|  |  |  |
| --- | --- | --- |
| **A. Ducted Cooling System Information** | | |
| 01 | Space Conditioning System Identification or Name |  |
| 02 | Space Conditioning System Description of Area Served |  |
| 03 | Indoor Unit Name |  |
| 04 | System Installation Type |  |
| 05 | Nominal Cooling Capacity (tons) |  |
| 06 | Condenser Speed Type |  |
| 07 | Cooling System Zonal Control Type |  |
| 08 | Central Fan Integrated (CFI) Ventilation System Status |  |
| 09 | System Bypass Duct Status |  |
| 10 | Date of System Airflow Rate Measurement |  |
| 11 | Airflow Rate Protocol Utilized |  |
| 12 | Central Fan Ventilation Cooling System Status |  |

|  |  |  |
| --- | --- | --- |
| **B. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum**  Procedures for installing HSPP or PSPP are specified in RA3.3.1.1. | | |
| 01 | Method Used to Demonstrate Compliance with the HSPP/PSPP Requirement |  |

|  |  |  |
| --- | --- | --- |
| **C. Airflow Rate Measurement Apparatus and Procedure Information**  Instrument Specifications are given in RA3.3.1.1, and system airflow rate measurement apparatus information is given in RA3.3.2. | | |
| 01 | Airflow Rate Measurement Type Used for this Airflow Rate Verification |  |
| 02 | Manufacturer of Airflow Measurement Apparatus |  |
| 03 | Model number of Airflow Measurement Apparatus |  |
| 04 | Certification Status of the Airflow Measurement Apparatus Accuracy |  |

|  |
| --- |
| **MCH-23f Forced Air System Airflow Rate Measurement – Newly Installed Zoned Single-Speed Compressor Systems with Central Fan Ventilation Cooling** |

|  |  |  |
| --- | --- | --- |
| **D. Forced Air System Airflow Rate Measurement – All Zones Calling**  The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3. | | |
| 01 | Required All Zones Calling Minimum System Airflow Rate (cfm/ton) |  |
| 02 | Required All Zones Calling Minimum System Airflow Target (cfm) |  |
| 03 | Actual System Airflow Rate Measurement (cfm) |  |
| 04 | Compliance Statement: |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **E. Forced Air System Airflow Rate Measurement – All Other Zonal Control Modes**  The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3.  For compliance with verification in all zonal control modes, it is sufficient to verify airflow rate for operation of each individual zone when the individual zone is the sole zone calling for conditioning. It is not necessary to verify airflow rate for combinations of 2 or more zones that are less than all zones calling (e.g., 2 out of three zones calling). | | | | |
| 01 | Number of Independently Controlled Zones  (i.e., number of thermostats or temperature sensors that independently control one or more dampers.) | |  | |
| 02 | Required Minimum Cooling System Airflow Rate (cfm/ton) | |  | |
| 03 | Required Minimum Airflow in all Zonal Control Modes (cfm) | |  | |
| 04 | | 05 | 06 | 07 |
| Zone Name | | Zone Description | Measured Airflow with All Other Zones Off (CFM) | Zone Compliance Status |
|  | |  |  |  |
|  | |  |  |  |
| 08 | Compliance Statement: | |  | |

|  |  |  |
| --- | --- | --- |
| **F. Central Fan Ventilation Cooling System Airflow Rate Measurement**  The procedures for central fan ventilation cooling system airflow rate verification are specified in Reference Residential Appendix RA3.3.4 | | |
| 01 | Required Ventilation System Airflow Rate (cfm) |  |
| 02 | Actual System Ventilation Airflow Rate Measurement (cfm) |  |
| 03 | Compliance Statement: |  |

