Shaping Tomorrow's Global Built Environment Today

INDOOR AIR QUALITY

THE ISSUE

The average adult breathes about 2,000 gallons (7,570 liters) of air each day, and most people spend around 90% of their time within buildings, stressing the importance of indoor air quality (IAQ). Indoor air is a significant exposure route for airborne particles and gases with impacts including eye and respiratory irritation, as well as the inhalation of infectious pathogens, poisonous compounds, and carcinogens. These contaminants can affect health, comfort, well-being, learning, sleep, and performance, which in turn have significant economic impacts.

The direct connection between health and wellness encourages building designers and operators to prioritize IAQ in buildings. Cost-benefit analyses have estimated health and economic benefits of improved IAQ to be far greater than the costs of implementing strategies to improve IAQ. There are three widely accepted approaches to improve IAQ: source control, ventilation, and air cleaning. Many strategies exist to simultaneously facilitate improved IAQ, lower energy use, and improve occupant satisfaction.

ASHRAE's ROLE

The critical connection between IAQ and building HVAC systems has made IAQ a fundamental issue for ASHRAE and its members for more than 50 years. ASHRAE provides technical resources, coordinates and funds research, organizes conferences, and educates practitioners about IAQ.

ASHRAE developed and continues to refine standards, guidelines, and other resources related to efficiently improving IAQ, such as:

- **Standard 62.1-2025*, Ventilation and Acceptable Indoor Air Quality*** – This standard establishes ventilation and other IAQ requirements for buildings other than residential and health care. It is referenced by most green commercial building programs, and its outdoor ventilation rate requirements have been adopted into the International Mechanical Code and Uniform Mechanical code.
- **Standard 62.2-2025*, Ventilation and Acceptable Indoor Air Quality in Residential Buildings*** – Residential (multifamily to single family homes) ventilation requirements from this standard have been adopted into numerous building codes and the U.S. Environmental Protection Agency's (EPA) Indoor airPlus program.
- **Standard 161-2024, *Air Quality within Commercial Aircraft*** - This standard defines the requirements for air quality in air-carrier aircraft and specifies methods for measurement and testing.
- **Standard 170-2021*, Ventilation of Health Care Facilities*** – This standard is widely used in building codes for ventilation requirements in hospitals and other health care facilities.
- **Standard 189.1-2023*, Standard for the Design of High- Performance Green Buildings Except Low-Rise Residential Buildings*** – This standard was developed in conjunction with the U.S. Green Building Council, the International Code Council, and the Illuminating Engineering Society. It includes IAQ requirements beyond those in Standard 62.1.
- **Standard 241-2023*, Control of Infectious Aerosols*** – This standard defines the amount of

equivalent clean airflow necessary to substantially reduce the risk of disease transmission during infection risk management mode. It also sets requirements for air cleaner testing and for assessment, planning, and implementation of infectious aerosol controls.

- **Guideline 42-2023, *Enhanced Indoor Air Quality in Commercial and Institutional Buildings*** – This guideline recommends measures that exceed the minimum requirements in Standard 62.1 to provide enhanced indoor air quality.
- **Guideline 44-2024, *Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events*** – This guideline recommends building measures to minimize occupant health impacts caused by smoke from wildfire and prescribed burn events.
- **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 that have proven successful in building projects to achieve good IAQ.
- **ASHRAE Report: *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 the provision of acceptable IAQ is an essential building service. Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.

Therefore, ASHRAE recommends that:

- Achieving and maintaining good IAQ should be included in all decisions (including policy decisions) that affect the design and operation of buildings and HVAC systems, including efforts to improve building energy efficiency, sustainability, resiliency, and the management of infectious diseases. In particular, operating and maintaining building systems according to the relevant ASHRAE standards should be required to ensure that the building continues to achieve good IAQ over its lifetime.
- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation should be included in education programs for all built environment stakeholders– from developers, owners, and operators to designers, technicians, and consultants.
- The latest versions of ASHRAE's IAQ standards should be adopted by building codes and regulations when they are updated every three years.
- Policymakers should also consider the impacts of extreme heat on IAQ, and as the frequency of extreme heat events continues to increase, jurisdictions should establish indoor temperature requirements consistent with ASHRAE Standard 55, *Thermal Environmental Conditions for Human Occupancy*
- Research and standards development should be supported by the government, including consideration for a national model standard, improvement of indoor contaminant monitoring and measurement technologies, approaches to improving IAQ beyond ventilation and filtration (e.g., air cleaning), development of tools to assess the economic valuation of IAQ benefits, and improved understanding of new contaminants of concern and techniques for removing them.