

Decoding Forms:

# Let's Talk Res and Nonres Title 24 Forms

*Host:*

Gina Rodda  
Gabel Associates, LLC

*Guest Speaker:*

Sally Blair  
AEC



This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.



# Welcome

## ► Welcome

- Who are we?
- Our goal today
- More about you

- What We Heard From you
- Let's Talk
- Next Steps
- Wrap Up





# Who Are We?

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## Host

Gina Rodda, Gabel Associates, LLC

[gina@gabelenergy.com](mailto:gina@gabelenergy.com)

Gina Rodda has been in the energy modeling field since 1991. Instructor of several dozen full day IOUs Codes and Standards trainings on the Residential and Nonresidential Title 24 Building Energy Efficiency Standards for building department staff and energy consultants, and for the Nonresidential CEPE preparation webinar offered through CABEC. As a Certified Energy Analyst (CEA) and Certified Energy Plans Examiner (CEPE) through CABEC, and a LEED AP, she provides residential and non residential energy calculations for many building types throughout the state of California.



**GABEL ASSOCIATES, LLC**

BUILDING ENERGY ANALYSIS & ENERGY CODE COMPLIANCE



# Who Are We?

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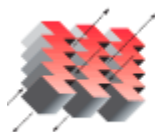


## Guest Speaker

Sally Blair, AEC

[Sblair@archenergy.com](mailto:Sblair@archenergy.com)

Sally works for Architectural Energy Corporation, where she has gained more than a decade of experience in energy and sustainability consulting. She holds a BS in mechanical engineering, and an MBA. Over the past few years, she has been fortunate to work for the IOU Codes and Standards team, focusing on Title 24, Part 6 compliance improvement. Sally has worked in partnership with seven building departments throughout California to identify solutions for streamlining compliance with the energy code. Although the C&S Team has many areas they are working on, Sally has primarily concentrated on developing pragmatic tools and resources for building departments.



**ARCHITECTURAL ENERGY**  
C O R P O R A T I O N



# Our Goal Today

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Review 2013 Title 24 forms:

- ✦ What should be used when
- ✦ Who should be providing and verifying
- ✦ Tips and tricks
- ✦ Any specific questions you may have



Brought to you by...

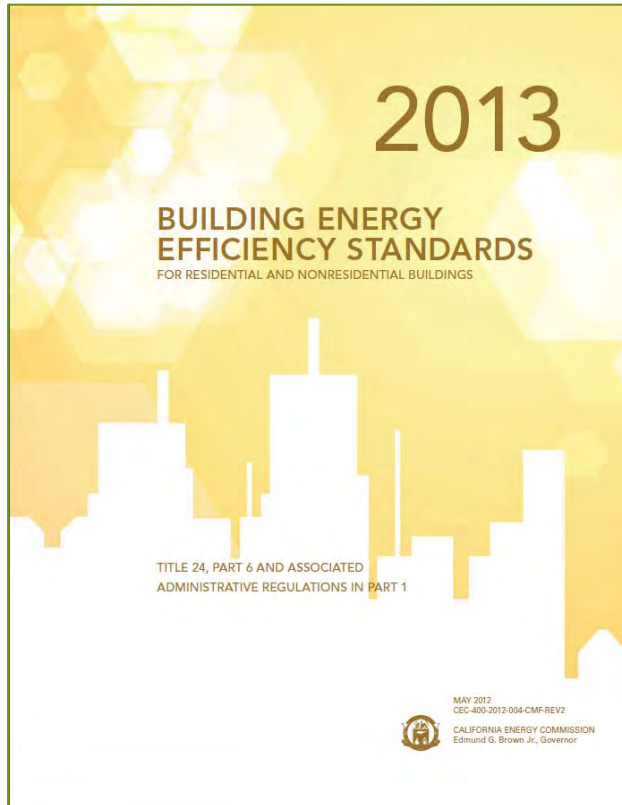
## California Statewide Codes & Standards



This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.



# When?



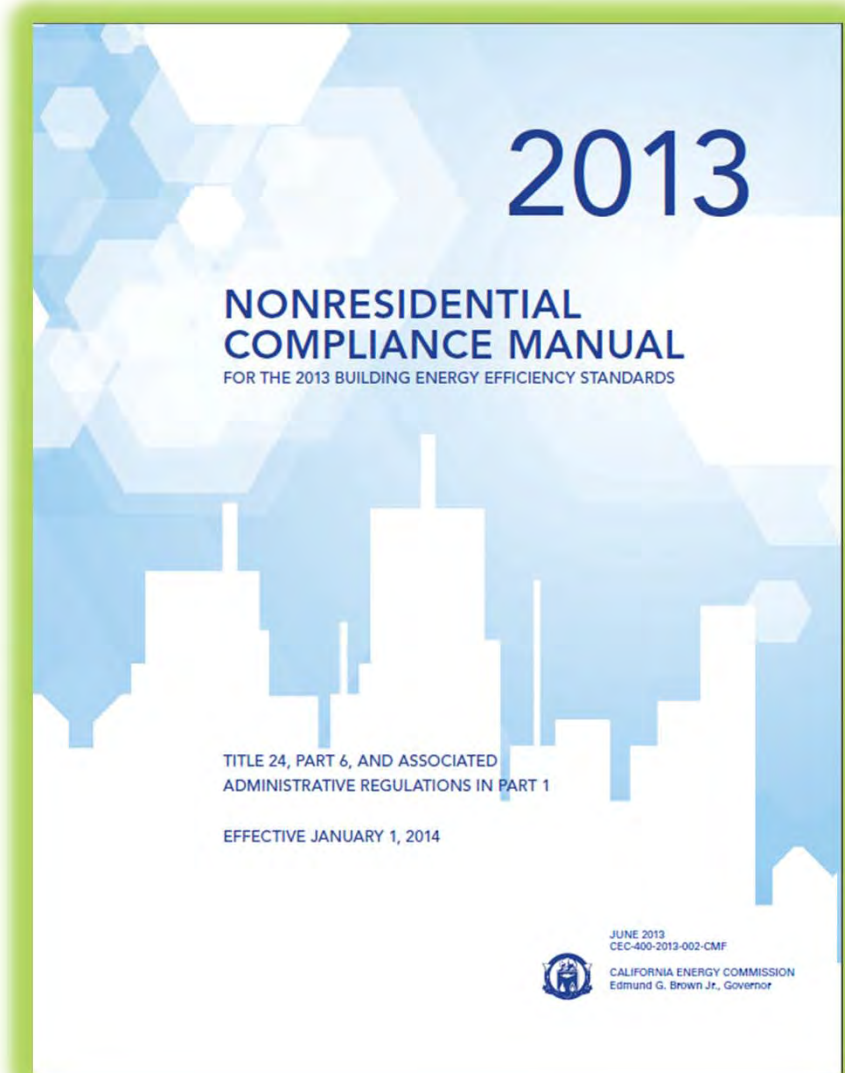
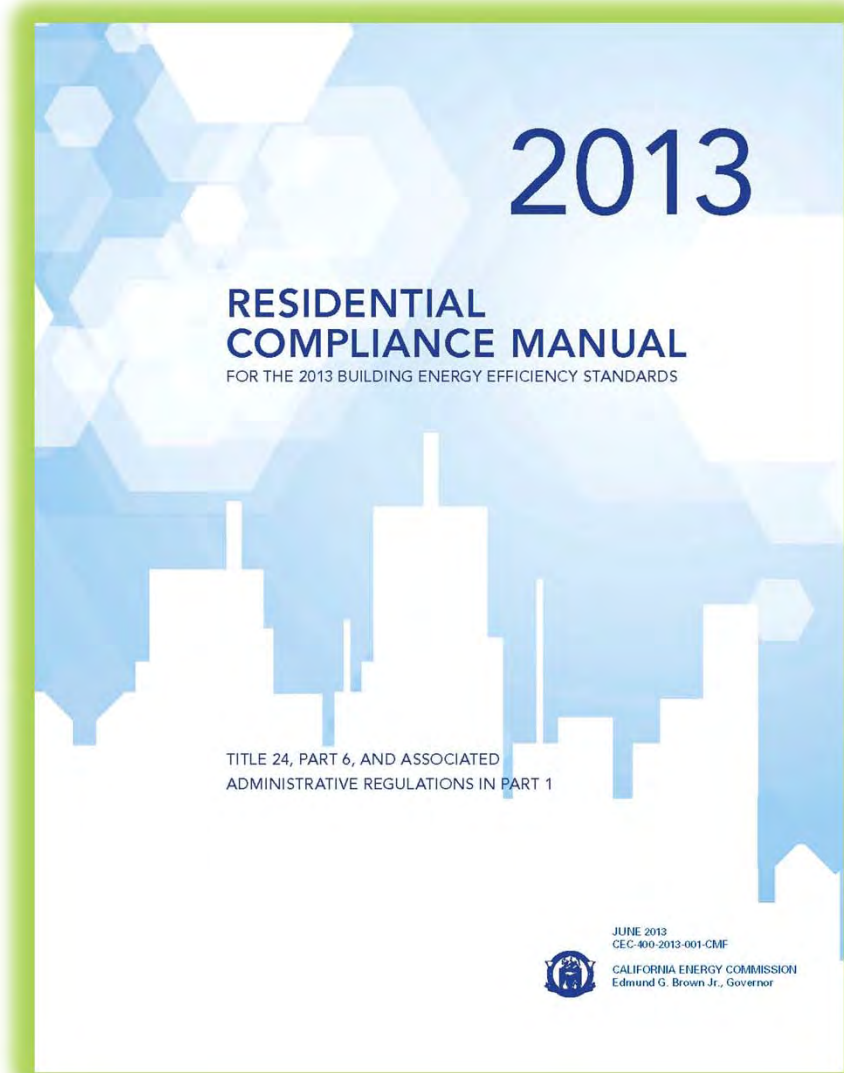
## When (current schedule):

- ✦ Any projects that apply for permit on or after **JULY 1, 2014** will be subject to the 2013 Standards.
- ✦ Nonresidential Registry January 1, 2015
- ✦ Appliance efficiency update January 1, 2015





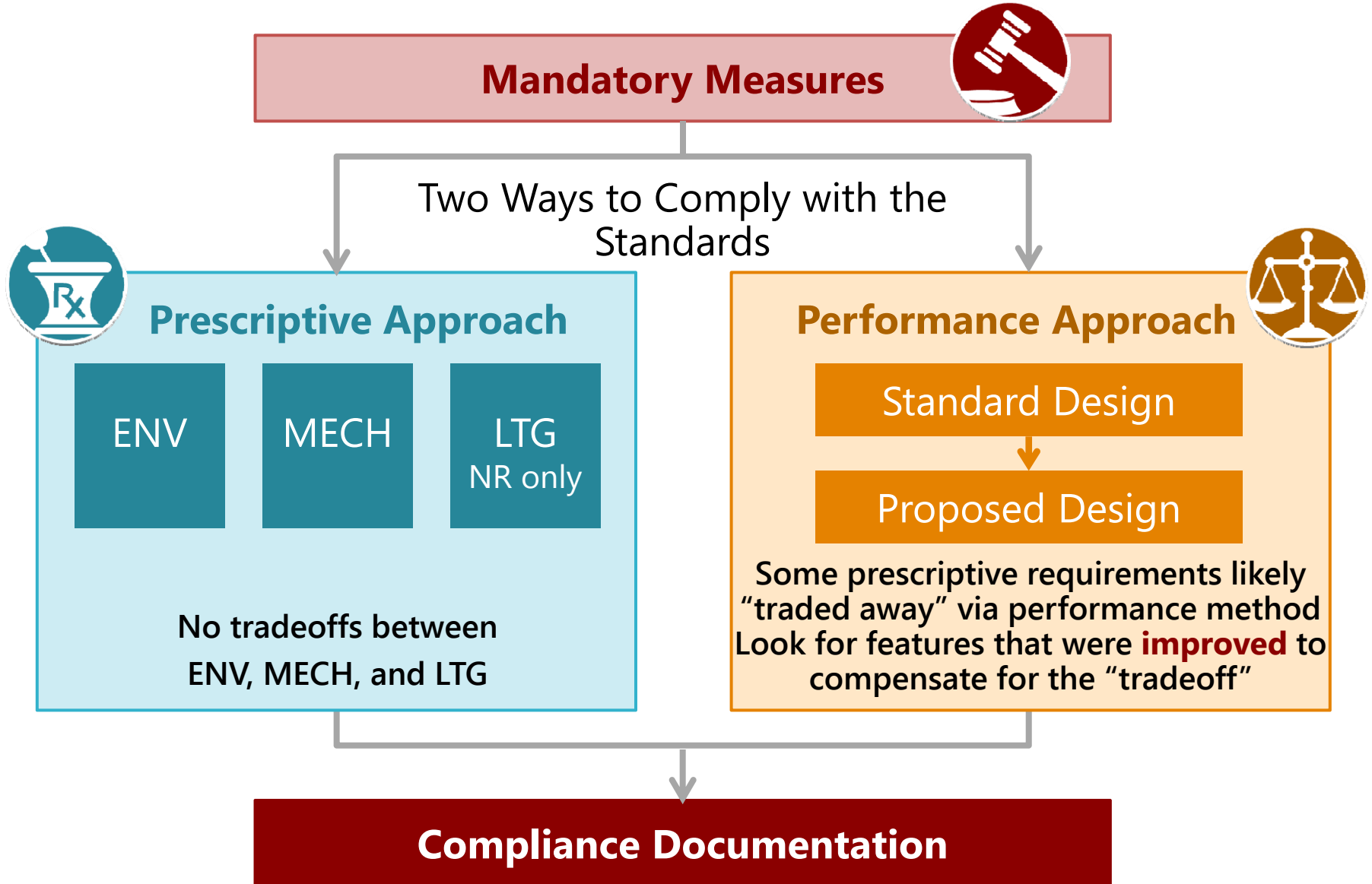
# CEC Documents: Forms







# Defining the Difference





# Let's Talk

- Welcome

- ▶ **What We Heard from You**

- Most common challenges

- Let's Talk

- Next Steps

- Wrap Up





# Our Questions To You

## Challenges

What are your top 3 concerns regarding the compliance forms under the 2013 Title 24 Part 6 standards?

Time involved to complete, availability of tools needed to perform measurements, amount of training required

What new forms have been produced?  
Who authors the new forms?  
Which forms are required to be on a plan page?

Which projects trigger each form?  
Which phase of the permit process needs which form?  
Who is supposed to check each form?

What has changed and how do we catch the changes?

What are the changes from existing docs?  
Who may fill out the docs?

So many pages of code...  
So many pages of references...  
How to make sense of it all?



# Let's Talk

- Welcome
- What We Heard from You

## ▶ Let's Talk

- Overview of challenges
- Challenge A: Residential forms
- Challenge B: Nonresidential Forms
- Challenge C: Who / What / When
- Challenge D: Scenario — Low Rise Multi Family Project

- Next Steps
- Wrap Up





# Challenges

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## ✦ Challenge A

- ✦ Residential Forms



## ✦ Challenge B

- ✦ Nonresidential Forms



## ✦ Challenge C

- ✦ Who / What / When
  - Who submits which form to who
  - What are the triggers for certain forms
  - When do you submit the forms and to who



## ✦ Challenge D

- ✦ Scenario: Low Rise Multi Family Project



# Challenge A

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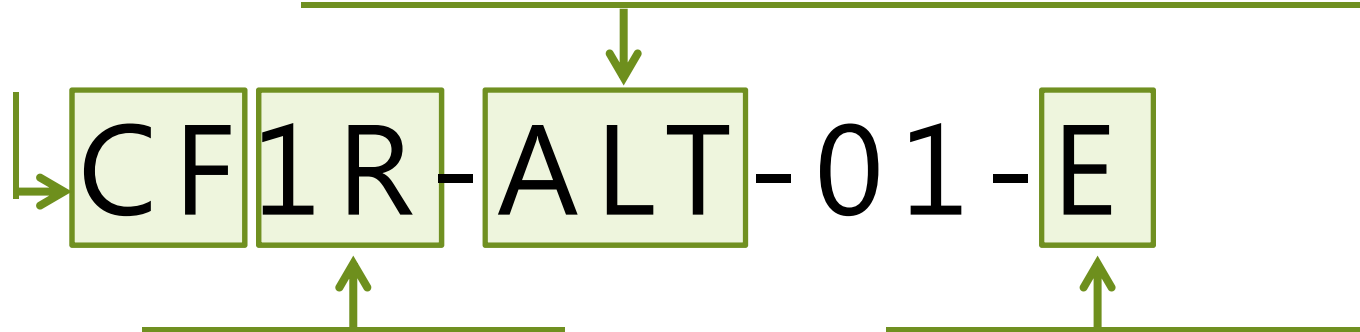


# 2013 Forms Conventions

## Document Category

PRF = Performance approach	ENV = Envelope
NCB = New construction & additions > 1,000 ft <sup>2</sup>	MCH = Mechanical
ADD = Additions (≤ 1,000 ft <sup>2</sup> )	LTG = Lighting
ALT = Alterations	PLB = Plumbing (DHW)
EXC = Existing Conditions	PHV = Photovoltaic
SRA = Solar Ready	WKS = Worksheet

(Residential)  
**Compliance Form**



### Document Type

*Certificates of...*

1R = Compliance

2R = Installation

3R = HERS Verification

### Primary user

E = Enforcement agency

H = HERS





## Applying for Permit: **CF1R**

# Certificate of Compliance



- ✦ Provided with plans or equipment schedule; submitted to building department for permit
- ✦ Reviewed by counter tech or plans examiner



CF1R:

New Homes and Additions Over 1,000 ft<sup>2</sup>

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✦ New Homes

AND

✦ Additions over 1,000 ft<sup>2</sup>

**Prescriptive**

CF1R-NCB

or

**Performance**

CF1R-PRF



CF1R:

Additions less than 1,000 ft<sup>2</sup>

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- ◆ Additions less than 1,000 ft<sup>2</sup>

**Prescriptive**

**CF1R-ADD**

or

**Performance**

**CF1R-PRF**



# CF1R: Alterations

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✦ Alterations

**Prescriptive**

**CF1R-ALT**

or

**Performance**

**CF1R-PRF**



## CF1R: Other Prescriptive Forms

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CF1R - ENV Envelope

CF1R - PLB Hydronic heating

CF1R - SRA Solar ready

CF1R - STH Solar hot water

CF1R - ALT-<sup>02</sup><sub>03</sub><sub>04</sub> HVAC



Construction: **CF2R**

## Certificate of Installation



- ✦ Provided by installing contractor or General Contractor during construction.
- ✦ Reviewed by building inspector.

