

AIR DISTRIBUTION DUCT LEAKAGE

CEC-NRCA-MCH-04b-A (Revised 01/19)

CALIFORNIA ENERGY COMMISSION



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| CERTIFICATE OF ACCEPTANCE | | NRCA-MCH-04-A |
| AIR DISTRIBUTION DUCT LEAKAGE | | (Page 1 of 5) |
| Project Name: | Enforcement Agency: | Permit Number: |
| Project Address: | City: | Zip Code: |
| System Name or Identification/Tag: | System Location or Area Served: | |

| | |
|---|---|
| Compliance Results: AUTOMATED ("Complies" or "Does Not Comply") | Enforcement Agency Use: Checked by/Date |
|---|---|

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|---------|--|
| Intent: | Submit one Certificate of Acceptance testing duct leakage rate for each newly installed, repaired, or altered heating, ventilating or air conditioning (HVAC) duct system (no sampling permitted). (§ 140.4(l)1, 141.0(b)2D, and 141.0(b)2E) NOTE: ATT only, No HERS Verification permitted. |
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| | |
|---|---|
| A. Construction Inspection | |
| Building: | Floor: |
| Room/Area/Zone: | Control System: |
| Prior to Functional Testing, verify and document all of the following. | |
| 1 | Required documentation (check all of the following): |
| <input type="checkbox"/> | a Confirm access to design drawings, cut-sheets, NRCC-MCH-02-E or NRCC-MCH-05-E , and verify that all materials are stamped or signed by a Professional Mechanical Engineer licensed by the State of California and approved by the authority having jurisdiction. |
| 2 | System installation type (check one of the following): |
| <input type="checkbox"/> | a Qualifying newly constructed system (§140.4(l)1) |
| <input type="checkbox"/> | b Qualifying altered duct systems (§141.0(b)2D) |
| | Qualifying altered space-conditioning systems. (§141.0(b)2E) |
| 3 | System operational capacity (record one of the following): |
| <input type="checkbox"/> | a Condenser Nominal Cooling Capacity (ton) (NA 2.1.4.1): |
| <input type="checkbox"/> | b (if heating only) Heating Capacity (kBtu/h) (NA 2.1.4.1): |
| 4 | Instrumentation Specification Requirements The apparatus for duct system pressurization and duct system leakage measurements must consist of a duct system pressurization and leakage airflow measurement device meeting the specifications below (check all of the following): (NA 2.1.2) |
| <input type="checkbox"/> | a The pressure measurement instrumentation systems is accurate to plus or minus 0.2 Pa and makes use of a static pressure probe. (NA 2.1.2.1) |
| <input type="checkbox"/> | b All measurements of duct leakage airflow shall have an accuracy of plus or minus 3 percent of measured airflow or better using digital gauges. (NA 2.1.2.2) |
| <input type="checkbox"/> | c All instrumentation used for duct leakage diagnostic measurements are calibrated according to the manufacturer's calibration procedure. (NA 2.1.2.3) |
| <input type="checkbox"/> | d The apparatus for determining leakage in and verifying sealing of all accessible leaks in existing duct systems provide means for introducing controllable amounts of non-toxic visual or theatrical smoke into the duct pressurization apparatus for identifying leaks in accessible portions of the duct system. The means for generating smoke shall have sufficient capacity to ensure that any accessible leaks will emit visibly identifiable smoke. (NA 2.1.3.2) |
| Duct Systems – Newly Constructed System | |
| 5 | Duct connections meet the requirements of Standards §120.4 (a) through (f) . (NA 7.5.3.1(a)) |
| <input type="checkbox"/> | a Confirm access to all installed plenums and duct work. (NA 7.5.3.1(d) , (f)) |
| <input type="checkbox"/> | b Reference NRCC-MCH-02-A or NRCC-MCH-5-A to verify that the duct design requirement has been completed on the signed and approved form. (NA 7.5.3(a) & (e) , §120.4(a)-(f)) |
| Duct Systems – Newly Constructed Systems, Altered Duct Systems, and Altered Space-Conditioning Systems | |
| 6 | Visually inspect and verify the seal of all of the following: |
| <input type="checkbox"/> | a Connections to plenums and other connections to the forced air unit. (NA 7.5.3.1(h)) |

