



Updated November 26, 2013

**MEMORANDUM FOR EUMMOT PROGRAM MANAGERS**

**FROM: FRONTIER ASSOCIATES**

**SUBJECT: Duct Efficiency Measure Frequently Asked Questions (FAQs)**

The following FAQs and terminology are for use with the Duct Efficiency measure:

- I. Application Questions (AQ#) and Answers (AA#)  
Application questions and answers are related to data and information that are required to be entered into the application tool.
  
- II. Methodology Questions and Answers (MQ# and MA#)  
Methodology questions and answers are explained to help the user understand the reasoning for the values used in the calculation process.
  
- III. Terminology  
The terminology section was added specifically to clarify the FAQs. Additional FAQs and terms will be added as needed to assist program managers and users of the Duct Efficiency Measure.

## I. Application Questions

**AQ1. When entering data for the Duct Efficiency measure, what selection should be entered for the “air handler location” when the air handler is located in a closet without a ceiling and closet is open to the attic? What if the closet door is sealed from conditioned space? What if there is a defect in the ceiling such as a gap around the plenum?**

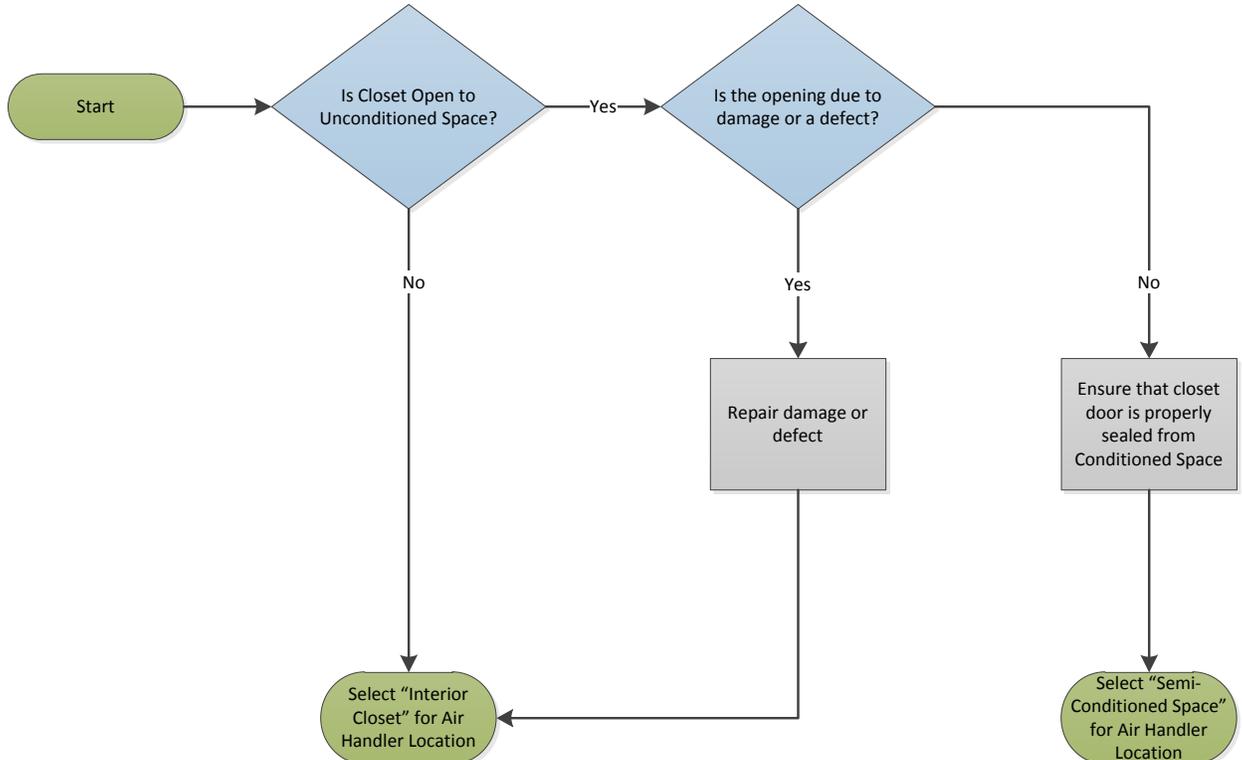
### AA1.

When the air handler is located in a closet open to the attic AND is sealed from the conditioned space, select “semi-conditioned space”. This selection is similar to attic/garage except that it accounts for some leakage and heat transfer from conditioned space.

If the closet door is not sealed and the closet is sealed from the attic, select “interior closet/fur down” for the air handler location.

If the closet ceiling is open to the attic due to some defect or damage in the ceiling, the project sponsor should repair the damage or correct the defect and classify the air handler location as ‘Interior Closet’.

\*Refer to the following flow chart as a guide for choosing the proper air handler location:



**AQ2. Does interior closet/fur down only mean conditioned space?**

**AA2.** Yes, provided there is insulation between the fur down and the unconditioned space.

**AQ3. What is a return register and is there a default number that should be entered?**

**AA3.** A return register is the inlet for air to return to the air conditioner or furnace. Most homes today are constructed with a filtered register as the only return register. There are situations where additional return register are installed. Examples include locations where there are obstructions in the return path and additional return grilles are necessary to provide the required filter area or to reduce the pressure drop for proper operation of the air handler.