|  |  |  |
| --- | --- | --- |
| **G. Additional Requirements** | | |
| 01 | Air filters that meet the applicable requirements of Standards Section 150.0(m)12 or 150.0(m)13 were properly installed in the system during system airflow rate measurement identified on this Certificate of Installation. | |
| 02 | The airflow rate measurement apparatus used to perform the airflow rate measurement identified on this Certificate of Installation was calibrated in accordance with the apparatus manufacturer's specifications and conforms to the instrumentation specifications given in RA3.3.1. | |
| 03 | A visual inspection shall confirm that bypass ducts that deliver conditioned supply air directly to the space conditioning system return duct airflow are not used on newly constructed zonally controlled systems unless the Performance Certificate of Compliance indicates an allowance for use of a bypass duct. When a bypass duct is accounted for on the Performance Certificate of Compliance, the airflow rate shall conform to the specifications listed on the Certificate of Compliance. | |
| 04 | All registers were fully open during the diagnostic test. | |
| 05 | System fan was set at maximum speed during the diagnostic test. | |
| 06 | If fresh air duct is part of the HVAC system it was not closed during the diagnostic test. | |
| 07 | Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the Fan Efficacy tested value. | |
| 08 | Multi-speed compressor space cooling systems or variable speed compressor systems shall verify airflow (cfm/ton) and fan efficacy (Watt/cfm) with system operating in cooling mode at the maximum compressor speed and the maximum air-handler fan speed. | |
| 09 | Verification Status: | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 10 | Correction Notes: |  |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

|  |  |
| --- | --- |
| **H. Determination of HERS Verification Compliance**  All applicable sections of this document shall indicate compliance with the specified verification protocol requirements in order for this Certificate of Verification as a whole to be determined to be in compliance. | |
| 01 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Documentation Author's Declaration Statement** | | | |
| 1. I certify that this Certificate of Verification documentation is accurate and complete. | | | |
| Documentation Author Name: | Documentation Author Signature: | | |
| Company: | Date Signed: | | |
| Address: | CEA/HERS Certification Information (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:   1. The information provided on this Certificate of Verification is true and correct. 2. I am the certified HERS Rater who performed the verification identified and reported on this Certificate of Verification (responsible rater). 3. The installed features, materials, components, manufactured devices, or system performance diagnostic results that require HERS verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, and the requirements specified on the Certificate of Compliance for the building approved by the enforcement agency. 4. The information reported on applicable sections of the Certificate(s) of Installation (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) approved by the enforcement agency. 5. I will ensure that a registered copy of this Certificate of Verification 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 Verification is required to be included with the documentation the builder provides to the building owner at occupancy. | | | |
| **BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION** | | | |
| Company Name (Installing Subcontractor, General Contractor, or Builder/Owner): | | | |
| Responsible Builder or Installer Name: | | CSLB License: | |
| **HERS PROVIDER DATA REGISTRY INFORMATION** | | | |
| Sample Group Number (if applicable): | | | Dwelling Test Status in Sample Group (if applicable): |
| **HERS RATER INFORMATION** | | | |
| HERS Rater Company Name: | | | |
| Responsible Rater Name: | | | Responsible Rater Signature: |
| Responsible Rater Certification Number w/ this HERS Provider: | | | Date Signed: |

**CF3R-MCH-23f-H User Instructions**

**Section A. Ducted Cooling System Information**

1. System Identification or Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. Indoor Unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. System Installation Type: Select the appropriate System Installation Type from the following choices:
   1. New: Use this choice for newly constructed buildings, additions with all-new systems dedicated to the addition, or new systems installed in existing homes where the equipment and ducts are all newly installed (aka, "Cut-in").
   2. Replacement: Use this choice if the system is a complete replacement space-conditioning system installed as part of an alteration, and includes all the system heating or cooling equipment plus a replacement duct system (150.2(b)1Diia) where the ducts are at least 75% or more newly installed duct material (up to 25% of the finished system may consist of reused parts from the dwelling unit’s previously existing duct system, such as registers, grilles, boots, air handler, coil, plenums, duct material); plus a replacement air handler.
   3. Alteration: Use this choice for existing buildings where any of the following are newly installed or replaced as part of the project and the system does not meet one of the other compliance categories above.:
      1. 40 feet or more of space-conditioning system ducts are installed in unconditioned space or indirectly conditioned space.
      2. Air conditioning or heat pump condenser
      3. Heating or cooling coil
      4. Air handler (e.g., furnace, fan coil, package unit)
5. Nominal Cooling Capacity (tons): This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document. If the number of indoor units connected to the outdoor unit is equal to one or the system is a packaged system then this field is equal to the nominal cooling capacity of the condenser. If the number of indoor units connected to the outdoor unit is greater than one this field is equal to the indoor unit nominal cooling capacity.Nominal Cooling Capacity (tons) of Condenser: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
6. Cooling System Zonal Control Type: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
7. Central Fan Integrated (CFI) Ventilation System Status: If the system has Central Fan Integrated System, then select “CFI System”, otherwise select “Not a CFI system”.
8. System Bypass Duct Status: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
9. Date of System Airflow Rate Measurement: Enter the date that the airflow test was performed.
10. Airflow Rate Protocol Utilized: If the system installation type is “New” or “Replacement” then only the RA3.3 airflow methods may be used. If the system installation type is “Alteration”, the RA3.3 airflow methods may be used, but the Alternative to Compliance with Minimum System Airflow Requirements (“Best I Can Do” Airflow) is an option for existing systems that may require substantial modification to improve the airflow.
11. Central Fan Ventilation Cooling System (CFVCS) Status: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.