**Mandatory Measures found within these forms.**



## CF2R: Certificate of Installation

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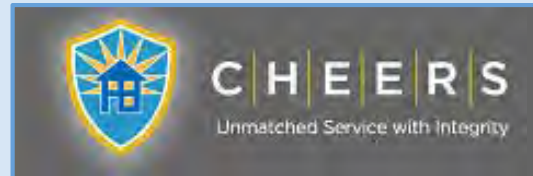
CF	2R	-	ENV	Envelope
CF	2R	-	LTG	Lighting
CF	2R	-	SPV	Photovoltaic
CF	2R	-	MCH	Mechanical
CF	2R	-	PLB	Plumbing
CF	2R	-	STH	Solar Thermal





Inspection/Verification: CF3R

## Certificate of Verification



- ★ Provided by HERS rater.
- ★ Made available BEFORE building inspector arrives for final.



## CF3R: Certificate of Verification

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CF3R - ENV Envelope

CF3R - MCH Mechanical

CF3R - PLB Plumbing

CF3R - EXH Existing Conditions



# HERS Registration and Verification Process: Overview

**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**  
Project Name: BROWN RESIDENCE Calculation Date/Time: 21:34, Tue, Apr 29, 2014  
Calculation Description: Existing Floor Plan (New Construction) Input File Name: BROWN RESIDENCE.nbd


CF1R-PRF-01  
Page 1 of 9

GENERAL INFORMATION					
01	Project Name	BROWN RESIDENCE			
02	Calculation Description	Single Family Residence			
03	Project Location	320 Flint Avenue			
04	A City	Burbank, CA	05	Standards Version	Compliance 2014
06	Zip code	91501	07	Compliance Manager Version	BEMCmpMgr 2013-1e (532)
08	Climate Zone	C29	09	Software Version	CBECC-Res 2013-1e (532)
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	180
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (FT <sup>2</sup> )	1560	15	Number of Zones	1
16	Slab Area (FT <sup>2</sup> )	268.96	17	Number of Stories	1
18	Addition Cond. Floor Area	NA	19	Natural Gas Available	Yes
20	Addition Slab Area (FT <sup>2</sup> )	NA	21	Glazing Percentage (%)	15.0%

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.				

Detailed help on using the CF-1R Certificate of Compliance is available via the Internet by either scanning the QR code or browsing to <http://www.title24energycode.org/124help/cf1r.aspx>

ENERGY USE SUMMARY					
04	05	06	07	08	
Energy Use (kTDO/yr)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement	
Space Heating	5.74	3.63	1.91	33.3%	
Space Cooling	29.35	31.25	-1.90	-6.5%	
IAQ Ventilation	1.31	1.31	0.00	0.0%	
Water Heating	17.55	15.22	2.33	13.3%	
Photovoltaic Offset	—	0.00	0.00	—	
<b>TOTAL</b>	<b>53.95</b>	<b>61.61</b>	<b>2.34</b>	<b>4.3%</b>	



Registration Number: thisisnotareal# Registration Date/Time: 5/5/55 5:55:55 HERS Provider: HERSRUS  
CA Building Energy Efficiency Standards - 2013 Residential Compliance Report Version - CF1R-04142014-574 Report Generated at: 4/29/2014 3:35:55 PM

**CF1R must be registered** for any low-rise residential project that requires HERS verification

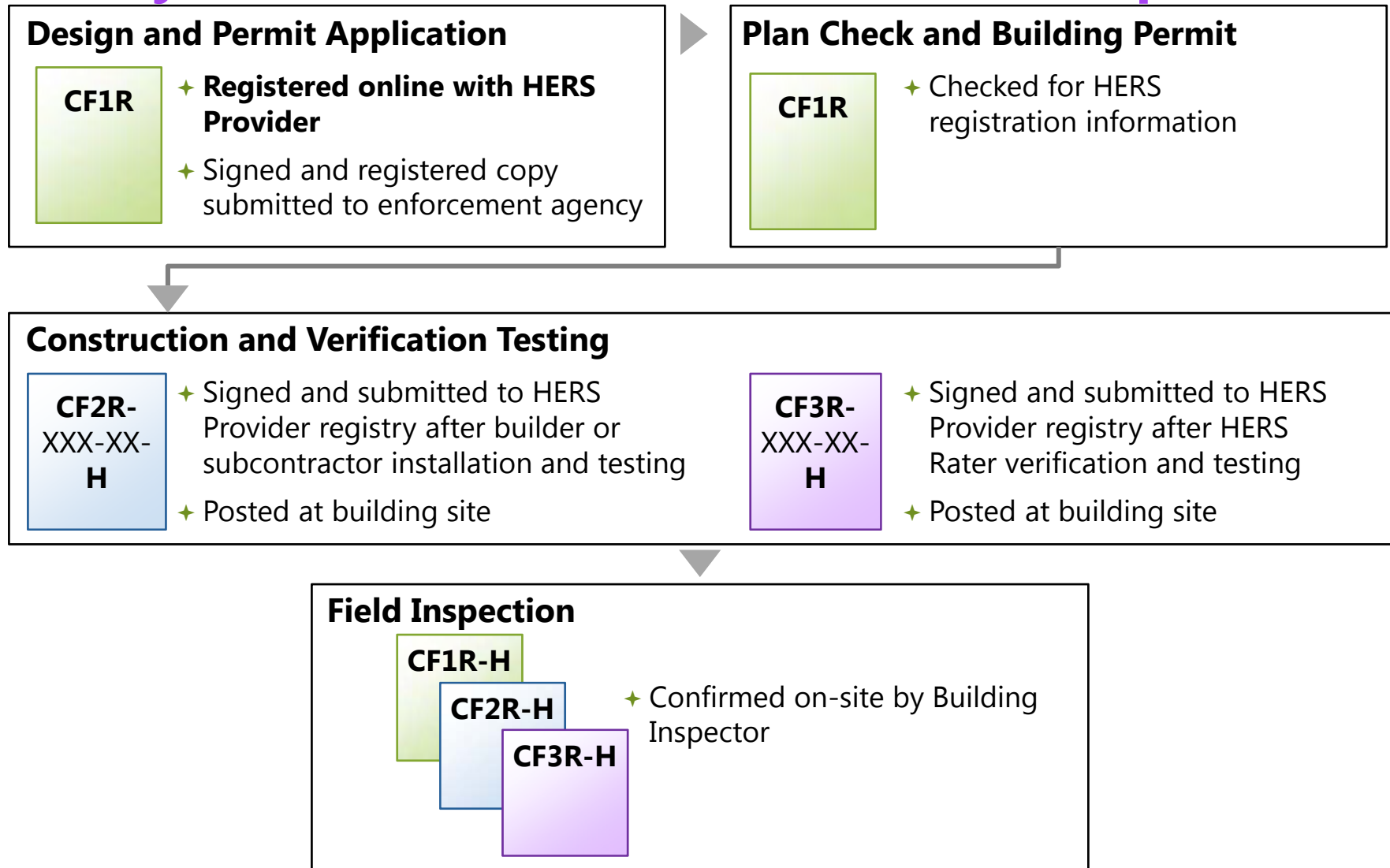
*Includes production homes that use the multiple orientation compliance option*

**MUST** be registered with an approved **HERS Provider**



# Overview of HERS Process (cont.)

## Key Forms When HERS Verification is Required





## Overview of HERS Process (cont.)

- ★ Compliance package is prepared by energy consultant or other appropriate author, then data uploaded to the HERS Provider of choice
- ★ CF1R is generated by the HERS Provider
- ★ Signatures are uploaded by consultant and designer and added to the CF1R

<b>CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD</b>		<b>CF1R-PRF-01</b>
<b>Project Name:</b> BROWN RESIDENCE		<b>Calculation Date/Time:</b> 21:34, Tue, Apr 29, 2014
<b>Calculation Description:</b> Existing Floor Plan (New Construction)		<b>Input File Name:</b> BROWN RESIDENCE.ribd
<b>Page 1 of 9</b>		
<b>GENERAL INFORMATION</b>		
01	<b>Project Name</b>	BROWN RESIDENCE
02	<b>Calculation Description</b>	Single Family Residence
03	<b>Project Location</b>	320 Flint Avenue

Registration Number: thisisnotareal#  
CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time: 5/5/55 5:55:55  
Report Version - CF1R-04142014-574

HERS Provider: HERSRUS  
Report Generated at: 4/29/2014:9:35:55 PM



# HERS Mandatory/Prescriptive/Performance

HERS-verified Measure	Mandatory	Prescriptive	(if credit taken) Performance
<b>Mechanical</b>			
Duct sealing (maximum leakage)	X <sup>A</sup>		
Indoor air quality ventilation (based on ASHRAE Standard 62.2)	X		
Refrigerant charge or Installation of a charge indicator display		CZ 2, 8-15	CZ 1, 3-7, 16
Duct design (reduced surface area, high insulation, and duct location)			X
Ducts entirely in conditioned space			X
Low leakage ducts entirely in conditioned space			X
Ducts <12 feet outside conditioned space			X
Low leakage air handlers			X
Cooling coil air flow and air handler fan watt draw <b>AND/OR</b> Verified return duct design and air filter device	X		
High SEER			X
High EER			X
Photovoltaic (PV) system capacity to qualify for PV rebate via New Solar Home Partnership			X
Central fan integrated ventilation cooling systems		Optional <sup>B</sup>	
Zonal control			X
Evaporatively cooled condensers			X
Ice storage air conditioners			X
<b>Plumbing</b>			
Pipe insulation			X
Verified design (parallel piping, compact design, point of use)			X
Multi family recirculation loops			X
<b>Envelope</b>			
Quality insulation installation (QII)			X <sup>C</sup>
Building envelope sealing			X
HERS verified pre-existing conditions			X

<sup>A</sup> Unless it is a ductless system (e.g., ductless mini splits)

<sup>B</sup> A project may comply prescriptively by using either a central fan integrated ventilation cooling system.  
 + If a central fan integrated cooling system is used, it requires HERS verification, and it must meet duct leakage, fan watt draw and airflow requirements

+ If a whole house fan is used, it does NOT require HERS verification.

<sup>C</sup> If QII is used for compliance credit, multiple inspections are required to confirm that QII standards are met.

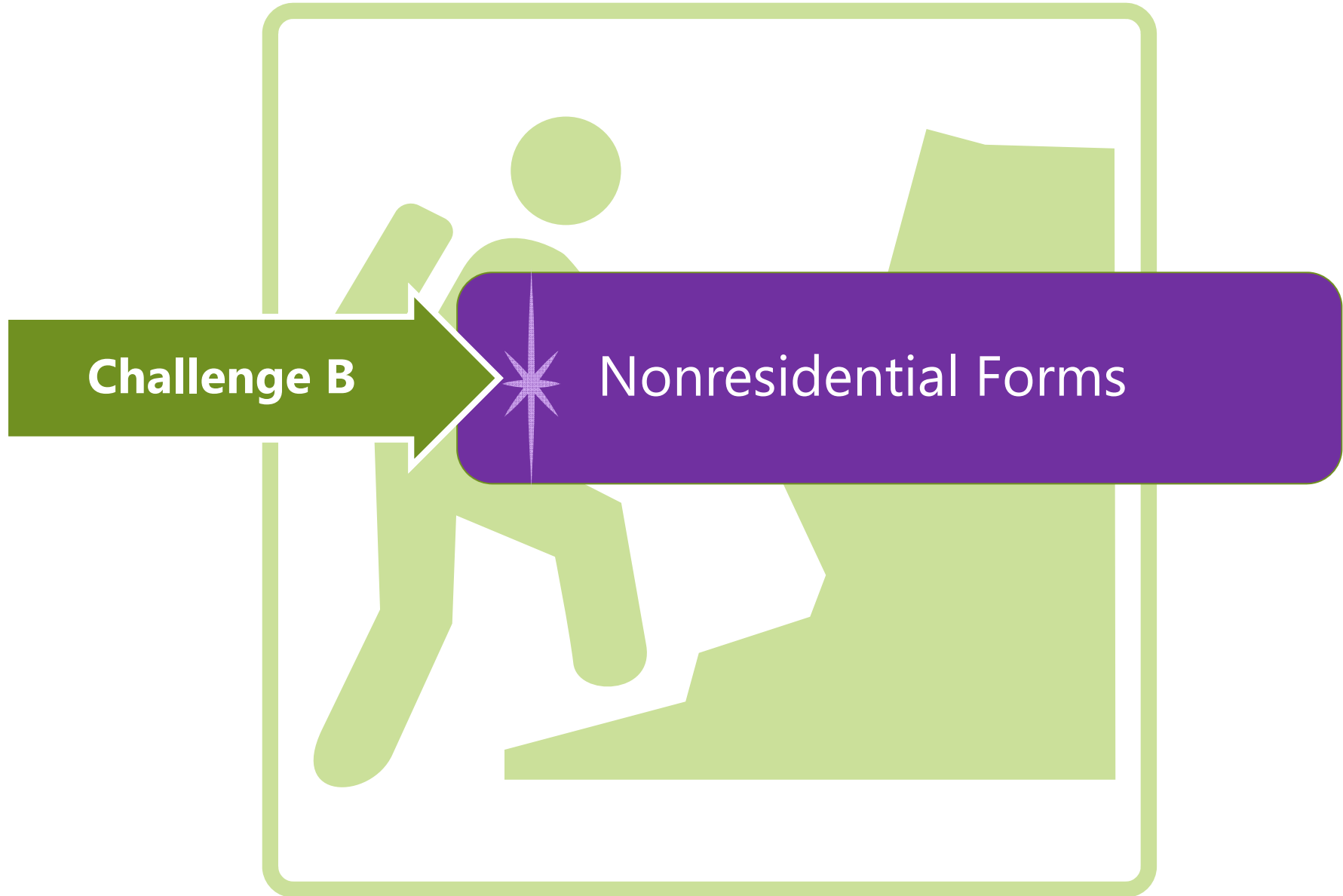
## HERS Verified Measures

- ✦ Triggers HERS registration
- ✦ Triggers ALL forms to be HERS registered
- ✦ Triggers HERS rater for verification of applicable features



# Challenge B

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# 2013 Forms Conventions

## Document Category

PRF = Performance approach	ENV = Envelope
CXR = Commissioning	MCH = Mechanical
LTI = Indoor Lighting	ELC = Electrical
LTO = Outdoor Lighting	PLB = Plumbing (DHW)
LTS = Sign Lighting	PRC = Covered Process
SRA = Solar Ready	STC = Solar Thermal

Nonresidential

NR CC - PRF - 01 - E

## Document Type

*Certificates of...*

CC = Compliance

CI = Installation

CA = Acceptance

CV = Verification

## Primary user

E = Enforcement agency

H = HERS Rater

F = Field Technician  
(Contractor)

A = Acceptance Test Tech



## Applying for Permit: **NRCC**

# Certificate of Compliance



- ✦ Provided with plans or equipment schedule; submitted to building department for permit
- ✦ Reviewed by counter tech or plans examiner



## Performance: Whole Building

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**N R C C - P R F**

**Envelope**



**Lighting\***

**HVAC**

**DHW**

\* Lighting for indoor conditioned spaces only



# NRCC: Envelope

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✦ Envelope

**Prescriptive**

NRCC-ENV

or

**Performance**

NRCC-PRF



# NRCC: Indoor Conditioned Lighting



✦ Lighting

**Prescriptive**

NRCC-LTI

or

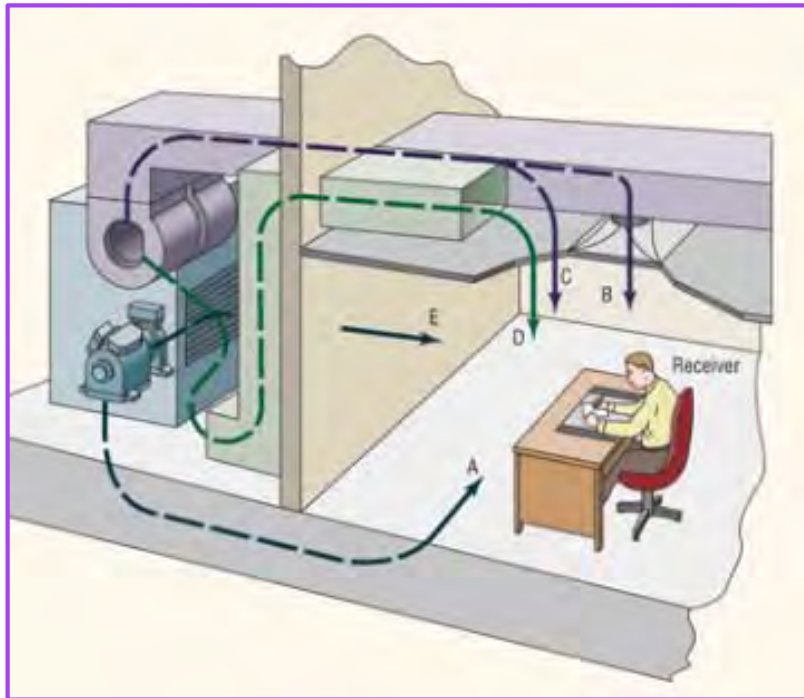
**Performance**

NRCC-PRF\*

\* Envelope and/or mechanical must also be included



# NRCC: Mechanical



HEATING/PIPING/AIR CONDITIONING  
**HPAC**  
ENGINEERING

✦ Mechanical

**Prescriptive**

**NRCC-MCH**

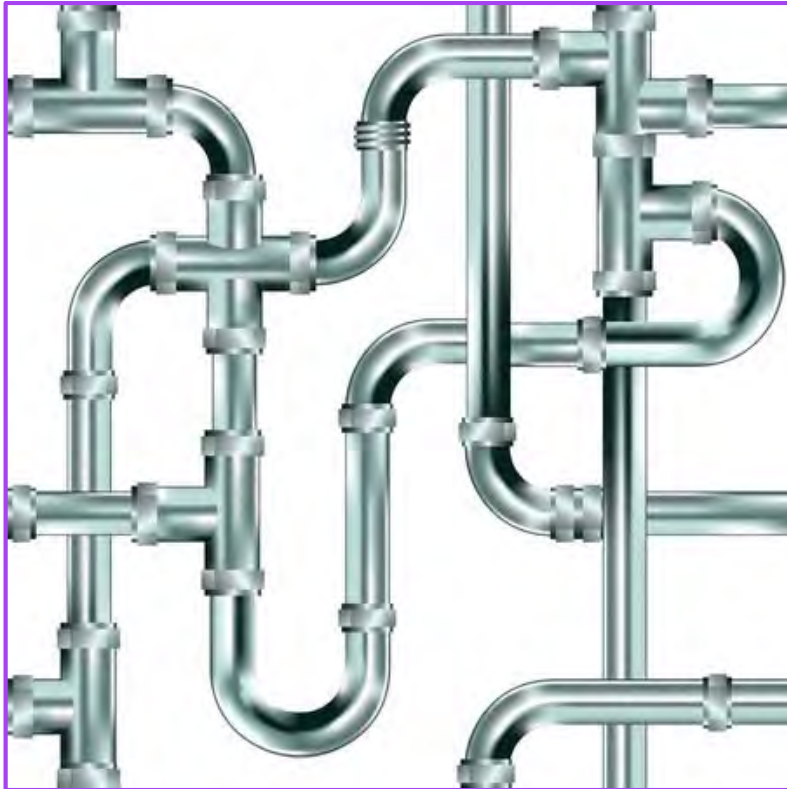
or

**Performance**

**NRCC-PRF**



# NRCC: Plumbing



✦ Plumbing

**Prescriptive**

**NRCC-PLB**

or

**Performance**

**NRCC-PRF**



# Commissioning

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NRCC-CXR

- ✦ New construction only
- ✦ All included in plan set for permit





## NRCC: Additional Prescriptive Forms

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NR	CC	- ELC	Electrical
NR	CC	- LTI	Indoor Lighting
NR	CC	- LTO	Outdoor Lighting
NR	CC	- LTS	Sign Lighting
NR	CC	- STH	Solar Hot Water
NR	CC	- SRA	Solar Ready
NR	CC	- PRC	Covered Process



Construction: **NRCI**

## Certificate of Installation



- ✦ Provided by installing contractor or General Contractor during construction.
- ✦ Reviewed by building inspector.

