

| CERTIFICATE OF COMPLIANCE: RESIDENTIAL | | (Page 1 of 5) | CF-1R |
|---|--------------|-----------------------------|--------------|
| Project Title | Date | Building Permit # | |
| Project Address | | | |
| | | Plan Check / Date | |
| Documentation Author | Telephone | Field Check / Date | |
| Compliance Method (Prescriptive) | Climate Zone | | |
| | | Enforcement Agency Use Only | |

Alternative Component Package Method: (check one) _____ C _____ D _____ D (Alternative)
 • Package C and Package D choices require HERS rater field verification and/or diagnostic testing (see CF-1R page 3)
 For Package D Alternative see Appendix B Table 151-C Footnotes 7-14

GENERAL INFORMATION

Total Conditioned Floor Area (CFA) _____ ft²

Average Ceiling Height: _____ ft

Maximum Allowed West Facing Fenestration Products Per Table 151-B or 151-C ---- (5% X CFA) _____ ft²

Maximum Allowed Total Fenestration Products Per Table 151-B or 151-C ----(20% X CFA) _____ ft²

Building Type: (check one or more) _____ Single Family _____ Multifamily _____ Addition _____ Alteration
 (If adding fenestration fill out WS-4R, Fenestration Maximum Allowed Area Worksheet and see Section 8.3.2 for Additions and 8.3.3 for Alterations.)

Number of Stories: _____ Number of Dwelling Units: _____

Floor Construction Type: _____ Slab/Raised Floor (circle one or both)

Front Orientation: _____ North / South / East / West / All Orientations (input front orientation in degrees from True North and circle one).

RADIANT BARRIER (required in climate zones 2, 4, 8-15)

OPAQUE SURFACES INCLUDING OPAQUE DOORS

| Component Type (Wall, Roof, Floor, Slab Edge, Doors) | Frame Type (Wood or Metal) | Cavity Insulation R-Value | Continuous Insulation R-Value | Assembly U-factor (for wood, metal frame and mass assemblies) ¹ | Joint Appendix IV Reference | Roof Radiant Barrier Installed Yes or No | Location Comments (attic, garage, typical, etc.) |
|--|----------------------------|---------------------------|-------------------------------|--|-----------------------------|--|--|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

1) See Joint Appendix IV in Section IV.2, IV.3 and IV.4, which is the basis for the U-factor criterion. U-factors can not exceed prescriptive value to show equivalence to R-values.

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| | |
|----------------------|-------------|
| <i>Project Title</i> | <i>Date</i> |
| | |

FENESTRATION PRODUCTS – U-FACTOR AND SHGC

✓ FENESTRATION MAXIMUM ALLOWED AREA WORKSHEET WS-4R –must be included for New Construction, Additions and Alterations.

| Fenestration #/Type/Pos. (Front, Left, Rear, Right, Skylight) | Orientation, N, S, E, W ¹ | Area (ft ²) | U-factor ² | U-factor Source ³ | SHGC ⁴ | SHGC Source ⁵ | Exterior Shading/Overhangs ^{6,7} ✓ box if WS-3R is included |
|---|--------------------------------------|-------------------------|-----------------------|------------------------------|-------------------|--------------------------|---|
| | | | | | | | <input type="checkbox"/> |
| | | | | | | | <input type="checkbox"/> |
| | | | | | | | <input type="checkbox"/> |
| | | | | | | | <input type="checkbox"/> |
| | | | | | | | <input type="checkbox"/> |
| | | | | | | | <input type="checkbox"/> |
| | | | | | | | <input type="checkbox"/> |

- 1) Skylights are now included in West-facing fenestration area if the skylights are tilted to the west or tilted in any direction when the pitch is less than 1:12. See §151(f)3C and in Section 3.2.3 of the Residential Manual
- 2) Enter values in this column are either NFRC Rated value or from Standards default Table 116A.
- 3) Indicate source either from NFRC or Table 116A,
- 4) Enter values in this column from NFRC or from Standards Default Table 116B or adjusted SHGC from WS-3R.
- 5) Indicate source either from NFRC or Table 116B.
- 6) Shading Devices are defined in Table 3-3 in the Residential Manual and see WS-3R to calculate Exterior Shading devices.
- 7) See Section 3.2.4 in the Residential Manual.

HVAC SYSTEMS

| Heating Equipment Type and Capacity (furnace, heat pump, boiler, etc.) | Minimum Efficiency (AFUE or HSPF) | Distribution Type and Location (ducts, attic, etc.) | Duct or Piping R-Value | Thermostat Type | Configuration (split or package) |
|--|-----------------------------------|---|------------------------|-----------------|----------------------------------|
| | | | | | |
| | | | | | |
| | | | | | |

| Cooling Equipment Type and Capacity (A/C, heat pump, evap. cooling) | Minimum Efficiency (SEER or EER) | Duct Location (attic, etc.) | Duct R-Value | Thermostat Type | Configuration (split or package) |
|---|----------------------------------|-----------------------------|--------------|-----------------|----------------------------------|
| | | | | | |
| | | | | | |
| | | | | | |

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|----------------------------|-------------------|
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SEALED DUCTS and TXVs (or Alternative Measures)

A signed CF-4R Form must be provided to the building department for each home for which the following are required.

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | |
| <input type="checkbox"/> | Sealed Ducts (all climate zones) (Installer testing and certification and HERS rater field verification required.) |
| <input type="checkbox"/> | TXVs, readily accessible (climate zones 2 and 8-15 only) (Installer testing and certification and HERS Rater field verification required.) |
| <input type="checkbox"/> | Refrigerant Charge (climate zones 2 and 8-15 only) (Installer testing and certification and HERS Rater field verification required.) |

OR

| | |
|--------------------------|---|
| <input type="checkbox"/> | Alternative to Sealed Ducts and Refrigerant Charge /TXVs (See Package D Alternative Package Features for Project Climate Zone in the RM Appendix B Table 151-C, Footnotes 7-14. |
|--------------------------|---|

OR

| | |
|--------------------------|---|
| <input type="checkbox"/> | For additions and alterations, duct systems that are not documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Residential ACM Manual and duct systems with more than 40 linear feet in unconditioned spaces shall meet the requirements of Section 150(m) and duct insulation requirements of Package D. |
|--------------------------|---|

WATER HEATING SYSTEMS

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | |
| <input type="checkbox"/> | Check box if system meets criteria of a “Standard” system. Standard system is one gas-fired water heater per dwelling unit. If the water heater is a storage type, 50 gallons is the maximum capacity and recirculation system is not allowed. |
| <input type="checkbox"/> | Check box when using Preapproved Alternative Water Heating table, Table 5-4 in Chapter 5 in the Residential Manual. No water heating calculations are required, and the system complies automatically. |
| <input type="checkbox"/> | Check box if system does not meet criteria of “Standard” system, and does not comply with the Preapproved Alternative Water Heating table. In this case, the Performance Method must be used and must be included in the submittal. |
| <input type="checkbox"/> | Check box to verify that a time control is required for a recirculating system pump for a system serving multiple units |

Systems serving single dwelling units

| Water Heater Type/Fuel Type | Distribution Type | Number in System | Rated Input ¹ (kW or Btu/hr) | Tank Capacity (gallons) | Energy Factor ¹ or Thermal Efficiency | Standby ¹ Loss (%) | Tank External Insulation R-Value |
|-----------------------------|-------------------|------------------|--|----------------------------|--|-------------------------------|----------------------------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

System serving multiple dwelling units

| Water Heater Type | Distribution Type | Number in System | Rated Input ¹ (kW or Btu/hr) | Tank Capacity (gallons) | Energy Factor ¹ or Thermal Efficiency | Standby ¹ Loss (%) | Tank External Insulation R-Value |
|-------------------|-------------------|------------------|--|----------------------------|--|-------------------------------|----------------------------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

1) For small gas storage water heaters (rated inputs of less than or equal to 75,000 Btu/hr), electric resistance, and heat pump water heaters, list Energy Factor. For large gas storage water heaters (rated input of greater than 75,000 Btu/hr), list Rated Input, Recovery Efficiency, Thermal Efficiency and Standby Loss. For instantaneous gas water heaters, list Rated Input and Thermal Efficiencies.

Pipe Insulation (kitchen lines $\geq 3/4$ inches) All hot water pipes from the heating source to the kitchen fixtures that are $3/4$ inches or greater in diameter shall be thermally insulated as specified by Section 150 (j) 2 A or 150 (j) 2 B.

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Date _____

SPECIAL FEATURES NOT REQUIRING HERS VERIFICATION (add extra sheets if necessary)

Indicate which special features are part of this project. The list below only represents special features relevant to the prescriptive method.

| <input checked="" type="checkbox"/> | Feature | Required Forms (if applicable) | Description |
|-------------------------------------|---|--|--------------------|
| <input type="checkbox"/> | Metal Framed Walls | CF-1R | |
| <input type="checkbox"/> | Radiant Barriers | CF-1R | |
| <input type="checkbox"/> | Exterior Shades | WS-4R | |
| <input type="checkbox"/> | Cool Roof | N/A; Attach CRRC Label to Forms. | |
| <input type="checkbox"/> | Dedicated Hydronic Heating System | Performance Calculation Required; Attach Run to Forms. | |
| <input type="checkbox"/> | Combined Hydronic System | Performance Calculation Required; Attach Run to Forms. | |
| <input type="checkbox"/> | Gas Cooling | Performance Calculation Required. | |
| <input type="checkbox"/> | Buried Ducts | N/A; Indicate on building plans. | |
| <input type="checkbox"/> | Kitchen Pipe Insulation | See Section 5.6.2 Distribution Systems in Residential Manual. | |
| <input type="checkbox"/> | Multiple Water Heaters Per Dwelling Unit | See Table 5-13 or use Performance Calculation and attach Run to Forms. | |
| <input type="checkbox"/> | Central Water Heating System Serving Multiple Dwellings | Performance Calculation and attach Run to Forms. | |
| <input type="checkbox"/> | Non-NAECA Large Water Heater | CF-1R | |
| <input type="checkbox"/> | Indirect Water Heater | See Table 5-13 or use Performance Calculation and attach Run to Forms | |
| <input type="checkbox"/> | Instantaneous Gas Water Heater | See Table 5-13 or use Performance Calculation and attach Run to Forms | |
| <input type="checkbox"/> | Solar Water Heating System | See Table 5-13 or use Performance Calculation and attach Run to Forms | |
| <input type="checkbox"/> | Wood Stove Boiler | Performance Calculation and attach Run to Forms | |

SPECIAL FEATURES REQUIRING HERS RATER VERIFICATION

(add extra sheets if necessary) Indicate to the HERS Rater which credits are part of this project and need verification.

