NRGY 235: Building Energy Efficiency
Week 10 Quiz

1. Approximately how much R value does a storm door add to a wood door?
   a) R-3
   b) R-4
   c) R-1
   d) R-2
2. What does the standard ASTM E 1554 specify?
   a) Precautions for ensuring that blower door testing of building envelopes is conducted in a safe manner, and to avoid issues with combustion equipment such as water heaters, furnaces, etc.
   b) Advised standardized procedures for conducting HVAC duct leakage testing
   c) Rated static pressure ratings for HVAC duct work of different types, sheet metal gauge and overall construction
   d) Advised standardized procedures for conducting blower door testing of building envelopes
3. When conducting a duct leakage test using a fan to pressurize the HVAC duct work, what is the purpose of using a blower door assembly to pressurize a building interior such that the pressure differential between the building exterior (reference pressure) and the duct interior is equal to the pressure differential between the building exterior and the building interior?
   a) To prevent the fan that is used to pressurize the duct from de-pressuring the building interior
   b) Equalizing the pressures in the duct and in the building relative to the building exterior allows for eliminating leaks through the duct into the building interior, thereby isolating the measurement to only the leaks fro the duct interior to the building exterior
   c) To ensure that the duct does not rupture at any joists or seams due to the increased pressure inside the duct
   d) To ensure that dust and other contaminants inside the duct work does not get blown into the building interior
4. Choose the description below that best describes a Method C duct leakage test according to the standard that was this week's reading assignment
   a) Connect Distribution System Pressurization Fan (e.g. Duct Blaster) to the HVAC return duct, cap/seal any open return duct registers/grilles other than where the Distribution System Pressurization Fan (e.g. Duct Blaster) is connected, cap/seal all supply-side diffusers/registers, install differential

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pressure sensor (manometer) for duct to measure differential between inside supply duct and outside building. Operate the Distribution System Pressurization Fan (Duct Blaster), and report this as the air-changes per hour under the conditions of Method C.

b) Connect Distribution System Pressurization Fan (e.g. Duct Blaster) to the HVAC return duct, cap/seal any open return duct registers/grilles other than where the Distribution System Pressurization Fan (e.g. Duct Blaster) is connected, cap/seal all supply-side diffusers/registers but one, install a blockage to the supply side duct inside the air handler cabinet, install differential pressure sensor (manometer) for duct to measure differential between inside building and outside building. Operate both the Distribution System Pressurization Fan (e.g. Duct Blaster) and the blower door assembly to maintain 25 Pa differential pressure at the associated manometers. Measure airflow rate at the Distribution System Pressurization Fan (Duct blaster), and report this as the air-changes per hour under the conditions of Method C.

c) Connect Distribution System Pressurization Fan (e.g. Duct Blaster) to the HVAC return duct, cap/seal any open return duct registers/grilles other than where the Distribution System Pressurization fan (e.g. Duct Blaster) is connected, cap/seal all supply-side diffusers/registers, install differential pressure sensor (manometer) for duct to measure differential between inside supply duct and outside building, install blower door assembly, install differential pressure sensor (manometer) for building to measure differential between inside and outside building. Operate both the Distribution System Pressurization Fan (e.g. Duct Blaster) and the blower door assembly to maintain 25 Pa differential pressure at the associated manometers. Measure airflow rate at the Distribution System Pressurization Fan (Duct Blaster), and report this as the air-changes per hour under the conditions of Method C.

d) Connect Distribution system Pressurization Fan (e.g. Duct Blaster) to the HVAC supply duct, cap/seal all supply-side diffusers/registers, install a blockage to the return duct inside the air handler cabinet, install differential pressure sensor (manometer) for duct to measure differential between inside supply duct and outside building. Operate both the Distribution System Pressurization Fan (e.g. Duct Blaster) and the blower door assembly to maintain 25 Pa differential pressure at the associated

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manometers. Measure airflow rate at the Distribution System Pressurization Fan (Duct Blaster), and report his as the air-changes per hour under the conditions of Method C.

5. What is the fundamental principal of duct leakage test by duct pressurization?
   a) By sealing off all points of air entry/exit except the unknown leaks, and then by pressurizing the duct with a fan and simultaneously measuring the flow rate through the fan, one can equate the flow rate through the fan to the flow rate through the ducts under the test conditions.
   b) By pressurizing the duct with a fan, the amount of time that it takes for the pressure in the duct to drop as the air pressure bleeds off through leak can be correlated to the leakage rate under normal operating conditions.
   c) A higher pressure inside the duct will make it easier to hear air as it leaks through the duct walls, and thus a technician can pinpoint leak locations by examining the duct and listening for leaks.
   d) A higher pressure inside the duct will help find leaks that would not only occur under lower pressures encountered under most normal operating conditions.
6. How are typical methods of duct leakage measurement in larger commercial systems different than in typical smaller residential systems?
   a) In larger commercial systems, it is most typical to use the fan inside the air handler to move air through the distribution system under conditions that are likely to occur in the system at design loads, and to measure a difference between the air that moves through the fan and the air that moves through all the normal points of entry and exit of air to and from the distribution system.
   b) In larger commercial systems, the blower door is not used to pressurize the building when doing a duct pressurization test.
   c) In larger commercial systems, a much larger Duct Blaster system is needed.
   d) In larger commercial systems, the ratio of leakage to total airflow is generally so low that leakage is ignored. Leakage is less important than other aspects of the air deliver and distribution system.
7. What is a major component of building envelope or enclosure best practice?
   a) Assure no holes that could leak air or water
   b) A continuous and contiguously aligned air, moisture, and thermal barrier.
   c) No thermal bridging.

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d) A consistent moisture, thermal, and air barrier.

8. What sentence best describes a thermal bypass?
   a) Air leakage through insulation
   b) Thermal energy movement through the envelope
   c) Air and moisture leakage through insulation
   d) Conditioned air movement through the envelope

9. What is the best answer regarding the need for Blower Door testing on all new buildings?
   a) To determine ACH50 for code compliance
   b) To determine ACHn for proper ventilation rates
   c) To determine if the air barrier was properly aligned to not cause potential safety issues, efficiency issues, moisture issues, or thermal bypasses
   d) All of the above

10. What is the best answer for why a thermal imaging device can be very helpful In building quality control?
   a) Saving a lot of money in building repairs
   b) Building moisture issues and thermal bypasses
   c) Determining points of infiltration
   d) Seeing through walls

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