**Section B. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum**

1. A hole for a static pressure probe (HSPP) or a permanent static pressure probe (PSPP) is required when system airflow verification is required, whether the airflow test method used requires one or not. Select the appropriate choice from the following options using a dropdown box, the Static Pressure Measurement Method:
2. If an Hole Static Pressure Probe is installed then select “HSPP Installed”
3. If a Permanent Static Pressure Probe is installed then select “PSPP Installed”
4. If the system is configured such that an HSPP nor PSPP can be installed, an alternate location that provides access for making supply plenum pressure measurement may be used. Select “An alternative location has been provided and clearly labeled.”
5. If the system is such that an HSPP or PSPP is not applicable, select “HSPP/PSPP are not applicable to this system”.

**Section C. Airflow Rate Measurement Apparatus and Procedure Information**

1. Airflow Rate Measurement Type Used for this Airflow Rate Verification: Select the appropriate airflow test procedure from the following options for the method used to determine actual fan airflow:
   1. Diagnostic Fan Flow Using Fan Flow Meter (aka Plenum Pressure Matching) according to the procedures in RA3.3.3.1.1
   2. Diagnostic Fan Flow Using Flow Grid Measurement according to the procedures in RA3.3.3.1.2
   3. Diagnostic Fan Flow Using Powered Flow Capture Hood according to the procedures in RA3.3.3.1.3
   4. Diagnostic Fan Flow Using Traditional Flow Capture Hood according to the procedures in RA3.3.3.1.4
2. Manufacturer of Airflow Measurement Apparatus: Enter the name of the manufacturer of the airflow measurement tool used to measure the airflow for this test.
3. Model number of Airflow Measurement Apparatus: Enter the model number of the airflow measurement tool used to measure the airflow for this test.
4. Certification Status of the Airflow Measurement Apparatus Accuracy: The measurement apparatus used to perform an airflow verification measurements must appear on the CEC list of approved devices found at <http://www.energy.ca.gov/title24/equipment_cert/ama_fas/index.html>, if this is true, select “Certified”, otherwise select “Not Certified”. The latter choice will not allow the system to pass until a certified device is used.
5. (not visible to user)

**Section D. Forced Air System Airflow Rate Measurement – All Zones Calling**

1. Required All Zones Calling Minimum System Airflow Rate (cfm/ton): This field is filled automatically. The target is based on whether the system is new or altered and whether a value was specified on the CF2R-MCH-01.
2. Required All Zones Calling Minimum System Airflow target (cfm): This field is calculated automatically. It is the product of the minimum airflow rate per ton and the tonnage of the system condenser.
3. Actual System Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
4. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the minimum airflow target.

**Section E. Forced Air System Airflow Rate Measurement – All Other Zonal Control Modes**

1. Number of Independently Controlled Zones: Enter the number of zones in this system that are independently controlled, i.e., that can call for cooling while other zones can be fully or mostly shut off from system airflow. This usually corresponds to the number of thermostats or zone sensors.
2. Required Minimum Airflow in all Zonal Control Modes (cfm): This field is filled out automatically. If a value other than 350 cfm was claimed in the performance calculations, it will be referenced from the CF1R, otherwise the target is 350 cfm.
3. Zone Name: Enter a unique name for each zone on this system. Examples: Zone 1, Z1, Zone A, etc.
4. Zone Description: Enter a brief description of each zone that is detailed enough allow someone to distinguish it from the others in the field. Examples: upstairs, first floor, east wing, bedrooms only, (list rooms served), etc.
5. Measured Airflow with All Other Zones Off: This test must be performed with only one independently controlled zone calling for cooling (Note: if fan watt verification is required, it must be performed simultaneously to the corresponding airflow from this test). All other zones must not be calling during this test. The zone dampers for the other zones must be in their normal closed position. Enter the airflow value measured for the zone that is calling. This test must be performed for each and every independently controlled zone.
6. Zone Compliance Status: This field is filled out automatically. The result is based on whether or not the actual airflow meets the required airflow for this zone.
7. Compliance Statement: This field is filled out automatically. The result is based on whether or not the actual airflow meets the required airflow for all zones

