

***2008 Residential
Energy Plan Review***

2008 Residential Energy Plan Review Checklist

- ❖ Simplification
- ❖ Clearly identifies what energy features to verify on the plans
- ❖ Guide will be available for additional information



Other Available Checklists

- ❖ 2005 and 2008 Residential Energy Documentation
- ❖ 2005 and 2008 Nonresidential Energy Documentation
- ❖ 2005 Residential Energy Plan Review
- ❖ 2005 and 2008 Nonresidential Energy Plan Review
- ❖ 2005 Nonresidential Alterations



** Inspection Checklists under construction*

Let's Begin! – Using The Checklist

2008 Residential Energy Plan Review Checklist Newly Constructed Buildings

Was the correct compliance software used? (<i>Performance Only</i>)	Yes	No	N/A
CalRes version 2008			
Energy Pro version 5.0			
Micropas version 8.0			
Is the CF-1R Form signed and dated by both the:			
Designer and/or Owner			
Documentation Author			
Is the CF-1R Form filed on the plans?			
Does the building “Comply” according to the CF-1R Form?			
Is the correct Climate Zone listed on the CF-1R Form?			
Does the CF-1R Form have a registration number?			
Is the MF-1R Form filed on the plans?			
DOES THE CF-1R FORM MATCH THE PLANS?			
Conditioned Floor Area for all floor types (i.e. slab on grade, raised floor, etc.)			
Front Orientation of the building			
Envelope			
Insulation for walls, ceilings, and floors (<i>from Reference Joint Appendix JA4</i>)			

Compliance Software

- Verify certified program used (Performance Approach)
- Certified programs for 2005 Standards:
 - Energy Pro (v. 4.1 through 4.4)
 - Micropas (v. 7.0 through 7.3)
- As of January 1, 2010 look for 2008 Certified Programs at:



<http://www.energy.ca.gov/title24/2008standards/>

CF-1R Signatures

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CF-1R Signatures *cont.*

❖ The CF-1R shall be signed by both the:

- Designer and/or Owner
- Documentation Author

➤ Signatures identify responsible parties.

** If both signatures are not on the CF-1R, identify that signatures are required for a permit in the comments for revised plans.*



CF-1R Signatures *cont.*

Documentation Author's Declaration Statement

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

Name:	Signature:	
Company:	Date:	
Address:	If Applicable <input type="checkbox"/> CEA or <input type="checkbox"/> CEPE (Certification #):	
City/State/Zip:	Phone:	

Responsible Building Designer's Declaration Statement

- I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
- I certify that the energy features and performance specifications for the building design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 1 and 6 of the California Code of Regulations.
- The building design features identified on this Certificate of Compliance are consistent with the information provided to document this building design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

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

Filing CF-1R On The Plans

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Filing CF-1R On The Plans *cont.*

- ❖ Recommend incorporating the CF-1R electronically on the plans:
 - Section 10-103 mandates that the CF-1R be filed on the plans.
 - All involved parties (Building Department, Builder, Contractor, etc.) are made aware of the Energy requirements.
 - Ensures CF-1R is not lost in the field for inspection.



Does The Building Comply?

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Does The Building Comply *cont.*

❖ Prescriptive Method

- Values on CF-1R shall be equivalent to or higher than the efficiency values in Section 151.
- Package D requirements listed in Table 151-C (Slide 9)

❖ Performance Method

- Page 1 of CF-1R will state “Building Complies”



- Positive Compliance Margin = Complies
- Negative Compliance Margin = Does Not Comply

Climate Zone

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Climate Zone *cont.*

- ❖ California is divided into 16 Climate Zones.
 - Prescriptive Requirements vary by Climate Zone

