NOT REGISTERED - CAN BE USED FOR SUBMISSION TO BUILDING DEPARTMENTS PRIOR TO MARCH 31, 2023

**CERTIFICATE OF INSTALLATION**

**Note:** This table completed by HERS Registry.

**Project Details**

| Field Name | Data Entry | Field Name | Data Entry |
|---|---|---|---|
| Project Name: | | Enforcement Agency: | |
| Dwelling Address: | | Permit Number: | |
| City and Zip Code: | | Permit Application Date: | |

**A. System Information**

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

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Space Conditioning System Identification or Name<br>*(pulled from MCH-01)* | |
| 02 | Space Conditioning System Location or Area Served<br>*(pulled from MCH-01)* | |
| 03 | Condenser (or package unit) Make or Brand<br>*(pulled from MCH-01)* | |
| 04 | Condenser (or package unit) Model Number<br>*(pulled from MCH-01)* | |
| 05 | Nominal Cooling Capacity (tons) of Condenser<br>*(pulled from MCH-01)* | |
| 06 | Condenser (or package unit) Serial Number<br>*(pulled from MCH-01)* | |
| 07 | Refrigerant Type<br>*(select option)* | |
| 08 | Other Refrigerant Type (if applicable) | |
| 09 | Liquid Line Filter Drier Installed According to Manufacturer's Specifications (if applicable) | |
| 10 | System Installation Type<br>*(select option)* | |
| 11 | Fault Indicator Display (FID) Status<br>(Note: Even systems with a FID must have refrigerant charge verified by installer) | |

| | | |
|---|---|---|
| | (*select option)* | |
| 12 | Is the system of a type that the minimum airflow can be verified for all indoor units using an approved measurement procedure (RA3.3 or RA3.3.3)?<br>*(select yes or no)* | |
| 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 ≥ 55°F (RA3.2.2, or RA1)?<br>*(select yes or no)* | |
| 14 | Date of Refrigerant Charge Verification for this System | |
| 15 | Refrigerant Charge Verification Method Used<br>*(select option)* | |
| 16 | Person Who Performed the Refrigerant Charge Verification Reported on this Certificate of Installation | |
| 17 | HERS Verification Compliance Requirement Status<br>*(select option)* | |

**MCH-25b - Refrigerant Charge Verification - Subcooling Method**

**B. Metering Device Verification**

*Subcooling Method can only be used on systems that have a variable metering device.*

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Refrigerant Metering Device<br>*(select option)* | |
| 02 | Subcooling Method Applicability Status | |

| | | |
|---|---|---|
| | | |

**C. Instrument Calibration**

*Procedures for instrument calibration are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2.*

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Date of Digital Refrigerant Gauge Calibration | |
| 02 | Date of Digital Thermocouple Calibration | |
| 03 | Digital Refrigerant Gauge Calibration Status | |
| 04 | Digital Thermocouple Calibration Status | |

**D. Measurement Access Hole (MAH) Verification**

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

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Method Used to Demonstrate Compliance with the Measurement Access Hole (MAH) Requirement<br>*(select option)* | |

**E. Minimum System Airflow Rate Verification**

*Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.3.3.*

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Indoor Unit Name or Description of Area Served | |
| 02 | Minimum Required System Airflow Rate (cfm) | |
| 03 | System Airflow Rate Verification Status<br>*(select option)* | |

| | | |
|---|---|---|
| | | |
| 04 | Compliance Statement<br>*(select option)* | |

Notes

| **Data Entry** |
|---|
| |

**F. Data Collection and Calculations**

*Procedures for determining Refrigerant Charge using the Standard Charge Verification Procedure are given in Reference Residential Appendix RA3.2.2.*

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Lowest Return Air Dry-bulb Temperature that Occurred During the Refrigerant Charge Verification Procedure (°F) | |
| 02 | Measured Condenser Air Entering Dry-bulb Temperature ($T_{condenser, db}$) | |
| 03 | Outdoor Temperature Qualification Status<br>*Check box if table F field 02<55F* | ☐ Subcooling refrigerant charge verification methods are not allowed to be used when the outdoor temperature is less than 55F, do not proceed |
| 04 | Measured Liquid Line Temperature ($T_{liquid}$) (°F) | |
| 05 | Measured Liquid Line Pressure ($P_{liquid}$) (psig) | |
| 06 | Condenser Saturation Temperature ($T_{condensor, sat}$) from Digital Gauge or P-T Table using Line F05 (°F) | |
| 07 | Measured Subcooling (Line F06 – Line F04) (°F) | |
| 08 | Target Subcooling from Manufacturer (°F) | |
| 09 | Compliance Statement<br>*Check box If table F field 01 ≥ 70, and ABS(F07 – F08) ≤ 3* | ☐ System Refrigerant Charge Passes by Subcooling Method – Must also pass Metering Device Verification, next section |

