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Standard for Testing Airtightness of Building, Dwelling Unit, and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems; and Airflow of Mechanical Ventilation Systems



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ZONING COMMISSION
District of Columbia
CASE NO.20-34A
EXHIBIT NO.8C

4. Procedure for Measuring Airtightness of Building or Dwelling Unit Enclosure

4.1. Equipment

The Equipment listed in this section shall have their calibrations checked at the manufacturer's recommended interval, and at least annually if no time is specified.

- 4.1.1. Air-Moving Fan.** A fan that is capable of moving air into or out of the building or Dwelling Unit to achieve one or more target pressure differences between the building or Dwelling Unit and the exterior.
- 4.1.2. Manometer.** A device that is capable of measuring pressure difference with a maximum error of 1 % of reading, or 0.25 Pa (0.001 in. H₂O), whichever is greater.
- 4.1.3. Airflow Meter.** A device to measure volumetric airflow with a maximum error of 5% of the measured flow.
- 4.1.4. Thermometer.** An instrument to measure air temperature with an accuracy of $\pm 1^{\circ}\text{C}$ (2°F).
- 4.1.5. Blower Door.** A device that combines an Air-Moving Fan as defined in Section 4.1.1, an Airflow Meter as defined in Section 4.1.3, and a covering to integrate the Air-Moving Fan into the building opening.

4.2. Procedure to Prepare the Building or Dwelling Unit for Testing⁵

- 4.2.1. Fenestration.** Exterior doors and windows shall be closed and latched.
- 4.2.2. Attached garages.** All exterior garage doors and windows shall be closed and latched unless the Blower Door is installed between the Conditioned Space Volume and the garage, in which case the garage shall be opened to outside by opening at least one exterior garage door.
- 4.2.3. Crawlspace.** Crawlspace shall be configured as follows and the position of the crawlspace access doors and hatches shall be recorded. When the access doors and hatches between Conditioned Space Volume and the crawlspace are closed, due to requirements in 4.2.3.1 or 4.2.3.2.1, the crawlspace shall be excluded from Infiltration Volume and Conditioned Space Volume.
 - 4.2.3.1.** If a crawlspace is vented to the exterior, interior access doors and hatches between the Conditioned Space Volume and the crawlspace shall be closed. Exterior crawlspace access doors, hatches, and vents shall be left in their as-found position.
 - 4.2.3.2.** If a crawlspace is not vented to the exterior, all access doors and hatches between the Conditioned Space Volume and crawlspace shall be opened.

⁵ (Normative Note) It is permissible for air tightness testing of Dwelling Units that contain fire suppression systems to be performed with temporary sprinkler head covers in place.

Exterior crawlspace access doors, hatches, and vents shall be closed to the extent possible.

4.2.3.2.1. Exception: If the floor above the crawlspace is air sealed and insulated, the access doors and hatches between the Conditioned Space Volume and crawlspace shall be closed. Exterior crawlspace access doors, hatches, and vents shall be left in their as-found position.

4.2.4. Attics. Attics shall be configured as follows and the position of the attic access doors and hatches shall be recorded. When the access doors and hatches between the Conditioned Space Volume and the attic are closed, due to requirements in 4.2.4.1 or there are no access doors, the attic shall be excluded from Infiltration Volume and Conditioned Space Volume.

4.2.4.1. If an attic is not *both* air sealed and insulated at the roof deck, access doors and hatches between the Conditioned Space Volume and the attic shall be closed. Exterior attic access doors, hatches and vents shall be left in their as-found position.

4.2.4.2. If an attic is both air sealed and insulated at the roof deck, interior access doors and hatches between the Conditioned Space Volume and the attic shall be opened. Exterior attic access doors, vents, and hatches shall be closed to the extent possible.

4.2.5. Basements. Basements shall be configured as follows and the position of the basement doors shall be recorded. When doors between the Conditioned Space Volume and the basement are closed, due to requirements in 4.2.5.1.1, the basement shall be excluded from Infiltration Volume and Conditioned Space Volume.

4.2.5.1. All doors between the Conditioned Space Volume and basement shall be opened. Exterior basement access doors, vents, and hatches shall be closed to the extent possible.

4.2.5.1.1. Exception: When the floor above the basement is air sealed and insulated, doors between the basement and Conditioned Space Volume shall be closed. Exterior basement access doors, hatches and vents shall be left in their as-found position.