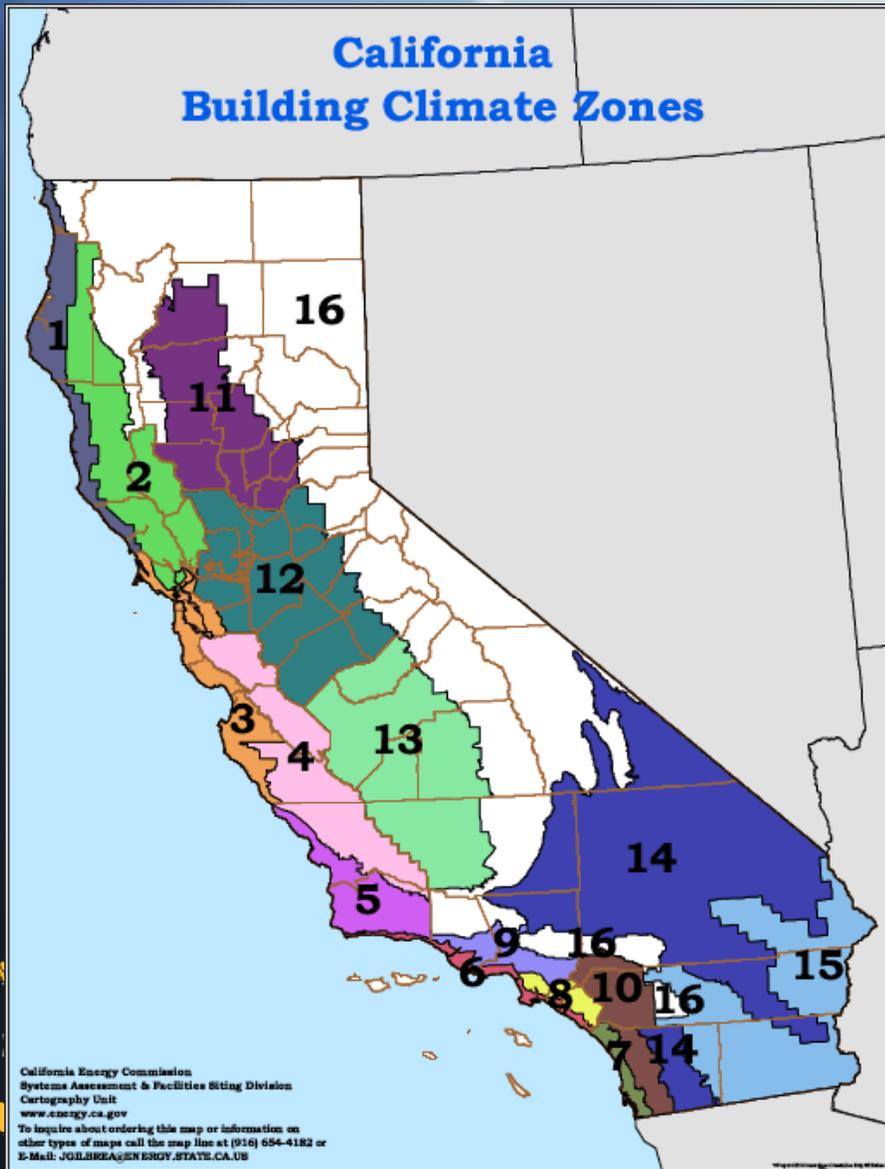
AND

- Standard Energy Budget (Performance):
 - Based on Prescriptive Requirements

** Important that Plans Examiner verifies building is modeled in correct Climate Zone.*



Climate Zone *cont.*



❖ Search your Climate Zone by:

- City
- Zip Code
- Google Earth

http://www.energy.ca.gov/maps/building_climate_zones.html

HERS Registration

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HERS Registration *cont.*

❖ As of January 1, 2010:

- Newly constructed homes facing multiple orientations (Tract Homes)
- Require HERS Verification

❖ As of October 1, 2010:

- Any residential home that requires HERS verification.



* *CF-1R MUST be registered with an approved HERS Provider.*

HERS Registration *cont.*

- The design features represented on this Certificate of Compliance are consistent with the information provided to document this design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Name:	Signature:
Company:	Date:
Address:	License #
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

Registration Number: _____ Registration Date/Time: _____ HERS Provider: _____
2008 Residential Compliance Forms December 2008

MF-1R Form

2008 Residential Energy Plan Review Checklist Newly Constructed Buildings

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MF-1R Form *cont.*

❖ 2008 Version

- No longer a checklist
- A summary of the Mandatory Measures
- Some measures are superseded by more stringent Prescriptive Requirements, and some are not.
- Recommend the MF-1R is filed on the plans along with the CF-1R.



Mandatory Measures Summary

MF-1R

Residential

(Page 1 of 3)

Site Address:

Enforcement Agency:

Date:

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

DESCRIPTION

Building Envelope Measures:

§116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.

§116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).

§117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.

