

**INSTALLER and INSPECTOR QUICK-REFERENCE:
2022 NRCA-MCH-04-A
Air Distribution System Acceptance Testing**

Purpose and Scope of the Test

This test verifies all duct work associated with all nonexempt constant volume, single-zone HVAC units (i.e., air conditioners, heat pumps, and furnaces) meet the material, installation, insulation R-values, and leakage requirements specified by the Energy Code.

Test trigger

This test is only for single-zone units serving less than 5,000 ft² of floor area where 25 percent or more of the duct surface area is in one of the following spaces:

- Outdoors.
- In a space directly under a roof where the U-factor of the roof is greater than the U-factor of the ceiling.
- In a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces.
- In an unconditioned crawlspace.
- In other unconditioned spaces.

Within these criteria, this test applies to both new duct systems and existing duct systems that are either being extended, or the space conditioning system is altered by the installation or replacement of space conditioning equipment. This includes the replacement of the air handler, outdoor condensing unit of a split-system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger.

Relevant Energy Code References and Required Compliance Documents

Title 24, Part 6 of the California Building Code, Building Energy Efficiency Standards (Energy Code) sections 120.4, 141.0(b)2D, 140(b)2E, 140.4(l), 141.0(b)2D, 141.0(b)2E, 160.3(c)2Hi, 160.3(b)5, 180.2(b)2Bii, 180.2(b)2Biii; NA2.1, NA7.5.3 and NRCC-MCH-E Table L.

Who Can Perform the Test

This test is intended to be performed by an acceptance test technician certified by a CEC-approved Acceptance Test Technician Certification Provider, using compliance document NRCA-MCH-04-A. At the discretion of the AHJ, a sampling of the units may be tested by the installing technician, and certified by a HERS rater.

Required Tools

- Performance of this test will require measuring duct leakage equipment:
 - Fan flowmeter (a fan with a calibrated orifice used to pressurize the ducts) accuracy within 3 percent of measured flow.
 - Digital manometer (pressure meter) accuracy within 0.2 pascals.

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Estimated Time to Complete Test

- Construction inspection: 0.5 to 2 hours, depending on duct access for visual inspections and availability of construction material documentation (designs, cut sheets, and the NRCC-MCH-E as approved by the authority having jurisdiction).
- Functional testing: 3 to 6 hours, depending on how long it takes to seal all supply diffusers and return grilles.

Potential Issues and Cautions

- Existing duct systems do not have to be tested if they are insulated or sealed with asbestos.
- Visual inspections of flex duct installation can be made as they are installed to ensure that they are not constructed beyond what the Energy Code allows.
- If this test is to be applied to existing duct systems that are having alterations made to the ducts or the HVAC equipment attached to the ducts, test the system leakage before making the alterations.
- Ensure all the supply and return diffusers/grilles are sealed tightly, all access panels are in place, and duct ends are sealed tightly before leakage testing.
- After the test, remember to remove all blockages from the supply and return ducts (that is, where the supply and return ducts at the HVAC unit were blanked off). Seal any holes drilled in the supply and return ducts for the static pressure probes.
- If a certified California HERS Rater must also verify duct leakage performance, it may be prudent to coordinate this test with the HERS Rater so that the HERS Rater can witness/verify the test simultaneously.

Caution!

If performing the **smoke test**, contact the local fire department and arrange to have the smoke detection and fire suppression system for the building taken off-line and the entire building evacuated of personnel prior to implementing the test. Following the conclusion of the test and working with the local fire department, ensure that the system is returned to on-line and operational status.

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Inspection Enforcement

Required:

- Verify that duct connections, flexible duct installations, and all duct R-Values are consistent with approved designs and Energy Code requirements.
- Verify that insulation is installed per approved designs and Energy Code requirements.
- Verify a sampling of installed drawbands for the correct type, rating, and tightness.
- Verify that outdoor ductwork has UV protection per approved design and Energy Code requirements.

Optional Equipment Check:

Verify that the installing technician or acceptance test technician has access to the following equipment:

- Fan flowmeter (a fan with a calibrated orifice used to pressurize the ducts) accuracy within 3 percent of measured flow.
- Digital manometer (pressure meter) accuracy within 0.2 pascals.

Acceptance Criteria

- Based on total fan system flow rate:
 - Newly installed ducts do not leak more than 6 percent.
 - Existing ducts do not leak more than 15 percent.
- Obtain HERS Rater field verification if not using an acceptance test technician.

Follow the **Construction Inspection** and **Functional Testing** instruction on NRCA-MCH-04-A.