**Mandatory Measures found within these forms.**



## NRCI: Certificate of Installation

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N	R	C	I	-	E	N	V	Envelope
N	R	C	I	-	E	L	C	Electrical
N	R	C	I	-	L	T	I	Indoor Lighting
N	R	C	I	-	L	T	O	Outdoor Lighting
N	R	C	I	-	L	T	S	Sign Lighting
N	R	C	I	-	P	L	B	Plumbing



## NRCI: Certificate of Installation (cont.)

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N	R	C	I	-	P	R	C	Covered Process
N	R	C	I	-	S	P	V	Photovoltaic
N	R	C	I	-	S	T	H	Solar Hot Water



## Building Inspection: **NRCA**

# Certificate of Acceptance



- ✦ Provided by installing contractor or Acceptance Test Technician.
- ✦ Made available BEFORE building inspector arrives for final.



## NRCA: Certificate of Acceptance

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NR	CA	-ENV	Envelope
NR	CA	-LTI	Indoor Lighting
NR	CA	-LTO	Outdoor Lighting
NR	CA	-MCH	Mechanical
NR	CA	-PRC	Covered Process



Inspection/Verification: **NRCV**

## Certificate of Verification



- ★ Provided by HERS rater.
- ★ Made available BEFORE building inspector arrives for final.



# HERS Prescriptive/Performance

HERS-verified Measure	Mandatory	Prescriptive	(if credit taken) Performance
<b>Mechanical</b>			
Duct sealing (maximum leakage)		X <sup>A</sup>	
HERS verified low leakage AHU			X
<b>Plumbing</b>			
Multi family/Hotel & motel recirculation system (piping and controls)			X
Multi family/Hotel & motel recirculation loops			X

<sup>A</sup> Constant volume, single zone system serves less than 5,000 sq. ft. and more than 25% ducts outside conditioned space (see standards for more specifics on duct location)

## HERS Verified Measures

- ✦ Triggers HERS registration
- ✦ Triggers applicable forms to be HERS registered
- ✦ Triggers HERS rater for verification of applicable features





# Challenge C

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**Challenge C**

## Who / What / When

- ✦ Identify relevant forms
- ✦ Who completes the forms and when?
- ✦ Who accepts the forms and when?



## Be Ready... with the right forms

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### **Permit Application**

1. Identify relevant forms
2. Complete certificates of compliance (NRCC or CF1R)
3. Bring Certificates of Compliance to building department



# Who Is Signing The CF1R & NRCC

## Designer

Architect

or  
Engineer

or  
Other

- Wood framed 2 story or less/4 or less dwelling units = unlicensed designer
- 3 stories or more/5 or more dwellings units/not wood framed = CA licensed professional

## Documentation Author

Designer

or  
Energy Consultant

or  
Other

- Contractor
- HERS rater
- Green Point Rater
- Person off the street able to verify that CF1R/NRCC is consistent with building design.



# Be Ready for Permit Application

## 1 Identify Relevant Forms

- ✦ Forms Ace Tool  
**Add & Alt. Only!**
- ✦ HERS Providers Registries
- ✦ Compliance Software
- ✦ Compliance Manual

## 2 Complete Certificates of Compliance

- ✦ Select HERS Provider & go to their website  
**Residential Only!**
- ✦ Complete Certificates of Compliance
- ✦ Print them

## 3 Go to Building Department

- ✦ Check building dept. website for backup documentation requirements
- ✦ Take forms and required backup documents to building dept.



# Know if You Need to Register

Project Phases - NonResidential	
<p><b>Phase 1:</b> Permit Application</p>	<p>Permit Application and Plan Review Process: All applicable Certificates of Compliance must be signed and submitted with construction documents. If more than one person has responsibility for building design, each person must sign the Certificate of Compliance document(s) applicable to that portion of the design for which the person is responsible. Alternatively, the person with chief responsibility for design may prepare and sign the Certificate of Compliance document(s) for the entire design. The signatures must be electronic signatures on electronic documents. For more detail about this project phase, visit <a href="http://www.Title24learning.com">www.Title24learning.com</a> or see the Ace Resources Fact Sheet on permitting here: <a href="http://energycodeace.com/content/resources-fact-sheets/">http://energycodeace.com/content/resources-fact-sheets/</a></p> <p>Beginning January 1, 2015, registration will be required for all Certificate(s) of Compliance submitted to the enforcement agency and must be a registered copy from an approved nonresidential data registry. The registration process requires the builder or designer to submit the Certificate(s) of Compliance information and an electronic signature to an approved nonresidential data registry in order to produce a completed, dated, and signed electronic Certificate(s) of Compliance that is retained by the registry prior to the building department.</p>
<p><b>Phase 2:</b> Installation &amp; Inspection</p>	<p>Construction Inspection and Installation Certificate Verification: A properly completed Installation Certificate (NRCI form) is required to be submitted or posted at the building site prior to proceeding with functional testing and completion of the Certificate of Acceptance.</p> <p>Beginning January 1, 2015, registration will be required for all Certificate(s) of Installation submitted to the enforcement agency and must be a registered copy from an approved nonresidential data registry. The registration process requires the builder or designer to submit the Certificate(s) of Installation information and an electronic signature to an approved nonresidential data registry in order to produce a completed, dated, and signed electronic Certificate(s) of Installation that is retained by the registry</p>
<p><b>Phase 3:</b> Acceptance &amp; Verification</p>	<p>Functional Testing and Completion of the Certificate of Acceptance: A copy of the Certificate(s) of Acceptance must be posted or made available with the building permit(s) issued for the construction/installation, and must be made available to the enforcement agency for all applicable inspections.</p>

## Forms Ace Phase Table

- ✦ Phase 1:  
Permit  
Application
  
- ✦ Phase 2:  
Installation &  
Inspection
  
- ✦ Phase 3:  
Acceptance &  
Verification



# Know Which Forms Using Forms Ace

You need to download the following 21 files:

<b>PHASE 1</b>	
hvac	NRCC-MCH-01-E-Prescriptive-Declarations.pdf NRCC-MCH-02-E-Prescriptive-Requirements-WetSystDrySyst.pdf NRCC-MCH-03-E-Prescriptive-VentilationAndReheat.pdf
lighting	NRCC-LTI-01-E-CertificateOfCompliance-IndoorLighting.pdf NRCC-LTI-03-E-IndoorLightingPowerAllowance.pdf NRCC-LTI-02-E-IndoorLightingControlsWorksheet.pdf NRCC-LTO-01-E-CertificateOfCompliance-OutdoorLighting.pdf NRCC-LTO-02-E-OutdoorLightingControls.pdf NRCC-LTO-03-E-OutdoorLightingPowerAllowance.pdf
<b>PHASE 2</b>	
hvac	NRCI-MCH-01-E-Mechanical.pdf
lighting	NRCI-LTI-01-E-IndoorLighting.pdf NRCI-LTI-02-E-EMCSLightingControlSystem.pdf NRCI-LTO-01-E-OutdoorLighting.pdf NRCI-LTO-02-E-EMCSLightingControlSystem.pdf
<b>PHASE 3</b>	
hvac	NRCA-MCH-02-A-OutdoorAir.pdf NRCA-MCH-05-A-AirEconomizerControls.pdf NRCA-MCH-13-F-FDD-AirHandlingUnitsAndZoneTerminalUnits.pdf NRCA-MCH-16-F-SupplyAirTemperatureReset Controls.pdf
lighting	NRCA-LTI-02-A-LightingControl.pdf NRCA-LTI-03-A-AutomaticDaylightingControl.pdf NRCA-LTO-02-A-OutdoorLightingControl.pdf

or you can download them all as a single zip here:

[Download](#)

## Forms Ace Summary Table

- ✦ Phase 1: Permit Application
- ✦ Phase 2: Installation & Inspection
- ✦ Phase 3: Acceptance & Verification



## Be Ready... with the right forms

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### Permit Application

1. Identify relevant forms
2. Complete Certificates of Compliance (NRCC or CF1R)
3. Bring Certificates of Compliance to building department

### Installation and Inspection

4. Complete Certificates of Installation (NRCI or CF2R)
5. Keep Certificates of Installation onsite for inspector



# Who Is Signing The CF2R & NRCI

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Specialty Subcontractor

General Contractor





# Be Ready for Inspection

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## 4 Complete Certificates of Installation

- ✦ Identify forms
- ✦ Get them while Installer is around
- ✦ Make sure they're complete before installer is done

## 5 Keep them onsite

- ✦ Stay organized
- ✦ Post them for building inspector
- ✦ Give them to building owner



# Be Ready... with the right forms

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## Permit Application

1. Identify relevant forms
2. Complete Certificates of Compliance (NRCC or CF1R)
3. Bring Certificates of Compliance to building department

## Installation and Inspection

4. Complete Certificates of Installation (NRCI or CF2R)
5. Keep Certificates of Installation onsite for inspector

## Acceptance and Verification

6. Complete certificates of acceptance and certificates of verification (NRCA, NRCV or CF3R)
7. Keep Certificates of Acceptance & Certificates of Verification onsite for inspector for permit final



## Who Is Signing the CF3R/NRCV & NRCA?

HERS Rater

Acceptance Test  
Technician or  
Installing Contractor\*

CF3R

NRCA

NRCV

\* Forms used by Acceptance Test Technicians end in "-A"  
Forms used by Installing Contractors end in "-F"



# Be Ready for Verification

---

## 6 Complete Certificates of Acceptance and Verification

- ✦ Identify forms
- ✦ Collect them from HERS Rater or Acceptance Test Technician
- ✦ Have the general contractor look them over and make sure they're complete

## 7 Keep them onsite

- ✦ Stay organized
- ✦ Post them for building inspector
- ✦ Give them to building owner



# Seven Step Checklist



## 7 Steps Check List

Title 24 Part 6 Energy Forms

Permit Application	
1. Identify relevant forms <input type="checkbox"/>	
✦ Forms Ace Tool	
✦ HERS Providers Registries	
✦ Compliance Software	
2. Register & complete certificates of compliance (NRCC or CF1R) <input type="checkbox"/>	
✦ Select HERS Provider & go to their website (Residential Only)	
✦ Complete Certificates of Compliance	
✦ Print them	
3. Bring compliance certificates to building department <input type="checkbox"/>	
✦ Check BD website for back up documentation requirements	
✦ Take forms + required back up documents to BD	
Installation and Inspection	
4. Complete certificates of installation (NRCI or CF2R) <input type="checkbox"/>	
✦ Already identified in step 1	
✦ Get them while Installer is around	
✦ Make sure they're complete before installer is done	
5. Keep Certificates of Installation Onsite for Inspector <input type="checkbox"/>	
✦ Stay organized	
✦ Give them to building inspector	
✦ They are to be given to building owner	
Acceptance and Verification	
6. Complete Certificates of Acceptance and Certificates of Verification (NRCA, NRCV or CF3R) <input type="checkbox"/>	
✦ Already identified in step 1	
✦ Collect from HERS rater or ATT	
✦ Look them over and make sure they are complete	
7. Keep CA's & CV's onsite for inspector for permit final <input type="checkbox"/>	
✦ Stay organized	
✦ Give them to building inspector	
✦ They are to be given to building owner	



This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.



## Challenge D

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**Challenge D**

Scenario: Low Rise Multi-family Project



## Our Project

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Location: Sacramento (CZ 12)  
Statistics: New Low rise Multi Family project that includes an existing building converted to a leasing office





# Climate Zone

## Sacramento: CZ 12







# Permit: Low Rise Residential

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## CF1R: Residential Performance

- ✦ Envelope
- ✦ HVAC
- ✦ Water Heating



# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, May 25, 2014

Page 1 of 8

Calculation Description: Title 24 Analysis

Input File Name: multi family.xml

**A** GENERAL INFORMATION


01	Project Name	Residential Example			
02	Calculation Description	Title 24 Analysis			
03	Project Location	_			
04	A City	Sacramento	05	Standards Version	Compliance 2015
06	Zip code	90000	07	Compliance Manager Version	BEMcmpMgr 2013-1e (532)
08	Climate Zone	CZ12	09	Software Version	EnergyPro 6.1
10	Building Type	Multifamily	11	Front Orientation (deg/Cardinal)	90
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	3
14	Total Cond. Floor Area (FT <sup>2</sup> )	14400	15	Number of Zones	3
16	Slab Area (FT <sup>2</sup> )	4800	17	Number of Stories	7
18	Addition Cond. Floor Area	NA	19	Natural Gas	
20	Addition Slab Area (FT <sup>2</sup> )	NA	21	Glazing Percent	

**B** 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 (kTDV/ft)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	25.05	21.61	3.44	13.7%
Space Cooling	17.49	20.24	-2.75	-15.7%
IAQ Ventilation	1.64	1.64	0.00	0.0%
Water Heating	6.48	4.45	2.03	31.3%
Photovoltaic Offset	---	-2.40	2.40	---
<b>TOTAL</b>	<b>50.66</b>	<b>45.54</b>	<b>5.12</b>	<b>10.1%</b>

**A Basic Information**

- Project name
- Climate Zone
- Square footage
- Orientation



**B Compliance results**

- "Building Complies"
- % of improvement

Registration Number:

CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:

Report Version - CF1R-05072014-595

HERS Provider:

Report Generated at: 5/25/2014:7:36:12 PM



# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, May 25, 2014

Page 2 of 8

Calculation Description: Title 24 Analysis

Input File Name: multi\_family.xml

### REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- PV System: 2.0 kW
- Ducts with high level of insulation

### BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	Conditioned Floor Area (sft)	Number of Dwelling Units	Number of Bedrooms	Number of Zones	Cooling Systems	Heating Systems
Residential Example	14400	3	7	3	0	1

### DWELLING UNIT INFORMATION

01	02	03	04
Dwelling Unit Configuration	Number of Units Per Configuration	Conditioned Floor Area	Number of Bedrooms per Unit
House	1	4800	2
other	1	4800	2
other	1	4800	3

### ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	Zone Type	HVAC System Name	Zone Floor Area (ft <sup>2</sup> )	Avg. Ceiling Height	Water Heating System 1	Water Heating System 2
1st Floor Zone	Conditioned	Res HVAC1	4800	8	DHW Sys 1	
2nd Floor Zone	Conditioned	Res HVAC1	4800	8	DHW Sys 1	
3rd Floor Zone	Conditioned	Res HVAC1	4800	8	DHW Sys 1	

## Special Features

- Building inspector to verify in field

Registration Number:

CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:

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# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, May 25, 2014

Page 3 of 8

Calculation Description: Title 24 Analysis

Input File Name: multi family.xml

### OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft <sup>2</sup> )	Window Area (ft <sup>2</sup> )	Tilt(deg)
Front Wall	1st Floor Zone	R-19 Wall	0	Right	1500	300	90
Left Wall	1st Floor Zone	R-19 Wall	90	Front	1000	200	90
Back Wall	1st Floor Zone	R-19 Wall	180	Left	1500	200	90
Right Wall	1st Floor Zone	R-19 Wall	270	Back	1000	150	90
Front Wall 2	2nd Floor Zone	R-19 Wall	0	Right	1500	300	90
Left Wall 2	2nd Floor Zone	R-19 Wall	90	Front	1000	200	90
Back Wall 2	2nd Floor Zone	R-19 Wall	180	Left	1500	200	90
Right Wall 2	2nd Floor Zone	R-19 Wall	270	Back	1000	150	90
Front Wall 3	3rd Floor Zone	R-19 Wall	0	Right	1500	300	90
Left Wall 3	3rd Floor Zone	R-19 Wall	90	Front	1000	200	90
Back Wall 3	3rd Floor Zone	R-19 Wall	180	Left	1500	200	90
Right Wall 3	3rd Floor Zone	R-19 Wall	270	Back	1000	150	90
Roof	3rd Floor Zone	R-30 Roof Attic					