| <input checked="" type="checkbox"/> | Feature | Required Forms (if applicable) | Description |
|-------------------------------------|------------------------------|---------------------------------------|--------------------|
| <input type="checkbox"/> | Duct Sealing | CF-6R part 4 of 12 | |
| <input type="checkbox"/> | Refrigerant Charge | CF-6R part 5 of 12 | |
| <input type="checkbox"/> | Thermostatic Expansion Valve | CF-6R part 6 of 12 | |

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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 Owner (per Business and Professions Code) | Documentation Author |
|--|-----------------------------|
| Name: | Name: |
| Title/Firm: | Title/Firm: |
| Address: | Address: |
| | |
| Telephone: | Telephone: |
| | |
| License #: | |
| | |
| (signature) (date) | (signature) (date) |

Enforcement Agency

| | |
|--|--|
| Name: _____ Title _____ Agency: _____ Telephone: _____ _____ (signature / stamp) (date) | Comments: _____ _____ _____ _____ _____ _____ |
|--|--|

SOLAR WATER HEATING CALCULATION FORM (Page 1 of 2) CF-SR

| | |
|---------------|------|
| Project Title | Date |
|---------------|------|

| | |
|--|---------------|
| CF-SR- Solar Water Heating Calculation Form | OG-300 |
|--|---------------|

| | |
|---|---|
| Property Name: | Building Type: (Single Family, Multi-family): |
| Total Conditioned Floor Area (CFA)ft ² : | Climate zone (1-16): |

INPUTS FOR SYSTEMS SRCC OG-300:

| | |
|--|--|
| 1. Solar Energy Factor of OG-300 solar water heating system as listed in SRCC directory | |
| 2. Energy Factor of Water Heater (enter .6 for gas .9 for electric) | |
| 3. Constant - 41045 (amount of energy used in SRCC test) | |
| 4. Constant - 3500 average parasitic loss value in SRCC test | |
| 5. System type. Enter 1 for systems with pumps or forced circulation for all other systems enter 0 | |
| 6. Gallons per day use value calculated as: (21.5*.0014*CFA) | |
| 7. Constant – 64.3 gallons used in SRCC test method | |
| 8. Hot water supply temperature 135 degrees | |
| 9. Environmental temperature (Enter value from Table 1 based on entry on Climate Zone) | |
| 10. Difference in supply and inlet water (subtract line 9 from line 8) | |
| 11. Constant - 1500 Solar radiation value used in SRCC test | |
| 12. Solar radiation level from Table 1 below | |
| 13. Energy for circulation. (enter 0.9 of forced re-circulation and 1 for all other systems) | |

CALCULATION FOR SYSTEM

| | |
|--|--|
| 14. Multiply line 2 by line 3 | |
| 15. Divide the results by line 1 | |
| 16. Divide line 6 by line 7 | |
| 17. Divide the result in line 10 by 77 | |
| 18. Subtract 1 by line 2 | |
| 19. Multiply lines 15, 16 and 17 | |
| 20. Multiply line 4 by line 5 by line 18 | |
| 21. Add line 19 to line 20 | |
| 22. Divide line 21 by line 3 | |
| 23. Divide line 11 by line 12 | |
| 24. Multiply line 22 by line 23 by line 13 | |
| 25. Subtract 1 add line 13 add line 24 | |

Solar Fraction

Table 1

| Climate Zone | Water Temperature | Solar Radiation | Environmental Temperature | Climate Zone | Water Temperature | Solar Radiation | Environmental Temperature |
|--------------|-------------------|-----------------|---------------------------|--------------|-------------------|-----------------|---------------------------|
| 1 | 53.90 | 1220 | 53.71 | 9 | 63.76 | 1685 | 63.73 |
| 2 | 57.52 | 1220 | 57.52 | 10 | 63.76 | 1612 | 63.80 |
| 3 | 57.69 | 1533 | 57.55 | 11 | 61.00 | 1580 | 61.22 |
| 4 | 59.12 | 1601 | 59.07 | 12 | 59.65 | 1670 | 59.77 |
| 5 | 57.93 | 1602 | 57.87 | 13 | 63.99 | 1726 | 64.31 |
| 6 | 61.55 | 1599 | 61.48 | 14 | 61.48 | 1827 | 61.94 |
| 7 | 62.63 | 1586 | 62.48 | 15 | 73.55 | 1884 | 73.86 |
| 8 | 62.97 | 1682 | 63.73 | 16 | 50.54 | 1513 | 51.68 |

EXAMPLE

CF-SR- Solar Water Heating Calculation Form

OG-300

Property Name: _____

Building Type: (Single Family, Multi-family): Single Family

Total Conditioned Floor Area (CFA)ft²: 2500

Climate zone (1-16): 2

INPUTS FOR SYSTEMS SRCC OG-300:

| | |
|---|-------|
| 1. Solar Energy Factor of OG-300 solar water heating system as listed in SRCC directory | 3.4 |
| 2. Energy Factor of Water Heater (enter .6 for gas .9 for electric) | 0.9 |
| 3. Constant - 41045 (amount of energy used in SRCC test) | 41045 |
| 4. Constant - 3500 average parasitic loss value in SRCC test | 3500 |
| 5. System type. Enter 1 for systems with pumps or forced circulation for all other systems enter 0. | 1 |
| 6. Gallons per day use value calculated as: (21.5*.0014*CFA) | 75.25 |
| 7. Constant – 64.3 gallons used in SRCC test method | 64.3 |
| 8. Hot water supply temperature 135 degrees | 135 |
| 9. Environmental temperature (Enter value from Table 1 based on Climate Zone) | 57.52 |
| 10. Difference in supply and inlet water (subtract line 9 from line 8) | 77.48 |
| 11. Constant - 1500 Solar radiation value used in SRCC test | 1500 |
| 12. Solar radiation level from Table 1below | 1220 |
| 13. Energy for circulation. (enter 0.9 of forced re-circulation and 1 for all other systems) | 0.9 |

CALCULATION FOR SYSTEM

| | |
|--|---------|
| 14. Multiply line 2 by line 3 | 36940.5 |
| 15. Divide the results by line 1 | 10864.9 |
| 16. Divide line 6 by line 7 | 1.2 |
| 17. Divide the result in line 10 by 77 | 1.0 |
| 18. Subtract 1 by line 2 | 0.1 |
| 19. Multiply lines 15, 16 and 17 | 12384.8 |
| 20. Multiply line 4 by line 5 by line 18 | 350.0 |
| 21. Add line 19 to line 20 | 12734.8 |
| 22. Divide line 21 by line 3 | 0.3 |
| 23. Divide line 11 by line 12 | 1.2 |
| 24. Multiply line 22 by line 23 by line 13 | 0.3 |
| 25. Subtract 1 add line 13 add line 24 | 0.4 |

Solar Fraction 0.4

MANDATORY MEASURES SUMMARY: RESIDENTIAL (Page 1 of 2) MF-1R

| | |
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| Project Title | Date |
|---------------|------|

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 NA if not applicable.

| DESCRIPTION | NA | Designer | Enforce-ment |
|--|--------------------------|--------------------------|--------------------------|
| Building Envelope Measures: | ✓ | ✓ | ✓ |
| * §150(a): Minimum R-19 in wood frame ceiling insulation or equivalent U-factor in metal frame ceiling. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(b): Loose fill insulation manufacturer's labeled R-Value: _____. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| * §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). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| * §150(d): Minimum R-13 raised floor insulation in framed floors or equivalent U-factor. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. outside air intake with damper and control, flue damper and control | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. No continuous burning gas pilot lights allowed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(f): Air retarding wrap installed to comply with §151 meets requirements specified in the ACM Residential Manual. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(g): Vapor barriers mandatory in Climate Zones 14 and 16 only. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(i): 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §118: Insulation specified or installed meets insulation installation quality standards. Indicate type and include CF-6R Form: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §116-17: Fenestration Products, Exterior Doors, and Infiltration/Exfiltration Controls. | | | |
| 1. Doors and windows between conditioned and unconditioned spaces designed to limit air leakage. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Fenestration products (except field-fabricated) have label with certified U-factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration certification. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Exterior doors and windows weatherstripped; all joints and penetrations caulked and sealed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Space Conditioning, Water Heating and Plumbing System Measures: | | | |
| §110-§113: HVAC equipment, water heaters, showerheads and faucets certified by the Energy Commission. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(h): Heating and/or cooling loads calculated in accordance with ASHRAE, SMACNA or ACCA. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(i): Setback thermostat on all applicable heating and/or cooling systems. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(j): Water system pipe and tank insulation and cooling systems line insulation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The following piping is insulated according to Table 150-A/B or Equation 150-A Insulation Thickness: | | | |
| 1. First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes shall be insulated to Table 150B. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Steam hydronic heating systems or hot water systems >15 psi, meet requirements of Table 123-A. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

MANDATORY MEASURES SUMMARY: RESIDENTIAL (Page 2 of 2) MF-1R

| Space Conditioning, Water Heating and Plumbing System Measures: (continued) | NA ✓ | Designer | Enforce-ment |
|--|--------------------------|--------------------------|--------------------------|
| 5. Insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Insulation for chilled water piping and refrigerant suction piping includes a vapor retardant or is enclosed entirely in conditioned space. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Solar water-heating systems/collectors are certified by the Solar Rating and Certification Corporation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| * §150(m): Ducts and Fans | | | |
| 1. All ducts and plenums installed, sealed and insulated 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-4.2 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 1/4 inch, the combination of mastic and either mesh or tape shall be used. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Exhaust fan systems have back draft or automatic dampers. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Flexible ducts cannot have porous inner cores. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. System is installed with: | | | |
| a. at least 36" of pipe between filter and heater for future solar heating | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. cover for outdoor pools or outdoor spas | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Pool system has directional inlets and a circulation pump time switch. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §118(i): Cool Roof material meets specified criteria | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Residential Lighting Measures: | | | |
| §150(k)1: HIGH EFFICACY LUMINAIRES OTHER THAN OUTDOOR HID: contain only high efficacy lamps 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 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(k)3: Permanently installed luminaires in bathrooms, garages, laundry rooms utility rooms shall be high efficacy luminaires. 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(k)4: Permanently installed luminaires located other than in kitchens, bathrooms, garages, laundry rooms, and utility rooms shall be high efficacy luminaires (except closets less than 70ft²): 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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §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). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(k)7: Lighting for parking lots for 8 or more vehicles shall have lighting that complies with Sec. 130, 132, and 147. Lighting for parking garages for 8 or more vehicles shall have lighting that complies with Sec. 130, 131, and 146. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §150(k)8: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires OR are controlled by occupant sensor(s) certified to comply with Section 119(d). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

AREA WEIGHTED AVERAGE CALCULATION WORKSHEET WS-2R

| | |
|---------------|------|
| Project Title | Date |
|---------------|------|

This worksheet should be used to calculate weight-averaged U-factors for prescriptive envelope compliance. R-values can never be area weighted; only area-weight U-factors.