**Section F. Central Fan Ventilation Cooling System Airflow Rate Measurement**

1. Required Ventilation System Airflow Rate (cfm): This field is filled automatically. The target is based on the airflow rate specified on the CF2R-MCH-01.
2. Actual System Ventilation Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
3. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the airflow target.

**Section G. Additional Requirements**

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement (or not applicable) for the system to comply.
7. This field must be a true statement (or not applicable) for the system to comply.
8. This field must be a true statement (or not applicable) for the system to comply.
9. *Verification Status*: If this Section does not apply, then select “All N/A”. If the system meets the airflow criteria then select “Pass”, otherwise select “Fail”. The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
10. *Correction Notes*: If one or more applicable requirements are not met “Fail” will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

|  |  |  |
| --- | --- | --- |
| **A. Ducted Cooling System Information** | | |
| 01 | Space Conditioning System Identification or Name | <<auto filled text: referenced from MCH01>> |
| 02 | Space Conditioning System Description of Area Served | <<auto filled text: referenced from MCH01>> |
| 03 | Indoor Unit Name | <<auto filled text: referenced from MCH01>> |
| 04 | System Installation Type | <<if the parent is a MCH-01b and a “yes” answer was given in B08 or B09, then A04 ≠ “alteration”; else User pick from complete list: \*New; or \*Replacement; or \*Alteration)>> |
| 05 | Nominal Cooling Capacity (tons) | <<calculated field:  If Cooling System Type on MCH-01 = ‘NoCooling’,  then, result in this field = ‘N/A - Heating-only system’;  Elseif, parent is **MCH-01a:**  **if** the duct system in MCH-01a field M03 has a value in MCH-01a field D06 > 1, and the system type in MCH-01a fields D04 or D05 are one of the following three types: 1:[VCHP-Ducted], 2:[VCHP-Ductless], 3:[VCHP-Ducted+Ductless],  **then** value in this field = Indoor Unit Nominal Cooling Capacity value referenced from MCH-01a field G10,  **else** value in this field = Condenser Nominal Cooling Capacity value referenced from one of the following two locations:  1: [MCH-01a field F09 (if SC system is not a HP)]  2: [MCH-01a field I10 (if SC system is a HP)]  Elseif parent is **MCH-01b**:  **if** the duct system in MCH-01b field J03 has a value in MCH-01b field C12 > 1, and the system type in MCH-01b fields C03 or C07 are one of the following three types: 1:[VCHP-Ducted], 2:[VCHP-Ductless], 3:[VCHP-Ducted+Ductless],  **then** value in this field = Indoor Unit Nominal Cooling Capacity value referenced from one of the following two locations:  1: [MCH-01b field F12 (if < 75% of duct system altered)]  2: [MCH-01b field G15 (if new or completely replaced duct system)]  **else** value in this field = Condenser Nominal Cooling Capacity value referenced from MCH-01b field E09  Elseif parent is **MCH-01c**:  **if** the duct system in MCH-01c field L03 has a value in MCH-01c field C11 > 1, and the system type in MCH-01c fields C04 or C05 are one of the following three types: 1:[VCHP-Ducted], 2:[VCHP-Ductless], 3:[VCHP-Ducted+Ductless],  **then** value in this field = Indoor Unit Nominal Cooling Capacity value reference from MCH-01c field F10  **else** value in this field = Condenser Nominal Cooling Capacity value referenced from one of the following two locations:  1: [MCH-01c field E09 (if SC system is not a HP)]  2: [MCH-01c field H10 (if SC system is a HP)]  Elseif parent is **MCH-01d**:  **if** the duct system in MCH-01d field O03 has a value in MCH-01d field D06 > 1, and the system type in MCH-01d fields D04 or D05 are one of the following three types: 1:[VCHP-Ducted], 2:[VCHP-Ductless], 3:[VCHP-Ducted+Ductless],  **then** value in this field = Indoor Unit Nominal Cooling Capacity value referenced from one of the following two locations  1: [MCH-01d field K12 (if < 75% of duct system altered)]  2: [MCH-01d filed L15 (if new or completely replaced duct system)]  **else** value in this filed = Condenser Nominal Cooling Capacity value referenced from one of the following two locations:  1: [MCH-01d field G09 (if SC system is not a HP)]  2: [MCH-01d field J10 (if SC system is a HP)]  >> |
| 06 | Condenser Speed Type | <<calculated field: If cooling system type=NoCooling then display text result= n/a - Heating-only system;  elsif the condenser speed type is not given on the MCH-01,  then display text n/a –Condenser Speed requirements do not apply;  elsif the condenser speed type is given on the MCH-01,  then display value for Condenser Speed Type  (note on applicable MCH-01 docs the options are: MultiSpeed; or SingleSpeed)>> |
| 07 | Cooling System Zonal Control Type | <<calculated field:If cooling system type=NoCooling then display text result= n/a - Heating-only system;  elseif the Cooling System Zonal Control Type is not given on the MCH-01,  then display text: n/a –Cooling System Zonal Control requirements do not apply;  elsif the Cooling System Zonal Control Type is given on the MCH-01,  then display value for Cooling System Zonal Control Type  (note on applicable MCH-01 docs the options are: ZonallyControlled and NotZonal)>> |
| 08 | Central Fan Integrated (CFI) Ventilation System Status | <<calculated field:  reference value from MCH-01;  note: allowable values =  \*CFI System  \*Not CFI>> |
| 09 | System Bypass Duct Status | <<calculated field:  If parent is MCH-01b, MCH-01c, or MCH-01d then value=N/A;  elseif parent is MCH-01a, reference value from MCH-01a section J10  (note: on the MCH01a the options are: Has Bypass Duct; or No bypass duct)>> |
| 10 | Date of System Airflow Rate Measurement | <<user input: date: use validated date format>> |
| 11 | Airflow Rate Protocol Utilized | <<Calculated field:  If A04=(New or Replacement), then display result = RA3.3 procedures for airflow rate measurement;  elseif A04=Alteration then allow user to pick from list:  \*\*RA3.3.3.1.5 Alternative to Compliance with Minimum System Airflow Requirements, or  \*\* RA3.3 procedures for airflow rate measurement>> |
| 12 | Central Fan Ventilation Cooling System Status | <<Calculated Field:  Referenced from MCH-01, if MCH-01 variant is b or c, then display ‘Not a CFVCS’,  If B05 Central Fan Ventilation Cooling System Type = Variable, then display ‘Variable CFVCS’,  ElseIf Type = Fixed, then display ‘Fixed CFVCS’,  otherwise display ‘Not a CFVCS’.>> |

|  |  |  |
| --- | --- | --- |
| **B. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum**  *Procedures for installing HSPP or PSPP are specified in RA3.3.1.1.* | | |
| 01 | Method Used to Demonstrate Compliance with the HSPP/PSPP Requirement | <<user select one of the options from list:  \*\*HSPP installed and labeled consistent with Figure RA3.3-1;  or  \*\*PSPP installed and labeled consistent with Figure RA3.3-1,  or  \*\*HSPP/PSPP cannot be installed consistent with Figure RA3.3-1. An alternative location has been provided and clearly labeled,  or  \*\* HSPP/PSPP are not applicable to this system >> |