### ATTIC

01	02	03	04
Name	Construction	Roof Rise	Roof Reflectance
Attic	Attic Roof Cons	2	0.1

**Solid surfaces**

- Construction "name"
- Orientation
- Area

Registration Number:  
CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:  
Report Version - CF1R-05072014-595

HERS Provider:  
Report Generated at: 5/25/2014:7:36:12 PM



# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, May 25, 2014

Page 4 of 8

Calculation Description: Title 24 Analysis

Input File Name: multi family.xml

E

WINDOWS									
01	02	03	04	05	06	07	08	09	10
Name	Type	Surface (Orientation-Azimuth)	Height (ft)	Width(ft)	Multiplier	Area (ft <sup>2</sup> )	U-factor	SHGC	Exterior Shading
Front Windows	Window	Front Wall (Right-0)	----	----	1	300.0	0.34	0.33	
Left Windows	Window	Left Wall (Front-90)	----	----	1	200.0	0.34	0.33	
Back Windows	Window	Back Wall (Left-180)	----	----	1	200.0	0.34	0.33	
Right Windows	Window	Right Wall (Back-270)	----	----	1	150.0	0.34	0.33	
Front Windows 2	Window	Front Wall 2 (Right-0)	----	----	1	300.0	0.34	0.33	
Left Windows 2	Window	Left Wall 2 (Front-90)	----	----	1	200.0	0.34	0.33	
Back Windows 2	Window	Back Wall 2 (Left-180)	----	----	1	200.0	0.34	0.33	
Right Windows 2	Window	Right Wall 2 (Back-270)	----	----	1	150.0	0.34	0.33	
Front Windows 3	Window	Front Wall 3 (Right-0)	----	----	1	300.0	0.34	0.33	
Left Windows 3	Window	Left Wall 3 (Front-90)	----	----	1	200.0	0.34	0.33	
Back Windows 3	Window	Back Wall 3 (Left-180)	----	----	1	200.0	0.34	0.33	
Right Windows 3	Window	Right Wall 3 (Back-270)	----	----	1	150.0	0.34	0.33	

DOORS	
01	02
Name	Side of Build
Entry Door	Front Wall
Entry Door 2	Front Wall
Entry Door 3	Front Wall

E

### Fenestration

- Orientation (i.e. Right at 0°)
- Area
- U-factor
- SHGC

Registration Number:  
CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:  
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# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Su

Calculation Description: Title 24 Analysis

Input File Name: multi family.xml

**F Construction Assemblies**  
 ■ Nitty gritty detail

**F** OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	Assembly Layers
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	
Attic Roof Cons	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.		<ul style="list-style-type: none"> <li>Roofing: Light Roof (Asphalt Shingle)</li> <li>Above Deck Insulation - no insulation -</li> <li>Roof Deck: Wood Siding/sheathing/decking</li> <li>Cavity: - no insulation -</li> <li>Inside Finish: - select inside finish -</li> </ul>
R-19 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O.C.	R 19	<ul style="list-style-type: none"> <li>Inside Finish: Gypsum Board</li> <li>Sheathing/Insulation: - no sheathing/insul. -</li> <li>Cavity: R 19</li> <li>Sheathing/Insulation: - no sheathing/insul. -</li> <li>Exterior Finish: Wood Siding/sheathing/decking</li> </ul>
R-30 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O.C.	R 30	<ul style="list-style-type: none"> <li>Attic Floor: - no attic floor -</li> <li>Cavity: R 30</li> <li>Sheathing/Insulation - no sheathing/insul. -</li> <li>Inside Finish: Gypsum Board</li> </ul>

**G** SLAB FLOORS

01	02	03	04	05	06	07
Name	Zone	Area (ft <sup>2</sup> )	Perimeter (ft)	Edge Insul. R-value& Depth	Carpeted Fraction	Heated
Covered Slab	1st Floor Zone	4800	450	None	0.8	No

**G** 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	---

**G** WATER HEATING SYSTEMS

01	02	03	04	05	06
Name	System Type	Number in Building	Multi-Family Distribution Type	Water Heater	Recirculation Loop
DHW Sys 1	Standard	5	- None -	DHW Heater 1	

**G Envelope HERS measures**  
 ■ If applicable

Registration Number:  
 CA Building Energy Efficiency Standards - 2013 Residential Compliance

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 Report Version - CF1R-05072014-595

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# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, May 25, 2014

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Calculation Description: Title 24 Analysis

Input File Name: multi family.xml

### WATER HEATERS

01	02	03	04	05	
Name	Heater Element Type	Tank Type	Tank Volume (gal)	Energy Factor or Efficiency	In
DHW Heater 1	Natural Gas	Small Instantaneous	0.2	0.83	19

### WATER HEATING - HERS VERIFICATION

01	02	03	04	05
Name	Pipe Insulation	Parallel Piping	Compact Distribution	Point-
DHW Sys 1-hers-dhw	n/a	n/a	n/a	n/

### HVAC SYSTEMS

01	02	03		04	
Name	System Type	Name	Ducted	Name	Ducted
Res HVAC1	Other Heating and Cooling System	Heating Component 1	Yes	Cooling Component 1	Yes

### HVAC - HEATING SYSTEMS

01	02
Name	Type
Heating Component 1	CntrlFurnace - Fuel-fired central furnace

### HVAC - COOLING SYSTEMS

01	02	03	04	05
Name	System Type	EER	SEER	HERS Verification
Cooling Component 1	SplitAirCond - Split air conditioning system	11.6	15	Cooling Component 1-hers-cool

### HVAC COOLING - HERS VERIFICATION

01	02	03	04	05	06
Name	Verified Airflow	Airflow Target	Verified EER	Verified SEER	Verified Refrigerant Charge
Cooling Component 1-hers-cool	Required	350	Not Required	Required	Required

Registration Number:

CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:

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HERS Provider:

Report Generated at: 5/25/2014:7:36:12 PM

## Water heaters

- Natural gas/electric resistance/other
- Volume
- Efficiency
- Input rating
- Standby loss
- Hot Water HERS measures

## HVAC

- Type
- Efficiency
- HERS measures



# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, Mar 23, 2014

Calculation Description: Title 24 Analysis

Input File Name: multi family.xml

### 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 entirely in conditioned space	Sealed and tested	8	Conditioned Zone	Conditioned Zone	None	Air Distribution System 1-hers-dist

### HVAC DISTRIBUTION - HERS VERIFICATION

01	02	03	04	05	06
Name	Duct Leakage Verification	Duct Leakage Target (%)	Verified Duct Location	Verified Duct Design Return	Verified Duct Design Supply
Air Distribution System 1-hers-dist	Required	total leakage <= 12.0 or leakage to outdoors <= 6.0	Required	Not Required	Not Required

### 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 SYSTEMS - HERS VERIFICATION

01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficiency (Watts/CFM)
HVAC Fan 1-hers-fan	Required	0.58

### IAQ (Indoor Air Quality) FANS

01	02	03	04
Name	IAQ CFM	IAQ Fan Type	IAQ Rec
Dwelling Unit #1 IAQ Fan	167	Exhaust	
Dwelling Unit #2 IAQ Fan	167	Exhaust	
Dwelling Unit #3 IAQ Fan	174	Exhaust	

### COOLING VENTILATION

NONE
------

## Ducting

- Location
- HER measures
- Duct insulation R-value

## Fan Systems

- Type
- HER measures
- IAQ
- Cooling ventilation

Registration Number:

CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:

Report Version - CF1R-05072014-595

HERS Provider:

Report Generated at: 5/25/2014:7:36:12 PM





# CF1R-PRF-01

## CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-NCB-01

Project Name: Residential Example

Calculation Date/Time: 19:33, Sun, May 25, 2014

Page 8 of 8

Calculation Description: Title 24 Analysis

Input File Name: multi\_family.xml

### DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company: Gabel Associates, LLC	Signature Date: 5/25/2014
Address:	CEA/HERS Certification Identification (If applicable):
City/State/Zip:	Phone:

### Signatures

### 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, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name:	Responsible Designer Signature:
Company:	Date Signed:
Address:	License:
City/State/Zip:	Phone:

### HERS registration

Registration Number:

CA Building Energy Efficiency Standards - 2013 Residential Compliance

Registration Date/Time:

Report Version - CF1R-05072014-595

HERS Provider:

Report Generated at: 5/25/2014:7:36:12 PM



# Construction: Low Rise Residential

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## CF2R

- ◆ Envelope
- ◆ HVAC
- ◆ Water Heating
- ◆ Mandatory Measures
  - ◇ Indoor Lighting
  - ◇ IAQ
  - ◇ HERS



# CF2R: Envelope

STATE OF CALIFORNIA  
**FENESTRATION INSTALLATION**  
 CEC-CF2R-ENV-01-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CF2R-ENV-01-E  
(Page 1 of 2)

Fenestration Installation

Project Name: \_\_\_\_\_ Enforcement Agency: \_\_\_\_\_ Permit Number: \_\_\_\_\_  
 Dwelling Address: \_\_\_\_\_

**Fenestration installed**

If more than one person has responsibility for installation of the items on this certificate, responsible. Alternatively, the person with chief responsibility for construction shall prepare and sign this certificate for the entire construction. The signee agrees that on approval, if necessary, Measures were met. Temporary labels are not to be removed before verification by the building inspector.

**A. FENESTRATION/GLAZING**  
 Includes all Windows, Skylights, Greenhouse/Bay Windows, and Glazed Doors.

01	02	03	04	05	06	07	08	09	10	11	12
Tag/ID	Manufacturer / Brand	Fenestration Area (ft <sup>2</sup> )	Orientation	Chromogenic?	Number of Like Products	U-factor	SHGC	Source NFRC, CEC Default	Fenestration Type	Exterior Shading Devices (Describe)	Comments/Special Features

**B. Fenestration Installation.**

01	For new construction, installed window U-factor and SHGC values should be equal to or less than listed on the CF1R.
02	For existing buildings the U-factor and SHGC values should be the same or better than the required Energy Commission prescriptive requirements.
03	Temporary labels should not be removed until verified by the building inspector.
04	The fenestration product manufacturer's installation specifications shall be followed when installing these products. The space between the fenestration product and rough opening shall be completely filled with insulation. If batt insulation is used, it is cut to size and placed properly around the fenestration product.

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

---

Registration Number: \_\_\_\_\_ Registration Date/Time: \_\_\_\_\_ HERS Provider: \_\_\_\_\_  
 CA Building Energy Efficiency Standards - 2013 Residential Compliance June 2013



# CF2R: Envelope

STATE OF CALIFORNIA  
**ENVELOPE AIR SEALING**  
 CEC-CF2R-ENV-02-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

**CERTIFICATE OF INSTALLATION** CF2R-ENV-02-E  
 Envelope Air Sealing - ENV 02 (Page 1 of 3)

Project Name: \_\_\_\_\_ Enforcement Agency: \_\_\_\_\_ Permit Number: \_\_\_\_\_  
 Dwelling Address: \_\_\_\_\_ City: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Note: The Energy Efficiency Standards Section 110.7 requires that "all joints, penetrations and other openings in the building envelope that are potential sources of air leakage shall be caulked, gasketed, weather stripped, or otherwise sealed to limit infiltration and exfiltration." The requirements below are for newly constructed spaces, additions and alterations to existing assemblies, in areas where Spray Foam (SPF) insulation is used, the SPF can be considered the air barrier. Rigid board insulation is also an air barrier as long as infiltration cannot bypass the product. All other forms of insulation are not considered an air barrier and cannot be used as such.

**A. ENVELOPE AIR SEALING**

01 The requirements below cover the required air sealing and installation of insulation that must occur in the framing stage.  
 02 Spray foam insulation (SPF) can be considered an air barrier when SPF covers the possible leakage area to a thickness of 5.5 inches for open cell SPF (ocSPF) and 2.0 inches for closed cell SPF (ccSPF).  
 The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

**B. RAISED FLOOR AIR BARRIER**

01 All gaps in the raised floor are sealed.  
 02 All chases sealed at floor level using a hard cover and the hard cover is sealed.  
 03 All plumbing and electrical wires that penetrate the floor are sealed.  
 04 Subfloor sheathing is glued or sealed to the joists.  
 The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

**C. WALL/KNEE WALL AIR BARRIER**

01 All penetrations through the exterior wall including outdoor, attic, garage and crawl space.  
 02 Exterior wall air barrier is sealed at the top and bottom.  
 03 All electrical boxes including knockouts that penetrate the exterior sheathing to unconditioned space are sealed.  
 04 All openings in the top and bottom plate, including all interior and exterior walls, to unconditioned space are sealed.  
 05 Exterior bottom plates (all stories) are sealed to the floor using the appropriate method under the entire exterior bottom plate of the home.  
 06 All gaps around windows and doors are sealed. Sealant used was specified by window manufacturer.  
 07 Rim joist gaps/openings are fully sealed.  
 08 Fan exhaust ducts that run between conditioned floors to the exterior walls include a damper at the exterior wall.  
 09 Metal tie downs are insulated between exterior framing and tie down.  
 10 Insulation is installed in hard to access wall stud cavities, such as corner channels, wall inter sections are insulated to the proper R-value prior to exterior sheathing or the exterior stucco lath.  
 11 Insulation is installed behind tub, shower, fireplace enclosures, and exterior stairwells to the R-value listed on the CF1R when located against exterior walls. Insulation is required to be installed before tub, shower, and fireplace are installed.  
 12 A solid air barrier is installed on the interior wall from floor to ceiling before tub, shower, and fireplace enclosures are installed in exterior walls. Insulation in contact on all six sides of air barrier on exterior walls.  
 13 All window and door headers shall be insulated to a minimum of R-2 between the exterior face of the header and inside surface of the finish wall material.  
 14 Knee walls have solid and sealed blocking at the bottom, top, left side and right side of the knee wall.  
 The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

**D. CEILING/ATTIC AIR BARRIER**

01 For vented attics much of the ceiling air barrier is verified after the ceiling drywall is installed using the ENV-22.  
 02 For non-vented attics ensure all penetrations through the roof deck and gable ends are sealed and air tight.  
 03 All eave vents are covered with a rigid ventilation baffle that maintains the net free-ventilation area.  
 04 All dropped ceiling/soffits are covered with hard covers and sealed to framing.  
 05 All chases are covered with hard covers and sealed to framing.  
 06 HVAC ducts that travel down a chase the chase is sealed at the ceiling level.  
 07 Chimney's and flue's require sheet metal flashing. The flashing shall be sealed to the chimney/flue with fire rated caulk. The flashing shall be sealed to the surrounding framing.  
 08 All eave/soffit baffles are installed to stop air movement around the baffle and into insulation. Net free-ventilation of the eave/soffit shall be maintained.  
 The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

CA Building Energy Efficiency Standards - 2013 Residential Compliance June 2013

STATE OF CALIFORNIA  
**INSULATION INSTALLATION**  
 CEC-CF2R-ENV-03-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

**CERTIFICATE OF INSTALLATION** CF2R-ENV-03-E  
 Insulation Installation (Page 1 of 4)

Project Name: \_\_\_\_\_ Enforcement Agency: \_\_\_\_\_ Permit Number: \_\_\_\_\_  
 Dwelling Address: \_\_\_\_\_ City: \_\_\_\_\_ Zip Code: \_\_\_\_\_

If more than one person has responsibility for installation of the items on this certificate, each person shall prepare and sign a certificate applicable to the portion of construction for which they are responsible. Alternatively, the person with chief responsibility for construction shall prepare and sign this certificate for the entire construction. The signer agrees that all applicable Mandatory Measures were met.

Medium and light density SPF manufacturers shall provide a manufacturer's label. For California the minimum R-value that can be claimed for ocSPF is an R-value of 5.8 per inch and for ccSPF is an R-value of 6.2 per inch. For other states, the manufacturer's label shall include the manufacturer's current ICC Evaluation Service Report (ESR).

**NOTE:** The Energy Efficiency Standards Section 110.7 requires that "all joints, penetrations and other openings in the building envelope that are potential sources of air leakage shall be caulked, gasketed, weather stripped, or otherwise sealed to limit infiltration and exfiltration." The requirements below are for newly constructed spaces, additions and alterations to existing assemblies, in areas where Spray Foam (SPF) insulation is used, the SPF can be considered the air barrier. Rigid board insulation is also an air barrier as long as infiltration cannot bypass the product. All other forms of insulation are not considered an air barrier and cannot be used as such.

**A. ROOF/CEILING INSULATION**

01	02	03	04	05	06	07	08	09	10
I.D.	Manufacturer & Brand	Framing Type	Framing Size	Frame Spacing (inches)	Insulation Type	Cavity Insulation R-value	Insulation Depth (in)	Above Deck R-value	Below Deck R-value

**B. WALL INSULATION**

01	02	03	04	05	06	07	08	09	10
I.D.	Manufacturer & Brand	Framing Material	Framing Size	Spacing (inches)	Insulation Type	Cavity Insulation R-value	Insulation Depth (in)	Exterior Wall R-value	Interior Wall R-value

**C. MASS INSULATION**

01	02	03	04	05	06	07	08
I.D.	Manufacturer & Brand	Location	Mass Thickness (in)	Furring Strip Type/ Depth (in)	Insulation Type	Exterior Insulation R-value	Interior Insulation R-value

**D. RAISED FLOOR INSULATION**

01	02	03	04	05	06	07	08	09	10
I.D.	Manufacturer & Brand	Framing Material	Framing Size	Spacing (inches)	Insulation Type	Cavity Insulation R-value	Insulation Depth (in)	Exterior Floor R-value	Interior Floor R-value

**F. HEATED SLAB INSULATION**

01 All heated slabs shall be insulated as required by Section 110.8(g). Footings must meet required insulation levels.  
 02 Insulation shall be installed from the top of the slab, down 16 inches or to the frost line, whichever is greater. Climate zones 1-5 require R-5, climate zone 16 requires R-10.  
 03 Alternatively, vertical insulation from top of slab at inside edge of outside wall down to the top of the horizontal insulation. Horizontal insulation from the outside edge of the vertical insulation extending 4 feet toward the center of the slab in a direction normal to the outside of the building in plan view. Climate zones 1-5 require R-5, climate zone 16 requires R-10 vertical and R-7 horizontal.  
 The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

CA Building Energy Efficiency Standards - 2013 Residential Compliance June 2013

## Insulation

- Installed (CF1R or better)

## Air Sealing

- Mandatory measures





# CF2R: Lighting & Plumbing

STATE OF CALIFORNIA  
**LIGHTING - MULTI FAMILY DWELLINGS**  
 CEC-CF2R-PLB-03-E (Revised 08/13)



**CERTIFICATE OF INSTALLATION**  
 Lighting - Multi Family Dwellings  
 Project Name:  
 Dwelling Address:

**A. Types of Installed Lighting and Controls**  
 Select Yes or No according to whether your work on the project controls.