Whenever two or more types of a building feature, material or construction assembly occur in a building, a weighted average of the different types must be calculated. Weighted averaging is simply a mathematical technique for combining different amounts of various components into a single number. Weighted averaging is frequently done when there is more than one level of floor, wall, or ceiling insulation in a building, or more than one type of window.

- a. "Area" can be replaced throughout the formula by "Length" or any other unit of measure used for the value being averaged.
- b. "Value" can be replaced throughout the formula by "U-factor," "Solar Heat Gain Coefficient," or any other value that varies throughout a residence and is appropriate to weight average.

| Item No. | Type 1 Value ^b | x | Type 1 Area ^a | + | Type 2 Value ^b | x | Type 2 Area ^a | + | Type 3 Value ^b | x | Type 3 Area ^a | ÷ | Total Area | = | Weighted Average Value |
|----------|---------------------------|---|--------------------------|---|---------------------------|---|--------------------------|---|---------------------------|---|--------------------------|---|------------|---|------------------------|
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |
| | [() | x | () | + | () | x | () | + | () | x | () | ÷ | | = | |

SOLAR HEAT GAIN COEFFICIENT WORKSHEET (Page 1 of 2) WS-3R

| | |
|---------------|------|
| Project Title | Date |
|---------------|------|

Items 1 through 4 must be completed for glazing/shading combinations by using the Default Table for Fenestration Products (Table 116-B of the Standard), NFRC certified data, or Solar Heat Gain Coefficients Used for Exterior Shading Attachments (Table S-1 below) for the specific conditions indicated (#1a or #1b or #3).

General Information

1a. For Fenestration Products w/NFRC testing and labels: SHGC_{fen} = _____

OR

1b. For Fenestration Products without NFRC testing and labels (Table 116-B of the Standard): SHGC_{fen} = _____

| | | | |
|---|-------------------------|---|----------------------------------|
| 1c. Frame Type | 1d. Product Type | 1e. Glazing Type | 1f. Single/Double Pane |
| _____ metal, non-metal, metal w/thermal break | _____ operable/fixed | _____ (visibly) tinted clear (not visibly tinted) | _____ single pane/double pane |

2. Skylight (Y/N) _____
(A skylight is fenestration mounted on a roof surface at a slope less than 60° from the horizon.)

Combined Exterior Shade with Fenestration

Exterior Shade Type: _____

3. SHGC_{Exterior Shade}: _____
(If no exterior shade, assume standard bug screens, SHGC_{Exterior Shade} = 0.76 for ordinary windows. This requirement does not apply to skylights where SHGC_{Exterior Shade} is assumed to be 1.00. If another exterior shade is substituted for bug screens, use one of the values from Table S-1.)

4. $[(\text{_____} \times 0.2875) + 0.75] \times \frac{\text{_____}}{\text{SHGC}_{min}} = \boxed{\text{_____}}$ Where:
SHGC_{max} = Larger of (#1a or #1b) or #3
SHGC_{min} = Smaller of (#1a or #1b) or #3

Total SHGC

Note: Calculated Solar Heat Gain Coefficient values for Total SHGC may be used directly for prescriptive packages.

- Package C Target Value for Total SHGC is 0.38 for Climate Zones 2, 4, 7-15
- Package C Target Value for Total SHGC is 0.42 for Climate Zones 1, 3, 5, 6, 16
- Package D Target Value for Total SHGC is 0.40 for Climate Zones 2, 4, 7-15

Table S-1: Solar Heat Gain Coefficients Used for Exterior Shading Attachments for WS-3R and Computer Performance Methods^{1,2}

| Exterior Shading Device ³ | w/Single Pane Clear Glass & Metal Framing ⁴ |
|--|---|
| 1) Standard Bug Screens | 0.76 |
| 2) Exterior Sunscreens with Weave 53*16/inch | 0.30 |
| 3) Louvered Sunscreens w/Louvers as Wide as Openings | 0.27 |
| 4) Low Sun Angle (LSA) Louvered Sunscreens | 0.13 |
| 5) Roll-down Awning | 0.13 |
| 6) Roll Down Blinds or Slats | 0.13 |
| 7) None (for skylights only) | 1.00 |

1. These values may be used on line 3 of the Solar Heat Gain Coefficient (SHGC) Worksheet (WS-3R) to calculate exterior shading with other glazing types and combined interior and exterior shading with glazing.
2. Exterior operable awnings (canvas, plastic or metal), except those that roll vertically down and cover the entire window, should be treated as overhangs for purposes of compliance with the Standards.
3. Standard bug screens must be assumed for all fenestration unless replaced by other exterior shading attachments. The solar heat gain coefficient listed for bug screens is an area-weighted value that assumes that the screens are only on operable windows. The solar heat gain coefficient of any other exterior shade screens applied only to some window areas must be area-weighted with the solar heat gain coefficient of standard bug screens for all other glazing (see Form WS-2R). Different shading conditions may also be modeled explicitly in the computer performance method.
4. Reference glass for determining solar heat gain coefficients is 1/8 inch double strength (DSS) glass.

Instructions for WS-3R

The following explains how to calculate solar heat gain coefficients on WS-3R. The number of each item below corresponds to the appropriate item on WS-3R.

Enter either:

1a. For products with NFRC testing and labels, enter the product's labeled SHGC as #1a. $SHGC_{fen}$

OR

1b. Enter the default $SHGC_{fen}$ from Table 116-B of the Standards corresponding to the fenestration characteristics described in entries 1c, 1d, 1e, and 1f. Entries for 1c, 1d, 1e, and 1f are only needed if 1b is entered for $SHGC_{fen}$.

If 1b is entered, then:

1c Describe the Frame Type [metal, metal w/thermal break, or non-metal (non-metal includes both vinyl and wood)].

1d The Product Type (operable or fixed);

1e The glazing type (tinted or uncoated). Note that tints or coatings that cannot be easily observed by the building official must be classified as "uncoated;" that is, tints must be easily visible to the naked eye.

1f Single or double pane glazing.

2 For skylights mounted on a roof surface, enter "Y," otherwise enter "N." A skylight is fenestration mounted at a slope less than 60° from the horizon.

In a performance compliance, select *standard* or *draperies*. This is the only available choice and some compliance tools will eliminate this choice altogether.

3 Describe the exterior shading device in the space provided (e.g., roll down awning). List $SHGC_{Exterior\ Shade}$, the SHGC of the exterior shade with 1/8" clear single pane glass and metal framing, from Table S-1. If a single window or skylight has multiple exterior shades (i.e., shade screens and awnings) use the one shading device with the lower SHGC.

If no exterior shade is proposed, assume standard bug screens with a SHGC or 0.76 (or a SHGC or 1.00 for horizontal glazing). This applies to the full area of fixed fenestration products as well as operable.

4 Calculate $SHGC_{Shade\ Open}$ using values from Items 3 and either 1a or 1b. The result is the combined SHGC of the fenestration product and exterior device with the interior *shade open*.

FENESTRATION – MAXIMUM ALLOWED AREA WORKSHEET WS-4R

Project Title _____

Date _____

FENESTRATION PRODUCTS – NEW CONSTRUCTION- NEW BUILDINGS

Use this table for new building construction to account for total building % of fenestration.

| A | B | C | D | E | F | G |
|---|-------------|--|--|---------------------------|--|---|
| #/Type/Pos. (Front, Left, Rear, Right, Skylight) | Orientation | Total Fenestration, West Facing Area (ft ²) | Total Fenestration for N, S, E Orientations Area (ft ²) | CFA (ft ²) | Total Percent of West Facing Fenestration ¹ (C/E) x 100% | Total % of Fenestration ² Including West (D/E) x 100% + F |
| | North | | | | | |
| | South | | | | | |
| | East | | | | | |
| | West | | | | | |
| | Totals | | | | | |

- 1) If west facing area exceeds 5% of CFA in climate zones 2, 4, and 7-15, the performance approach must be used.
- 2) If total percent of fenestration exceeds 20% including West facing orientations then performance approach must be used. West facing area includes skylights tilted to the west or tilted in any direction when the pitch is less than 1:12 for Package D only.

FENESTRATION PRODUCTS – NEW CONSTRUCTION- ADDITIONS

Less than 100 ft², Less than or Equal to 1000 ft², Greater 1000 ft²

| A | B | C | D | E | F | G | H |
|---|---------------------------|----------------------------------|--|--|--|---|---|
| #/Type/Pos. (Front, Left, Rear, Right, Skylight) | Orientation N, S, E, W | Addition's CFA ^{1,2} | Addition's New Fenestration Area (ft ²) | Fenestration Area Removed to make way for Addition (ft ²) | Total Area Fenestration ² (D + E) | Total % of West Facing Fenestration (F/C)x100% | Total % of Fenestration ² (F/C)x100 % |
| | North | | | | | | |
| | South | | | | | | |
| | East | | | | | | |
| | West ⁴ | | | | | | |
| | | | | | Total | | |

- 1) Additions that add less than 50ft² of fenestration area are exempt from the maximum total area limits. See Table 8-2 in RM.
- 2) If the addition has a floor area equal to or less than 1,000 ft², the maximum allowed fenestration % may be increased to by the amount of glazing removed in the wall that separates the addition from the existing house. See Table 8-2 in RM.
- 3) If the addition has a floor area greater than to 1,000 ft², must meet Package D requirements. See Table 8-2 in RM.
- 4) West facing area includes skylights tilted to the west or tilted in any direction when the pitch is less than 1:12 for Package D.

FENESTRATION PRODUCTS: ALTERATIONS

Use this table for alterations to an existing building where fenestrations products (windows) are being removed and/or added.

| A | B | C | D | E | F | G | H | I |
|-----|-------------------------|--|------------------------|---------------------------------------|--------------------------------------|---|--|--|
| CFA | Existing Orientation | Existing Area (ft ²) | Removed Orientation | Removed Area (ft ²) | Proposed Installed Orientation | Proposed Installed New Area (ft ²) | Total Net Fenestration (ft ²) (C-E+G) | Total % of Fenestration ^{1,2} H / A Max of 20% |
| | North | | North | | North | | | |
| | South | | South | | South | | | |
| | East | | East | | East | | | |
| | West | | West | | West | | | |
| | Total | | Total | | Total | | | |

- 1) When 50 ft² or more of fenestration area is added to an existing building, then the fenestration must meet the requirements of Package D. The area requirement for the total fenestration area for the whole building, including the added fenestration, must not exceed 20% otherwise the Performance Approach must be used. Note: The 5% west facing limit is exempt. See Section 8.3.3 in the RM for further details.

RESIDENTIAL KITCHEN LIGHTING WORKSHEET

WS-5R

Project Title _____

Date _____

At least 50% of the total rated wattage of permanently installed luminaires in the kitchen must be in luminaires that are high efficacy luminaires as defined in Table 150-C. Luminaires that are not high efficacy must be switched separately.

