

INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ PREREQUISITE: MINIMUM INDOOR AIR QUALITY PERFORMANCE Required

BD&C

This prerequisite applies to

- New Construction
- Core & Shell
- Schools
- Retail
- Data Centers
- Warehouses & Distribution Centers
- Hospitality
- Healthcare

Intent

To contribute to the comfort and well-being of building occupants by establishing minimum standards for indoor air quality (IAQ).

Requirements

NC, CS, SCHOOLS, RETAIL, DATA CENTERS, WAREHOUSES & DISTRIBUTION CENTERS, HOSPITALITY

Meet the requirements for both ventilation and monitoring.

Ventilation

Mechanically Ventilated Spaces

Option 1. ASHRAE Standard 62.1–2010

For mechanically ventilated spaces (and for mixed-mode systems when the mechanical ventilation is activated), determine the minimum outdoor air intake flow for mechanical ventilation systems using the ventilation rate procedure from ASHRAE 62.1–2010 or a local equivalent, whichever is more stringent.

Meet the minimum requirements of ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or a local equivalent, whichever is more stringent.

Option 2. CEN Standards EN 15251–2007 and EN 13779–2007

Projects outside the U.S. may instead meet the minimum outdoor air requirements of Annex B of Comité Européen de Normalisation (CEN) Standard EN 15251–2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics; and meet the requirements of CEN Standard EN 13779–2007, Ventilation for nonresidential buildings, Performance requirements for ventilation and room conditioning systems, excluding Section 7.3, Thermal environment; 7.6, Acoustic environment; A.16; and A.17.

Naturally Ventilated Spaces

For naturally ventilated spaces (and for mixed-mode systems when the mechanical ventilation is inactivated), determine the minimum outdoor air opening and space configuration requirements using the natural ventilation procedure from ASHRAE Standard 62.1–2010 or a local equivalent, whichever is more stringent. Confirm that natural ventilation is an effective strategy for the project by following the flow

diagram in the Chartered Institution of Building Services Engineers (CIBSE) Applications Manual AM10, March 2005, Natural Ventilation in Nondomestic Buildings, Figure 2.8, and meet the requirements of ASHRAE Standard 62.1–2010, Section 4, or a local equivalent, whichever is more stringent.

All Spaces

The indoor air quality procedure defined in ASHRAE Standard 62.1–2010 may not be used to comply with this prerequisite.

Monitoring

Mechanically Ventilated Spaces

For mechanically ventilated spaces (and for mixed-mode systems when the mechanical ventilation is activated), monitor outdoor air intake flow as follows:

- For variable air volume systems, provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor air intake flow. This device must measure the minimum outdoor air intake flow with an accuracy of $\pm 10\%$ of the design minimum outdoor airflow rate, as defined by the ventilation requirements above. An alarm must indicate when the outdoor airflow value varies by 15% or more from the outdoor airflow setpoint.
- For constant-volume systems, balance outdoor airflow to the design minimum outdoor airflow rate defined by ASHRAE Standard 62.1–2010 (with errata), or higher. Install a current transducer on the supply fan, an airflow switch, or similar monitoring device.

Naturally Ventilated Spaces

For naturally ventilated spaces (and for mixed-mode systems when the mechanical ventilation is inactivated), comply with at least one of the following strategies.

- Provide a direct exhaust airflow measurement device capable of measuring the exhaust airflow. This device must measure the exhaust airflow with an accuracy of $\pm 10\%$ of the design minimum exhaust airflow rate. An alarm must indicate when airflow values vary by 15% or more from the exhaust airflow setpoint.
- Provide automatic indication devices on all natural ventilation openings intended to meet the minimum opening requirements. An alarm must indicate when any one of the openings is closed during occupied hours.
- Monitor carbon dioxide (CO₂) concentrations within each thermal zone. CO₂ monitors must be between 3 and 6 feet (900 and 1 800 millimeters) above the floor and within the thermal zone. CO₂ monitors must have an audible or visual indicator or alert the building automation system if the sensed CO₂ concentration exceeds the setpoint by more than 10%. Calculate appropriate CO₂ setpoints using the methods in ASHRAE 62.1–2010, Appendix C.