01	Controls for any interior or outdoor lighting	
02	Luminaires in any interior room or outdoor	
03	luminaires recessed into ceilings	
04	Light Emitting Diode (LED) luminaires	
05	Kitchen lighting scope (check one)	<input type="checkbox"/> Only in <input type="checkbox"/> At least <input type="checkbox"/> install <input type="checkbox"/> No kitchen lighting
06	Lighting internal to cabinets	
07	Bathroom lighting	
08	Lighting in garages, laundry rooms or utility rooms	
09	Lighting in rooms other than a kitchen, bathroom, or	
10	Outdoor lighting that is for private patios, entrances,	
11	Outdoor lighting for multi-family buildings with four or more entrances, balconies, porches or residential parking	
12	Internally illuminated address signs	
13	Outdoor lighting for residential parking lots or carport	
14	Outdoor lighting for residential parking lots or carport	
15	Interior common areas equal to 20% or less of the floor	
16	Interior common areas equal to more than 20% of the floor	

**B. Lighting Controls**

01	150.0(k)2A: High efficacy luminaires are switched separately from
02	150.0(k)2B: Exhaust fans are switched separately from
03	150.0(k)2C: Luminaires are switched with readily accessible
04	150.0(k)2D: Lighting controls and equipment are installed
05	150.0(k)2E: No controls are installed that bypass a dimmer
06	150.0(k)2F: Lighting control devices have been certified to meet applicable requirements in Section 110.9
07	150.0(k)2G: Energy Management Control Systems installed in accordance with Section 110.9, meet the installation and comply with all other applicable requirements in
08	150.0(k)2H: Energy Management Control Systems installed in accordance with the functionality of a vacancy sensor in accordance with EMC5 requirements in Section 130.5, and comply with
09	150.0(k)2I: A multi-scene programmable controller is installed in accordance with Section 110.9, and complies with all

The responsible person's signature on this compliance document:

**C. Luminaires (Lighting Fixtures)**

01	150.0(k)1(A-C): For compliance with Section 150.0(k)1, the luminaire must be in accordance with the applicable requirements in Section 150.0(k)1(A-C).
02	150.0(k)1(D): Ballasts for fluorescent lamps rated 13 v
03	150.0(k)1(E): Night lights are rated to consume no more than 1 watt.
04	150.0(k)1(F): Lighting integral to exhaust fans meets applicable requirements in Section 150.0(k)1(F).

The responsible person's signature on this compliance document:

Registration Number:  
 CA Building Energy Efficiency Standards - 2013 Residential

STATE OF CALIFORNIA  
**MULTIFAMILY CENTRAL HOT WATER SYSTEM DISTRIBUTION**  
 CEC-CF2R-PLB-03-E (Revised 08/13)



**CERTIFICATE OF INSTALLATION**  
 Multifamily Central Hot Water System Distribution  
 Project Name: Enforcement Agency: Permit Number:  
 Dwelling Address: City: Zip Code:  
 CF2R-PLB-01-E (Page 1 of 6)

**A. Design Central Water Heating Systems Information**

This table reports the water heating system features that were specified on the registered CF1R compliance document for this project.

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Water Heaters in system	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insul. R-Value	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type

**B. Installed Central Water Heating Systems Information**

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Water Heaters in system	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insul. R-Value	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type

**C. Installed Water Heater Manufacturer Information**

01	02	03
Water Heating System ID or Name	Manufacturer	Model Number



# CF2R: HVAC

STATE OF CALIFORNIA  
**SPACE CONDITIONING SYSTEMS DUCTS AND FANS**  
 CEC-CF2R-MCH-01-H (Revised 08/13)

CALIFORNIA ENERGY COMMISSION

CF2R-MCH-01-E  
(Page 1 of 8)

CERTIFICATE OF INSTALLATION

Space Conditioning Systems Ducts and Fans

Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

**A. General Information**

01 Dwelling Unit Name	02 Climate Zone:
03 Dwelling Unit Conditioned Floor Area (ft <sup>2</sup> )	04 Number of Space Conditioning Systems in this dwelling unit
05 Certificate of Compliance Type	06 method used to calculate HVAC loads
07 Calculated Dwelling Unit Sensible Cooling Load (Btuh)	08 Calculated Dwelling Unit Heating Load (Btuh)

CF2R-MCH-01a – Space Conditioning Systems Ducts and Fans - For use with Performance Certificate of Compliance>>

**B. Design Space Conditioning (SC) System Component Specifications from CF1R**  
 This table reports the space conditioning system features that were specified on the registered CF1R-PRF compliance document for this project.

01	02	03	04	05	06	07	08	09	10	11	12
Zone Name	Space Conditioning System Identification or Name	Space Conditioning System Type	Heating System Type	Cooling System Type	Space Conditioning Fan Type	Distribution System Type	Required Thermostat Type	Low Leakage Air-Handling Unit (LLAHU) Status	Bypass Damper Status	Cooling Zoning Type	Cooling System Compressor Speed Type

Notes:

---

Registration Number: CA Building Energy Efficiency Standards - 2013 Residential Compliance      Registration Date/Time:      HERS Provider:      June 2013



**General Information**

- Floor area
- Heating and cooling load
- Climate zone

**System components**

- From CF1R



# CF2R: HVAC

STATE OF CALIFORNIA  
**DUCT LEAKAGE DIAGNOSTIC TEST**  
CEC-CF2R-MCH-20-H (Revised 08/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION CF2R-MCH-20-H  
(Page 1 of 3)

Project Name:	Installation Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

**A. System Information**

01	Space Conditioning System Identification or Name:	
02	Space Conditioning System Location or Area Served:	
03	Building Type from CEFR:	

---

09	Calculated Target Allowable Duct Leakage Rate (cfm)	
10	Actual duct leakage rate from leakage test measurement (cfm)	
11	Compliance Statement:	

Registration Number: \_\_\_\_\_ Registration Date/Time: \_\_\_\_\_ HERS Provider: \_\_\_\_\_  
 CA Building Energy Efficiency Standards - 2013 Residential Compliance June 2013

STATE OF CALIFORNIA  
**SPACE CONDITIONING SYSTEM FAN EFFICACY**  
CEC-CF2R-MCH-22-H (Revised 08/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION CF2R-MCH-22-H  
(Page 1 of 2)

Project Name:	Installation Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

**A. Ducted Cooling System Information**

01	System Identification or Name	
02	System Location or Area Served	
03	System Installation Type	
04	Nominal Cooling Capacity (tons) of Condenser	
05	Condenser Speed Type	

---

zones calling).					
01	Number of independently controlled zones (i.e., number of thermostats or temperature sensors that independently control one or more dampers.)				
02	Required Fan Efficacy in all Zonal Control Modes (watt/cfm)				
09	Compliance Statement:				

Registration Number: \_\_\_\_\_ Registration Date/Time: \_\_\_\_\_ HERS Provider: \_\_\_\_\_  
 CA Building Energy Efficiency Standards - 2013 Residential Compliance June 2013



## Final: Low Rise Residential

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### CF3R

- ◆ HVAC
  - ◆ CF1R HERS measure

CF1R & HERS registry provides list of forms and test required, as does the Forms ACE summary





# Permit: Leasing Office

<b>PHASE 1</b>	
hvac	NRCC-MCH-01-E-Prescriptive-Declarations.pdf NRCC-MCH-02-E-Prescriptive-Requirements-WetSystDrySyst.pdf NRCC-MCH-03-E-Prescriptive-VentilationAndReheat.pdf
lighting	NRCC-LTI-01-E-CertificateOfCompliance-IndoorLighting.pdf NRCC-LTI-03-E-IndoorLightingPowerAllowance.pdf NRCC-LTI-02-E-IndoorLightingControlsWorksheet.pdf NRCC-LTO-01-E-CertificateOfCompliance-OutdoorLighting.pdf NRCC-LTO-02-E-OutdoorLightingControls.pdf NRCC-LTO-03-E-OutdoorLightingPowerAllowance.pdf
<b>PHASE 2</b>	
hvac	NRCI-MCH-01-E-Mechanical.pdf
lighting	NRCI-LTI-01-E-IndoorLighting.pdf NRCI-LTI-02-E-EMCSLightingControlSystem.pdf NRCI-LTO-01-E-OutdoorLighting.pdf NRCI-LTO-02-E-EMCSLightingControlSystem.pdf
<b>PHASE 3</b>	
hvac	NRCA-MCH-02-A-OutdoorAir.pdf NRCA-MCH-05-A-AirEconomizerControls.pdf NRCA-MCH-13-F-FDD-AirHandlingUnitsAndZoneTerminalUnits.pdf NRCA-MCH-16-F-SupplyAirTemperatureReset Controls.pdf
lighting	NRCA-LTI-02-A-LightingControl.pdf NRCA-LTI-03-A-AutomaticDaylightingControl.pdf NRCA-LTO-02-A-OutdoorLightingControl.pdf



## NRCC: Nonresidential Prescriptive with Forms ACE Summary

- ✦ No envelope because existing conditioned space to remain
- ✦ HVAC
- ✦ Indoor Lighting
- ✦ Outdoor Lighting



# NRCC: Prescriptive Indoor Lighting

STATE OF CALIFORNIA

## INDOOR LIGHTING

CEC-NRCC-LTI-01-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION



### CERTIFICATE OF COMPLIANCE – USER INSTRUCTIONS

NRCC-LTI-01-E

Indoor Lighting

(Page 1 of 5)

Project Name: Nonres Sample

Date Prepared: 5/25/2014

A

Climate Zone: 12	Conditioned Floor Area : 500
	Unconditioned Floor Area : 0
<b>General Information</b>	
<b>Building Type:</b>	<input checked="" type="checkbox"/> Nonresidential <input type="checkbox"/> High-Rise Residential <input type="checkbox"/> Schools <input type="checkbox"/> Relocatable Public Schools <input checked="" type="checkbox"/> Conditioned Spaces
<b>Phase of Construction:</b>	<input type="checkbox"/> New Construction <input type="checkbox"/> Addition
<b>Method of Compliance:</b>	<input checked="" type="checkbox"/> Complete Building <input type="checkbox"/> Area Category

A

### Basic Information

- Project name
- Climate Zone
- Square footage
- Method of compliance

B

### LIGHTING COMPLIANCE DOCUMENTS (select yes for each document included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance documents, refer to the Nonresidential Manual published by the California Energy Commission.

YES	NO	FORM	TITLE
YES		NRCC-LIT-01-E	Certificate of Compliance. All Pages required on plans for all submittals.
	NO	NRCC-LIT-02-E	Lighting Controls, Certificate of Compliance, and PAF Calculation. All Pages required on plans for all submittals.
YES		NRCC-LIT-03-E	Indoor Lighting Power Allowance
	NO	NRCC-LIT-04-E	Tailored Method Worksheets
	NO	NRCC-LIT-05-E	Line Voltage Track Lighting Worksheets

B

### Other forms required

- Further NRCC's required

C

### Summary of Allowed Lighting Power

Conditioned and Unconditioned space Lighting must not be combined for compliance					
Indoor Lighting Power for Conditioned Spaces			Indoor Lighting Power for Unconditioned Spaces		
		Watts			Watts
1.	Installed Lighting NRCC-LTI-01-E, page 4	+ 310		Installed Lighting NRCC-LTI-01-E, page 4	+ 0
2.	PORTABLE ONLY FOR OFFICES NRCC-LTI-01-E, page 3	+			
3.	Minus Lighting Control Credits NRCC-LTI-01-E, page 2	- 0		Minus Lighting Control Credits NRCC-LTI-01-E, page 2	- 0
4.	Adjusted Installed Lighting Power (row 1 plus row 2 minus row 3)	= 310		Adjusted Installed Lighting Power (row 1 minus row 3)	= 0

C

### Allowed lighting power

- Conditioned and unconditioned spaces



# NRCC: Prescriptive Outdoor Lighting

STATE OF CALIFORNIA OUTDOOR LIGHTING CERTIFICATE OF COMPLIANCE (Revised 06/13)		CALIFORNIA ENERGY COMMISSION NRCC-LTO-01-E (Page 1 of 3)	
Project Name: Nonres Sample		Date Prepared: 5/25/2014	
Project Address:		Total Illuminated Hardscape Area 2,000	
General Information			
Phase of Construction: <input type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Alteration			
Outdoor Lighting Zone (OLZ) <input type="checkbox"/> OLZ-1 <input type="checkbox"/> OLZ-2 <input type="checkbox"/> OLZ-3 <input type="checkbox"/> OLZ-4			
The OLZ is: <input type="checkbox"/> Default in accordance with §10-114, or <input type="checkbox"/> Amended by the AHI			
<b>DOCUMENTATION AUTHOR'S DECLARATION STATEMENT</b>			
I certify that this Certificate of Compliance documentation is accurate and complete.			
Documentation Author Name:		Documentation Author Signature:	
Company: Gabel Associates, LLC		Signature Date: 5/25/2014	
Address:		CEA/ HERS Certification Identification (if applicable):	
City/State/Zip:		Phone:	
<b>RESPONSIBLE PERSON'S DECLARATION STATEMENT</b>			
I certify the following under penalty of perjury, under the laws of the State of California:			
1. The information provided on this Certificate of Compliance is true and correct.			
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).			
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.			
4. 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, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.			
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.			
Responsible Designer Name:		Responsible Designer Signature:	
Company:		Date Signed:	
Address:		License:	
City/State/Zip:		Phone:	
<b>LIGHTING COMPLIANCE DOCUMENTS (check box for each document included)</b>			
For detailed instructions on the use of this and all Energy Efficiency Standards compliance documents, refer to the Nonresidential Manual published by the California Energy Commission.			
<input checked="" type="checkbox"/>	NRCC-LTO-01-E	Certificate of Compliance	
<input type="checkbox"/>	NRCC-LTO-02-E	Outdoor Lighting Controls Certificate of Compliance	
<input checked="" type="checkbox"/>	NRCC-LTO-03-E	Outdoor Lighting Power Allowance Certificate of Compliance	

**A Basic Information**

- Project name
- Illuminated area
- Lighting Zone

**B Signatures**

**C Other forms required**

- Additional NRCC's required



# NRCC: Prescriptive HVAC

STATE OF CALIFORNIA  
**MECHANICAL SYSTEMS**  
 CEC-NRCC-MCH-01-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE		NRCC-MCH-01-E
Mechanical Systems		(Page 1 of 4)
Project Name: Nonres Sample	Date Prepared: 5/25/2014	



**A MECHANICAL COMPLIANCE FORMS & WORKSHEETS (check box if worksheet is included)**

For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, refer to the 2013 Nonresidential Compliance Manual. Note: The Enforcement Agency may require all forms to be incorporated onto the building plans.

YES	NO	Form/Worksheet #	Title
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01E (Part 1 of 3)	Certificate of Compliance, Declaration. Required on plans for all submittals.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01E (Part 2 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-02A to 11A). Required on plans for all submittals.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01E (Part 3 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-12A to 18A). Required on plans where applicable.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-02E (Part 1 of 2)	Mechanical Dry Equipment Summary is required for all submittals with Central Air Systems. It is optional on plans.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-02E (Part 2 of 2)	Mechanical Wet Equipment Summary is required for all submittals with chilled water, hot water or condenser water systems. It is optional on plans.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-03E	Mechanical Ventilation and Reheat is required for all submittals with multiple zone heating and cooling systems. It is optional on plans.

**A Other forms required**

- Further NRCC's required

**B MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)**

**Designer:**  
 This form is to be used by the designer and attached to the plans. Listed below are all the acceptance tests for HVAC systems. The designer shall list all equipment that requires an acceptance test. All equipment of the same type that requires a test, list only one.

**Installing Contractor:**  
 The contractor who installed the equipment is responsible to either conduct the acceptance test them self or have a qualified entity run the test for them. If more than one person has responsibility for the acceptance testing, each person shall sign and submit the Certificate of Acceptance applicable to the portion of the construction or installation for which they are responsible.

**Enforcement Agency:**  
**Plancheck** – The NRCC-MCH-01-E form is not considered a completed form and is not to be accepted by the building department unless the correct boxes are checked.  
**Inspector** – Before occupancy permit is granted all newly installed process systems must be tested to ensure proper operations.

Test Description	# of units	MCH-02A Outdoor Ventilation	MCH-03A Single Zone Unitary	MCH-04A Air Distribution Ducts	MCH-05A Economizer Controls	MCH-06A Demand Control Ventilation (DCV)	MCH-07A Supply Fan VAV	MCH-08A Valve Leakage Test	MCH-09A Supply Water Temp. Reset	MCH-10A Hydronic System Variable Flow Control	MCH-11A Automatic Demand Shed Control
CARRIER 58MV	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**B Acceptance testing required**

- Documented in field with NRCA's



# NRCC: Prescriptive HVAC

STATE OF CALIFORNIA

## MECHANICAL VENTILATION AND REHEAT

CEC-NRCC-MCH-03-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE

NRCC-MCH-03-E

Mechanical Ventilation & Reheat

(Page 1 of 2)

Project Name: Nonres Sample

Date Prepared: 5/25/2014

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)				AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheat Primary Air CFM		VAV Deadband Primary Air CFM						
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
ZONE/SYSTEM/ VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEADBAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CONTROL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDITIONED AREA (ft <sup>2</sup> )	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU- PANT	REQUIRED AIRFLOW (MAX OF (OR L) (CFM)	COMPLETES	50% DDC/30% NON-DDC (CFM)	PRIMARY COOLING AIRFLOW (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COMPLETES <sup>1</sup>	(20% DDC, N/A NON-DDC) (CFM)	(CFM) N/A for NON- DDC	(larger of M or R, N/A for NON- DDC)
Office						500	0.15	75	5.0	15.0	75	75	Y							
											Total	75								

**A** Ventilation and reheat  
 ■ Minimum CFM required

- Yellow shaded cells require user input. Remaining cells are protected and automatic
- B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
  - C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
  - D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
  - E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
  - F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Air flow (Column C).