Kitchen Lighting Schedule. Provide the following information for all luminaires to be installed in kitchens.

| Luminaire Type | High Efficacy? | Watts | x | Quantity | = | High Efficacy Watts | or | Other Watts |
|----------------|--|-------|---|----------|---|---------------------|----|-------------|
| _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> | _____ | x | _____ | = | _____ | or | _____ |
| _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> | _____ | x | _____ | = | _____ | or | _____ |
| _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> | _____ | x | _____ | = | _____ | or | _____ |
| _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> | _____ | x | _____ | = | _____ | or | _____ |
| _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> | _____ | x | _____ | = | _____ | or | _____ |
| Total: | | | | | | A: | B: | |

COMPLIES IF $A \geq B$

Yes No

Rules for Determining Residential Kitchen Luminaire Wattage

Screw Base Sockets §130(c) 1

(Not containing permanently installed ballasts) The maximum relamping rated wattage of the luminaire, as listed on a permanent factory-installed label (luminaire wattage is not based on type or wattage of lamp that is used).

Permanently or Remotely Installed Ballasts §130(c) 2

The operating input wattage of the rated lamp/ballast combination based on values published in manufacturer's catalogs based on independent testing lab reports.

Line Voltage Track Lighting (90 through 480 volts) §130(c) 3

1. Volt-ampere (VA) rating of the branch circuit(s) feeding the tracks; or
2. The higher of
 - The wattage (or VA) rating of an approved integral current limiter controlling the track system or
 - 15 watts per linear foot of the track; or
3. The higher of
 - 45 W per linear foot of the track or
 - The total wattage of all of the luminaires included in the system.

Low Voltage Track Lighting (less than 90 volts) §130(c) 4

Rated wattage of the transformer feeding the system, as shown on a permanent factory-installed label

Other Lighting §130(c) 5

(Lighting systems that are not addressed in §130 (c) 1-4) The maximum rated wattage, or operating input wattage of the system, listed on a permanent factory installed label, or published in manufacturer's catalogs, based on independent testing lab reports.

EXAMPLE

RESIDENTIAL KITCHEN LIGHTING WORKSHEET

WS-5R

Project Title _____

Date _____

Kitchen Lighting Schedule. Provide the following information for all luminaires to be installed in kitchens.

| Luminaire Type | High Efficacy (y/n) | Watts | x | Quantity | = | High Efficacy Watts | or | Other Watts |
|----------------|---------------------|-------|---|----------|---|---------------------|----|-------------|
| CFL-1 | Yes | 26 | x | 5 | = | 130 | or | |
| MR-16 | No | 55 | x | 2 | = | | or | 110 |
| _____ | _____ | _____ | x | _____ | = | _____ | or | _____ |
| _____ | _____ | _____ | x | _____ | = | _____ | or | _____ |
| _____ | _____ | _____ | x | _____ | = | _____ | or | _____ |
| Total: | | | | | | A: 130 | B: | 110 |

COMPLIES IF $A \geq B$

Yes No

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 1 of 8) CF-4R

| | | |
|----------------------------------|-----------|---------------------|
| Project Address | | Builder Name |
| Builder Contact | Telephone | Plan Number |
| HERS Rater | Telephone | Sample Group Number |
| Compliance Method (Prescriptive) | | Climate Zone |
| Certifying Signature | Date | Sample House Number |
| Firm | | HERS Provider |
| Street Address: | | City/State/Zip: |

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

HERS RATER COMPLIANCE STATEMENT

The house was: Tested Approved as part of sample testing, but was not tested

As the HERS rater providing diagnostic testing and field verification, I certify that the house identified on this form complies with the diagnostic tested compliance requirements as checked on this form. The HERS rater must check and verify that the new distribution system is fully ducted and correct tape is used before a CF-4R may be released on every tested building. The HERS rater must not release the CF-4R until a properly completed and signed CF-6R has been received for the sample and tested buildings.

- The installer has provided a copy of CF-6R (Installation Certificate).
- New Distribution system is fully ducted (i.e., does not use building cavities as plenums or platform returns in lieu of ducts).
- New systems where cloth backed, rubber adhesive duct tape is installed, mastic and draw bands are used in combination with cloth backed, rubber adhesive duct tape to seal leaks at duct connections.

MINIMUM REQUIREMENTS FOR DUCT LEAKAGE REDUCTION COMPLIANCE CREDIT

Procedures for field verification and diagnostic testing of air distribution systems are available in RACM, Appendix RC4.3.

Duct Diagnostic Leakage Testing Results

| NEW CONSTRUCTION: | | | |
|---|---|-----------------|---|
| | | Measured Values | |
| | Duct Pressurization Test Results (CFM @ 25 Pa) | | |
| 1 | Enter Tested Leakage Flow in CFM: | | |
| 2 | Fan Flow: Calculated (Nominal: <input checked="" type="checkbox"/> Cooling <input checked="" type="checkbox"/> Heating) or <input checked="" type="checkbox"/> Measured Enter Total Fan Flow in CFM: | | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
| 3 | Pass if Leakage Percentage ≤ 6% [100 x [_____(Line # 1) / _____(Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| ALTERATIONS: Duct System and/or HVAC Equipment Change-Out | | | |
| 4 | Enter Tested Leakage Flow in CFM from CF-6R: Pre-Test of Existing Duct System Prior to Duct System Alteration and/or Equipment Change-Out. | | |
| 5 | Enter Tested Leakage Flow in CFM: Final Test of New Duct System or Altered Duct System for Duct System Alteration and/or Equipment Change-Out. | | |
| 6 | Enter Reduction in Leakage for Altered Duct System [_____(Line # 4) Minus _____(Line # 5)] (Only if Applicable) | | |
| 7 | Enter Tested Leakage Flow in CFM to Outside (Only if Applicable) | | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
| 8 | Entire New Duct System - Pass if Leakage Percentage ≤ 6% [100 x [_____(Line # 5) / _____(Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| TEST OR VERIFICATION STANDARDS: For Altered Duct System and/or HVAC Equipment Change-Out | | | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
| Use one of the following four Test or Verification Standards for compliance: | | | |
| 9 | Pass if Leakage Percentage ≤ 15% [100 x [_____(Line # 5) / _____(Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| 10 | Pass if Leakage to Outside Percentage ≤ 10% [100 x [_____(Line # 7) / _____(Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| 11 | Pass if Leakage Reduction Percentage ≥ 60% [100 x [_____(Line # 6) / _____(Line # 4)]] and Verification by Smoke Test and Visual Inspection | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| 12 | Pass if Sealing of all Accessible Leaks and Verification by Smoke Test and Visual Inspection | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| | Pass if One of Lines # 9 through # 12 pass | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 2 of 8) CF-4R

| | |
|-----------------|---------------|
| Project Address | Builders Name |
|-----------------|---------------|

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

✓ DIAGNOSTIC SUPPLY DUCT LOCATION, SURFACE AREA AND R-VALUE

Procedures for field verification and diagnostic testing for this group compliance credits are available in RACM, Appendix RC, RE & RH.

✓ LESS THAN 12 LINEAL FEET OF SUPPLY DUCT OUTSIDE OF CONDITIONED SPACE COMPLIANCE CREDIT

| | | | | | | |
|---|------------------------------|-----------------------------|---|---|---------------------------------|---------------------------------|
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Less than 12 lineal feet of supply duct outside of conditioned space. | Yes to this compliance credit is a pass | ✓ <input type="checkbox"/> Pass | ✓ <input type="checkbox"/> Fail |
|---|------------------------------|-----------------------------|---|---|---------------------------------|---------------------------------|

✓ SUPPLY DUCTS LOCATED IN CONDITIONED SPACE COMPLIANCE CREDIT

| | | | | | | |
|---|------------------------------|-----------------------------|--|---|---------------------------------|---------------------------------|
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Ducts are located within the conditioned volume of building. | Yes to this compliance credit is a pass | ✓ <input type="checkbox"/> Pass | ✓ <input type="checkbox"/> Fail |
|---|------------------------------|-----------------------------|--|---|---------------------------------|---------------------------------|

Duct System Design verification is required for a compliance credit for the following:

1. Supply duct surface area reduction
2. Buried supply ducts on the ceiling
3. Deeply buried supply ducts

✓ DUCT SYSTEM DESIGN VERIFICATION

| | | | | | | |
|----------------------|------------------------------|-----------------------------|---|---------------------------------|---------------------------------|--|
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Adequate airflow verified | | | |
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | The duct system design plan meets the requirements specified in RACM, Appendix RE, Section RE.4.2 | | | |
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | The duct system design plan exists on building plans | | | |
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct sizes, duct system layout and locations of supply & return registers match the duct system design plan | | | |
| Yes to all is a pass | | | | ✓ <input type="checkbox"/> Pass | ✓ <input type="checkbox"/> Fail | |

✓ SUPPLY DUCTS SURFACE AREA REDUCTION COMPLIANCE CREDIT

| Attic | Crawl Space | Basement | Covered | Deeply Covered | Other | Duct Diameter | R-4.2 Surface Area | R-6.0 Surface Area | R-8.0 Surface Area | |
|---------------------------------------|------------------------------|-----------------------------|--|--------------------------|--------------------------|---------------|-------------------------------|-------------------------------|--------------------|--|
| <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"/> | <input type="checkbox"/> | | | | | |
| Total Surface Area for Each R-Value = | | | | | | | | | | |
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct Surface Area matches Performance's CF-1R? | | | | | ✓ | ✓ | |
| Yes to all is a pass | | | | | | | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | | |

✓ BURIED DUCTS ON THE CEILING COMPLIANCE CREDIT

| | | | | | | |
|--|------------------------------|-----------------------------|---|-------------------------------|-------------------------------|---|
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Buried Ducts on the Ceiling | | | |
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Verified High Insulation Installation Quality | | ✓ | ✓ |
| Yes to duct system design, supply duct surface area reduction and this compliance credit is a pass | | | | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | |

✓ DEEPLY BURIED DUCTS COMPLIANCE CREDIT

| | | | | | | |
|--|------------------------------|-----------------------------|---|-------------------------------|-------------------------------|---|
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <i>Deeply Buried Ducts</i> | | | |
| ✓ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Verified High Insulation Installation Quality | | ✓ | ✓ |
| Yes to duct system design, supply duct surface area reduction and this compliance credit is a pass | | | | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | |

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 3 of 8) CF-4R

| | | |
|----------------------------------|-----------|---------------------|
| Project Address | | Builder Name |
| Builder Contact | Telephone | Plan Number |
| HERS Rater | Telephone | Sample Group Number |
| Compliance Method (Prescriptive) | | Climate Zone |
| Certifying Signature | Date | Sample House Number |
| Firm | | HERS Provider |
| Street Address: | | City/State/Zip: |

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

HERS RATER COMPLIANCE STATEMENT

The house was: Tested Approved as part of sample testing, but was not tested

As the HERS rater providing diagnostic testing and field verification, I certify that the house identified on this form complies with the diagnostic tested compliance requirements as checked on this form.

The installer has provided a copy of CF-6R (Installation Certificate).

