



CALIFORNIA ENERGY COMMISSION

Residential HVAC & Indoor Air Quality(ASHRAE 62.2)

Tav Commins



Contact Information

- Energy Hotline (Title 24 Questions)
 - 1-800-772-3300
 - Monday – Friday 8:00-12:00 and 1:00-4:30
 - title24@energy.state.ca.us
- Title 24 Home Page
 - www.energy.ca.gov/title24



Contact Information

- Contractor State License Board (CSLB)
 - For problems with contractors
- Jane Flint, Enforcement Supervisor
 - E-mail address: JFlint@cslb.ca.gov
 - Office: (916) 255-4057



Title 24 Information

- Working with CALBO Develop New Training Material
 - [Checklists](#) and Guides for Plans Examiner
 - Checklists and Guides for Inspector
- New construction, Additions /Alterations
- Nonresidential and Residential



Residential HVAC & Indoor Air Quality(ASHRAE 62.2)

- HVAC Efficiency
- Quality Installation (HERS Measures)
- Sampling by HERS Rater
- Indoor Air Quality (ASHRAE 62.2)



HVAC Efficiency

- Heating - AFUE 78%
- Cooling – 13 SEER
 - Tested at 82 Degrees
- Cooling – EER
 - Tested at 95 Degrees
 - HERS Measure



HVAC Efficiency

- Plans Examiner – Look at CF-1R and if it is above 78% AFUE or 13 SEER then verify the information is on the plans and highlight for the inspector to verify.
- Inspector – Collect **CF-6R-MECH-04** any time HVAC equipment installed. If equipment modeled on CF-1R is above 78% AFUE or 13 SEER than inspector must verify by either a cut sheet from the installer or calling the Energy Hotline with the model number.



HERS Measures (Quality Installation)

- The HERS Measures are in the Standards because that equipment is rarely installed correctly.
- They are installation requirements and testing procedures for the installer.



HERS Measures

- All but two of the HERS measures have to do with Air Conditioning
- Most Air Conditioners are operating at 33% to 50% of their rated **Efficiency** and **Capacity**



HERS Measures

- All the measures have installation and testing requirements for the installer.
- Installer certifies that the equipment was installed according to the HERS Measures and that they have been tested to that Standard.
- Any time HERS is required the installer fills out a CF-6R for every measure for every house.



HERS Measures

- When are they Required?
 - Alterations to Existing buildings
 - Newly Constructed Buildings/Additions
- Alterations to Existing Buildings
 - All HVAC Changeouts
- Newly Constructed Buildings/Additions
 - Listed on CF-1R



HERS Measures

- Alterations to Existing buildings (HVAC Changeout)
 - For all HVAC Changeouts, Replacing the Coil, or Condenser
 - Duct Testing required in CZ 2, 9 to 16
 - Refrigerant Charge required in CZ 2, 8 to 15



HERS Measures

- Alterations to Existing buildings (New System)
New Systems - Changeout and **all new ducts**
- Required Tests:
 - Duct Testing less than 6% - CZ 1 to 16
 - Refrigerant Charge - CZ 2, 8 to 15
 - Cooling Coil Airflow - CZ 10 TO 15
 - Watt Draw – CZ 1 to 16



HERS Measures

- Required Forms
- HVAC Changeout, Coil, or Condenser replacement
 - Inspector must collect
 - **CF-1R – ALT – For all alterations**
 - **CF-6R-MECH-04 – Equipment Efficiency, Make, Model**
 - **CF-6R and 4R - Duct test form**
 - **CF-6R and 4R – Refrigerant charge form**



HERS Measures

- Required Forms
- For **new systems** in existing buildings (Changeout and new ducts)
 - Inspector must collect
 - **CF-6R-MECH-04 – Equipment Efficiency, Make, Model**
 - **CF-6R-MECH-20-HERS – Duct test form (new ducts)**
 - **CF-6R-MECH-25-HERS – Refrigerant charge form**
 - **CF-6R-MECH-22-HERS – Cooling Coil Airflow**
 - **CF-6R-MECH-24-HERS – Temperature Measurement Access Holes**



HERS Measures

- Required Tests – Newly Constructed Buildings and Additions
- **Performance**
 - Will be listed on Page 2 of the [CF-1R](#) under HERS measures
- **Prescriptive**
 - Must look at prescriptive package for that CZ in Standards Section 151



