



Energy Package D for Residential Additions & Alterations for Zone 12

July 2004 (Rev. June 2004, October 2005, March 2009)

Certificate of Compliance for Residential Additions 101 to 1,000 Ft² CF-1R

Project Title (print)	Date
Project Address	Building Permit No.
Total Conditioned Floor Area for Addition (Ft ²)	Total Glazing Area for Addition (Ft ²)

Requirements that apply to New Area for Building Shell Insulation

COMPONENT	TYPE: BATT OR BLOWN (CHECK ONE)	R-VALUE MINIMUM
Ceiling		R-38
Wood-Frame Walls		R-13
Raised Floor		R-19
Ducting		R-6

Compliance is required via either "Package D" or "Alternative Package D" (**check one**):

PREFERRED PACKAGE D	<input type="checkbox"/> PACKAGE D ¹	<input type="checkbox"/> ALTERNATIVE PACKAGE D ²
Maximum Solar Heat Gain Coefficient (SHGC)	0.40	0.31
Fenestration U-factor	0.57	0.38
Thermostatic Expansion Valve (TXV)	Yes	No
* Duct Sealing	Yes	No ³
* Radiant Barrier (emittance 0.05 or less) ⁴	Yes	Yes

Footnotes:

* Installer testing and certification and HERS Rater field verification required. HERS rater is an Energy Commission-approved person able to perform the necessary field verification and diagnostic testing required for demonstrating compliance with the standards.

¹ Space conditioning equipment installed can only serve the addition.

² The Alternative Package D cannot be used for projects that involve alterations to the "existing" building equipment. Also, for **alternatives** to duct sealing & refrigerant charge measurement, see HVAC Systems, page 2.

³ Testing for refrigerant charge not required if cooling equipment has a min. 13 SEER.

⁴ The radiant barrier requirement applies to the roof area of the addition. Refer to illustration on page 5 for allowed installation methods.

A. <input style="width: 100px; height: 20px;" type="text"/> Ft ² Total glass in Addition	B. <input style="width: 100px; height: 20px;" type="text"/> Ft ² Total of any removed (Addition Area)	C. <input style="width: 100px; height: 20px;" type="text"/> Ft ² Subtract B from A, enter amount in C	D. <input style="width: 100px; height: 20px;" type="text"/> % Divide C by Floor Area of Addition x 100
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Maximum 20% Glazing Allowed

E. **West Facing Glass Max. 5% Allowed**
 (Divide floor area of addition or alteration by the total of west facing glazing)

NEW HEATING, COOLING, OR DOMESTIC WATER HEATING

Systems installed in conjunction with the addition must comply with the appliance standards applicable to new installations in new residences. Complete the following standards if new equipment is being installed in conjunction with the room addition, OR if using the existing equipment, provide information to verify the adequacy of its heating capacity:

HVAC SYSTEMS				
HEATING EQUIPMENT TYPE & CAPACITY ¹ (FURNACE, HEAT PUMP, BOILER, ETC.)	MINIMUM EFFICIENCY ² (AFUE OR HSPF)	DISTRIBUTION TYPE & LOCATION (DUCTS, ATTIC, ETC.)	OUTPUT (BTUH)	MANUF/ MODEL NO. & CONFIGURATION (SPLIT OR PACKAGE)
COOLING EQUIPMENT TYPE & CAPACITY ¹ (A/C, HEAT PUMP, EVAP. COOLING)	MINIMUM EFFICIENCY (SEER OR EER)	DISTRIBUTION TYPE & LOCATION (ATTIC, ETC.)	OUTPUT (BTUH)	MANUF/ MODEL NO. & CONFIGURATION (SPLIT OR PACKAGE)

Footnotes:

¹ As of January 23, 2006, split system A/C's with single-phase power must have a minimum 13 SEER; single-phase heat pump requires a minimum of 13 SEER and 7.7 HSPF.

² In lieu of duct sealing and possibly refrigerant charge measurement, the following may be used as an option (check one):

Option 1: Requires efficiency upgrade of a furnace only - appliance must have an AFUE of 0.92.

Option 2: Requires efficiency upgrade on the cooling side of equipment only – installation of SEER-14 & EER-12 equipment; plus TXV; plus increased duct insulation (R-4 on existing ducts; R-8 for new ducts).