CS only

Mechanical ventilation systems installed during core and shell construction must be capable of meeting projected ventilation levels and monitoring based on the requirements of anticipated future tenants.

Residential only

In addition to the requirements above, if the project building contains residential units, each dwelling unit must meet all of the following requirements.

- Unvented combustion appliances (e.g., decorative logs) are not allowed.
- Carbon monoxide monitors must be installed on each floor of each unit.
- All indoor fireplaces and woodstoves must have solid glass enclosures or doors that seal when closed.
- Any indoor fireplaces and woodstoves that are not closed combustion or power-vented must pass a backdraft potential test to ensure that depressurization of the combustion appliance zone is less than 5 Pa.

- Space- and water-heating equipment that involves combustion must be designed and installed with closed combustion (i.e., sealed supply air and exhaust ducting) or with power-vented exhaust, or located in a detached utility building or open-air facility.
- For projects in high-risk areas for radon, EPA Radon Zone 1 (or local equivalent for projects outside the U.S.), design and construct any dwelling unit on levels one through four above grade with radon-resistant construction techniques. Follow the techniques prescribed in EPA Building Radon Out; NFPA 5000, Chapter 49; International Residential Code, Appendix F; CABO, Appendix F; ASTM E1465; or a local equivalent, whichever is most stringent.

HEALTHCARE

Meet the following requirements for both ventilation and monitoring.

Ventilation

Mechanically Ventilated Spaces

For mechanically ventilated spaces (and for mixed-mode systems when the mechanical ventilation is activated), determine the minimum outdoor air intake flow for mechanical ventilations systems using the ventilation rates in ASHRAE Standard 170–2008, Section 7; the requirements of the 2010 FGI Guidelines for Design and Construction of Health Care Facilities (Table 2.1–2); or a local equivalent, whichever is most stringent. For any area not covered in 170 or the FGI guidelines, follow ASHRAE 62.1 or a local equivalent, whichever is more stringent and meet the minimum requirements of ASHRAE Standard 170–2008, Sections 6–8, Ventilation of Health Care Facilities (with errata) or a USGBC-approved equivalent standard for projects outside the U.S.

Naturally Ventilated Spaces

For naturally ventilated spaces (and for mixed-mode systems when the mechanical ventilation is inactivated), determine the minimum outdoor air opening and space configuration requirements using the natural ventilation procedure of ASHRAE Standard 62.1–2010 (with errata) or a local equivalent, whichever is more stringent. Confirm that natural ventilation is an effective strategy for the project by following the flow diagram in Figure 2.8 of the Chartered Institution of Building Services Engineers (CIBSE) Applications Manual AM10, March 2005, Natural Ventilation in Nondomestic Buildings.

Monitoring

Mechanically Ventilated Spaces

For mechanically ventilated spaces (and for mixed-mode systems when the mechanical ventilation is activated), provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor air intake flow. This device must measure the minimum outdoor air intake flow with an accuracy of +/-10% of the design minimum outdoor airflow rate defined by the ventilation requirements above. An alarm must alert staff whenever the outdoor airflow value varies by 15% or more from the outdoor airflow setpoint.

Naturally Ventilated Spaces

For naturally ventilated spaces (and for mixed-mode systems when the mechanical ventilation is inactivated), comply with at least one of the following strategies.

- Provide a direct exhaust airflow measurement device capable of measuring the exhaust airflow with an accuracy of +/-10% of the design minimum exhaust airflow rate. An alarm must indicate when airflow values vary by 15% or more from the exhaust airflow setpoint.
- Provide automatic indication devices on all natural ventilation openings intended to meet the minimum opening requirements. An alarm must indicate when any one of the openings is closed during occupied hours.
- Monitor carbon dioxide (CO₂) concentrations within each thermal zone. CO₂ monitors must be between 3 and 6 feet (900 and 1 800 millimeters) above the floor and within the thermal zone. CO₂ monitors must have an audible or visual indicator or alert the building automation system if

the sensed CO₂ concentration exceeds the setpoint by more than 10%. Calculate appropriate CO₂ setpoints by using the methods in ASHRAE 62.1–2010, Appendix C.