THERMOSTATIC EXPANSION VALVE (TXV)

Procedures for field verification of thermostatic expansion valves are available in RACM, Appendix RI.

| | | | | | |
|-------------------------------------|------------------------------|-----------------------------|---|-------------------------------------|-------------------------------------|
| | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Access is provided for inspection. The procedure shall consist of visual verification that the TXV is installed on the system and installation of the specific equipment shall be verified. | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | Yes is a pass | Pass | Fail |

REFRIGERANT CHARGE MEASUREMENT

Verification for Required Refrigerant Charge for Split System Space Cooling Systems without Thermostatic Expansion Valves

| | | |
|---------------------------------------|--|---------------------------|
| Outdoor Unit Serial # | | |
| Location | | |
| Outdoor Unit Make | | |
| Outdoor Unit Model | | |
| Cooling Capacity | | Btu/hr |
| Date of Verification | | |
| Date of Refrigerant Gauge Calibration | | (must be checked monthly) |
| Date of Thermocouple Calibration | | (must be checked monthly) |

Standard Charge Measurement (outdoor air dry-bulb 55 °F and above):

Note: The system should be installed and charged in accordance with the manufacturer's specifications and installer verification shall be documented on CF-6R before starting this procedure. If outdoor air dry-bulb is below 55 °F rater shall use the Alternative Charge Measure Procedure

Procedures for Determining Refrigerant Charge using the Standard Method are available in RACM, Appendix RD2.

| | |
|--|--|
| <input checked="" type="checkbox"/> <input type="checkbox"/> Yes <input type="checkbox"/> No | A copy of CF-6R (Installation Certificate) has been provided with refrigerant charge measurement documented. |
|--|--|

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 4 of 8) CF-4R

| | |
|-----------------|---------------|
| Project Address | Builders Name |
|-----------------|---------------|

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

Measured Temperatures

| | | |
|---|--|----|
| Supply (evaporator leaving) air dry-bulb temperature (Tsupply, db) | | °F |
| Return (evaporator entering) air dry-bulb temperature (Treturn, db) | | °F |
| Return (evaporator entering) air wet-bulb temperature (Treturn, wb) | | °F |
| Evaporator saturation temperature (Tevaporator, sat) | | °F |
| Suction line temperature (Tsuction, db) | | °F |
| Condenser (entering) air dry-bulb temperature (Tcondenser, db) | | °F |

Superheat Charge Method Calculations for Refrigerant Charge

| | | |
|--|--|----|
| Actual Superheat = Tsuction, db – Tevaporator, sat | | °F |
| Target Superheat (from Table RD-2) | | °F |
| Actual Superheat – Target Superheat (System passes if between -5 and +5°F) | | °F |

Temperature Split Method Calculations for Adequate Airflow

Split Method Calculation is not necessary if Adequate Airflow credit is taken

| | | |
|---|--|----|
| Actual Temperature Split = T return, db Tsupply, db | | °F |
| Target Temperature Split (from Table RD3) | | °F |
| Actual Temperature Split Target Temperature Split (System passes if between -3°F and +3°F or, upon remeasurement, if between -3°F and -100°F) | | °F |

Standard Charge Measurement Summary:

System shall pass both refrigerant charge and adequate airflow calculation criteria from the same measurements. If corrective actions were taken, both criteria must be remeasured and recalculated

| | | | |
|-------------------------------------|------------------------------|-----------------------------|---------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | System Passes |
|-------------------------------------|------------------------------|-----------------------------|---------------|

Alternative Charge Measurement (outdoor air dry-bulb below 55 °F)

Note: The system should be installed and charged in accordance with the manufacturer’s specifications and installer verification shall be documented on CF-6R before starting this procedure. If outdoor air dry-bulb is 55 °F or above, rater shall use the Standard Charge Measure Procedure:

Procedures for Determining Refrigerant Charge using the Alternative Method are available in RACM, Appendix RD3.

| | | | |
|-------------------------------------|------------------------------|-----------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | A copy of CF-6R (Installation Certificate) has been provided with refrigerant charge measurement documented. |
|-------------------------------------|------------------------------|-----------------------------|--|

Weigh-In Charging Method for Refrigerant Charge

| | | |
|---|--|----|
| Actual liquid line length: | | ft |
| Manufacturer’s Standard liquid line length: | | ft |
| Difference (Actual – Standard): | | ft |

| |
|--|
| Manufacturer’s correction (ounces per foot) _____ x difference in length = _____ ounces (“+ “ = add ounces) (“-“ = remove ounces) |
|--|

Alternative Charge Measurement Summary:

System shall pass both refrigerant charge and adequate airflow calculation criteria from the same measurements. If corrective actions were taken, both criteria must be remeasured and recalculated.

| | | | |
|-------------------------------------|------------------------------|-----------------------------|---------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | System Passes |
|-------------------------------------|------------------------------|-----------------------------|---------------|

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 5 of 8) CF-4R

| | | |
|----------------------|-----------------|---------------------|
| Project Address | | Builder Name |
| Builder Contact | Telephone | Plan Number |
| HERS Rater | Telephone | Sample Group Number |
| Certifying Signature | Date | Sample House Number |
| Firm | HERS Provider | |
| Street Address: | City/State/Zip: | |

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

HERS RATER COMPLIANCE STATEMENT

The house was: Tested Approved as part of sample testing, but was not tested

As the HERS rater providing diagnostic testing and field verification, I certify that the house identified on this form complies with the diagnostic tested compliance requirements as checked on this form.

The installer has provided a copy of CF-6R (Installation Certificate).

ADEQUATE AIRFLOW VERIFICATION

Procedures for field verification and diagnostic testing of adequate airflow are available in RACM, Appendix RE4.1.

| Method For Airflow Measurement | | | | |
|-------------------------------------|------------------------------|-----------------------------|---|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct design exists on plans | |
| <input type="checkbox"/> | RE4.1.1 | | Diagnostic Fan Flow Using Flow Capture Hood | |
| <input type="checkbox"/> | RE4.1.2 | | Diagnostic Fan Flow Using Plenum Pressure Matching | |
| <input type="checkbox"/> | RE4.1.3 | | Diagnostic Fan Flow Using Flow Grid Measurement | |
| | | | Measured Airflow: | |
| | | | Rated Tons: | |
| | | | | Total CFM |
| | | | | cfm/ton |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Measured airflow is greater than the criteria in Table RE-2 | <input type="checkbox"/> |
| | | | Yes is a pass | <input type="checkbox"/> |
| | | | | Pass |
| | | | | Fail |

MAXIMUM COOLING CAPACITY

Procedures for determining maximum cooling load capacity are available in RACM, Appendix RF3.

| | | | | | |
|--|-------------------------------------|------------------------------|-----------------------------|--|-------------------------------------|
| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Adequate airflow verified (see adequate airflow credit) | |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Refrigerant charge or TXV | |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct leakage reduction credit verified | |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Cooling capacities of installed systems are ≤ to maximum cooling capacity indicated on the Performance's CF-1R and RF-3. | |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | If the cooling capacities of installed systems are > than maximum cooling capacity in the CF-1R, then the electrical input for the installed systems must be ≤ to electrical input in the CF-1R. | |
| Yes to 1, 2, and 3; and Yes to either 4 or 5 is a pass | | | | | |
| | | | | | <input checked="" type="checkbox"/> |
| | | | | | <input checked="" type="checkbox"/> |
| | | | | | <input type="checkbox"/> |
| | | | | | <input type="checkbox"/> |
| | | | | | Pass |
| | | | | | Fail |

HIGH EER AIR CONDITIONER

Procedures for verification are available in RACM, Appendix RI.

| | | | | | |
|---|-------------------------------------|------------------------------|-----------------------------|--|-------------------------------------|
| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | EER values of installed systems match the CF-1R | |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | For split system, indoor coil is matched to outdoor coil | |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Time Delay Relay Verified (If Required) | |
| Yes to 1 and 2; and 3 (If Required) is a pass | | | | | |
| | | | | | <input checked="" type="checkbox"/> |
| | | | | | <input checked="" type="checkbox"/> |
| | | | | | <input type="checkbox"/> |
| | | | | | <input type="checkbox"/> |
| | | | | | Pass |
| | | | | | Fail |

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 6 of 8) CF-4R

| | | |
|----------------------|-----------------|---------------------|
| Project Address | | Builder Name |
| Builder Contact | Telephone | Plan Number |
| HERS Rater | Telephone | Sample Group Number |
| Certifying Signature | Date | Sample House Number |
| Firm | HERS Provider | |
| Street Address: | City/State/Zip: | |

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

HERS RATER COMPLIANCE STATEMENT

The house was: Tested Approved as part of sample testing, but was not tested

As the HERS rater providing diagnostic testing and field verification, I certify that the house identified on this form complies with the diagnostic tested compliance requirements as checked on this form.

The installer has provided a copy of CF-6R (Installation Certificate).

FAN WATT DRAW

Procedures for measuring the air handler watt draw are available in RACM, Appendix RE3.2.

| | | | | |
|---|-----------------------------|---|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> Method For Fan Watt Draw Measurement | | | | |
| <input type="checkbox"/> | RE3.2.1 | Portable Watt Meter Measurement | | |
| <input type="checkbox"/> | RE3.2.2 | Utility Revenue Meter Measurement | | |
| Measured Fan watt Draw: | | (enter watts here) | | Watts |
| Measured Fan Flow (Enter total cfm from airflow verification) | | | | cfm |
| Enter results of Watts/cfm: | | | | Watts/cfm |
| | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Calculated fan watt/cfm is equal to or lower than the fan watt/cfm draw documented in CF-1R | <input type="checkbox"/> | <input type="checkbox"/> |
| | | Yes is a pass | Pass | Fail |

HERS RATER COMPLIANCE STATEMENT

The house was: Tested Approved as part of sample testing, but was not tested

As the HERS rater providing diagnostic testing and field verification, I certify that the house identified on this form complies with the diagnostic tested compliance requirements as checked on this form.

The installer has provided a copy of CF-6R (Installation Certificate).

MINIMUM REQUIREMENTS FOR INFILTRATION REDUCTION COMPLIANCE CREDIT

Procedures for field verification and diagnostic testing of infiltration reduction are available in RACM Section 3.5.