**G. Metering Device Verification**

*Procedures for the verification of proper metering device operation are specified in RA3.2.2.6.2.*

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | Measured Suction Line Temperature ($T_{suction}$) (°F) | |
| 02 | Measured Suction Line Pressure ($P_{suction}$) (psig) | |

| | | |
|---|---|---|
| 03 | Evaporator Saturation Temperature ($T_{evaporator, sat}$) from Digital Gauge or P-T Table using line G02 (°F) | |
| 04 | Measured Superheat (Line G01 – Line G03) (°F) | |
| 05 | Measured Superheat (Line G04) is between 4°F and 25°F (inclusive)<br>*Check box if 4 ≤ G04 ≤ 25* | ☐ Passes CEC requirement |
| 06 | Measured Superheat (Line G04) is within Manufacturer's Specifications (if known)<br>*(select option)* | |
| 07 | Compliance Statement<br>*(Check box If G05 = "Passes CEC requirement" and G06 = "Not known", or G06 = "Yes, documentation to be provided upon request")* | ☐ Metering Device Verification Passes |

**MCH-25d - Refrigerant Charge Verification - Fault Indicator Display (FID)**

**H. Fault Indicator Display**

*Procedures for the Fault Indicator Display Verification are detailed in RA3.4.2.*

| Field | Field Name | Data Entry |
|---|---|---|
| 01 | FID Manufacturer Name/Make | |
| 02 | FID Model Number | |
| 03 | The display module is mounted adjacent to the system thermostat.<br>*(select option)*<br>(pass if confirmed, else do not proceed) | |
| 04 | The manufacturer has certified to the Energy Commission that the FID model meets the requirements of Reference Joint Appendix JA6 (Make and model found on CEC list of approved FID devices).<br>*(select option)*<br>(pass if confirmed, else do not proceed) | |
| 05 | The system has operated for at least 15 minutes and the FID reports that the system is operating within acceptable parameters.<br>*(select option)*<br>(pass if confirmed, else do not proceed) | |

**I. Fault Indicator Display – Additional Requirements**

*The responsible persons signature on this document indicates the installation complies with the following requirements:*

| Field | Field Description |
|---|---|
| 01 | Fault Indicator Display devices is factory installed by the space-conditioning system manufacturer, or field installed according to the space-conditioning system manufacturer's requirements and the FID manufacturer's specifications. |
| 02 | The installer shall ensure that a copy of the FID manufacturer's user instructions documentation has been made available to the building owner. |

**The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.**

**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

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

| SIGNATORY | Entry |
|---|---|
| Author Name | |
| Author Signature | |
| Company Name | |
| Date Signed | |
| CEA/HERS Certification Identification (if applicable) | |
| Address | |
| 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:

1. The information provided on this certificate of installation is true and correct.
2. I am either: a) a responsible person 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, or b) I am an authorized representative of the responsible person and attest to the declarations in this statement on the responsible person's behalf.
3. 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 certificate of compliance, plans, and specifications approved by the enforcement agency.
4. I understand that a HERS rater will check the installation to verify compliance and if such checking determines the installation fails to comply, I am required to offer any necessary corrective action at no charge to the building owner.
5. I understand 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, and I will take the necessary steps to ensure this requirement is accomplished.
6. 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, and I will take the necessary steps to ensure this requirement is accomplished.

| SIGNATORY | Entry |
|---|---|
| Builder/Installer Name | |
| Builder/Installer Signature | |
| Company Name | |
| 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) | |

**LMCI-MCH-25b-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 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 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 direr shall be installed according to the manufacturer's specifications.
10. Indicate whether the HVAC system is Completely New, Replacement or an Alteration. These are defined in detail the Residential Compliance Manual.
11. Select the appropriate choice regarding whether this system has a Fault Indicator Display (FID). Qualifying FID's may exempt a system from HERS refrigerant charge verification. FID's are described in Joint Appendix JA6.1. Qualifying FID's must appear on a list of approved devices kept by the Commission. Installation of a FID 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 FID is required. Other requirements may also be triggered.
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.
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 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.
14. Specify the date the refrigerant charge verification was performed by the installer.
15. Select the refrigerant charge verification method used from the choices provided:
    - Superheat (outdoor temperature must be ≥ 55°F); this verification method can only be used when the outdoor temperature is at or above 55°F. 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 LMCI-MCH-25a.
    - Subcooling (outdoor temperature must be ≥ 55°F); this verification method can only be used when the outdoor temperature is at or above 55°F. 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 LMCI-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 LMCI-MCH-25c.