4.2.6. Interior doors. All doors between rooms inside the Conditioned Space Volume shall be opened.

4.2.7. Chimney dampers and combustion-air inlets on solid fuel appliances. Chimney dampers and combustion-air inlets on solid fuel appliances shall be closed. Precautions shall be taken to prevent ashes or soot from entering the building or Dwelling Unit during testing.

4.2.8. Combustion appliance flue vents. Combustion appliance flue vents shall be left in their as-found position.

4.2.9. Fans. Any fan or appliance capable of inducing airflow across the building or Dwelling Unit enclosure shall be turned off including, but not limited to, clothes dryers, attic and crawlspace fans, kitchen and bathroom exhaust fans, air

handlers, and ventilation fans used in a Dwelling Unit Mechanical Ventilation system⁶. The party conducting the test shall not turn on fans in adjacent attached Dwelling Units. For continuously operating central ventilation systems serving more than one Dwelling Unit in a building with multiple Dwelling Units, the registers shall be sealed in the subject Dwelling Unit. The central ventilation system shall be turned off where possible. If it is not possible to turn off the system, then it can be left operating provided sealing select registers will not compromise the system and the sealed registers remain sealed during the test.

4.2.10. Dampers

4.2.10.1. Non-motorized dampers⁷ that connect the Conditioned Space Volume to the exterior or to Unconditioned Space Volumes shall be left in their as-found positions.⁸

4.2.10.2. Motorized dampers that connect the Conditioned Space Volume to the exterior or to Unconditioned Space Volume shall be placed in their closed positions and shall not be further sealed.

4.2.11. Non-dampered openings for ventilation, combustion air and make-up air

4.2.11.1. Non-dampered ventilation openings of intermittently operating local exhaust ventilation systems⁹ that connect the Conditioned Space Volume to the exterior or to Unconditioned Space Volume shall be left open.

4.2.11.2. Non-dampered ventilation openings of intermittently operating Dwelling Unit ventilation systems, including HVAC fan-integrated outdoor air inlets, that connect the Conditioned Space Volume to the exterior or to Unconditioned Space Volume shall not be sealed.

4.2.11.3. Non-dampered ventilation openings of continuously operating local exhaust ventilation systems¹⁰ that connect the Conditioned Space Volume to the exterior or to Unconditioned Space Volume shall be sealed at the exterior of the enclosure where conditions allow.

4.2.11.4. Non-dampered ventilation openings of continuously operating Dwelling Unit ventilation systems that connect the Conditioned Space Volume to the exterior or to Unconditioned Space Volume shall be sealed at the exterior of the enclosure where conditions allow.

4.2.11.5. All other non-dampered intentional openings between Conditioned Space Volume and the exterior or Unconditioned Space Volume shall be left open.¹¹ This includes non-dampered openings to a duct, unless it has a fan that is

⁶ (Informative Note) For example, a system intended to meet ASHRAE Standard 62.2.

⁷ (Informative Note) For example, pressure-activated operable dampers and fixed dampers.

⁸ (Informative Note) For example, a fixed damper in a duct supplying outdoor air for an intermittent ventilation system that utilizes the HVAC fan shall be left in its as-found position.

⁹ (Informative Note) For example, bath fan and kitchen range fan.

¹⁰ (Informative Note) For example, bathroom or kitchen exhaust.

¹¹ (Informative Note) For example, un-dampered combustion air or make-up air openings shall be left in their open position.

independent of the HVAC air-handler fan directly connected to the duct and continuously inducing a pressure difference¹².

- 4.2.12. Whole-House Fan louvers/shutters.** Whole-House Fan louvers and shutters shall be closed. In addition, if there is a seasonal cover present, it shall be installed.
- 4.2.13. Evaporative coolers.** The opening to the exterior of evaporative coolers shall be placed in its off position. In addition, if there is a seasonal cover present, it shall be installed.
- 4.2.14. Operable window trickle-vents and through-the-wall vents.** Operable window trickle-vents and through-the-wall vents shall be closed.
- 4.2.15. Heating and cooling supply registers and return grilles.** Heating and cooling supply registers and return grilles shall be left in their as-found position and left uncovered.
- 4.2.16. Plumbing drains with p-traps.** Plumbing drains with empty p-traps shall be sealed or filled with water.
- 4.2.17. Vented combustion appliances.** Vented combustion appliances shall remain off or in “pilot only” mode for the duration of the test.
- 4.2.18. Required air bypass.** Where building code or manufacturer specifications require air bypass around a component, the leakage point shall not be sealed¹³.