# NRCC: Prescriptive HVAC

STATE OF CALIFORNIA

## REQUIREMENTS FOR PACKAGED SINGLE ZONE UNITS

CEC-NRCC-MCH-05-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE

NRCC-MCH-05-E

Requirements for Packaged Single-Zone Units

(Page 1 of 2)

Project Name: Nonres Sample

Date Prepared: 5/25/2014



Equipment Tag(s) <sup>1</sup>	T-24 Sections	HVAC	
		Requirement <sup>2</sup>	As Scheduled <sup>3</sup>
<b>MANDATORY MEASURES</b>			
Heating Equipment Efficiency <sup>4</sup>	110.1 or 110.2(a)	78% AFUE	94% AFUE
Cooling Equipment Efficiency <sup>4</sup>	110.1 or 110.2(a)	13 SEER	15.0 SEER / 1
Thermostats <sup>5</sup>	110.2(b), 110.2(c)	Setback	Setback
Furnace Standby Loss Control <sup>6</sup>	110.2(d)	n/a	
Ventilation <sup>7</sup>	120.1(b)	75	75
Demand Control Ventilation <sup>8</sup>	120.1(c)4	NR	No
Occupant Sensor Ventilation Control <sup>8</sup>	120.1(c)5, 120.2(e)3		
Shutoff and Reset Controls <sup>9</sup>	120.2(e)	Req	Programmable
Outdoor Air and Exhaust Damper Control	120.2(f)	Req	Auto
Automatic Demand Shed Controls	120.2(h)	NR	none
Economizer FDD	120.2(i)	NR	No
Duct Insulation	120.4	R-8	R-8.0
<b>PRESCRIPTIVE MEASURES</b>			
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	36,633 Btu/hr 29,725 Btu/hr	75,000 Btu/hr 34,669 Btu/hr
Economizer	140.4(e)	NR	No Economize
Electric Resistance Heating <sup>10</sup>	140.4(g)	No	No
Duct Leakage Sealing and Testing <sup>11</sup>	140.4(i)	NR	Yes

**Notes:**

1. Provide equipment tags (e.g. AC1 or AC1 to 10). Multiple units of the same make and model with the same application and accessories.
2. Enter the following information as appropriate: Unit Manufacturer; Unit Model Number (including all accessories); Description of the (enter "N/A" if no heating); and, rated cooling capacity (enter "N/A" if no cooling). For unit capacities include the units (e.g. kBtu/h or ...).
3. For each requirement, enter the minimum requirement from the Standard in the left column (under "Standard Requirement"). In the ... the units as specified.
4. Where there is more than one requirement (e.g. full and part load efficiency) enter both with the appropriate labels (e.g. COP and IEE ...).
5. In the left column identify the thermostatic requirements from the standard (e.g. programmable setback thermostat or heatpump with capabilities of the thermostat as scheduled).
6. If the unit has a furnace which is rated at >=225,000 Btu/h of capacity, indicate the rated standby loss and ignition source (e.g. IID). If there is no furnace or the unit is rated for <225,000 Btu/h indicate "N/A".
7. In the left column, enter both the required ventilation value from Table 120.1A and for the number of occupants times 15 cfm/person. In the right column enter the actual minimum ventilation as scheduled. If the space is naturally ventilated enter "N/A" in the left column and "the space is naturally ventilated" in the right column.
8. If the space is required to have either DCV or Occupant Sensor Ventilation Control indicate "required" in the left column (otherwise indicate "N/A" in the left column). If either DCV or Occupant Sensor Ventilation Control is provided indicate "provided" in the right column (otherwise indicate "N/A" in the right column).
9. In the left column indicate the required time controls from the standard. In the right column identify the device that provides this functionality (e.g. EMCS or programmable timeclock).
10. Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.
11. If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.

**Mandatory Measures**

- Efficiency
- Ventilation
- Demand control (CO2)
- Occupancy sensor ventilation control
- Duct insulation

**Prescriptive Measures**

- Meeting size restrictions
- Economizer
- Electric resistance heating
- Duct testing



# Construction: Leasing Office

<b>PHASE 1</b>	
hvac	NRCC-MCH-01-E-Prescriptive-Declarations.pdf NRCC-MCH-02-E-Prescriptive-Requirements-WetSystDrySyst.pdf NRCC-MCH-03-E-Prescriptive-VentilationAndReheat.pdf
lighting	NRCC-LTI-01-E-CertificateOfCompliance-IndoorLighting.pdf NRCC-LTI-03-E-IndoorLightingPowerAllowance.pdf NRCC-LTI-02-E-IndoorLightingControlsWorksheet.pdf NRCC-LTO-01-E-CertificateOfCompliance-OutdoorLighting.pdf NRCC-LTO-02-E-OutdoorLightingControls.pdf NRCC-LTO-03-E-OutdoorLightingPowerAllowance.pdf
<b>PHASE 2</b>	
hvac	NRCI-MCH-01-E-Mechanical.pdf
lighting	NRCI-LTI-01-E-IndoorLighting.pdf NRCI-LTI-02-E-EMCSLightingControlSystem.pdf NRCI-LTO-01-E-OutdoorLighting.pdf NRCI-LTO-02-E-EMCSLightingControlSystem.pdf
<b>PHASE 3</b>	
hvac	NRCA-MCH-02-A-OutdoorAir.pdf NRCA-MCH-05-A-AirEconomizerControls.pdf NRCA-MCH-13-F-FDD-AirHandlingUnitsAndZoneTerminalUnits.pdf NRCA-MCH-16-F-SupplyAirTemperatureReset Controls.pdf
lighting	NRCA-LTI-02-A-LightingControl.pdf NRCA-LTI-03-A-AutomaticDaylightingControl.pdf NRCA-LTO-02-A-OutdoorLightingControl.pdf



## NRCI

- ✦ Envelope
- ✦ HVAC
- ✦ Indoor Lighting
- ✦ Outdoor Lighting



# NRCI

STATE OF CALIFORNIA  
**MECHANICAL**  
 CEC-NRCI-MCH-01-E (Revised 08/13)

CALIFORNIA ENERGY COMMISSION  
 NRC I-MCH-01-E  
 (Page 1 of 2)

CERTIFICATE OF INSTALLATION  
 Mechanical  
 Project Name: \_\_\_\_\_ Enforcement Agency: \_\_\_\_\_  
 Project Address: \_\_\_\_\_ Permit Number: \_\_\_\_\_

**A**

**A. GENERAL INFORMATION**

DATE OF BUILDING PERMIT \_\_\_\_\_

BUILDING TYPE \_\_\_\_\_

PHASE OF CONSTRUCTION \_\_\_\_\_

*If more than one person has responsibility for building construction, the person with chief responsibility for construction shall prepare and sign the Installation Certificate document(s) for the entire construction.*

**B**

**B. SCOPE OF RESPONSIBILITY**

Date of approval by the enforcement agency of the Certificate of Compliance that provides the specifications for this Installation Certificate. \_\_\_\_\_

*In the table below identify all applicable construction documents that specify the features, materials, components, manufactured devices, or system performance diagnostic results required for the scope of responsibility for this Installation Certificate.*

Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved By the Enforcement Agency

**General Information**

- Date of permit
- Phase of construction

**Scope**

- Document(s) verifying features installed are the same or better than required in CF1R
- Date approved by building inspector

STATE OF CALIFORNIA  
**MECHANICAL**  
 CEC-NRCI-MCH-01-E (Revised 08/13)

CALIFORNIA ENERGY COMMISSION  
 NRC I-MCH-01-E  
 (Page 2 of 2)

CERTIFICATE OF INSTALLATION  
 Mechanical  
 Project Name: \_\_\_\_\_ Enforcement Agency: \_\_\_\_\_  
 Project Address: \_\_\_\_\_ Permit Number: \_\_\_\_\_

Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved By the Enforcement Agency

**C**

**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

1. I certify that this Certificate of Installation documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

**C**

**RESPONSIBLE PERSON'S DECLARATION STATEMENT**

I certify the following under penalty of perjury, under the laws of the State of California:

- The information provided on this Certificate of Installation is accurate and complete.
- I am eligible under Division 3 of the Business and Professions Code to perform the design, construction, or installation of features, materials, components, manufactured devices, or system performance diagnostic results identified on this Certificate of Installation and attest to the accuracy of the information provided; otherwise I am an authorized representative of the responsible person.
- The constructed or installed features, materials, components, manufactured devices, or system performance diagnostic results conform to all applicable code given on the plans and specifications approved by the enforcement agency.
- I reviewed a copy of the Certificate of Compliance approved by the enforcement agency for the scope of construction or installation identified on this Certificate of Installation that apply to the construction or installation have been completed.
- I will ensure that a completed signed copy of this Certificate of Installation is provided to the building owner at occupancy.

Responsible Builder/Installer Name:
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)
Address:
City/State/Zip:

**Signatures**

- Documentation author
- Installing contractor (or general contractor)
- Can be the same person





# Final: Leasing Office

PHASE 1	
hvac	NRCC-MCH-01-E-Prescriptive-Declarations.pdf NRCC-MCH-02-E-Prescriptive-Requirements-WetSystDrySyst.pdf NRCC-MCH-03-E-Prescriptive-VentilationAndReheat.pdf
lighting	NRCC-LTI-01-E-CertificateOfCompliance-IndoorLighting.pdf NRCC-LTI-03-E-IndoorLightingPowerAllowance.pdf NRCC-LTI-02-E-IndoorLightingControlsWorksheet.pdf NRCC-LTO-01-E-CertificateOfCompliance-OutdoorLighting.pdf NRCC-LTO-02-E-OutdoorLightingControls.pdf NRCC-LTO-03-E-OutdoorLightingPowerAllowance.pdf
PHASE 2	
hvac	NRCI-MCH-01-E-Mechanical.pdf
lighting	NRCI-LTI-01-E-IndoorLighting.pdf NRCI-LTI-02-E-EMCSLightingControlSystem.pdf NRCI-LTO-01-E-OutdoorLighting.pdf NRCI-LTO-02-E-EMCSLightingControlSystem.pdf
PHASE 3	
hvac	NRCA-MCH-02-A-OutdoorAir.pdf NRCA-MCH-05-A-AirEconomizerControls.pdf NRCA-MCH-13-F-FDD-AirHandlingUnitsAndZoneTerminalUnits.pdf NRCA-MCH-16-F-SupplyAirTemperatureReset Controls.pdf
lighting	NRCA-LTI-02-A-LightingControl.pdf NRCA-LTI-03-A-AutomaticDaylightingControl.pdf NRCA-LTO-02-A-OutdoorLightingControl.pdf



## NRCA & NRCV

- ✦ Envelope (none)
- ✦ HVAC (HVAC controls for NRCA)
  - ✧ No HERS = no NRCV required
- ✦ Indoor Lighting (controls)
- ✦ Outdoor Lighting (controls)



# NRCA: HVAC

STATE OF CALIFORNIA  
**OUTDOOR AIR ACCEPTANCE**  
CEC-NRCA-MCH-02-A (Revised 08/13)  
CALIFORNIA ENERGY COMMISSION  
CERTIFICATE OF ACCEPTANCE  
NRCA-MCH-02-A  
Outdoor Air Acceptance (Page 1 of 3)

STATE OF CALIFORNIA  
**CONSTANT VOLUME SINGLE ZONE UNITARY (PACKAGED AND SPLIT) AIR CONDITIONER AND HEAT PUMP SYSTEMS**  
CEC-NRCA-MCH-03-A (Revised 08/13)  
CALIFORNIA ENERGY COMMISSION  
CERTIFICATE OF ACCEPTANCE  
NRCA-MCH-03-A  
Constant Volume Single Zone Unitary (Packaged and Split) Air Conditioner and Heat Pump Systems (Page 1 of 3)

STATE OF CALIFORNIA  
**AIR ECONOMIZER CONTROLS ACCEPTANCE**  
CEC-NRCA-MCH-05-A (Revised 08/13)  
CALIFORNIA ENERGY COMMISSION  
CERTIFICATE OF ACCEPTANCE  
NRCA-MCH-05-A  
Air Economizer Controls Acceptance (Page 1 of 3)

STATE OF CALIFORNIA  
**AUTOMATIC FAULT DETECTION AND DIAGNOSTICS FOR AIR HANDLING UNITS AND ZONE TERMINAL UNITS ACCEPTANCE**  
CEC-NRCA-MCH-13-F (Revised 08/13)  
CALIFORNIA ENERGY COMMISSION  
CERTIFICATE OF ACCEPTANCE  
NRCA-MCH-13-F  
Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance (Page 1 of 3)

STATE OF CALIFORNIA  
**Supply Air Temperature Reset Controls Acceptance**  
CEC-NRCA-MCH-16-F (Revised 08/13)  
CALIFORNIA ENERGY COMMISSION  
CERTIFICATE OF ACCEPTANCE  
NRCA-MCH-16-F  
Supply Air Temperature Reset Controls Acceptance (Page 1 of 2)

**Construction Inspection**

- Supporting documents:
  - 2013 Building Glance
  - 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual (NA7.5.15 Supply Air Temperature Reset Controls Acceptance At-A-Glance)
  - 2013 Building Energy Efficiency Standards Nonresidential Appendix (Section NA7)
- Instrumentation to perform test includes, but is not limited to:
  - Hand-held temperature sensor
- Installation:
  - Check the appropriate box:
    - The supply air temperature reset controls are installed per the requirements of the 2013 Building Energy Efficiency Standards section 140.4(f): Multi-zone systems shall include controls that automatically reset supply-air temperatures:
      - (1) In response to representative building loads or to outdoor air temperature; and
      - (2) By at least 25 percent of the difference between the design supply-air temperature and the design room air temperature.
    - An exception is taken to this requirement (one of the following must be true; acceptance test is not needed):



# NRCA: Lighting Controls

STATE OF CALIFORNIA  
**LIGHTING CONTROL ACCEPTANCE DOCUMENT**  
CEC/NRCA/LTI-03-A (Revised 08/13)

**CERTIFICATE OF ACCEPTANCE** NRCA-I TI-02-A  
Lighting Control Acceptance Document (Page 1 of 6)

Project Name: Enforcement Agency: Permit Number:  
Project Address: City: Zip Code:

*Note: For more than 3 spaces attach additional sheets through 5, as required.*

**Automatic Shut-off Controls: Automatic**  
**Intent:** Lights are turned off

**Guidance**  
This acceptance test form must be filled out by:  
I. Automatic Time Switch Controls  
II. Occupancy Sensors  
III. Partial-OFF occupancy sensors  
IV. Partial-ON occupancy sensors (only)  
V. Occupancy Sensors serving small zones

For automatic daylighting controls use acceptance test form NRCA-LTI-04-A. The tests on this certificate are required by Sections 150.2 and 150.3.

**A. Construction Inspection**  
Fill out Section A to cover spaces 1 through 5. Instruments are required to test all spaces in the building. Instruments needed to perform tests include:  
1. **Automatic Time Switch Controls Construction Inspection**  
a. All automatic time switch controls:  
 Weekdays  
 Weekend  
 Holidays  
b. Document for the owner automatic time switch controls:  
 Weekdays settings  
 Weekend settings  
 Holidays settings  
 Set-up settings  
 Preference program setting  
 Verify the correct time and date  
 Verify the battery is installed  
 Override time limit is no more than 10 minutes  
 Occupant Sensors and Automatic Shut-off Controls are listed on the Construction Inspection Report  
2. **Occupancy Sensor Construction Inspection**

CA Building Energy Efficiency Standards - 2013 N

STATE OF CALIFORNIA  
**AUTOMATIC DAYLIGHTING CONTROL ACCEPTANCE DOCUMENT**  
CEC/NRCA/LTI-03-A (Revised 08/13)

**CERTIFICATE OF ACCEPTANCE** NRCA-I TI-03-A  
Automatic Daylighting Control Acceptance Document (Page 1 of 10)

Project Name: Enforcement Agency: Permit Number:  
Project Address: City: Zip Code:

*Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.*

Check boxes for all pages of this LTG-3A completed and indicated:  
 LTG-3A Page 2 Construction Inspection: This system  
 LTG-3A Page 3 & 4 Continuous dimming control for lighting  
 LTG-3A Page 5 & 6 Stepped Switching/ Stepped Dimming  
 LTG-3A Page 7 & 8 Continuous dimming control for lighting  
 LTG-3A Page 9 & 10 Stepped Switching/ Stepped Dimming

**I. Construction Inspection NA-7.6.2.1**  
**1. Drawing of Daylit Zone(s) must be shown on plans**  
 Shown on plans page #'s  
 Daylit zone(s) drawn in on as-built plans (attached)

*Check box below if sampling method is used in accordance with Section 150.2(c)(1) for buildings with > 5 daylight control spaces.*

Control System	System Name
A	
B	
C	

**2 System Information**  
**Zone Type:** Skylit (Sky), Primary Sidelit (PS), or Secondary Sidelit (SS)  
**Control Type:** Continuous Dimming with more than 10% Stepped Switching (SW)  
**Design Footcandles:** (enter number or "Unknown")

**3 Sensor and Controls**

STATE OF CALIFORNIA  
**OUTDOOR LIGHTING ACCEPTANCE TESTS**  
CEC/NRCA/LTI-03-A (Revised 08/13)

**CERTIFICATE OF ACCEPTANCE** NRCA-LTI-02-A  
Outdoor Lighting Acceptance Tests (Page 1 of 2)

Project Name: Enforcement Agency: Permit Number:  
Project Address: City: Zip Code:

*Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.* Enforcement Agency User: Checked by/Date:

**NA7.8.1.2 Outdoor Motion Sensor Acceptance**  
**Intent:** Luminaires that can accept an incandescent lamp (for instance, screw-base fixtures) rated over 100W are controlled with a motion sensor per Section 130.2(a). Luminaires mounted 24 feet or below are controlled with a motion sensor per Section 130.2(c)3A.

