - no sheathing/insul. - • Exterior Finish: Wood Siding/sheathing/decking

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What to Check on a CF1R

Opaque Surface Constructions Section (CF2R-ENV-03*)

- ☐ Column 01 Construction name – Referenced from Opaque Surfaces Section, Column 03. Construction.
- ☐ Column 06 Assembly Layers – Look for R-values. **These should be verified in the field.**

OPAQUE SURFACE CONSTRUCTIONS					
01	02	03	04	05	06
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	Assembly Layers
Attic Roof Cons	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.		<ul style="list-style-type: none"> • Roofing: Light Roof (Asphalt Shingle) • Above Deck Insulation - no insulation - • Roof Deck: Wood Siding/sheathing/decking • Cavity: - no insulation - • Inside Finish: - select inside finish -
R-0 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O.C.		<ul style="list-style-type: none"> • Attic Floor: - no attic floor - • Cavity: - no insulation - • Sheathing/Insulation - no sheathing/insul. - • Inside Finish: Gypsum Board
R-13 Wall	Interior Walls	Wood Framed Wall	2x4 @ 16 in. O.C.	R 13	<ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Sheathing/Insulation: - no sheathing/insul. - • Cavity: R 13 • Other Side Finish: Gypsum Board
R-30 Floor Crawlspace	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O.C.	R 25	<ul style="list-style-type: none"> • Floor Surface: Carpeted • Concrete Fill: - no concrete fill - • Floor Deck: Wood Siding/sheathing/decking • Cavity: R 25 • Sheathing/Insulation: - no sheathing/insul. - • Exterior Finish: - select finish -
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O.C.	R 21	<ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Sheathing/Insulation: - no sheathing/insul. - • Cavity: R 21 • Sheathing/Insulation: - no sheathing/insul. - • Exterior Finish: Wood Siding/sheathing/decking

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What to Check on a CF1R

Building Envelope HERS Verification Section (CF3R-ENV forms*)

- ☐ Leverage any listed HERS tests to reduce inspections.

BUILDING ENVELOPE - HERS VERIFICATION			
01	02	03	04
Quality Insulation Installation(QII)	Quality Installation of Spray Foam Insulation	Building Envelope Air Leakage	ACH @ 50 Pa
Not Required	Not Required	Not Required	---

HERS rater will thoroughly inspect insulation.

HERS rater will pressure test home for leakage.

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What to Check on a CF1R

Water Heating Sections (CF2R-PLB-02*)

- ☐ System Type, Number of Heaters, Energy Factor and Volume should be **verified in the field**.
- ☐ Leverage any listed HERS tests to reduce inspections. (CF3R-PLB forms)

WATER HEATING SYSTEMS			
01	02	03	04
Name	Distribution Type	Number of Heaters	Solar Fraction (%)
DHW Sys 1	Recirculation, Demand Control Push Button	1	0.0%

WATER HEATERS							
01	02	03	04	05	06	07	08
Name	Heater Element Type	Tank Type	Tank Volume (gal)	Energy Factor or Efficiency	Input Rating	Tank Exterior Insulation R-value	Standby Loss (Fraction)
DHW Heater 1	Natural Gas	Large Storage	75	0.96	80000-Btu/hr	0	0.0191

WATER HEATING - HERS VERIFICATION						
01	02	03	04	05	06	07
Name	Pipe Insulation	Parallel Piping	Compact Distribution	Point-of Use	Recirculation with Manual Control	Recirculation with Sensor Control
DHW Sys 1-hers-dhw	n/a	n/a	n/a	n/a	n/a	n/a

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What to Check on a CF1R

Water Heating Sections (CF2R-PLB-02*)

- System Type, Number of Heaters, Energy Factor and Volume should be **verified in the field**.
- Leverage any listed HERS tests to reduce inspections. (CF3R-PLB forms)

WATER HEATING SYSTEMS							
01	02			03		04	
Name	Distribution Type			Number of Heaters		Solar Fraction (%)	
DHW Sys 1	Recirculation, Demand Control Push Button			1		0.0%	

WATER HEATERS							
01	02	03	04	05	06	07	08
Name	Heater Element Type	Tank Type	Tank Volume (gal)	Energy Factor or Efficiency	Input Rating	Tank Exterior Insulation R-value	Standby Loss (Fraction)
DHW Heater 1	Natural Gas	Large Storage	75	0.96	80000-Btu/hr	0	0.0191

WATER HEATING - HERS VERIFICATION							
01	02	03	04	05	06	07	
Name	Pipe Insulation	Parallel Piping	Compact Distribution	Point-of Use	Recirculation with Manual Control	Recirculation with Sensor Control	
DHW Sys 1-hers-dhw	n/a	n/a	n/a	n/a	n/a	n/a	

HERS rater will thoroughly inspect pipe insulation, layout, etc..