4.3. Procedures to Install the Test Apparatus and Prepare for Airtightness Test

- 4.3.1. Procedure to Install the Test Apparatus and Prepare for Airtightness Test for a Detached Dwelling Unit**
 - 4.3.1.1.** The Blower Door shall be installed in an exterior doorway or window that has an unrestricted air pathway into the Dwelling Unit and no obstructions to airflow within 5 feet of the fan inlet and 2 feet of the fan outlet. The opening that is chosen shall be noted on the test report. The system shall not be installed in a doorway or window exposed to wind, where conditions allow. It is permissible to use a doorway or window between the Conditioned Space Volume and an Unconditioned Space Volume as long as the Unconditioned Space Volume has an unrestricted air pathway to the outdoors and all operable exterior windows and doors of the Unconditioned Space Volume are opened to the outdoors.
 - 4.3.1.2.** Tubing shall be installed to measure the difference in pressure between the enclosure and the outdoors in accordance with manufacturer’s instructions. The tubing, especially vertical sections, shall be positioned out of direct sunlight.

¹² (Informative Note) For example, a non-dampered duct connecting an air handler to outside shall be left open, even if a separate continuous or intermittent bathroom exhaust fan is present in the Dwelling Unit.

¹³ (Informative Note) For example, fire and smoke suppression systems.

- 4.3.1.3.** The indoor and outdoor temperatures shall be measured using the Thermometer and recorded. Observations of general weather conditions shall be recorded.
 - 4.3.1.4.** The altitude of the building site above sea level shall be recorded with an accuracy of 500 feet (150 m).
 - 4.3.1.5.** The model and serial number(s) of all measurement equipment shall be recorded.
 - 4.3.1.6.** If the results of the test will be reported as Air Changes Per Hour at 50 Pa (0.2 in. H₂O) (ACH50), the Infiltration Volume of the Dwelling Unit shall be recorded.
 - 4.3.1.7.** If the results of the test will be reported as Specific Leakage Area (SLA), the Conditioned Floor Area of the Dwelling Unit shall be recorded.
 - 4.3.1.8.** If the results of the test will be reported as Cubic Feet per Minute per square foot of enclosure surface area at 50 Pa (0.2 in. H₂O) (CFM50/ft² of enclosure), the Compartmentalization Boundary area of the Dwelling Unit shall be recorded.
- 4.3.2.** Procedure to Install the Test Apparatus and Prepare for Airtightness Test for an Attached Dwelling Unit¹⁴
- 4.3.2.1.** Pressures shall be induced only via a Blower Door (or Blower Doors) attached to the subject Dwelling Unit. Pressures shall not be induced through the use of Blower Doors attached to spaces adjacent to the subject Dwelling Unit.
 - 4.3.2.2.** The Blower Door shall be installed in a doorway leading to an enclosed space¹⁵, when one exists. The Blower Door shall have an unrestricted air pathway into the subject Dwelling Unit and no obstructions to airflow within 5 feet of the fan inlet and 2 feet of the fan outlet. When a doorway leading to an enclosed space is not available, the Blower Door is permitted to be installed in an exterior door or window. The tubing setup procedures listed in Section 4.3.1.2 shall be followed. The opening that is chosen shall be noted on the test report.
 - 4.3.2.2.1.** The reference tube for the Dwelling Unit pressure shall terminate in the enclosed space. The end of the reference tube shall be located where it is not impacted by the turbulence created by the fan. Tubing shall be installed to measure the difference in pressure between the subject Dwelling Unit and the enclosed space in accordance with manufacturer's instructions.

¹⁴ (Informative Note) This test is the same as a compartmentalization test.

¹⁵ (Informative Note) For example, a corridor.

4.3.2.2.2. An unrestricted air pathway larger than 20 square feet shall be opened between the enclosed space and outside¹⁶.

4.3.2.2.2.1. Where an unrestricted air pathway larger than 20 square feet cannot be created, the pressure difference between the enclosed space and outside shall be measured. The pressure difference shall change by less than 3 Pa when the Blower Door is turned on to pressurize or depressurize the subject Dwelling Unit by 50 Pa¹⁷.

4.3.2.2.3. When a doorway leading to an enclosed space is not available, the Blower Door is permitted to be installed in an exterior door or window. The tubing setup procedures listed in Section 4.3.1.2 shall be followed.

