



|                                 |                     |                |
|---------------------------------|---------------------|----------------|
| CERTIFICATE OF INSTALLATION     |                     | CF2R-MCH-25c-H |
| Refrigerant Charge Verification |                     | (Page 1 of 4)  |
| Project Name:                   | Enforcement Agency: | Permit Number: |
| Dwelling Address:               | City:               | Zip Code:      |

**A. System Information**

Each system requiring refrigerant charge verification will be documented on a separate certificate.

|                  |  |  |
|------------------|--|--|
| 01               | System Identification or Name  |  |
| 02               | System Location or Area Served   |  |
| 03               | Condenser (or package unit) make or brand  |  |
| 04               | Condenser (or package unit) model number   |  |
| 05               | Nominal Cooling Capacity (tons) of Condenser   |  |
| 06               | Condenser (or package unit) serial number  |  |
| 07               | Refrigerant Type   |  |
| 08               | Other Refrigerant Type (if applicable)   |  |
| 09               | <u>Liquid Line Filter Drier Installed According to Manufacturer's Specification (if applicable)</u>  |  |
| <del>09</del> 10 | System Installation Type   |  |
| <del>10</del> 11 | <del>Charge-Fault</del> Indicator Display ( <del>CFID</del> ) Status<br>(Note: Even systems with a <del>CFID</del> must have refrigerant charge verified by installer)   |  |
| <del>11</del> 12 | Is the system of a type that the minimum airflow can be verified using an approved measurement procedure (RA3.3 or RA3.2.2.7)?   |  |
| <del>12</del> 13 | Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are $\geq 55^{\circ}\text{F}$ (RA3.2.2, or RA1)? |  |
| <del>13</del> 14 | Date of Refrigerant Charge Verification for this System  |  |
| <del>14</del> 15 | Refrigerant Charge Verification Method Used  |  |
| <del>15</del> 16 | Person who Performed the Refrigerant Charge Verification Reported on this Certificate of Installation  |  |
| <del>16</del> 17 | HERS Verification Compliance Requirement Status  |  |

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 201~~36~~ Residential Compliance

&lt;Date&gt;



|                                 |                     |                |
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| CERTIFICATE OF INSTALLATION     |                     | CF2R-MCH-25c-H |
| Refrigerant Charge Verification |                     | (Page 2 of 4)  |
| Project Name:                   | Enforcement Agency: | Permit Number: |
| Dwelling Address:               | City:               | Zip Code:      |

### Weigh In Charging Procedure - MCH25c

#### B. Instrument Calibration

Procedures for instrument calibration are given in Reference Residential Appendix RA3.2.2 and RA3.2.3.1.4

|    |  |  |
|----|--|--|
| 01 | Date of Expiration of Digital Refrigerant Scale Calibration    |  |
| 02 | Date of Digital Thermometer and Temperature Sensor Calibration |  |
| 03 | Digital Refrigerant Scale Calibration Status                   |  |
| 04 | Digital Thermocouple Calibration Status                        |  |

#### C. Measurement Access Hole (MAH) Verification

Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3

|    |  |  |
|----|--|--|
| 01 | Method Used to Demonstrate Compliance with the Measurement Access Hole (MAH) Requirement |  |
|----|--|--|

#### D. Minimum System Airflow Rate Verification

Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.2.2.7.

|    |  |  |
|----|--|--|
| 01 | Minimum Required System Airflow Rate (cfm) |  |
| 02 | System Airflow Rate Verification Status    |  |

#### E. Weigh In Charge Procedure

Procedures for Refrigerant Charge using the Weigh-in Charging Procedure are given in Reference Residential Appendix RA3.2.2.2 and RA3.2.3

|    |   |  |
|----|---|--|
| 01 | Measured Condenser Air Entering Dry-bulb Temperature ( $T_{\text{condenser, db}}$ ) (degreeF)                       |  |
| 02 | Specify the Method of Weigh-in  |  |
| 03 | Manufacturer's Standard Charge for Condenser (lbs, oz.)   |  |
| 04 | Manufacturer's Standard Liquid Line Length (ft)   |  |
| 05 | Manufacturer's Standard Liquid Line Diameter (in)   |  |
| 06 | Manufacturer's Standard Indoor Coil Size (tons)   |  |
| 07 | Installed Liquid Line Length (ft)   |  |
| 08 | Installed Liquid Line Diameter (in)   |  |
| 09 | Installed Indoor Coil Size (tons)   |  |
| 10 | Charge Adjustment to Standard Charge from Manufacturer's Specifications (ounces, positive = add, negative = remove) |  |
| 11 | Refrigerant Required to be Weighed in by the Installer (lbs, oz)  |  |
| 12 | Refrigerant Weighed in by Installer (lbs, oz)   |  |
| 13 | Compliance Statement:   |  |

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2013~~6~~ Residential Compliance