Diagnostic Testing Results

| | | | | |
|---|-------------------------------------|-------------------------------------|--|---|
| | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Building Envelope Leakage (CFM @ 50 Pa) as measured by Rater: | |
| 1. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Is measured envelope leakage less than or equal to the required level from CF-1R? | |
| 2. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Is Mechanical Ventilation shown as required on the CF-1R? | |
| 2a. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | If Mechanical Ventilation is required on the CF-1R (Yes in line 2), has it been installed? | |
| 2b. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Check this box yes if mechanical ventilation is required (Yes in line 2) and ventilation fan watts are no greater than shown on CF-1R. | |
| 3. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Check this box yes if measured building infiltration (CFM @ 50 Pa) is greater than the CFM @ 50 values shown for an SLA of 1.5 on CF-1R (If this box is checked no, mechanical ventilation is required.) | |
| 4. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Check this box yes if measured building infiltration (CFM @ 50 Pa) is less than the CFM @ 50 values shown for an SLA of 1.5 on CF-1R, mechanical ventilation is installed and house pressure is greater than minus 5 Pascal with all exhaust fans operating. | |
| Pass if: a) Yes in line 1 and line 3, or b) Yes in line 1 and line2, 2a, and 2b, or c)Yes in line 1 and line 4, Otherwise Fail. | | | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |

| CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 7 of 8) CF-4R | | |
|---|-----------------|---------------------|
| Project Address | | Builder Name |
| Builder Contact | Telephone | Plan Number |
| HERS Rater | Telephone | Sample Group Number |
| Certifying Signature | Date | Sample House Number |
| Firm | HERS Provider | |
| Street Address: | City/State/Zip: | |

Copies to: BUILDER, HERS PROVIDER AND BUILDING DEPARTMENT

HERS RATER COMPLIANCE STATEMENT

The house was: Tested Approved as part of sample testing, but was not tested

As the HERS rater providing diagnostic testing and field verification, I certify that the house identified on this form complies with all applicable requirements of the “High Quality Installation of Insulation” protocols as specified in the Residential ACM, Appendix RH and as checked on this form. Note that to PASS and receive compliance credit, NONE of the BOXES below may be checked “No” and the first three boxes also must be checked. Check “NA” only if the item is not part of the design of the building (i.e., single story buildings do not have rim joists or there may be no recessed can lights installed, etc.).

REQUIREMENTS FOR “HIGH QUALITY INSTALLATION OF INSULATION” COMPLIANCE CREDIT

- The building is wood frame construction with wall stud cavities, ceilings, and roof assemblies insulated with mineral fiber or cellulose insulation in low-rise residential buildings.
- Description of insulation, (CF-6R, formerly IC-1) signed by the installer stating: insulation manufacturer’s name, material identification, installed R-values, and for loose-fill insulation: minimum weight per square foot and minimum inches.
- Installation Certificate, (CF-6R) signed by the installer certifying that the installation meets all applicable requirements as specified in the High Quality Insulation Installation Procedures (ACM, Appendix RH).

FLOOR

| | | | |
|--|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All floor joist cavity insulation installed to uniformly fit the cavity side-to-side and end-to-end |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation in contact with the subfloor or rim joists insulated |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation properly supported to avoid gaps, voids, and compression |
| Yes | No | NA | |
| <input checked="" type="checkbox"/> WALLS | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wall stud cavity insulation uniformly fills the cavity side-to-side, top-to-bottom, and front-to-back |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No gaps |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No voids over 3/4” deep or more than 10% of the batt surface area. |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Hard to access wall stud cavities such as; corner channels, wall intersections, and behind tub/shower enclosures insulated to proper R-Value |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Small spaces filled |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rim-joists insulated |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wall stud cavities caulked or foamed to provide an air tight envelope |
| Yes | No | NA | |

CERTIFICATE OF FIELD VERIFICATION & DIAGNOSTIC TESTING (Page 8 of 8) CF-4R

Project Address

Builders Name

✓ ROOF/CEILING PREPARATION

| | | | |
|---------------------------------|--------------------------------|--------------------------------|---|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | All draft stops in place to form a continuous ceiling and wall air barrier |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | All drops covered with hard covers |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | All draft stops and hard covers caulked or foamed to provide an air tight envelope |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | All recessed light fixtures IC and air tight (AT) rated and sealed with a gasket or caulk between the housing and the ceiling |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Floor cavities on multiple-story buildings have air tight draft stops to all adjoining attics |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Eave vents prepared for blown insulation - maintain net free-ventilation area |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Knee walls insulated or prepared for blown insulation |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Area under equipment platforms and cat-walks insulated or accessible for blown insulation |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Attic rulers installed |

✓ ROOF/CEILING BATTS

| | | | |
|---------------------------------|--------------------------------|--------------------------------|--|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | No gaps |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | No voids over 3/4 in. deep or more than 10% of the batt surface area |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Insulation in contact with the air-barrier |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Recessed light fixtures covered |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Net free-ventilation area maintained at eave vents |

✓ ROOF/CEILING LOOSE-FILL

| | | | |
|---------------------------------|--------------------------------|--------------------------------|--|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Insulation uniformly covers the entire ceiling (or roof) area from the outside of all exterior walls |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Baffles installed at eaves vents or soffit vents - maintain net free-ventilation area of eave vent |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Attic access insulated |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Recessed light fixtures covered |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Insulation at proper depth – insulation rulers visible and indicating proper depth and R-value |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Loose-fill mineral fiber insulation meets or exceeds manufacturer's minimum weight and thickness requirement for the target R-value. Target R-value _____ Manufacturer's minimum required weight for the target R-value _____ (pounds-per-square foot). Sample weight _____ (pounds per square foot). |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA | Manufacturer's minimum required thickness at time of installation _____ (inches) Manufacturer's minimum required settled thickness _____ (inches). Number of days since loose-fill insulation was installed _____ (days). At the time of installation, the insulation shall be greater than or equal to the manufacturer's minimum initial insulation thickness. If the HERS rater does not verify the insulation at the time of installation, and if the loose-fill insulation has been in place less than seven days the thickness shall be greater than the manufacturer's minimum required thickness at the time of installation less 1/2 inch to account for settling. If the insulation has been in place for seven days or longer the insulation thickness shall be greater than or equal to the manufacturer's minimum required settled thickness. Minimum thickness measured (inches). |

INSTALLATION CERTIFICATE

Site Address

Permit Number

An installation certificate is required to be posted at the building site or made available for all appropriate inspections. (The information provided on this form is required) After completion of final inspection, a copy must be provided to the building department (upon request) and the building owner at occupancy, per Section 10-103(a).

WATER HEATING SYSTEMS:

| Heater Type | CEC Certified Mfr Name & Model Number | Distribution Type (Std, Point-of-Use, etc) | If Recirculation, Control Type | # of Identical Systems | Rated Input (kW or Btu/hr) ¹ | Tank Volume (gallons) | Efficiency (EF, RE) ² | Standby Loss (%) ² | External Insulation R-value ² |
|-------------|---------------------------------------|--|--------------------------------|------------------------|---|-----------------------|----------------------------------|-------------------------------|--|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

- 1 For **small gas storage** (rated input of less than or equal to 75,000 Btu/hr), **electric resistance** and **heat pump water heaters**, list Energy Factor (EF). For **large gas storage water heaters** (rated input of greater than 75,000 Btu/hr), list Recovery (RE), Thermal Efficiency, Standby Loss and Rated Input. For **instantaneous gas water heaters**, list Thermal Efficiency and Rated Input.
2. R-12 external insulation is mandatory for storage water heaters with an energy factor of less than 0.58.

Kitchen Piping:

If indicated on the CF-1R, all hot water piping \geq 3/4 inches in diameter that runs from the hot water source to the kitchen fixtures is insulated.

Faucets & Shower Heads:

All faucets and showerheads installed are certified to the Energy Commission, pursuant to Title 24, Part 6, Section 111.

Central Water Heating in Buildings with Multiple Dwelling Units (required for prescriptive)

- All hot water piping in main circulating loop is insulated to requirements of §150(j)
 - Central hot water systems serving six or fewer dwelling units which have (1) less than 25' of distribution piping outdoors; (2) zero distribution piping underground; (3) no recirculation pump; and (4) insulation on distribution piping that meets the requirements of Section 150(j)
 - Central hot water systems serving more than 6 dwelling units - presence of either a time control or a time/temperature control
- I, the undersigned, verify that equipment listed above my signature is: 1) the actual equipment installed; 2) equivalent to or more efficient than that specified in the certificate of compliance (Form CF-1R) submitted for compliance with the *Energy Efficiency Standards* for residential buildings; and 3) equipment that meets or exceeds the appropriate requirements for manufactured devices (from the *Appliance Efficiency Regulations* or Part 6), where applicable.

| | |
|---|-------|
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

Copies to: BUILDING DEPARTMENT, HERS RATER (IF APPLICABLE) BUILDING OWNER AT OCCUPANCY

INSTALLATION CERTIFICATE

| | |
|--------------|---------------|
| Site Address | Permit Number |
|--------------|---------------|

An installation certificate is required to be posted at the building site or made available for all appropriate inspections. (The information provided on this form is required) After completion of final inspection, a copy must be provided to the building department (upon request) and the building owner at occupancy, per Section 10-103(a).

FENESTRATION/GLAZING:

| Item | Manufacturer/Brand Name (GROUP LIKE PRODUCTS) | Product U-factor ¹ (≤ CF-1R value) ² | Product SHGC ¹ (≤CF-1R value) ² | # of Panes | Total Quantity of Like Product (Optional) | Area Square Feet | Exterior Shading Device or Overhang | Comments/Location/ Special Features |
|------|--|---|--|------------|--|------------------|-------------------------------------|--|
| 1. | | | | | | | | |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |
| 11. | | | | | | | | |
| 12. | | | | | | | | |
| 13. | | | | | | | | |
| 14. | | | | | | | | |
| 15. | | | | | | | | |

- ¹⁾ Use values from a fenestration product’s NFRC label. For fenestration products without an NFRC label, use the default values from Section 116 of the Energy Efficiency Standards.
- ²⁾ Installed U-factor must be less than or equal to values from CF-1R. Installed SHGC must be less than or equal to values from CF-1R, or a shading device (exterior or overhang) is installed as specified on the CF-1R. Alternatively, installed weighted average U-factors for the total fenestration area are less than or equal to values from CF-1R. If using default table SHGC values from §116 identify whether tinted or not.

I, the undersigned, verify that the fenestration/glazing listed above my signature: 1) is the actual fenestration product installed; 2) is equivalent to or has a lower U-factor and lower SHGC than that specified in the certificate of compliance (Form CF-1R) submitted for compliance with the *Energy Efficiency Standards* for residential buildings; and 3) the product meets or exceeds the appropriate requirements for manufactured devices (from Part 6), where applicable.

| | | | |
|----------------------------|-----------|------|---|
| Item #s (if applicable) | Signature | Date | Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner OR Window Distributor |
| Item #s (if applicable) | Signature | Date | Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner OR Window Distributor |
| Item #s (if applicable) | Signature | Date | Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner OR Window Distributor |

Copies to: Building Department , HERS Rater (if applicable) Building Owner at Occupancy

INSTALLATION CERTIFICATE**(Page 3 of 12) CF-6R**

Site Address

Permit Number

An installation certificate is required to be posted at the building site or made available for all appropriate inspections. (The information provided on this form is required) After completion of final inspection, a copy must be provided to the building department (upon request) and the building owner at occupancy, per Section 10-103(a).