4.3.2.3. Where access is permitted, open doors between the enclosed space and any Dwelling Units that are horizontally adjacent to the subject Dwelling Unit¹⁸.

4.3.2.3.1. Leave windows and interior doors in adjacent Dwelling Units in the condition they are found.

4.3.2.4. The door where the Blower Door is installed shall be inspected for the presence of a door seal installed to minimize air leakage between the door and door frame. Where such seal is not present or is not properly installed, 140 CFM50 shall be added to the measured airflow. This adjustment, and the presence, installation quality and condition of the door seal shall be documented in the final test report¹⁹.

4.3.2.5. If a door is present between the subject Dwelling Unit and its mechanical closet, it shall be open during the test if the mechanical closet is Conditioned Space Volume and closed during the test if the mechanical closet is Unconditioned Space Volume.

4.3.2.6. Ductwork between units shall be sealed at the register(s) of the subject Dwelling Unit.

4.3.2.7. Where the crawlspace volume is continuous below multiple adjacent Dwelling Units, interior access doors and hatches between the subject Dwelling Unit and the crawlspace shall be closed. Exterior crawlspace access doors, hatches and vents shall be left in their as-found position.

4.3.2.8. Where the attic volume is continuous above multiple adjacent Dwelling Units, interior access doors and hatches between the subject Dwelling Unit and the attic shall be closed. Exterior attic access doors, hatches and vents shall be left in their as-found position.

¹⁶ (Informative Note) For example, 1) opening windows in a corridor 2) opening a door between a corridor and a common stairwell and also opening a door between the common stairwell and outside 3) opening a door between an adjacent Dwelling Unit and the corridor and also opening windows in the adjacent unit.

¹⁷ (Informative Note) It is permitted to reduce the pressure difference between the enclosed space and outside by opening interior doors to increase the volume of the enclosed space.

¹⁸ (Informative Note) For example, the units on either side of the subject Dwelling Unit in a double loaded corridor style subject Dwelling Unit (2 units total).

¹⁹ (Normative Note) The adjustment may be subsequently removed if the door sweep continuity is inspected and confirmed.

- 4.3.2.9.** Where the basement volume is continuous below multiple adjacent Dwelling Units, interior doors between the subject Dwelling Unit and the basement shall be closed. Exterior basement access doors, hatches and vents shall be left in their as-found position.
- 4.3.2.10.** Where the mechanical room volume is continuous below multiple adjacent Dwelling Units, interior doors between the subject Dwelling Unit and the mechanical room shall be closed. Exterior mechanical room access doors, hatches and vents shall be left in their as-found position.
- 4.3.2.11.** The indoor and outdoor temperatures shall be measured using the Thermometer and recorded. Observations of general weather conditions shall be recorded.
- 4.3.2.12.** The altitude of the building site above sea level shall be recorded with an accuracy of 500 feet (150 m).
- 4.3.2.13.** The model and serial number(s) of all measurement equipment shall be recorded.
- 4.3.2.14.** If the results of the test will be reported as Air Changes Per Hour at 50 Pa (0.2 in. H₂O) (ACH50), the Infiltration Volume of the Dwelling Unit shall be recorded.
- 4.3.2.15.** If the results of the test will be reported as Specific Leakage Area (SLA), the Conditioned Floor Area of the Dwelling Unit shall be recorded.
- 4.3.2.16.** If the results of the test will be reported as Cubic Feet per Minute per square foot of enclosure surface area at 50 Pa (0.2 in. H₂O) (CFM50/ft² of enclosure), the Compartmentalization Boundary area of the Dwelling Unit shall be recorded.

4.4. Procedure to Conduct Airtightness Test. The leakage of the enclosure shall be measured using either the One-Point Airtightness Test in Section 4.4.1 or the Multi-Point Airtightness Test in Section 4.4.2.

4.4.1. One-Point Airtightness Test

- 4.4.1.1.** With the Air-Moving Fan turned off and sealed, the pressure difference across the enclosure shall be recorded using the Manometer, with the outside as the reference. The measurement shall represent the average value over at least a 10-second period and shall be defined as the Pre-Test Baseline Dwelling Unit Pressure.
- 4.4.1.2.** The Air-Moving Fan shall be unsealed, turned on, and adjusted to create an induced enclosure pressure difference of 50 ± 3 Pa (0.2 in. ± 0.012 H₂O), defined as the induced enclosure pressure minus the Pre-Test Baseline Dwelling Unit Pressure. Note that this value is permitted to be positive or negative, which will be dependent upon whether the enclosure is pressurized or depressurized. An indication of whether the Air-Moving Fan pressurized or depressurized the Dwelling Unit shall be recorded.

