



Shaping Tomorrow's
Built Environment Today

INDOOR AIR QUALITY

THE ISSUE

Indoor air quality (IAQ) refers to the types and concentrations of airborne contaminants found in buildings. Indoor air is a dominant pathway for exposure to airborne contaminants given that people spend the majority of their time indoors and indoor air commonly contains numerous contaminants originating from both indoor and outdoor sources. Many of the contaminants impact health, comfort, well-being, learning, sleep, and work performance.

For these reasons, it is important that IAQ is considered in the design, construction and operation of buildings and HVAC systems. Cost-benefit analyses have estimated that the health and economic benefits of improved IAQ are far greater than the costs of implementing these improvements. There are three widely accepted approaches to improving IAQ – Source Control, Ventilation, and Air Cleaning. Many strategies exist within these approaches that can help achieve good IAQ with lower energy impacts while still maintaining thermal comfort.

ASHRAE's ROLE

IAQ has long been a critical issue for ASHRAE and its members because of the connection to ventilation and other HVAC systems in buildings. ASHRAE provides technical resources, coordinates and funds research, organizes conferences, and educates practitioners about IAQ.

ASHRAE has developed and continues to support standards, guidelines, and other resources related to improving IAQ. For example, ASHRAE promulgates the following standards and guides that specifically address IAQ:

- **ANSI/ASHRAE Standard 62.1, Ventilation for Acceptable Indoor Air Quality.** This Standard establishes ventilation and other IAQ related requirements for buildings other than residential and health care. Its outdoor air ventilation rate requirements have been adopted into the International Mechanical Code and Uniform Mechanical Code, the two most common model building codes in the US. The standard is also referenced by most green commercial building programs including LEED.
- **ANSI/ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings.** This Standard covers residential buildings. Ventilation requirements from this standard have been adopted into codes, including California's Title 24, and into LEED for Homes and the U.S. Environmental Protection Agency's (EPA) Indoor airPlus program.
- **ANSI/ASHRAE/ASHE Standard 170, Ventilation of Health Care Facilities.** Standard 170 brought together several documents used throughout North America into a single standard. It is now widely used in building codes for ventilation requirements in hospitals and other health care facilities.
- **ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1, Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings.** Developed in



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- conjunction with USBGC, the International Code Council and Illuminating Engineering Society (IES), this standard provides IAQ requirements beyond those in Standard 62.1.
- **ASHRAE Indoor Air Quality Guide** – *Best Practices for Design, Construction, and Commissioning* and *ASHRAE Residential Indoor Air Quality Guide: Best Practices for Acquisition, Design, Construction, Maintenance and Operation*. These Guides present best practices for design, construction, commissioning, operation and maintenance that have proven successful in building projects to achieve good IAQ.
 - **2017 ASHRAE Handbook Fundamentals** – covers basic principles and data used in the HVAC&R industry including indoor air quality. The ASHRAE Technical Committees that prepare these chapters provide new information, clarify existing content, delete obsolete materials, and reorganize chapters to make the Handbook more understandable and easier to use.
 - **Damp Buildings, Human Health, and HVAC Design** – This report provides a summary of what is understood about dampness-related health risks in buildings as well as suggestions for HVAC system designers that can help avoid such risks.

ASHRAE's VIEW

ASHRAE's view is that achieving and maintaining good IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including efforts to improve building energy efficiency, sustainability and resiliency. ASHRAE's IAQ standards should be adopted by building codes and regulations to enhance building purpose and improve occupant health, productivity and well-being.

ASHRAE recommends fundamental and applied IAQ research and standards development in the following areas:

- The relationship of ventilation rates and contaminant concentrations to occupant health, comfort, well-being, learning outcomes and work performance.
- Approaches to improving IAQ beyond dilution ventilation, e.g., air cleaning and source control.
- Development of tools to allow economic valuation of IAQ benefits for individual buildings and groups of buildings.
- Development of monitoring and HVAC equipment to automatically control IAQ by measurement of contaminants.
- Development of diagnostics for commissioning and maintenance of ventilation and related IAQ systems.
- The role of IAQ in building sustainability and resilience.
- Development of IAQ control systems and solutions that contribute to other building goals including reducing energy use and greenhouse gas emissions and supporting grid integration.
- Research on new contaminants of concern and development of technologies and approaches to address them.