Option 3: Requires efficiency upgrade in both heating & cooling equipment – installation of SEER-14 & EER-12 equipment; plus TXV; plus either 0.92 AFUE (or 0.82 AFUE with increased duct insulation (R-4 on existing ducts; R-8 for new ducts)). Note: Package systems may use Option 2 or 3 without meeting the requirement for a TXV (or refrigerant charge measurement).

HOT WATER SYSTEMS			
SYSTEM TYPE (STORAGE GAS, ETC.)	TYPE CAPACITY	MANUFACTURER / MODEL NO. (OR APPROVED EQUAL)	SPECIAL FEATURE(S)

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

DESIGNER OR BUILDING OWNER	DOCUMENTATION AUTHOR	ENFORCEMENT AGENCY
Name (print)	Name (print)	Name (print)
Title / Firm	Title / Firm	Title / Agency
Address / Phone No.	Address / Phone No.	Address / Phone No.

(Signature / License #) *(Date)* *(Signature)* *(Date)* *(Signature)* *(Date)*

MANDATORY MEASURES CHECKLIST: RESIDENTIAL

MF-1R

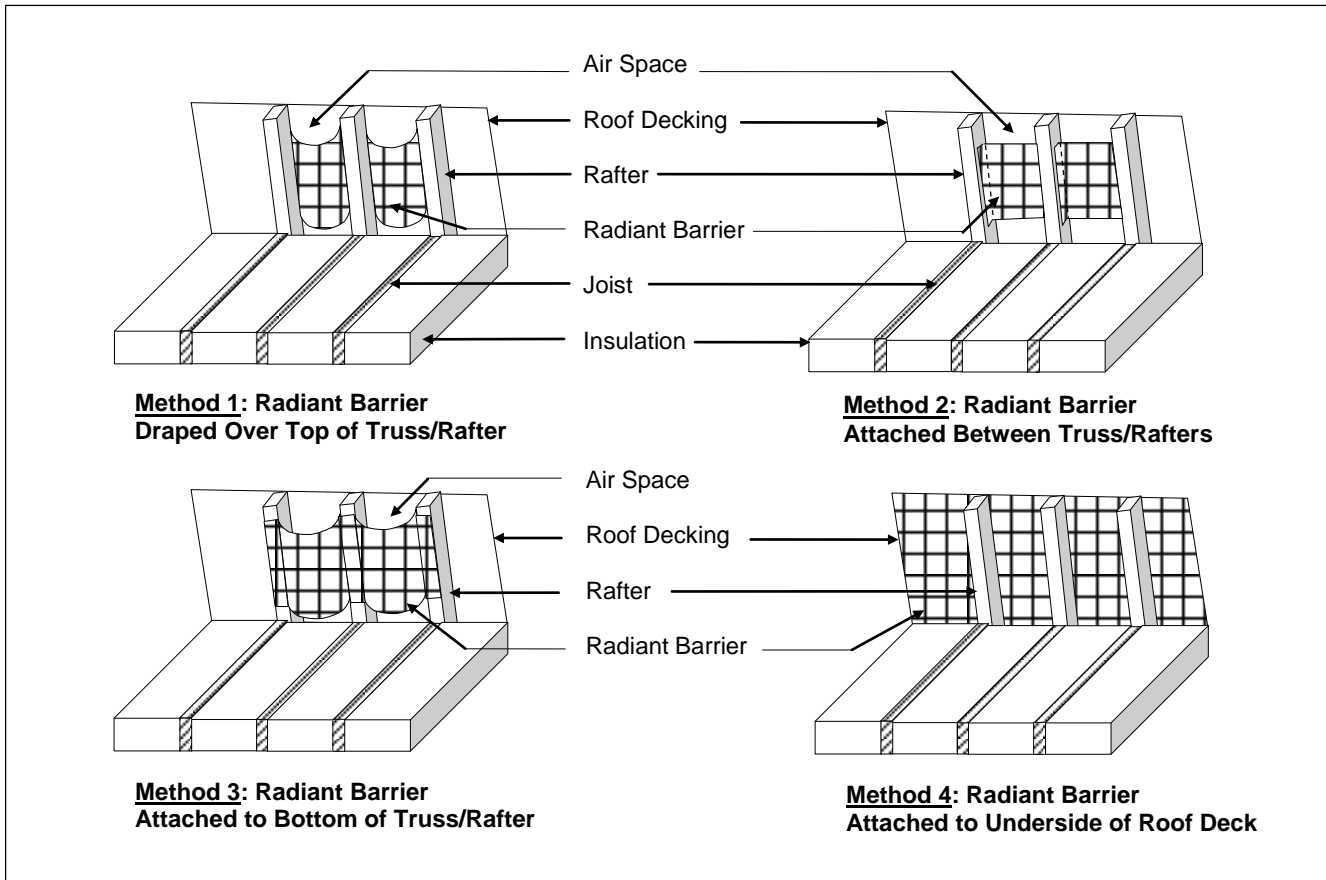
Note: Low-rise residential buildings subject to the Standards must contain these measures regardless of the compliance approach used. More stringent compliance requirements from the Certificate of Compliance supersede the items marked with an asterisk (*) below. When this checklist is incorporated into the permit documents, the features noted shall be considered by all parties as minimum component performance specifications for the mandatory measures whether they are shown elsewhere in the documents or on this checklist only.