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| A. Construction Inspection | | | |
|---|--|---|-----------------|
| Building: | Floor: | Room/Area/Zone: | Control System: |
| <input type="checkbox"/> | b | Refrigerant lines and other penetrations into the forced air unit. (NA 7.5.3.1(i)) | |
| <input type="checkbox"/> | c | Air handler door panel (do not use permanent sealing material, metal tape is acceptable). (NA 7.5.3.1(j)) | |
| <input type="checkbox"/> | d | Register boots sealed to surrounding material. (NA 7.5.3.1(k)) | |
| <input type="checkbox"/> | e | Connections between lengths of duct, as well as connections to takeoffs, wyes, tees, and splitter boxes. (NA 7.5.3.1(l)) | |
| 7 | Inspect all plenums and enough of the installed duct work to be confident that all of the following are reasonably accurate (in descending order of priority): (check all of the following) | | |
| <input type="checkbox"/> | a | Joints and seams are NOT sealed with a cloth-backed rubber adhesive tape unless used in combination with mastic and draw bands. (NA 7.5.3.1 (f), §120.4(b)2D) | |
| <input type="checkbox"/> | b | Insulation Requirements – reference NRCC-MCH-02-E or NRCC-MCH-05-E , approved design drawing and cut-sheets (if available) for the system and verify the insulation by location has been installed as indicated and is either R-8 or R-4.2. Flex duct must be also be labeled as either R-8 or R-4.2. (NA 7.5.3.1(g), §120.4(a), (c), and (d)) | |
| <input type="checkbox"/> | c | Drawbands: Reference the approved design drawing and cut-sheets (if available). Verify that all drawbands are specified to be stainless-steel worm-driven hose clamps or UV-resistant nylon duct ties, have a minimum tensile strength rating of 150 pounds, and make note of the manufacturer’s recommended tightening. Visual inspect a representative amount of drawband installations. (NA7.5.3.1(b), §120.4(b)2E) | |
| <input type="checkbox"/> | d | Constriction of flexible ducts: Visually verify that the flexible ducts are not compressed against an immovable object, squeezed through an opening, or contorted to extreme configurations. Verify that any bend radius (at the centerline) in a flexible duct does not exceed one duct diameter. (NA 7.5.3.1c) | |
| <input type="checkbox"/> | e | For outdoor duct work, reference approved design drawing and cut sheets (if available). Verify that the insulation is protected from sunlight, moisture, equipment maintenance, wind, and weather by the appropriate application of aluminum, sheet metal, painted canvas, or plastic cover. Cellular foam insulation may also be protected by direct application of paint with a coating that is water retardant and provides shielding from solar radiation. (NA7.5.3.1(g), § 120.4(f)) | |
| Construction Inspection Compliance Results: AUTOMATED (“Complies” or “Does Not Comply”) | | | |

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B1. Functional Testing

| | | | |
|---|--|-----------------|-----------------|
| Building: | Floor: | Room/Area/Zone: | Control System: |
| STEP | Procedure – Pressurize duct leakage test | | |
| 1 | Temporarily seal all the supply registers and return grilles, except for one large centrally located return grille or the air handler cabinet access door or panel. (NA 2.1.4.2.1(c)) | | |
| 2 | Verify that all outside air dampers and/or economizers are sealed prior to pressurizing the system. (NA 2.1.4.2.1(c)) | | |
| 3 | Attach the fan flowmeter device to the duct system at the unsealed return grille or the air handler cabinet access door or panel. (NA 2.1.4.2.1(d)) | | |
| 4 | Install a static pressure probe at a supply register located close to the air handler, or at the supply plenum. (NA 2.1.4.2.1(e)) | | |
| 5 | Adjust the fan flowmeter to produce a positive 25 Pa (0.1 inches water) pressure at the supply register or the supply plenum with respect to the outside or with respect to the building space with the entry door open to the outside. (NA 2.1.4.2.1(f)) | | |
| 6 | Record the flow through the flowmeter, this is the duct leakage flow at 25 Pa (0.1 inches water). (NA 2.1.4.2.1(g)) | | CFM |
| 7 | Calculate the nominal air handler air flow: <ul style="list-style-type: none"> Air conditioner or heat pump: 400 cfm per rated ton of cooling capacity (Table A-3a). Heating-only system furnaces: 21.7 cfm per kBtu/hr of rated heating output capacity (Table A-3b). (NA 2.1.4.1) | | CFM |
| 8 | Divide the duct leakage flow (STEP 6) by the nominal air handler airflow (STEP 7) and convert to a percentage (multiply by 100). (NA 2.1.4.2.1(h)) | | Percentage |
| 9 | PASS or FAIL <ul style="list-style-type: none"> New duct system: 6% or less is passing. (§140.4(l)1) Existing duct system: 15% or less is passing. (§141.0(b)2D or 141.0(b)2E) (NA 2.1.4.2) | | P/F |
| 10 | IF FAIL: Newly constructed systems must be repaired until they pass. (NA2.1.4.2) Altered duct systems and altered space-conditioning systems may be allowed to pass using the Smoke Test of Accessible Duct Sealing (NA 2.1.4.2.3) and the Visual Inspection of Accessible Duct Sealing (NA2.1.4.2.4) if further repairing is not possible. (NA 2.1.4.2.2, NA 2.1.4.2.3) | | |
| 11 | Return system to normal operating condition. | | |
| Functional Test Compliance Results: AUTOMATED (“Complies” or “Does Not Comply”) | | | |