<Date>



|                                 |                     |                |
|---------------------------------|---------------------|----------------|
| CERTIFICATE OF INSTALLATION     |                     | CF2R-MCH-25c-H |
| Refrigerant Charge Verification |                     | (Page 3 of 4)  |
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#### F. Weigh In Charge Procedure – Additional Requirements

|   |  |
|---|--|
| 01  | All brazing of refrigerant lines done with dry nitrogen in lines and evaporator coil.  |
| 02  | The indoor coil correction to refrigerant weight is used if it is supplied by the manufacturer.  |
| 03  | Prior to introducing refrigerant, system is evacuated to 500 microns or less and, when isolated, has risen no more than 300 microns after 5 minutes.   |
| 04  | When applicable and if necessary to avoid delay of approval of dwelling units completed when outside temperatures are below 55°F, the enforcement agency may approve compliance with the refrigerant charge verification requirements based on registration of this CF2R-MCH-25, documenting use of the RA3.2.3.1 HVAC Installer Weigh-In Charging Procedure when the optional Section RA3.2.3.2 HERS Rater Observation of Weigh-In Charging Procedure is not used. As condition for such enforcement agency approval, the responsible person's signature on this compliance document affirms the installer agrees to return to correct refrigerant charge if a HERS Rater determines at a later time, when the outside temperature is 55°F or greater, that refrigerant charge correction is necessary. |
| <b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b> |  |

#### G. Charge-Fault Indicator Display

Procedures for the ~~Charge-Indicator-Display~~Fault Indicator Display Verification are detailed in RA3.4.2

|    |   |
|----|---|
| 01 | <del>CID-FID</del> Manufacturer Name/Make   |
| 02 | <del>CID-FID</del> Model Number   |
| 03 | The display module is mounted adjacent to the system thermostat.  |
| 04 | The manufacturer has certified to the Energy Commission that the <del>CID-FID</del> model meets the requirements of Reference Joint Appendix JA6 (Make and model found on CEC list of approved <del>CID-FID</del> devices). |
| 05 | The system has operated for at least 15 minutes and the <del>CID-FID</del> reports that the system is operating within acceptable parameters.   |

#### H. Charge-Fault Indicator Display – Additional Requirements

|   |  |
|---|--|
| 01  | <del>Charge-Fault</del> indicator display devices shall either be factory installed by the space-conditioning system manufacturer, or field installed according to the space-conditioning system manufacturer's requirements and the <del>CID-FID</del> manufacturer's specifications. |
| 02  | The installer shall ensure that a copy of the <del>CID-FID</del> manufacturer's user instructions documentation has been made available to the building owner.   |
| <b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b> |  |



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| Dwelling Address:               | City:               | Zip Code:      |

**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

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

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

**RESPONSIBLE PERSON'S DECLARATION STATEMENT**

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

- The information provided on this Certificate of Installation is true and correct.
- I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer.
- The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations, and the installation conforms to the requirements given on the plans and specifications approved by the enforcement agency.
- I understand that a HERS rater will check the installation to verify compliance, and that if such checking identifies defects; I am required to take corrective action at my expense. I understand that Energy Commission and HERS Provider representatives will also perform quality assurance checking of installations, including those approved as part of a sample group but not checked by a HERS rater, and if those installations fail to meet the requirements of such quality assurance checking, the required corrective action and additional checking/testing of other installations in that HERS sample group will be performed at my expense.
- I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met.
- I will ensure that a registered copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy.

|   |  |              |
|---|--|--------------|
| Responsible Builder/Installer Name:   | Responsible Builder/Installer Signature: |              |
| Company Name: (Installing Subcontractor or General Contractor or Builder/Owner) | Position With Company (Title):           |              |
| Address:  | CSLB License:                            |              |
| City/State/Zip:   | Phone:                                   | Date Signed: |
| Third Party Quality Control Program (TPQCP) Status:                             | Name of TPQCP (if applicable):           |              |

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2013~~6~~ Residential Compliance

&lt;Date&gt;