Instructions: Check or initial applicable boxes when completed or check N/A if not applicable.

DESCRIPTION	Designer	Enforcement
Building Envelope Measures:		
* §150(a): Minimum R-19 in wood frame ceiling insulation or equivalent U-factor in metal frame ceiling.		
§150(b): Loose fill insulation manufacturer’s labeled R-Value: _____.		
* §150(c): Minimum R-13 wall insulation in wood framed walls or equivalent U-factor in metal frame walls (does not apply to exterior mass walls).		
* §150(d): Minimum R-13 raised floor insulation in framed floors or equivalent U-factor.		
§150(e): Installation of Fireplaces, Decorative Gas Appliances and Gas Logs. 1. Masonry and factory-built fireplaces have: a. Closeable metal or glass door covering the entire opening of the firebox b. Outside air intake with damper and control 2. No continuous burning gas pilot lights allowed.		
§150(f): Air retarding wrap installed to comply with §151 meets requirements specified in the ACM Residential Manual.		
§150(g): Vapor barriers mandatory in Climate Zones 14 and 16 only.		
§150(l): Slab edge insulation - water absorption rate for the insulation material alone without facings no greater than 0.3%, water vapor permeance rate no greater than 2.0 perm/inch.		
§118: Insulation specified or installed meets insulation quality standards. Indicate type and include CF-6R Form: _____.		
§116-17: Fenestration Products, Exterior Doors, and Infiltration/Ex-filtration Controls 1. Doors and windows between conditioned and unconditioned spaces designed to limit air leakage. 2. Fenestration products (except field-fabricated) have label with certified U-factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration certification. 3. Exterior doors and windows weather-stripped; all joints and penetrations caulked and sealed.		
Space Conditioning, Water Heating and Plumbing System Measures:		
§110-§113: HVAC equipment, water heaters, showerheads and faucets Certified by the Energy Commission.		
§150(h): Heating and/or cooling loads calculated in accordance with ASHRAE, SMACNA or ACCA.		
§150(i): Setback thermostat on all applicable heating and/or cooling systems.		
§150(j): Pipe and tank insulation and cooling systems line insulation. 1. Storage gas water heaters rated with an Energy Factor less than 0.58 must be externally wrapped with insulation having an installed thermal resistance of R-12 or greater. 2. Back-up tanks for solar system, unfired storage tanks, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation and indicated on the exterior of the tank showing the R-value. 3. The following piping is insulated according to Table 150-A/B or Equation 150-A Insulation Thickness: a. First 5 feet of pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes shall be insulated to Table 150-B. b. Cooling system piping (suction, chilled water, or brine lines), piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A. 4. Steam hydronic heating systems or hot water systems >15 psi, meet requirements of Table 123-A. 5. Insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. 6. Insulation for chilled water piping and refrigerant suction piping includes a vapor retardant or is 7. Solar water-heating systems/collectors are certified by the Solar Rating and Certification Corporation.		
* §150(m): Ducts and Fans 1. All ducts and plenums installed, sealed to meet the requirement of the CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-6 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than ¼ inch, the combination of mastic and either mesh or tape shall be used. Building cavities shall not be used for conveying conditioned air. 2. Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts. 3. Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands. 4. Exhaust fan systems have back draft or automatic dampers. 5. Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers. 6. Protection of Insulation. Insulation shall be protected from damage, including that due to sunlight,		

moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material. 7. Flexible ducts cannot have porous inner cores.		
§114: Pool and Spa Heating Systems and Equipment. 1. A thermal efficiency that complies with the Appliance Efficiency Regulations, on-off switch, mounted outside of the heater, weatherproof operating instructions, no electric resistance heating and no pilot light. 2. System is installed with: a. At least 36" of pipe between filter and heater for future solar heating b. Cover for outdoor pools or outdoor spas 3. Pool system has directional inlets and a circulation pump time switch..		
§115: Gas fired fan-type central furnaces, pool heaters, spa heaters or household cooking appliances have no continuously burning pilot light. (Exception: Non-electrical cooking appliances with pilot < 150 Btu/hr).		
§118(i): Cool Roof material meets specified criteria.		
Residential Lighting Measures:		
§150(k)1: HIGH EFFICACY LUMINAIRES OTHER THAN OUTDOOR HID: contain only high efficacy lamp as outlined in Table 150-C, and do not contain a medium screw base socket (E24/E26). Ballast for lamps 13 watts or greater are electronic and have an output frequency no less than 20 kHz.		
§150(k)1: HIGH EFFICACY LUMINAIRES OUTDOOR HID: contain only high efficacy lamps as outlined in Table 150-C, luminaire has factory installed HID ballast.		
§150(k)2: Permanently installed luminaires in kitchens shall be high efficacy luminaires. Up to 50 percent of the wattage, as determined in §130(c), of permanently installed luminaires in kitchens may be in luminaires that are not high efficacy luminaires, provided that these luminaires are controlled by switches separate from those controlling the high efficacy luminaires.		
§150(k)3: Permanently installed luminaires in bathrooms, garages, laundry rooms and utility rooms shall be high efficacy luminaries; OR are controlled by an occupant sensor(s) certified to comply with Section 119(d) that does not turn on automatically or have an always on option.		
§150(k)4: Permanently installed luminaires located in all other rooms shall be high efficacy luminaires (except closets less than 70ft ²); OR are controlled by a dimmer switch; OR are controlled by an occupant sensor that complies with Section 119(d) that does not turn on automatically or have an always on option.		
§150(k)5: Luminaires that are recessed into insulated ceilings are approved for zero clearance insulation cover (IC) and are certified airtight to ASTM E283 and labeled as air tight (AT) to less than 2.0 CFM at 75 Pascals.		
§150(k)6: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires (not including lighting around swimming pools/water features or other Article 680 locations); OR are controlled by occupant sensors with integral photo control certified to comply with Section 119(d).		

RADIANT BARRIER: INSTALLATION METHODS



What is a radiant barrier?

A Radiant Barrier is required for roofs in climate zone 12 (Elk Grove). The radiant barrier is a reflective material that reduces radiant heat transfer caused by solar heat gain to the roof. This reduces the radiant gain to ducts and insulation located below the radiant barrier.

What are the requirements for installation?

Radiant barriers must be installed as follows:

- The emittance must be no less than or equal to 0.05, as tested in accordance with ASTM C-1371-98 or ASTM E408-71 (1996)e1.
- Installed securely in a permanent manner with the shiny side facing down toward the attic floor.
- Installed in any of the following methods as illustrated above, with the material:
 1. Draped over the truss/rafter (the top chords) before the upper roof decking is installed.
 2. Spanning between the truss/rafters (top chords) and secured (stapled) to each side.
 3. Secured (stapled) to bottom surface of truss/rafter (top chord). Maintain a 1.5-in min. air space between the top surface of radiant barrier and roof decking at center of the truss/rafter span.
 4. Attached (laminated) directly to underside of the roof decking. The radiant barrier must be laminated and perforated by the manufacturer to allow moisture/vapor transfer through the roof deck.
- Cover all gable end walls and other vertical surfaces in attic. The attic must be ventilated to:
 1. Conform to manufacturer's instructions (if applicable).
 2. Maintain free ventilation (min. of not less than one sq. ft. of vent area for each 150 sq. ft. of attic floor area).
 3. Provide no less than 30% upper vents. (Ridge vents or gable end vents are recommended to achieve the best performance. Material should be cut to allow for full air flow to the venting).
- Provide a 3.5-in min. gap between bottom of radiant barrier and top of ceiling insulation to allow for air flow ventilation.
- Have a 6-in min. left at the roof peak (measured horizontally) to allow hot air to escape.
- When installed in enclosed rafter spaces where ceilings are applied directly to the underside of roof rafters (i.e., cathedral ceilings), allow a 1-in min. air space between barrier and top of ceiling insulation; provide ventilation for every rafter space. Vents must be provided at both the upper and lower ends of the enclosed rafter space, see Methods 1 & 4.