

- Section 3.6, “Specification for Joining and Attaching Flexible Duct”
 - Section 3.7, “Specification for Supporting Flexible Duct”
 - Sections S6.1, S6.3, S6.4, and S6.5 of Section 9.1, “Casing and Plenum Construction Standards”
- b. All sections of SMACNA’s *Fibrous Glass Duct Construction Standards*¹⁸
- c. NFPA 90A¹⁹, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, and NFPA 90B²⁰, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*

7.2 System Start-Up

7.2.1 Application. The requirements of this section apply to the following ventilation systems:

- a. Newly installed air-handling systems
- b. Existing air-handling systems undergoing supply air or outdoor airflow reduction (Only the requirements of Section 7.2.2 shall apply to these altered systems.)
- c. Existing air-handling distribution systems undergoing alterations affecting more than 25% of the floor area served by the systems (Only the requirements of Section 7.2.2 shall apply to these altered systems.)

7.2.2 Air Balancing. Ventilation systems shall be balanced in accordance with ASHRAE Standard 111¹⁵ or another applicable national standard for measuring and balancing airflow so as to verify conformance with the total outdoor airflow requirements of this standard.

7.2.3 Testing of Drain Pans. To minimize conditions of water stagnation that may result in microbial growth, drain pans shall be field tested under operating conditions that are the most restrictive to condensate flow to demonstrate proper drainage.

Informative Note: Above conditions usually occur at full fan airflow for draw-through fans and minimum fan airflow for blow through fans.

Exception: Field testing of drain pans is not required if units with factory-installed drain pans have been certified (attested in writing) by the manufacturer for proper drainage when installed as recommended.

7.2.4 Ventilation System Start-Up. Ventilation air distribution systems shall be clean of dirt and debris.

7.2.5 Outdoor Air Dampers. Prior to occupancy, each ventilation system shall be tested to demonstrate that outdoor air dampers operate in accordance with the system design.

7.2.6 Documentation. The following ventilation system documentation shall be provided to the building owner or his/her designee, retained within the building, and made available to the building operating personnel:

- a. An operating and maintenance manual describing basic data relating to the operation and maintenance of ventilation systems and equipment as installed
- b. HVAC controls information consisting of diagrams, schematics, control sequence narratives, and maintenance and/or calibration information

- c. An air balance report documenting the work performed for Section 7.2.2
- d. Construction drawings of record, control drawings, and final design drawings
- e. Design criteria and assumptions

8. OPERATIONS AND MAINTENANCE

8.1 General

8.1.1 Application. The requirements of this section apply to buildings and their ventilation systems and their components constructed or renovated after the adoption date of this section.

8.1.2 Building Alterations or Change of Use. When buildings are altered or when changes in building use, occupant category, significant change in occupant density, or other changes inconsistent with system design assumptions are made, the ventilation system design, operation, and maintenance shall be reevaluated and the operations and maintenance (O&M) manual updated as necessary.

8.2 Operations and Maintenance Manual. An O&M manual, either written or electronic, shall be developed and maintained on site or in a centrally accessible location for the working life of the applicable ventilation system equipment or components. This manual shall be updated as necessary. The manual shall include the O&M procedures, ventilation system operating schedules and any changes made thereto, final design drawings, maintenance schedules based on manufacturer’s instructions, and the maintenance requirements and frequencies provided in Table 8.2.

8.3 Ventilation System Operation. Mechanical and natural ventilation systems shall be operated in a manner consistent with the O&M manual. Systems shall be operated such that spaces are ventilated in accordance with Section 6 during periods of expected occupancy.

8.4 Ventilation System Maintenance. The building ventilation system components shall be maintained in accordance with the O&M manual.

9. REFERENCES

1. *National Ambient Air Quality Standards*, Code of Federal Regulations, Title 40 Part 50 (40 CFR 50). U.S. Environmental Protection Agency. www.epa.gov/air/criteria.html, accessed June 27, 2015.
2. *ANSI/SMACNA 016-2012, HVAC Air Duct Leakage Test Manual*, Second Edition, 2012. Chantilly, VA.: Sheet Metal and Air Conditioning Contractors’ Association, Inc. (SMACNA)
3. *UL 181, Factory-Made Air Ducts and Air Connectors*, 11th Edition, 2013. Northbrook, IL: Underwriters’ Laboratories, Inc.
4. *ASTM C 1338-14, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings*. West Conshohocken, PA: American Society for Testing and Materials.