HVAC SYSTEMS:***Heating Equipment***

| Equip Type (pkg. heat pump) | CEC Certified Mfr. Name and Model Number | # of Identical Systems | Efficiency (AFUE, etc.) ¹ (≥CF-1R value) | Duct Location (attic, etc.) | Duct or Piping R-value | Heating Load (Btu/hr) | Heating Capacity (Btu/hr) |
|--------------------------------|--|------------------------------|---|-----------------------------------|------------------------------|-----------------------------|---------------------------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Cooling Equipment

| Equip Type (pkg. heat pump) | CEC Certified Mfr. Name and Model Number | # of Identical Systems | Efficiency (SEER or EER) ¹ (≥CF-1R value) | Duct Location (attic, etc.) | Duct R-value | Cooling Load (Btu/hr) | Cooling Capacity (Btu/hr) |
|--------------------------------|--|------------------------------|--|-----------------------------------|-----------------|-----------------------------|---------------------------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

1. ≥ symbol reads *greater than or equal to what is indicated on the CF-1R value.*

Include both SEER and EER if compliance credit for high EER air conditioner is claimed.

✓ I, the undersigned, verify that equipment listed above is: 1) is the actual equipment installed, 2) equivalent to or more efficient than that specified in the certificate of compliance (Form CF-1R) submitted for compliance with the *Energy Efficiency Standards* for residential buildings, and 3) equipment that meets or exceeds the appropriate requirements for manufactured devices (from the *Appliance Efficiency Regulations* or Part 6), where applicable.

| | |
|---|-------|
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

Copies to: BUILDING DEPARTMENT, HERS RATER (IF APPLICABLE) BUILDING OWNER AT OCCUPANCY

Site Address

Permit Number

INSTALLER COMPLIANCE STATEMENT FOR DUCT LEAKAGE

INSTALLER COMPLIANCE STATEMENT

The building was: Tested at Final Tested at Rough-in

INSTALLER VISUAL INSPECTION AT FINAL CONSTRUCTION STAGE:

- Remove at least one supply and one return register, and verify that the spaces between the register boot and the interior finishing wall are properly sealed.
- If the house rough-in duct leakage test was conducted without an air handler installed, inspect the connection points between the air handler and the supply and return plenums to verify that the connection points are properly sealed.
- Inspect all joints to ensure that no cloth backed rubber adhesive duct tape is used

DUCT LEAKAGE REDUCTION

Procedures for field verification and diagnostic testing of air distribution systems are available in RACM, Appendix RC4.3

| NEW CONSTRUCTION: | | | |
|--|---|-----------------|---|
| | | Measured Values | |
| | Duct Pressurization Test Results (CFM @ 25 Pa) | | |
| 1 | Enter Tested Leakage Flow in CFM: | | |
| 2 | Fan Flow: Calculated (Nominal: <input checked="" type="checkbox"/> Cooling <input checked="" type="checkbox"/> Heating) or <input checked="" type="checkbox"/> Measured If Fan Flow is Calculated as 400 cfm/ton x number of tons or as 21.7 cfm/(kBtu/hr) x Heating Capacity in Thousands of Btu/hr, enter total calculated or measured fan flow in CFM here: | | ✓ ✓ |
| 3 | Pass if Leakage Percentage ≤ 6% for Final or ≤ 4% at Rough-in: [100 x [_____ (Line # 1) / _____ (Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| ALTERATIONS: Duct System and/or HVAC Equipment Change-Out | | | |
| 4 | Enter Tested Leakage Flow in CFM from Pre-Test of Existing Duct System Prior to Duct System Alteration and/or Equipment Change-Out. | | |
| 5 | Enter Tested Leakage Flow in CFM from Final Test of New Duct System or Altered Duct System for Duct System Alteration and/or Equipment Change-Out. | | |
| 6 | Enter Reduction in Leakage for Altered Duct System [_____ (Line # 4) Minus _____ (Line # 5)] – (Only if Applicable) | | |
| 7 | Enter Tested Leakage Flow in CFM to Outside (Only if Applicable) | | ✓ ✓ |
| 8 | Entire New Duct System - Pass if Leakage Percentage ≤ 6% for Final or ≤ 4% at Rough-in [100 x [_____ (Line # 5) / _____ (Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| TEST OR VERIFICATION STANDARDS: For Altered Duct System and/or HVAC Equipment Change-Out Use one of the following four Test or Verification Standards for compliance: | | | ✓ ✓ |
| 9 | Pass if Leakage Percentage ≤ 15% [100 x [_____ (Line # 5) / _____ (Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| 10 | Pass if Leakage to Outside Percentage ≤ 10% [100 x [_____ (Line # 7) / _____ (Line # 2)]] | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| 11 | Pass if Leakage Reduction Percentage ≥ 60% [100 x [_____ (Line # 6) / _____ (Line # 4)]] and Verification by Smoke Test and Visual Inspection | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| 12 | Pass if Sealing of all Accessible Leaks and Verification by Smoke Test and Visual Inspection | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Pass if One of Lines # 9 through # 12 pass | | | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |

I, the undersigned, verify that the above diagnostic test results were performed in conformance with the requirements for compliance credit. I, the undersigned, also certify that the newly installed or retrofit Air-Distribution System Ducts, Plenums and Fans comply with Mandatory requirements specified in Section 150 (m) of the 2005 Building Energy Efficiency standards.

| | |
|---|-------|
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

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INSTALLATION CERTIFICATE

Site Address

Permit Number

THERMOSTATIC EXPANSION VALVE (TXV)

Procedures for field verification of thermostatic expansion valves are available in RACM, Appendix RI.

| | | | | | |
|-------------------------------------|------------------------------|-----------------------------|---|--------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Access is provided for inspection. The procedure shall consist of visual verification that the TXV is installed on the system and installation of the specific equipment shall be verified. | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | Yes is a pass | Pass | Fail |

REFRIGERANT CHARGE MEASUREMENT

Verification for Required Refrigerant Charge and Adequate Airflow for Split System Space Cooling Systems without Thermostatic Expansion Valves

| | | |
|---------------------------------------|--|---------------------------|
| Outdoor Unit Serial # | | |
| Location | | |
| Outdoor Unit Make | | |
| Outdoor Unit Model | | |
| Cooling Capacity | | Btu/hr |
| Date of Verification | | |
| Date of Refrigerant Gauge Calibration | | (must be checked monthly) |
| Date of Thermocouple Calibration | | (must be checked monthly) |

Standard Charge Measurement Procedure (outdoor air dry-bulb 55°F and above):

Procedures for Determining Refrigerant Charge using the Standard Method are available in RACM, Appendix RD2.

Note: The system should be installed and charged in accordance with the manufacturer’s specifications before starting this procedure.

Measured Temperatures

| | | |
|---|--|----|
| Supply (evaporator leaving) air dry-bulb temperature (Tsupply, db) | | °F |
| Return (evaporator entering) air dry-bulb temperature (Treturn, db) | | °F |
| Return (evaporator entering) air wet-bulb temperature (Treturn, wb) | | °F |
| Evaporator saturation temperature (Tevaporator, sat) | | °F |
| Suction line temperature (Tsuction, db) | | °F |
| Condenser (entering) air dry-bulb temperature (Tcondenser, db) | | °F |

Superheat Charge Method Calculations for Refrigerant Charge

| | | |
|--|--|----|
| Actual Superheat = Tsuction, db – Tevaporator, sat | | °F |
| Target Superheat (from Table RD-2) | | °F |
| Actual Superheat – Target Superheat (System passes if between -5 and +5°F) | | °F |

Temperature Split Method Calculations for Adequate Airflow

Split Method Calculation is not necessary if Adequate Airflow credit is taken

| | | |
|---|--|----|
| Actual Temperature Split = T return, db Tsupply, db | | °F |
| Target Temperature Split (from Table RD3) | | °F |
| Actual Temperature Split Target Temperature Split (System passes if between -3°F and +3°F or, upon remeasurement, if between -3°F and -100°F) | | °F |

INSTALLATION CERTIFICATE**(Page 6 of 12) CF-6R**

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Standard Charge Measurement Summary:

System shall pass both refrigerant charge and adequate airflow calculation criteria from the same measurements. If corrective actions were taken, both criteria must be remeasured and recalculated.

 Yes No

System Passes

Alternate Charge Measurement Procedure (outdoor air dry-bulb below 55 °F)

Note: The system should be installed and charged in accordance with the manufacturer's specifications and installer verification shall be documented on CF-6R before starting this procedure. If outdoor air dry-bulb is 55 °F or above, installer shall use the Standard Charge Measure Procedure:

Procedures for Determining Refrigerant Charge using the Alternate Method are available in RACM, Appendix RD3.

Weigh-In Charging Method for Refrigerant Charge

| | | |
|---|--|----|
| Actual liquid line length: | | ft |
| Manufacturer's Standard liquid line length: | | ft |
| Difference (Actual – Standard): | | ft |
| Manufacturer's correction (ounces per foot) _____ x difference in length = _____ ounces (+ = add) (- = remove) | | |

Measured Airflow Method for Adequate Airflow Verification *available in RACM, Appendix RD2.6*

| |
|---|
| Calculated Airflow: Cooling Capacity (Btu/hr) _____ X 0.033 (cfm/Btu-hr) = _____ CFM |
| Measured Airflow is _____ CFM (Measured airflow must be greater than the calculated airflow). |

Alternate Charge Measurement Summary:

System shall pass both refrigerant charge and adequate airflow calculation criteria from the same measurements. If corrective actions were taken, both criteria must be remeasured and recalculated.

 Yes No

System Passes

| | |
|---|-------|
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

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MISCELLANEOUS CREDITS

DIAGNOSTIC SUPPLY DUCT LOCATION, SURFACE AREA AND R-VALUE

Procedures for field verification and diagnostic testing for this group compliance credits are available in RACM, Appendix RC, RE & RH.