|  |  |  |
| --- | --- | --- |
| **C. Airflow Rate Measurement Apparatus and Procedure Information**  Instrument Specifications are given in RA3.3.1.1, and system airflow rate measurement apparatus information is given in RA3.3.2. | | |
| 01 | Airflow Rate Measurement Type Used for this Airflow Rate Verification | << user select one from list:   * Fan Flowmeter according to procedure in RA3.3.3.1.1 * Flow Grid according to procedure in RA3.3.3.1.2 * Powered Flow Capture Hood according to procedure in RA3.3.3.1.3 * Traditional Flow Capture Hood according to procedure in RA3.3.3.1.4>> |
| 02 | Manufacturer of Airflow Measurement Apparatus | <<user entry : text (or consider referencing from a data registry user profile)>> |
| 03 | Model number of Airflow Measurement Apparatus | <<user entry: text (or consider referencing from a data registry user profile)>> |
| 04 | Certification Status of the Airflow Measurement Apparatus Accuracy | <<user select from list:   * Certified by Manufacturer and listed on CEC Website at   <http://www.energy.ca.gov/title24/equipment_cert/ama_fas/index.html>, or   * Not Certified (do not continue)>> |
| 05 | Determination of MCH23 type (this field not visible to user) | <<calculated field:  If A11 = RA3.3.3.1.5 Then  If A04 = alteration Then Use variant MCH-23c;  ElseIf A11 = RA3.3 procedures Then  If A04=alteration then  If A12 = Variable CFVCS or Fixed CFVCS, then use variant MCH-23e,  Else use MCH-23a  End  If A07 = ZonallyControlled Then  If A06 = SingleSpeed then  if A12 = Variable CFVCS or Fixed CFVCS, Then use variant MCH-23f,  Else use variant MCH-23b;  ElseIf A06 = MultiSpeed then  if A12 = Variable CFVCS or Fixed CFVCS, Then use variant MCH-23e,  Else use variant MCH-23a;  ElseIf A07 = NotZonal Then  If cooling system type on MCH-01 = No Cooling And A08 = CFI System or A12 = Variable CFVCS or Fixed CFVCS, Then use variant MCH-23d;  Elseif A04 = New or Replacement then  if A12 = Variable CFVCS or Fixed CFVCS, Then use variant MCH-23e,  Else use variant MCH-23a;  ElseIf A07 = N/A Then  if A04 = New or Replacement, Then  If cooling system type on MCH-01 = No Cooling And A08 = CFI System or A12 = Variable CFVCS or Fixed CFVCS, Then use variant MCH-23d;  if A12 = Variable CFVCS or Fixed CFVCS use variant MCH-23e,  Else use variant MCH-23-a  End  End>> |

|  |
| --- |
| **MCH-23F Forced Air System Airflow Rate Measurement – Newly Installed Zoned Single-Speed Compressor Systems with Central Fan Ventilation Cooling** |

|  |  |  |
| --- | --- | --- |
| **D. Forced Air System Airflow Rate Measurement – All Zones Calling**  The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3. | | |
| 01 | Required All Zones Calling Minimum System Airflow Rate (cfm/ton) | <<calculated field:  If MCH-01 – ResidentialCoolingSystemType = Small Duct High Velocity AC or Small Duct High Velocity HP, then value = 250  Elseif, A04 = Alteration, then value = 300;  Elseif parent is MCH-01a, and B10 ≠ D09, then value = 350;  Elseif parent is MCH-01a, and C08 ≠ NA, then reference value from MCH-01a C08;  Else value = 350>> |
| 02 | Required All Zones Calling Minimum System Airflow Target (cfm) | <<calculated field: = A05 multiplied by value in D01>> |
| 03 | Actual System Airflow Rate Measurement (cfm) | <<user input numeric value: xxxx>> |
| 04 | Compliance Statement: | <<If D03≥D02, the display text "system airflow rate complies", else display text "system does not comply with minimum airflow rate requirement">> |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **E. Forced Air System Airflow Rate Measurement – All Other Zonal Control Modes**  The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3.  For compliance with verification in all zonal control modes, it is sufficient to verify airflow rate for operation of each individual zone when the individual zone is the sole zone calling for conditioning. It is not necessary to verify airflow rate for combinations of 2 or more zones that are less than all zones calling (e.g., 2 out of three zones calling). | | | | | |
| 01 | | Number of Independently Controlled Zones  (i.e., number of thermostats or temperature sensors that independently control one or more dampers.) | | <<user input, integer>>  (For each zone create a row in Table E: fields 04 through 07) | |
| 02 | | Required Minimum Cooling System Airflow Rate (cfm/ton) | | <<calculated field:  If MCH-01 – ResidentialCoolingSystemType = Small Duct High Velocity AC or Small Duct High Velocity HP, then value = 250  Elseif, A04 = Alteration, then value = 300;  Elseif parent is MCH-01a, and B11 ≠ D09, then value = 350;  Elseif parent is MCH-01a, and C08 ≠ NA, then reference value from MCH-01a C08;  Else value = 350>> | |
| 03 | | Required Minimum Airflow in all Zonal Control Modes (cfm) | | <<calculated field: = A05 multiplied by value in E02>> | |
| <<create 1 row of data for each of the number of independently controlled zones identified in E01>> | | | | | |
| 04 | | | 05 | 06 | 07 |
| Zone Name | | | Zone Description | Measured Airflow with All Other Zones Off (CFM) | Zone Compliance Status |
| <<user entry, text field 20 characters>> | | | <<user entry, text field 50 characters>> | <<user input numeric value: xxxx>> | <<if E06 ≥ E03, then print “Pass”, else print “Fail” |
|  | | |  |  |  |
| 08 | | Compliance Statement: | | <<If all rows = “pass” in column E07, then display text "system airflow rate complies", else display text "system does not comply with minimum airflow rate requirement">> | |
| **F. Central Fan Ventilation Cooling System Airflow Rate Measurement**  The procedures for central fan ventilation cooling system airflow rate verification are specified in Reference Residential Appendix RA3.3.4 | | | | | |
| 01 | Required Ventilation System Airflow Rate (cfm) | | | <<calculated field:  Reference MCH-01 C11, Central Fan Ventilation Cooling Airflow>> | |
| 02 | Actual System Ventilation Airflow Rate Measurement (cfm) | | | <<user input numeric value: xxxx>> | |
| 03 | Compliance Statement: | | | <<If A12 = ‘Fixed CFVCS’, then if F02≥F01, result = "System ventilation airflow rate complies"  ElseIf A12 = ‘Variable CFVCS’, then if F02≤F01, result = "System ventilation airflow rate complies"  Else display text "System does not comply with ventilation airflow rate requirement" >> | |