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B2. Functional Testing

| | | | |
|--|--|-----------------|-----------------|
| Building: | Floor: | Room/Area/Zone: | Control System: |
| STEP | Procedure – Smoke Test and Visual Inspection of Accessible Duct Sealing | | |
| <input type="checkbox"/> | This functional test may only be performed if Functional Test B1 (Pressurized duct leakage test) results in a “Does Not Comply” for altered duct systems and altered space-conditioning systems only. These test may NOT be performed on newly constructed systems. (NA2.1.4.2.3, NA2.1.4.2.4) | | |
| Smoke Test of Accessible Duct Sealing | | | |
| 1. | Inject either theatrical or other non-toxic smoke into a fan pressurization device that is maintaining a duct pressure difference of 25 Pa (0.1 inches water) relative to the duct surroundings, with all grilles and registers in the duct system sealed. (NA2.1.4.2.3(a)) | | |
| 2. | Visually inspect all accessible portions of the duct system during smoke injection. (NA2.1.4.2.3(b)) | | |
| 3. | The system shall pass the test if one of the following conditions is met: A. No visible smoke exits the accessible portions of the duct system. B. Smoke only emanates from the furnace cabinet which is gasketed and sealed by the manufacturer and no visible smoke exits from the accessible portions of the duct system. (NA2.1.4.2.3(c)) | P/F | |
| Visual Inspection of Accessible Duct Sealing – Visually inspect and verify that all of the following locations have been sealed during the smoke test: | | | |
| 4. | Connections to plenums and other connections to the forced air unit. (NA2.1.4.2.4(a)) | P/F | |
| 5. | Refrigerant lines and other penetrations into the forced air unit. (NA2.1.4.2.4(b)) | | |
| 6. | Air handler door panel (do not use permanent sealing material, metal tape is acceptable). (NA2.1.4.2.4(b)) | | |
| 7. | Register boots sealed to surrounding material. (NA2.1.4.2.4(d)) | | |
| 8. | Connections between lengths of duct, as well as connections to takeoffs, wyes, tees, and splitter boxes. (NA2.1.4.2.4(e)) | | |
| 9. | Return system to normal operating condition. | | |
| Functional Test Compliance Results: AUTOMATED (“Complies” or “Does Not Comply”) | | | |

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

| | |
|------------------------------------|---------------------------------|
| Documentation Author Name: | Documentation Author Signature: |
| Documentation Author Company Name: | Date Signed: |
| Address: | Phone: |

ACCEPTANCE TEST TECHNICIAN'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 Acceptance is true and correct.
2. I am the person who performed the acceptance test reported on this Certificate of Acceptance.
3. The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix.
4. I have completed this Certificate of Acceptance through the Acceptance Test Technician Certification Provider that approved by certification as an Acceptance Test Technician.
5. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building.

| | | |
|---------------|-----------------------------------|--------------|
| ATT Name: | Field Technician Signature: | |
| Company Name: | ATT Certification Identification: | |
| Address: | Phone: | Date Signed: |

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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

1. I am the Acceptance Test Technician, or the Acceptance Test Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance.
2. 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 Acceptance, and attest to the declarations in this statement (responsible acceptance person).
3. The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix.
4. I understand that an Acceptance Test Technician will check the installation to verify compliance, and that if such checking identifies defects the responsible builder/installer shall be required to take corrective action at their expense. I understand that Energy Commission and Acceptance Test Technician Certification Provider representatives will also perform quality assurance checking of installations.
5. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building.
6. I will ensure that a completed, signed copy of this Certificate of Acceptance 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 signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

| | | |
|---|--|--------------|
| Responsible Acceptance Person Name: | Responsible Acceptance Person Signature: | |
| Responsible Acceptance Person Company Name: | Position with Company (Title): | |
| Address: | CSLB License: | |
| City/State/Zip: | Phone: | Date Signed: |