If a 50 Pa (0.2 in. H₂O) induced enclosure pressure difference is achieved, then the average value of the induced enclosure pressure difference and the airflow at 50 Pa (0.2 in. H₂O), measured over at least a 10-second period, shall be recorded.

If a 50 Pa (0.2 in. H₂O) induced enclosure pressure difference is not achieved, then additional Air-Moving Fans shall be used or the highest induced enclosure pressure difference ($dP_{measured}$) and airflow ($Q_{measured}$) that was achieved with the equipment available, measured over at least a 10-second period, shall be recorded. A minimum of 15 Pa (0.06 in. H₂O) must be induced across the enclosure for the test to be valid.

4.4.1.3. The Air-Moving Fan shall be turned off and the Dwelling Unit returned to its as-found condition.

4.4.1.4. If an induced enclosure pressure difference of 50 Pa (0.2 in. H₂O) was not achieved in Section 4.4.1.2, then the recorded airflow ($Q_{measured}$) shall be converted to a nominal airflow at 50 Pa (0.2 in. H₂O) using Equation 1. Alternately, a Manometer that is equipped to automatically make the conversion to CFM50 or CMS50 is permitted to be used.

$$CFM50 \left(\frac{ft^3}{min} \right) = Q_{measured} \left(\frac{ft^3}{min} \right) \left(\frac{50}{dP_{measured}} \right)^{0.65} \quad (1a)$$

$$CMS50 \left(\frac{m^3}{s} \right) = Q_{measured} \left(\frac{m^3}{s} \right) \left(\frac{50}{dP_{measured}} \right)^{0.65} \quad (1b)$$

4.4.1.5. Corrected CFM50 (corrected CMS50) shall be calculated by making the adjustments due to density and viscosity using Section 9 of ASTM E779²⁰. Equations 1 and 2 in Section 9 shall be used to convert air flows to flows through the building envelope. Equation 4 in Section 9 shall be used to convert to standard conditions by substituting CFM50 (CMS50) for C and Corrected CFM50 (corrected CMS50) for C₀.

4.4.1.6. The Effective Leakage Area (ELA) shall be calculated using Equation 2:

$$ELA(in^2) = \frac{Corrected\ CFM50}{18.2} \quad (2a)$$

$$ELA(m^2) = \frac{Corrected\ CMS50}{13.6} \quad (2b)$$

4.4.2. Multi-Point Airtightness Test

4.4.2.1. With the Air-Moving Fan turned off and sealed, the pressure difference across the enclosure shall be recorded using the Manometer, with the outside as the reference. The measurement shall represent the average value over at least a 10-second period and shall be defined as the Pre-Test Baseline Dwelling Unit Pressure.

²⁰ (Normative Note) Software provided by manufacturers of test equipment is permitted to be used to perform these calculations if the manufacturer certifies that the calculations are performed in accordance with ASTM E779.

4.4.2.2. The Air-Moving Fan shall be unsealed, turned on, and adjusted to create at least five induced enclosure pressure differences at approximately equally-spaced pressure stations between 10 Pa (0.04 in. H₂O) and either 60 Pa (0.24 in. H₂O) or the highest achievable pressure difference up to 60 Pa. The induced enclosure pressure difference is defined as the measured enclosure pressure at the pressure station, with reference to the exterior, minus the Pre-Test Baseline Dwelling Unit Pressure. If a manometer is used that has automatic baseline adjustments²¹ then the Pre-Test Baseline Dwelling Unit Pressure shall not be subtracted from the adjusted value. The induced enclosure pressure difference is positive for pressurization and negative for depressurization. An indication of whether the Air-Moving Fan pressurized or depressurized the Dwelling Unit shall be recorded.

At each pressure station, the average value of the induced enclosure pressure difference, and the airflow, measured over at least a 10-second period, shall be recorded. The highest induced enclosure pressure difference shall be at least 25 Pa (0.1 in. H₂O). If 25 Pa (0.1 in. H₂O) is not achieved, the One-Point Airtightness Test in Section 4.4.1 shall be used.