|  |  |  |
| --- | --- | --- |
| **G. Additional Requirements** | | |
| 01 | Air filters that meet the applicable requirements of Standards Section 150.0(m)12 or 150.0(m)13 were properly installed in the system during system airflow rate measurement identified on this Certificate of Installation. | |
| 02 | The airflow rate measurement apparatus used to perform the airflow rate measurement identified on this Certificate of Installation was calibrated in accordance with the apparatus manufacturer's specifications and conforms to the instrumentation specifications given in RA3.3.1. | |
| 03 | A visual inspection shall confirm that bypass ducts that deliver conditioned supply air directly to the space conditioning system return duct airflow are not used on newly constructed zonally controlled systems unless the Performance Certificate of Compliance indicates an allowance for use of a bypass duct. When a bypass duct is accounted for on the Performance Certificate of Compliance, the airflow rate shall conform to the specifications listed on the Certificate of Compliance. | |
| 04 | All registers were fully open during the diagnostic test. | |
| 05 | System fan was set at maximum speed during the diagnostic test. | |
| 06 | If fresh air duct is part of the HVAC system it was not closed during the diagnostic test. | |
| 07 | Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the Fan Efficacy tested value. | |
| 08 | Multi-speed compressor space cooling systems or variable speed compressor systems shall verify airflow (cfm/ton) and fan efficacy (Watt/cfm) with system operating in cooling mode at the maximum compressor speed and the maximum air-handler fan speed. | |
| 09 | Verification Status: | <<user pick from list:  \*\*\* Pass - all applicable requirements are met; or  \*\*\* Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or  \*\*\* All n/a - This entire table is not applicable |
| 10 | Correction Notes: | <<if Verification Status= Fail, then text entry in this Corrections Notes field is required;  user input text>> |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

|  |  |
| --- | --- |
| **H. Determination of HERS Verification Compliance**  All applicable sections of this document shall indicate compliance with the specified verification protocol requirements in order for this Certificate of Verification as a whole to be determined to be in compliance. | |
| 01 | <<if B01≠ System does not comply; and C04 ≠ Not Certified; and D04=system airflow rate complies; and E08= system airflow rate complies; and F03 = system airflow rate complies; and G09≠Fail; then display: Complies: All specified verification protocol requirements on this document are met; else display: Does not comply: One or more specified verification protocol requirements on this document are not met > |