**CF2R-MCH-25c-H User Instructions****Section A. System Information**

1. This information is automatically pulled from the Certificate of Installation (MCH-01).
2. This information is automatically pulled from the Certificate of Installation (MCH-01).
3. This information is automatically pulled from the Certificate of Installation (MCH-01).
4. This information is automatically pulled from the Certificate of Installation (MCH-01).
5. This information is automatically pulled from the Certificate of Installation (MCH-01).
6. This information is automatically pulled from the Certificate of Installation (MCH-01).
7. Choose the type of refrigerant used by the system being verified. R-22 and R-410A are the most common, but other types may occasionally be encountered.
8. If "Other" is chosen in Row A07, then indicate the type of refrigerant being used. If R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in Row A07. This row is only for refrigerants other than R-22 and R-410a. Documentation of refrigerant may be requested.
9. If applicable, a liquid line filter drier shall be installed according to the manufacturer's specifications.
- 9-10. \_\_\_\_\_ Indicate whether the HVAC system is Completely New, Replacement or an Alteration. These are defined in detail the Residential Compliance Manual.
- 10-11. \_\_\_\_\_ Select the appropriate choice regarding whether this system has a **Charge-Fault** Indicator Display (**CFID**). Qualifying **CFID's** may exempt a system from HERS refrigerant charge verification. **CFID's** are described in Joint Appendix JA6.1. Qualifying **CFID's** must appear on a list of approved devices kept by the Commission. Installation of a **CFID** does not exempt the installer from proper refrigerant charge verification. It may only exempt the need for third party refrigerant charge verification. Third party verification of the **CFID** is required. Other requirements may also be triggered.
- 11-12. \_\_\_\_\_ Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
- 12-13. \_\_\_\_\_ Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification or Winter Setup Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
- 13-14. \_\_\_\_\_ Specify the date the refrigerant charge verification was performed by the installer.
- 14-15. \_\_\_\_\_ Select the refrigerant charge verification method used from the choices provided:
  - Superheat (outdoor temperature must be  $\geq 55$  degF): This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25a.
  - Subcooling (outdoor temperature must be  $\geq 55$  degF): This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25b.
  - Weigh-in: This verification method can be used at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25c.
  - Winter Setup (applicable when outdoor temperature is  $< 55$  degF): The Winter Setup verification method is a special version of the Subcooling method. It can be used when the outdoor temperature is between 37 and 55 degF. It can only be used on equipment where the manufacturer has specifically approved it for the equipment being tested. The Winter Setup procedure is details in Residential Appendix RA1.2. Choosing this option will generate a CF2R-MCH-25e.
  - New Package Unit Factory Charge: Choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. HERS verification of refrigerant charge may not be required in this case. Choosing this option will generate a CF2R-MCH-25f.

15-16. Identify who will be performing the verification that is documented on this Certificate of Installation, select from the two options. Note that HERS verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a HERS rater for verification. If Group Sampling is not intended, the HERS Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.

16-17. The Group Sampling status is automatically displayed based on the input results of Row [A14A15](#) and Row [A15A16](#). Group Sampling procedures are detailed Residential Appendix RA2.3.

### Section B. Instrument Calibration

1. Enter the date that Digital Refrigerant Scale calibration expires. Digital Refrigerant Scales must be calibrated according to manufacturer's specifications. This requirement is in Residential Appendix RA3.2.1.4.1. A sticker must be affixed to the scale that shows the calibration check date (expiration date).
2. Enter the date of the most recent Digital Thermocouple Calibration. Specifications for thermocouples and temperature sensors can be found in Residential Appendix RA3.2.2.2.2. Procedures for calibration are detailed in RA3.2.2.4.1. Calibration must happen at least once every 30 days.
3. Digital Refrigerant Scale Calibration status will appear automatically. If the date entered in Row C01 is prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document until calibration is completed and dates are updated.
4. Digital Thermocouple Calibration status will appear automatically. If the date entered in Row C02 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document until calibration is completed and dates are updated.

### Section C. Measurement Access Hole (MAH) Verification

1. Indicate the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel. If [A11A12](#) = NO, then system is exempt from the MAH requirement and a special message will show up here.

### Section D. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in line [A09A10](#). This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on the MCH-23 or MCH-28, which documents the measured airflow (or alternative method) of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed until the airflow meets the requirement. If [A11A12](#) = NO, then system is exempt from the airflow rate requirement and a special message will show up here.

### Section E. Weigh In Charge Procedure

1. Measure and record the outside air dry-bulb temperature in degrees F. This will affect the procedures that may be used for HERS verification. If the installer opts to use the weigh-in method when the outside air dry-bulb temperature is above 55 degrees, HERS verification may only utilize the standard charge procedure (super heat or subcool) if the system is conducive to that procedure.
2. Specify the method of weigh-in. There are two options that may be used. One is to add or remove a small, weighed portion of refrigerant from a factory charged unit (Charge Adjustment). The other is to weigh the entire charge of refrigerant before introducing it into the system (Total Charge). Select either one. Note: The amount of refrigerant in systems that are not newly installed cannot be assumed to be the factory charge. Altered systems using existing refrigerant must use the Total Charge method. Only new, factory installed equipment can utilize the Charge Adjustment method.
3. Enter the Manufacturer's Standard Charge for condenser in pounds and ounces. This is the amount of refrigerant that the manufacturer specifies for a "standard" installation (typical coil match, typical line set size and length). For the Charge Adjustment method, this is the amount of refrigerant that factory charges the system to. Be prepared to provide manufacturer's documentation to support this value.
4. The Manufacturer's Standard Charge, specified in E03 is based on a standard liquid line length, typically 25 feet. Enter the value here, in feet. Be prepared to provide manufacturer's documentation to support this value.
5. The Manufacturer's Standard Charge, specified in E03 is based on a standard liquid line diameter. Enter the value here, in inches (for example: 1/4", 3/8", etc.). Be prepared to provide manufacturer's documentation to support this value.

