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Brady,

Enclosed is the *Duct Leakage to Outside* test procedure using an Aeroseal SmartSeal system. The total leakage of the duct system to the outside including ducts, plenums, register boots and mechanical equipment should be measured during this test. The Aeroseal injection machine performs like a "Duct Blaster" during this leakage measurement.

Pre-Sealing Leakage Test

1. Turn off the HVAC unit to be tested.
2. Set-up the Blower Door testing system.
3. Open any mechanical dampers after marking their existing position.
4. Use DuctMask to temporarily seal all registers and return grilles prior to their removal. This allows measurement of all leakage at the register-boot/sheet-rock junctions and the HVAC equipment.
5. Seal any intentional outdoor air intakes.
6. Insert the blue pressure tube assembly into supply and return sides of the duct system through register plugs or other convenient opening. Place the equal-length tubes in both the supply and return to provide an average of the two pressures. This improves the accuracy of the test, particularly when there is significant resistance between the supply and return sides (e.g. a dirty or blocked coil).
7. **If the Aeroseal machine is inside the pressurized building envelope, insert the clear pressure tube into the brass barb directly across from the blue barb and place the tube through a convenient opening in the building envelope to measure outside air pressure. If the Aeroseal machine is outside the building envelope, the reference pressure measured at the brass bar on the computer case will read the outside air pressure.**
8. Start the Blower Door machine.
9. Start the Aeroseal machine. When prompted by the software, set the Inlet Gate Setting to #2. Ensure the injector gate is set to the same setting.
10. Press 'T' on the Aeroseal pre-seal screen and adjust the target pressure for the pre-seal test to 50 Pa.
11. Press F2 to begin the Duct Leakage to Outside test. The fan will gradually ramp up to, and then hold, a duct/mechanical-system pressure of 50 Pa. Adjust the Blower Door machine fan speed to maintain a building pressure of 50 Pa during the test.
12. After the Pre-Seal test is complete, remove all temporary DuctMask seals and replace with foam blocks.

Post-Sealing Leakage Test

1. Verify the HVAC equipment is off.
2. Remove all foam blocks from the registers and return grilles.
3. Replace all registers and return grilles.
4. Use DuctMask to temporarily seal all registers and return grilles. This allows measurement of all leakage at the register-boot/sheet-rock junctions and the HVAC equipment.
5. Remove foam blocks isolating furnace, AC coil or fan coil.
6. Verify intentional outdoor air intakes are sealed.
7. Insert the blue pressure tube assembly into supply and return sides of the duct system through register plugs or other convenient opening. Place the equal-length tubes in both the supply and return to provide an average of the two pressures. This improves the accuracy of the test, particularly when there is significant resistance between the supply and return sides (e.g. a dirty or blocked coil).
8. **If the Aero seal machine is inside the pressurized building envelope, insert the clear pressure tube into the brass barb directly across from the blue barb and place the tube through a convenient opening in the building envelope to measure outside air pressure. If the Aero seal machine is outside the building envelope, the reference pressure measured at the brass bar on the computer case will read the outside air pressure.**
9. Start the Blower Door machine.
10. Start the Aero seal machine. When prompted by the software, set the Inlet Gate Setting to #2. Ensure the injector gate is set to the same setting.
11. Press 'T' on the Aero seal pre-seal screen and adjust the target pressure for the pre-seal test to 50 Pa.
12. Press F2 to begin the Duct Leakage to Outside test. The fan will gradually ramp up to, and then hold, a duct/mechanical-system pressure of 50 Pa. Adjust the Blower Door machine fan speed to maintain a building pressure of 50 Pa during the test.
13. After the Pre-Seal test is complete, remove all temporary DuctMask seals and replace with foam blocks.

During the test, the duct leakage on the Aero seal machine is displayed in CFM @ 50 Pa, and in square inches of equivalent hole size. With the duct pressure held constant at 0.20 inch H₂O (50 Pa), the software measures the airflow thru the fan box. As all purposeful duct openings have been temporarily blocked and the building has been pressurized to the same pressure as the duct system, the measured airflow through the fan box is the leakage of the duct system to the outside at an average pressure of 0.20 inch H₂O (50 Pa).

Sincerely,

Neal Walsh
Vice President
Aero seal