- 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 LMCI-MCH-25f.

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 LMCI and LMCV.
17. The Group Sampling status is automatically displayed based on the input results of A15 and A16. Group Sampling procedures are detailed Residential Appendix RA2.3.

**Section B. Metering Device Verification**

1. Select the correct metering device used on the system being verified. This will check against the refrigerant charge verification method selected in A15. An error message will appear in B02 if the wrong verification method has been selected. Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV).
2. An error message here indicates that the wrong verification method may have been selected. Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV).

**Section C. Instrument Calibration**

1. Enter the date of most recent Digital Refrigerant Gauge Calibration Field Check. Analog gauges are not allowed for verification purposes under the 2016 Standards. Specification for pressure gauges is found in Residential Appendix RA3.2.2.2.3. Procedures for the field check procedure are detailed in RA3.2.2.4.2. Calibration field check must happen at least once every 30 days.
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 Gauge Calibration status will appear automatically. If the date entered in C01 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 performed.
4. Digital Thermocouple Calibration status will appear automatically. If the date entered in 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 performed.

**Section D. 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.

**Section E. Minimum System Airflow Rate Verification**

1. This information is automatically calculated based on the information given in A10. 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.

**Section F. Subcooling Charge Verification Method – Data Collection**

1. Measure and record the lowest return air dry-bulb temperature that occurred during the refrigerant charge procedure in °F. This temperature must remain above 70°F during the verification procedure. This requirement is detailed in Residential Appendix RA3.2.2.5.
2. Measure and record the condenser air dry-bulb temperature ($T_{condenser}$) in °F. This value must be at least 55°F and no more than 115°F to use the Subcooling Charge Verification Method.
3. If a value less than 55°F or greater than 115°F is entered in F02 the Subcooling Method cannot be used.
4. Measure and record the liquid line temperature ($T_{liquid}$) in °F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured subcool temperature.
5. Measure and record the liquid line pressure ($P_{liquid}$) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the condenser saturation temperature ($T_{condenser,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into F06.
6. Enter the condenser saturation temperature ($T_{condenser,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the liquid line pressure entered in F05, in °F.
7. Measured Subcooling is automatically calculated as the difference between the liquid line temperature (F04) and the condenser saturation temperature (F06)
8. Enter target subcooling from manufacturer. This may be a challenge to find for older equipment. Internet searches can sometimes result in archived equipment specifications for the equipment in question, or sometimes a very similar model. If the manufacturer's target cannot be found the Commission's Executive Director may provide additional guidance for compliance.
9. System passes Subcooling method when F08 is within plus or minus 5°F of F07.

**Section G. Metering Device Verification**

1. Measure and record the suction line temperature ($T_{suction}$) in °F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured superheat.
2. Measure and record the suction line pressure ($P_{suction}$) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the evaporator saturation temperature ($T_{evaporator,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into G03.
3. Enter the evaporator saturation temperature ($T_{evaporator,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the suction line pressure entered in G02, in °F.

4. Measured superheat is automatically calculated as the difference between the suction line temperature (G01) and the evaporator saturation temperature (G03)
5. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 4°F and 25°F, inclusive. This row checks the CEC requirement.
6. If the manufacturer's target superheat for ensuring proper metering device operation is known, it supersedes the CEC requirement of being between 4°F and 25°F. If "Yes, documentation to be provided upon request." is selected, the installer should be prepared to provide documentation for the target values used.
7. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 4°F and 25°F, inclusive. If "Yes, documentation to be provided upon request." is selected in G06, the installer should be prepared to provide documentation for the target values used.

**Section H. Verification of Fault Indicator Display**

1. Enter the manufacturer name or make of the approved 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 Fault Indicator Display. Must match name shown on the list of approved devices kept by the Commission.
3. The installer must confirm that the 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 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 FID and equipment manufacturers. This requirement is detailed in Residential Appendix RA3.4.2.