**AQ4. If there are multiple return registers near one another, should I consider them to be a single return register or separate return registers?**

**AA4.** If the return registers are within approximately 10 feet of one another and are supplying air to the same return duct, the multiple return registers should be considered to be a single return register towards the overall count of return registers for the home.

**AQ5. Does the Duct Efficiency measure apply when more than one air handler is installed.**

**AA5.** Yes, the Duct Efficiency measure can be used for multiple units. Care must be taken to properly seal all supply and return air grilles and registers on the unit not being tested. The appropriate square footage must be entered.

Example: A 3600 square foot home is cooled by two units. 1700 of the 1850 square feet downstairs is conditioned by a 2.5 ton air conditioner and 1550 of the 1750 square feet upstairs is conditioned by a 3.5 ton air conditioner. When testing the upstairs unit, all openings on the downstairs unit are sealed off. And the results are entered into the duct calculator along with the 1550 square feet for the conditioned area.

**AQ6. How do I input a Multi-family dwelling with multiple stories (e.g. – a two-story apartment complex that has individual dwellings on both floors)? Can I assume the dwelling is all upper floor or all lower floor?**

**AA6.** The appropriate way to handle this scenario is to consider each floor as a separate Duct Efficiency measure. Essentially all of the inputs will remain the same except for the “Building Type,” which will be “SF: Upper Floor(s) of Multi-story Home” in the first instance and “SF: Lower Floor(s) of Multi-story Home” in the second instance.

**AQ7. How do I input a Multi-family dwelling that has more than two dwellings under a continuous roof structure (typically with shared walls)?**

**AA7.** The current options do not address MF: Single-level dwellings. However, a reasonable estimate can be provided if the user assumes a SF: Single-story home and treats each dwelling/unit separately. (e.g. – a four-plex complex would require four separate tests to be performed, and each test would be measured by the calculator individually.

**AQ8. What if there is insulation on the attic ceiling rather than the attic floor?**

**AA8.** If the attic ceiling is insulated, then the duct efficiency (or duct sealing) measure is not eligible for incentives. By insulating the ceiling of the attic, one expands the thermal envelope of the home to include the attic, which is now considered conditioned space. In this scenario, since all of the ductwork is considered to be in conditioned space, any leakage occurring within that duct system is occurring to or from conditioned space. Therefore, the deemed energy and demand savings for sealing duct systems do not apply in this case. This particular scenario may become more common as this insulation method continues to emerge as a best practice in constructing more energy efficient residences.

## II. Methodology Questions

### **MQ1. Why was duct leakage capped at 35 percent?**

**MA1.** The duct leakage cap is utility specific and may be set to a lower value. The value of 35 percent was chosen because 1) several studies noted duct leakage test results were typically under 35 percent, 2) discussions with field testers also confirmed that results were within the 35 percent range, 3) leakage over 35 percent will not adequately cool or heat a home during design conditions if the heating and air conditioning systems were sized according to ACCA Guidelines, and 4) systems with duct leakage rates greater than 35 percent indicate the air conditioning system is in need of repair and repair work is outside the scope of work for energy efficiency incentives.

### **MQ2. Why is leakage-to-outside duct testing required?**

**MA2.** The savings calculation methodology is now heavily dependent on the CFM reduction as measured through duct testing. Leakage-to-outside duct testing is required in order to prevent claiming savings for eliminating duct leakage to conditioned space.

### III. Terminology

**Blower Door Test** – a test used to determine the leakage of the residential envelope, namely leakage through walls, windows, and door cracks/gaps.

**CFM<sub>25</sub>** – air volume measured in cubic feet per minute at a test pressure of 25 pascals.

**CFM<sub>50</sub>** – air volume measured in cubic feet per minute at a test pressure of 50 pascals.

**Conditioned Space** – a space within a building structure that is heated, cooled, or indirectly heated or cooled and whose area space temperature is typically less than 90 degrees Fahrenheit during the cooling season and typically greater than 50 degrees Fahrenheit during the heating season.

**Duct Blaster Test** – a test used to test for duct leakage. The equipment necessary includes a test fan with a means to measure air flow such as orifice plates.

**Fur down** – construction for the purpose of concealing equipment and/or duct work. Typical building wall and ceiling materials (gypsum and 2x4 wood) are used.

**Leakage to Outside** – leakage of the ductwork to unconditioned space. The leakage is determined by using both a duct blaster and a blower door test. The blower door test creates pressure in the ductwork in conditioned space. The resulting duct leakage is considered as leakage to non-conditioned space.

**Non-Conditioned Space** – a space within a building that is neither heated, cooled, or indirectly heated or cooled and whose area space temperature typically exceeds 90 degrees Fahrenheit during the designed cooling season and whose area space temperature typically drops below 50 degrees Fahrenheit during the heating season.

**Pascal** – metric units of pressure used for relatively low pressures. 50 pascals is approximately equal to 1/4" water column.

**Return Register** – the device, usually in the wall or ceiling, which air enters to return back to the air conditioner or furnace. Most return registers are filtered registers.

**Total leakage** – leakage of the ductwork when tested only with a duct blaster.