§118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.

§118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.

*§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.

§150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.

*§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.

*§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.

§150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.

§150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.

§150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

§150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.

§150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake which is at least six square inches in area and is equipped

Does The CF-1R Match The Plans?

Does the CF-1R Form have a registration number?			
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DOES THE CF-1R FORM MATCH THE PLANS?			
Conditioned Floor Area for all floor types (i.e. slab on grade, raised floor, etc.)			
Front Orientation of the building			
Envelope			
Insulation for walls, ceilings, and floors (<i>from Reference Joint Appendix JA4</i>)			
Window area and orientation			
U-factor and SHGC values for fenestration (<i>a window schedule required upon Plan Checker's request</i>)			
Exterior shading (i.e. overhangs, fins, exterior shades)			
HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
Pipe Insulation Values (<i>Mandatory Measures</i>)			
Lighting			
All lighting is high efficacy lighting (i.e. fluorescent, LED) or meets applicable alternatives (<i>Mandatory Measures</i>)			
ALL Special Features are verified on the plans and highlighted for the inspector? (i.e. <i>Thermal Mass, Radiant Barrier, Cool Roof</i>)			

Conditioned Floor Area (CFA) *cont.*

- Verify CFA on the CF-1R for all floor types:
 - Total CFA
 - Slab on grade
 - Raised floor
- Should match the CFA on the plans:
 - Title Sheet
 - Floor Plan



CF-1R and Plans *cont.*

❖ CFA *cont.*

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: Single Family Addition
 Multi Family Existing + Add/Alt

Building Front Orientation: (N) 0 deg

Fuel Type: Natural Gas

Fenestration:

Area: 390 ft² Avg. U: 0.34

Ratio: 20.5% Avg. SHGC: 0.33

Total Conditioned Floor Area: 1,906 ft²

Existing Floor Area: n/a ft²

Raised Floor Area: 387 ft²

Slab on Grade Area: 798 ft²

Average Ceiling Height: 8.0 ft

Number of Dwelling Units: 1.00

Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Res HVAC	1,906	15,248	1.00	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Act. Cont.	Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	400	0.035	R-30	R-0.0	0	22	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	02-A10	1st Floor Zone
Wall	Wood	239	0.074	R-19	R-0.0	0	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	09-A5	1st Floor Zone

Front Orientation

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Exterior shading (i.e. overhangs, fins, exterior shades)			
HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
Pipe Insulation Values (<i>Mandatory Measures</i>)			
Lighting			
All lighting is high efficacy lighting (i.e. fluorescent, LED) or meets applicable alternatives (<i>Mandatory Measures</i>)			
ALL Special Features are verified on the plans and highlighted for the inspector? (<i>i.e. Thermal Mass, Radiant Barrier, Cool Roof</i>)			

CF-1R and Plans *cont.*

❖ Front Orientation

- Direction the front of the house is facing
- Verify Front Orientation on CF-1R
- Should match the compass on:



- Title Sheet
- Floor Plan

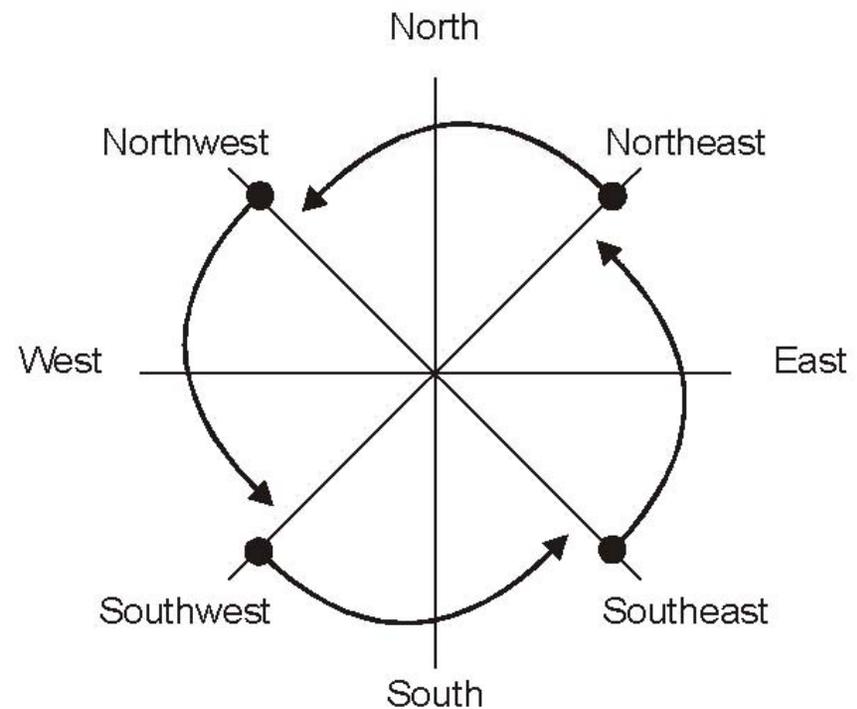


Figure 3-5 – Four Surface Orientations

CF-1R and Plans *cont.*

❖ Front Orientation *cont.*

Building Type: Single Family Addition
 Multi Family Existing + Add/Alt

Building Front Orientation: (N) 0 deg

Fuel Type: Natural Gas

Fenestration:

Area: 390 ft² **Avg. U:** 0.34
Ratio: 20.5% **Avg. SHGC:** 0.33

Total Conditioned Floor Area: 1,906 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 387 ft²
Slab on Grade Area: 798 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Hgt.	Vent Area
Res HVAC	1,906	15,248	1.00	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Cont.	Act. Azm.	Tilt	Gains Y / N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	400	0.035	R-30	R-0.0	0	22	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	02-A10	1st Floor Zone
Wall	Wood	239	0.074	R-19	R-0.0	0	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	09-A5	1st Floor Zone
Door	None	21	1.450	None	R-0.0	0	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	28-A1	1st Floor Zone
Wall	Wood	200	0.074	R-19	R-0.0	90	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	09-A5	1st Floor Zone
Wall	Wood	231	0.074	R-19	R-0.0	180	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	09-A5	1st Floor Zone
Door	None	17	1.450	None	R-0.0	180	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	28-A1	1st Floor Zone
Wall	Wood	208	0.074	R-19	R-0.0	270	90	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	09-A5	1st Floor Zone
Roof	Wood	800	0.035	R-30	R-0.0	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/> New	02-A10	2nd Floor Zone
Floor	Wood	387	0.048	R-19	R-0.0	0	180	<input type="checkbox"/>	<input checked="" type="checkbox"/> New	21-A4	2nd Floor Zone

Envelope – Insulation

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CF-1R and Plans *cont.*

❖ Envelope

- Verify Insulation Values on CF-1R:
 - Walls
 - Ceiling
 - Floors
- Should match insulation values on the plans:
 - Cross Section
 - Architecture/Structure Details



Fenestration Areas and Efficiencies

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CF-1R and Plans (Envelope) *cont.*

- ❖ Fenestration (windows)
 - Verify on CF-1R:
 - Area
 - Orientation
 - U-factor and SHGC
 - Should match the plans:
 - Usually verified on the Floor Plan
 - Window schedule



CF-1R and Plans (Envelope) *cont.*

❖ Sample Window Schedule

Window Schedule

Orientation	Area (ft ²)	U-factor	SHGC
West	15.0	.36	.31
West	15.0	.36	.31
West	15.0	.36	.30
West	20.0	.36	.30
West	13.0	.36	.30
North	20.0	.36	.31
North	15.0	.36	.31
North	20.0	.36	.31
North	25.0	.36	.30
East	80.0	.36	.31
East	24.0	.36	.30
South	70.0	.36	.30
South	60.0	.36	.31

Exterior Shading

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CF-1R and Plans (Envelope) *cont.*

❖ Fenestration *cont.*

- Also verify on CF-1R Exterior Shading:
 - Overhangs (usually roof tops modeled)
 - Fins
 - Exterior Shades
- Overhangs that extend beyond 4 ft shall:
 - Detail dimensions in a window schedule