**A. Construction Inspection**  
1. **Motion Sensor Construction Inspection**  
 Motion sensor has been located to minimize false signals  
 sensor is not triggered by motion outside of controlled area  
 Desired motion sensor coverage is not blocked by obstruction that could adversely affect performance  
 The lighting power of each luminaire is set to reduce by at least 40 percent but no more than 80 percent, in the unoccupied condition  
 No more than 1,500 watts of lighting power is controlled together, by the same sensor or group of sensors

**B. Functional testing**  
1. Simulate motion of a pedestrian in area under lights controlled by the motion sensor. Verify and document the following:  
 Status indicator operates correctly.  
 Lights controlled by motion sensors turn on immediately upon entry into the area lit by the controlled lights near the motion sensor  
 Signal sensitivity is adequate to achieve desired control  
2. Simulate no motion in area with lighting controlled by the sensor but with pedestrian motion adjacent to this area. Verify and document the following:  
 The occupant sensor does not trigger a false "on" from movement outside of the controlled area  
 Signal sensitivity is adequate to achieve desired control.

**NA7.8.2 Outdoor Lighting Automatic Shut-off Controls Acceptance**  
**Intent:** All installed outdoor lighting shall be controlled by a photocontrol or outdoor astronomical time-switch control that automatically turns OFF the outdoor lighting when daylight is available, per Section 130.2(c)1. All outdoor lighting shall also be controlled by an automatic scheduling control that automatically turns OFF the lighting outside of business hours or occupied times. Certain types of outdoor lighting shall also be controlled by motion sensor controls. Outdoor lighting shall be circuited separately from other electrical loads.



# Next Steps

- Welcome
- What We Heard from You
- Let's Talk

## ▶ Next Steps

- Best Practices
  - Improvements
- Wrap Up





# Our Questions To You

## Best Practices

How will you prepare for the use and submittal of the new forms under the 2013 code?

We have a checklist for compliance forms need (per scope of work) for the prescriptive method.

Staff to view this webinar and establish policies for plan check and inspection staff to administer.

Study, study, study.

I will look at them to compare to the old forms.

We have been using Energy Pro

We have occasional training sessions with our plans examiners and inspectors. Usually someone volunteers (is forced) to do independent research on particular topics and then teach the group in a weekly session.





A new website developed by the Statewide Codes & Standards Program to help you meet the requirements of Title 24, Part 6

We offer **FREE**



A variety of tools to help you identify the forms, installation techniques, and building energy standards relevant to building projects in California



Classroom and online trainings on Title 24, Part 6.

**Learning Portal  
Coming Soon!**



Fact Sheets, Trigger Sheets, Checklists, and FAQs to help you understand when Title 24, Part 6 is "triggered" and how to correctly comply when it is



visit us at  
[www.EnergyCodeAce.com](http://www.EnergyCodeAce.com)



# Our Questions To You

## Improvements

What would make your job easier when using and/or verifying the Title 24 part 6 forms?

I really like the trigger sheets and other information on the Energy Code Ace website but a lot of information is 'coming soon.' Complete information would be REALLY helpful.

"How to" hand outs would be helpful.

Digital format or online tool

Being able to reach out and put my hands on the answers that come to me from the field..

Check list for inspection.

Your checklists have already made my job easier.



# Residential: HERS Mandatory / Prescriptive / Performance

HERS-verified Measure	Mandatory	Prescriptive	(if credit taken) Performance
<b>Mechanical</b>			
Duct sealing (maximum leakage)	X <sup>A</sup>		
Indoor air quality ventilation (based on ASHRAE Standard 62.2)	X		
Refrigerant charge or Installation of a charge indicator display		CZ 2, 8-15	CZ 1, 3-7, 16
Duct design (reduced surface area, high insulation, and duct location)			X
Ducts entirely in conditioned space			X
Low leakage ducts entirely in conditioned space			X
Ducts <12 feet outside conditioned space			X
Low leakage air handlers			X
Cooling coil air flow and air handler fan watt draw <b>AND/OR</b> Verified return duct design and air filter device	X		
High SEER			X
High EER			X
Photovoltaic (PV) system capacity to qualify for PV rebate via New Solar Home Partnership			X
Central fan integrated ventilation cooling systems		Optional <sup>B</sup>	
Zonal control			X
Evaporatively cooled condensers			X
Ice storage air conditioners			X
<b>Plumbing</b>			
Pipe insulation			X
Verified design (parallel piping, compact design, point of use)			X
Multi family recirculation loops			X
<b>Envelope</b>			
Quality insulation installation (QII)			X <sup>C</sup>
Building envelope sealing			X
HERS verified pre-existing conditions			X

<sup>A</sup> Unless it is a ductless system (e.g., ductless mini splits)

<sup>B</sup> A project may comply prescriptively by using either a central fan integrated ventilation cooling system.

- + If a central fan integrated cooling system is used, it requires HERS verification, and it must meet duct leakage, fan watt draw and airflow requirements
- + If a whole house fan is used, it does NOT require HERS verification.

<sup>C</sup> If QII is used for compliance credit, multiple inspections are required to confirm that QII standards are met.

## HERS Verified Measures

- ✦ Triggers HERS registration
- ✦ Triggers ALL forms to be HERS registered
- ✦ Triggers HERS rater for verification of applicable features





# Nonresidential: HERS Prescriptive & Performance

HERS-verified Measure	Mandatory	Prescriptive	(if credit taken) Performance
<b>Mechanical</b>			
Duct sealing (maximum leakage)		X <sup>A</sup>	
HERS verified low leakage AHU			X
<b>Plumbing</b>			
Multi family/Hotel & motel recirculation system (piping and controls)			X
Multi family/Hotel & motel recirculation loops			X

<sup>A</sup> Constant volume, single zone system serves less than 5,000 sq. ft. and more than 25% ducts outside conditioned space (see standards for more specifics on duct location)

## HERS Verified Measures

- ✦ Triggers HERS registration
- ✦ Triggers applicable forms to be HERS registered
- ✦ Triggers HERS rater for verification of applicable features



# Seven Step Checklist



## 7 Steps Check List

Title 24 Part 6 Energy Forms

Permit Application	
1. Identify relevant forms <input type="checkbox"/>	
✦ Forms Ace Tool	
✦ HERS Providers Registries	
✦ Compliance Software	
2. Register & complete certificates of compliance (NRCC or CF1R) <input type="checkbox"/>	
✦ Select HERS Provider & go to their website (Residential Only)	
✦ Complete Certificates of Compliance	
✦ Print them	
3. Bring compliance certificates to building department <input type="checkbox"/>	
✦ Check BD website for back up documentation requirements	
✦ Take forms + required back up documents to BD	
Installation and Inspection	
4. Complete certificates of installation (NRCI or CF2R) <input type="checkbox"/>	
✦ Already identified in step 1	
✦ Get them while Installer is around	
✦ Make sure they're complete before installer is done	
5. Keep Certificates of Installation Onsite for Inspector <input type="checkbox"/>	
✦ Stay organized	
✦ Give them to building inspector	
✦ They are to be given to building owner	
Acceptance and Verification	
6. Complete Certificates of Acceptance and Certificates of Verification (NRCA, NRCV or CF3R) <input type="checkbox"/>	
✦ Already identified in step 1	
✦ Collect from HERS rater or ATT	
✦ Look them over and make sure they are complete	
7. Keep CA's & CV's onsite for inspector for permit final <input type="checkbox"/>	
✦ Stay organized	
✦ Give them to building inspector	
✦ They are to be given to building owner	



This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.



# Residential Plan Review Checklists

Permit Number: \_\_\_\_\_

**FLOORS continued** YES NO\*

Slab floor(s): \_\_\_\_\_

**Ace Resources** **Title 24 Part 6** **Energy Plan Review Checklist** **Residential Performance Method 2: Envelope**  
*New Construction, Addition, and/or Alteration*  
*2 of 4 checklists to be completed*

Permit: \_\_\_\_\_

**Ace Resources** **Title 24 Part 6** **Energy Plan Review Checklist** **Residential Performance Method 1: General Information**  
*New Construction, Addition, and/or Alteration*  
*1 of 4 checklists to be completed*  
*1: General Information, 2: Envelope, 3: Mechanical, and 4: Lighting*

Permit Number: \_\_\_\_\_ Permit Applicant: \_\_\_\_\_  
 Project Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Plans Examiner: \_\_\_\_\_  
 Phone: \_\_\_\_\_

COMPLIANCE RESULTS AND REQUIREMENTS		Project Notes	YES	NO*
Do all pages of the CF1R have the same "Report Generated" date and time?	<i>Date and Time</i>		<input type="checkbox"/>	<input type="checkbox"/>
Is the correct Standards Version used?	<i>Compliance 2014 / Compliance 2015</i>		<input type="checkbox"/>	<input type="checkbox"/>
Compliance software approved for 2013 Low-rise Residential Standards?	<i>Software version</i>		<input type="checkbox"/>	<input type="checkbox"/>
If HERS verification is required, has the CF1R been registered with a HERS provider?	<i>Registration Number</i>		<input type="checkbox"/>	<input type="checkbox"/>
Are there any Special Features? (Example: Cool Roof, PV System)			<input type="checkbox"/>	<input type="checkbox"/>
Is the CF1R signed and dated by both required roles? Documentation Author Responsible Building Designer or Owner	<i>Electronic signature always allowed</i> <i>Electronic signature allowed on HERS registered documents</i>		<input type="checkbox"/>	<input type="checkbox"/>
Is the CF1R filed on the plans?	CF1R-PRF-01 New Construction CF1R-PRF-02 Additions and/or Alterations		<input type="checkbox"/>	<input type="checkbox"/>
<b>Does the CF1R show "Building Complies with Computer Performance"?</b>				
<input type="checkbox"/> <input type="checkbox"/>				
GENERAL INFORMATION (Are the following CF1R inputs confirmed on the plans?)		YES	NO*	
Climate Zone		<input type="checkbox"/>	<input type="checkbox"/>	
Building Type	Single Family / Multifamily	<input type="checkbox"/>	<input type="checkbox"/>	
Project Scope	Newly Constructed / Addition / Alteration	<input type="checkbox"/>	<input type="checkbox"/>	
Total Conditioned Floor Area (FT <sup>2</sup> )		<input type="checkbox"/>	<input type="checkbox"/>	
Addition Conditioned Floor Area (FT <sup>2</sup> )		<input type="checkbox"/>	<input type="checkbox"/>	
Building Front Orientation		<input type="checkbox"/>	<input type="checkbox"/>	
Number of Dwelling Units		<input type="checkbox"/>	<input type="checkbox"/>	
Number of Stories		<input type="checkbox"/>	<input type="checkbox"/>	
Principal heating source	Natural Gas / Propane / Electric, natural gas available or not available	<input type="checkbox"/>	<input type="checkbox"/>	

**NOTE:** Highlight all HERS measures and Special Features listed on the CF1R and inform the Building Inspector that field verification is required for these items.  
 \* Items marked "no" must be corrected

**EnergyCodeAce** This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission. Version 1

- ✦ Two Plan Review checklists
  - ✦ Performance
  - ✦ Prescriptive
- ✦ Both checklists address new construction, additions, and alterations
- ✦ Can be found:
  - At [EnergyCodeAce.com](http://EnergyCodeAce.com)



# Residential Inspection Checklist

**Ace Resources** 2013 Residential Energy Inspection Checklist **EnergyCode Ace**  
Helping you play your cards right

Permit Number: \_\_\_\_\_

Project Address: \_\_\_\_\_

PROJECT CONTACTS	
Permit Applicant:	Phone: _____
General Contractor:	Phone: _____
Plans Examiner:	Phone: _____
HERS Rater:	Phone: _____
HERS Provider:	HERS Registration Number: _____

OVERALL REQUIREMENTS		DATE: _____
	YES	NO
Is the installing contractor(s) available to meet you at site, and aware of required paperwork?	<input type="checkbox"/>	<input type="checkbox"/>
Is Plan Examiner's checklist available?	<input type="checkbox"/>	<input type="checkbox"/>
All compliance documents completed, signed and registered, if required (HERS verification triggers registration.)	<input type="checkbox"/>	<input type="checkbox"/>
CF1R (Certificate of Compliance - most current, if revised from plan review)	<input type="checkbox"/>	<input type="checkbox"/>
CF2R (Certificates of Installation)	<input type="checkbox"/>	<input type="checkbox"/>
CF3R (Certificates of Verification- HERS)	<input type="checkbox"/>	<input type="checkbox"/>

FOOTING/FOUNDATION INSPECTION		DATE: _____	
Does installed measure and/or HERS-verified data match CF1R and meet all mandatory requirements?		YES	NO
Building Front Orientation (degrees from North)	<input type="checkbox"/>	<input type="checkbox"/>	
Total Conditioned Floor Area (FT <sup>2</sup> )	<input type="checkbox"/>	<input type="checkbox"/>	
Floor types (i.e. slab on grade, raised floor, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	
Slab on Grade: Perimeter insulation (heated slab or special feature in CF1R)	<input type="checkbox"/>	<input type="checkbox"/>	
Fuel Type (natural gas, propane, electricity)	<input type="checkbox"/>	<input type="checkbox"/>	

SOLAR READY REQUIREMENTS		DATE: _____	
Does project meet all mandatory requirements?		YES	NO
Single family subdivisions >10 residences, and low-rise multi-family buildings (\$100.10) Form CF1R-SRA-01-E	<input type="checkbox"/>		
Solar Zone: Minimum individual and total areas and dimensions (see form for exceptions)			
SF: ≥ 250 ft <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	
MF: ≥ 15% of roof area, excluding skylights (on building, another structure within 250 ft <sup>2</sup> , or associated covered parking)	<input type="checkbox"/>	<input type="checkbox"/>	
Orientation: If slope >2, 12, 110-270 degrees from true North	<input type="checkbox"/>	<input type="checkbox"/>	
Shading: No obstructions within solar zone. Obstructions outside zone: ratio of horizontal distance to height ≥ 2:1	<input type="checkbox"/>	<input type="checkbox"/>	
Interconnection Pathways from solar zone for routing electrical service and plumbing	<input type="checkbox"/>	<input type="checkbox"/>	
Main Electrical Service Panel (single family only): Minimum busbar rating ≥ 200 amps. Reserved space for future installation.	<input type="checkbox"/>	<input type="checkbox"/>	

Continued on next page Page 1 of 5

- ✦ Applies to all construction projects
  - ✦ Performance and Prescriptive
  - ✦ New construction, Additions, and Alterations
- ✦ Can be found:
  - ✦ At [EnergyCodeAce.com](http://EnergyCodeAce.com)



# Wrap Up

- Welcome
- What We Heard from You
- Let's Talk
- Next Steps

## ▶ **Wrap Up**

- CEUs
- Questions?
- Thank you!





## CEU's – Certificate of Participation

- ✦ Certificate of Participation will be emailed to those who are registered and tracked as having attended through the end of this presentation.
- ✦ If you viewed this session with a group, please make sure to send "Sign Up" sheet to us so that all can a Certificate of Participation.





# Thank you!

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HELPING YOU PLAY YOUR CARDS RIGHT

## Residential

Form Name	Use	Description
<i>Performance Approach</i>		
CF1R-PRF-01-E	New Construction, Additions, Alterations, E+A, E+A+A	Performance compliance method
<i>Prescriptive Approach – all components</i>		
CF1R-NCB-01-E	New Construction	New constructed buildings and addition greater than 1,000 sf
CF1R-ADD-01-E	Additions	Addition less than 1,000 sf
CF1R-ALT-01-E	Alterations	Non HVAC Alterations
<i>Prescriptive Approach – HVAC only</i>		
CF1R-ALT-02a-E	HVAC alterations	New ducts greater than 40 linear ft.
CF1R-ALT-02b-E	HVAC alterations	Equipment or component changeout
CF1R-ALT-02c-E	HVAC alterations	Equipment or component changeout with all new ducts
CF1R-ALT-02d-E	HVAC alterations	Entirely new or replacement system
CF1R-ALT-03-E	HVAC alterations	Paper version of CF1R-ALT-HVAC CZ 1, 3-7, 16
CF1R-ALT-04-E	HVAC alterations	Paper version of CF1R-ALT-HVAC CZ 2, 8-15
<i>Prescriptive Worksheets – Envelope</i>		
CF1R-ENV-01-E	Envelope worksheet	EZ Frame - opaque
CF1R-ENV-02-E	Envelope worksheet	Area weighted average calculation
CF1R-ENV-03-E	Envelope worksheet	SHGC
CF1R-ENV-04-E	Envelope worksheet	Cool roof and SRI
<i>Prescriptive Worksheets - Plumbing</i>		
CF1R-PLB-01-E	Hydronic heating worksheet	Hydronic heating system
<i>Prescriptive Worksheets - Solar</i>		
CF1R-SRA-01-E	Solar worksheet	Solar ready areas
CF1R-SRA-02-E	Solar worksheet	Minimum Solar zone area
CF1R-STH-01-E	Solar worksheet	OG 300 Solar water heating system
CF1R-STH-02-E	Solar worksheet	OG 100 Solar water heating system



