

tion rates and air-cleaning requirements. The contaminant monitoring and occupant or visitor evaluation plans shall also be included in the documentation.

6.4 Natural Ventilation Procedure. Natural ventilation systems shall be designed in accordance with this section and shall include mechanical ventilation systems designed in accordance with Section 6.2, Section 6.3, or both.

Exceptions:

1. An engineered natural ventilation system, where approved by the authority having jurisdiction, need not meet the requirements of Section 6.4.
2. The mechanical ventilation systems shall not be required where
 - a. natural ventilation openings that comply with the requirements of Section 6.4 are permanently open or have controls that prevent the openings from being closed during periods of expected occupancy or
 - b. the zone is not served by heating or cooling equipment.

6.4.1 Floor Area to Be Ventilated. Spaces, or portions of spaces, to be naturally ventilated shall be located within a distance based on the ceiling height, as determined by Sections 6.4.1.1, 6.4.1.2, or 6.4.1.3, from operable wall openings that meet the requirements of Section 6.4.2. For spaces with ceilings that are not parallel to the floor, the ceiling height shall be determined in accordance with Section 6.4.1.4.

6.4.1.1 Single Side Opening. For spaces with operable openings on one side of the space, the maximum distance from the operable openings shall be not more than $2H$, where H is the ceiling height.

6.4.1.2 Double Side Opening. For spaces with operable openings on two opposite sides of the space, the maximum distance from the operable openings shall be not more than $5H$, where H is the ceiling height.

6.4.1.3 Corner Openings. For spaces with operable openings on two adjacent sides of a space, the maximum distance from the operable openings shall be not more than $5H$ along a line drawn between the two openings that are farthest apart. Floor area outside that line shall comply with Section 6.4.1.1.

6.4.1.4 Ceiling Height. The ceiling height (H) to be used in Sections 6.4.1.1 through 6.4.1.3 shall be the minimum ceiling height in the space.

Exception: For ceilings that are increasing in height as distance from the openings is increased, the ceiling height shall be determined as the average height of the ceiling within 6 m (20 ft) from the operable openings.

6.4.2 Location and Size of Openings. Spaces or portions of spaces to be naturally ventilated shall be permanently open to operable wall openings directly to the outdoors. The openable area shall be not less than 4% of the net occupiable floor area. Where openings are covered with louvers or otherwise obstructed, openable area shall be based on the net free unobstructed area through the opening. Where interior rooms, or portions of rooms, without direct openings to the outdoors are

ventilated through adjoining rooms, the opening between rooms shall be permanently unobstructed and have a free area of not less than 8% of the area of the interior room or less than 25 ft² (2.3 m²).

6.4.3 Control and Accessibility. The means to open required operable openings shall be readily accessible to building occupants whenever the space is occupied. Controls shall be designed to coordinate operation of the natural and mechanical ventilation systems.

6.5 Exhaust Ventilation. The Prescriptive Compliance Path or the Performance Compliance Path shall be used to meet the requirements of this section. Exhaust makeup air shall be permitted to be any combination of outdoor air, recirculated air, or transfer air.

6.5.1 Prescriptive Compliance Path. The design exhaust airflow shall be determined in accordance with the requirements in Table 6.5.

6.5.2 Performance Compliance Path. The exhaust airflow shall be determined in accordance with the following subsections.

6.5.2.1 Contaminant Sources. Contaminants or mixtures of concern for purposes of the design shall be identified. For each contaminant or mixture of concern, indoor sources (occupants, materials, activities, and processes) and outdoor sources shall be identified, and the emission rate for each contaminant of concern from each source shall be determined.

Informative Note: Informative Appendix C provides information for some potential contaminants of concern.

6.5.2.2 Contaminant Concentration. For each contaminant of concern, a concentration limit and its corresponding exposure period and an appropriate reference to a cognizant authority shall be specified.

Informative Note: Informative Appendix C includes concentration guidelines for some potential contaminants of concern.

6.5.2.3 Monitoring and control systems shall be provided to automatically detect contaminant levels of concern and modulate exhaust airflow such that contaminant levels are maintained at not greater than the specified contaminant concentration limits.

6.6 Design Documentation Procedures. Design criteria and assumptions shall be documented and made available for operation of the system after installation. See Sections 4.3, 5.1.3, 5.16.4, 6.2.7.1.4, and 6.3.6 regarding assumptions to be detailed in the documentation.

7. CONSTRUCTION AND SYSTEM START-UP

7.1 Construction Phase

7.1.1 Application. The requirements of this section apply to ventilation systems and the spaces they serve in new buildings and additions to or alterations in existing buildings.

7.1.2 Filters. Systems designed with particle filters shall not be operated without filters in place.

7.1.3 Protection of Materials. When recommended by the manufacturer, building materials shall be protected from rain and other sources of moisture by appropriate in-transit and on-site procedures. Porous materials with visible microbial