CF-1R and Plans (Envelope) *cont.*

❖ Fenestration *cont.*

- Interior and Exterior Shading on CF-1R

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window		Overhang				Left Fin			Right Fin		
			Hgt.	Wd.	Len.	Hgt.	LExt.	RExt.	Dist.	Len.	Hgt.	Dist.	Len.	Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76	3.0	2.0	2.0	0.5	4.0	4.0						
4	Bug Screen	0.76	3.0	2.0	2.0	0.5	4.0	4.0						
5	Bug Screen	0.76	5.0	3.0	2.0	0.5	2.0	2.0						
6	Bug Screen	0.76	5.0	3.0	2.0	0.5	2.0	2.0						
7	Bug Screen	0.76	5.0	3.0	2.0	0.5	2.0	2.0						
8	Bug Screen	0.76												
9	Bug Screen	0.76												
10	Bug Screen	0.76												
11	Bug Screen	0.76												
12	Bug Screen	0.76												
13	Bug Screen	0.76												
14	Bug Screen	0.76	5.0	5.0	6.0	0.1	5.0	5.0						
15	Bug Screen	0.76												
16	Bug Screen	0.76	6.0	5.0	6.0	0.1	5.0	5.0						
17	Bug Screen	0.76												
18	Bug Screen	0.76												
19	Bug Screen	0.76	5.0	4.0	6.0	0.1	5.0	5.0						

CF-1R and Plans (Envelope) *cont.*

Orientation	Area (ft ²)	U-factor	SHGC	Ext. Shading Device	Len.	Hgt.	Left.	Right.
North	15.0	.39	.29					
North	15.0	.39	.29					
North	6.0	.39	.29					
North	6.0	.39	.29					
West	15.0	.39	.30					
West	25.0	.45	.38					
West	15.0	.39	.29					
West	25.0	.45	.38					
West	20.0	.45	.38					
South	25.0	.45	.38	Overhang	6.0	0.1	5.0	5.0
South	30.0	.39	.29	Overhang	6.0	0.1	5.0	5.0
South	20.0	.45	.38	Overhang	6.0	0.1	5.0	5.0
South	25.0	.45	.38					

Length = distance device extends out from window

Height = distance from top of window to device

Left Extension = distance extends past left side of window

Right Extension = distance extends past right side of window



HVAC Efficiencies and Ducting

Does the CF-1R Form have a registration number?			
Is the MF-1R Form filed on the plans?			
DOES THE CF-1R FORM MATCH THE PLANS?			
Conditioned Floor Area for all floor types (i.e. slab on grade, raised floor, etc.)			
Front Orientation of the building			
Envelope			
Insulation for walls, ceilings, and floors (<i>from Reference Joint Appendix JA4</i>)			
Window area and orientation			
U-factor and SHGC values for fenestration (<i>a window schedule required upon Plan Checker's request</i>)			
Exterior shading (i.e. overhangs, fins, exterior shades)			
HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
Pipe Insulation Values (<i>Mandatory Measures</i>)			
Lighting			
All lighting is high efficacy lighting (i.e. fluorescent, LED) or meets applicable alternatives (<i>Mandatory Measures</i>)			
ALL Special Features are verified on the plans and highlighted for the inspector? (<i>i.e. Thermal Mass, Radiant Barrier, Cool Roof</i>)			

CF-1R and Plans *cont.*

❖ HVAC

- Verify Equipment Efficiencies on CF-1R:
 - SEER for A/C (sometime EER)
 - AFUE for Furnace
 - HSPF for Heat Pumps

AND

- Duct Insulation

- Should match the plans:

- Mechanical Schedule



CF-1R and Plans *cont.*

❖ HVAC *cont.*

- HVAC Systems and Distribution on CF-1R

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Res HVAC	Central Furnace	80% AFUE	Split Air Conditioner	15.0 SEER	New	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Res HVAC	Ducted	Ducted	Crawlspace	6.0	New	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

CF-1R and Plans *cont.*

❖ HVAC *cont.*

- Sample Mechanical Schedule

Mechanical Schedule

Equipment	Type	Minimum Efficiency	Duct R-value
Heating	Central Furnace	80% AFUE	R-6
Cooling	Split A/C	15.0 SEER	R-6



Ventilation – ASHRAE 62.2

Does the CF-1R Form have a registration number?			
Is the MF-1R Form filed on the plans?			
DOES THE CF-1R FORM MATCH THE PLANS?			
Conditioned Floor Area for all floor types (i.e. slab on grade, raised floor, etc.)			
Front Orientation of the building			
Envelope			
Insulation for walls, ceilings, and floors (<i>from Reference Joint Appendix JA4</i>)			
Window area and orientation			
U-factor and SHGC values for fenestration (<i>a window schedule required upon Plan Checker's request</i>)			
Exterior shading (i.e. overhangs, fins, exterior shades)			
HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
Pipe Insulation Values (<i>Mandatory Measures</i>)			
Lighting			
All lighting is high efficacy lighting (i.e. fluorescent, LED) or meets applicable alternatives (<i>Mandatory Measures</i>)			
ALL Special Features are verified on the plans and highlighted for the inspector? (<i>i.e. Thermal Mass, Radiant Barrier, Cool Roof</i>)			