6. The Manufacturer's Standard Charge, specified in E03 is based on a standard indoor (evaporator) coil size. Enter the value here, in tons. Be prepared to provide manufacturer's documentation to support this value.
7. Enter the length of the liquid line installed on the system being verified, in feet. This value must be compared to the standard liquid line length entered in E04 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.
8. Enter the diameter of the liquid line installed on the system being verified, in inches (for example: 1/4", 3/8", etc.). This value must be compared to the standard liquid line diameter entered in E05 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.
9. Enter the size of the indoor (evaporator) coil installed on the system being verified, in tons. This value must be compared to the standard coil size entered in E06 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.
10. Enter the Charge Adjustment to Standard Charge, in ounces. This is the amount of refrigerant that the manufacturer specifies to add to, or remove from, the Manufacturer's Standard Charge entered in E03. This value must come from manufacturer's specifications using the standard values entered in Rows E04 through E06 to the installed values entered in Rows E07 through E09. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed, this value should be a negative number. Be prepared to provide manufacturer's documentation to support this value.
11. This value is calculated automatically. If "Charge Adjustment" was specified in Row E02, then the value shown here will be the same as the value shown in Row E10. This is the amount of weighed refrigerant that will be added or removed from the factory charged unit. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed, this value should be a negative number. If "Total Charge" was specified in Row E02, then the value shown here will be the value in row E03 added to the value in row E10. This is the total amount of refrigerant that will be in the system, all of which must be weighed before introducing into the system.
12. Enter the amount of refrigerant weighed and added to, or removed from, system. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed from a factory charged system, this value should be a negative number. This value must match the value in E11 for the system to pass.
13. If the value in line E11 equals the value in line E12, a statement will appear here indicating that the system passes the weigh-in method. Otherwise, a statement will appear here indicating that the system does not pass.

#### Section F. Weigh In Charge Verification – Additional Requirements

1. Additional requirements are items that must be done, but are not specifically required to be checked by the HERS rater. By signing the Declaration Statement on this document, the installer is declaring that all of these additional requirements have been met. The requirement for brazing lines charged with dry nitrogen is specified in Residential Appendix RA3.2.3.1.5.
2. Additional requirements are items that must be done, but are not specifically required to be checked by the HERS rater. By signing the Declaration Statement on this document, the installer is declaring that all of these additional requirements have been met. The requirement for making a correction to the refrigerant weight to allow for the indoor coil when that information is supplied by the Manufacturer is specified in Residential Appendix RA3.2.3.1.5.
3. Additional requirements are items that must be done, but are not specifically required to be checked by the HERS rater. By signing the Declaration Statement on this document, the installer is declaring that all of these additional requirements have been met. The requirement for checking refrigerant lines for leaks by evacuating to 500 microns or less and rising by no more than 300 microns after 5 minutes is specified in Residential Appendix RA3.2.3.1.5.

#### Section G. Charge-Fault Indicator Display

1. Enter the manufacturer name or make of the approved Charge-Fault Indicator Display. Must match name shown on the list of approved devices kept by the Commission.
2. Enter the manufacturer model number of the approved Charge-Fault Indicator Display. Must match name shown on the list of approved devices kept by the Commission.
3. The installer must confirm that the CFD-FID display module is mounted adjacent to thermostat that controls the system being verified. This requirement is detailed in Residential Appendix RA3.4.2.
4. The installer must confirm that the installed CFD-FID is approved and appears the list of approved devices kept by the Commission. This requirement is detailed in Residential Appendix RA3.4.2.
5. The installer must confirm that the system has operated for at least 15 minutes and that they system is operating within acceptable parameters as specified by the CFD-FID and equipment manufacturers. This requirement is detailed in Residential Appendix RA3.4.2.

**Section H. Charge-Fault Indicator Display – Additional Requirements**

1. Additional requirements are items that must be done, but are not specifically required to be checked by the HERS rater. By signing the Declaration Statement on this document, the installer is declaring that all of these additional requirements have been met. The requirement for installing ~~CIDs~~ FIDs to manufacturer's specifications (unless factory installed) can be found in Joint Appendix JA6.1.3.
2. Additional requirements are items that must be done, but are not specifically required to be checked by the HERS rater. By signing the Declaration Statement on this document, the installer is declaring that all of these additional requirements have been met. The requirement for providing manufacturer's instructions and other documentation for ~~CIDs~~ FIDs can be found in Joint Appendix JA6.1.4.

For information and data collection  
only. Not valid until registered with a  
HERS provider