4.4.2.3. The Air-Moving Fan shall be turned off and the Dwelling Unit returned to its as-found condition.

4.4.2.4. The airflow at each pressure station shall be corrected for altitude and temperature to determine the corrected airflow using the calculations in Section 9 of ASTM E779²².

4.4.2.5. The corrected airflow (Q) and the induced enclosure pressure difference measured at each pressure station (dP) shall be used in a log-linearized regression of the form $Q = C(dP)^n$ to calculate^{23,24} C and n.

4.4.2.6. The Effective Leakage Area (ELA) shall be calculated using Equation 3:

$$ELA(in^2) = C \left(\frac{ft^3}{minPa^n} \right) \times 0.567 \times 4^{(n-0.5)} \quad (3a)$$

$$ELA(m^2) = C \left(\frac{m^3}{sPa^n} \right) \times 0.775 \times 4^{(n-0.5)} \quad (3b)$$

Where C and n are the values determined in Section 4.4.2.5.

4.4.2.7. The flow through the building or Dwelling Unit enclosure at 50 Pa (0.20 in. H₂O) (CFM50 or CMS50) shall be calculated using Equation 4:

²¹ (Informative Note) for example, a “baseline” or “extrapolation” feature that automatically subtracts a previously-measured baseline from the measured value before displaying the measurement.

²² (Normative Note) Software provided by manufacturers of test equipment is permitted to be used to perform these calculations if the manufacturer certifies that the calculations are performed in accordance with ASTM E779.

²³ (Informative Note) For example, using the procedures in ASTM E779, Section 9 and Annex A.1.

²⁴ (Normative Note) Software provided by the test equipment manufacturer that automatically calculates C and n shall not be used unless the manufacturer certifies that the calculations are performed in accordance with ASTM E779.

$$CFM50 = C \left(\frac{ft^3}{minPa^n} \right) \times 50^{(n)} \quad (4a)$$

$$CMS50 = C \left(\frac{m^3}{sPa^n} \right) \times 50^{(n)} \quad (4b)$$

Where C and n are the values determined in Section 4.4.2.5.

4.5. Procedure to Apply Results of Enclosure Air Leakage Test

4.5.1. If the results of the building or Dwelling Unit enclosure air leakage test are to be used for conducting an energy rating or assessing compliance with a building or Dwelling Unit enclosure leakage limit²⁵, then the corrected airflow determined using a one-point test shall be adjusted using Equation 5a or 5b.

$$\text{Adjusted CFM50} = 1.1 \times \text{Corrected CFM50} \quad (5a)$$

$$\text{Adjusted CMS50} = 1.1 \times \text{Corrected CMS50} \quad (5b)$$

The ELA determined in Section 4.4.1.6 for a one-point air leakage test shall be adjusted using Equation 6.

$$\text{Adjusted ELA} = 1.1 \times \text{ELA} \quad (6)$$

Other applications of building or Dwelling Unit enclosure air leakage testing and the results of multi-point testing do not require the corrections in this section.

4.5.2. If the results of the building or Dwelling Unit enclosure leakage test are to be converted to Air Changes Per Hour at 50 Pa (0.2 in. H₂O) (ACH50), Specific Leakage Area (SLA), Normalized Leakage Area (NLA), or compartmentalization leakage ratio at 50 Pa (CFM50/ft²), then Equations 7 through 10 shall be used. Where adjusted or corrected CFM50, CMS50 or ELA values have been calculated in previous sections they shall be used in Equations 7 through 10.

$$ACH50 = CFM50 \times 60 / \text{Infiltration Volume in cubic feet} \quad (7a)$$

$$ACH50 = CMS50 \times 3600 / \text{Infiltration Volume in cubic meters} \quad (7b)$$

$$SLA = 0.00694 \times ELA \text{ in } in^2 / \text{Conditioned Floor Area in square feet} \quad (8a)$$

$$SLA = 10.764 \times ELA \text{ in } m^2 / \text{Conditioned Floor Area in square meters} \quad (8b)$$

$$NLA = SLA \times (S)^{0.4}, \text{ where } S \text{ is the number of stories above grade} \quad (9)$$

$$CFM50/ft^2 = CFM50 / \text{Compartmentalization Boundary area in square feet} \quad (10)$$

5. Procedure for Measuring Airtightness of Duct Systems

²⁵ (Informative Note) For example, defined by code or by an energy efficiency program.