Form Name	Use	Description
<i>Non-HERS - Envelope</i>		
CF2R-ENV-01-E	Envelope – non HERS	Fenestration and site-built fenestration
CF2R-ENV-02-E	Envelope – non HERS	Envelope air sealing requirements
CF2R-ENV-03-E	Envelope – non HERS	Insulation installation
CF2R-ENV-04-E	Envelope – non HERS	Roofing: Cool Roof
<i>Non-HERS – Lighting</i>		
CF2R-LTG-01-E	Lighting – non HERS	Single family dwellings
CF2R-LTG-02-E	Lighting – non HERS	Multi family dwellings
<i>Non-HERS – Photovoltaic</i>		
CF2R-SPV-01a-E	Photovoltaic– non HERS	Photo voltaic systems compliance credits
CF2R-SPV-01b-E	Photovoltaic– non HERS	Exception to solar ready area requirements
CF2R-SPV-01c-E	Photovoltaic– non HERS	PV Compliance credits and exception to solar ready area requirements
<i>Non-HERS – Mechanical</i>		
CF2R-MCH-01-E	Mechanical – non HERS	HVAC systems, ducts, fans and thermostats
CF2R-MCH-02-E	Mechanical – non HERS	Whole house fan
CF2R-MCH-04-E	Mechanical – non HERS	Evaporative coolers
CF2R-MCH-05-E	Mechanical – non HERS	Ice storage air conditioning units
CF2R-MCH-06-E	Mechanical – non HERS	Verification of air filtration

CF2R-MCH-25f-E	Mechanical – non HERS	Verification of refrigerant charge – packaged system manufacturer refrigerant charge certification
<i>Non-HERS – Plumbing</i>		
CF2R-PLB-01-E	Plumbing– non HERS	Water heating system – general information
CF2R-PLB-02-E	Plumbing– non HERS	Single dwelling unit hot water distribution system
CF2R-PLB-03-E	Plumbing– non HERS	Multi-family central hot water distribution system
CF2R-PLB-04-E	Plumbing– non HERS	Pool and spa systems
<i>Non-HERS – Solar Thermal</i>		
CF2R-STH-01-E	Solar thermal– non HERS	Solar water heating system
<i>HERS - Envelope</i>		
CF2R-ENV-20a-H	Envelope – HERS	Building envelope air leakage: single point test with manual meter
CF2R-ENV-20b-H	Envelope – HERS	Building envelope air leakage: single point test with automatic meter
CF2R-ENV-20c-H	Envelope – HERS	Building envelope air leakage: multi-point test
CF2R-ENV-20d-H	Envelope – HERS	Building envelope air leakage: repeated single point with manual meter
CF2R-ENV-20e-H	Envelope – HERS	Building envelope air leakage: repeated single point with manual meter
CF2R-ENV-21a-H	Envelope – HERS	Quality Insulation Installation – air infiltration sealing – framing stage for batt, loose fill and SPF
CF2R-ENV-21b-H	Envelope – HERS	Quality Insulation Installation – air infiltration sealing – framing stage for SIP and ICF
CF2R-ENV-22-H	Envelope – HERS	Quality Insulation Installation – air infiltration sealing – Ceiling/roof deck
CF2R-ENV-23-H	Envelope – HERS	Quality Insulation Installation – air infiltration sealing – Insulation stage
<i>HERS - Plumbing</i>		

CF2R-PLB-20-H	Plumbing– HERS	Single dwelling unit hot water system distribution
CF2R-PLB-21-H	Plumbing– HERS	Multi-family central hot water system distribution
<i>HERS - Mechanical</i>		
CF2R-MCH-20a-H	Mechanical – HERS	Duct leakage measurement – new system
CF2R-MCH-20b-H	Mechanical – HERS	Duct leakage measurement – low leakage ducts in conditioned space
CF2R-MCH-20c-H	Mechanical – HERS	Duct leakage measurement – low leakage air handling units
CF2R-MCH-20d-H	Mechanical – HERS	Duct leakage measurement – Altered (existing) system
CF2R-MCH-20e-H	Mechanical – HERS	Duct leakage measurement – Sealing of all accessible leaks
CF2R-MCH-21-H	Mechanical – HERS	Duct location verification (directly conditioned space)
CF2R-MCH-22-H	Mechanical – HERS	Forced air system fan efficacy (watt/cfm)
CF2R-MCH-23a-H	Mechanical – HERS	Forced air system airflow rate (cfm/ton) single zone or zonally controlled
CF2R-MCH-23b-H	Mechanical – HERS	Forced air system airflow rate (cfm/ton) zonally controlled
CF2R-MCH-23c-H	Mechanical – HERS	Forced air system airflow rate (cfm/ton) alternative compliance
CF2R-MCH-25a-H	Mechanical – HERS	Refrigerant charge – superheat method
CF2R-MCH-25b-H	Mechanical – HERS	Refrigerant charge – subcooling method
CF2R-MCH-25c-H	Mechanical – HERS	Refrigerant charge – weigh-in procedure
CF2R-MCH-25d-H	Mechanical – HERS	Refrigerant charge – charge indicator display
CF2R-MCH-25e-H	Mechanical – HERS	Refrigerant charge – winter setup
CF2R-MCH-26-H	Mechanical – HERS	Verified EER or SEER
CF2R-MCH-27a-H	Mechanical – HERS	Mechanical Ventilation – continuous – fan vent rate method

CF2R-MCH-27b-H	Mechanical – HERS	Mechanical Ventilation – continuous – total vent rate method
CF2R-MCH-27c-H	Mechanical – HERS	Mechanical Ventilation – intermittent – fan vent rate method
CF2R-MCH-27d-H	Mechanical – HERS	Mechanical Ventilation – intermittent – total vent rate method
CF2R-MCH-28-H	Mechanical – HERS	Return duct and filter grille design
CF2R-MCH-29-H	Mechanical – HERS	Supply duct surface and R-value
CF2R-MCH-30-H	Mechanical – HERS	Ventilation cooling compliance credit
CF2R-MCH-31-H	Mechanical – HERS	Buried ducts and deeply buried ducts
<b>Form Name</b>	<b>Use</b>	<b>Description</b>
<i>HERS Envelope</i>		
CF3R-ENV-20a-H	Envelope – HERS	Building envelope air leakage – single point with manual meter
CF3R-ENV-20b-H	Envelope – HERS	Building envelope air leakage – single point with automatic meter
CF3R-ENV-20c-H	Envelope – HERS	Building envelope air leakage – Multi point test
CF3R-ENV-20d-H	Envelope – HERS	Building envelope air leakage – repeated point with manual meter
CF3R-ENV-20e-H	Envelope – HERS	Building envelope air leakage – repeated point with automatic meter
CF3R-ENV-21a-H	Envelope – HERS	Quality insulation installation – framing stage – wood frame
CF3R-ENV-21b-H	Envelope – HERS	Quality insulation installation – framing stage – SIP or ICF
CF3R-ENV-22-H	Envelope – HERS	Quality insulation installation – ceiling/roof deck – air filtration sealing
CF3R-ENV-23-H	Envelope – HERS	Quality insulation installation – insulation stage
<i>HERS - Plumbing</i>		
CF3R-PLB-20-H	Plumbing– HERS	Single dwelling unit hot water system distribution
CF3R-PLB-21-H	Plumbing– HERS	Multi-family central hot water system distribution

<i>HERS – Existing Conditions</i>		
CF3R-EXH-20-H	Existing conditioned– HERS	Verify existing conditioned for CF1R-PERF-ALT credit (no CF2R)
<i>HERS Mechanical</i>		
CF3R-MCH-20a-H	Mechanical – HERS	Duct leakage measurement – new system
CF3R-MCH-20b-H	Mechanical – HERS	Duct leakage measurement – low leakage ducts in conditioned space
CF3R-MCH-20c-H	Mechanical – HERS	Duct leakage measurement – low leakage air handling units
CF3R-MCH-20d-H	Mechanical – HERS	Duct leakage measurement – Altered (existing) system
CF3R-MCH-20e-H	Mechanical – HERS	Duct leakage measurement – Sealing of all accessible leaks
CF3R-MCH-21-H	Mechanical – HERS	Duct location verification (directly conditioned space)
CF3R-MCH-22-H	Mechanical – HERS	Forced air system fan efficacy (watt/cfm)
CF3R-MCH-23a-H	Mechanical – HERS	Forced air system airflow rate (cfm/ton) single zone or zonally controlled
CF3R-MCH-23b-H	Mechanical – HERS	Forced air system airflow rate (cfm/ton) zonally controlled
CF3R-MCH-23c-H	Mechanical – HERS	Forced air system airflow rate (cfm/ton) alternative compliance
CF3R-MCH-25a-H	Mechanical – HERS	Refrigerant charge – superheat method
CF3R-MCH-25b-H	Mechanical – HERS	Refrigerant charge – subcooling method
CF3R-MCH-25c-H	Mechanical – HERS	Refrigerant charge – weigh-in procedure
CF3R-MCH-25d-H	Mechanical – HERS	Refrigerant charge – charge indicator display
CF3R-MCH-25e-H	Mechanical – HERS	Refrigerant charge – winter setup
CF3R-MCH-26-H	Mechanical – HERS	Verified EER or SEER
CF3R-MCH-27a-H	Mechanical – HERS	Mechanical Ventilation – continuous – fan vent rate method

CF3R-MCH-27b-H	Mechanical – HERS	Mechanical Ventilation – continuous – total vent rate method
CF3R-MCH-27c-H	Mechanical – HERS	Mechanical Ventilation – intermittent – fan vent rate method
CF3R-MCH-27d-H	Mechanical – HERS	Mechanical Ventilation – intermittent – total vent rate method
CF3R-MCH-28-H	Mechanical – HERS	Return duct and filter grille design
CF3R-MCH-29-H	Mechanical – HERS	Supply duct surface and R-value
CF3R-MCH-30-H	Mechanical – HERS	Ventilation cooling compliance credit
CF3R-MCH-31-H	Mechanical – HERS	Buried ducts and deeply buried ducts

### **Nonresidential**

Form Name	Use	Description
<i>Design Review (NEW)</i>		
NRCC-CXR-01-E	Design Review	Design Review Kickoff (completed at schematic design)
NRCC-CXR-02-E	Design Review	Construction documents - general
NRCC-CXR-03-E	Design Review	Construction documents – simple HVAC systems
NRCC-CXR-04-E	Design Review	Construction documents – complex HVAC systems
NRCC-CXR-05-E	Design Review	Design review signature page (completed at design stage)
<i>Performance Approach</i>		
NRCC-PRF-01	New Construction, addition, alterations, E+A, E+A+A	Performance documentation
<i>Envelope</i>		

NRCC-ENV-01-E	Envelope	Component Approach (prescriptive)
<i>Worksheets – Envelope</i>		
NRCC-ENV-02-E	Envelope	Fenestration worksheet
NRCC-ENV-03-E	Envelope	Cool roof and SRI worksheet
NRCC-ENV-04-E	Envelope	Daylit zone worksheet
NRCC-ENV-06-E	Envelope	Area weighted calculation
<i>Label – Envelope</i>		
NRCC-ENV-05-E	Envelope	Fenestration certificate label
Form Name	Use	Description
<i>Electrical (NEW)</i>		
NRCC-ELC-01-E	Electrical	Disaggregation of electric circuits
<i>Lighting</i>		
NRCC-LTI-01-E	Lighting – interior	Declarations and Field inspection list
NRCC-LTO-01-E	Lighting – outdoor	Declarations and Field inspection list
NRCC-LTO-02-E	Lighting – outdoor	Lighting controls
NRCC-LTO-03-E	Lighting – outdoor	Lighting power allowance
NRCC-LTS-01-E	Lighting – sign	Field inspection list
<i>Worksheets – Indoor lighting</i>		
NRCC-LTI-02-E	Lighting – interior	Lighting controls for credit worksheet



NRCC-LTI-03-E	Lighting – interior	Indoor lighting power allowance - prescriptive
NRCC-LTI-04-E	Lighting – interior	Tailored lighting worksheet
NRCC-LTI-05-E	Lighting – interior	Line voltage track lighting worksheet
<i>Mechanical</i>		
NRCC-MCH-01-E	Mechanical	Declarations and Field inspection list
NRCC-MCH-02-E	Mechanical	Requirements – Dry and wet systems
NRCC-MCH-03-E	Mechanical	Mechanical ventilation and reheat
NRCC-MCH-04-E	Mechanical	Declarations – single zone systems
NRCC-MCH-05-E	Mechanical	Requirements – single zone systems
<i>Worksheets – mechanical (NEW)</i>		
NRCC-MCH-06-E	Mechanical	Max. cycles of concentration worksheet for cooling towers
<i>Plumbing (NEW)</i>		
NRCC-PLB-01-E	Plumbing	Water heating systems
<i>Solar – (NEW)</i>		
NRCC-STH-01-E	Solar – thermal heating	OG-100 worksheet
NRCC-SRA-01-E	Solar – ready area	Solar radiation availability
<i>Worksheets – solar ready (NEW)</i>		
NRCC-SRA-02-E	Solar – ready area	Minimum solar zone area worksheet
Form Name	Use	Description

<i>Process (many are NEW)</i>		
NRCC-PRC-01-E	Process	Covered process
NRCC-PRC-02-E	Process	Garage exhaust
NRCC-PRC-03-E	Process	Commercial kitchens
NRCC-PRC-04-E	Process	Data Centers
NRCC-PRC-05-E	Process	Refrigeration – Performance or prescriptive
NRCC-PRC-06-E	Process	Refrigerated warehouses
NRCC-PRC-07-E	Process	Refrigerated warehouse – 3,000 sf or greater
NRCC-PRC-08-E	Process	Refrigerated warehouse – 3,000 sf or greater and served by same refrigeration system
NRCC-PRC-09-E	Process	Laboratory exhaust
NRCC-PRC-10-E	Process	Compressed air systems
NRCC-PRC-11-E	Process	Process boilers
Form Name	Use	Description
<i>Envelope</i>		
NRCI-ENV-01-E	Envelope	Validation
<i>Electrical (NEW)</i>		
NRCI-ELC-01-E	Electrical	Power distribution
<i>Lighting</i>		
NRCI-LTI-01-E	Lighting – indoor	Validation

NRCI-LTI-02-E	Lighting – indoor	EMCS or lighting control system
NRCI-LTI-03-E	Lighting – indoor	Line voltage or track lighting
NRCI-LTI-04-E	Lighting – indoor	2 interlocked lighting systems
NRCI-LTI-05-E	Lighting – indoor	Power adjustment factor
NRCI-LTI-06-E	Lighting – indoor	Additional videoconference studio lighting
NRCI-LTO-01-E	Lighting – outdoor	Validation
NRCI-LTO-02-E	Lighting – outdoor	EMCS or lighting control system
NRCI-LTS-01-E	Lighting – sign	Validation
<i>Mechanical</i>		
NRCI-MCH-01-E	Mechanical	Validation
<i>Plumbing</i>		
NRCI-PLB-01-E	Plumbing	Water heating systems validation
NRCI-PLB-02-E	Plumbing	Single dwelling unit hot water systems distribution
NRCI-PLB-03-E	Plumbing – non HERS	Multifamily central hot water systems distribution
NRCI-PLB-21-H	Plumbing –HERS	Water heating systems distribution verified by HERS
<i>Process</i>		
NRCI-PRC-01-E	Process	Refrigerated warehouse
<i>Solar</i>		
NRCI-SPV-01-E	Solar – photovoltaic	Validation

NRCI-STH-01-E	Solar – Thermal heating	Validation
<b>Form Name</b>	<b>Use</b>	<b>Description</b>
<i>Envelope</i>		
NRCA-ENV-02-F	Envelope	Fenestration
<i>Lighting</i>		
NRCA-LTI-02-A	Lighting – indoor	Lighting controls
NRCA-LTI-03-A	Lighting – indoor	Automatic daylighting
NRCA-LTI-04-A	Lighting – indoor	Demand responsive lighting controls
NRCA-LTO-02-A	Lighting – outdoor	Motion sensor and lighting shut-off controls
<i>Mechanical</i>		
NRCA-MCH-02-A	Mechanical	Outdoor air
NRCA-MCH-03-A	Mechanical	Constant volume single zone HVAC
NRCA-MCH-04-H	Mechanical	Air distribution duct leakage verified by HERS
NRCA-MCH-05-A	Mechanical	Air economizer controls
NRCA-MCH-06-A	Mechanical	Demand control ventilation controls
NRCA-MCH-07-A	Mechanical	Supply fan variable flow controls
NRCA-MCH-08-A	Mechanical	Valve leakage test
NRCA-MCH-09-F	Mechanical	Supply water temperature reset controls
NRCA-MCH-10-A	Mechanical	Hydronic system variable flow controls
NRCA-MCH-11-A	Mechanical	Automatic demand shed controls
NRCA-MCH-12-F	Mechanical	Fault detection & Diagnostic for DX units
NRCA-MCH-13-F	Mechanical	Fault detection & Diagnostics for air handling and zone terminal units
NRCA-MCH-14-F	Mechanical	Distributed energy storage DX AC systems test
NRCA-MCH-15-F	Mechanical	Thermal energy storage systems
NRCA-MCH-16-F	Mechanical	Supply air temperature reset controls

NRCA-MCH-17-F	Mechanical	Condenser water temperature reset controls
NRCA-MCH-18-F	Mechanical	Energy management control system
<b>Form Name</b>	<b>Use</b>	<b>Description</b>
<i>Process</i>		
NRCA-PRC-01-F	Process	Compressed air
NRCA-PRC-02-F	Process	Commercial kitchen exhaust
NRCA-PRC-03-F	Process	Parking garage exhaust
NRCA-PRC-04-F	Process	Refrigerated warehouse – Evaporator fan motor controls
NRCA-PRC-05-F	Process	Refrigerated warehouse – Evaporative condenser controls
NRCA-PRC-06-F	Process	Refrigerated warehouse – Air cooled condenser controls
NRCA-PRC-07-F	Process	Refrigerated warehouse – variable speed compressor
NRCA-PRC-08-F	Process	Refrigerated warehouse – electric resistance underslab heating
<b>Form Name</b>	<b>Use</b>	<b>Description</b>
<i>Mechanical (NEW)</i>		
NRCV-MCH-04a-H	Mechanical	Duct leakage testing – new system
NRCV-MCH-04c-H	Mechanical	Duct leakage testing – Low leakage air handling units
NRCV-MCH-04d-H	Mechanical	Duct leakage testing – Altered systems
NRCV-MCH-04e-H	Mechanical	Duct leakage testing – Sealing of all accessible leaks
<i>Plumbing (NEW)</i>		

NRCV-PLB-21-H	Plumbing	Verification of domestic hot water distribution (HR multi family central system)
NRCV-PLB-22-H	Plumbing	Verification of domestic hot water distribution (HR single dwelling unit)