# Testing Duct Detectors with Smoke Bombs and Smoke Machines?

Condensed article from Security Dealer magazine, Dec.2005, by Greg Kessinger SET, CFPS

There are easier more scientific methods for testing these devices. First, you must comply with the IBC/IFC, which isn't too much of a problem, since 907.16 "Acceptance Tests" refers to NFPA 72 and the IFC does the same for on-going/routine testing. Once in NFPA 72, (The National Fire Alarm Code) we turn to the Testing and Maintenance" chapter. Once you find the "Test Methods" table, scan through the list until you find "Initiating Devices", then "Smoke detectors", then "Duct-type". This table states that system smoke detectors are to be tested "in place to ensure smoke entry into the sensing chamber and an alarm response. Testing with smoke or listed aerosol approved by the manufacturer shall be permitted as an acceptable test method. Other methods approved by the manufacturer that ensure smoke entry into the sensing chamber shall be permitted."

Specifically for duct detectors, the test method table states "Air duct detectors shall be tested or inspected to ensure that the device will sample the air stream. The test shall be made in accordance with the manufacturer's instructions."

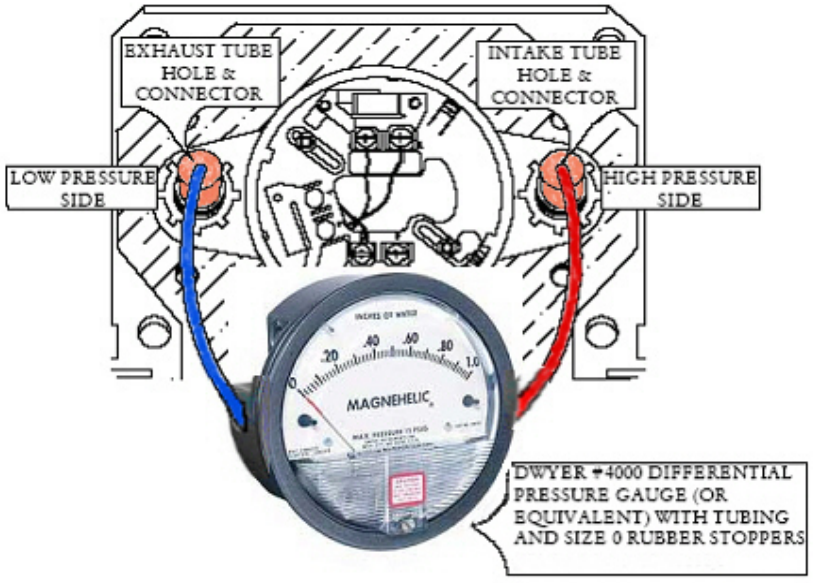
After locating a half dozen duct detector installation/testing instructions, I've found that they all state that a manometer or Magnehelic gauge is used to test the pressure differential across the sampling tubes. These gauges have two small hoses that connect on each side of the detector housing; one is labeled LOW and the other HIGH. The LOW hose is connected to the exhaust tube. The HIGH hose is connected to the sampling tube. Once connected, the gauge will give you a reading indicating the pressure differential between these two tubes. In the example below, the pressure differential between input sampling tube and exhaust tube should be greater than 0.01" of water and less than 1.2" of water.

This test is performed to prove that smoke is able to enter the detector housing. The instructions then say to use canned smoke, punk, or other smoke source to prove that the detector will respond to smoke by applying it to the detector head after removing the duct detector's housing cover. You may have to temporally plug the sampling tubes so air from the duct doesn't blow the test smoke away from the detector head. However, if the HVAC contractor installed the duct detector(s), then they should be the ones doing the testing.

**Every duct detector comes with UL approved instructions for its proper testing.**

*Typical wording from manufacturers testing instructions, which MUST be followed for code compliance:*

"To verify proper sampling of air, use a Dwyer differential pressure gauge (or equivalent). See Figure for proper gauge connections."




**VERIFY AIR SAMPLING**