LESS THAN 12 LINEAL FEET OF SUPPLY DUCT OUTSIDE OF CONDITIONED SPACE

COMPLIANCE CREDIT

| | | | |
|---|------------------------------|-----------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Less than 12 lineal feet of supply duct outside of conditioned space. |
| Yes to this compliance credit is a pass | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Pass <input checked="" type="checkbox"/> Fail |

SUPPLY DUCTS LOCATED IN CONDITIONED SPACE COMPLIANCE CREDIT

| | | | |
|---|------------------------------|-----------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Ducts are located within the conditioned volume of building. |
| Yes to this compliance credit is a pass | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Pass <input checked="" type="checkbox"/> Fail |

Duct System Design verification is required for a compliance credit for the following:

1. Supply duct surface area reduction
2. Buried supply ducts on the ceiling
3. Deeply buried supply ducts

DUCT SYSTEM DESIGN VERIFICATION

| | | | |
|-------------------------------------|------------------------------|-----------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Adequate airflow verified |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | The duct system design plan meets the requirements specified in RACM, Appendix RE, Section RE.4.2 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | The duct system design plan exists on building plans |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct sizes, duct system layout and locations of supply & return registers match the duct system design plan |
| Yes to all is a pass | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Pass <input checked="" type="checkbox"/> Fail |

SUPPLY DUCTS SURFACE AREA REDUCTION COMPLIANCE CREDIT

| Attic | Crawl Space | Basement | Covered | Deeply Covered | Other | Duct Diameter | R-4.2 Surface Area | R-6.0 Surface Area | R-8.0 Surface Area |
|---------------------------------------|------------------------------|-----------------------------|------------------------------|--------------------------|--------------------------|---------------|--------------------|-------------------------------------|-------------------------------------|
| <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"/> | | | | |
| Total Surface Area for Each R-Value = | | | | | | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Matches Performance's CF-1R? | | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Yes to all is a pass | | | | | | | | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail |

BURIED DUCTS ON THE CEILING COMPLIANCE CREDIT

| | | | |
|--|------------------------------|-----------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Buried Ducts on the Ceiling |
| <input type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Verified High Insulation Installation Quality |
| Yes to duct system design, supply duct surface area reduction and this compliance credit is a pass | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |

DEEPLY BURIED DUCTS COMPLIANCE CREDIT

| | | | |
|--|------------------------------|-----------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Deeply Buried Ducts |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Verified High Insulation Installation Quality |
| Yes to duct system design, supply duct surface area reduction and this compliance credit is a pass | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |

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INSTALLATION CERTIFICATE

Site Address

Permit Number

FAN WATT DRAW

Procedures for measuring the air handler watt draw are available in RACM, Appendix RE3.2.

| | | | | |
|---|-----------------------------|--|--|---|
| <input checked="" type="checkbox"/> Method For Fan Watt Draw Measurement | | | | |
| <input type="checkbox"/> | RE3.2.1 | Portable Watt Meter Measurement | | |
| <input type="checkbox"/> | RE3.2.2 | Utility Revenue Meter Measurement | | |
| | | | | Measured Fan Watt Draw |
| | | | | Measured Fan Flow (enter total cfm from airflow verification) |
| | | | | Enter results of Watts/cfm |
| | | | | Watts |
| | | | | cfm |
| | | | | Watts/cfm |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Measured fan watt/cfm draw is equal to or lower than the fan watt/cfm draw documented in CF-1R | | <input type="checkbox"/> <input type="checkbox"/> |
| Yes is a pass | | | | Pass Fail |

ADEQUATE AIRFLOW VERIFICATION

Procedures for measuring the airflow are available in RACM, Appendix RE3.1.

| | | | | |
|---|-----------------------------|---|--|---|
| <input checked="" type="checkbox"/> Method For Airflow Measurement | | | | |
| <input type="checkbox"/> | RE4.1.1 | Diagnostic Fan Flow Using Flow Capture Hood | | |
| <input type="checkbox"/> | RE4.1.2 | Diagnostic Fan Flow Using Plenum Pressure Matching | | |
| <input type="checkbox"/> | RE4.1.3 | Diagnostic Fan Flow Using Flow Grid Measurement | | |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct design exists on plans | | |
| | | | | Measured Airflow: |
| | | | | Rated Tons cfm/ton |
| | | | | Total cfm |
| | | | | cfm/ton |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Measured airflow is greater than the criteria in Table RE-2 | | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
| Yes is a pass | | | | Pass Fail |

MAXIMUM COOLING CAPACITY

Procedures for determining maximum cooling load capacity are available in RACM, Appendix RF3.

| | | | | | | |
|--|-------------------------------------|------------------------------|-----------------------------|--|-------------------------------------|-------------------------------------|
| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Adequate airflow verified (see adequate airflow credit) | | |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Refrigerant charge or TXV | | |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Duct leakage reduction credit verified | | |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Cooling capacities of installed systems are ≤ to maximum cooling capacity indicated on the Performance's CF-1R and RF-3. | | |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | If the cooling capacities of installed systems are > than maximum cooling capacity in the CF-1R, then the electrical input for the installed systems must be ≤ to electrical input in the CF-1R. | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Yes to 1, 2, and 3; and Yes to either 4 or 5 is a pass | | | | | Pass | Fail |

HIGH EER AIR CONDITIONER

Procedures for verification are available in RACM, Appendix RI.

| | | | | | | |
|---|-------------------------------------|------------------------------|-----------------------------|--|-------------------------------------|-------------------------------------|
| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | EER values of installed systems match the CF-1R | | |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | For split system, indoor coil is matched to outdoor coil | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Time Delay Relay Verified (If Required) | <input type="checkbox"/> | <input type="checkbox"/> |
| Yes to 1 and 2; and 3 (If Required) is a pass | | | | | Pass | Fail |

| | |
|---|-------|
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

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INSTALLATION CERTIFICATE**(Page 9 of 12) CF-6R**

Site Address

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An installation certificate is required to be posted at the building site or made available for all appropriate inspections. (The information provided on this form is required) After completion of final inspection, a copy must be provided to the building department (upon request) and the building owner at occupancy, per Section 10-103(a).

BUILDING ENVELOPE LEAKAGE DIAGNOSTICS **ENVELOPE SEALING INFILTRATION REDUCTION**

Procedures for field verification and diagnostic testing of envelope leakage are available in RACM, Appendix RC.

Diagnostic Testing Results

| | | ✓ | ✓ | Building Envelope Leakage (CFM @ 50 Pa) as measured by Rater: | | |
|-----|---------------------------------|--------------------------------|---|--|----------------------------------|----------------------------------|
| 1. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | Measured envelope leakage less than or equal to the required level from CF-1R? | | |
| 2. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | Is Mechanical Ventilation shown as required on the CF-1R? | | |
| 2a. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | If Mechanical Ventilation is required on the CF-1R ('Yes' in line 2), has it been installed? | | |
| 2b. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | Check this box 'yes' if mechanical ventilation is required ('Yes' in line 2) and ventilation fan watts are no greater than shown on CF-1R. Measured Watts = | | |
| 3. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | Check this box "yes" if measured building infiltration (CFM @ 50 Pa) is greater than the CFM @ 50 values shown for an SLA of 1.5 on CF-1R (If this box is checked no, mechanical ventilation is required.) | | |
| 4. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | Check this box "yes" if measured building infiltration (CFM @ 50 Pa) is less than the CFM @ 50 values shown for an SLA of 1.5 on CF-1R, mechanical ventilation is installed and house pressure is greater than minus 5 Pascal with all exhaust fans operating. | | |
| | | | | Pass if: a. Yes in line 1 and line 3, or b. Yes in line 1 and line2, 2a, and 2b, or c. Yes in line 1 and Yes in line 4. Otherwise fail. | ✓ | ✓ |
| | | | | | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail |

I, the undersigned, verify that the building envelope leakage meets the requirements claimed for building leakage reduction below default assumptions as used for compliance on the CF-1R. This is to certify that the above diagnostic test results and the work I performed associated with the test(s) is in conformance with the requirements for compliance credit. (The builder shall provide the HERS provider a copy of the CF-6R signed by the builder employees or subcontractors certifying that diagnostic testing and installation meet the requirements for compliance credit.)

| | |
|---|-------|
| Test Performed | |
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

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| | |
|--------------|---------------|
| Site Address | Permit Number |
|--------------|---------------|

Insulation Installation Quality Certificate

- ✓ Description of Insulation, (CF-6R, formerly IC-1) signed by the installer stating: insulation manufacturer’s name, material identification, installed R-values, and for loose-fill insulation: minimum weight per square foot and minimum inches
- ✓ Installation meets all applicable requirements as specified in the High Quality Insulation Installation Procedures (ACM, Appendix RH)

| | | | |
|-----------------------------------|--------------------------|--------------------------|--|
| ✓ FLOOR | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All floor joist cavity insulation installed to uniformly fit the cavity side-to-side and end-to-end |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation in contact with the subfloor or rim joists insulated |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation properly supported to avoid gaps, voids, and compression |
| Yes | No | NA | |
| ✓ WALLS | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <i>Wall stud cavities caulked or foamed to provide an air tight envelope</i> |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wall stud cavity insulation uniformly fills the cavity side-to-side, top-to-bottom, and front-to-back |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No gaps |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No voids over 3/4" deep or more than 10% of the batt surface area. |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Hard to access wall stud cavities such as; corner channels, wall intersections, and behind tub/shower enclosures insulated to proper R-Value |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Small spaces filled |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rim-joists insulated |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loose fill wall insulation meets or exceeds manufacturer's minimum weight-per-square-foot requirement |
| Yes | No | NA | |
| ✓ ROOF/CEILING PREPARATION | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All draft stops in place to form a continuous ceiling and wall air barrier |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All drops covered with hard covers |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All draft stops and hard covers caulked or foamed to provide an air tight envelope |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All recessed light fixtures IC and air tight (AT) rated and sealed with a gasket or caulk between the housing and the ceiling |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Floor cavities on multiple-story buildings have air tight draft stops to all adjoining attics |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Eave vents prepared for blown insulation - maintain net free-ventilation area |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Knee walls insulated or prepared for blown insulation |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Area under equipment platforms and cat-walks insulated or accessible for blown insulation |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Attic rulers installed |
| Yes | No | NA | |

INSTALLATION CERTIFICATE

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Site Address

Permit Number

✓ ROOF/CEILING BATTS

| | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No gaps |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No voids over ¼ in. deep or more than 10% of the batt surface area. |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation in contact with the air-barrier |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Recessed light fixtures covered |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <i>Net free-ventilation area maintained at eave vents</i> |
| Yes | No | NA | |

✓ ROOF/CEILING LOOSE-FILL

| | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation uniformly covers the entire ceiling (or roof) area from the outside of all exterior walls. |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Baffles installed at eaves vents or soffit vents - maintain net free-ventilation area of eave vent |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Attic access insulated |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Recessed light fixtures covered |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Insulation at proper depth – insulation rulers visible and indicating proper depth and R-value |
| Yes | No | NA | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <i>Loose-fill insulation meets or exceeds manufacturer's minimum weight and thickness requirements for the target R-value. Target R-value _____. Manufacturer's minimum required weight for the target R-value _____ (pounds-per-square-foot). Manufacturer's minimum required thickness at time of installation _____. Manufacturer's minimum required settled thickness _____. Note: To receive compliance credit the HERS rater shall verify that the manufacturer's minimum weight and thickness has been achieved for the target R-value. (CF-6R only)</i> |
| Yes | No | NA | |

DECLARATION

✓ I hereby certify that the installation meets all applicable requirements as specified in the Insulation Installation Procedures.

| | |
|---|-------|
| Installing Subcontractor (Co. Name) OR General Contractor (Co. Name) OR Owner | |
| Signature: | Date: |

Copies to: BUILDING DEPARTMENT, HERS RATER (IF APPLICABLE), BUILDING OWNER AT OCCUPANCY