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What to Check on a CF1R

The CF2R-MCH-01 is a very important form to collect regarding HVAC equipment

HVAC Sections (CF2R-MCH-01*)

- System Type, Efficiencies, Duct Locations and Duct R-Value should be **verified in the field**.
- Leverage any listed HERS tests to reduce inspections. (CF3R-MCH forms)

HVAC SYSTEMS								
01	02	03		04		05	06	07
Name	System Type	Heating System		Cooling System		Distribution System	Fan System	Floor Area Served
		Name	Ducted	Name	Ducted			
HVAC System1	Other Heating and Cooling System	Heating Component 1	Yes	Cooling Component 1	Yes	Air Distribution System 1	HVAC Fan 1	2216
Upper HVAC System2	Other Heating and Cooling System	Heating Component 2	Yes	Cooling Component 2	Yes	Air Distribution System 2	HVAC Fan 2	1627

HVAC - HEATING SYSTEMS		
01	02	03
Name	Type	Efficiency
Heating Component 1	Centrifumace - Fuel-fired central furnace	96 AFUE
Heating Component 2	Centrifumace - Fuel-fired central furnace	96 AFUE

HVAC - COOLING SYSTEMS				
01	02	03	04	05
Name	System Type	Efficiency		HERS Verification
		EER	SEER	
Cooling Component 1	Split/AirCond - Split air conditioning system	11.3	13	Cooling Component 1-hers-cool
Cooling Component 2	Split/AirCond - Split air conditioning system	11.3	13	Cooling Component 2-hers-cool

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What to Check on a CF1R

HVAC Sections (CF2R-MCH-01*)

- ☐ System Type, Efficiencies, Duct Locations and Duct R-Value **should be verified in the field.**
- ☐ Leverage any listed HERS tests to reduce inspections. (CF3R-MCH forms)

HVAC - DISTRIBUTION SYSTEMS							
01	02	03	04	05	06	07	08
Name	Type	Duct Leakage	Insulation R-value	Supply Duct Location	Return Duct	Bypass Duct	HERS Verification
Air Distribution System 1	Ducts located in a crawl space	Sealed and tested	6	Crawl Space	Crawl Space	None	Air Distribution System 1-hers-dist
Air Distribution System 2	Ducts located in unconditioned attic	Sealed and tested	6	Attic	Attic	None	Air Distribution System 2-hers-dist

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What to Check on a CF1R

HVAC Sections (CF2R-MCH-01*)

- ☐ System Type, Efficiencies, Duct Locations and Duct R-Value **should be verified in the field.**
- ☐ Leverage any listed HERS tests to reduce inspections. (CF3R-MCH forms)

HVAC COOLING - HERS VERIFICATION					
01	02	03	04	05	06
Name	Verified Airflow	Airflow Target	Verified EER	Verified SEER	Verified Refrigerant Charge
HVAC System1 SCSysRpt 1	Required	350	11.3	---	---
Upper HVAC System2 SCSysRpt 1	Required	350	11.3	---	---

HERS rater will test system airflow.

HERS rater will check make/model and efficiency.

HERS rater will check refrigerant charge.

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What to Check on a CF1R

HVAC Sections (CF2R-MCH-01*)

- System Type, Efficiencies, Duct Locations and Duct R-Value **should be verified in the field.**
- Leverage any listed HERS tests to reduce inspections. (CF3R-MCH forms)

HVAC DISTRIBUTION - HERS VERIFICATION					
01	02	03	04	05	06
Name	Duct Leakage Verification	Duct Leakage Target (%)	Verified Duct Location	Verified Duct Design	
				Return	Supply
Air Distribution System 1-hers-dist	Required	6.0	Not Required	Not Required	Not Required
Air Distribution System 2-hers-dist	Required	6.0	Not Required	Not Required	Not Required

HERS rater will test duct leakage

HERS rater will verify special duct location.

HERS rater will verify special design criteria.

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What to Check on a CF1R

HVAC Sections (CF2R-MCH-01*)

- System Type, Efficiencies, Duct Locations and Duct R-Value **should be verified in the field.**
- Leverage any listed HERS tests to reduce inspections. (CF3R-MCH forms)

HVAC - FAN SYSTEMS			
01	02	03	04
Name	Type	Fan Power (Watts/CFM)	HERS Verification
HVAC Fan 1	Single Speed PSC Furnace Fan	0.58	Required
HVAC Fan 2	Single Speed PSC Furnace Fan	0.58	Required

HERS rater will test system fan watt draw.

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What to Check on a CF1R

IAQ (Indoor Air Quality) Fans Section (CF3R-MCH-27*)

➡ Leverage any listed HERS tests to reduce inspections.

IAQ (Indoor Air Quality) FANS				
01	02	03	04	05
Name	IAQ CFM	IAQ Fan Type	IAQ Recovery Effectiveness(%)	HERS Verification
IAQ Fan	83	Exhaust	0	Required

HERS rater will inspect mechanical ventilation system and measure airflow.

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What to Check on a CF1R

Declaration Statements

➡ Documents should be signed by authorized individuals (digital signatures are legal).

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that the Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: [Redacted]	Documentation Author Signature: [Redacted]
Company:	Signature Date: 2014-08-12 20:39:30
Address:	CEA/HERS Certification identification (if applicable): [Redacted]
City/State/Zip:	Phone:
RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California:	
1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.	
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.	
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, drawings , calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.	
Responsible Designer Name: [Redacted]	Responsible Designer Signature: [Redacted]
Company:	Date Signed: 2014-08-13 11:54:07
Address:	License:
City/State/Zip:	Phone:

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Resource

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



- The Forms Ace™ tool helps applicants (and building departments) determine which forms are applicable to a specific project. Use this tool to identify:
 - Necessary compliance steps
 - The compliance path that is least cumbersome to pursue
 - Which forms will be required & generate a checklist
 - Whether or not a project requires HERS verification

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Class Wrap-up

Contact information:

- BayREN Codes & Standards Program
 - www.bayren.org/codes
 - codes@bayren.org

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