CF-1R and Plans *cont.*

❖ HVAC *cont.*

• Ventilation

- Mandatory Measure [§150(o)]

- Meet ASHRAE Standard 62.2 – Ventilation and Acceptable Indoor Air Quality

- Local Ventilation Exhaust

- 50 cfm exhaust fan in each bathroom

- 100 cfm exhaust fan in the kitchen

- Whole Building Ventilation

- 1 exhaust fan shall be sized to provide cfm ventilation for the entire house

- * *Ducting for all exhaust fans must be properly sized (diameter and length) according to tables in ASHRAE Standard 62.2.*



CF-1R and Plans *cont.*

❖ HVAC *cont.*

- Ventilation

- Plans shall identify:

- Exhaust fan in each bathroom

- Exhaust fan in the kitchen

- The properly sized ducting and cfm of the fan that will provide whole building ventilation

* *Examples can be found in the Residential Guide.*



CF-1R and Plans *cont.*

❖ HVAC *cont.*

- Ventilation

- Whole Building Ventilation Equation:

$$Q_{fan} = 0.01(A_{floor}) + 7.5 (N_{br} + 1)$$

Q_{fan} = required ventilation (cfm)

A_{floor} = conditioned floor area (ft²)

N_{br} = number of bedrooms (cannot be less than 1)

- Example (2,500 ft² home with 5 bedrooms)

$$Q_{fan} = 0.01(2,500) + 7.5(5 + 1)$$

$$Q_{fan} = 70 \text{ cfm}$$



Water Heater Efficiencies and Type

Does the CF-1R Form have a registration number?			
Is the MF-1R Form filed on the plans?			
DOES THE CF-1R FORM MATCH THE PLANS?			
Conditioned Floor Area for all floor types (i.e. slab on grade, raised floor, etc.)			
Front Orientation of the building			
Envelope			
Insulation for walls, ceilings, and floors (<i>from Reference Joint Appendix JA4</i>)			
Window area and orientation			
U-factor and SHGC values for fenestration (<i>a window schedule required upon Plan Checker's request</i>)			
Exterior shading (i.e. overhangs, fins, exterior shades)			
HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
Pipe Insulation Values (<i>Mandatory Measures</i>)			
Lighting			
All lighting is high efficacy lighting (i.e. fluorescent, LED) or meets applicable alternatives (<i>Mandatory Measures</i>)			
ALL Special Features are verified on the plans and highlighted for the inspector? (i.e. Thermal Mass, Radiant Barrier, Cool Roof)			

CF-1R and Plans *cont.*

❖ Water Heating

- Verify Equipment Efficiencies on CF-1R:
 - Small Storage Water Heater (75,000 Btu/hr or less)
 - Energy Factor
 - Tank Volume (gallons)
 - If required, Tank Insulation (Energy factor below .58)
 - Large Storage Water Heater (greater than 75,000 Btu/hr)
 - Thermal Efficiency
 - Standby Loss
 - Tank Volume (gallons)



CF-1R and Plans *cont.*

❖ Water Heating *cont.*

- Also need to verify on the CF-1R:

- Type of Water Heater

- Storage (Small or Large)

- Instantaneous

- Distribution Type (piping)

- Standard/No Pipe Insulation

- Recirculating

- Compliance Credit – All Pipes Insulation, Kitchen Pipe, etc.

** All specifications and credits for the water heater shall be detailed in a water heating schedule on the plans.*



CF-1R and Plans *cont.*

❖ Water Heating *cont.*

- Water Heating Systems on CF-1R

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Standard Gas 50 gal or Less	Small Gas	No Pipe Insulation	1	40,000	50	New	0.57	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump			Hot Water Piping Length (ft)			Add 1/2" Insulation
	#	HP	Type	In Plenum	Outside	Buried	



CF-1R and Plans *cont.*

❖ Water Heater Schedule Sample

Water Heater Schedule 4

Type	Distribution	Rated Input	Tank Cap.	Energy Factor/TE	Insulation
Small Gas	Standard	40,000 btu/hr	50 gallons	.57	R-12

* When “Standard” or “No Pipe Insulation” is modeled, this means piping shall be insulated according to Section 150(j); no credit is taken.