HERS Measures

- **Duct sealing**
- Supply Duct Location, Surface Area and R-value
- Low Leakage Ducts in Conditioned Space
- Low Leakage Air Handlers
- **Refrigerant Charge**
- Installation of a Charge Indicator Display (CID)
- **Verified Cooling Coil Airflow**
- **Air Handler Fan Watt Draw**
- **High Energy Efficiency Ratio (EER)**
- **Maximum Rated Total Cooling Capacity**
- Evaporatively Cooled Condensers
- Ice Storage Air Conditioners
- Ducts <12 ft Outside Conditioned Space



Sampling by HERS Rater

- Installer fills out CF-6R for each HERS measure for each building/system
- HERS rater randomly tests 1 of 7 or 1 of 30 systems
- 1 in 7 for all HERS measures
- 1 in 30 only for Duct Testing and Refrigerant Charge



Sampling by HERS Rater

- What does the **Plans Examiner** need to verify?
 - Highlight for the inspector each HERS measure that requires HERS verification
- What does the **Inspector** need to verify?
 - Must collect CF-6R from Installer and CF-4R from Rater for each test and building. Verify that the form is filled out correctly.



Sampling by HERS Rater

- Forms
 - Starting January 1st all building modeled using multiple orientation (tract buildings) and that have modeled HERS measures the CF-1R, CF-6R and CF-4R must be registered with a HERS provider
 - After October 1st 2010 all newly constructed buildings that include HERS verification the CF-1R, CF-6R and CF-4R must be registered with a HERS provider



Sampling by HERS Rater

- What does the **Plans Examiner** need to do?
 - After January 1st ensure that the CF-1R on plans using multiple orientation and HERS were **Registered** with a HERS provider.
- What does the **Inspector** need to do?
 - Verify the CF-6R and CF-4R were **Registered** with a HERS provider



Sampling by HERS Rater

- What does **Registration** mean
- Registration means that all energy forms (CF-1R, CF-6R, CF-4R) must come from a HERS provider. All the data on the forms will have been uploaded to the HERS providers web site before they can be printed out. The forms will have the HERS providers logo, name of the provider, and a registration number for that specific test. Every test will have a different registration number.



Indoor Air Quality (ASHRAE 62.2)

- When Required?
 - All new buildings and additions to existing buildings over 1,000 sf (original building must comply)
- Two mechanical ventilation requirements
 - Whole-Building Ventilation
 - Local Ventilation Exhaust



Indoor Air Quality (ASHRAE 62.2)

- Additional Information
 - Chapter 4 on the Residential Manual and the Plans Examiners Guide.



Indoor Air Quality (ASHRAE 62.2)

- **Whole-Building Ventilation**
 - Many options for the builder to choose
- One fan, vented to the outside, expected to be left on at all times. Uses normal On/Off switch
- This can be used for **Local Ventilation Exhaust** if used in a bathroom



Indoor Air Quality (ASHRAE 62.2)

- **Whole-Building Ventilation** Fan requirements
 - Rated at less than one sone
 - Move the required amount of air from Equation 4.1 at a minimum static pressure of 0.25 in. w.c.
 - Fan attached to the proper diameter and length of duct per Equation 7.1



Indoor Air Quality (ASHRAE 62.2)

- **Whole-Building Ventilation** Fan requirements
 - Equation 4.1 example
 - A 2500 sf house with 5 bedrooms
 - $Q_{fan} = 0.01 \times 2500 + 7.5(5 + 1)$
 - $Q_{fan} = 70 \text{ cfm}$



Indoor Air Quality (ASHRAE 62.2)

- **Local Ventilation Exhaust**
 - Many options for the builder to choose from
- Every Bathroom and Kitchen range hood vented to outside.
 - A bathroom is any room containing a bathtub, shower, spa, or other similar source of moisture. Fan located in toilet area not considered a bathroom



Indoor Air Quality (ASHRAE 62.2)

- **Local Ventilation Exhaust Fan Requirements**
 - All baths and kitchen exhausted to outside
 - Minimum 100 cfm range hood and 50 cfm bath
 - Rated at 3 sones or less at .25 in. w.c.
 - Attached to a duct size listed in Table 7.1



Indoor Air Quality (ASHRAE 62.2)

- **Local Ventilation Exhaust Fan Requirements**
 - **Plans Examiner** verifies that:
 - NOTE BLOCK on plans next to bath fans
 - NOTE BLOCK on plans next to kitchen range hood