# Outdoor air ventilation in mid-rise buildings

MEQc4 | Possible 3 points

## Intent

Reduce occupant exposure to indoor pollutants by ventilating with outdoor air.

## Requirements

**Prerequisites**

4.1 **Basic outdoor air ventilation for mid-rise.** Meet all of the following requirements:

a. Design and install a whole-unit ventilation system for each individual dwelling unit that complies with the requirements of ASHRAE Standard 62.2-2007 (with errata but without addenda). Major components of the standard are summarized below.
   a. Outdoor air must be provided to each unit directly from the outdoors. Projects using exhaust ventilation systems must specify how outside air is delivered at the flow rate required by ASHRAE 62.2-2007. Systems that rely on transfer air from pressurized hallways or corridors, adjacent dwelling units, attics, etc. are prohibited.
   b. For continuous ventilation systems, meet the requirements of ASHRAE 62.2-2007, which is summarized in Table 16-1 or Equation 16-1 below. Continuous in unit ventilation fans must be rated for sound at a maximum of 1.0 sone per ASHRAE 62.2 Section 7.2.1.
   c. For intermittent ventilation systems, install fans to meet ASHRAE Standard 62.2. The requirement states that the fan flow rate is equal to the outdoor air flow requirements provided in Table 16-1 or Equation 16-1 below multiplied by the fan flow rate multiplier shown in Table 16-2. The system must be designed so that it can operate automatically based on a timer. Fans must be rated for sound at a maximum of 1.0 sone.
   d. As applicable, follow the restrictions on system types for Hot, Humid Climates and Very Cold Climates. In hot, humid climates, whole-house mechanical net exhaust flow shall not exceed 7.5 cfm per 100ft2of conditioned floor area. Mechanical supply-only systems exceeding 7.5 cfm per 100ft2 shall not be used in very cold climates. See ASHRAE 62.2 Section 4.5 and Section 8 for more details and a list of applicable climates.
   e. Air inlets that are part of the ventilation design shall be located a minimum of 10 feet from known sources of contamination such as a stack, vent, exhaust hood, or vehicle exhaust. The intake shall be placed so that entering air is not obstructed by snow, plantings, or other material. Forced air inlets shall be provided with rodent/insect screens (mesh not larger than ½ inch). See ASHRAE 62.2 Section 6.8 for more details and a list of exceptions.

b. Meet the minimum requirements of Sections 4 through 7 of ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda) for all spaces outside the dwelling units, and:
   a. Mechanically Ventilated Spaces must be designed using the ventilation rate procedure or the applicable local code, whichever is more stringent.
   b. Naturally Ventilated Spaces must comply with ASHRAE Standard 62.1-2007, Paragraph 5.1 (with errata but without addenda[1]).

**Credits**

4.2 **Enhanced outdoor air ventilation for mid-rise** (2 points). Install a system that provides heat transfer between the incoming outdoor air stream and the exhaust air stream, such as a heat-recovery ventilator (HRV) or energy-recovery ventilator (ERV). The heat recovery system must be listed by a certified testing lab (e.g., UL, ETL).

4.3 **Third-party performance testing for mid-rise** (1 point). Have a third-party test the flow rate of ventilation to each unit and verify that the ventilation requirements in EQ 4.1 are met.

**Table 16-1. Minimum air flow requirements for continuous ventilation systems, in cfm.**

The table below is used to estimate continuous outdoor air flow requiremnt, in cfm, for EQ 4.1a.

| Conditioned Floor Area ($ft^2$) | Bedrooms | | | | |
|---|---|---|---|---|---|
| | 0, 1 | 2 | 3 | 4 | 5 |
| ≤ 500 | 20 cfm | 27.5 cfm | 35 cfm | 42.5 cfm | 50 cfm |
| 501 – 1,000 | 25 | 32.5 | 40 | 47.5 | 55 |
| 1,001 – 1,500 | 30 | 37.5 | 45 | 52.5 | 60 |
| 1,501 – 2,000 | 35 | 42.5 | 50 | 57.5 | 65 |
| 2,001– 2,500 | 40 | 47.4 | 55 | 62.5 | 70 |
| 2,501 – 3,000 | 45 | 52.5 | 60 | 67.5 | 75 |

Credit: ASHRAE 62.2-2007 ©American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc.

**Equation 16-1**

$Q_{fan} = 0.01\ A_{floor} + 7.5\ (N_{br} + 1)$

*Where :*
$Q_{fan}$ = fan flow rate, cfm
$A_{floor}$ = floor area, $ft^2$
$N_{br}$ = number of bedrooms ; not to be less than one

**Table 16-2. Fan flow rate multiplier for intermittent ventilation systems.**

This multiplier is used to determine how to size the intermittent fan in order to meet the ventilation requirements for EQ 4.1a.

| Fractional On-time | If the system operates at least once every 3 hours | If the system does not operate at least once every 3 hours |
|---|---|---|
| 10% | 10.0 | 30.3 |
| 20% | 5.0 | 15.2 |

| | | |
|---|---|---|
| 30% | 3.3 | 10.1 |
| 40% | 2.5 | 5.0 |
| 50% | 2.0 | 4.0 |
| 60% | 1.7 | 2.2 |
| 70% | 1.4 | 1.9 |
| 80% | 1.3 | 1.3 |
| 90% | 1.1 | 1.1 |