Lighting

HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
Pipe Insulation Values (<i>Mandatory Measures</i>)			
Lighting			
All lighting is high efficacy lighting (i.e. fluorescent, LED) or meets applicable alternatives (<i>Mandatory Measures</i>)			
ALL Special Features are verified on the plans and highlighted for the inspector? (<i>i.e. Thermal Mass, Radiant Barrier, Cool Roof</i>)			
ALL HERS Measures are verified on the plans and highlighted for the inspector? [<i>i.e. Duct Leakage, Refrigerant Charge, Airflow (Fan Flow) and Watt Draw</i>]			

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CF-1R and Plans *cont.*

❖ Lighting

- Mandatory Measures §150(k)
- Requirements detailed on the MF-1R Form
- High efficacy lighting or alternative controls shall be specified on the electrical plans:
 - Will usually include a lighting key
 - 2008 plans may now include LED or GU-24 lighting



CF-1R and Plans *cont.*

❖ Lighting *cont.*

- Exceptions

- Kitchen

- 50% of total installed rated wattage may be low-efficiency

- Bathrooms, Garages, Laundry Rooms, Closets, and Utility Rooms

- Low-efficiency lighting is controlled by a manual-on occupant sensor

- Closets less than 70 ft² are exempt

- All other lighting (Bedrooms, Hallways, Living Room, etc.)

- Low-efficiency lighting is controlled by a manual-on occupant sensor,

OR

- A dimmer switch



CF-1R and Plans *cont.*

❖ Lighting *cont.*

- 2008 Requirements:

- Low-efficacy lighting and High-efficacy lighting shall be switched separately throughout the entire house.
- Exhaust fans shall be separately switched from the lighting.
- Internal cabinet lighting in kitchens shall not exceed 20 watts per linear foot.



CF-1R and Plans *cont.*

❖ Lighting *cont.*

- Outdoor Lighting

- Must be high-efficacy lighting
- Low-efficacy lighting allowed if controlled by:

1. A motion sensor, and
2. At least one of the following controls:
 - Photo-control
 - Astronomical Time Clock
 - Energy Management Control System

* *Outdoor lighting shall be specified on the plans in the same manner as indoor lighting.*



Special Features

HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
Efficiency and Type of Water Heating/Boiler equipment (i.e. storage, instantaneous, etc.)			
Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
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February 25, 2009

CF-1R and Plans *cont.*

❖ Special Features

- Verify on the CF-1R:
 - If there are any Special Features modeled
 - Identify installation criteria for the Special feature
- The installation criteria of the special feature shall be identified on the appropriate section of the plans:
 - Cool Roof
 - Radiant Barrier



Include “call out” or footnote on the Cross Section

CF-1R and Plans *cont.*

❖ Special Features *cont.*

- Sample Footnote

Footnote shall be included on Structure or Architecture plans to specify for the roof:

A “Cool Roof” material shall be installed that is certified to the Cool Roof Rating Council (CRRC) with a Aged Solar Reflectance of 0.30 and a Thermal Emittance of 0.75



Special Features

HVAC			
Efficiencies of HVAC equipment			
Duct Insulation			
Indoor Air Quality and Mechanical Ventilation (<i>Mandatory Measures</i>)			
Water Heating			
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Distribution Type (i.e. recirculating, standard, pipe insulation credit, etc.)			
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CF-1R and Plans *cont.*

❖ HERS Measures

- Verify on the CF-1R:

- If there are any HERS Measures modeled:

- Refrigerant Charge

- Duct Sealing

- Quality Installation of Insulation (QII)

- Plans Examiner should inform the Inspector that HERS Verification is required on the plans:

- Use a Stamp

- Circle In Red

- Highlight



For More Information

❖ **Energy Standards Website:**

www.energy.ca.gov/title24

❖ **Energy Standards Hotline:**

- 1 (800) 772-3300 (Public)
- (916) 654-5106 (Outside of CA)

title24@energy.state.ca.us

